SECTION STR
STARTING SYSTEM

CONTENTS

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow (With GR8-1200 NI)

INFOID:0000000009945301

STARTING SYSTEM DIAGNOSIS WITH GR8-1200 NI

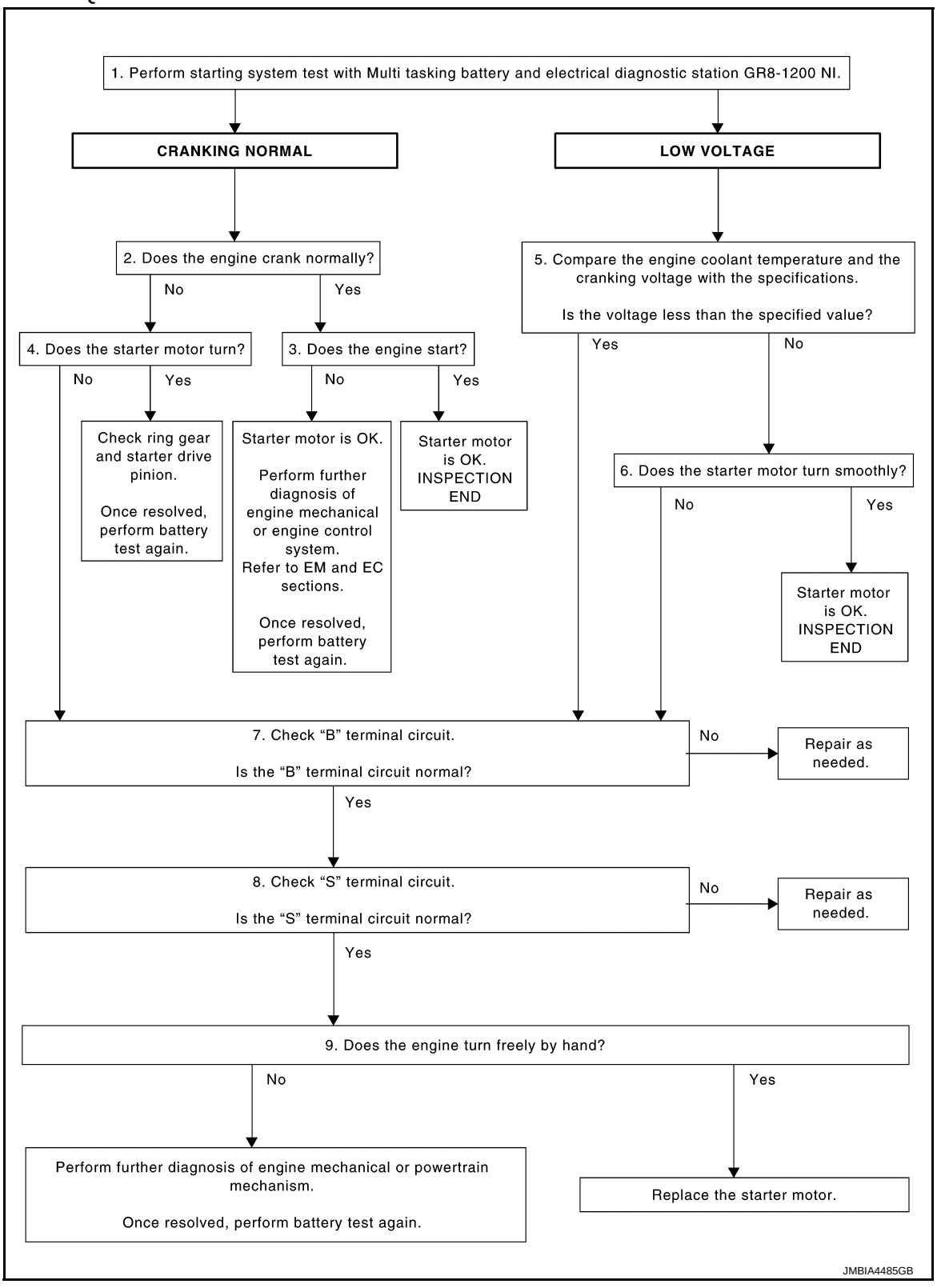
To test the starting system, use the following special service tool:

- GR8-1200 NI Multitasking battery and electrical diagnostic station

NOTE:

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

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

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-12, "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-13, "Diagnosis Procedure".

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.

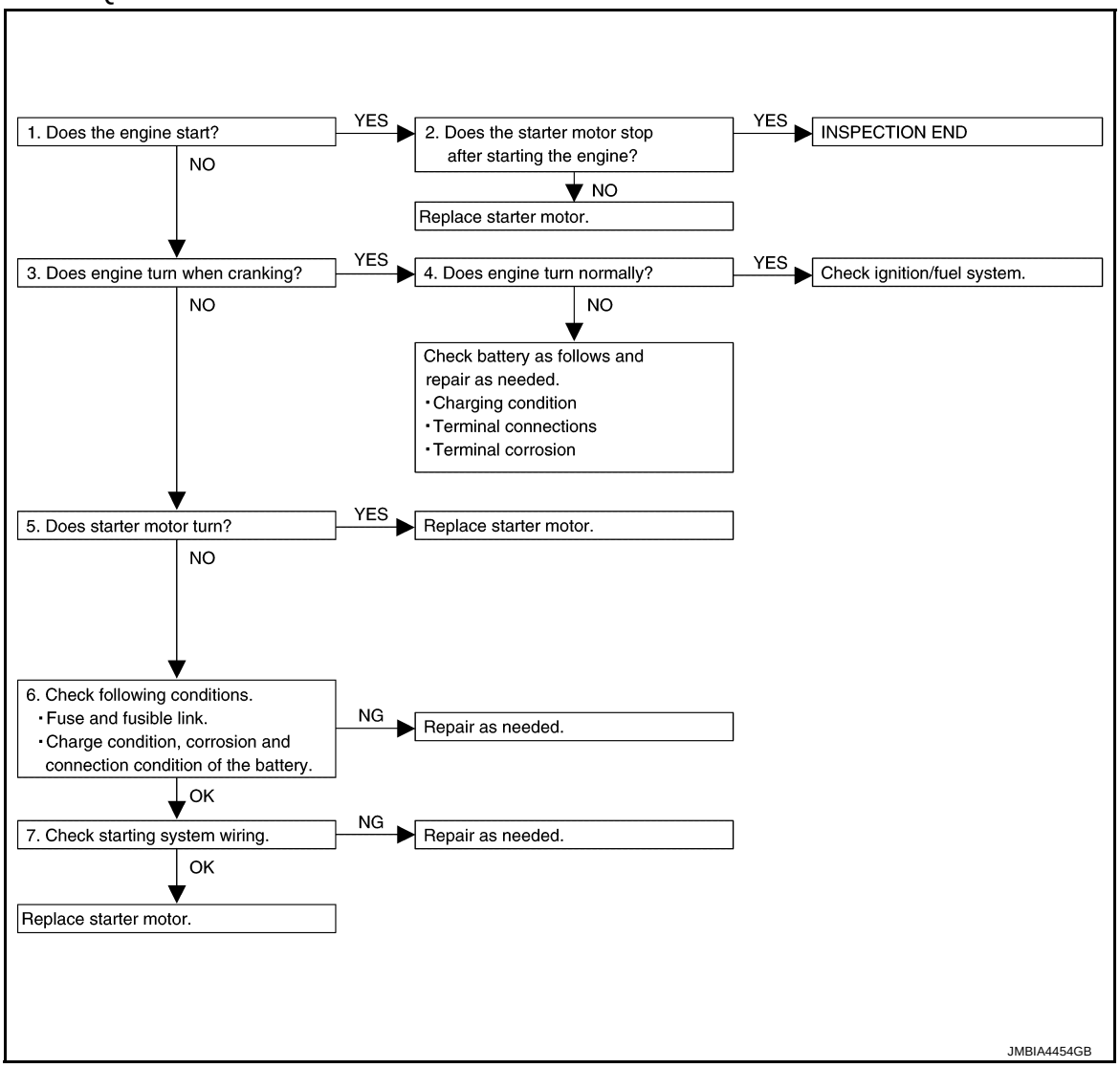
Does the engine turn freely by hand?

