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# SECTION STR

## STARTING SYSTEM

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**SERVICE DATA AND SPECIFICATIONS**  
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# PRECAUTIONS

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## PRECAUTION

### PRECAUTIONS

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

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The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

#### **WARNING:**

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

#### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

#### **WARNING:**

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

#### Precautions for Removing of Battery Terminal

INFOID:000000010193789

- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.

#### **NOTE:**

ECU may be active for several tens of seconds after the ignition switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.

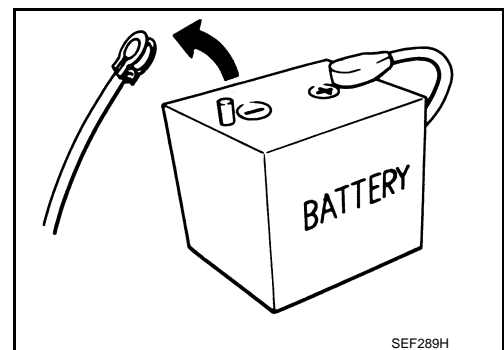
#### **NOTE:**

If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.

#### **NOTE:**

The removal of 12V battery may cause a DTC detection error.



# PREPARATION


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## PREPARATION

### PREPARATION


#### Special Service Tools

INFOID:000000009751882

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;">AWIA1239ZZ</p>	<p>Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.</p>

#### Commercial Service Tools

INFOID:000000009751883

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

# COMPONENT PARTS

< SYSTEM DESCRIPTION >

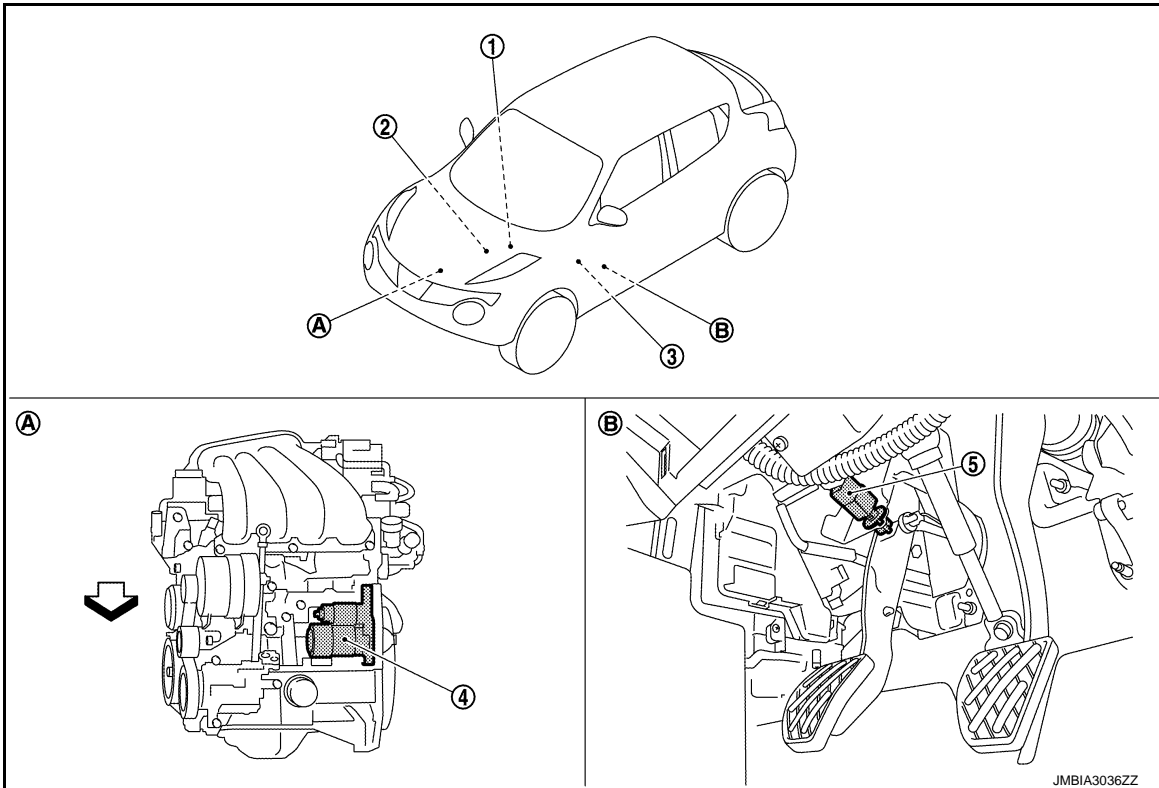
## SYSTEM DESCRIPTION

### COMPONENT PARTS

#### STARTING SYSTEM (WITH INTELLIGENT KEY)

#### STARTING SYSTEM (WITH INTELLIGENT KEY) : Component Parts Location

INFOID:000000009751884



- |   |   |   |
|---|---|---|
| <p>1. IPDM E/R<br/>Refer to <a href="#">PCS-5. "Component Parts Location"</a>.</p> <p>4. Starter motor</p> <p>A. Engine</p> | <p>2. Transmission range switch (CVT models)<br/>Refer to <a href="#">TM-150. "CVT CONTROL SYSTEM : Component Parts Location"</a>.</p> <p>5. Clutch interlock switch (M/T models)</p> <p>B. Clutch pedal (M/T models)</p> | <p>3. BCM<br/>Refer to <a href="#">BCS-6. "BODY CONTROL SYSTEM : Component Parts Location"</a>.</p> |
|---|---|---|

↔ : Vehicle front

#### STARTING SYSTEM (WITH INTELLIGENT KEY) : Component Description

INFOID:000000009751885

Component part	Description
BCM	BCM controls the starter relay.
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.

# COMPONENT PARTS

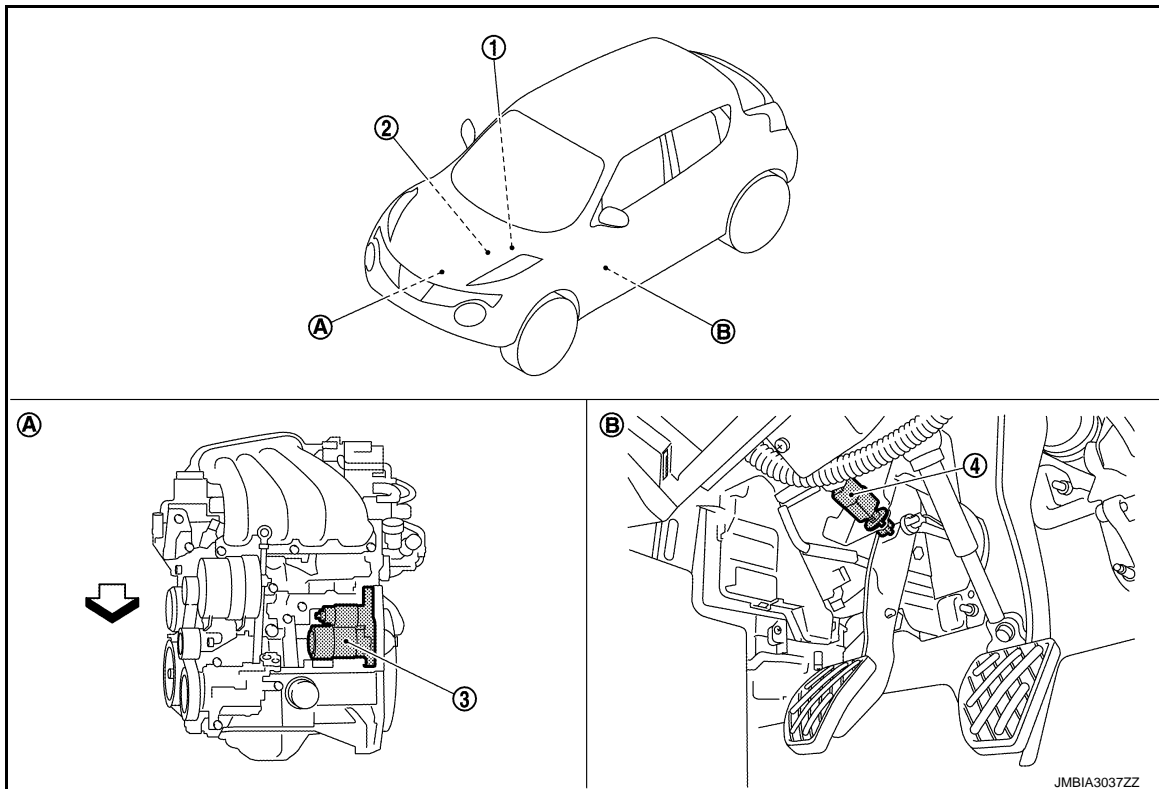
## < SYSTEM DESCRIPTION >

Component part	Description
Transmission range switch (CVT models)	Transmission range switch 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.
Clutch interlock switch (M/T models)	The switch turns ON and electric power is supplied to the starter relay and starter control relay inside IPDM E/R when the clutch pedal is depressed.

## STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

### STARTING SYSTEM (WITHOUT INTELLIGENT KEY) : Component Parts Location

INFOID:000000009751886



- 1. IPDM E/R  
Refer to [PCS-37, "Component Parts Location"](#).
- 2. Transmission range switch (CVT models)  
Refer to [TM-150, "CVT CONTROL SYSTEM : Component Parts Location"](#).
- 3. Starter motor
- 4. Clutch interlock switch (M/T models)
- A. Engine
- B. Clutch pedal (M/T models)

↶ : Vehicle front

### STARTING SYSTEM (WITHOUT INTELLIGENT KEY) : Component Description

INFOID:000000009751887

Component part	Description
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.

# COMPONENT PARTS

## < SYSTEM DESCRIPTION >

Component part	Description
Transmission range switch (CVT models)	Transmission range switch supplies power to the starter control relay inside IPDM E/R when the selector lever is shifted to the P or N position.
Clutch interlock switch (M/T models)	The switch turns ON and electric power is supplied to the starter control relay inside IPDM E/R when the clutch pedal is depressed.

