

SECTION **CHG**
CHARGING SYSTEM

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< PRECAUTION >

PRECAUTION

PRECAUTIONS

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

INFOID:000000013439979

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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.
- Improper repair, 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 or batteries, and wait at least 3 minutes before performing any service.

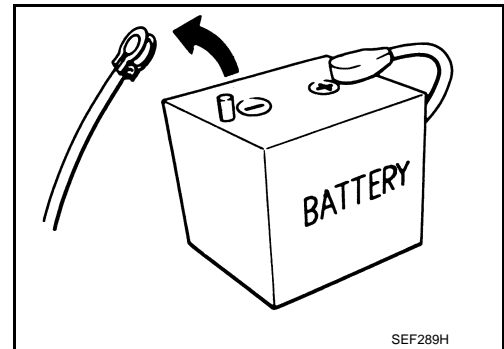
Precautions for Removing Battery Terminal

INFOID:000000013439984

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.
- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

BR08DE	: 4 minutes	V9X engine	: 4 minutes
D4D engine	: 20 minutes	YD25DDTi	: 2 minutes
HR09DET	: 12 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		



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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.

- After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.

NOTE:

PRECAUTIONS

[2.0L TURBO GASOLINE ENGINE]

< PRECAUTION >

- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
 - Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
 - Driving for 30 minutes or more on a steep slope.
- 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.

Precaution for Power Generation Voltage Variable Control System

INFOID:000000012789756

CAUTION:

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

PREPARATION

< PREPARATION >

[2.0L TURBO GASOLINE ENGINE]

PREPARATION

PREPARATION

Special Service Tools

INFOID:000000012789757

Tool number (Kent-Moore No.) Tool name	Description
<p>— (—) Model GR8-1200 NI Multitasking battery and electrical diagnostic station</p>	<p>Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.</p>
<p>— (—) Model EXP-800 NI Battery and electrical diagnostic analyzer</p>	<p>Tests batteries and charging systems. For operating instructions, refer to diagnostic analyzer instruction manual.</p>

Commercial Service Tools

INFOID:000000012789758

Tool name	Description
<p>Power tool</p>	<p>Loosening bolts, nuts and screws</p>

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< SYSTEM DESCRIPTION >

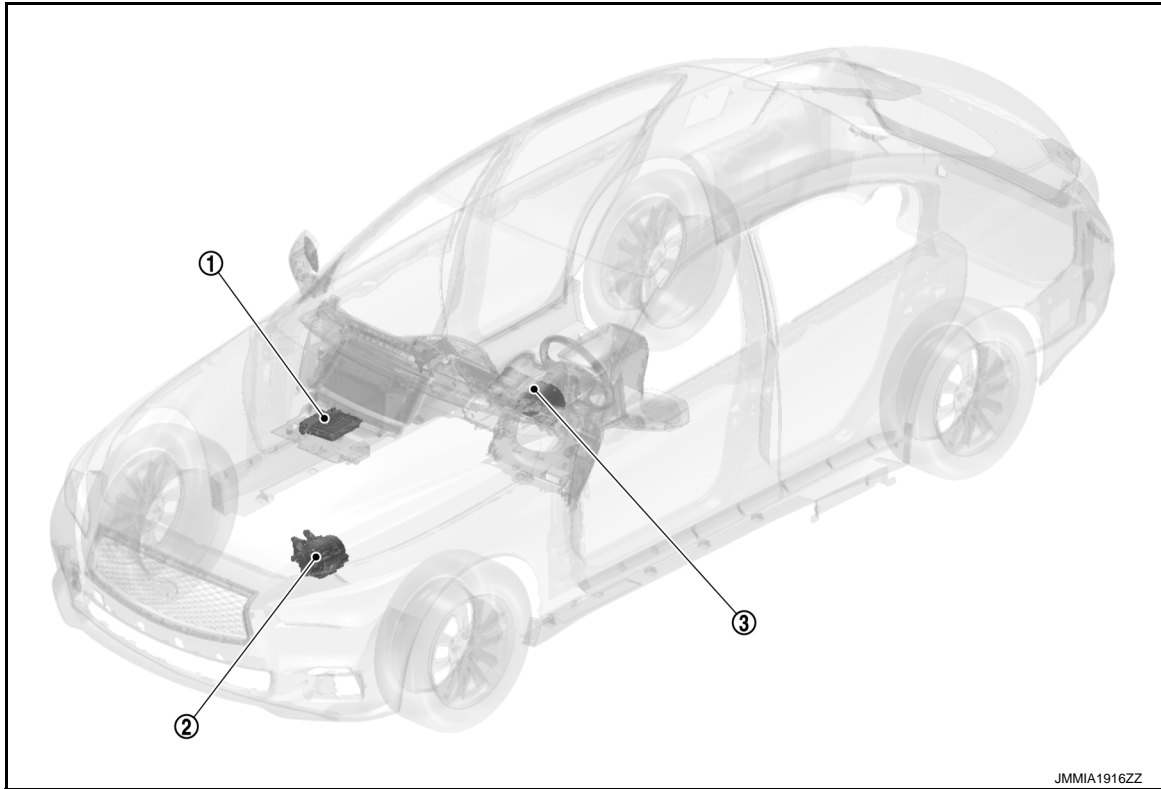
SYSTEM DESCRIPTION

COMPONENT PARTS

CHARGING SYSTEM

CHARGING SYSTEM : Component Parts Location

INFOID:000000012789759

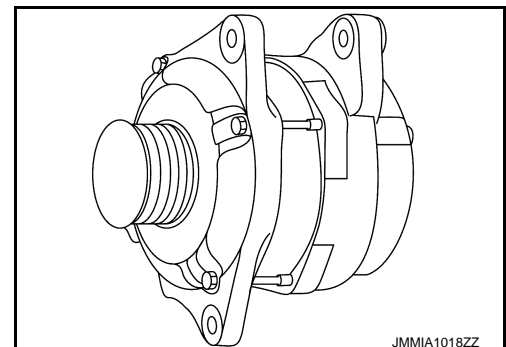


No.	Component	Function
①	ECM	ECM consult alternator generation and charge warning lamp. Refer to EC4-25, "ENGINE CONTROL SYSTEM : Component Parts Location" for detailed installation location.
②	Alternator	Refer to CHG-6, "CHARGING SYSTEM : Alternator" .
③	Combination meter (Charge warning lamp)	Combination meter indicates charge warning lamp judged with charge warning lamp signal received from ECM. Refer to MWI-24, "WARNING LAMPS/INDICATOR LAMPS : Charge Warning Lamp (2.0L Turbo Gasoline Engine Models)" .

CHARGING SYSTEM : Alternator

INFOID:000000012789760

- The alternator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC voltage regulator.
- The output voltage of the alternator is controlled by the IC voltage regulator inside the alternator. IC voltage regulator controls the power generation voltage by the target power generation voltage based on the received power generation command signal. When there is no power generation command signal, the alternator performs the normal power generation according to the characteristic of the IC voltage regulator.



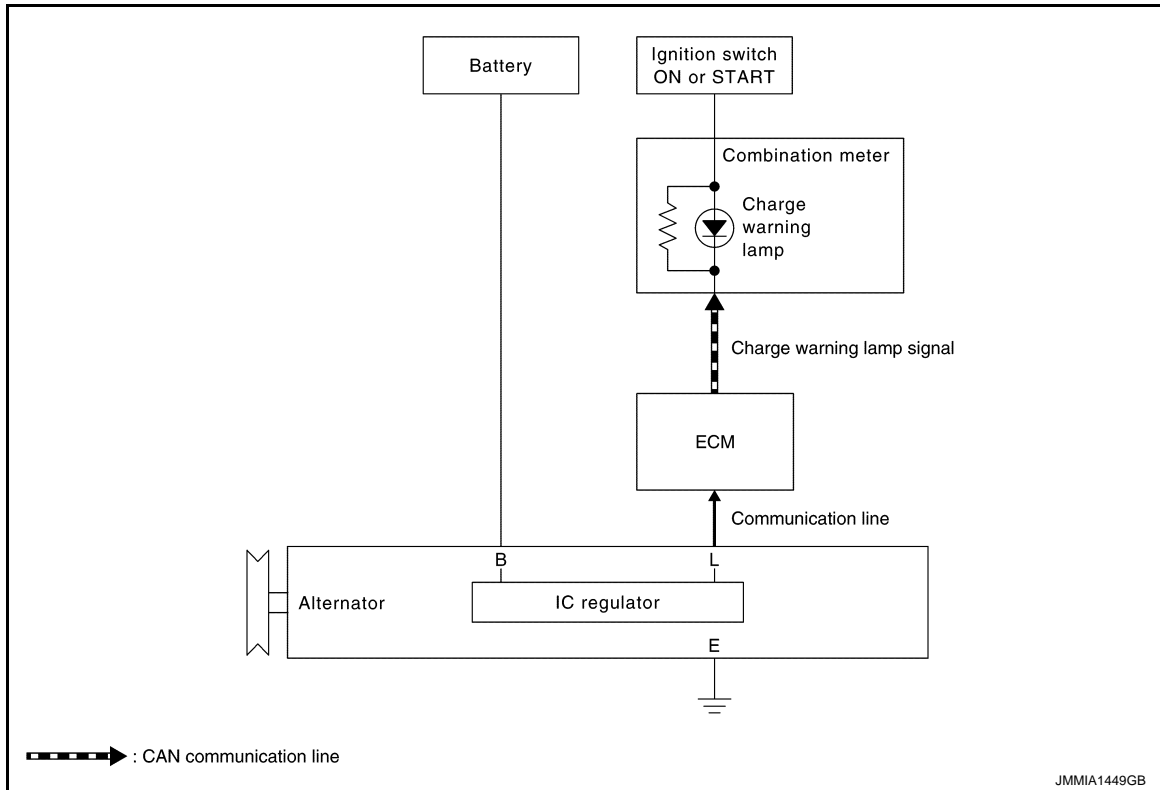
SYSTEM

CHARGING SYSTEM

CHARGING SYSTEM : System Description

INFOID:000000012789763

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

ECM controls the alternator control response, for example, in order to reduce the regulation voltage (charging voltage) when the engine is at idle and the battery is sufficiently charged.

Reducing the engine loading in this manner decrease the quantify of fuel consumed and reduces exhaust gas emissions.

ECM actuates the following functions:

- Switching ON the alternator after engine start.
- Adapting the control voltage with a delay in the event of frequent load changes at the alternator to stabilize the idle speed.
- Protecting the alternator against overheating.
- Reporting detected faults to combination meter for actuation of the charge warning lamp.

The alternator constantly performs a self-diagnosis and sends the results when requested to ECM. ECM compares the results with other signals (for example, engine rpm, battery voltage, time since engine start) and thus detects any alternator faults.

The following faults are identified:

- Open circuit on alternator interface line (LIN communication) or interface driver fault in ECM.
- Electrical and mechanical alternator fault:
 - Regulator or diodes defective
 - Stator interruption or short circuit
- Excitation interruption
- Regulation voltage and charging current not achieved
- Regulation voltage too high
- A cracked or loose drive belt

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : System De-

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< SYSTEM DESCRIPTION >

[2.0L TURBO GASOLINE ENGINE]

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INFOID:000000012789764

By performing the power generation voltage variable control, the engine load due to the power generation of the alternator is reduced and fuel consumption is decreased. Refer to [EC4-88. "ENGINE ON ENERGY MANAGEMENT FUNCTION : System Description"](#).

WARNING/INDICATOR/CHIME LIST

WARNING/INDICATOR/CHIME LIST : Warning Lamps/Indicator Lamps

INFOID:000000012789765

Item	Design	Reference
Charge warning lamp		For layout, refer to MWI-9. "METER SYSTEM : Design" .
		For function, refer to MWI-24. "WARNING LAMPS/INDICATOR LAMPS : Charge Warning Lamp (2.0L Turbo Gasoline Engine Models)" .