YES >> Replace starter motor. Refer to STR-26, "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:0000000009945302

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.

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-26, "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-3, "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-26, "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-3, "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-12, "Diagnosis Procedure".
- “S” terminal circuit. Refer to STR-13, "Diagnosis Procedure".

Are these inspection results normal?

YES >> Replace starter motor. Refer to STR-26, "Removal and Installation".
NO >> Repair as needed.

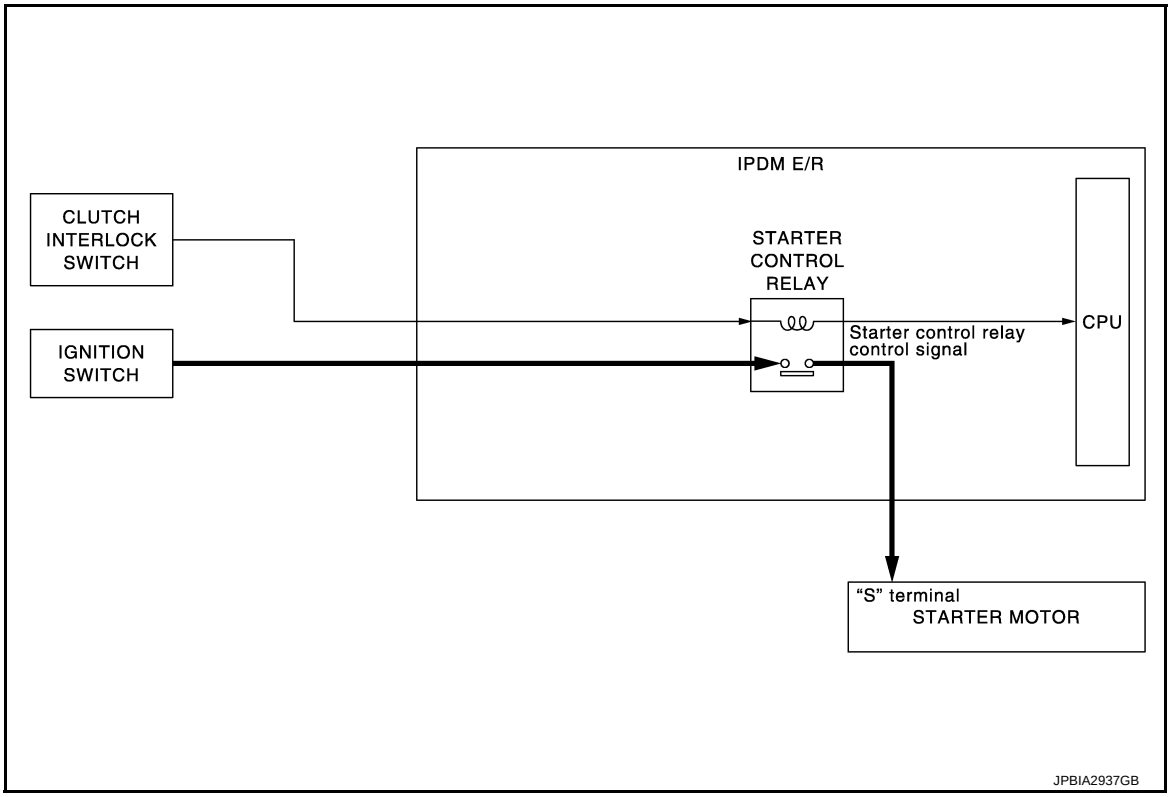
SYSTEM DESCRIPTION

STARTING SYSTEM

M/T

M/T : System Diagram

INFOID:0000000009945303



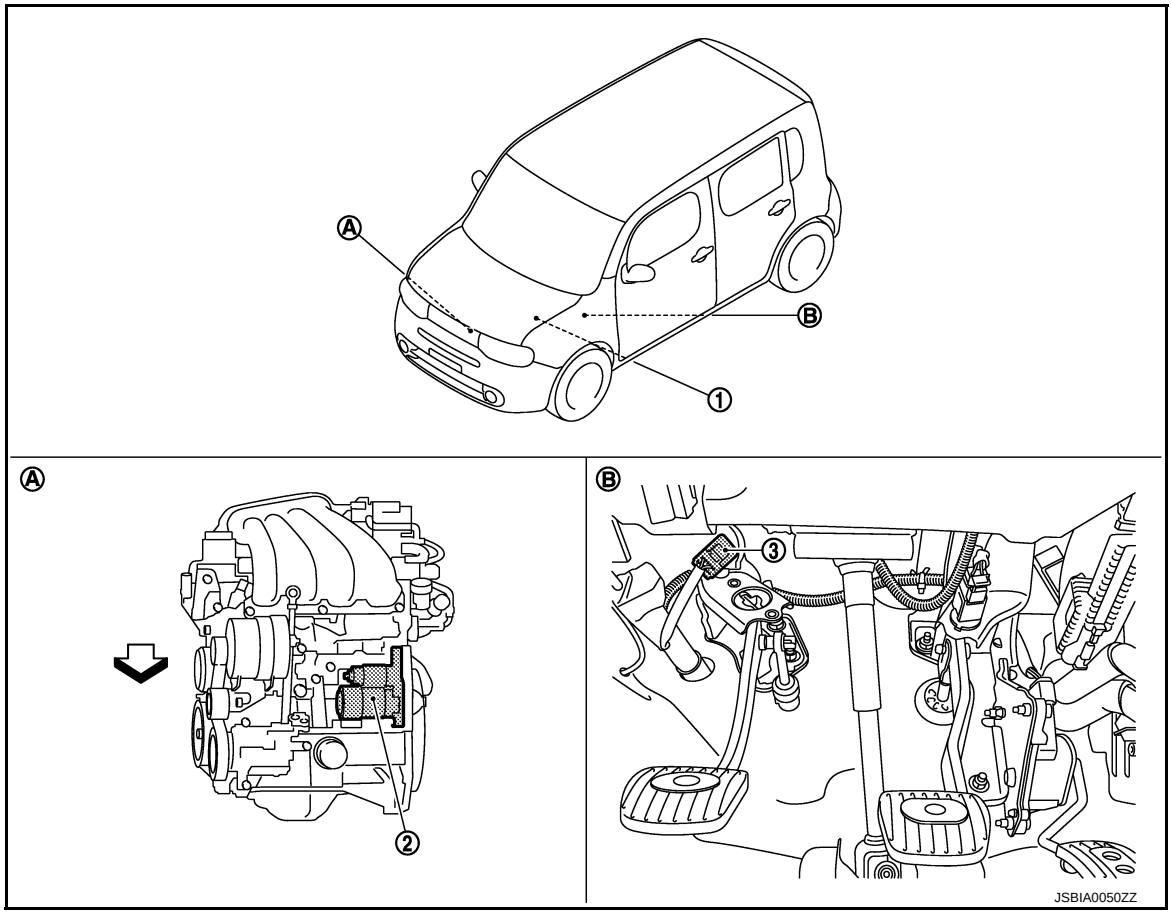
M/T : System Description

INFOID:0000000009945304

- When the clutch interlock switch is turned ON, power is supplied to starter control relay. And IPDM E/R (CPU) detect clutch interlock switch 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, then battery power is supplied to starter motor ("S" terminal) through starter control relay.

