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# SECTION STR

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## STARTING SYSTEM

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# PRECAUTIONS

< PRECAUTION >

## PRECAUTION

### PRECAUTIONS

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

INFOID:000000005530130

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 Variable Voltage Control System

INFOID:000000005276047

#### **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.

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# PREPARATION

< PREPARATION >


## PREPARATION

### PREPARATION

#### Special Service Tool

INFOID:000000005276048

Tool number (Kent Moore No.) Tool name	Description
— (—) Model GR-8 Multitasking Battery Diagnostic Station	Tests Batteries, starting and charging system. For operating instructions, refer to diagnostic station instruction manual.

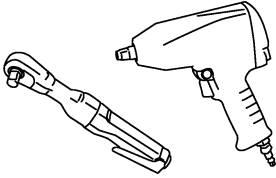


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#### Commercial Service Tool

INFOID:000000005276049

Tool name	Description
Power tool	Loosening bolts and nuts



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# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORKFLOW

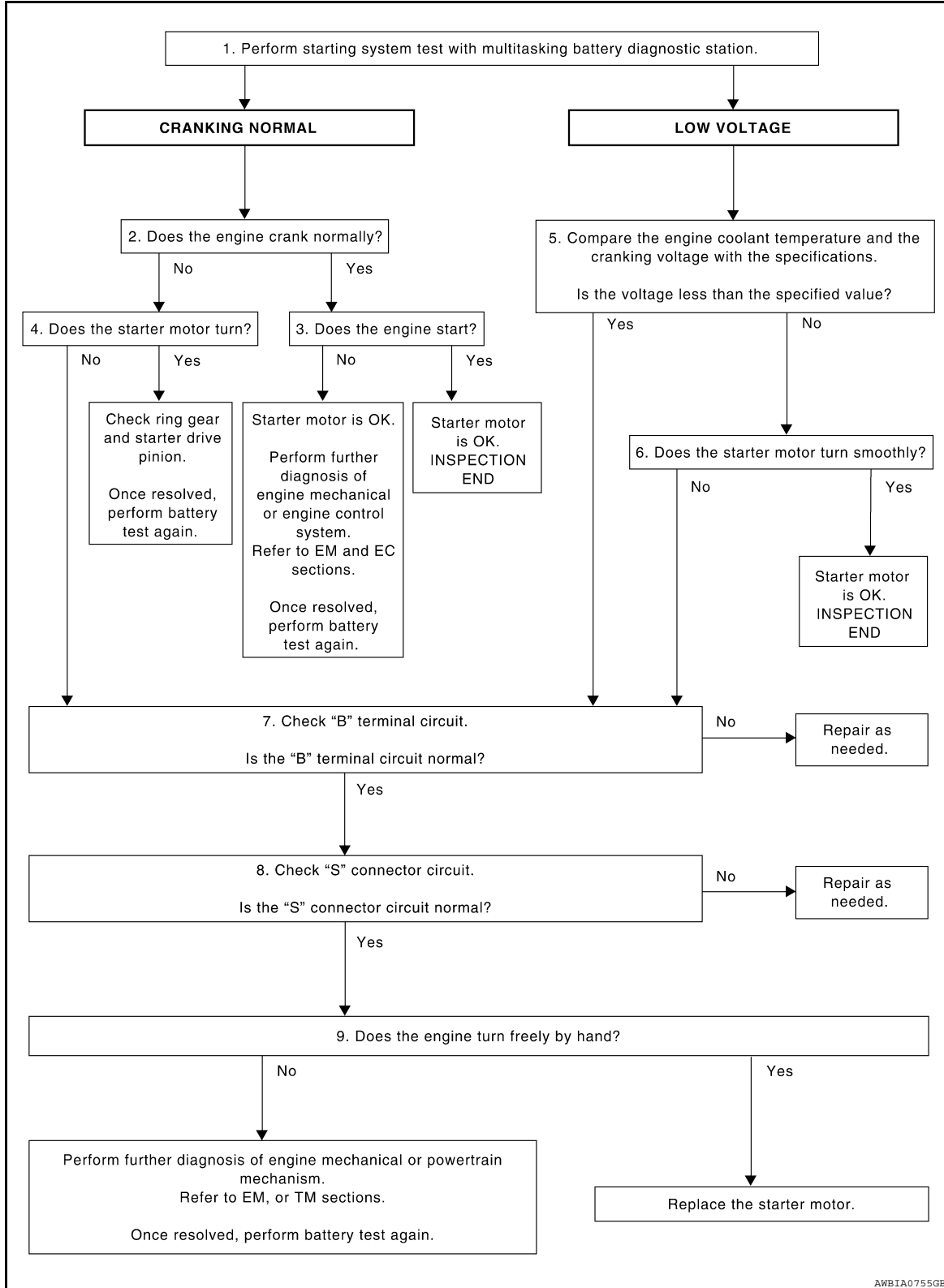
Work Flow

INFOID:000000005276050

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#### OVERALL SEQUENCE



#### DETAILED FLOW

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# DIAGNOSIS AND REPAIR WORKFLOW

## < BASIC INSPECTION >

### 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-13, "Diagnosis Procedure"](#).

### Is "B" terminal circuit normal?

# DIAGNOSIS AND REPAIR WORKFLOW

## < BASIC INSPECTION >

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

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## 8. "S" CONNECTOR CIRCUIT INSPECTION

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Check "S" connector circuit. Refer to [STR-15. "QR25DE : Diagnosis Procedure"](#) (QR25DE) or [STR-16. "VQ40DE : Diagnosis Procedure"](#) (VQ40DE).

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Is "S" connector circuit normal?

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

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## 9. ENGINE ROTATION STATUS

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Check that the engine can be rotated by hand.

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Does the engine turn freely by hand?

- YES >> Replace starter motor. Refer to [STR-33. "Removal and Installation \(QR25DE\)"](#) or [STR-34. "Removal and Installation \(VQ40DE\)"](#).
- NO >> Perform further diagnosis of engine mechanical or powertrain mechanism. Refer to EM or TM sections. Once resolved, perform battery test again. Refer to diagnostic station instruction manual.