CHARGING SYSTEM

< WIRING DIAGRAM >

[2.0L TURBO GASOLINE ENGINE]

CHARGING SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	B6
Connector Name	WIRE TO WIRE
Connector Type	TH16MW-AH



Terminal No.	Color Of Wire	Signal Name [Specification]
7	LG	-
8	GR	-
9	SHIELD	-
10	L	- [With VR30 engine]
11	V	- [With 2.0L turbo gasoline engine]
12	GR	- [With VR30 engine]
13	BG	-
14	LG	-
15	BR	-
16	BG	-

Connector No.	B18
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4



Terminal No.	Color Of Wire	Signal Name [Specification]
1	Y	-
2	G	-
3	L	-
4	LG	-
5	Y	-
6	R	-
7	V	-

8	LG	-
10	BG	-
11	BG	-
12	LG	-
13	GR	-
14	R	-
15	L	-
16	V	-
18	W	-
19	BR	-
20	W	-
22	R	-
23	V	-
24	R	- [With 2.0L turbo gasoline engine]
24	Y	- [With VR30 engine]
25	P	- [With 2.0L turbo gasoline engine and without gateway]
25	V	- [With 2.0L turbo gasoline engine and with gateway]
25	W	- [With VR30 engine]
26	G	-
27	R	-
28	R	-
31	B	-
31	BR	- [With VR30 engine]
32	B	- [With 2.0L turbo gasoline engine]
33	B	-
34	LG	-
35	P	-
36	W	-
37	SB	-
38	LG	-
40	P	-
41	SB	-
42	BR	-
43	BG	-
44	BG	-
46	R	-
50	W	-
51	SB	-
52	V	-
53	LG	-
54	R	-
55	R	-
57	W	-
58	V	-
59	GR	-
60	G	-
61	G	-
62	BG	-
63	BR	-

Connector No.	B113
Connector Name	SUB BATTERY RELAY
Connector Type	24340_1ATDC



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

Connector No.	B114
Connector Name	SUB BATTERY RELAY
Connector Type	E-BA8



Terminal No.	Color Of Wire	Signal Name [Specification]
6	B/Y	-

Connector No.	B154
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK 1
Connector Type	24340_1A04D



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

Connector No.	B109
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Type	24340_13U00



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CHARGING SYSTEM

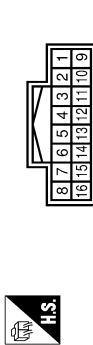
< WIRING DIAGRAM >

[2.0L TURBO GASOLINE ENGINE]

CHARGING SYSTEM (2.0L TURBO GASOLINE ENGINE)

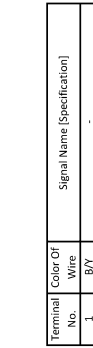
Terminal No.	5	Color Of Wire	B/W	Signal Name [Specification]	-
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Connector No.	C1	Connector Name	WIRE TO WIRE
Connector Type	TH08FW-NH		



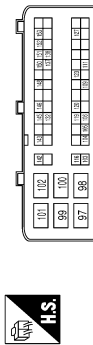
Connector No.	E159	Signal Name [Specification]	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Name			
Connector Type	24340_15400		

Terminal No.	1	Color Of Wire	B/Y	Signal Name [Specification]	-
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Terminal No.	8	Color Of Wire	B/Y	Signal Name [Specification]	-
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Connector No.	EZ00	Connector Name	ECM
Connector Type	ADA55FB-AH26		



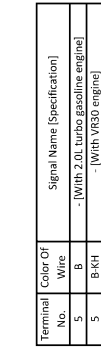
Terminal No.	Color Of Wire	Signal Name [Specification]
7	LG	-
8	GR	-
9	SHIELD	-
10	L	- [With VR3D engine]
11	V	- [With 2.0L turbo gasoline engine]
12	GR	-
13	BG	-
14	LG	-
15	BR	-
16	BG	-

Connector No.	C8	Connector Name	SUB BATTERY RELAY
Connector Type	TH08FW-NH		



Connector No.	E186	Signal Name [Specification]	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Name			
Connector Type	E-BA8		

Terminal No.	5	Color Of Wire	B-KH	Signal Name [Specification]	- [With 2.0L Turbo gasoline engine] - [With VR3D engine]
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Connector No.	E187	Signal Name [Specification]	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Name			
Connector Type	24340_JA04D		

Terminal No.	1	Color Of Wire	B/W	Signal Name [Specification]	-
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Connector No.	EZ20	Connector Name	JOINT CONNECTOR-E05
Connector Type	NH24FB-J		



Terminal No.	Color Of Wire	Signal Name [Specification]
3	W	-
4	L	-
7	W	-
8	L	-
11	W	-
12	L	-
15	P	- [Without Gateway]
15	R	- [With Gateway]
16	L	-
19	P	- [Without Gateway]
19	R	- [With Gateway]
20	L	-
23	P	- [Without Gateway]
23	R	- [With Gateway]
24	L	-

Connector No.	EZ29	Connector Name	ALTERNATOR
Connector Type	AUTOKABEL_20732		



Terminal No.	2	Color Of Wire	B	Signal Name [Specification]	-
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CHARGING SYSTEM

< WIRING DIAGRAM >

[2.0L TURBO GASOLINE ENGINE]

CHARGING SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	F150
Connector Name	ECM
Connector Type	Kostal 09409602



Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	FUEL INJECTOR (No. 1)
2	R	FUEL INJECTOR (No. 1)
3	Y	PARTIAL LOAD OPERATION/ENGINE OIL LEVEL SWITCH
4	L	COOLANT THERMOSTAT HEATER ELEMENT
7	R	IGNITION COIL (No. 2)
10	BG	SENSOR GROUND
11	BG	SENSOR GROUND
12	P	SENSOR GROUND
13	L	SENSOR GROUND
14	BR	SENSOR GROUND
16	W	SENSOR POWER SUPPLY
17	LG	SENSOR POWER SUPPLY
18	R	SENSOR POWER SUPPLY
23	L	DIVERT AIR SWITCHOVER VALVE
24	W	THROTTLE VALVE (MOTOR (+))
25	B	FUEL INJECTOR (No. 4)
26	G	FUEL INJECTOR (No. 4)
28	W	ENGINE OIL PUMP VALVE
29	SB	INTAKE CAMSHAFT ACTUATOR
31	GR	IGNITION COIL (No. 4)
34	Y	EXHAUST CAMSHAFT POSITION SENSOR
36	Y	EVAP CONTROL SYSTEM PRESSURE SENSOR
37	W	HEATED OXYGEN SENSOR
38	Y	THROTTLE POSITION SENSOR 1
40	G	CHANGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE
41	L	PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE
45	L	INTAKE CAMSHAFT POSITION SENSOR
46	GR	THROTTLE VALVE (MOTOR (-))
49	R	FUEL INJECTOR (No. 3)
50	G	FUEL INJECTOR (No. 3)
51	Y	BOOST PRESSURE CONTROL/VACUUM TRANSDUCER
53	G	EXHAUST CAMSHAFT ACTUATOR
54	G	COOLANT PUMP SWITCHOVER VALVE
55	L	IGNITION COIL (No. 3)
58	R	INTAKE CAMSHAFT POSITION SENSOR
59	B	KNOCK SENSOR 1

60	LG	KNOCK SENSOR 2
61	R	CHANGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE
62	P	THROTTLE POSITION SENSOR 2
63	L	AIR FUEL RATIO (A/F) SENSOR
64	B	AIR FUEL RATIO (A/F) SENSOR
65	BR	FUEL PRESSURE SIGNAL
67	SB	FUEL PRESSURE SIGNAL
73	BR	FUEL INJECTOR (No. 2)
74	Y	FUEL INJECTOR (No. 2)
75	V	QUANTITY CONTROL VALVE (LOW)
76	G	QUANTITY CONTROL VALVE (HIGH)
77	BG	AIR FUEL RATIO (A/F) SENSOR HEATER
78	V	FULL LOAD OPERATION/WENT LINE HEATER ELEMENT
79	Y	IGNITION COIL (No. 1)
81	GR	CRANKSHAFT POSITION SENSOR
82	BG	ENGINE OIL LEVEL SWITCH
83	W	KNOCK SENSOR 1
84	Y	KNOCK SENSOR 2
85	G	BLOW BY SENSOR
86	V	ENGINE COOLANT TEMPERATURE SENSOR
87	R	AIR FUEL RATIO (A/F) SENSOR
88	Y	AIR FUEL RATIO (A/F) SENSOR
90	P	PRESSURE SENSOR DOWNSTREAM OF AIR FILTER
91	W	PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE
95	R	HEATED OXYGEN SENSOR HEATER

Connector No.	F190
Connector Name	ALTERNATOR
Connector Type	HIRSCHMANN 805-198-506



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

Connector No.	M19
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-C516-TM4



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

41	G	
42	BR	
43	BR	
44	BR	
46	BG	
50	W	
51	Y	
52	V	
53	LG	
54	R	
55	R	
57	W	
58	V	
59	BG	
60	G	
61	G	
62	BR	
63	BR	
64	Y	
66	R	
70	LG	
71	W	
72	B	
73	W	
74	L	
75	W	
76	BR	
77	B	
78	SB	
79	P	
79	W	
81	B	
82	R	
83	BG	
84	L	
85	W	
86	B	
88	G	
89	V	
89	W	
91	GR	
94	GR	
96	W	
97	V	
98	BR	
98	Y	

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CHARGING SYSTEM

< WIRING DIAGRAM >

[2.0L TURBO GASOLINE ENGINE]

CHARGING SYSTEM (2.0L TURBO GASOLINE ENGINE)

Connector No.	M58
Connector Name	COMBINATION METER
Connector Type	TH12FW-AH



41	42	43	44	45	46
47	48	49	50	51	52

Terminal No.	Wire	Signal Name [Specification]
41	L	CAN-H
42	P	CAN-L
43	B	ILLUMINATION CONTROL SIGNAL
44	Y	FUEL LEVEL SENSOR GROUND
45	W	BATTERY POWER SUPPLY
46	BG	IGNITION SIGNAL (Except with V630 engine and without ISS)
47	R	IGNITION SIGNAL (With V630 engine and without ISS)
48	LG	AV COMMUNICATION SIGNAL (H)
49	LG	AV COMMUNICATION SIGNAL (L)
51	BR	FUEL LEVEL SENSOR SIGNAL
52	B	GROUND



42	43	44	45	46	47
48	49	50	51	52	53

Connector No.	M147
Connector Name	EMCM
Connector Type	RH40FE-RZ8-RLHZ

22	G	ENGINE RESTART BYPASS CONTROL RELAY
23	BR	BRAKE PEDAL POSITION SWITCH
24	GR	MAIN BATTERY CURRENT SENSOR
25	BG	MAIN BATTERY TEMPERATURE SENSOR
26	R	SUB BATTERY CURRENT SENSOR
27	BR	SUB BATTERY TEMPERATURE SENSOR
35	SB	SENSOR GROUND MAIN BATTERY CURRENT/TEMPERATURE SENSOR
36	G	SENSOR GROUND SUB BATTERY CURRENT/TEMPERATURE SENSOR
42	G	EMCM POWER SUPPLY
45	R	SUB BATTERY VOLTAGE MONITOR
47	B	EMCM GROUND
48	B	EMCM GROUND

Connector No.	M175
Connector Name	JOINT CONNECTOR-M05
Connector Type	NH2DFL-DC



8	7	6	5	4	3	2	1
20	19	17	18	15	14	13	12
11	10	9	8	7	6	5	4

Terminal No.	Color Of Wire	Signal Name [Specification]
1	L	-
2	L	-
3	L	-
4	L	-
5	L	-
6	L	-
7	L	-
8	L	-
10	P	-
11	P	-
12	P	-
13	P	-
14	P	-
15	P	-
16	R	- [With V630 engine]
17	P	- [With V630 engine]
19	R	- [With 2.0L turbo gasoline engine]
19	W	- [With V630 engine and with ISS]
20	R	- [With V630 engine and with ISS]
20	W	- [Except with V630 engine and with ISS]