M/T : Component Parts Location

INFOID:0000000009945305



1. IPDM E/R
   Refer to PCS-36, "Component Parts Location".
2. Starter motor
3. Clutch interlock switch

A. Engine
B. Clutch pedal

⇦ :Vehicle front

M/T : Component Description

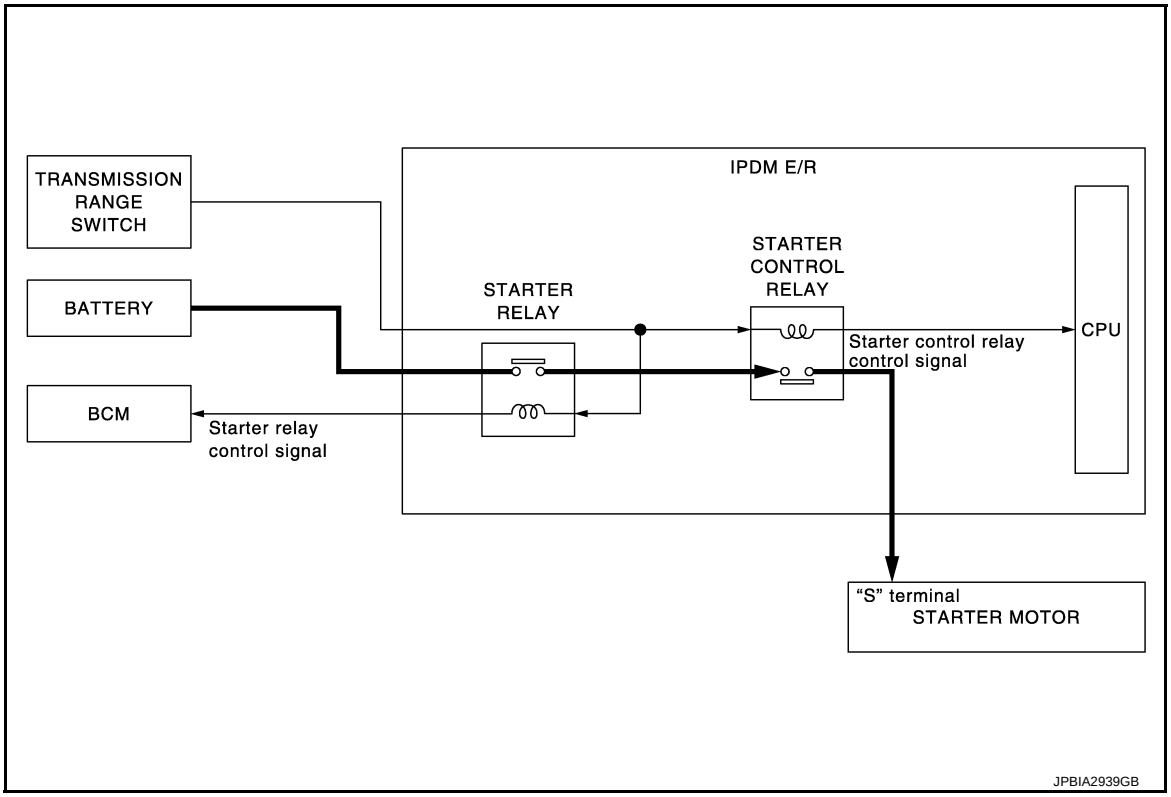
INFOID:0000000009945306

Component part	Description
Clutch interlock switch	The switch turns ON and electric power is supplied to the starter control relay inside IPDM E/R when the clutch pedal is depressed.
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.

CVT

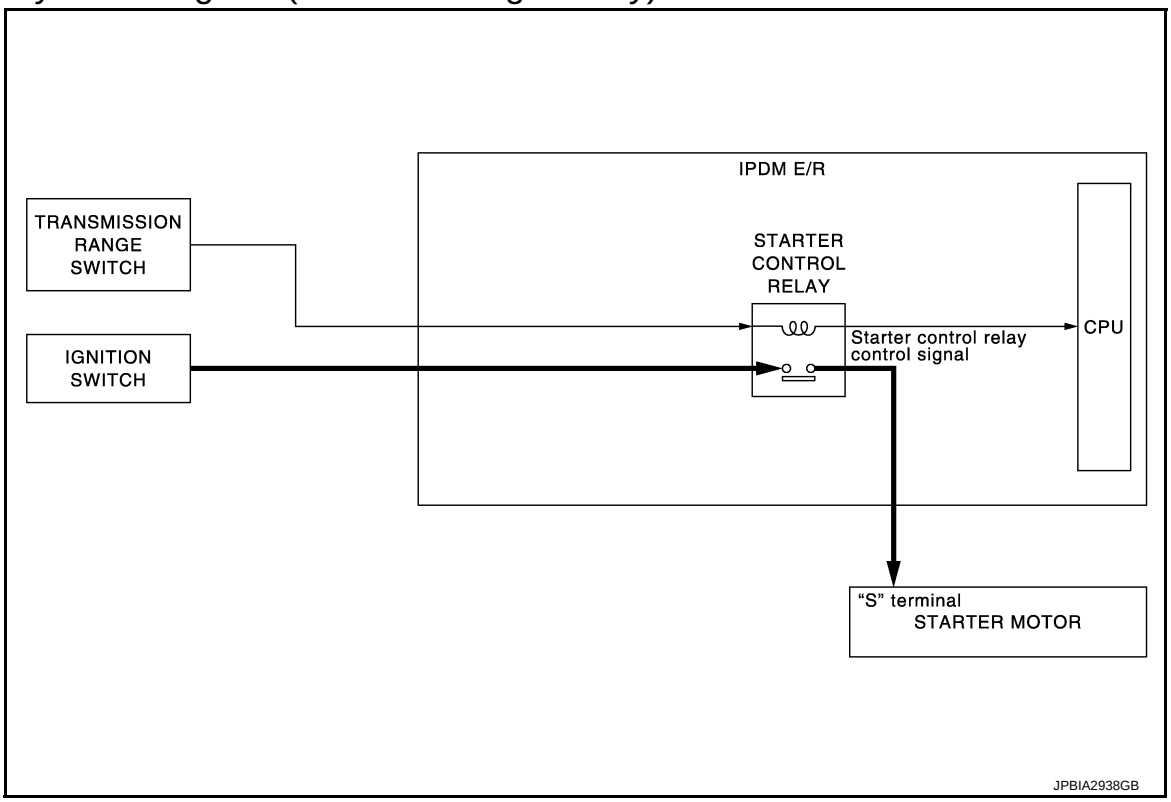
CVT : System Diagram (With Intelligent Key)

INFOID:0000000009945307



CVT : System Diagram (Without Intellgent Key)

INFOID:0000000009945308



CVT : System Description (With Intelligent Key)

INFOID:0000000009945309

- 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.