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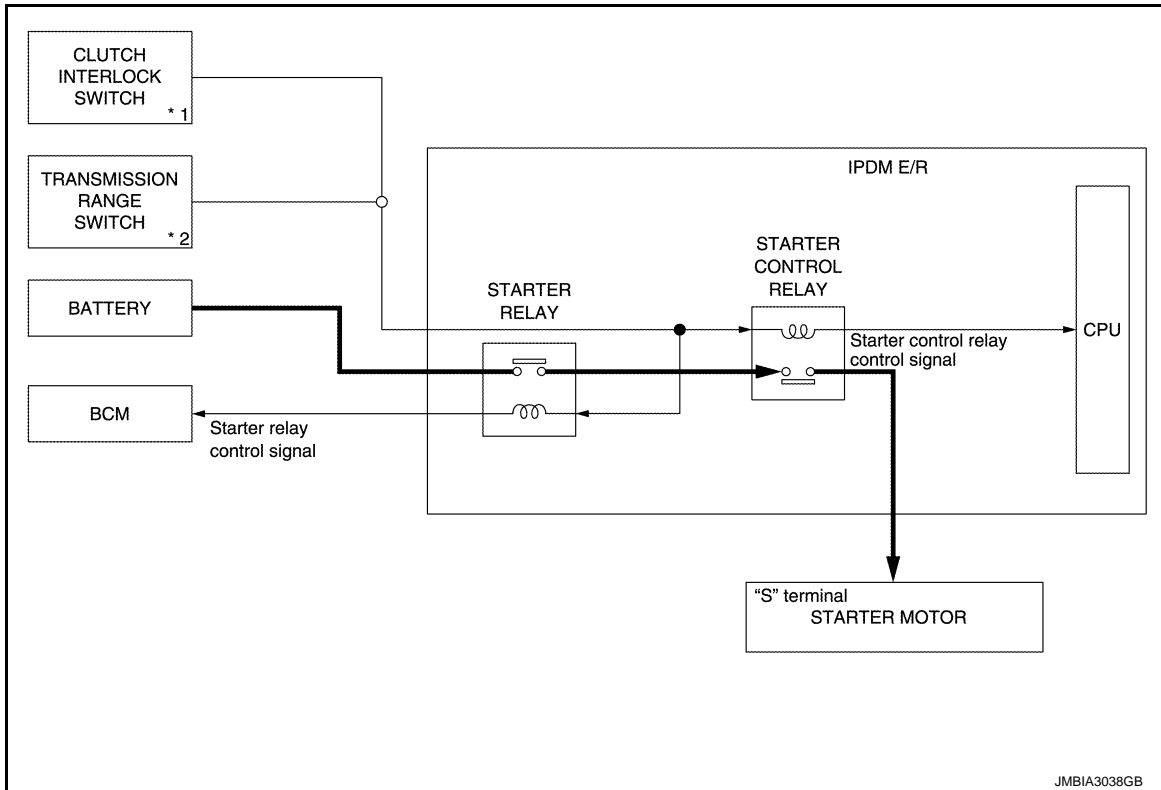
< SYSTEM DESCRIPTION >

## SYSTEM

### STARTING SYSTEM (WITH INTELLIGENT KEY)

#### STARTING SYSTEM (WITH INTELLIGENT KEY) : System Diagram

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\*1: M/T models

\*2: CVT models

#### STARTING SYSTEM (WITH INTELLIGENT KEY) : System Description

INFOID:000000009751889

##### CVT MODELS

- When selector lever is P or N, power is supplied to starter relay and starter control relay by transmission range switch. And BCM and IPDM E/R (CPU) detect selector lever P/N condition by the inputted signal.
- When starter operating condition is satisfied, IPDM E/R turns starter control relay ON by starter control relay control signal.
- When engine cranking condition is satisfied, BCM turns starter relay ON by starter relay control signal.
- Then battery power is supplied to starter motor ("S" terminal) through starter control relay and starter relay.

##### M/T MODELS

- When the clutch interlock switch is turned ON position (clutch pedal is depressed) power is supplied to starter relay and starter control relay. And BCM and IPDM E/R (CPU) detect ignition switch position by the inputted signal.
- When starter operating condition is satisfied, IPDM E/R turns starter control relay ON by starter control relay control signal.
- When engine cranking condition is satisfied, BCM turns starter relay ON by starter relay control signal.
- Then battery power is supplied to starter motor ("S" terminal) through starter control relay and starter relay.

#### STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

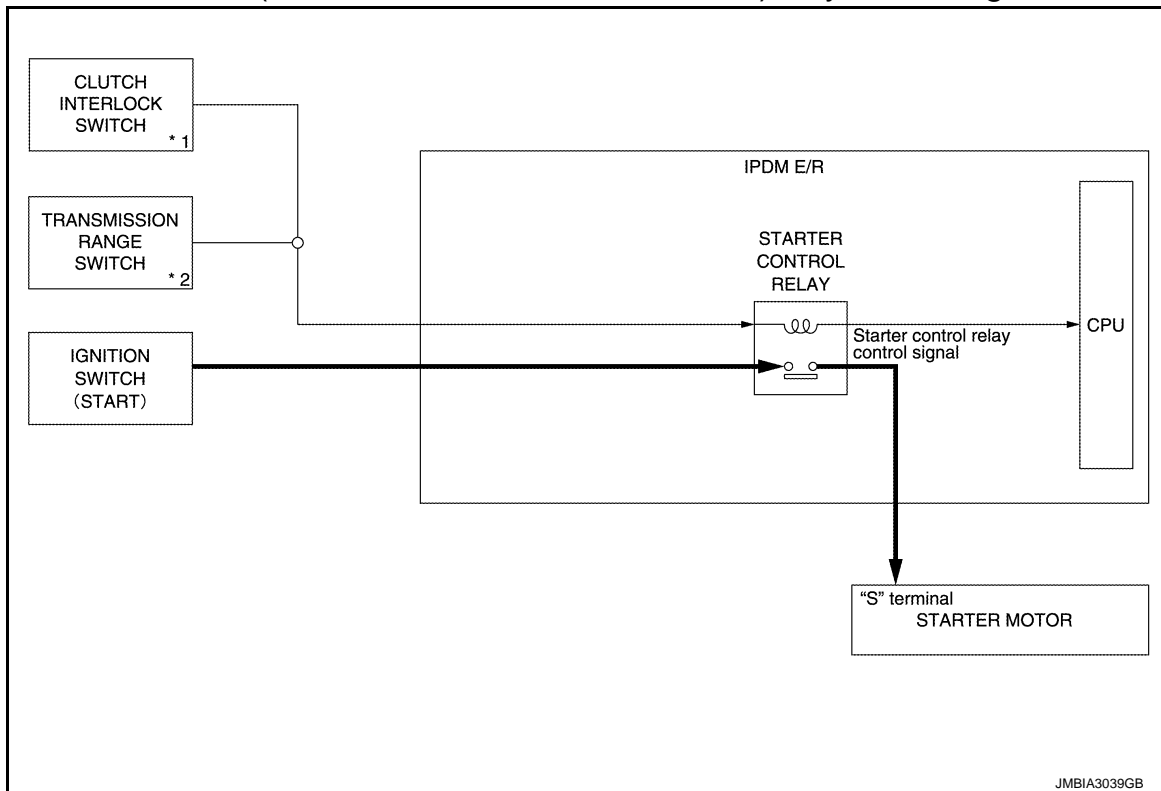


# SYSTEM

< SYSTEM DESCRIPTION >

## STARTING SYSTEM (WITHOUT INTELLIGENT KEY) : System Diagram

INFOID:000000009751890



\*1: M/T models

\*2: CVT models

## STARTING SYSTEM (WITHOUT INTELLIGENT KEY) : System Description

INFOID:000000009751891

### CVT MODELS

- When selector lever is P or N, power is supplied to starter control relay by transmission range switch. And IPDM E/R (CPU) detect selector lever P/N condition by the inputted signal.
- When engine cranking condition is satisfied, then battery power is supplied to starter motor ("S" terminal) through starter control relay.

### M/T MODELS

When the clutch pedal is depressed, battery power is supplied to starter motor ("S" terminal).

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## STARTING SYSTEM (WITHOUT INTELLIGENT KEY) : System Description

INFOID:000000009751891

### CVT MODELS

- When selector lever is P or N, power is supplied to starter control relay by transmission range switch. And IPDM E/R (CPU) detect selector lever P/N condition by the inputted signal.
- When engine cranking condition is satisfied, then battery power is supplied to starter motor ("S" terminal) through starter control relay.

### M/T MODELS

When the clutch pedal is depressed, battery power is supplied to starter motor ("S" terminal).

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# STARTING SYSTEM (WITH INTELLIGENT KEY)

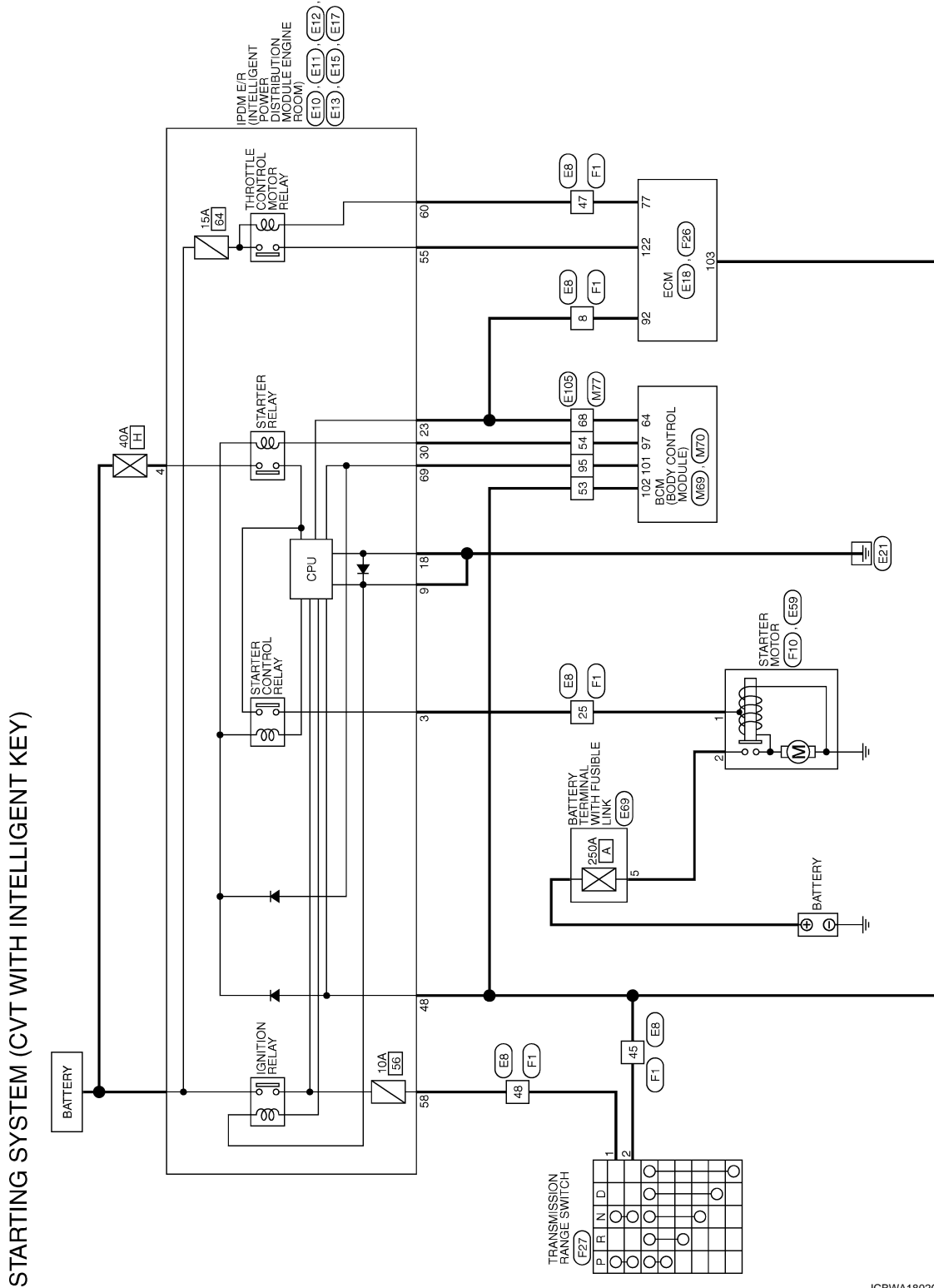
< WIRING DIAGRAM >

## WIRING DIAGRAM

### STARTING SYSTEM (WITH INTELLIGENT KEY)

Wiring Diagram (CVT Models)

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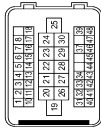


# STARTING SYSTEM (WITH INTELLIGENT KEY)

< WIRING DIAGRAM >

## STARTING SYSTEM (CVT WITH INTELLIGENT KEY)

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	SAAS3MB-FS10-SLZZ



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	-
2	L	-
3	G	-
4	LG	-
5	O	-
6	V	-
7	BR	-
8	SB	-
10	R	-
11	O	-
12	G	-
13	O	-
14	Y	-
15	R	-
16	SB	-
17	GR	-
18	W	-
19	L/B	-
20	L/W	-
21	G	-
22	G	-
23	SHIELD	-
24	P	-
25	R	-
26	B	-
27	B	-
28	LG	-
29	SB	-
30	R	-
31	O	-
32	O	-
33	BR	-
34	W	-
37	L	-
39	B	-