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# STARTING SYSTEM

< FUNCTION DIAGNOSIS >

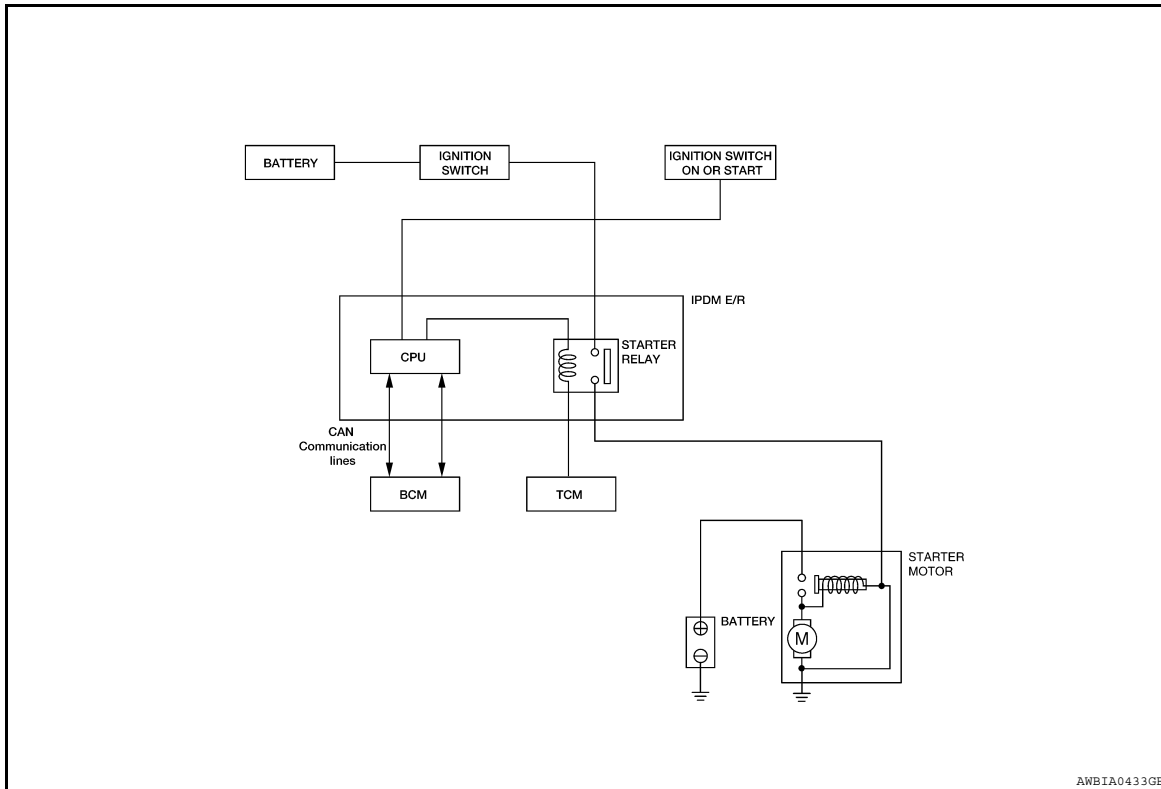
## FUNCTION DIAGNOSIS

### STARTING SYSTEM

A/T

A/T : System Diagram

INFOID:000000005276051



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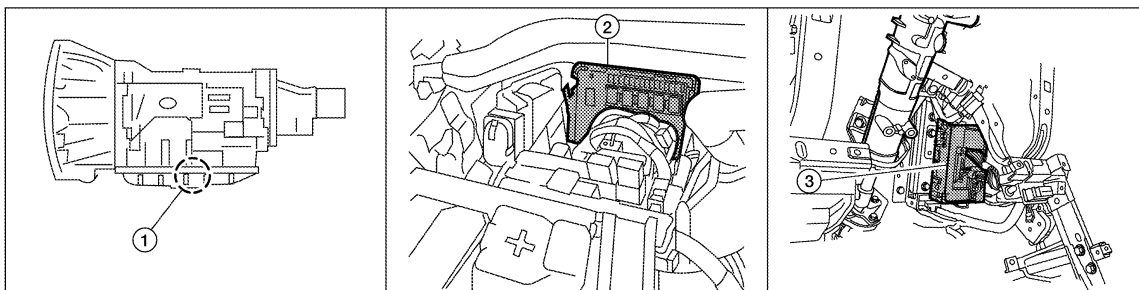
A/T : System Description

INFOID:000000005276052

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:000000005276053



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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

< FUNCTION DIAGNOSIS >

A/T : Component Description

INFOID:000000005276054

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.

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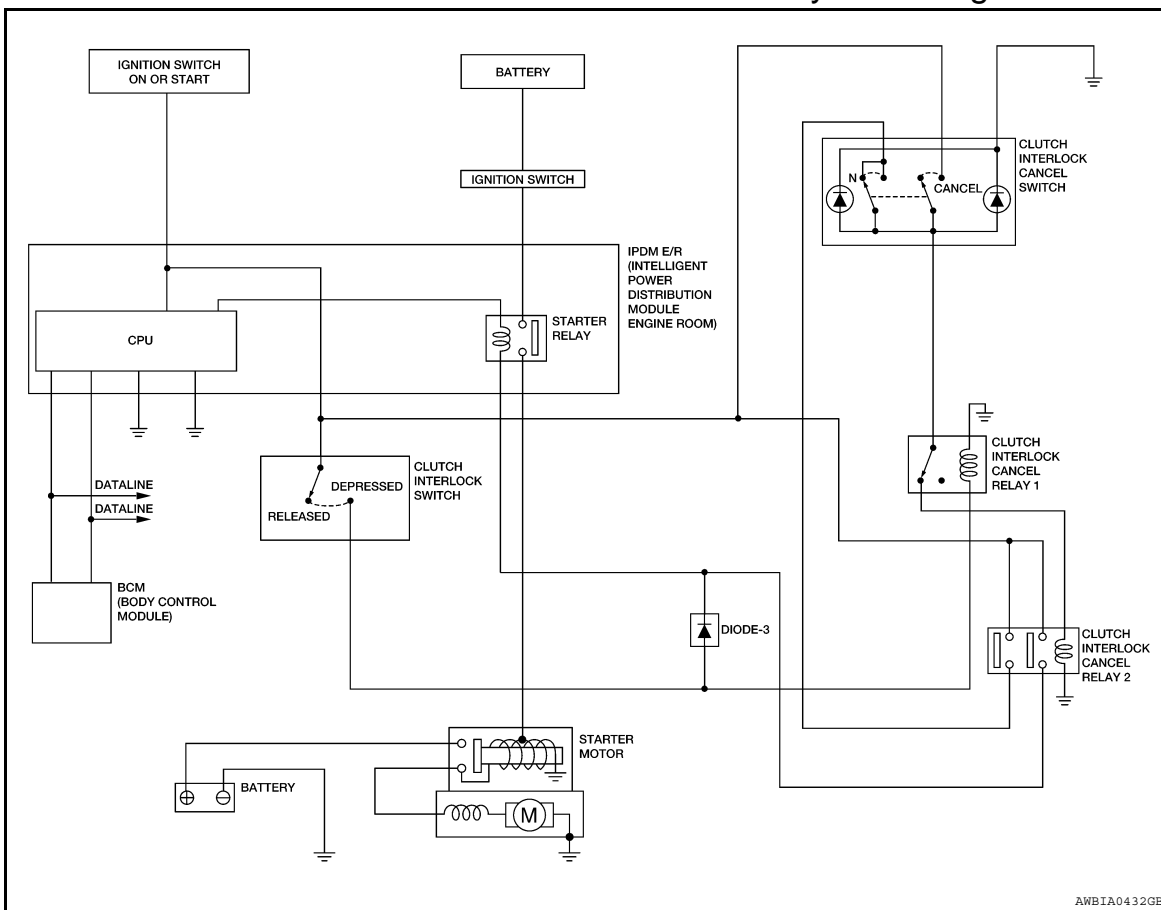
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## M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM

### M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM : System Diagram

INFOID:000000005276055



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### M/T WITH CLUTCH INTERLOCK CANCEL SYSTEM : System Description

INFOID:000000005276056

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

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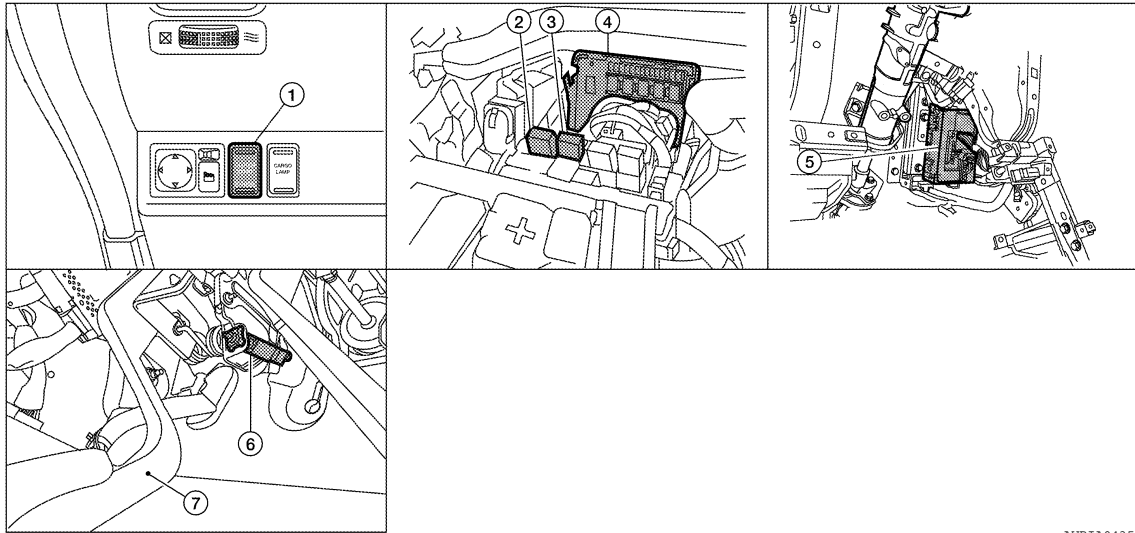
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# STARTING SYSTEM

< FUNCTION DIAGNOSIS >

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

INFOID:000000005276057



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1. Clutch interlock cancel switch M163
2. Clutch interlock cancel relay 2 E166
3. Clutch interlock cancel relay 1 E171
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:000000005276058

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.