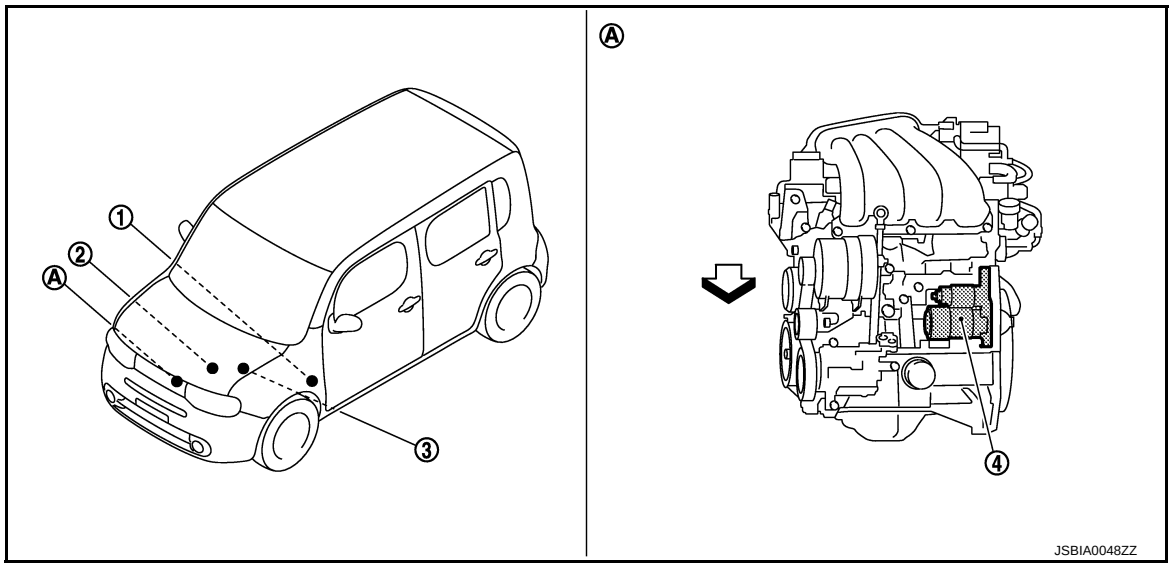
CVT : System Description (Without Intelligent Key)

INFOID:0000000009945310

- 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.

CVT : Component Parts Location

INFOID:0000000009945311



1. BCM
   Refer to BCS-10, "Component Parts Location". (With Intelligent Key)
   Refer to BCS-95, "Component Parts Location". (Without Intelligent Key)
2. Transmission range switch
   Refer to TM-71, "Component Parts Location".
3. IPDM E/R
   Refer to PCS-5, "Component Parts Location". (With Intelligent Key)
   Refer to PCS-36, "Component Parts Location". (Without Intelligent Key)
4. Starter motor

A. Engine

⇦ :Vehicle front

CVT : Component Description (With Intellgent Key)

INFOID:0000000009945312

Component part	Description
Transmission range switch	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.
BCM	BCM controls the starter relay inside IPDM E/R.
IPDM E/R	CPU inside IPDM E/R controls the starter control relay.
Starter motor	The starter motor plunger closes and the motor is supplied with battery power, which in turn cranks the engine, when the “S” terminal is supplied with electric power.

CVT : Component Description (Without Intelligent Key)

INFOID:0000000009945313

Component part	Description
Transmission range switch	Transmission range switch supplies power to the starter relay inside IPDM E/R when the selector lever is shifted to the P or N position.
IPDM E/R	CPU inside IPDM E/R controls the starter control relay.
Starter motor	The starter motor plunger closes and the motor is supplied with battery power, which in turn cranks the engine, when the “S” terminal is supplied with electric power.

DTC/CIRCUIT DIAGNOSIS

B TERMINAL CIRCUIT

Description

INFOID:0000000009945314

The “B” terminal is constantly supplied with battery power.

Diagnosis Procedure

INFOID:0000000009945315

CAUTION:

Perform diagnosis under the condition that engine cannot start by the following procedure.

1. **Remove fuel pump fuse.**
2. **Crank or start the engine (where possible) until the fuel pressure is released.**

1.CHECK “B” TERMINAL CIRCUIT

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

Terminals			Voltage (Approx.)
(+)		(–)	
Starter motor “B” terminal	Terminal		
F56	2	Ground	Battery voltage

Is the inspection result normal?

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

2.CHECK BATTERY CABLE CONNECTION STATUS (VOLTAGE DROP TEST)

1. Shift CVT 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		
Battery positive terminal	F56	2	When the ignition switch is in START position	Less than 0.5 V

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check harness between the battery and the starter motor for poor continuity.

3.CHECK GROUND CIRCUIT STATUS (VOLTAGE DROP TEST)

1. Shift CVT 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.

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

Is the inspection result normal?

YES >> “B” terminal circuit is OK. Further inspection is necessary. Refer to STR-2, "Work Flow (With GR8-1200 NI)" or STR-5, "Work Flow (Without GR8-1200 NI)".
NO >> Check the starter motor case and ground for poor continuity.

S TERMINAL CIRCUIT

Description

INFOID:0000000009945316

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:0000000009945317

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 CVT 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	Ground	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-2, "Work Flow (With GR8-1200 NI)" or STR-5, "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?

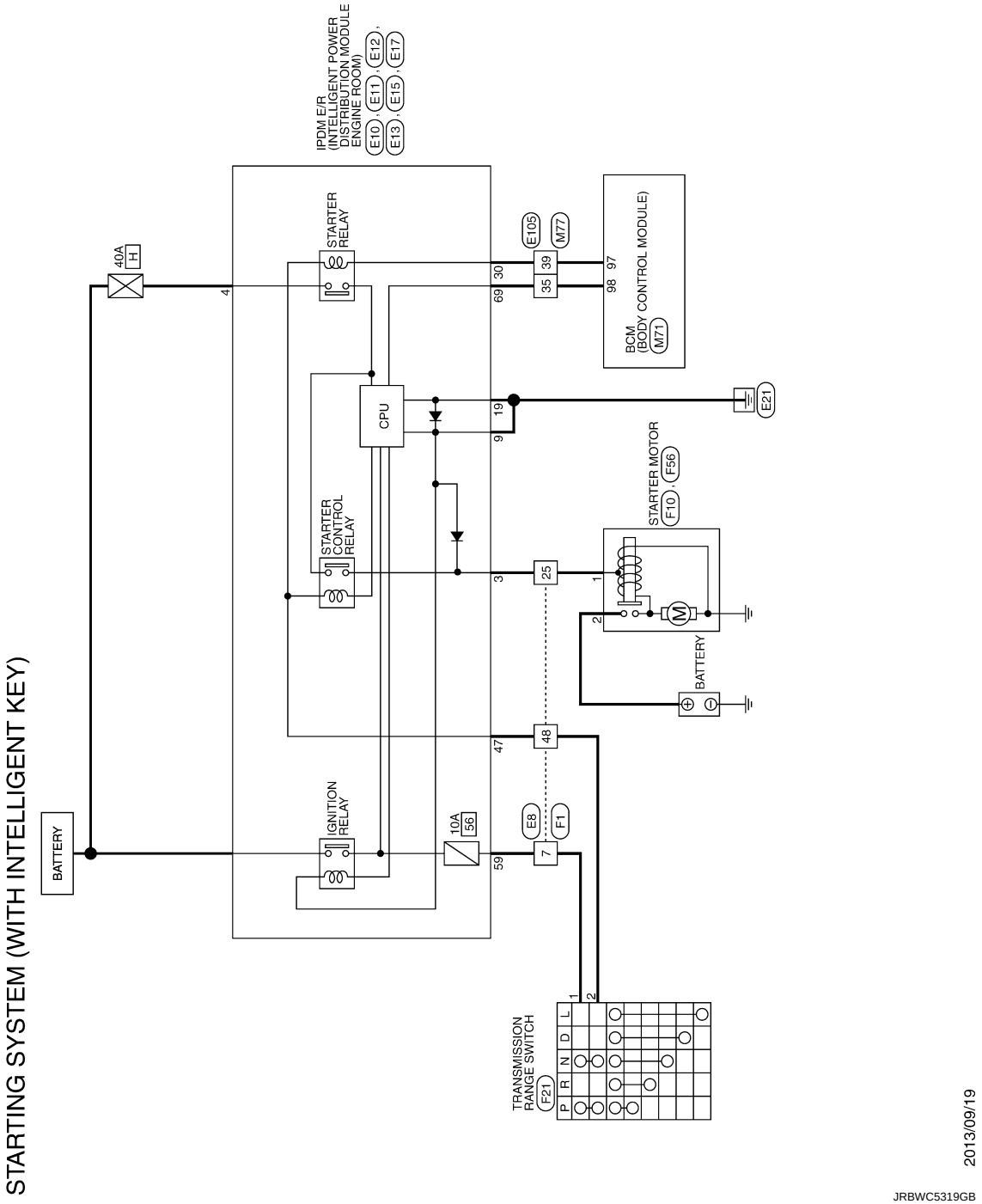
YES >> Further inspection is necessary. Refer to STR-2, "Work Flow (With GR8-1200 NI)" or STR-5, "Work Flow (Without GR8-1200 NI)".