Terminal No.	Wire	Signal Name [Specification]
1	Y	EMCM RELAY CONTROL (S/OFF)
5	L	IGNITION SWITCH
6	LG	STOP LAMP SWITCH
9	L	CAN-L
10	P	CAN-H
13	W	STOP/START OFF SWITCH
15	Y	SENSOR POWER SUPPLY MAIN BATTERY CURRENT/TEMPERATURE SENSOR
16	W	SENSOR POWER SUPPLY SUB BATTERY CURRENT/TEMPERATURE SENSOR
21	V	SUB BATTERY RELAY CONTROL

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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow (With EXP-800 NI or GR8-1200 NI)

INFOID:000000012789767

CHARGING SYSTEM DIAGNOSIS WITH EXP-800 NI OR GR8-1200 NI

To test the charging system, use the following special service tools:

- EXP-800 NI Battery and electrical diagnostic analyzer
- GR8-1200 NI Multitasking battery and electrical diagnostic station

NOTE:

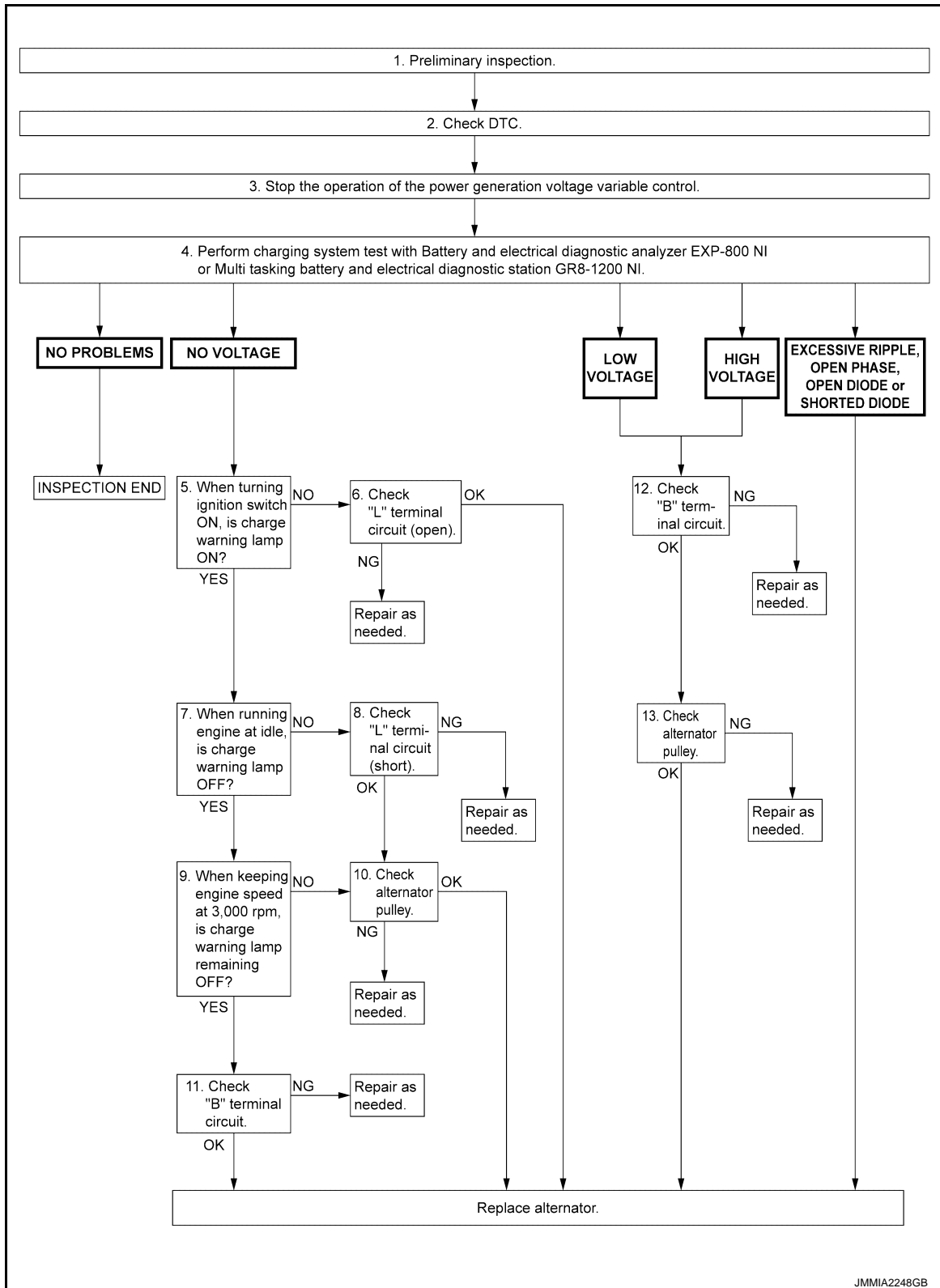
Refer to the applicable Instruction Manual for proper charging system diagnosis procedures.

DIAGNOSIS AND REPAIR WORK FLOW

[2.0L TURBO GASOLINE ENGINE]

< BASIC INSPECTION >

OVERALL SEQUENCE



DETAILED FLOW

NOTE:

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

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-20. "Inspection Procedure"](#).

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

>> GO TO 2.

2. CHECK DTC

Perform self diagnosis with CONSULT

Is any DTC detected?

YES >> • ECM: Refer to [EC4-146, "DTC Index"](#).
• EMCM: refer to [EC4-165, "DTC Index"](#).

NO >> GO TO 3.

3. STOP POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

Turn the ignition switch OFF, and disconnect the battery current sensor connector to stop the operation of the power generation voltage variable control. [However, DTC (P1550 - P1554) of the engine might remain. After finishing the inspection, connect the battery current sensor connector and erase the self-diagnosis results history of the engine using CONSULT.]

>> GO TO 4.

4. DIAGNOSIS WITH EXP-800 NI OR GR8-1200 NI

Perform the charging system test using Multitasking battery and electrical diagnostic station GR8-1200 NI or Battery and electrical diagnostic analyzer EXP-800 NI. Refer to the applicable Instruction Manual for proper testing procedures.

Test result

NO PROBLEMS>>Charging system is normal and will also show "DIODE RIPPLE" test result.

NO VOLTAGE>>GO TO 5.

LOW VOLTAGE or HIGH VOLTAGE>>GO TO 12.

EXCESSIVE RIPPLE, OPEN PHASE, OPEN DIODE or SHORTED DIODE>>Replace alternator. Perform "DIODE RIPPLE" test again using Multitasking battery and electrical diagnostic station GR8-1200 NI or Battery and electrical diagnostic analyzer EXP-800 NI to confirm repair.

5. INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS ON)

Turn the ignition switch ON.

Does the charge warning lamp turn ON?

YES >> GO TO 7.

NO >> GO TO 6.

6. "L" TERMINAL CIRCUIT (OPEN) INSPECTION

Check "L" terminal circuit (open). Refer to [CHG-22, "Diagnosis Procedure"](#).

Is the "L" terminal circuit normal?

YES >> Replace alternator. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

NO >> Repair as needed.

7. INSPECTION WITH CHARGE WARNING LAMP (IDLING)

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 9.

NO >> GO TO 8.

8. "L" TERMINAL CIRCUIT (SHORT) INSPECTION

Check "L" terminal circuit (short). Refer to [CHG-23, "Diagnosis Procedure"](#).

Is the "L" terminal circuit normal?

YES >> GO TO 10.

NO >> Repair as needed.

9. INSPECTION WITH CHARGE WARNING LAMP (ENGINE AT 3,000 RPM)

Increase and maintain the engine speed at 3,000 rpm.

DIAGNOSIS AND REPAIR WORK FLOW

[2.0L TURBO GASOLINE ENGINE]

< BASIC INSPECTION >

Does the charge warning lamp remain OFF?

YES >> GO TO 11.

NO >> GO TO 10.

10. INSPECTION OF ALTERNATOR PULLEY

Check alternator pulley. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Inspection"](#).

Is alternator pulley normal?

YES >> Replace alternator. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

NO >> Repair as needed.

11. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [CHG-21, "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

YES >> Replace alternator. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

NO >> Repair as needed.

12. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [CHG-21, "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

YES >> GO TO 13.

NO >> Repair as needed.

13. INSPECTION OF ALTERNATOR PULLEY

Check alternator pulley. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Inspection"](#).

Is alternator pulley normal?

YES >> Replace alternator. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

NO >> Repair as needed.

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DIAGNOSIS AND REPAIR WORK FLOW

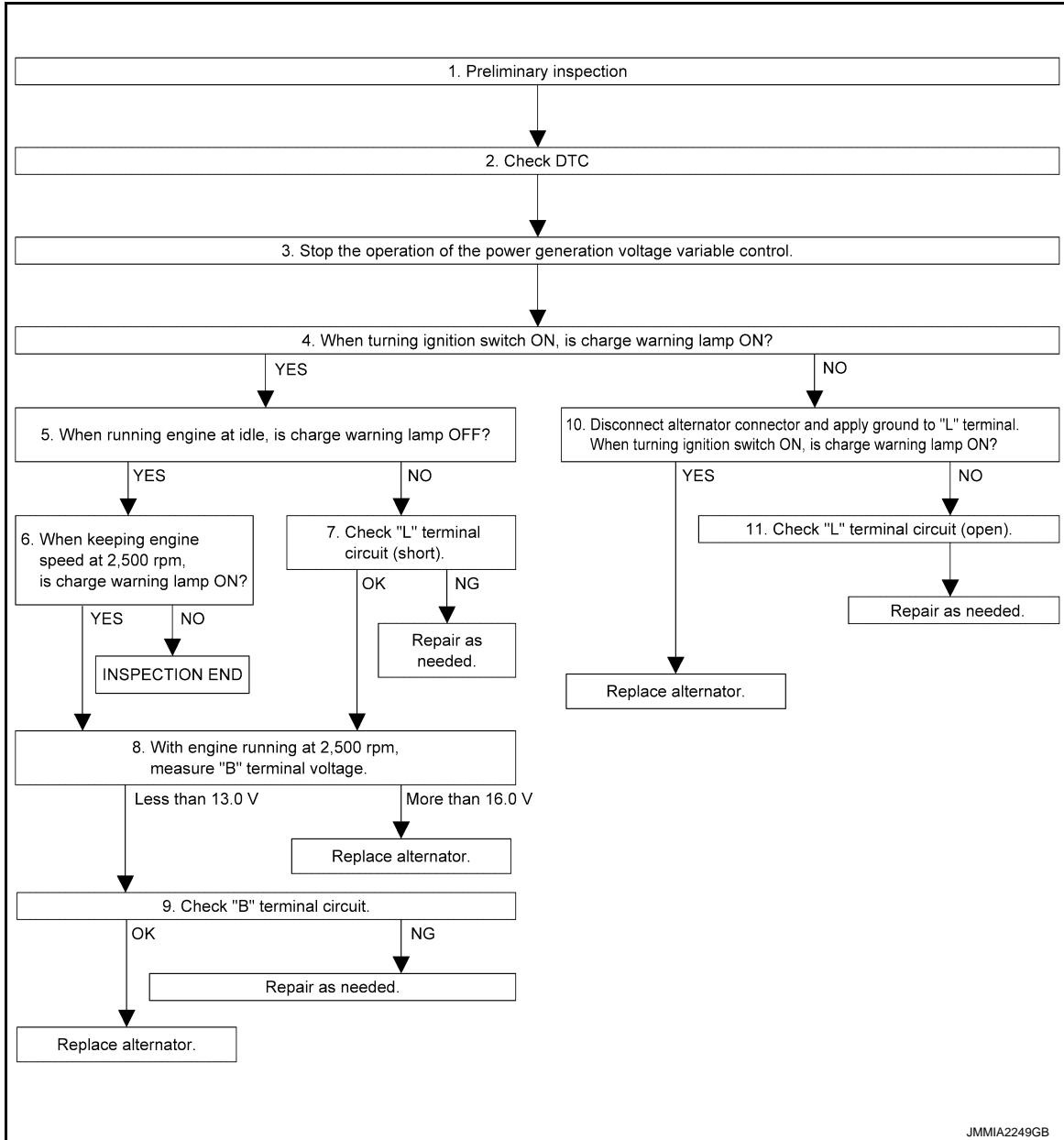
< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

Work Flow (Without EXP-800 NI or GR8-1200 NI)

INFOID:000000012789768

OVERALL SEQUENCE



DETAILED FLOW

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-20, "Inspection Procedure"](#).