40	P	-
42	L	-
43	BR	-
44	G	-
45	BR	-
46	Y	-
47	SB	-
48	LG	-

Connector No.	E10
Connector Name	PEOPLE IN INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM
Connector Type	M09FW-LC



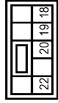
Terminal No.	Color Of Wire	Signal Name [Specification]
3	R	-
4	P	-
8	GR	-

Connector No.	E11
Connector Name	PEOPLE IN INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM
Connector Type	M09FB-LC



Terminal No.	Color Of Wire	Signal Name [Specification]
8	B/Y	-
14	R	-

Connector No.	E12
Connector Name	PEOPLE IN INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM
Connector Type	NS09FB-CS



Terminal No.	Color Of Wire	Signal Name [Specification]
18	B/Y	-
19	W	- [With Front fog lamp]
19	W	- [With Front fog lamp]
20	G	- [With Front fog lamp]
20	V	- [With Front fog lamp]
22	G	-

Connector No.	E13
Connector Name	PEOPLE IN INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM
Connector Type	TH12FW-NH



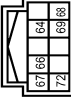
Terminal No.	Color Of Wire	Signal Name [Specification]
23	SB	-
25	BR	-
26	P	-
27	L	-
28	Y	-
30	V	-
31	Y	-
34	L	-

Connector No.	E15
Connector Name	PEOPLE IN INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM
Connector Type	NS12FW-CS



Terminal No.	Color Of Wire	Signal Name [Specification]
48	BR	-
49	G	-
50	O	-
51	O	-
52	P	-
54	P	-
55	G	-
56	SB	-
57	O	-
58	LG	-
59	V	-
60	SB	-
61	LG	-
62	O	-

Connector No.	E17
Connector Name	PEOPLE IN INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM
Connector Type	TH12FB-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
64	Y	-
66	L	-
67	L	-
68	O	-
69	BR	-

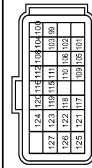
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# STARTING SYSTEM (WITH INTELLIGENT KEY)

< WIRING DIAGRAM >

## STARTING SYSTEM (CVT WITH INTELLIGENT KEY)

Terminal No.	W		
Connector No.	E1B		
Connector Name	ECM		
Connector Type	RH24FGY-RZ8-RH		



Terminal No.	Color Of Wire	Signal Name [Specification]
99	P	CAN COMMUNICATION LINE (CAN-L)
100	L	CAN COMMUNICATION LINE (CAN-H)
101	V	SENSOR POWER SUPPLY
102	R	ACCELERATOR PEDAL POSITION SENSOR 1
103	BR	PNP SIGNAL
104	R	DATA LINK CONNECTOR
105	GR	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 1)
106	Y	POWER SUPPLY FOR ECM (BACKUP)
108	GR	CLUTCH PEDAL POSITION SWITCH
109	O	IGNITION SWITCH
110	P	ASCD STEERING SWITCH
111	BR	STOP LAMP SWITCH
112	BR	ECM RELAY (SOLE SWITCH-OFF)
115	SR	STOP LAMP SWITCH
116	G	BRAKE PEDAL POSITION SWITCH
117	G	FUEL PUMP RELAY
118	O	SENSOR POWER SUPPLY
119	BR	ACCELERATOR PEDAL POSITION SENSOR 2
120	Y	SENSOR GROUND
121	G	POWER SUPPLY FOR ECM
122	GR	THROTTLE CONTROL MOTOR POWER SUPPLY
123	B/Y	ECM GROUND
124	B/Y	ECM GROUND
125	L	A/F SENSOR 1 HEATER
126	B/Y	HEATED OXYGEN SENSOR 2 HEATER
127	B/Y	ECM GROUND

Connector No.	E5B		
Connector Name	STARTER MOTOR		
Connector Type	24340 EN013		



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

Connector No.	E6B		
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK		
Connector Type	24340 T9906		



Terminal No.	Color Of Wire	Signal Name [Specification]
5	B/R	

Connector No.	E105		
Connector Name	WIRE TO WIRE		
Connector Type	TH80MM-C516-TM4		



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	
4	Y	
5	GR	
6	P	
9	G	
10	R	
34	O	
35	GR	
36	B	
37	P	
52	SB	
53	BR	
54	O	
55	L	
56	Y	
59	Y	
64	LG	
65	GR	
66	R	
67	W	
68	SB	
70	R	
71	LG	
72	V	
73	L	
76	R	
78	B	
79	W	
80	L	
83	Y	
84	LG	
85	GR	
86	O	
90	SHIELD	
91	G	
92	R	
95	BR	
96	P	
97	GR	
88	W	
89	V	
31	BG	
32	LG	
33	BR	
34	G	
37	G	
39	B	
40	P	

Connector No.	FT		
Connector Name	WIRE TO WIRE		
Connector Type	LSA3WFB-RS10-SJZZ		



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	
2	Y	
3	Y	
4	BG	
5	LG	
6	SB	
7	G	
8	R	
10	BR	
11	Y	
12	G	
13	BG	
14	L	
15	BR	
17	SB	
18	CG	
18	G	
20	BR	
21	G	
22	BR	
23	SHIELD	
24	R	
25	R	
26	B	
27	B	
28	R	
29	W	
30	L	
31	BG	
32	LG	
33	BR	
34	G	
37	G	
39	B	
40	P	

JRBWC5389GB

# STARTING SYSTEM (WITH INTELLIGENT KEY)

< WIRING DIAGRAM >

## STARTING SYSTEM (CVT WITH INTELLIGENT KEY)

41	BR	-	SENSOR GROUND
42	Y	-	SENSOR POWER SUPPLY
43	G	-	CRANKSHAFT POSITION SENSOR (PHASE)
44	LG	-	CRANKSHAFT POSITION SENSOR (POS)
45	BR	-	STARTER RELAY CONTROL
46	R	-	EXHAUST VALVE TIMING CONTROL POSITION SENSOR
47	Y	-	SENSOR POWER SUPPLY
48	GR	-	EVAP CANISTER VENT CONTROL VALVE

Connector No.	F10
Connector Name	STARTER MOTOR
Connector Type	Z4540 ED924



Terminal No.	1	R	-	Signal Name [Specification]
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Connector No.	F26
Connector Name	ECM
Connector Type	RH40EBR-R28-L-RH



Terminal No.	Color Of Wire	Signal Name [Specification]
48	G	FUEL INJECTOR DRIVER POWER SUPPLY 1
49	G	ECM OIL PUMP PRESSURE FUEL PUMP
50	BR	THROTTLE CONTROL MOTOR (CLOSE)
51	BR	THROTTLE CONTROL MOTOR (CLOSE)
52	BR	FUEL INJECTOR DRIVER POWER SUPPLY 2
53	BR	FUEL INJECTOR DRIVER POWER SUPPLY 2
54	R	HIGH PRESSURE FUEL PUMP DRIVER POWER SUPPLY
55	BR	HIGH PRESSURE FUEL PUMP (HI)
56	Y	HIGH PRESSURE FUEL PUMP (LO)
58	G	SENSOR POWER SUPPLY

49	L	-	SENSOR GROUND
50	R	-	SENSOR POWER SUPPLY
51	R	-	CRANKSHAFT POSITION SENSOR (PHASE)
52	BR	-	CRANKSHAFT POSITION SENSOR (POS)
53	BR	-	STARTER RELAY CONTROL
54	R	-	EXHAUST VALVE TIMING CONTROL POSITION SENSOR
55	LG	-	SENSOR POWER SUPPLY
56	Y	-	EVAP CANISTER VENT CONTROL VALVE
57	L	-	SENSOR POWER SUPPLY
58	GR	-	TURBOCHARGER BOOST CONTROL SOLENOID VALVE
59	BR	-	SENSOR GROUND
60	R	-	THROTTLE POSITION SENSOR 1
61	G	-	THROTTLE POSITION SENSOR 2
62	W	-	THROTTLE CONTROL RELAY
63	BR	-	BATTERY CURRENT SENSOR
64	Y	-	BATTERY CURRENT SENSOR
65	R	-	INTAKE VALVE TIMING CONTROL SOLENOID VALVE
66	R	-	IGNITION SIGNAL NO.1
67	G	-	G. SENSOR
68	P	-	FUEL TANK TEMPERATURE SENSOR
69	LG	-	EXHAUST VALVE TIMING CONTROL SOLENOID VALVE
70	LG	-	IGNITION SIGNAL NO.2
71	BR	-	SENSOR GROUND
72	Y	-	INTAKE AIR TEMPERATURE SENSOR 2
73	P	-	IGNITION SIGNAL NO.3
74	R	-	CRANKING ENABLE SIGNAL
75	BR	-	IGNITION SIGNAL NO.3
76	L	-	ESP MASTER/SLAVE VALVE (DYNAMIC SUSPENSION VALVE)

Connector No.	F27
Connector Name	TRANSMISSION RANGE SWITCH
Connector Type	RK08FG



Terminal No.	Color Of Wire	Signal Name [Specification]
1	GR	-
2	BR	-
3	LG	-
4	L	-
5	G	-

6	Y	-	-
7	W	-	-
8	V	-	-

Connector No.	M69
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	FEA09FW-FH4E-SA



Terminal No.	Wire	Signal Name [Specification]
56	LG	INT ROOM LAMP PWR SPLY (With front fog lamp)
57	L	INT ROOM LAMP PWR SPLY (Without front fog lamp)
58	L	BAT (FUSE)
59	SB	PASS DOOR/UNLCK OUTPUT
60	V	TURN SIG LH OUTPUT
61	W	TURN SIG RH OUTPUT
62	BR	INT ROOM LAMP CONT
63	R	REVERSE SW
64	R	ALL DOOR LOCK OUTPUT
65	V	DR DOOR UNLCK OUTPUT
66	B	PW PWR SPLY (IGN)
67	L	PW PWR SPLY (BAT)
68	P	BAT (F/L)
70	Y	-

Connector No.	M70
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
75	LG	DR DOOR REC SW

76	LG	PASS DOOR REC SW
77	V	DRIVER DOOR ANT+
78	V	DRIVER DOOR ANT-
79	LG	PASS DOOR ANT+
80	Y	PASS DOOR ANT-
81	W	REAR BMRP ANT+
82	W	REAR BMRP ANT-
83	LG	ROOM ANT 1+
84	BR	ROOM ANT 1-
85	GR	ROOM ANT 2+
86	G	ROOM ANT 2-
87	R	LUGGAGE ROOM ANT+
88	V	LUGGAGE ROOM ANT-
89	W	PUSH-BTN IGN SW L/L PWR
90	W	PUSH-BTN IGN SW L/L PWR
91	G	AGC / ON/OFF
92	G	PUSH / WASH / SUZZER
93	GR	AGC RELAY CONT
94	BR	STARTER RELAY CONT
95	P	IGN RELAY (P/D/M/E/R) CONT
96	R	IGN RELAY (F/B) CONT
97	P	PUSH SW
98	P	CLUTCH INTERLOCK SW
99	L	NEUTRAL SW
100	L	CVT SHIFT SELECT PWR SPLY
101	SB	STOP LAMP SW 2
102	Y	BLWR RELAY CONT

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-GS18-1M4



Terminal No.	Color Of Wire	Signal Name [Specification]
4	V	-
5	W	-
6	P	-
9	R	-
10	R	-
34	LG	-

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# STARTING SYSTEM (WITH INTELLIGENT KEY)

< WIRING DIAGRAM >

STARTING SYSTEM (CVT WITH INTELLIGENT KEY)