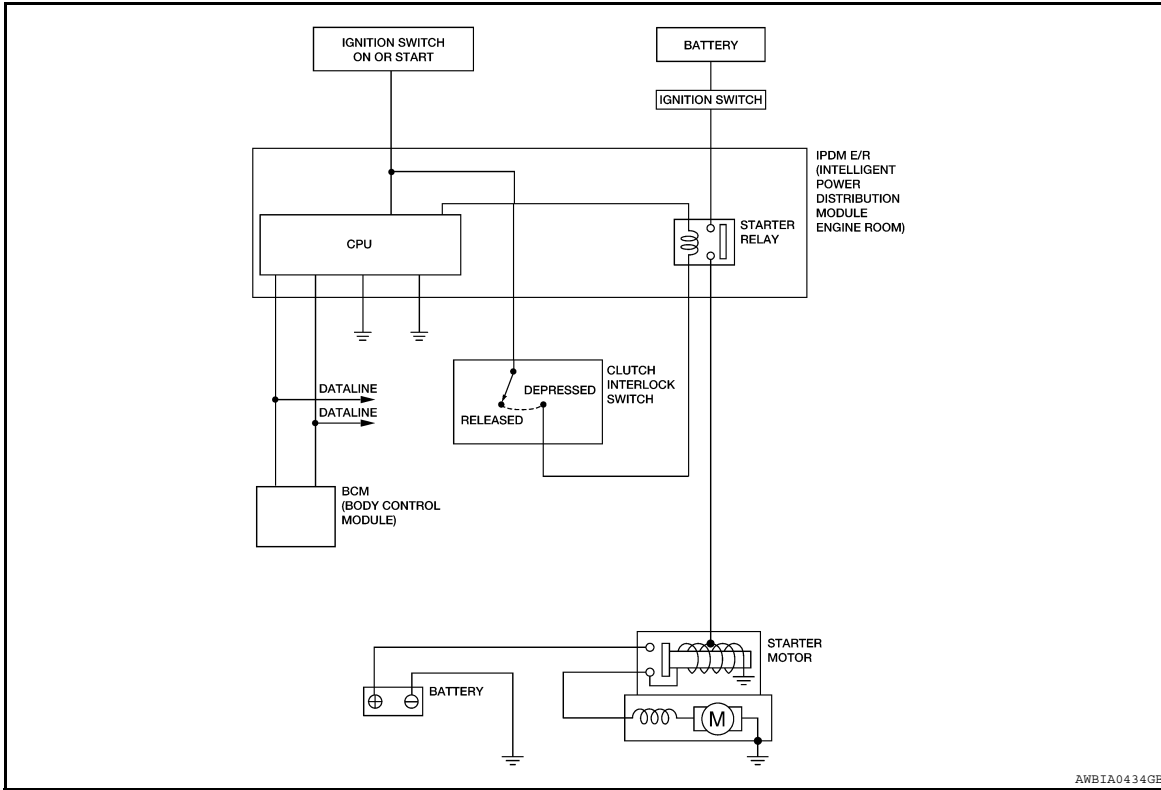
## M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM

# STARTING SYSTEM

< FUNCTION DIAGNOSIS >

## M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM : System Diagram

INFOID:000000005276059



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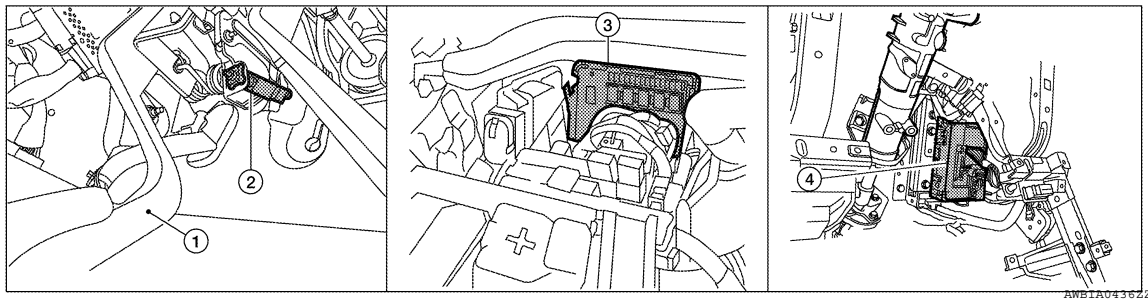
## M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM : System Description

INFOID:000000005276060

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:000000005276061



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)

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# STARTING SYSTEM

< FUNCTION DIAGNOSIS >

## M/T WITHOUT CLUTCH INTERLOCK CANCEL SYSTEM : Component Description

INFOID:000000005276062

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.

# B TERMINAL CIRCUIT

< COMPONENT DIAGNOSIS >

## COMPONENT DIAGNOSIS

### B TERMINAL CIRCUIT

#### Description

INFOID:000000005276063

Terminal "2" (B) is constantly supplied with battery power.

#### Diagnosis Procedure

INFOID:000000005276064

Regarding Wiring Diagram information, refer to [STR-18, "Wiring Diagram - VQ40DE - With Clutch Interlock Cancel Switch"](#), [STR-24, "Wiring Diagram - VQ40DE - Without Clutch Interlock Cancel Switch"](#) or [STR-28, "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 depleted.

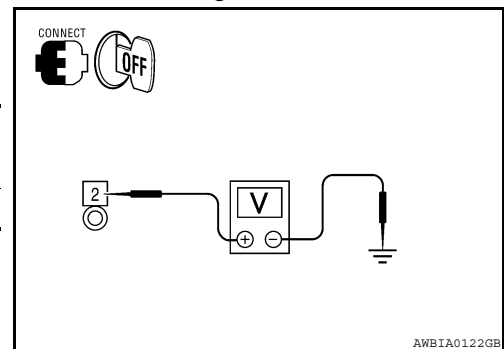
#### 1. CHECK TERMINAL 2 POWER SUPPLY VOLTAGE

1. Turn ignition switch OFF.
2. Make sure that starter motor connector E210 terminal 2 connection is clean and tight.
3. Check voltage between starter motor connector E210 terminal 2 and ground.

(+)		(-)	Voltage
Connector	Terminal		
E210	2	Ground	Battery voltage

Is there battery voltage present?

- YES >> GO TO 2  
 NO >> Check harness between battery and starter motor for open circuit.