>> GO TO 2.

2. CHECK DTC

Perform self diagnosis with CONSULT

Is any DTC detected?

YES >> • ECM: Refer to [EC4-146, "DTC Index"](#).
• EMCM: refer to [EC4-165, "DTC Index"](#).

NO >> GO TO 3.

3. STOP POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

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DIAGNOSIS AND REPAIR WORK FLOW

[2.0L TURBO GASOLINE ENGINE]

< BASIC INSPECTION >

Turn the ignition switch OFF, and disconnect the battery current sensor connector to stop the operation of the power generation voltage variable control. [However, DTC (P1550 - P1554) of the engine might remain. After finishing the inspection, connect the battery current sensor connector and erase the self-diagnosis results history of the engine using CONSULT.]

>> GO TO 4.

4.INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS ON)

Turn the ignition switch ON.

Does the charge warning lamp turn ON?

YES >> GO TO 5.

NO >> GO TO 10.

5.INSPECTION WITH CHARGE WARNING LAMP (IDLING)

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 6.

NO >> GO TO 7.

6.INSPECTION WITH CHARGE WARNING LAMP (ENGINE AT 2,500 RPM)

Increase and maintain the engine speed at 2,500 rpm.

Does the charge warning lamp turn ON?

YES >> GO TO 8.

NO >> INSPECTION END

7.“L” TERMINAL CIRCUIT (SHORT) INSPECTION

Check “L” terminal circuit (short). Refer to [CHG-23, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair as needed.

8.MEASURE “B” TERMINAL VOLTAGE

Start engine. With engine running at 2,500 rpm, measure “B” terminal voltage.

What voltage does the measurement result show?

Less than 13.0 V>>GO TO 9.

More than 16.0 V>>Replace alternator. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

9.“B” TERMINAL CIRCUIT INSPECTION

Check “B” terminal circuit. Refer to [CHG-21, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Replace alternator. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

NO >> Repair as needed.

10.INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS ON)

1. Disconnect alternator connector and apply ground to “L” terminal.

2. Turn the ignition switch ON.

Does the charge warning lamp turn ON?

YES >> Replace alternator. Refer to [CHG-25, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).

NO >> GO TO 11.

11.CHECK “L” TERMINAL CIRCUIT (OPEN)

Check “L” terminal circuit (open). Refer to [CHG-22, "Diagnosis Procedure"](#).

>> Repair as needed.

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CHARGING SYSTEM PRELIMINARY INSPECTION

< BASIC INSPECTION >

[2.0L TURBO GASOLINE ENGINE]

CHARGING SYSTEM PRELIMINARY INSPECTION

Inspection Procedure

INFOID:000000012789769

1.CHECK BATTERY TERMINALS CONNECTION

Check if battery terminals are clean and tight.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair battery terminals connection.

2.CHECK "E" TERMINAL CONNECTION

Check if "E" terminal (alternator ground harness) is clean and tight.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair "E" terminal connection.

3.CHECK DRIVE BELT TENSION

Check drive belt tension. Refer to [EM-17, "Inspection"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair as needed.

B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

DTC/CIRCUIT DIAGNOSIS

B TERMINAL CIRCUIT

Diagnosis Procedure

INFOID:000000012789771

1. CHECK "B" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if "B" terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair "B" terminal connection. Confirm repair by performing complete Charging system test using EXP-800 NI or GR8-1200 NI (if available). Refer to the applicable Instruction Manual for proper testing procedures.

2. CHECK "B" TERMINAL CIRCUIT

Check voltage between alternator "B" terminal and ground.

(+)		(-)	Voltage (Approx.)
Alternator			
Connector	Terminal		
E229	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check harness for open between alternator and fusible link.

3. CHECK "B" TERMINAL CONNECTION (VOLTAGE DROP TEST)

1. Start engine, then engine running at idle and warm.
2. Check voltage between battery positive terminal and alternator "B" terminal.

(+)	(-)		Voltage (Approx.)
	Alternator		
	Connector	Terminal	
Battery positive terminal	E229	2	Less than 0.2 V

Is the inspection result normal?

YES >> "B" terminal circuit is normal. Refer to [CHG-14, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-18, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

NO >> Check harness between battery and alternator for poor continuity.

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L TERMINAL CIRCUIT (OPEN)

[2.0L TURBO GASOLINE ENGINE]

< DTC/CIRCUIT DIAGNOSIS >

L TERMINAL CIRCUIT (OPEN)

Diagnosis Procedure

INFOID:000000012789772

1. CHECK "L" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if "L" terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair "L" terminal connection. Confirm repair by performing complete Charging system test using EXP-800 NI or GR8-1200 NI (if available). Refer to the applicable Instruction Manual for proper testing procedures.

2. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the battery cable from the negative terminal.
2. Disconnect the ECM connector.
3. Check continuity between alternator harness connector and ECM harness connector.

Alternator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F190	1	F150	45	Existed

Is the inspection result normal?

YES >> Replace ECM. Refer to [EC4-967. "Removal and Installation"](#).

NO >> Repair the harness or connector.

L TERMINAL CIRCUIT (SHORT)

< DTC/CIRCUIT DIAGNOSIS >

[2.0L TURBO GASOLINE ENGINE]

L TERMINAL CIRCUIT (SHORT)

Diagnosis Procedure

INFOID:000000012789773

1. CHECK "L" TERMINAL CIRCUIT (SHORT)

1. Turn ignition switch OFF.
2. Disconnect alternator connector.
3. Turn ignition switch ON.

Does charge warning lamp illuminate?

YES >> GO TO 2.

NO >> Refer to [CHG-14, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-18, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

2. CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

1. Turn ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect ECM connector.
4. Check continuity between ECM harness connector and ground.

ECM		—	Continuity
Connector	Terminal		
F150	45	Ground	Not existed

Is the inspection result normal?

YES >> Replace ECM. Refer to [EC4-967, "Removal and Installation"](#).

NO >> Repair or replace the harness.

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SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:000000012789775

Symptom	Reference
Discharged battery	Refer to CHG-14, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-18, "Work Flow (Without EXP-800 NI or GR8-1200 NI)" .
The charge warning lamp does not illuminate when the ignition switch is set to ON.	
The charge warning lamp does not turn OFF after the engine starts.	
The charging warning lamp turns ON when increasing the engine speed.	

ALTERNATOR

< REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]

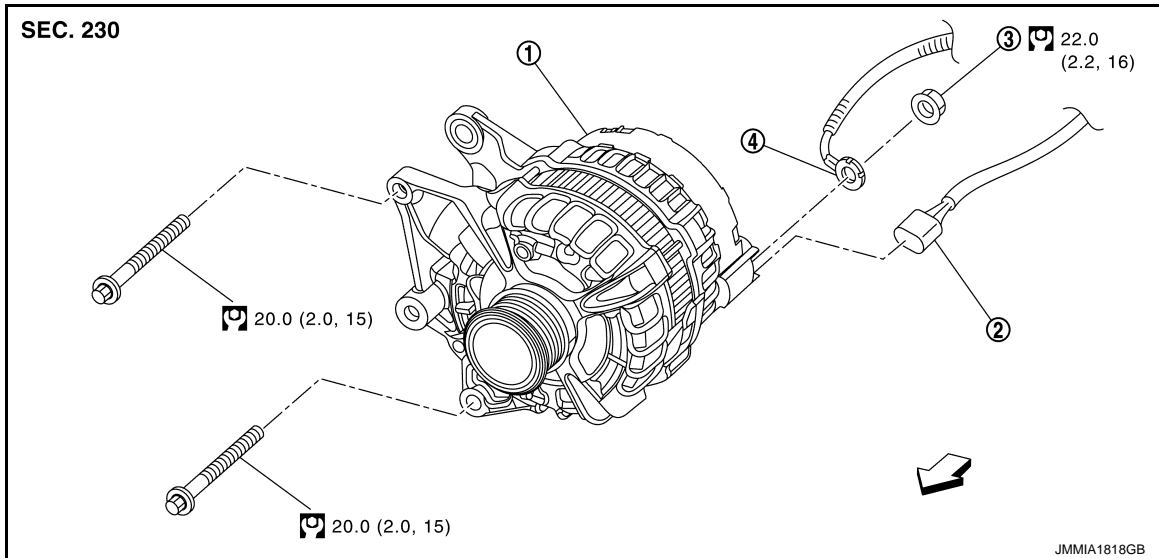
REMOVAL AND INSTALLATION

ALTERNATOR

2.0L TURBO GASOLINE ENGINE

2.0L TURBO GASOLINE ENGINE : Exploded View

INFOID:000000013439971



- ① Alternator
② Alternator connector
③ "B" terminal nut
④ "B" terminal harness
⇐ : Vehicle front
⊞ : N·m (kg-m, ft-lb)

2.0L TURBO GASOLINE ENGINE : Removal and Installation

INFOID:000000013439972

REMOVAL

1. Disconnect the battery cable from the negative terminal. Refer to [PG-261, "2.0L TURBO GASOLINE ENGINE : Removal and Installation"](#).
2. Remove charge air manifold. Refer to [EM-29, "Removal and Installation"](#).
3. Remove drive belt. Refer to [EM-16, "Removal and Installation"](#).
4. Remove idler pulley. Refer to [EM-27, "Removal and Installation"](#).
5. Disconnect alternator connector.
6. Remove "B" terminal nut and disconnect "B" terminal harness.
7. Remove alternator mounting bolts.
8. Remove alternator assembly upward from the vehicle.

INSTALLATION

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

CAUTION:

- Be careful to tighten "B" terminal nut to the specified torque.
- Install alternator, and check tension of belt. Refer to [EM-17, "Inspection"](#).

2.0L TURBO GASOLINE ENGINE : Inspection

INFOID:000000012789778

ALTERNATOR PULLEY INSPECTION

Perform the following.

- Make sure that alternator pulley does not rattle.

ALTERNATOR

< REMOVAL AND INSTALLATION >

[2.0L TURBO GASOLINE ENGINE]

- Make sure that alternator pulley is tight.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[2.0L TURBO GASOLINE ENGINE]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Alternator

INFOID:0000000013439973

Applied model		2.0L turbo gasoline engine
Type		0 125 711 032
		BOSCH make
Nominal rating	[V - A]	—
Ground polarity		—
Minimum revolution under no-load (When 13.5 V is applied)	[rpm]	—
Hot output current (When 13.5 V is applied)	[A/rpm]	—
Regulated output voltage	[V]	—

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PRECAUTION

PRECAUTIONS

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

INFOID:000000013600022

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, it is recommended that all maintenance and repair be performed by an authorized NISSAN/INFINITI dealer.
- Improper repair, 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 or batteries, and wait at least 3 minutes before performing any service.