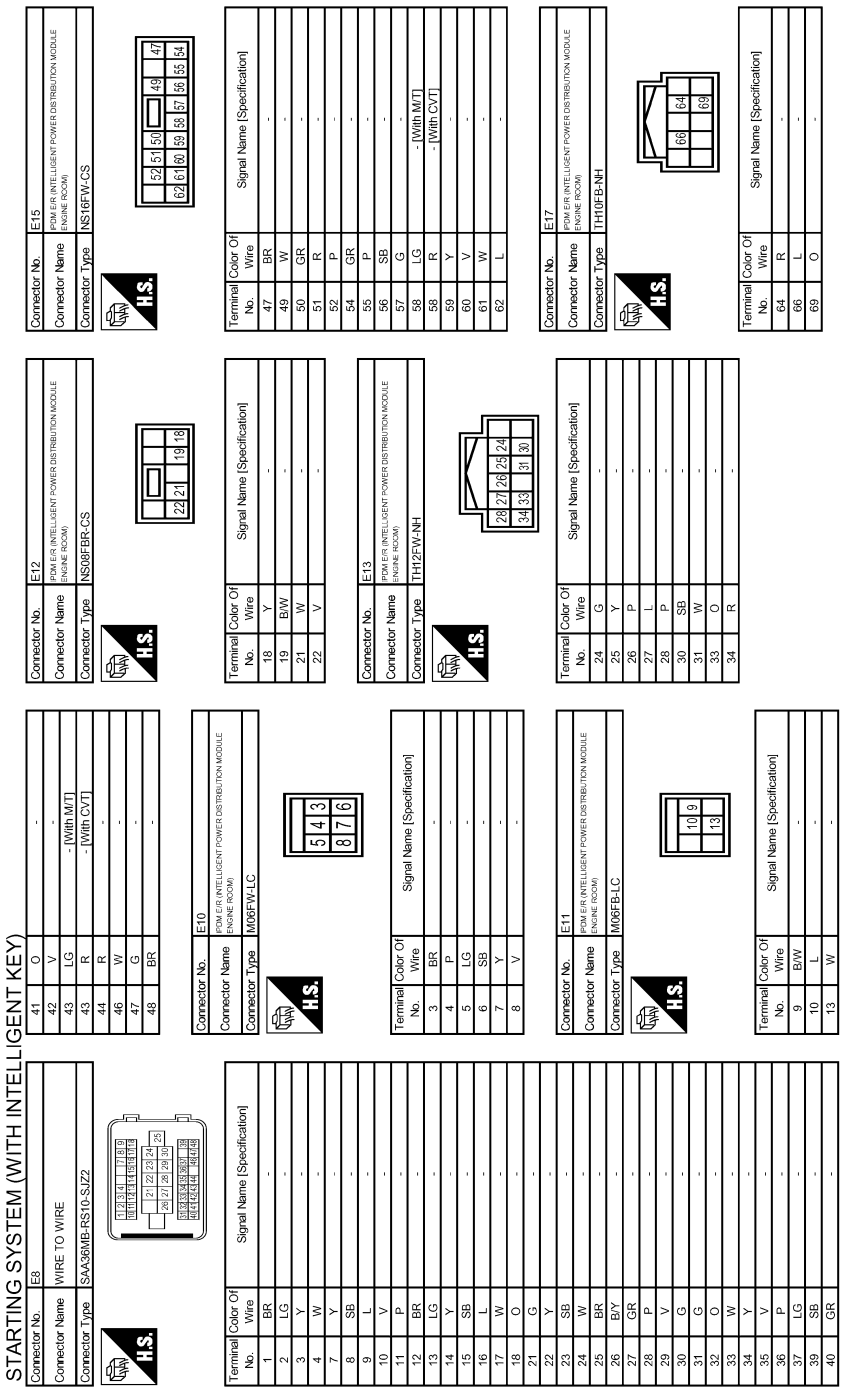
NO >> Repair the harness.

STARTING SYSTEM

Wiring Diagram - STARTING SYSTEM (WITH INTELLIGENT KEY) -

INFOID:0000000009945318





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STARTING SYSTEM (WITH INTELLIGENT KEY)

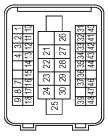
Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	V	-
2	W	-
3	SB	-
4	G	-
5	P	-
6	L	- [With NAVI]
6	R	- [Without NAVI]
7	Y	-
8	O	-
9	W	-
10	SB	-
31	V	-
32	R	-
33	GR	-
34	P	-
35	Y	-
36	BR	-
39	SB	-
44	R	-
45	V	-
46	P	-
48	L	-
51	B	- [With M/T]
51	BR	- [With CVT]
53	SB	-
54	O	- [With M/T]
54	W	- [With CVT]
57	LG	-
59	L	-
60	O	-
61	G	-
62	W	-
63	L	-
67	GR	- [With CVT]
67	V	- [With M/T]
69	P	-
70	SHIELD	-
71	GR	-
72	LG	-
73	P	-
74	V	-
76	Y	-
77	LG	-
78	O	-
79	G	-
80	P	-
81	L	-
82	W	-
83	BR	-
84	B	-
91	W	-
92	Y	-
93	Y	-
94	R	-
95	V	-
96	LG	-
97	R	-
98	SB	-
99	G	-
100	P	-

Connector No.	F1
Connector Name	WIRE TO WIRE
Connector Type	SAA36FB-RS10-SJZ2

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
1	SB	-
2	LG	-
3	R	-
4	Y	-
7	V	-
8	G	-
9	SB	-
10	L	-
11	Y	-
12	GR	-
13	BR	-
14	G	-
15	W	-
16	Y	-
17	P	-
18	BR	-
21	G	-
22	L	-
23	W	-
24	R	-
25	R	-
26	B	-
27	SB	-
28	V	-
29	V	-
30	BR	-
31	GR	-
32	BR	-
33	W	-
34	LG	-
35	V	-
36	Y	-
37	W	-
39	G	-
40	P	-
41	O	-
42	G	-
43	R	-
44	P	-
46	GR	-
47	Y	-
48	BR	-

Connector No.	F10
Connector Name	STARTER MOTOR
Connector Type	24340_ED024

H.S.

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

Connector No.	F21
Connector Name	TRANSMISSION RANGE SWITCH
Connector Type	RK08FG

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-
2	W	-
3	R	-
4	GR	-
5	SB	-
6	W	-
7	Y	-
8	G	-

Connector No.	F56
Connector Name	STARTER MOTOR
Connector Type	24340_JG04B

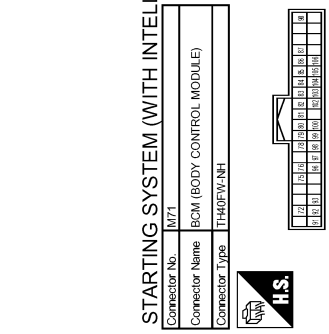
H.S.