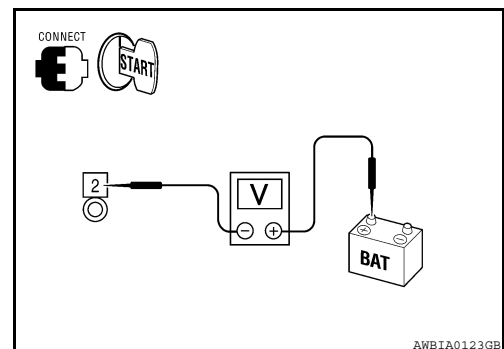
#### 2. CHECK BATTERY CABLE (VOLTAGE DROP TEST)

1. Shift the transmission into park or neutral.
2. Check voltage between battery positive terminal and starter motor connector E210 terminal 2 while cranking the engine.

(-)		(+)	Condition	Voltage
Connector	Terminal			
E210	2	Battery (+) terminal	While cranking the engine	Less than 0.2V

Is the voltage drop less than 0.2V?

- 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)

## B TERMINAL CIRCUIT

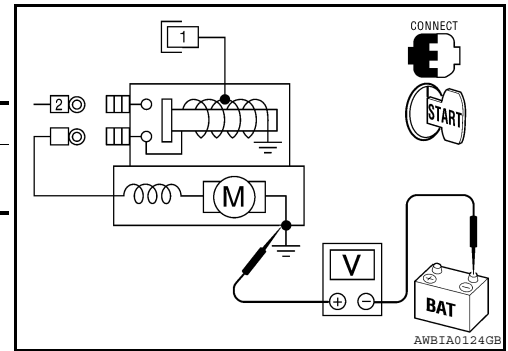
### < COMPONENT DIAGNOSIS >

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

(+)	(-)	Condition	Voltage
Starter motor case	Battery (-) terminal	While cranking the engine	Less than 0.2V

Is the voltage drop less than 0.2V?

- YES >> Terminal 2 circuit is OK. Further inspection necessary. Refer to [STR-5. "Work Flow"](#).
- NO >> Check the starter motor case to engine mounting for high resistance.



# S CONNECTOR CIRCUIT

< COMPONENT DIAGNOSIS >

## S CONNECTOR CIRCUIT

QR25DE

### QR25DE : Description

INFOID:000000005276065

Terminal "1" (S) is the power supply for the starter motor magnetic switch. Terminal 1 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.

### QR25DE : Diagnosis Procedure

INFOID:000000005276066

Regarding Wiring Diagram information, refer to [STR-28, "Wiring Diagram - QR25DE"](#).

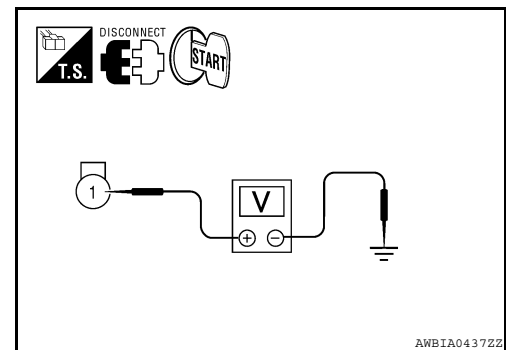
#### CAUTION:

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 STARTER MOTOR MAGNETIC SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect starter motor connector E211.
3. Shift transmission into park or neutral.
4. Check voltage between starter motor harness connector E211 terminal 1 and ground with the ignition in START.



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(+)		(-)	Condition	Voltage
Connector	Terminal			
E211	1	Ground	While cranking the engine	Battery voltage

Is battery voltage present?

YES >> Magnetic switch circuit is OK. Further inspection necessary. Refer to [STR-5, "Work Flow"](#).

NO >> GO TO 2

#### 2. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Check the IPDM E/R harness connector E120 and starter motor harness connector E211 for damage, bent pins and loose connections.

Is the inspection result normal?

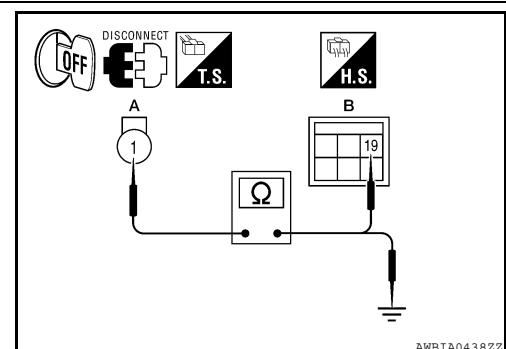
YES >> GO TO 3

NO >> Repair the terminal and connector.

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

1. Disconnect IPDM E/R connector E120 and starter motor connector E211.
2. Check continuity between starter motor harness connector E211 (A) terminal 1 and IPDM E/R harness connector E120 (B) terminal 19.

A		B		Continuity
Connector	Terminal	Connector	Terminal	
E211	1	E120	19	Yes



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3. Check continuity between starter motor harness connector E211 (A) terminal 1 and ground.

# S CONNECTOR CIRCUIT

## < COMPONENT DIAGNOSIS >

A		—	Continuity
Connector	Terminal		
E211	1	Ground	No

Are the continuity test results as specified?

- YES >> Further inspection necessary. Refer to [STR-5. "Work Flow"](#).  
 NO >> Repair the harness.

### VQ40DE

#### VQ40DE : Description

INFOID:000000005276067

Terminal "1" (S) is the power supply for the starter motor magnetic switch. Terminal 1 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.

#### VQ40DE : Diagnosis Procedure

INFOID:000000005276068

Regarding Wiring Diagram information, refer to [STR-18. "Wiring Diagram - VQ40DE - With Clutch Interlock Cancel Switch"](#) or [STR-24. "Wiring Diagram - VQ40DE - Without Clutch Interlock Cancel Switch"](#).

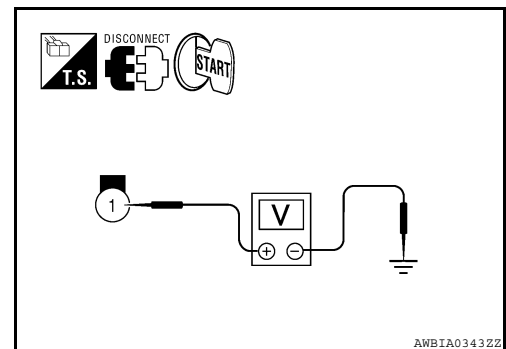
### CAUTION:

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 STARTER MOTOR MAGNETIC SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect starter motor connector E207.
3. Shift transmission into park or neutral.
4. Check voltage between starter motor harness connector E207 terminal 1 and ground with the ignition in START.



(+)		(-)	Condition	Voltage
Connector	Terminal			
E207	1	Ground	While cranking the engine	Battery voltage

Is battery voltage present?

- YES >> Magnetic switch circuit is OK. Further inspection necessary. Refer to [STR-5. "Work Flow"](#).  
 NO >> GO TO 2

### 2. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Check the IPDM E/R harness connector E120 and starter motor harness connector E207 for damage, bent pins and loose connections.

Is the inspection result normal?

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

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



# S CONNECTOR CIRCUIT

## < COMPONENT DIAGNOSIS >

1. Disconnect IPDM E/R connector E120 and starter motor connector E207.
2. Check continuity between starter motor harness connector E207 (A) terminal 1 and IPDM E/R harness connector E120 (B) terminal 19.

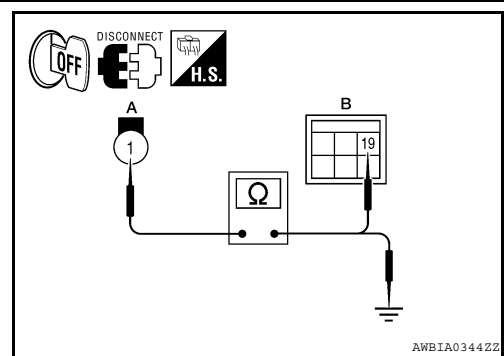
A		B		Continuity
Connector	Terminal	Connector	Terminal	
E207	1	E120	19	Yes

3. Check continuity between starter motor harness connector E207 (A) terminal 1 and ground.

A		—	Continuity
Connector	Terminal		
E207	1	Ground	No

Are the continuity test results as specified?