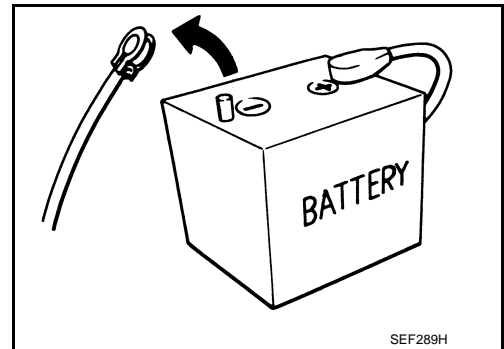
Precautions for Removing Battery Terminal

INFOID:000000013600023

When disconnecting the battery terminal, pay attention to the following.

- Always use a 12V battery as power source.
- Never disconnect battery terminal while engine is running.
- When removing the 12V battery terminal, turn OFF the ignition switch and wait at least 30 seconds.
- For vehicles with the engine listed below, remove the battery terminal after a lapse of the specified time:

BR08DE	: 4 minutes	V9X engine	: 4 minutes
D4D engine	: 20 minutes	YD25DDTi	: 2 minutes
HR09DET	: 12 minutes	YS23DDT	: 4 minutes
HRA2DDT	: 12 minutes	YS23DDTT	: 4 minutes
K9K engine	: 4 minutes	ZD30DDTi	: 60 seconds
M9R engine	: 4 minutes	ZD30DDTT	: 60 seconds
R9M engine	: 4 minutes		



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.

- After high-load driving, if the vehicle is equipped with the V9X engine, turn the ignition switch OFF and wait for at least 15 minutes to remove the battery terminal.

NOTE:

PRECAUTIONS

[VR30DDTT]

< PRECAUTION >

- Turbocharger cooling pump may operate in a few minutes after the ignition switch is turned OFF.
- Example of high-load driving
 - Driving for 30 minutes or more at 140 km/h (86 MPH) or more.
 - Driving for 30 minutes or more on a steep slope.
- 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.

Precaution for Power Generation Voltage Variable Control System

INFOID:000000013599994

CAUTION:

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

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PREPARATION

< PREPARATION >

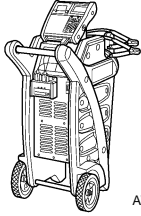
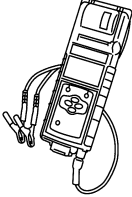
[VR30DDTT]

PREPARATION

PREPARATION


Special Service Tools

INFOID:00000001359995

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>
<p>— (—) Model EXP-800 NI Battery and electrical diagnostic analyzer</p>  <p style="text-align: right; font-size: small;">JSMIA0806ZZ</p>	<p>Tests batteries and charging systems. For operating instructions, refer to diagnostic analyzer instruction manual.</p>

Commercial Service Tools

INFOID:00000001359996

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

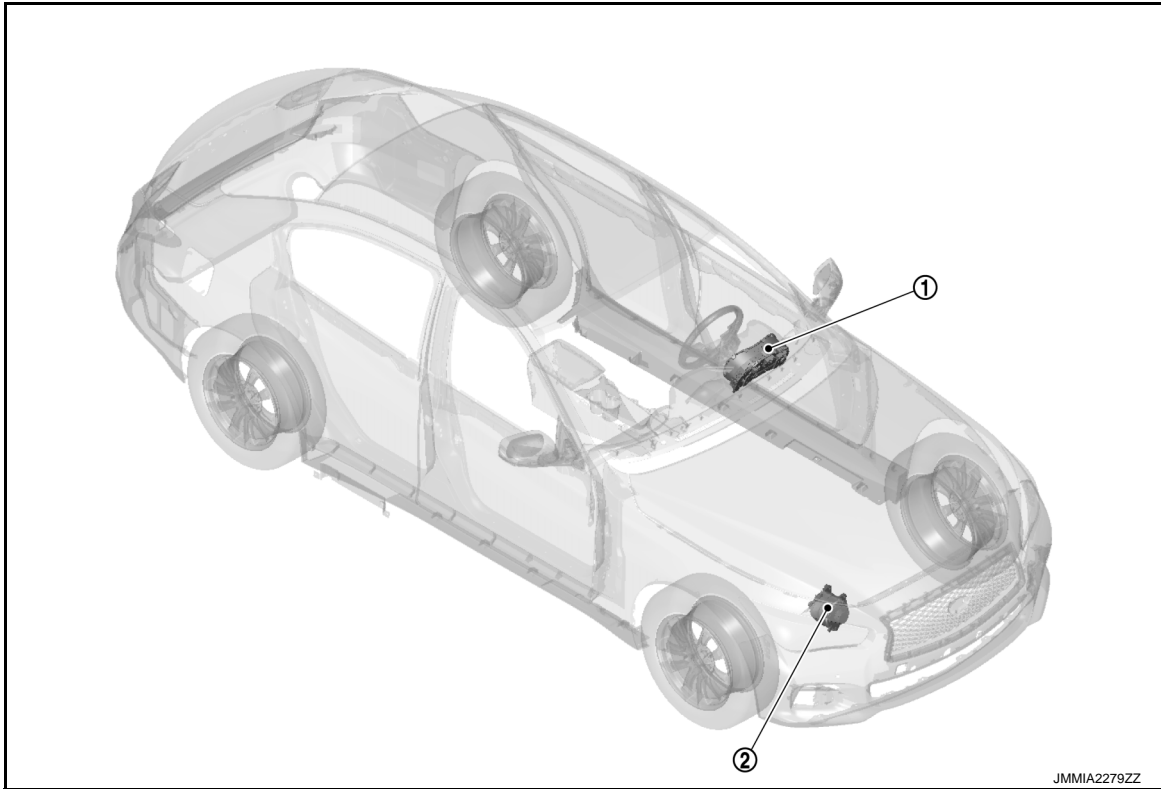
SYSTEM DESCRIPTION

COMPONENT PARTS

CHARGING SYSTEM

CHARGING SYSTEM : Component Parts Location

INFOID:00000001359997



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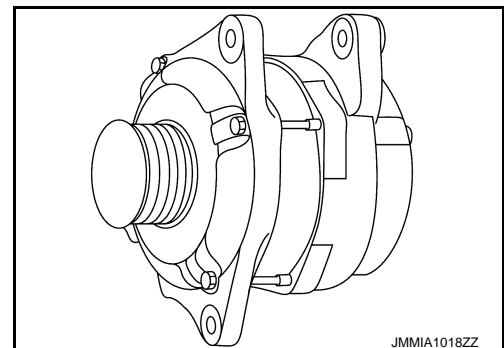
No.	Component	Function
①	Combination meter (Charge warning lamp)	The IC voltage regulator warning function activates to illuminate the charge warning lamp, if any of the following symptoms occur while alternator is operating: <ul style="list-style-type: none"> • Excessive voltage is produced. • No voltage is produced.
②	Alternator	Refer to CHG-31, "CHARGING SYSTEM : Alternator" .

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CHARGING SYSTEM : Alternator

INFOID:00000001359998

The alternator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC voltage regulator.



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POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : Component

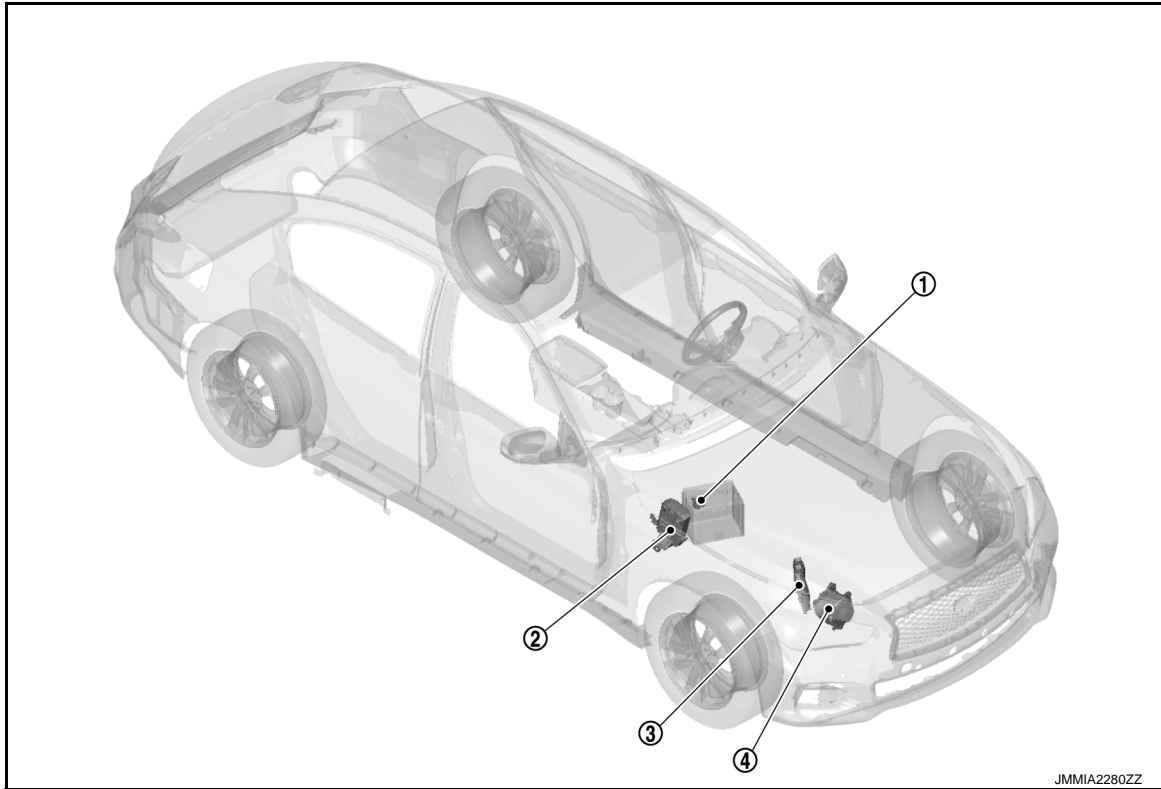
COMPONENT PARTS

< SYSTEM DESCRIPTION >

[VR30DDTT]

Parts Location

INFOID:00000001359999



No.	Component	Function
①	Battery current sensor	Battery current sensor is installed to the battery cable at the negative terminal, and it detects the charging/discharging current of the battery and sends the voltage signal to ECM according to the current value. Refer to EC6-40. "Battery Current Sensor (With Battery Temperature Sensor)" (for USA and CANADA) or EC6-1031. "Battery Current Sensor (With Battery Temperature Sensor)" (for MEXICO).
②	IPDM E/R	IPDM E/R converts the received power generation command value into the power generation command signal (PWM signal) and sends it to the IC voltage regulator. Refer to PCS-5. "Component Parts Location" for detailed installation location.
③	ECM	ECM judges whether to perform the power generation voltage variable control according to the battery condition. When performing the power generation voltage variable control, ECM calculates the target power generation voltage according to the battery condition and sends the calculated value as the power generation command value signal to IPDM E/R. Refer to EC6-33. "ENGINE CONTROL SYSTEM : Component Parts Location" (for USA and CANADA), or EC6-1024. "ENGINE CONTROL SYSTEM : Component Parts Location" (for MEXICO) for detailed installation location.
④	Alternator (IC voltage regulator)	Refer to CHG-32. "POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : Alternator (IC voltage regulator)" .

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : Alternator (IC

COMPONENT PARTS

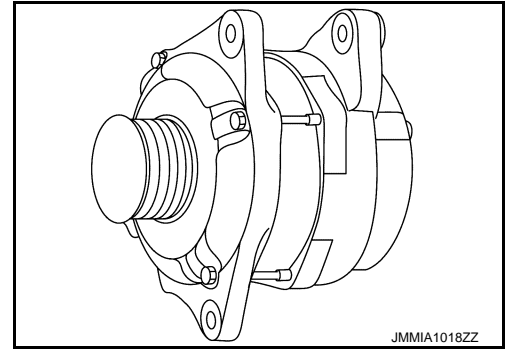
[VR30DDTT]

< SYSTEM DESCRIPTION >

voltage regulator)

INFOID:000000013600000

The output voltage of the alternator is controlled by the IC voltage regulator inside the alternator.
IC voltage regulator controls the power generation voltage by the target power generation voltage based on the received power generation command signal (PWM signal).
When there is no power generation command signal (PWM signal), the alternator performs the normal power generation according to the characteristic of the IC voltage regulator.