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

JRBWC5365GB

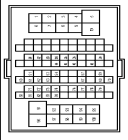
STARTING SYSTEM (WITH INTELLIGENT KEY)

Connector No.	M71
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FW-NH



Terminal No.	Color Of Wire	Signal Name [Specification]
72	SB	A/C INDICATOR OUTPUT
75	SB	DRIVER DOOR REQUEST SW
76	L/O	PUSH SW
78	LG	DRIVER DOOR ANT+
79	V	DRIVER DOOR ANT-
80	BR/Y	PASSENGER DOOR ANT+
81	L/Y	PASSENGER DOOR ANT-
82	W/B	BACK DOOR ANT+
83	B/W	BACK DOOR ANT-
84	Y/G	ROOM ANT+
85	Y/L	ROOM ANT-
86	P	LUGGAGE ROOM ANT+
87	L	LUGGAGE ROOM ANT-
90	W/L	PUSH-BUTTON IGNITION SW ILL POWER
91	Y	ACC/ON IND
92	BR/R	PUSH-BUTTON IGNITION SW ILL GND
93	GR/W	I-KEY WARN BUZZER
96	BR/W	ACC RELAY CONT
97	L/R	STARTER RELAY CONT
98	BR	IGN RELAY (IPDM E/R) CONT
99	W/R	IGN RELAY CONT
100	G	PASSENGER DOOR REQUEST SW
102	G	SHIFT N/P
103	G/Y	FR DEFROSTER SW
104	Y/R	CVT SHIFT SELECTOR POWER SUPPLY
105	B/O	STOP LAMP SW 2
106	Y/B	BLOWER FAN MOTOR RELAY CONT

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4

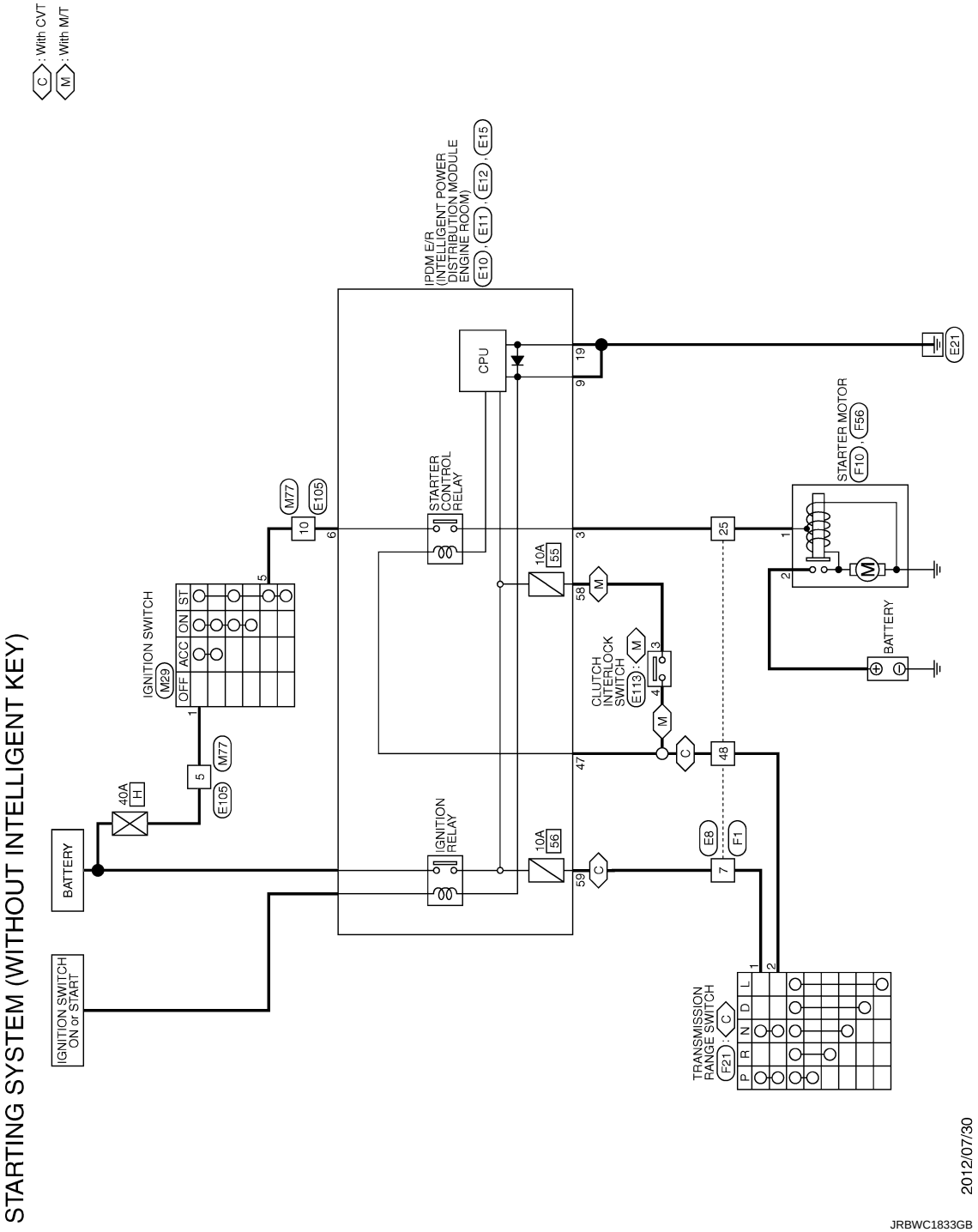


Terminal No.	Color Of Wire	Signal Name [Specification]
1	B/O	-
2	R	-
3	G/R	-
4	G/B	-
5	L	-
6	L	-
7	W/R	-
8	G/W	-
9	Y/L	-
10	W	-
31	GR/L	-
32	L/B	-
33	R/Y	-
34	SB	-
35	BR	-
36	G	-
39	L/R	-
44	G/O	-
45	LG/R	-
46	GR/W	-
48	L/O	-
51	B/W	-
53	R/L	-
54	O	-
57	GR	-
59	V	-
60	R/W	-
61	PU/W	-
62	W/L	-
63	W/B	-
67	Y/R	-
69	LG	-
70	SHIELD	-
71	P/B	-
72	R/G	-
73	R	-
74	L/Y	-
76	W/G	-
77	GR/R	-
78	O	-
79	LG	-
80	P	-
81	L	-
82	G/R	-
83	G/R	-
84	B	-
91	R	-
92	O	-
93	Y	-
94	R/B	-
95	L/W	-
96	Y	-
97	L	-
98	BR/W	-
99	W	-
100	G/R	-