32	SB	-
33	SB	-
34	P	-
35	R	-
36	L	-
37	SB	-
38	P	-
39	LG	-
40	G	-
41	GR	-
42	V	-
43	R	-
44	B	-
45	GR	-
46	LG	-
47	W	-
48	LG	-
49	V	-
50	LG	-
51	P	-
52	G	-
53	BR	-
54	LG	-
55	SHIELD	-
56	LG	-
57	SB	-
58	GR	-
59	Y	-
60	L	-
61	GR	-
62	G	-
63	W	-
64	LG	-
65	LG	-
66	W	-
67	LG	-
68	V	-
69	LG	-
70	V	-
71	LG	-
72	P	-
73	G	-
74	BR	-
75	LG	-
76	W	-
77	LG	-
78	V	-
79	V	-
80	LG	-
81	LG	-
82	P	-
83	G	-
84	G	-
85	BR	-
86	LG	-
87	SHIELD	-
88	LG	-
89	SB	-
90	GR	-
91	Y	-
92	L	-
93	GR	-
94	G	-
95	W	-
96	LG	-
97	LG	-
98	G	-
99	W	-
100	LG	-

- [Without Intelligent Key]  
- [With Intelligent Key]

JRBWC5391GB

# STARTING SYSTEM (WITH INTELLIGENT KEY)

< WIRING DIAGRAM >

## Wiring Diagram (M/T Models)

INFOID:000000009751893

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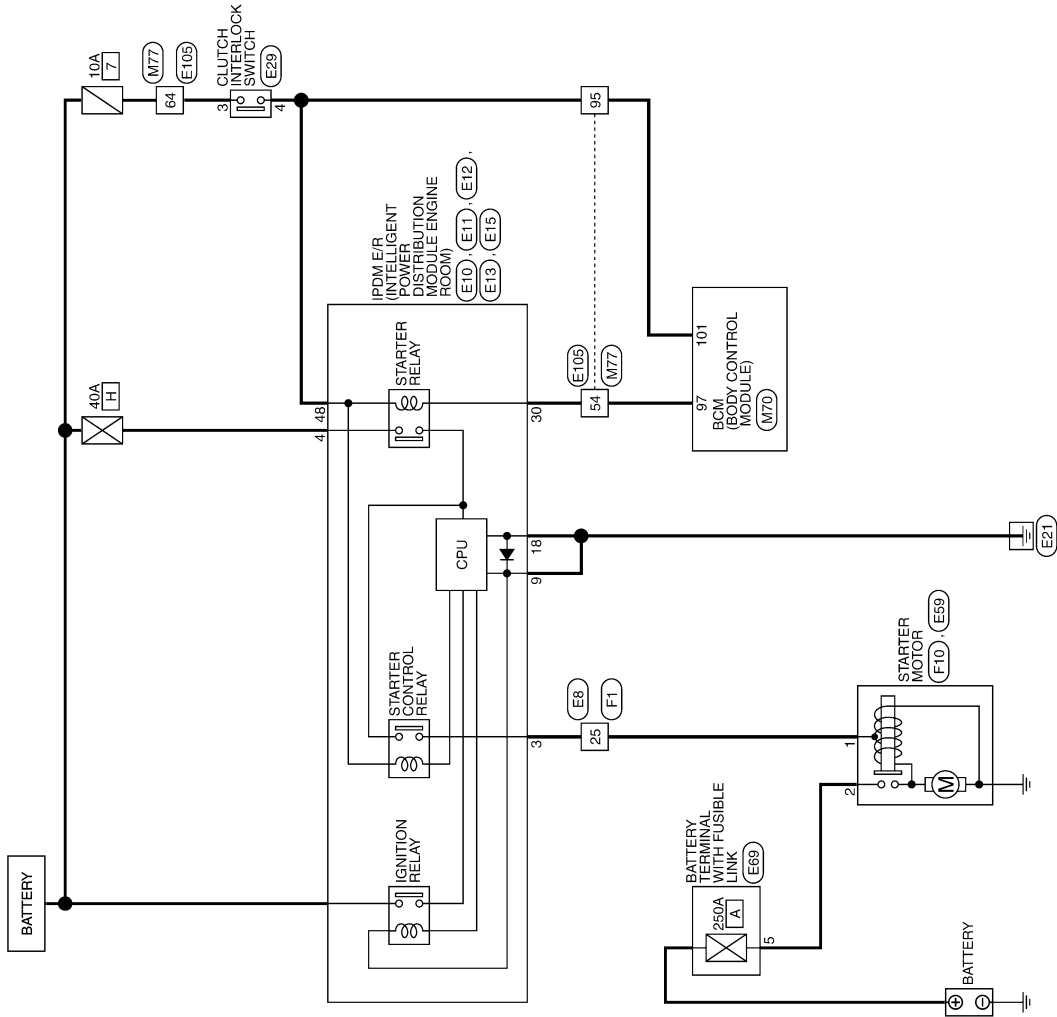
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### STARTING SYSTEM (M/T WITH INTELLIGENT KEY)



2011/08/18

JRBWC0741GB

# STARTING SYSTEM (WITH INTELLIGENT KEY)

< WIRING DIAGRAM >

## STARTING SYSTEM (M/T WITH INTELLIGENT KEY)

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	SAAS3MB-ES10-SL22



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	
2	L	
3	O	
4	LG	
5	O	
6	V	
7	BR	
8	SB	
10	R	
11	O	
12	G	
13	O	
14	Y	
15	R	
16	SB	
17	GB	
18	W	
19	L/B	
20	L/W	
21	G	
22	G	
23	SHIELD	
24	P	
25	R	
26	B	
27	B	
28	LG	
29	SB	
30	R	
31	G	
32	Y	
33	BR	
34	W	
37	L	
39	B	

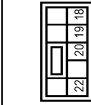
Terminal No.	40	Y	
Terminal No.	42	L	
Terminal No.	43	BR	
Terminal No.	44	G	
Terminal No.	45	BR	
Terminal No.	46	Y	
Terminal No.	47	SB	
Terminal No.	48	LG	



Connector No.	E10
Connector Name	MODULE IN INTELLIGENT POWER DISTRIBUTION MODULE ENGINE
Connector Type	M09FW-LC

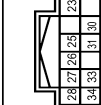
Terminal No.	Color Of Wire	Signal Name [Specification]
3	R	
4	P	
6	GR	

Connector No.	E12
Connector Name	MODULE IN INTELLIGENT POWER DISTRIBUTION MODULE ENGINE
Connector Type	NS09FB-CS



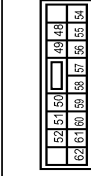
Terminal No.	Color Of Wire	Signal Name [Specification]
18	BR	
19	W	[Without front fog lamp]
19	W	[With front fog lamp]
20	G	[Without front fog lamp]
20	V	[With front fog lamp]
22	G	

Connector No.	E13
Connector Name	MODULE IN INTELLIGENT POWER DISTRIBUTION MODULE ENGINE
Connector Type	TH12FW-NH



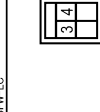
Terminal No.	Color Of Wire	Signal Name [Specification]
23	SB	
25	BR	
26	P	
27	L	
28	Y	
30	V	
31	G	
33	L	

Connector No.	E15
Connector Name	MODULE IN INTELLIGENT POWER DISTRIBUTION MODULE ENGINE
Connector Type	NS10FW-CS



Terminal No.	Color Of Wire	Signal Name [Specification]
48	BR	
50	G	
51	G	
52	P	
54	P	
55	G	
56	G	
57	O	
58	LG	
59	V	
60	SB	
61	LG	
62	O	

Connector No.	E29
Connector Name	CLUTCH INTERLOCK SWITCH
Connector Type	M04FW-LC



Terminal No.	Color Of Wire	Signal Name [Specification]
3	LG	
4	BR	

JRBWC5392GB



# STARTING SYSTEM (WITH INTELLIGENT KEY)

< WIRING DIAGRAM >

## STARTING SYSTEM (M/T WITH INTELLIGENT KEY)

Connector No.	E59
Connector Name	STARTER MOTOR
Connector Type	24340 E0103



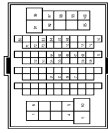
Terminal No.	Color Of Wire	Signal Name [Specification]
2	B/R	-

Connector No.	E68
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Type	24340 78906



Terminal No.	Color Of Wire	Signal Name [Specification]
5	B/R	-

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	T1880MY-0516-TM4



Connector No.	F1
Connector Name	WIRE TO WIRE
Connector Type	SAA38FB-#S10-SJ22



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	-
2	Y	-
3	Y	-
4	B/G	-
5	L/G	-
6	S/B	-
7	G	-
8	R	-
10	BR	-
11	Y	-
12	G	-
13	B/G	-
14	L	-
15	BR	-
16	B	-
17	S/B	-
18	L	-
19	G	-
20	BR	-
21	G	-
22	BR	-
23	SHIELD	-
24	R	-
25	R	-
26	B	-
27	B	-
28	R	-
29	W	-
30	R	-
31	W	-
32	BR	-
33	BR	-
34	G	-
37	G	-
39	B	-
40	P	-

41	BR	-
42	W	-
43	Y	-
44	G	-
45	BR	-
46	R	-
47	Y	-
48	GR	-

Connector No.	F10
Connector Name	STARTER MOTOR
Connector Type	24340 E0024



Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-

Connector No.	M7D
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	T1468FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
75	LG	DR DOOR RED SW
76	LG	PASS DOOR RED SW
78	LG	DR DOOR ANT-
79	Y	DRIVER DOOR ANT-
80	LG	PASS DOOR ANT+
81	Y	PASS DOOR ANT-
82	W	REAR EMFR ANT+
83	LG	REAR EMFR ANT-
84	BR	ROOM ANT 1+

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# STARTING SYSTEM (WITH INTELLIGENT KEY)

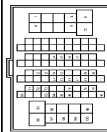
< WIRING DIAGRAM >

## STARTING SYSTEM (M/T WITH INTELLIGENT KEY)

85	GR	ROOM ANT 1
86	G	ROOM ANT 1
87	G	ROOM ANT 2
88	V	ROOM ANT 2
89	LG	LUGGAGE ROOM ANT+
90	W	LUGGAGE ROOM ANT-
91	V	PUSH-BTN IGN SW ILL-PWR
92	R	PUSH-BTN IGN SW ILL-GND
93	GR	I-KEY WARN BUZZER
96	BR	ACC RELAY CONT
97	SB	STARTER RELAY CONT
98	P	IGN RELAY (PDM E/R) CONT
99	R	IGN RELAY (I/Z) CONT
100	P	PUSH SW
101	Y	CLUTCH LOCK SW
102	L	NEUTRAL SW
104	SB	CVT SHIF. SELECT PWR SPLY
105	V	STOP LAMP SW 2
106	Y	BLWR RELAY CONT

89	GR	-
90	G	-
91	GR	-
92	Y	-
93	R	-
94	V	-
95	G	-
96	W	-
97	LG	-
98	V	-
99	BR	-
100	LG	-
101	Y	-
102	R	-
103	G	-
104	GR	-
105	W	-
106	LG	-

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	T188PW-C516-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	-
4	V	-
5	W	-
6	P	-
9	R	-
10	R	-
14	LG	-
32	SB	-
33	B	-
37	B	-
52	R	-
53	L	-
54	SB	-
55	P	-
58	LG	-

JRBWC5394GB

# STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

< WIRING DIAGRAM >

## STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

Wiring Diagram (CVT Models)