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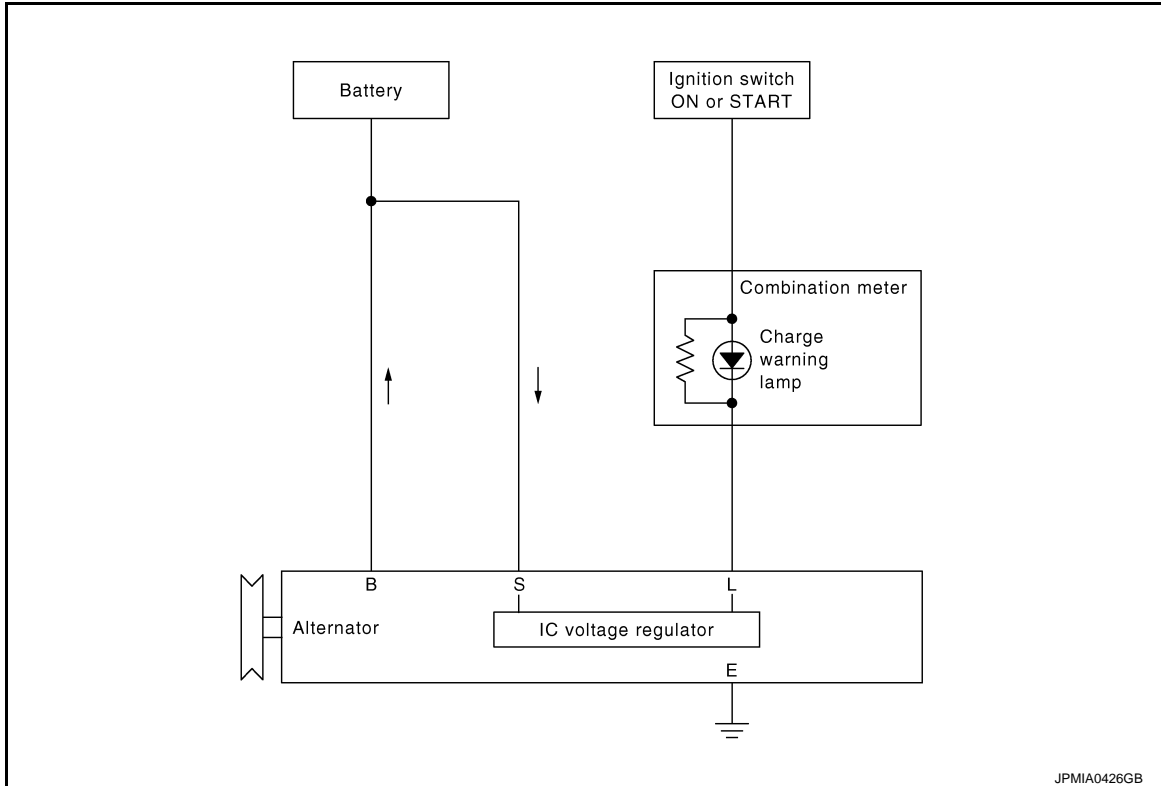
SYSTEM

CHARGING SYSTEM

CHARGING SYSTEM : System Description

INFOID:00000001360001

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

- “B” terminal circuit supplies power to charge the battery and to operate the vehicle’s electrical system.
- “L” terminal circuit controls the charge warning lamp. The charge warning lamp illuminates when the ignition switch is set to ON or START. When the alternator is providing sufficient voltage with the engine running, the charge warning lamp will go off. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.
Refer to [MWI-25, "WARNING LAMPS/INDICATOR LAMPS : Charge Warning Lamp \(VR30DDTT Models\)"](#).
- “S” terminal circuit detects the battery voltage to adjust the alternator output voltage with the IC voltage regulator.

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : System De-

SYSTEM

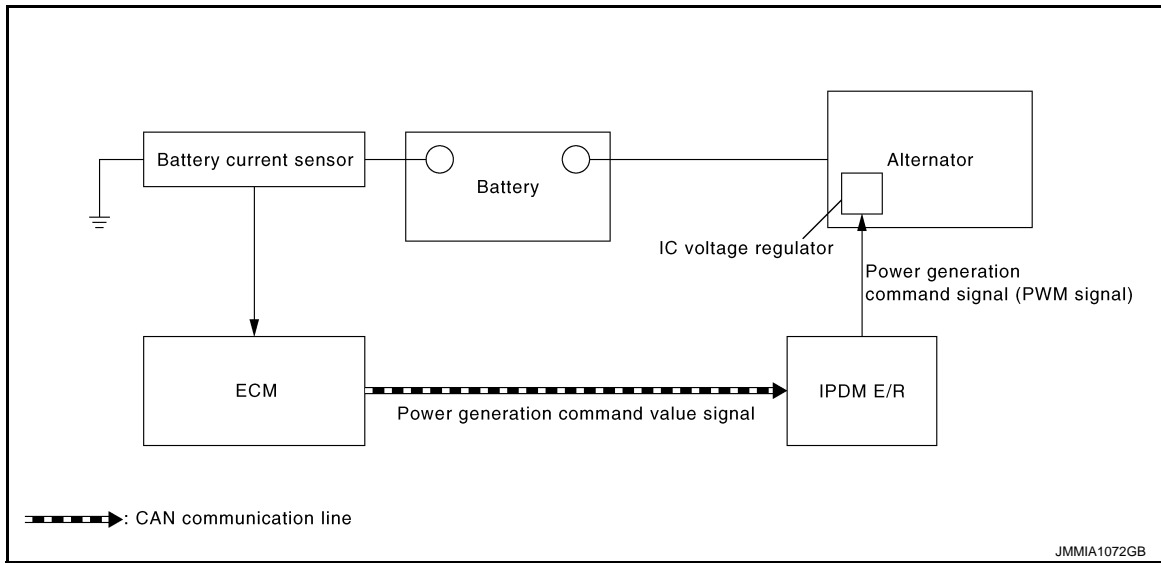
< SYSTEM DESCRIPTION >

[VR30DDTT]

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INFOID:000000013600002

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

By performing the power generation voltage variable control, the engine load due to the power generation of the alternator is reduced and fuel consumption is decreased.

NOTE:

When any malfunction is detected in the power generation voltage variable control system, the power generation is performed according to the characteristic of the IC voltage regulator of the alternator.

WARNING/INDICATOR/CHIME LIST

WARNING/INDICATOR/CHIME LIST : Warning Lamps/Indicator Lamps

INFOID:000000013600003

Item	Design	Reference
Charge warning lamp		For layout, refer to MWI-9, "METER SYSTEM : Design" .
		For function, refer to MWI-25, "WARNING LAMPS/INDICATOR LAMPS : Charge Warning Lamp (VR30DDTT Models)" .

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CHARGING SYSTEM (VR ENGINE)

100	SHIELD	-
Connector No. E121		
Connector Name FROM I/R INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM		
Connector Type TH32FW-NH		

Terminal No.	Color Of Wire	Signal Name [Specification]
19	L	- [With 2.0L turbo gasoline engine]
22	BG	- [With VR30 engine]
23	GR	- [With VR30 engine]
23	LG	- [With 2.0L turbo gasoline engine and without A/T (with diesel)]
23	P	- [With 2.0L turbo gasoline engine and with A/T (with diesel)]
27	GR	-
28	P	-
29	L	-
31	G	-
32	SB	-
33	SB	-
34	Y	-
35	G	-
36	SB	- [With VR30 engine]
36	W	- [With 2.0L turbo gasoline engine]
37	GR	-
38	BR	-
41	GR	-
43	V	-

Connector No. E124		
Connector Name FROM I/R INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM		
Connector Type TH12FW-NH		

Terminal No.	Color Of Wire	Signal Name [Specification]
62	G	-
64	SB	-
65	V	-
69	G	-
71	W	-
72	Y	-

Connector No. E131		
Connector Name ALTERNATOR		
Connector Type 24340-4HK0A		

Terminal No.	Color Of Wire	Signal Name [Specification]
1	B-K4	-

Connector No. E152		
Connector Name ECM		
Connector Type RH24FB-R28-L-RH		

Terminal No.	Color Of Wire	Signal Name [Specification]
173	SB	FUEL TANK PRESSURE SENSOR
175	P	CAN-L
176	L	CAN-H
177	G	SENSOR POWER SUPPLY (FUEL TANK PRESSURE SENSOR)
178	V	TACHO METER SIGNAL
182	P	FUEL TANK TEMPERATURE SENSOR
182	W	FUEL PUMP CONTROL MODULE (PCM) CHECK
185	SB	IGNITION SWITCH
186	SB	ASC-D STEERING SWITCH
187	BG	SENSOR GROUND (ASC-D STEERING SWITCH)
188	Y	FUEL PUMP CONTROL MODULE (PCM)
189	Y	ENGINE COMMUNICATION LINE-L
190	L	ENGINE COMMUNICATION LINE-H
191	P	STOP-LAMP SWITCH
192	BG	BRAKE PEDAL POSITION SWITCH
193	GR	SENSOR GROUND (BRAKE PEDAL POSITION SWITCH)
193	LG	SENSOR GROUND (BRAKE PEDAL POSITION SWITCH)
194	W	SENSOR POWER SUPPLY
195	BR	ACCELERATOR PEDAL POSITION SENSOR 2
196	R	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 2)
197	R	ECM POWER SUPPLY
198	L	SENSOR GROUND
199	B	ECM GROUND
200	V	SENSOR GROUND
200	V	ECM GROUND
201	B	ACCELERATOR PEDAL POSITION SENSOR 1
202	Y	SENSOR GROUND
203	G	SENSOR GROUND
204	B	ECM GROUND

Connector No. E172		
Connector Name JOINT CONNECTOR-E01		
Connector Type SGA28FB1BRJ		

Terminal No.	Color Of Wire	Signal Name [Specification]
1	GR	-
2	Y	-
3	W	-
4	L	-
5	GR	-
6	Y	-
7	W	-
8	L	-
9	GR	-
10	Y	-
11	W	-
12	L	-
15	W	-
16	BG	-
17	P	-
18	L	-
19	W	-
20	BG	-
21	P	-
22	L	-
23	SB	- [Color of wire differs depending on production]
23	W	- [Color of wire differs depending on production]
24	BG	- [Color of wire differs depending on production]
24	LG	- [Color of wire differs depending on production]
25	P	-
26	L	-
27	Y	-
28	L	-

CHARGING SYSTEM

< WIRING DIAGRAM >

[VR30DDTT]

CHARGING SYSTEM (VR ENGINE)

Connector No.	E185
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Type	E-1A8



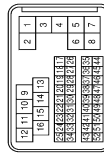
Terminal No.	6	Wire	G	Signal Name [Specification]	-
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Connector No.	E186
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Type	E-BA8



Terminal No.	5	Wire	B4H	Signal Name [Specification]	- [With 2.0L turbo gasoline engine] - [With VR30 engine]
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Connector No.	F12
Connector Name	WIRE TO WIRE
Connector Type	SA33FB-RSS-SH28



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

Terminal No.	51	Wire	W	Signal Name [Specification]	-
Terminal No.	52	Wire	G	Signal Name [Specification]	-

Connector No.	F83
Connector Name	ALTERNATOR
Connector Type	HS33FB



Terminal No.	1	Wire	G	Signal Name [Specification]	-
Terminal No.	2	Wire	G	Signal Name [Specification]	-
Terminal No.	3	Wire	V	Signal Name [Specification]	-
Terminal No.	4	Wire	W	Signal Name [Specification]	-