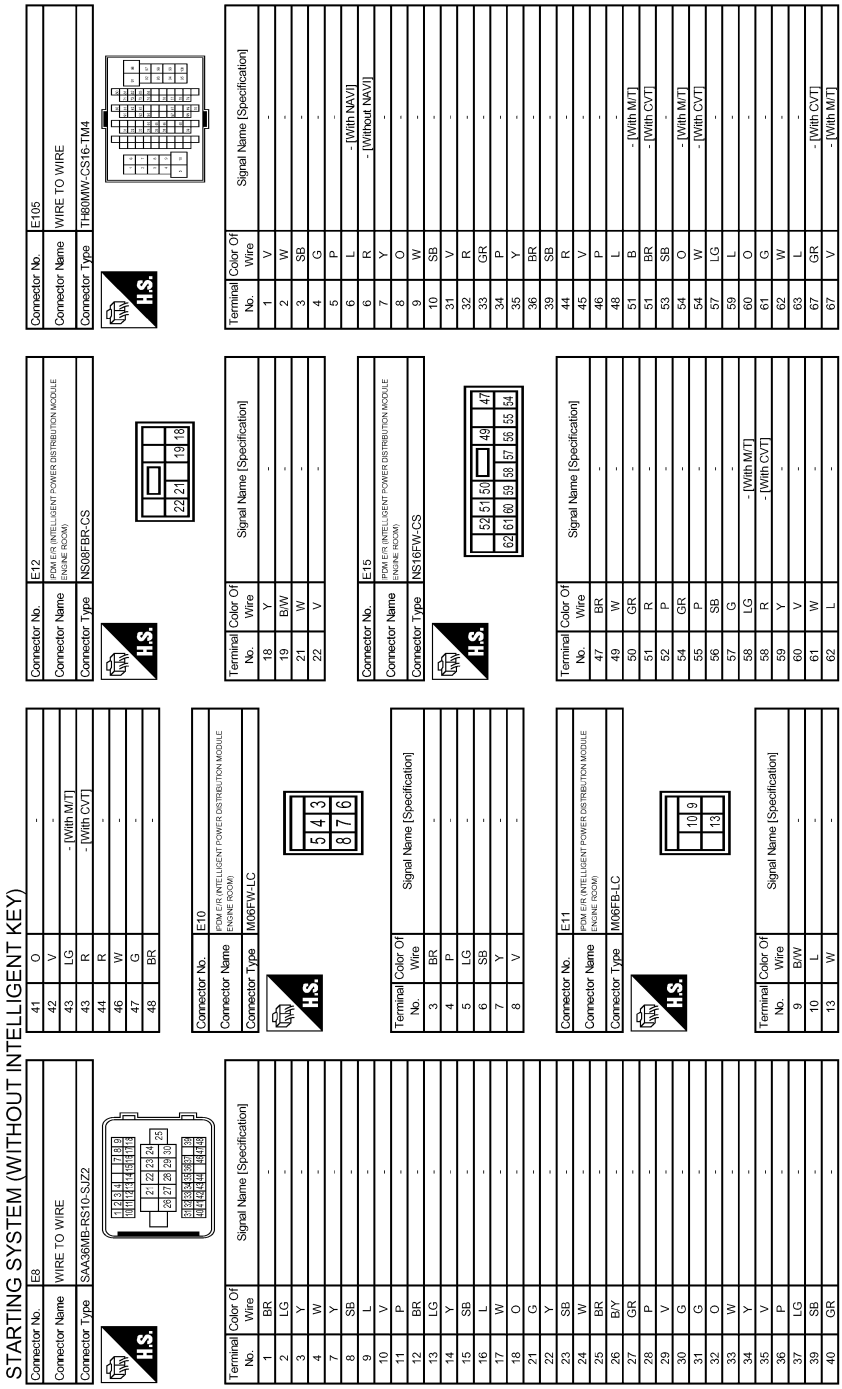
JRBWC5366GB

Wiring Diagram - STARTING SYSTEM (WITHOUT INTELLIGENTKEY) -

INFOID:0000000009945319



STARTING SYSTEM (WITHOUT INTELLIGENT KEY)



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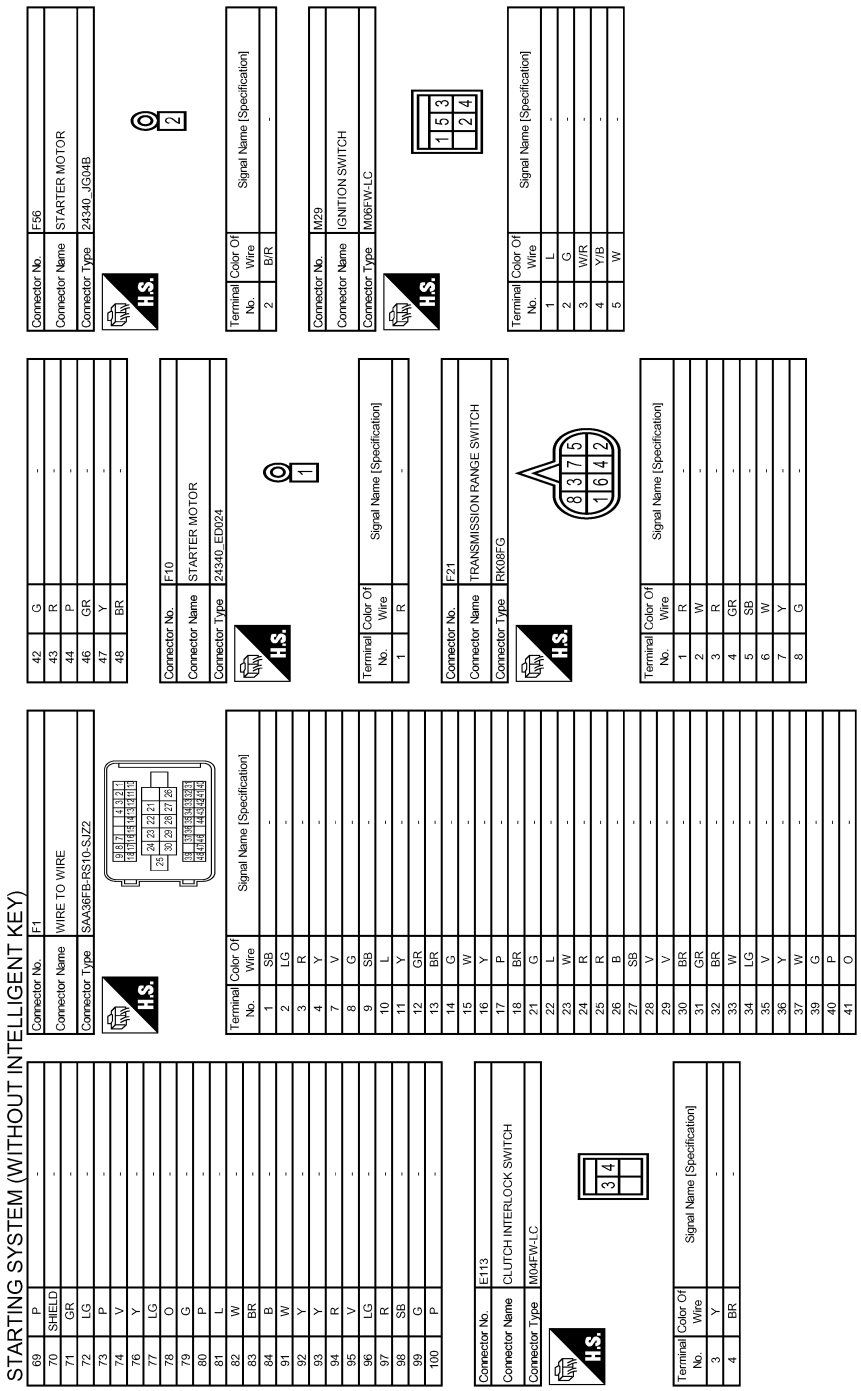

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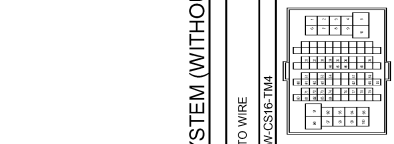
STARTING SYSTEM (WITHOUT INTELLIGENT KEY)

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
1	B/O	-
2	R	-
3	G/R	-
4	G/B	-
5	L	-
6	L	-
7	W/R	-
8	G/W	-
9	Y/L	-
10	W	-
31	GR/L	-
32	L/B	-
33	R/Y	-
34	SB	-
35	BR	-
36	G	-
39	L/R	-
44	G/O	-
45	LG/R	-
46	GR/W	-
48	L/O	-
51	B/W	-
53	R/L	-
54	O	-
57	GR	-
59	V	-
60	R/W	-
61	PU/W	-
62	W/L	-
63	W/B	-
67	Y/R	-
69	LG	-
70	SHIELD	-
71	P/B	-
72	R/G	-
73	R	-
74	L/Y	-
76	W/G	-
77	GR/R	-
78	O	-
79	LG	-
80	P	-
81	L	-
82	GR	-
83	G/R	-
84	B	-
91	R	-
92	O	-
93	Y	-
94	R/B	-
95	L/W	-
96	Y	-
97	L	-
98	BR/W	-
99	W	-
100	G/R	-

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SYMPTOM DIAGNOSIS

STARTING SYSTEM

Symptom Table

INFOID:0000000009945320

Symptom	Reference
No normal cranking	Refer to STR-2, "Work Flow (With GR8-1200 NI)" or STR-5, "Work Flow (Without GR8-1200 NI)".
Starter motor does not rotate	

PRECAUTION

PRECAUTIONS

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

INFOID:0000000009945321

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:

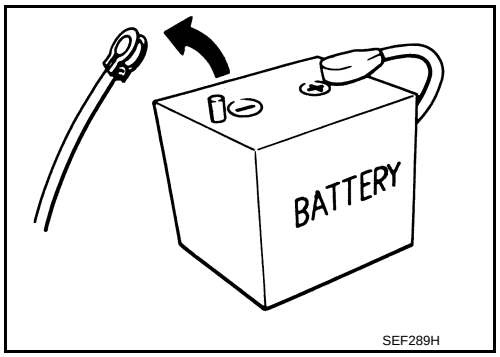
Always observe the following items for preventing accidental activation.