- YES >> Further inspection necessary. Refer to [STR-5. "Work Flow"](#).  
 NO >> Repair the harness.



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# STARTING SYSTEM

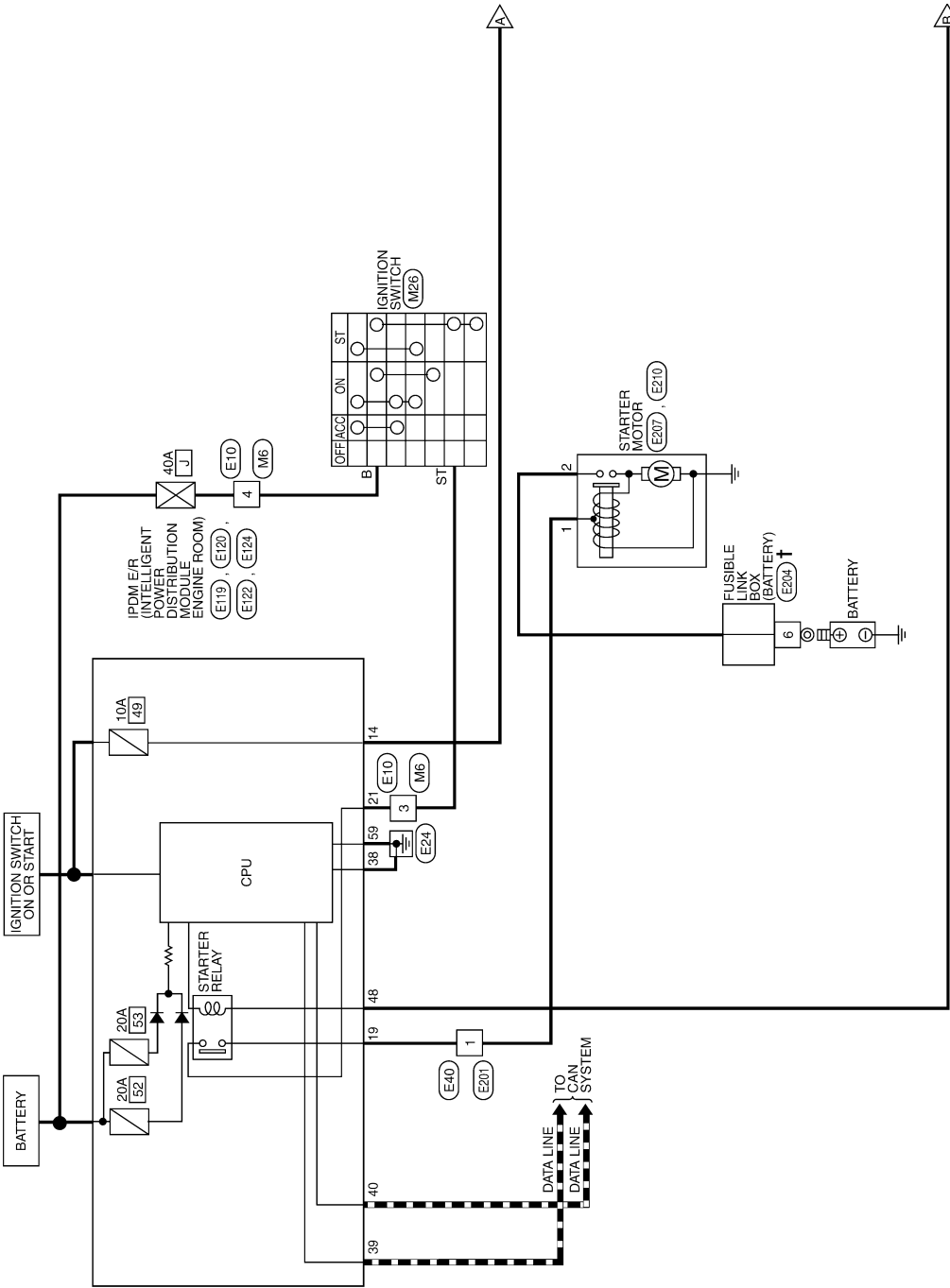
< COMPONENT DIAGNOSIS >

## STARTING SYSTEM

Wiring Diagram - VQ40DE - With Clutch Interlock Cancel Switch

INFOID:000000005276069

### STARTING SYSTEM - VQ40DE WITH CLUTCH INTERLOCK CANCEL SYSTEM

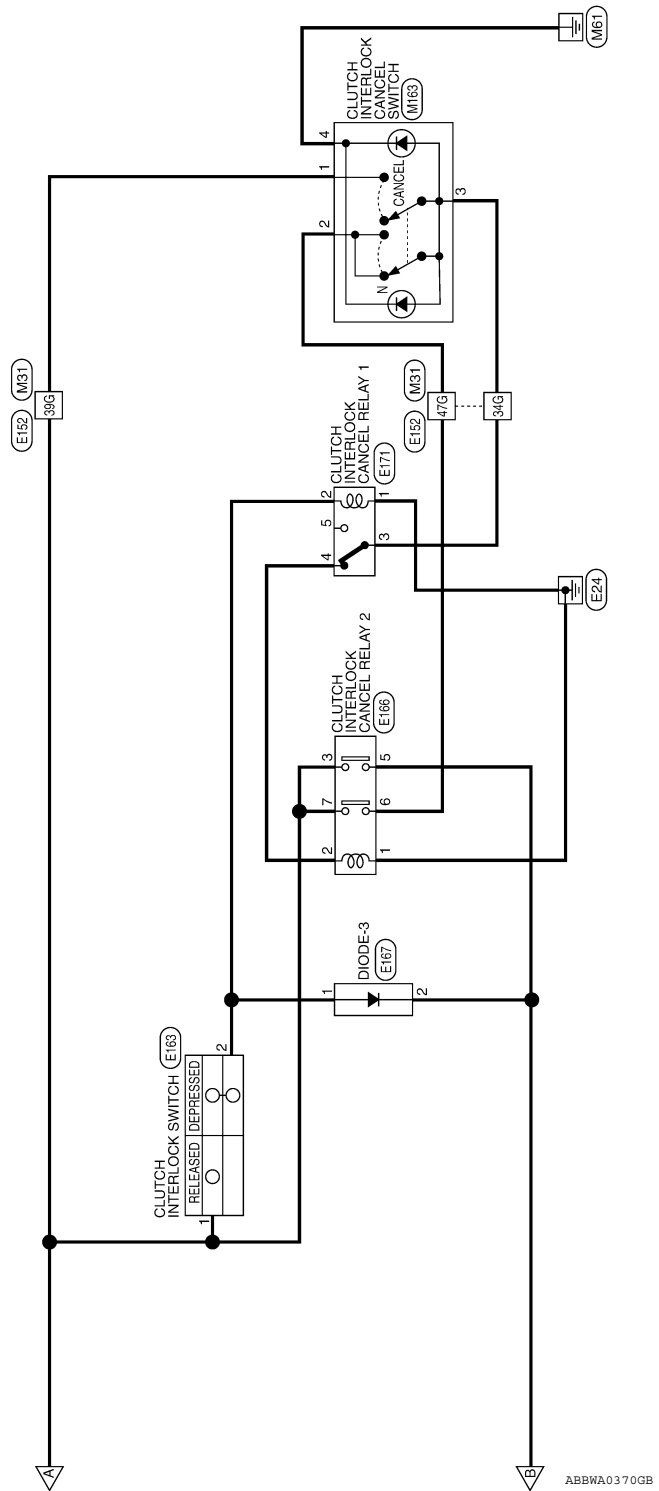


\* :THIS CONNECTOR IS NOT SHOWN IN "HARNES LAYOUT" OF PG SECTION.  
 † :THIS CONNECTOR IS AN INTEGRAL PART OF THE FUSIBLE LINK BOX (BATTERY).