Connector No.	IM40
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4



Terminal No.	1	Wire	BG	Signal Name [Specification]	-
Terminal No.	6	Wire	W/B	Signal Name [Specification]	-
Terminal No.	7	Wire	V	Signal Name [Specification]	-
Terminal No.	8	Wire	BG	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	9	Wire	LG	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	10	Wire	P	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	11	Wire	W	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	12	Wire	B	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	13	Wire	GR	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]

Terminal No.	13	Wire	SHIELD	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	14	Wire	B	Signal Name [Specification]	-
Terminal No.	15	Wire	BG	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	16	Wire	SB	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	17	Wire	BR	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	18	Wire	B	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	19	Wire	W/B	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	20	Wire	Y	Signal Name [Specification]	-
Terminal No.	31	Wire	W	Signal Name [Specification]	-
Terminal No.	32	Wire	G	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	32	Wire	V	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	33	Wire	L	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	33	Wire	Y	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	34	Wire	P	Signal Name [Specification]	-
Terminal No.	35	Wire	BG	Signal Name [Specification]	-
Terminal No.	36	Wire	G	Signal Name [Specification]	-
Terminal No.	37	Wire	B	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	37	Wire	L	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	38	Wire	L	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	38	Wire	P	Signal Name [Specification]	- [With 2.0L turbo gasoline engine and without gateway]
Terminal No.	38	Wire	R	Signal Name [Specification]	- [With 2.0L turbo gasoline engine and with gateway]
Terminal No.	39	Wire	R	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	39	Wire	Y	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	40	Wire	GR	Signal Name [Specification]	-
Terminal No.	41	Wire	L	Signal Name [Specification]	-
Terminal No.	44	Wire	BR	Signal Name [Specification]	-
Terminal No.	45	Wire	L	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	45	Wire	W	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	46	Wire	G	Signal Name [Specification]	-
Terminal No.	46	Wire	Y	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	47	Wire	BG	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	47	Wire	R	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	48	Wire	SHIELD	Signal Name [Specification]	-
Terminal No.	49	Wire	B	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	49	Wire	G	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	50	Wire	B	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	50	Wire	BR	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	51	Wire	L	Signal Name [Specification]	-
Terminal No.	52	Wire	W	Signal Name [Specification]	-
Terminal No.	53	Wire	G	Signal Name [Specification]	-
Terminal No.	54	Wire	SB	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	54	Wire	Y	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	55	Wire	B	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	55	Wire	P	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	56	Wire	BG	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	56	Wire	GR	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]
Terminal No.	57	Wire	GR	Signal Name [Specification]	- [With VR30 engine]
Terminal No.	57	Wire	P	Signal Name [Specification]	- [With 2.0L turbo gasoline engine]

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CHARGING SYSTEM

[VR30DDTT]

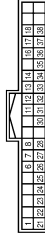
< WIRING DIAGRAM >

CHARGING SYSTEM (VR ENGINE)

58	B	-	-
59	SB	-	-
61	W/B	-	-
64	Y	-	-
65	R	-	-
66	P	- [Color of wire differs depending on production]	-
66	V	- [Color of wire differs depending on production]	-
67	LG	-	-
68	BG	-	-
69	L	-	-
70	R	-	-
71	V	- [With VR30 engine]	-
71	W	- [With 2.0L turbo gasoline engine]	-
72	L	- [With 2.0L turbo gasoline engine]	-
72	LG	- [With VR30 engine]	-
73	R	- [With VR30 engine]	-
73	W	- [With 2.0L turbo gasoline engine]	-
74	BR	- [With VR30 engine]	-
74	L	- [With 2.0L turbo gasoline engine]	-
75	B	- [With VR30 engine]	-
75	P	- [With 2.0L turbo gasoline engine and without gateway]	-
75	R	- [With 2.0L turbo gasoline engine and with gateway]	-
76	W/B	-	-
77	SB	-	-
78	G	- [With VR30 engine]	-
78	LG	- [With 2.0L turbo gasoline engine]	-
79	R	-	-
80	G	-	-
81	R	-	-
82	LG	-	-
83	BR	- [With 2.0L turbo gasoline engine]	-
83	R	- [With VR30 engine]	-
84	V	-	-
86	V	-	-
87	G	-	-
89	V	-	-
90	V	- [With VR30 engine]	-
90	V	- [With 2.0L turbo gasoline engine]	-
91	W	-	-
92	G	-	-
93	BR	-	-
94	GR	- [With VR30 engine]	-
94	L	- [With 2.0L turbo gasoline engine]	-
95	BR	- [With VR30 engine]	-
95	P	- [With 2.0L turbo gasoline engine and without gateway]	-
95	R	- [With 2.0L turbo gasoline engine and with gateway]	-
96	W	-	-
97	LG	-	-
98	Y	-	-
99	BR	- [With VR30 engine]	-

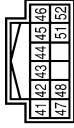
99	LG	- [With 2.0L turbo gasoline engine]
100	SHIELD	-

Connector No.	M57
Connector Name	COMBINATION METER
Connector Type	TH40PW-AH



Terminal No.	Wire	Signal Name [Specification]
1	B	GROUND
6	GR	STOP/START OFF SWITCH INDICATOR SIGNAL
7	G	SECURITY SIGNAL
8	B	-
11	W	ALTERNATOR SIGNAL
12	G	LED HEADLAMP (RH) WARNING SIGNAL
13	BR	LED HEADLAMP (LH) WARNING SIGNAL
14	V	ACC POWER SUPPLY
16	V	AIR BAG SIGNAL
17	BR	METER CONTROL SWITCH GROUND
18	SB	TRIP/RESET SIGNAL
21	B	STEERING SWITCH SIGNAL A
22	P	STEERING SWITCH SIGNAL B
23	W/B	WASHER LEVEL SWITCH SIGNAL
24	L	WASHER FLUID LEVEL SWITCH SIGNAL
25	LG	PARKING BRAKE SWITCH SIGNAL
26	V	PASSENGER SEAT BELT WARNING SIGNAL
27	G	SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE)
30	G	MANUAL MODE SIGNAL [With 2.0L turbo gasoline engine]
30	SB	NON-MANUAL MODE SIGNAL [With VR30 engine]
31	G	NON-MANUAL MODE SIGNAL [With VR30 engine]
31	L	NON-MANUAL MODE SIGNAL [With 2.0L turbo gasoline engine]
32	BG	MANUAL MODE SHIFT UP SIGNAL
33	GR	MANUAL MODE SHIFT DOWN SIGNAL [With VR30 engine]
33	P	MANUAL MODE SHIFT DOWN SIGNAL [With 2.0L turbo gasoline engine]
34	BG	PADDLE SHIFTER UP SWITCH SIGNAL
35	G	PADDLE SHIFTER DOWN SWITCH SIGNAL (+)
36	V	ILLUMINATION CONTROL SWITCH SIGNAL (-)
37	GR	ILLUMINATION CONTROL SWITCH SIGNAL (+)
38	R	VEHICLE SPEED SIGNAL (8-PULSE)

Connector No.	M58
Connector Name	COMBINATION METER
Connector Type	TH12FW-AH



Terminal No.	Wire	Signal Name [Specification]
41	L	CAN-L
42	P	CAN-H
43	B	ILLUMINATION CONTROL SIGNAL
44	Y	FUEL LEVEL SENSOR GROUND
45	W	BATTERY POWER SUPPLY
46	BG	Ignition switch [except with VR30 engine and without ISS]
46	R	IGNITION SIGNAL [With VR30 engine and without ISS]
47	SB	AV COMMUNICATION SIGNAL (H)
48	LG	AV COMMUNICATION SIGNAL (L)
51	BR	FUEL LEVEL SENSOR SIGNAL
52	B	GROUND

Connector No.	M133
Connector Name	FUSE BLOCK (J/B)
Connector Type	TH40PW-AH



Terminal No.	Wire	Signal Name [Specification]
13C	V	-
13C	L	-
13C	L	-
14C	Y	-
15C	R	-
16C	R	-
17C	L	- [Without DRPO]
18C	BG	- [Without DRPO]
18C	P	- [Without DRPO]

19C	B	-
1C	R	-
20C	W	-
21C	L	-
22C	L	-
23C	L	-
23C	LG	-
26C	SR	-
27C	P	-
28C	W	-
29C	W	-
30C	R	-
30C	R	-
31C	W	-
32C	R	-
33C	B	- [With VR30 engine]
33C	R	- [With 2.0L turbo gasoline engine]
34C	R	-
35C	SB	-
36C	R	-
37C	W	-
38C	SB	-
39C	V	-
3C	P	-
40C	G	-
4C	P	-
5C	G	-
6C	G	-
7C	G	-
8C	G	-
9C	V	-

JRMWJ4800GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow (With EXP-800 NI or GR8-1200 NI)

INFOID:0000000013600005

CHARGING SYSTEM DIAGNOSIS WITH EXP-800 NI OR GR8-1200 NI

To test the charging system, use the following special service tools:

- EXP-800 NI Battery and electrical diagnostic analyzer
- GR8-1200 NI Multitasking battery and electrical diagnostic station

NOTE:

Refer to the applicable Instruction Manual for proper charging system diagnosis procedures.

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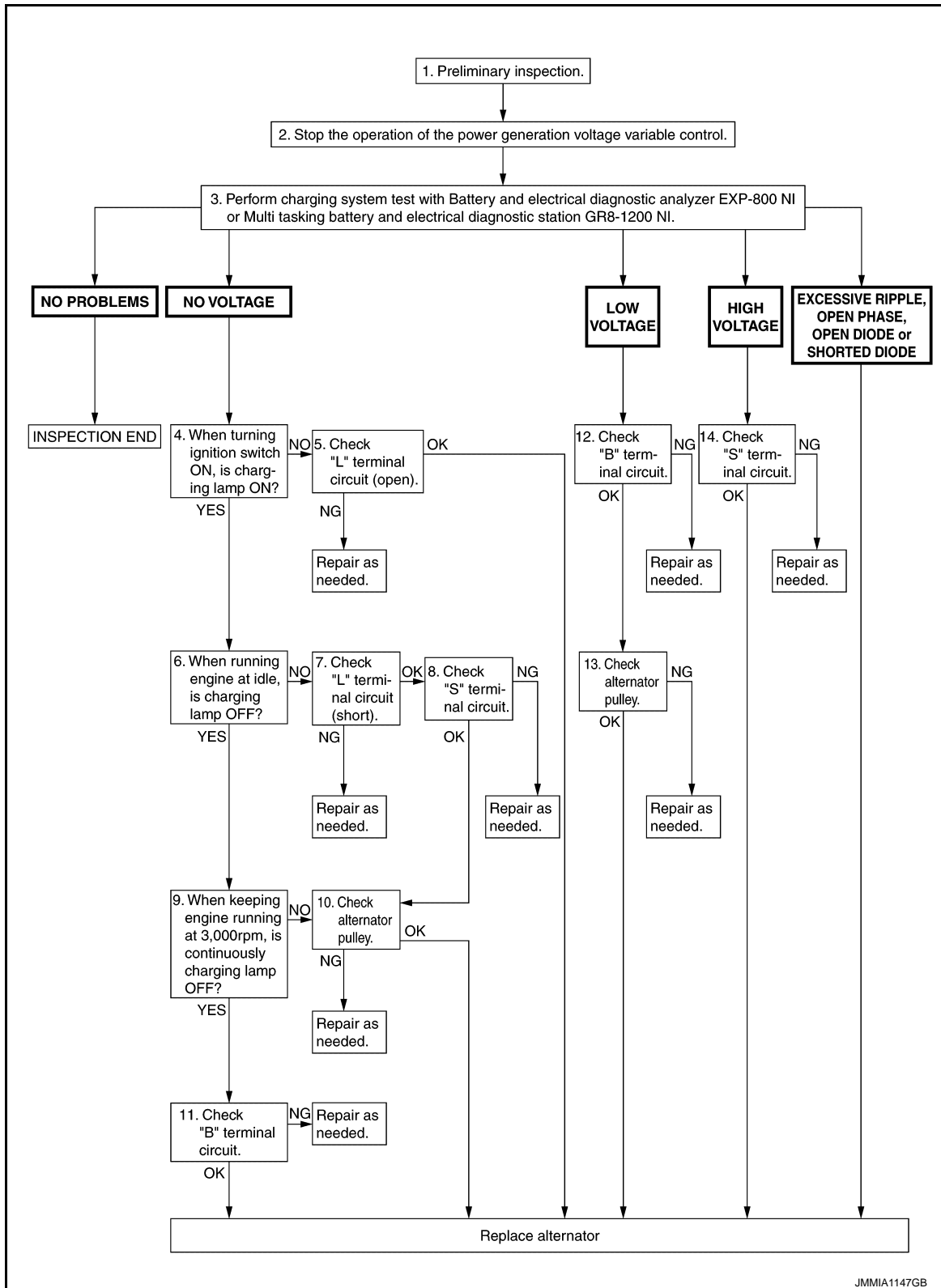
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DIAGNOSIS AND REPAIR WORK FLOW

[VR30DDTT]

< BASIC INSPECTION >

OVERALL SEQUENCE



DETAILED FLOW

NOTE:

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

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-48, "Inspection Procedure"](#).