INFOID:000000009751894

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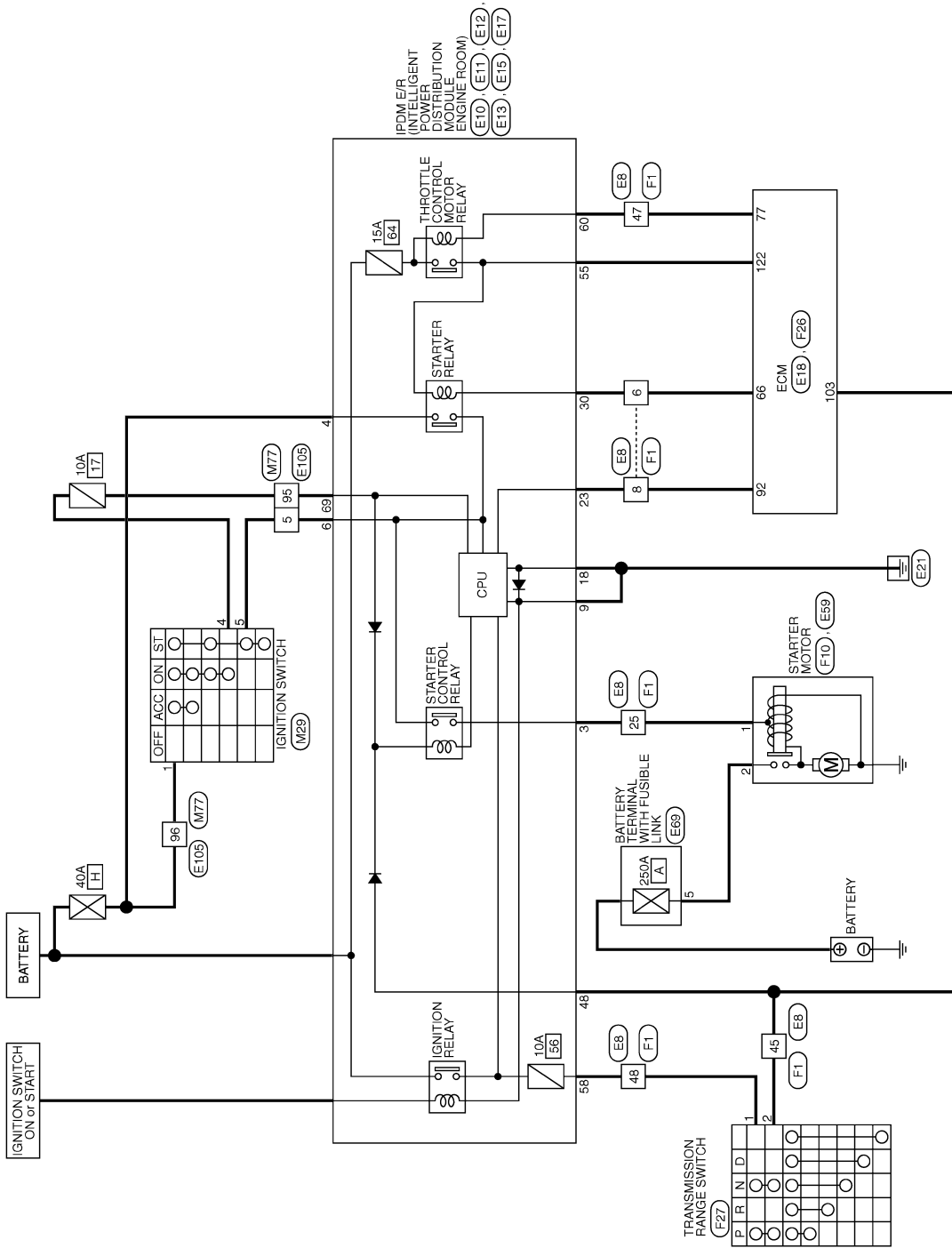
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### STARTING SYSTEM (CVT WITHOUT INTELLIGENT KEY)



2010/08/30

JCBWA1811GB

# STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

< WIRING DIAGRAM >

## STARTING SYSTEM (CVT WITHOUT INTELLIGENT KEY)

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	SAAS3MB-ES10-SL22



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	
2	D	
3	O	
4	LG	
5	O	
6	V	
7	BR	
8	SB	
10	R	
11	O	
12	G	
13	O	
14	Y	
15	R	
16	SB	
17	GB	
18	W	
19	L/B	
20	L/W	
21	G	
22	G	
23	SHIELD	
24	P	
25	R	
26	B	
27	B	
28	LG	
29	SB	
30	R	
31	G	
32	Y	
33	BR	
34	W	
37	L	
39	B	

40	D	
41	Y	
42	L	
43	BR	
44	G	
45	BR	
46	Y	
47	SB	
48	LG	

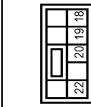


Connector No.	E10
Connector Name	FRAME R INTELLIGENT POWER DISTRIBUTION MODULE ENGINE
Connector Type	M8BFB-LC

Terminal No.	Color Of Wire	Signal Name [Specification]
3	R	
4	P	
6	GR	

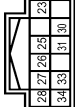
Connector No.	E12
Connector Name	FRAME R INTELLIGENT POWER DISTRIBUTION MODULE ENGINE
Connector Type	NSB8FB-CS



Terminal No.	Color Of Wire	Signal Name [Specification]
18	BR	
19	W	[Without front fog lamp]
19	W	[With front fog lamp]
20	G	[Without front fog lamp]
20	G	[With front fog lamp]
22	V	

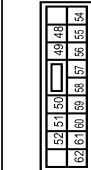
  

Connector No.	E13
Connector Name	FRAME R INTELLIGENT POWER DISTRIBUTION MODULE ENGINE
Connector Type	TH12FW-NH



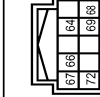
Terminal No.	Color Of Wire	Signal Name [Specification]
23	SB	
25	BR	
26	P	
27	L	
28	Y	
30	V	
31	G	
33	L	

Connector No.	E15
Connector Name	FRAME R INTELLIGENT POWER DISTRIBUTION MODULE ENGINE
Connector Type	NS18FW-CS



Terminal No.	Color Of Wire	Signal Name [Specification]
48	BR	
49	G	
50	G	
51	G	
52	P	
54	P	
55	G	
56	G	
57	O	
58	LG	
59	V	
60	SB	
61	LG	
62	O	

Connector No.	E17
Connector Name	FRAME R INTELLIGENT POWER DISTRIBUTION MODULE ENGINE
Connector Type	TH18FB-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
64	Y	
66	L	
67	L	
68	O	
69	BR	

JRBWC5395GB

# STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

< WIRING DIAGRAM >

## STARTING SYSTEM (CVT WITHOUT INTELLIGENT KEY)

Terminal No.	W	-
Connector No.	E18	
Connector Name	ECM	
Connector Type	RH24FCY-RZ8-R-RH	



Terminal No.	Color Of Wire	Signal Name [Specification]
89	P	CAN COMMUNICATION LINE (CAN-L)
100	L	CAN COMMUNICATION LINE (CAN-H)
101	V	SENSOR POWER SUPPLY
102	R	ACCELERATOR PEDAL POSITION SENSOR 1
104	R	DATA LINK CONNECTOR
105	GR	SENSOR FORWARD JACKLEIN (OR PEDAL POSITION SENSOR 2)
108	GR	CLUTCH PEDAL POSITION SWITCH
109	O	IGNITION SWITCH
110	P	ASCD STEERING SWITCH
111	B	SENSOR GROUND
112	BR	ECM RELAY (OR OFF)
115	SB	STEEL LAMP SWITCH
116	G	BRAKE PEDAL POSITION SWITCH
117	Y	FUEL PUMP RELAY
118	O	SENSOR POWER SUPPLY
119	BR	ACCELERATOR PEDAL POSITION SENSOR 2
120	Y	SENSOR GROUND
121	G	POWER SUPPLY FOR ECM
122	GR	THROTTLE CONTROL MOTOR POWER SUPPLY
123	B/Y	ECM GROUND
124	B/Y	ECM GROUND
125	L	A/F SENSOR 1 HEATER
126	W	HEATED OXYGEN SENSOR 2 HEATER
127	B/Y	ECM GROUND

Connector No.	E69
Connector Name	STARTER MOTOR
Connector Type	24340.EV013



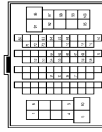
Terminal No.	2	B/R	-
Color Of Wire	B/R	-	-
Signal Name [Specification]	-	-	-

Connector No.	E69
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Type	24340.79906



Terminal No.	5	B/R	-
Color Of Wire	B/R	-	-
Signal Name [Specification]	-	-	-

Connector No.	E 05
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4



Connector No.	F1
Connector Name	WIRE TO WIRE
Connector Type	SAA38FB-JSU0-SLZ2



Terminal No.	Color Of Wire	Signal Name [Specification]
1	P	-
2	Y	-
3	Y	-
4	EG	-
5	LG	-
6	SB	-
7	G	-
8	R	-
10	BR	-
11	Y	-
12	G	-
13	EG	-
14	L	-
15	BR	-
16	P	-
17	SB	-
18	GR	-
19	G	-
20	BR	-
21	G	-
22	BR	-
23	SHIELD	-
24	R	-
25	R	-
26	B	-
27	B	-
28	R	-
29	W	-
30	R	-
31	EG	-
32	LG	-
33	BR	-
34	G	-
37	G	-
39	B	-
40	P	-

Terminal No.	Color Of Wire	Signal Name [Specification]
4	Y	-
5	GR	-
6	P	-
9	G	-
10	R	-
34	O	-
35	GR	-
38	B	-
37	P	-
52	SB	-
53	BR	-
54	V	-
55	O	-
56	Y	-
59	Y	-
64	LG	-
65	GR	-
66	R	-
67	W	-
68	SB	-
70	R	-
71	LG	-
72	V	-
73	L	-
76	R	-
78	B	-
80	L	-
83	Y	-
84	LG	-
85	GR	-
86	O	-
90	SHIELD	-
91	G	-
92	R	-
95	BR	-
96	P	-
97	GR	-
98	W	-
99	V	-
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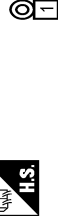
# STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

< WIRING DIAGRAM >

## STARTING SYSTEM (CVT WITHOUT INTELLIGENT KEY)

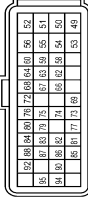
42	BR	-	SENSOR GROUND
43	W	-	SENSOR GROUND
44	L	-	SENSOR POWER SUPPLY
45	BR	-	CRANKSHAFT POSITION SENSOR (PHASE)
46	R	-	STARTER RELAY CONTROL
47	Y	-	EXHAUST VALVE TIMING CONTROL POSITION SENSOR
48	GR	-	E/VAP CANISTER VENT CONTROL VALVE

Connector No.	F10
Connector Name	STARTER MOTOR
Connector Type	24340 E0024



Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-

Connector No.	F28
Connector Name	ECM
Connector Type	RH40PBR-32S-L-RH



Terminal No.	Color Of Wire	Signal Name [Specification]
49	G	FUEL INJECTOR DRIVER POWER SUPPLY 1
50	GR	ESCAPE MOTOR (LOCK)
51	GR	THROTTLE CONTROL MOTOR (CLOSE)
52	BR	THROTTLE CONTROL MOTOR (OPEN)
53	BR	FUEL INJECTOR DRIVER POWER SUPPLY 2
54	R	HIGH PRESSURE FUEL PUMP DRIVER POWER SUPPLY
55	BR	HIGH PRESSURE FUEL PUMP (H)
56	Y	HIGH PRESSURE FUEL PUMP (LO)
58	G	SENSOR POWER SUPPLY