ABBWA0369GB

# STARTING SYSTEM

< COMPONENT DIAGNOSIS >



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## STARTING SYSTEM CONNECTORS - VQ40DE WITH CLUTCH INTERLOCK CANCEL SYSTEM

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



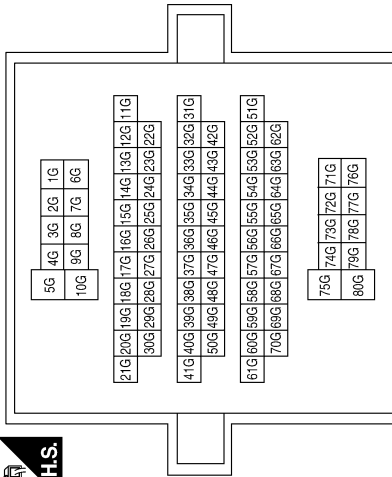
Connector No.	M26
Connector Name	IGNITION SWITCH
Connector Color	WHITE



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

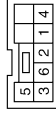
Terminal No.	Color of Wire	Signal Name
B	G	-
ST	GR	-

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



Terminal No.	Color of Wire	Signal Name
34G	O	-
39G	W/G	-
47G	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	O	-
4	B	-

# STARTING SYSTEM

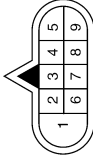
## < COMPONENT DIAGNOSIS >

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



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

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



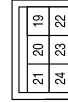
Terminal No.	Color of Wire	Signal Name
1	W	-

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



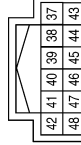
Terminal No.	Color of Wire	Signal Name
14	W/G	A/T ECU IGN SUPPLY

Connector No.	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)

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	INHIBIT SW

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)

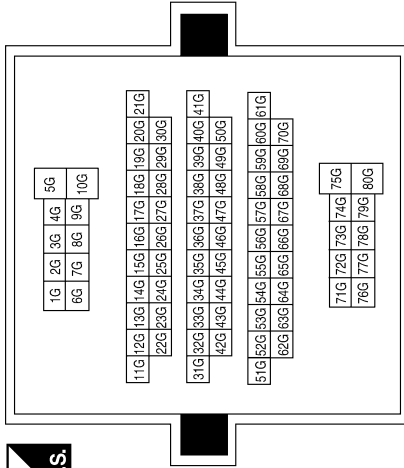
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# STARTING SYSTEM

## < COMPONENT DIAGNOSIS >

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



Terminal No.	Color of Wire	Signal Name
34G	O	-
39G	W/G	-
47G	Y	-

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	-

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	-

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



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

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	O	-
4	R	-

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# STARTING SYSTEM



## < COMPONENT DIAGNOSIS >

Connector No.	E210
Connector Name	STARTER MOTOR
Connector Color	BLACK


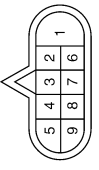
Terminal No.	2	Color of Wire	B/R	Signal Name	-
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Connector No.	E207
Connector Name	STARTER MOTOR (WITH VQ40DE)
Connector Color	GRAY

Terminal No.	1	Color of Wire	W	Signal Name	-
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Connector No.	E201
Connector Name	WIRE TO WIRE
Connector Color	GRAY

Terminal No.	1	Color of Wire	W	Signal Name	-
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# STARTING SYSTEM

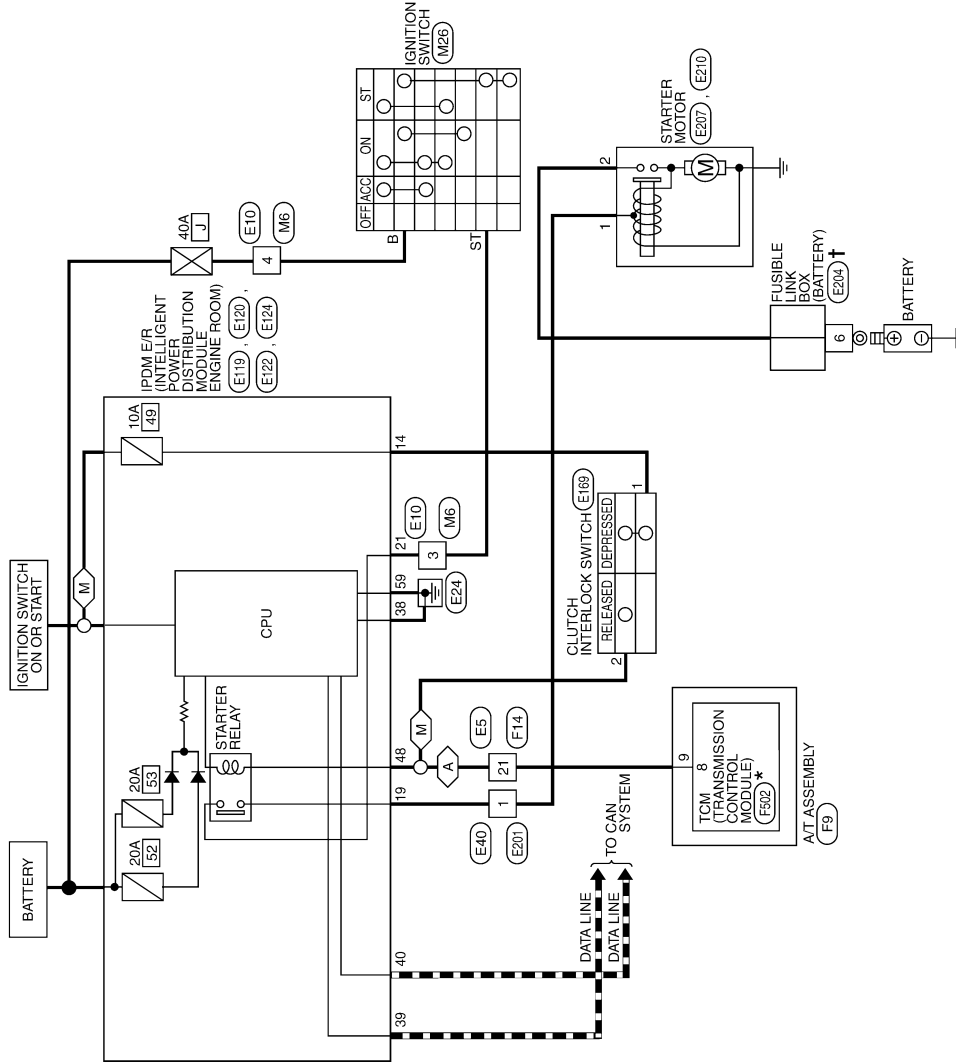
< COMPONENT DIAGNOSIS >

## Wiring Diagram - VQ40DE - Without Clutch Interlock Cancel Switch

INFOID:000000005276070

A : WITH A/T  
M : WITH M/T

### 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).

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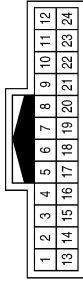


# STARTING SYSTEM

< COMPONENT DIAGNOSIS >

## 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	-
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Connector No.	M26
Connector Name	IGNITION SWITCH
Connector Color	WHITE



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

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



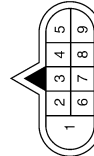
Terminal No.	3	Color of Wire	GR	Signal Name	-
Terminal No.	4	Color of Wire	G	Signal Name	-

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



Terminal No.	1	Color of Wire	W	Signal Name	-
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Connector No.	E10
Connector Name	WIRE TO WIRE
Connector Color	WHITE