- **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:0000000010138348

- 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

PREPARATION

Special Service Tools

INFOID:0000000009945322

Tool number (Kent-Moore No.) Tool name	Description
— (—) Model GR8-1200 NI Multitasking battery and electrical diagnostic station  AWIIA1239ZZ	Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.

Commercial Service Tools

INFOID:0000000009945323

Tool name	Description
Power tool  PIIB1407E	Loosening bolts, nuts and screws

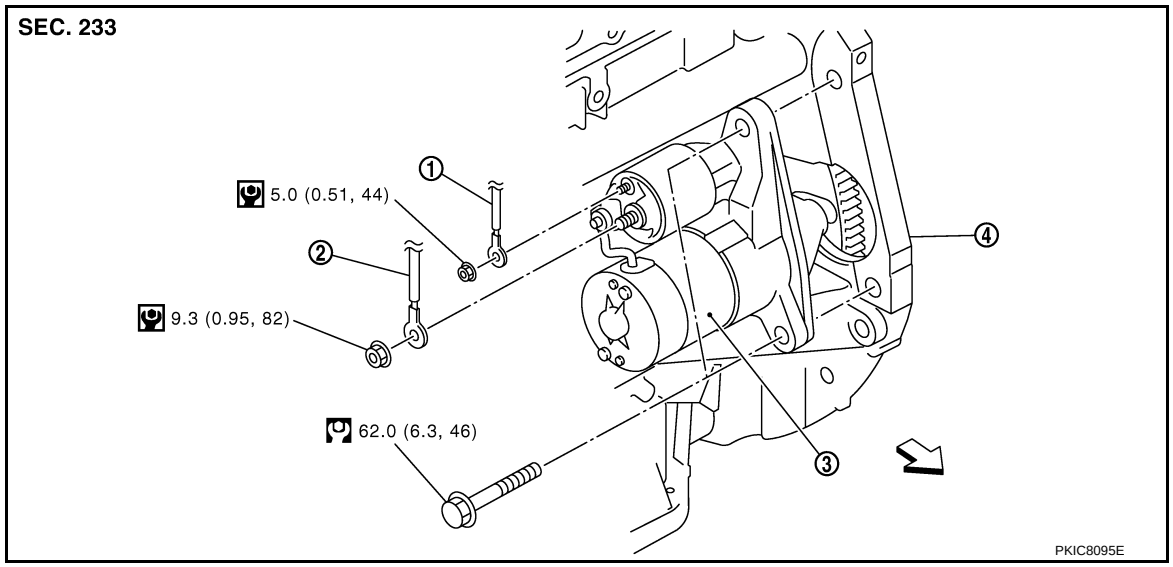
REMOVAL AND INSTALLATION

STARTER MOTOR

Exploded View

INFOID:0000000009945324

REMOVAL



1. “S” terminal harness
2. “B” terminal harness
3. Starter motor
4. Cylinder block

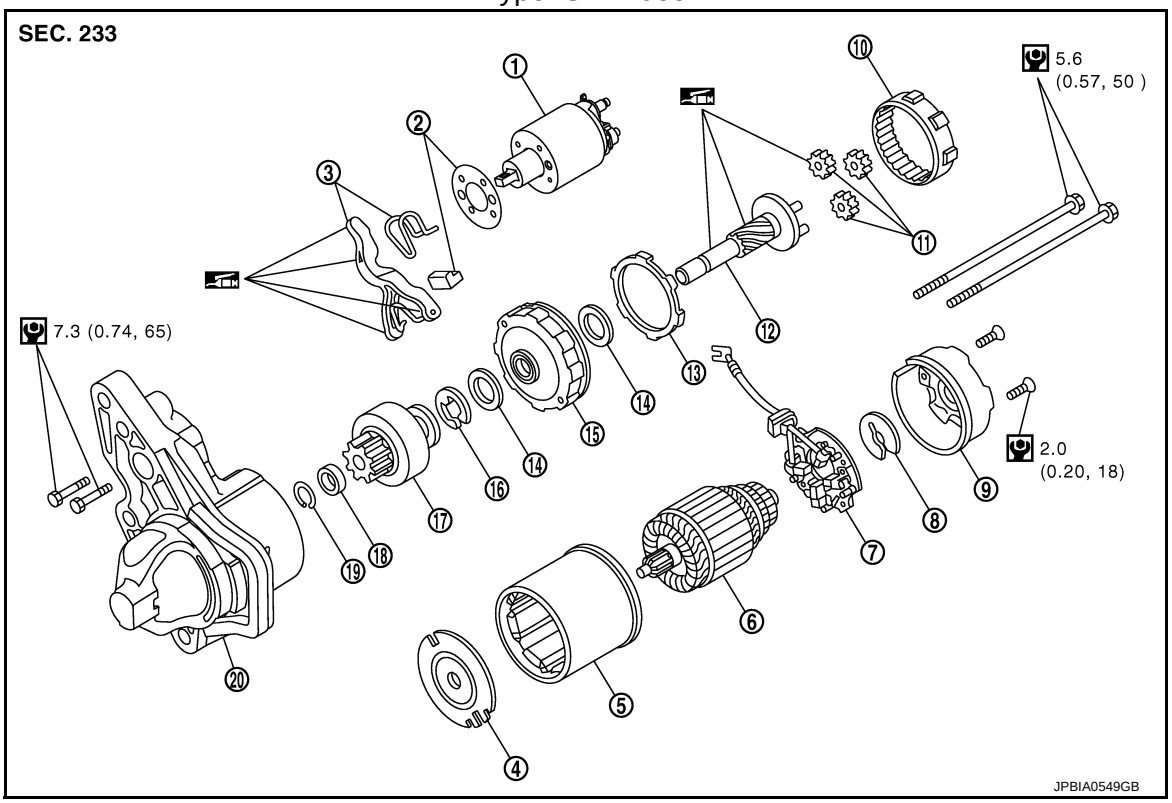
⇦ : Vehicle front

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

DISASSEMBLY

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:0000000009945325

REMOVAL

1. Disconnect the battery cable from the negative terminal.
2. Remove air duct (inlet). Refer to EM-24, "Exploded View".
3. Remove radiator reservoir tank.
4. Disconnect oil pressure switch connector.
5. Remove “B” terminal nut and “B” terminal harness.
6. Remove “S” terminal nut and “S” terminal harness.
7. Remove starter motor mounting bolts.
8. Remove starter motor upward from the vehicle.

INSTALLATION

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

CAUTION:
Be careful to tighten “B” terminal nut to the specified torque.

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Starter Motor

INFOID:0000000009945326

Type			S114-955
			HITACHI make
			Reduction gear type
System voltage		[V]	12
No-load	Terminal voltage	[V]	11
	Current	[A]	Less than 110
	Revolution	[rpm]	More than 3,000