59	L	SENSOR GROUND
60	W	SENSOR GROUND
61	B	SENSOR POWER SUPPLY
62	BR	CRANKSHAFT POSITION SENSOR (PHASE)
63	BR	CRANKSHAFT POSITION SENSOR (POS)
64	R	STARTER RELAY CONTROL
65	SB	EXHAUST VALVE TIMING CONTROL POSITION SENSOR
66	LG	E/VAP CANISTER VENT CONTROL VALVE
67	Y	SENSOR POWER SUPPLY
68	Y	SENSOR POWER SUPPLY
69	L	SENSOR POWER SUPPLY
70	GR	TURBOCHARGER BOOST CONTROL SOLENOID VALVE
71	R	SENSOR GROUND
72	G	THROTTLE POSITION SENSOR 1
73	W	THROTTLE POSITION SENSOR 2
74	W	THROTTLE POSITION SENSOR 3
75	W	BATTERY CURRENT SENSOR
76	RG	BATTERY CURRENT SENSOR
77	CG	INTAKE VALVE TIMING CONTROL SOLENOID VALVE
78	CG	INTAKE VALVE TIMING CONTROL SOLENOID VALVE
79	W	G SENSOR
80	R	G SENSOR
81	G	FUEL TANK TEMPERATURE SENSOR
82	P	EXHAUST VALVE TIMING CONTROL SOLENOID VALVE
83	LG	IGNITION SIGNAL NO. 1
84	LG	IGNITION SIGNAL NO. 2
85	LG	IGNITION SIGNAL NO. 3
86	BR	IGNITION SIGNAL NO. 4
87	BR	IGNITION SIGNAL NO. 4
88	V	CRANKING ENABLE SIGNAL
89	P	IGNITION SIGNAL NO. 2
90	R	IGNITION SIGNAL NO. 4
91	SB	EXHAUST VALVE TIMING CONTROL SOLENOID VALVE
92	L	EXHAUST VALVE TIMING CONTROL SOLENOID VALVE

Connector No.	F27
Connector Name	TRANSMISSION RANGE SWITCH
Connector Type	RK08FG



Terminal No.	Color Of Wire	Signal Name [Specification]
1	GR	-
2	BR	-
3	LG	-
4	L	-
5	G	-

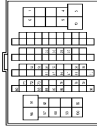
6	Y	-
7	W	-
8	V	-

Connector No.	M29
Connector Name	IGNITION SWITCH
Connector Type	IM06FW-LC



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	-
2	BR	-
3	R	-
4	Y	-
5	W	-

Connector No.	IM77
Connector Name	WIRE TO WIRE
Connector Type	TH06FW-SS16-TM



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	-
2	W	-
3	P	-
4	R	-
5	LG	-
6	SB	-
7	B	-
8	P	-
9	R	-
10	R	-
11	LG	-
12	SB	-
13	B	-
14	P	-
15	P	-
16	P	-

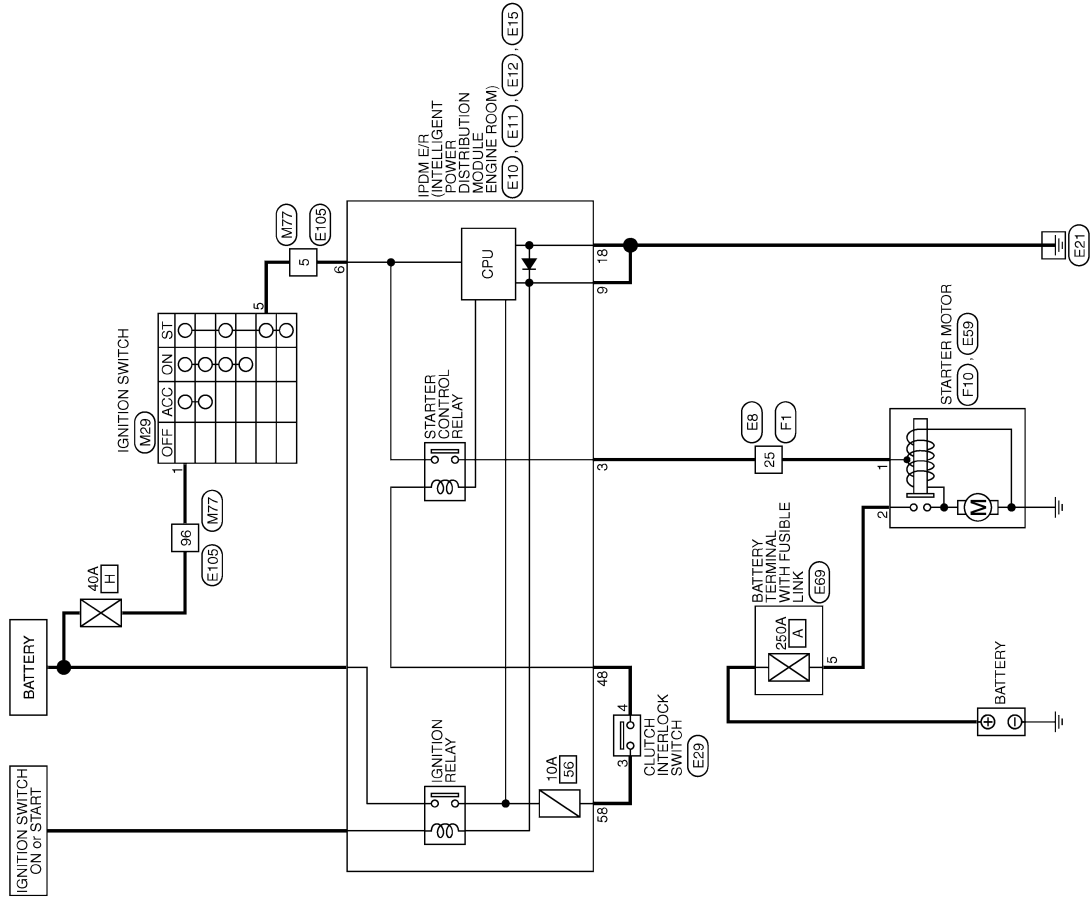
# STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

< WIRING DIAGRAM >

## Wiring Diagram (M/T Models)

INFOID:000000009751895

### STARTING SYSTEM (M/T WITHOUT INTELLIGENT KEY)



2010/08/30

JCBWA1816GB

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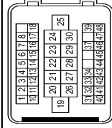
P

# STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

< WIRING DIAGRAM >

## STARTING SYSTEM (M/T WITHOUT INTELLIGENT KEY)

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	SAAS3MB-ES10-SLZZ



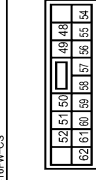
Terminal No.	40	41	42	43	44	45	46	47	48
Color Of Wire	P	L	BR	G	BR	Y	SB	LG	

Connector No.	E10
Connector Name	FRAME INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	M8BFB-LC



Terminal No.	18	19	20	21	22
Color Of Wire	BR	W	G	V	G

Connector No.	E15
Connector Name	FRAME INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	HS18FPW-CS



Terminal No.	48	49	50	51	52	53	54	55	56	57	58	59	60	61
Color Of Wire	BR	Y	G	L	P	C	SB	O	V	V	LG	V	SB	LG

Connector No.	E11
Connector Name	FRAME INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	M8BFB-LC

Terminal No.	8	14
Color Of Wire	B/Y	R

Terminal No.	18	19	20	21	22
Color Of Wire	BR	W	G	V	G

Connector No.	E11
Connector Name	FRAME INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	HS18FPW-CS



Terminal No.	18	19	20	21	22
Color Of Wire	BR	W	G	V	G

Connector No.	E15
Connector Name	STARTER MOTOR
Connector Type	24340-END03

Terminal No.	2
Color Of Wire	B/R

Terminal No.	48	49	50	51	52	53	54	55	56	57	58	59	60	61
Color Of Wire	BR	Y	G	L	P	C	SB	O	V	V	LG	V	SB	LG

Connector No.	E29
Connector Name	CLUTCH INTERLOCK SWITCH
Connector Type	M04FW-LC

Terminal No.	3	4
Color Of Wire	LG	BR

Connector No.	E59
Connector Name	STARTER MOTOR
Connector Type	24340-END03

Terminal No.	2
Color Of Wire	B/R



# STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

< WIRING DIAGRAM >

## STARTING SYSTEM (M/T WITHOUT INTELLIGENT KEY)

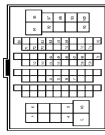
Connector No.	E89
Connector Name	BATTERY TERMINAL WITH FUSE/LE LINK
Connector Type	24340 29006

Terminal No.	1	2	3	4	5
Color Of Wire	W	B	GR	LG	P
Signal Name [Specification]					



Terminal No.	5	B/R
Color Of Wire		
Signal Name [Specification]		

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH86MMV-CST1E-TM4



Terminal No.	1	4	5	6	7	8	9	10	34	35	37	38	52	53	54	55	58	59	64	65	66
Color Of Wire	L	Y	GR	P	G	R	O	GR	B	P	SB	Y	GR	O	Y	LG	GR	Y	LG	GR	R
Signal Name [Specification]																					

Terminal No.	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30	31	32	33	34	37	40	41	42	43	44	46	48
Color Of Wire	RG	BR	BR	P	SB	G	R	BR	G	BR	SHIELD	R	R	B	B	W	R	RG	LG	BR	G	G	P	BR	W	L	GR	Y	GR
Signal Name [Specification]																													

Connector No.	F10
Connector Name	STARTER MOTOR
Connector Type	24340 ED024



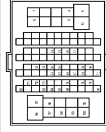
Terminal No.	1
Color Of Wire	R
Signal Name [Specification]	

Connector No.	M29
Connector Name	IGNITION SWITCH
Connector Type	MD8FW-LC



Terminal No.	1	2	3	4	5
Color Of Wire	L	BR	R	Y	W
Signal Name [Specification]					

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH86FT-CST1E-TM4



Terminal No.	1	4	5	6	8	10	34	35	36	37
Color Of Wire	L	Y	W	BR	R	R	LG	SB	B	P
Signal Name [Specification]										

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JRBWC5399GB

# STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

< WIRING DIAGRAM >

STARTING SYSTEM (M/T WITHOUT INTELLIGENT KEY)

52	R	-
53	L	-
54	SB	-
55	P	-
58	LG	-
59	G	-
64	G	-
65	GR	-
67	V	-
68	R	-
70	V	-
71	R	-
72	GR	-
73	G	-
74	W	-
78	LG	-
79	V	-
80	LG	-
83	P	-
84	G	-
85	BR	-
86	LG	-
90	SHIELD	-
91	Y	-
92	BR	-
95	R	- [Without Intelligent Key]
96	Y	- [With Intelligent Key]
97	L	-
98	GR	-
99	G	-
99	W	-
100	LG	-

JRBWC5400GB

# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

## BASIC INSPECTION

### DIAGNOSIS AND REPAIR WORK FLOW

Work Flow (With GR8-1200 NI)

INFOID:000000009751896

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#### 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.