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

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# STARTING SYSTEM

## < COMPONENT DIAGNOSIS >

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



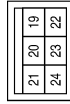
Terminal No.	Color of Wire	Signal Name
59	B	GND (POWER)

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	INHIBIT SW

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



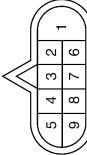
Terminal No.	Color of Wire	Signal Name
19	W	STARTER MTR
21	GR	IGN SW (ST)

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



Terminal No.	Color of Wire	Signal Name
1	W	-

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



Terminal No.	Color of Wire	Signal Name
1	W	-

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



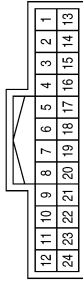
Terminal No.	Color of Wire	Signal Name
1	W/G	-
2	R	-

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# STARTING SYSTEM

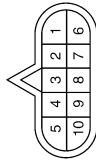
## < COMPONENT DIAGNOSIS >

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



Terminal No.	21	Color of Wire	R	Signal Name	-
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Connector No.	F9
Connector Name	A/T ASSEMBLY
Connector Color	GREEN



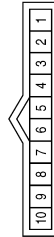
Terminal No.	9	Color of Wire	R	Signal Name	-
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Connector No.	E210
Connector Name	STARTER MOTOR
Connector Color	BLACK



Terminal No.	2	Color of Wire	B/R	Signal Name	-
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Connector No.	F502
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Color	GRAY



Terminal No.	8	Color of Wire	G	Signal Name	START-FLY
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# STARTING SYSTEM

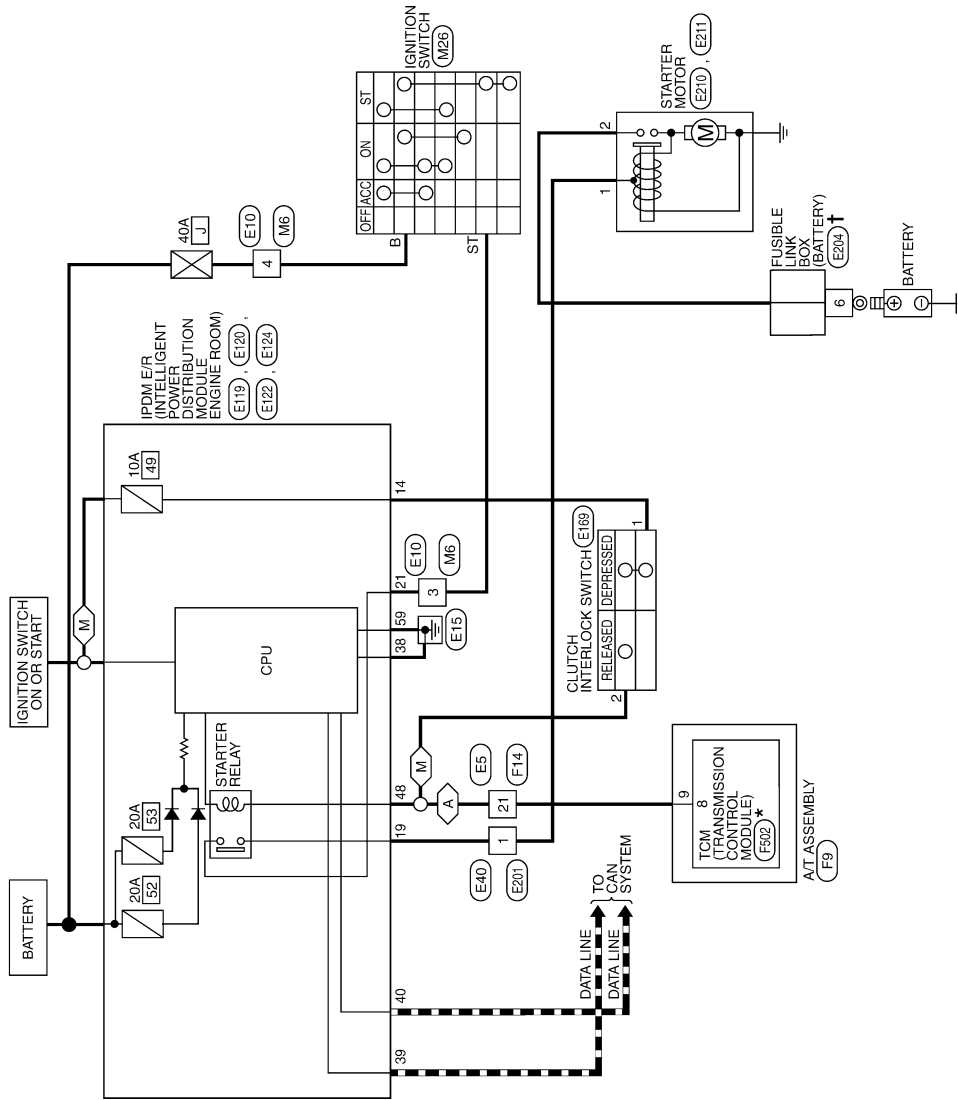
< COMPONENT DIAGNOSIS >

## Wiring Diagram - QR25DE

INFOID:000000005276071

### STARTING SYSTEM - QR25DE

⬡: WITH A/T  
⬢: WITH M/T



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

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# STARTING SYSTEM

## < COMPONENT DIAGNOSIS >

### STARTING SYSTEM CONNECTORS - QR25DE

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

3	2	1
6	5	4



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

Connector No.	M26
Connector Name	IGNITION SWITCH
Connector Color	WHITE

B	ST	IG
R	ACC	R2



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



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

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

1	2	3	4	5
6	7	8	9	



Terminal No.	Color of Wire	Signal Name
1	W	-

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					



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

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# STARTING SYSTEM

## < COMPONENT DIAGNOSIS >

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



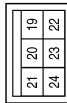
Terminal No.	Color of Wire	Signal Name
59	B	GND (POWER)

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	INHIBIT SW

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



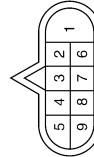
Terminal No.	Color of Wire	Signal Name
19	W	STARTER MOTOR
21	GR	IGN SW (ST)

Connector No.	E210
Connector Name	STARTER MOTOR
Connector Color	BLACK



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

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



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



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

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# STARTING SYSTEM

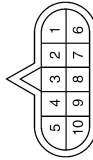
## < COMPONENT DIAGNOSIS >

Connector No.	E211
Connector Name	STARTER MOTOR (WITH GR25DE)
Connector Color	GRAY



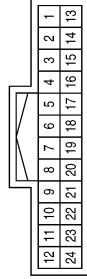
Terminal No.	1	Color of Wire	W	Signal Name	-
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Connector No.	F9
Connector Name	A/T ASSEMBLY
Connector Color	GREEN



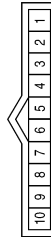
Terminal No.	9	Color of Wire	R	Signal Name	-
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Connector No.	F14
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	21	Color of Wire	R	Signal Name	-
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Connector No.	F502
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Color	GRAY



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

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### STARTING SYSTEM

#### Symptom Table

INFOID:000000005276072

Symptom	Reference
No normal cranking	Refer to <a href="#">STR-5, "Work Flow"</a> .
Starter motor does not rotate	