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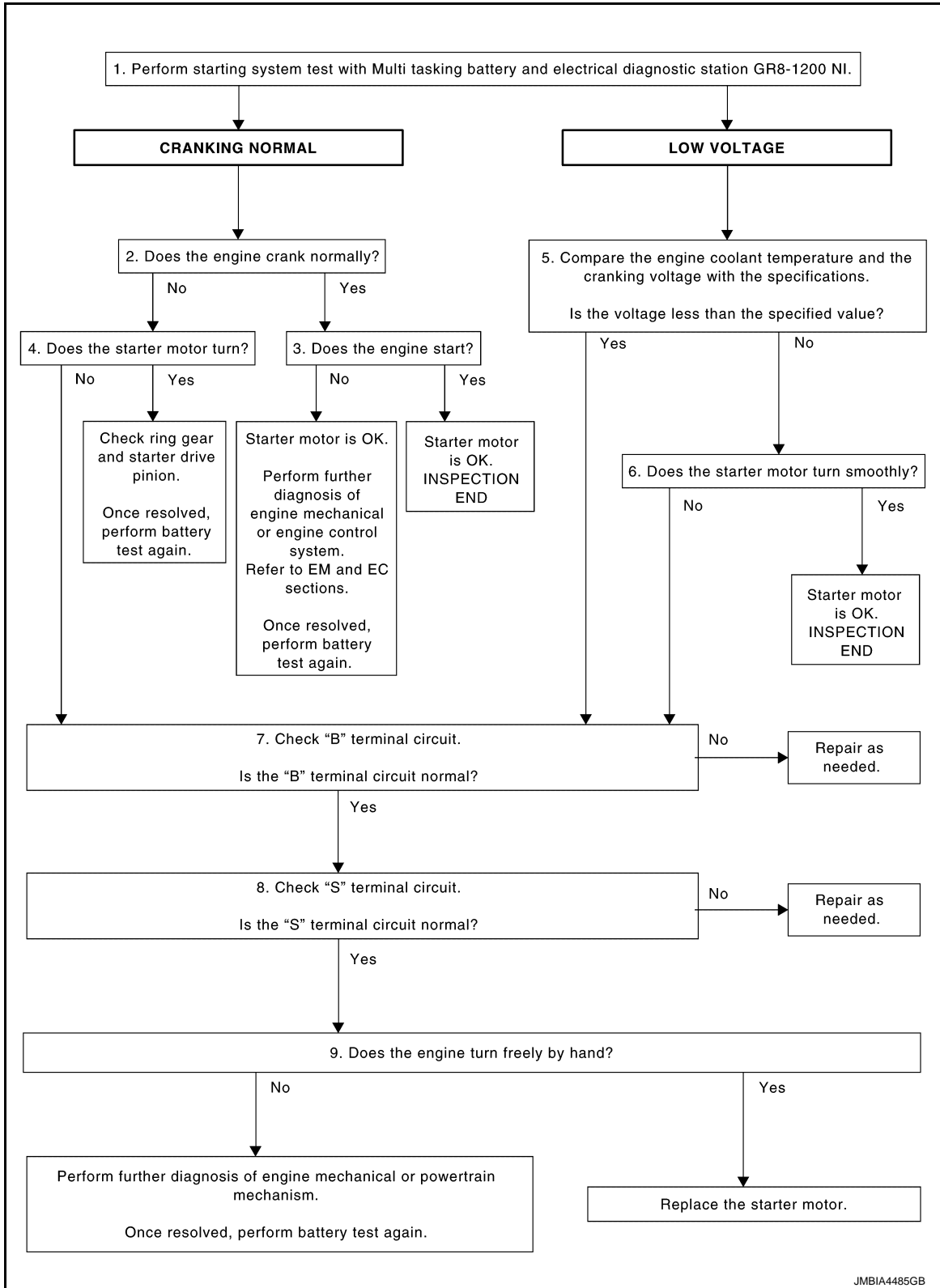
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# DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

## OVERALL SEQUENCE



### DETAILED FLOW

#### NOTE:

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

#### 1. DIAGNOSIS WITH MULTITASKING BATTERY AND ELECTRICAL DIAGNOSTIC STATION GR8-1200 NI

# DIAGNOSIS AND REPAIR WORK FLOW

## < 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 correctly.

### Does the engine crank normally?

YES >> GO TO 3.

NO >> GO TO 4.

## 3. ENGINE START CHECK

Check that the engine starts.

### Does the engine start?

YES >> Starter motor is OK. INSPECTION END

NO >> Perform further diagnosis of engine mechanical or engine control system. Refer EM and EC sections. Once resolved, perform battery test again.

## 4. STARTER MOTOR ACTIVATION

Check that the starter motor operates.

### Does the starter motor turn?

YES >> Check ring gear and starter motor drive pinion. Once resolved, perform battery test again.

NO >> GO TO 7.

## 5. COMPARISON BETWEEN ENGINE COOLANT AND CRANKING VOLTAGE

Compare the engine coolant temperature and the cranking voltage with the specifications.

### Minimum Specification of Cranking Voltage Referencing Coolant Temperature

Engine coolant temperature [°C (°F)]	Voltage [V]
-30 to -20 (-22 to -4)	8.6
-19 to -10 (-2 to 14)	9.1
-9 to 0 (16 to 32)	9.5
More than 1 (More than 34)	9.9

### Is the voltage less than the specified value?

YES >> GO TO 7.

NO >> GO TO 6.

## 6. STARTER OPERATION

Check the starter operation status.

### Does the starter motor turn smoothly?

YES >> Starter motor is OK. INSPECTION END

NO >> GO TO 7.

## 7. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [STR-32, "Diagnosis Procedure"](#).

### Is "B" terminal circuit normal?

YES >> GO TO 8.

NO >> Repair as needed.

## 8. "S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to [STR-34, "Diagnosis Procedure"](#).

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# DIAGNOSIS AND REPAIR WORK FLOW

## < BASIC INSPECTION >

### Is "S" terminal circuit normal?

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

## 9. ENGINE ROTATION STATUS

Check that the engine can be rotated by hand.

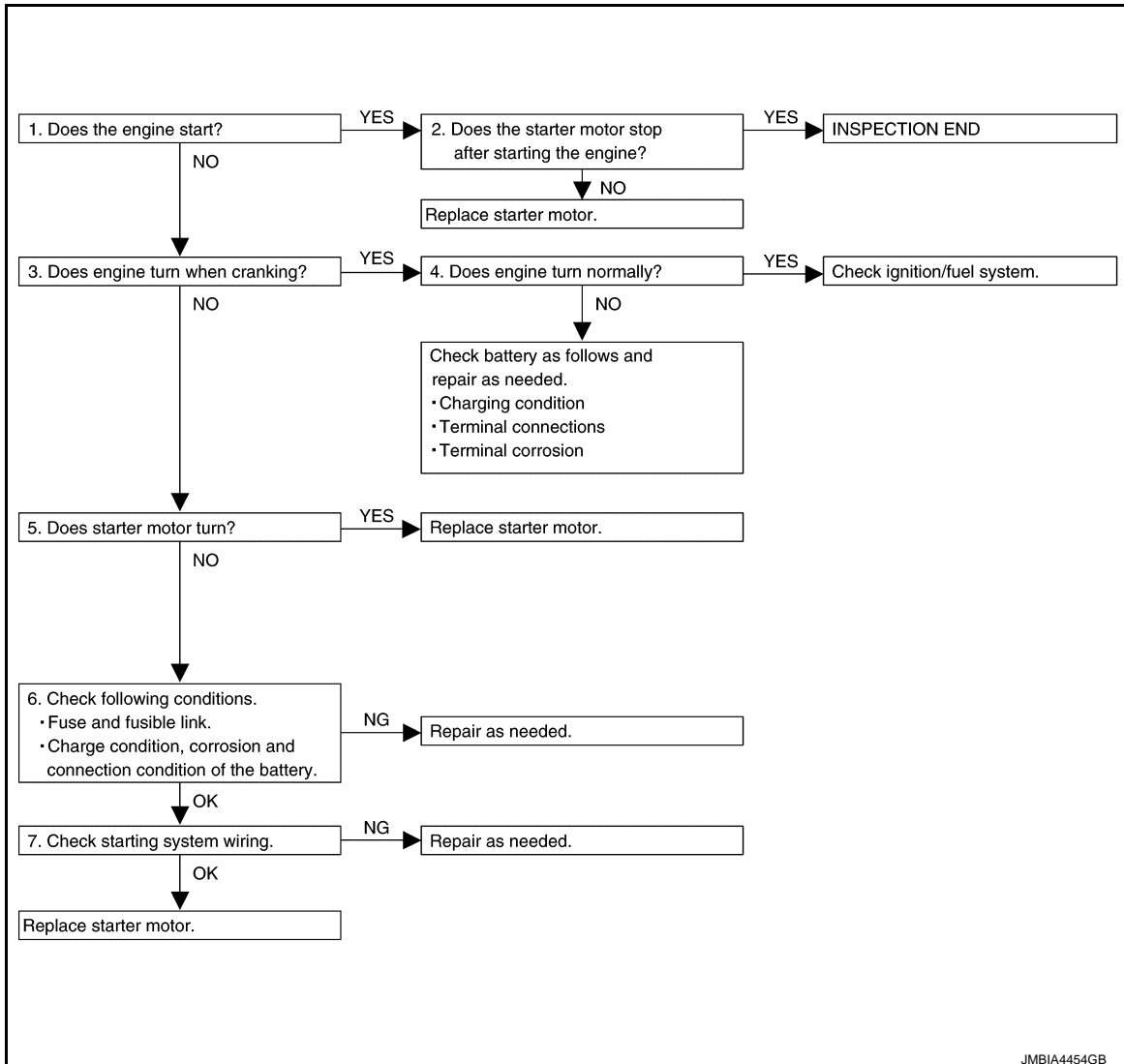
### Does the engine turn freely by hand?

- YES >> Replace starter motor. Refer to [STR-37. "Removal and Installation"](#).
- 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.

## Work Flow (Without GR8-1200 NI)

INFOID:000000009751897

## OVERALL SEQUENCE



## 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.

# DIAGNOSIS AND REPAIR WORK FLOW

## < BASIC INSPECTION >

---

NO >> GO TO 3.

### 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-37. "Removal and Installation"](#).

### 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. Refer to [PG-91. "Work Flow"](#).

### 5.CHECK STARTER MOTOR ACTIVATION

---

Check that the starter motor runs at cranking.

Does starter motor turn?

YES >> Replace starter motor. Refer to [STR-37. "Removal and Installation"](#).

NO >> GO TO 6.

### 6.CHECK POWER SUPPLY CIRCUIT

---

Check the following conditions.

- Fuse and fusible link
- Charge condition, corrosion and connection condition of the battery. Refer to [PG-91. "Work Flow"](#).

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-32. "Diagnosis Procedure"](#).
- "S" terminal circuit. Refer to [STR-34. "Diagnosis Procedure"](#).

Are these inspection results normal?

YES >> Replace starter motor. Refer to [STR-37. "Removal and Installation"](#).

NO >> Repair as needed.

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# B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## DTC/CIRCUIT DIAGNOSIS

### B TERMINAL CIRCUIT

#### Description

INFOID:000000009751898

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

#### Diagnosis Procedure

INFOID:000000009751899

#### 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 FUSIBLE LINK

Check that the following fusible link is not blown.

Terminal No.	Signal name	Fusible link No.
2	Battery power supply	A (250A)

#### Is the fusible link blown?

- YES >> Replace the blown fusible link after repairing the affected circuit if a fusible link is blown.  
NO >> GO TO 2.

#### 2. CHECK "B" TERMINAL CIRCUIT

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

Terminals			Voltage (Approx.)
(+)	(-)		
Starter motor "B" terminal	Terminal		Battery voltage
E59	2		
		Ground	

#### Is the inspection result normal?

- YES >> GO TO 3.  
NO >> Check harness between battery and starter motor for open circuit.

#### 3. CHECK BATTERY CABLE CONNECTION STATUS (VOLTAGE DROP TEST)

1. Shift selector lever to "P" or "N" position. (CVT models)  
Keep depressing clutch pedal fully. (M/T models)
2. Check voltage between battery positive terminal and starter motor "B" terminal.

Terminals			Condition	Voltage (Approx.)
(+)	(-)			
	Starter motor "B" terminal	Terminal	When the ignition switch is in START position	Less than 0.5 V
Battery positive terminal	E59	2		

#### Is the inspection result normal?

- YES >> GO TO 4.  
NO >> Check harness between the battery and the starter motor for poor continuity.

#### 4. CHECK GROUND CIRCUIT STATUS (VOLTAGE DROP TEST)

1. Shift selector lever to "P" or "N" position. (CVT models)  
Keep depressing clutch pedal fully. (M/T models)
2. Check voltage between starter motor case and battery negative terminal.



## B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Terminals		Condition	Voltage (Approx.)
(+)	(-)		
Starter motor case	Battery negative terminal	When the ignition switch is in START position	Less than 0.2 V

A

STR

Is the inspection result normal?

YES >> "B" terminal circuit is OK. Further inspection is necessary. Refer to [STR-27, "Work Flow \(With GR8-1200 NI\)"](#) or [STR-30, "Work Flow \(Without GR8-1200 NI\)"](#).

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

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# S TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

## S TERMINAL CIRCUIT

### Description

INFOID:000000009751900

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 for CVT models or the clutch pedal is depressed for M/T models.

### Diagnosis Procedure

INFOID:000000009751901

#### 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" TERMINAL CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect starter motor connector.
3. Shift selector lever to "P" or "N" position. (CVT models)  
Keep depressing clutch pedal fully. (M/T models)
4. Check voltage between starter motor harness connector and ground.

Terminals		Condition	Voltage (Approx.)
(+)	(-)		
Starter motor harness connector	Terminal		
F10	1	When the ignition switch is in START position	Battery voltage

#### Is the inspection result normal?

YES >> "S" terminal circuit is OK. Further inspection is necessary. Refer to [STR-27, "Work Flow \(With GR8-1200 NI\)"](#) or [STR-30, "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 and IPDM E/R harness connector.

Starter motor harness connector		IPDM E/R harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
F10	1	E10	3	Existed

#### Is the inspection result normal?

YES >> Further inspection is necessary. Refer to [STR-27, "Work Flow \(With GR8-1200 NI\)"](#) or [STR-30, "Work Flow \(Without GR8-1200 NI\)"](#).

NO >> Repair the harness.

# STARTING SYSTEM

< SYMPTOM DIAGNOSIS >

## SYMPTOM DIAGNOSIS

### STARTING SYSTEM

#### Symptom Table

INFOID:000000009751902

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STR

Symptom	Reference
No normal cranking	Refer to <a href="#">STR-27, "Work Flow (With GR8-1200 NI)"</a> or <a href="#">STR-30, "Work Flow (Without GR8-1200 NI)"</a> .
Starter motor does not rotate	

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# STARTER MOTOR

< REMOVAL AND INSTALLATION >

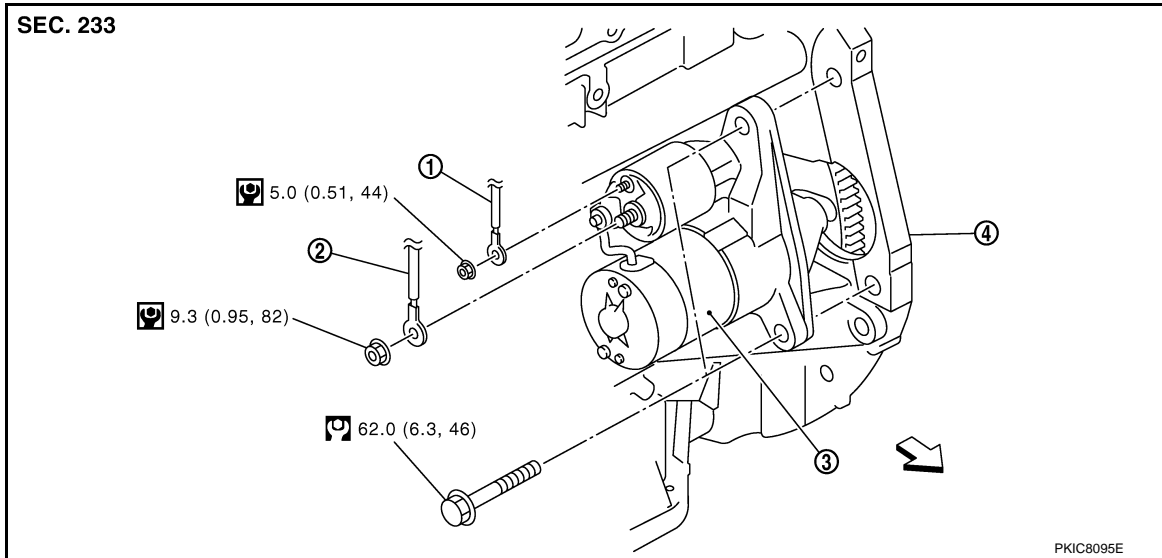
## REMOVAL AND INSTALLATION

### STARTER MOTOR

Exploded View

INFOID:000000009751903

#### REMOVAL



1. "S" terminal harness

2. "B" terminal harness

3. Starter motor

4. Cylinder block

↔ : Vehicle front

🔧 : N·m (kg-m, ft-lb)

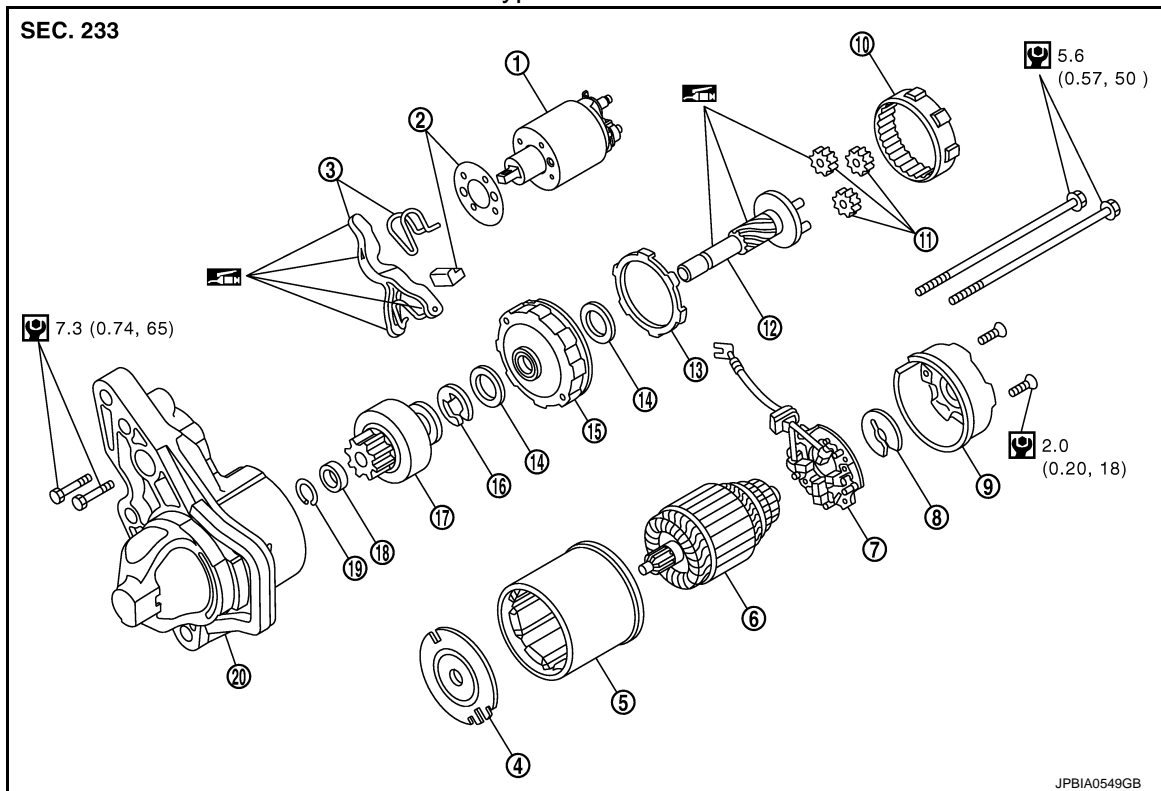
🔧 : N·m (kg-m, in-lb)

#### DISASSEMBLY

# STARTER MOTOR


< REMOVAL AND INSTALLATION >

Type: S114-955



- |                             |                        |                        |
|-----------------------------|------------------------|------------------------|
| 1. Magnetic switch assembly | 2. Dust cover kit      | 3. Shift lever set     |
| 4. Center bracket (A)       | 5. Yoke assembly       | 6. Armature assembly   |
| 7. Brush holder assembly    | 8. Thrust washer       | 9. Rear cover assembly |
| 10. Internal gear           | 11. Planetary gear     | 12. Pinion shaft       |
| 13. Packing                 | 14. Thrust washer      | 15. Center bracket (P) |
| 16. E-ring                  | 17. Pinion assembly    | 18. Pinion stopper     |
| 19. Pinion stopper clip     | 20. Gear case assembly |                        |

 : High-temperature grease point

 : N·m (kg·m, in·lb)

## NOTE:

Apply high-temperature grease to lubricate the bearing, gears and frictional surface when assembling the starter.

## Removal and Installation

INFOID:000000009751904

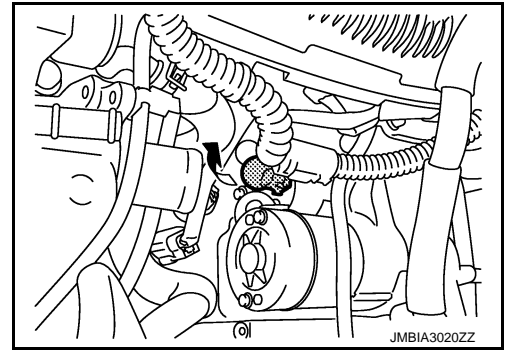
### REMOVAL

1. Disconnect the battery cable from the negative terminal. Refer to [PG-99, "Removal and Installation"](#).
2. Drain engine coolant from radiator. Refer to [CO-8, "Draining"](#).
3. Remove charge air cooler. Refer to [EM-30, "Removal and Installation"](#).
4. Remove CVT water hose on thermostat housing side (CVT models). Refer to [CO-22, "Exploded View"](#).
5. Remove radiator hose (lower) on water inlet side. Refer to [CO-14, "Removal and Installation"](#).
6. Move CVT water hose A and radiator hose (lower) to a location where they do not inhibit work.

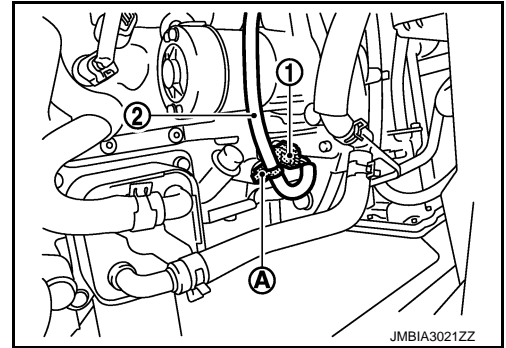
# STARTER MOTOR

## < REMOVAL AND INSTALLATION >

7. Open "B" terminal cover, in the direction indicated by an arrow, as shown in the figure.



8. Remove "B" terminal nut and "B" terminal harness.
9. Remove "S" terminal nut and "S" terminal harness.
10. Disconnect harness connector (1) from crankshaft position sensor.
11. Remove harness fixing clip (A) from oil pan (upper), and then move harness (2) to a location where they do not inhibit work.



12. Remove starter motor mounting bolts.
13. Remove starter motor forward from the vehicle.

## INSTALLATION

Note the following items, and install in the reverse order of removal.

### CAUTION:

- Be careful to tighten "B" terminal nut to the specified torque.
- After work is complete fill engine coolant. Refer to [CO-9, "Refilling"](#).

# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Starter Motor

INFOID:000000009751905

A

STR

Type	S114 - 955		
	HITACHImake		
	Reduction gear type		
System voltage	[V]	12	
No-load	Terminal voltage	[V]	11
	Current	[A]	Less than 110
	Revolution	[rpm]	More than 3000

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