# STARTER MOTOR

< ON-VEHICLE REPAIR >

## ON-VEHICLE REPAIR

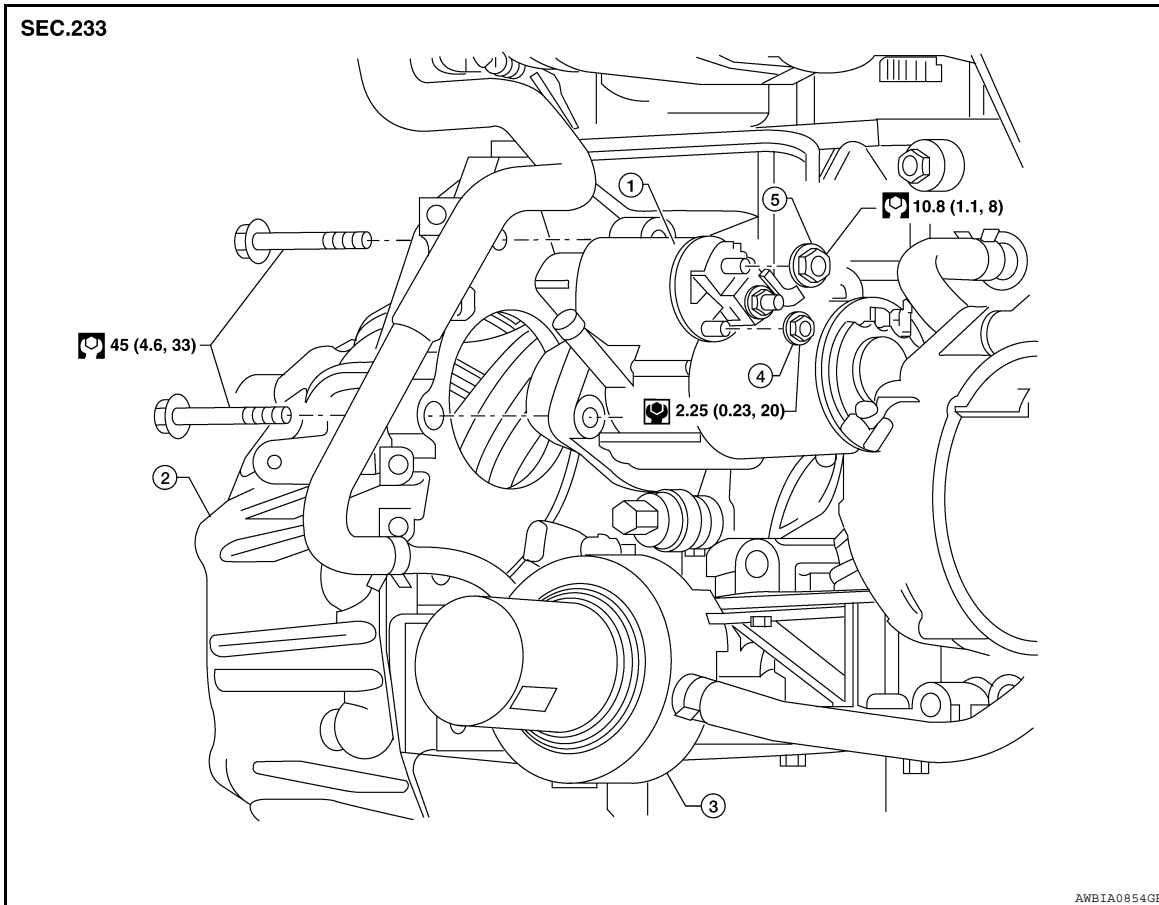
### STARTER MOTOR

#### Removal and Installation (QR25DE)

INFOID:000000005276073

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|---------------------------|-------------------------|----------------------|
| 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.
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.**

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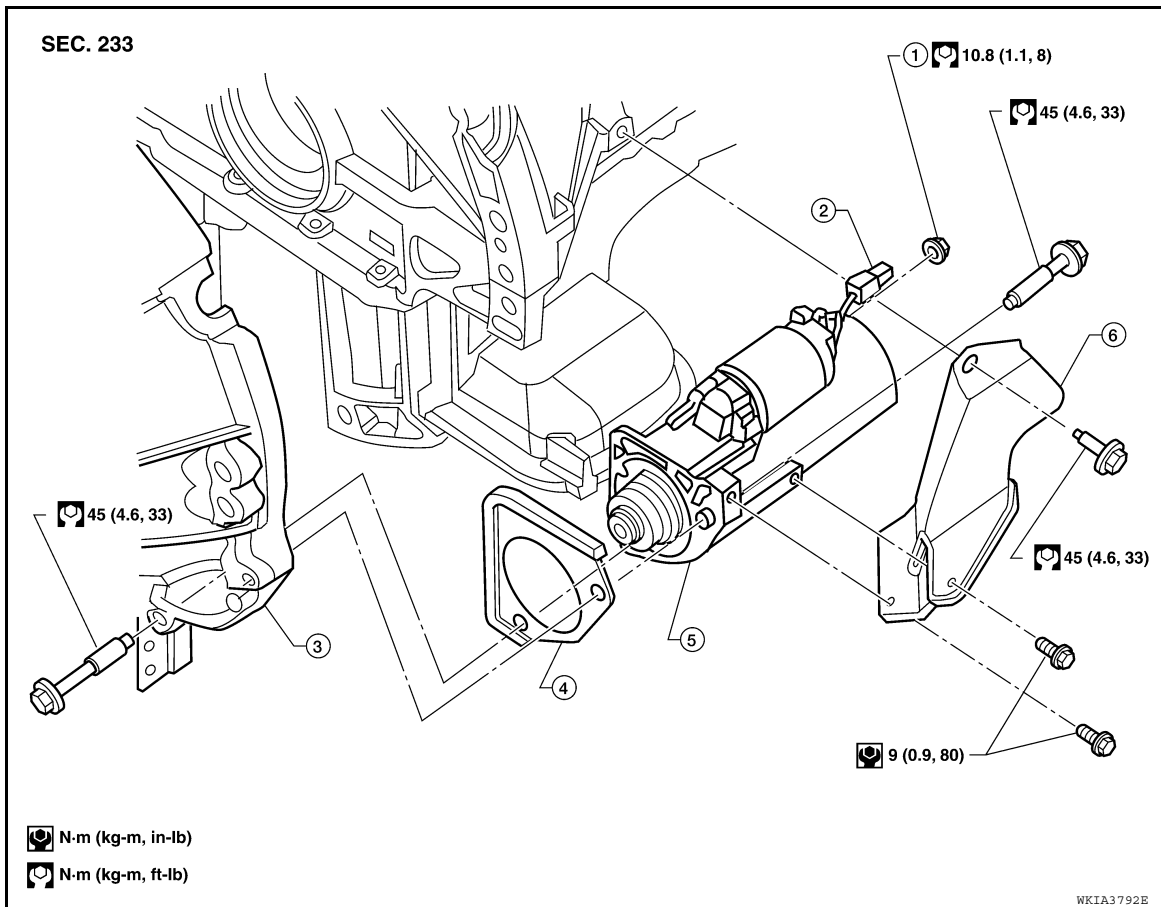
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# STARTER MOTOR

< ON-VEHICLE REPAIR >

## Removal and Installation (VQ40DE)

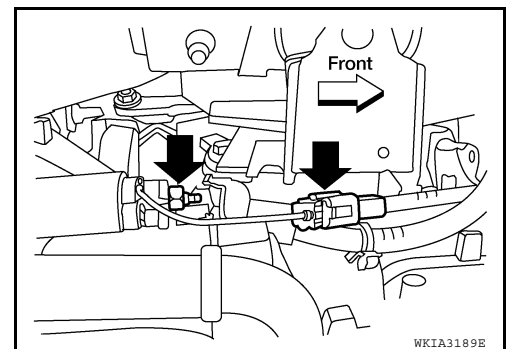
INFOID:000000005276074



- |                               |                               |                         |
|-------------------------------|-------------------------------|-------------------------|
| 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.
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:000000005276075

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Application	QR25DE	VQ40DE
Manufacturer	Mitsubishi M000T8828ZC	Mitsubishi M001TA0072ZC
Type	Reduction gear type	
System voltage	12V	
No-load	Terminal voltage	11V
	Current	Less than 90A
	Revolution	More than 2,800 rpm

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