>> GO TO 2.

2. STOP POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

Stop the operation of the power generation voltage variable control in either of the following procedures.

- After selecting “ENGINE” of “SELECT SYSTEM” using CONSULT, set the DUTY value of “ALTERNATOR DUTY” to 0 % by selecting “ALTERNATOR DUTY” of “Active Test”. Continue “Active Test” until the end of inspection. (When the DUTY value is 0 or 100 %, the normal power generation is performed according to the characteristic of the IC voltage regulator of the alternator.)
- Turn the ignition switch OFF, and disconnect the battery current sensor connector. [However, DTC (P1550 - P1554) of the engine might remain. After finishing the inspection, connect the battery current sensor connector and erase the self-diagnosis results history of the engine using CONSULT.]

>> GO TO 3.

3. DIAGNOSIS WITH EXP-800 NI OR GR8-1200 NI

Perform the charging system test using Multitasking battery and electrical diagnostic station GR8-1200 NI or Battery and electrical diagnostic analyzer EXP-800 NI. Refer to the applicable Instruction Manual for proper testing procedures.

Test result

NO PROBLEMS>>Charging system is normal and will also show “DIODE RIPPLE” test result.

NO VOLTAGE>>GO TO 4.

LOW VOLTAGE>>GO TO 12.

HIGH VOLTAGE>>GO TO 14.

EXCESSIVE RIPPLE, OPEN PHASE, OPEN DIODE or SHORTED DIODE>>Replace the alternator. Perform “DIODE RIPPLE” test again using Multitasking battery and electrical diagnostic station GR8-1200 NI or Battery and electrical diagnostic analyzer EXP-800 NI to confirm repair.

4. INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS ON)

Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> GO TO 6.

NO >> GO TO 5.

5. “L” TERMINAL CIRCUIT (OPEN) INSPECTION

Check “L” terminal circuit (open). Refer to [CHG-52, "Diagnosis Procedure"](#).

Is the “L” terminal circuit normal?

YES >> Replace alternator. Refer to [CHG-57, "VR30DDTT : Removal and Installation"](#).

NO >> Repair as needed.

6. INSPECTION WITH CHARGE WARNING LAMP (IDLING)

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 9.

NO >> GO TO 7.

7. “L” TERMINAL CIRCUIT (SHORT) INSPECTION

Check “L” terminal circuit (short). Refer to [CHG-53, "Diagnosis Procedure"](#).

Is the “L” terminal circuit normal?

YES >> GO TO 8.

NO >> Repair as needed.

8. “S” TERMINAL CIRCUIT INSPECTION

Check “S” terminal circuit. Refer to [CHG-54, "Diagnosis Procedure"](#).

Is the “S” terminal circuit normal?

YES >> GO TO 10.

NO >> Repair as needed.

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DIAGNOSIS AND REPAIR WORK FLOW

[VR30DDTT]

< BASIC INSPECTION >

9. INSPECTION WITH CHARGE WARNING LAMP (ENGINE AT 3,000 RPM)

Increase and maintain the engine speed at 3,000 rpm.

Does the charge warning lamp remain off?

YES >> GO TO 11.

NO >> GO TO 10.

10. INSPECTION OF ALTERNATOR PULLEY

Check alternator pulley. Refer to [CHG-58, "VR30DDTT : Inspection"](#).

Is alternator pulley normal?

YES >> Replace alternator. Refer to [CHG-57, "VR30DDTT : Removal and Installation"](#).

NO >> Repair as needed.

11. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [CHG-51, "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

YES >> Replace alternator. Refer to [CHG-57, "VR30DDTT : Removal and Installation"](#).

NO >> Repair as needed.

12. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [CHG-51, "Diagnosis Procedure"](#).

Is "B" terminal circuit normal?

YES >> GO TO 13.

NO >> Repair as needed.

13. INSPECTION OF ALTERNATOR PULLEY

Check alternator pulley. Refer to [CHG-58, "VR30DDTT : Inspection"](#).

Is alternator pulley normal?

YES >> Replace alternator. Refer to [CHG-57, "VR30DDTT : Removal and Installation"](#).

NO >> Repair as needed.

14. "S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to [CHG-54, "Diagnosis Procedure"](#).

Is the "S" terminal circuit normal?

YES >> Replace alternator. Refer to [CHG-57, "VR30DDTT : Removal and Installation"](#).

NO >> Repair as needed.

DIAGNOSIS AND REPAIR WORK FLOW

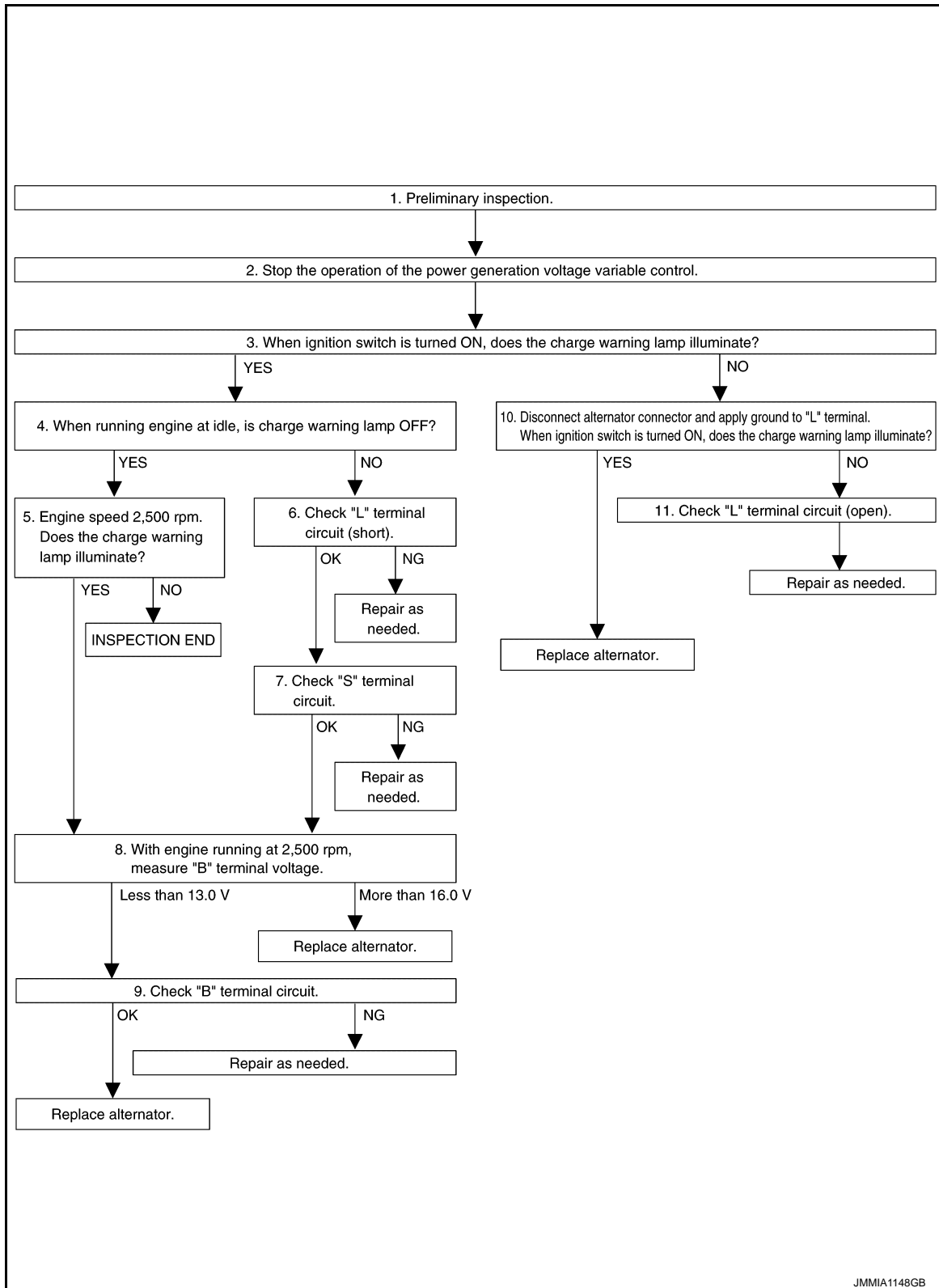
< BASIC INSPECTION >

[VR30DDTT]

Work Flow (Without EXP-800 NI or GR8-1200 NI)

INFOID:000000013600006

OVERALL SEQUENCE



DETAILED FLOW

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to [CHG-48, "Inspection Procedure"](#).

DIAGNOSIS AND REPAIR WORK FLOW

[VR30DDTT]

< BASIC INSPECTION >

>> GO TO 2.

2. STOP POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

Stop the operation of the power generation voltage variable control in either of the following procedures.

- After selecting "ENGINE" of "SELECT SYSTEM" using CONSULT, set the DUTY value of "ALTERNATOR DUTY" to 0 % by selecting "ALTERNATOR DUTY" of "Active Test". Continue "Active Test" until the end of inspection. (When the DUTY value is 0 or 100 %, the normal power generation is performed according to the characteristic of the IC regulator of the alternator.)
- Turn the ignition switch OFF, and disconnect the battery current sensor connector. [However, DTC (P1550 - P1554) of the engine might remain. After finishing the inspection, connect the battery current sensor connector and erase the self-diagnostic results history of the engine using CONSULT.]

>> GO TO 3.

3. INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS TURNED ON)

When ignition switch is turned ON

Does the charge warning lamp illuminate?

YES >> GO TO 4.

NO >> GO TO 10.

4. INSPECTION WITH CHARGE WARNING LAMP (IDLING)

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 5.

NO >> GO TO 6.

5. INSPECTION WITH CHARGE WARNING LAMP (ENGINE AT 2,500 RPM)

Increase and maintain the engine speed at 2,500 rpm.

Does the charge warning lamp illuminate?

YES >> GO TO 8.

NO >> INSPECTION END

6. "L" TERMINAL CIRCUIT (SHORT) INSPECTION

Check "L" terminal circuit (short). Refer to [CHG-53, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair as needed.

7. "S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to [CHG-54, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair as needed.

8. MEASURE "B" TERMINAL VOLTAGE

Start engine. With engine running at 2,500 rpm, measure "B" terminal voltage.

What voltage does the measurement result show?

Less than 13.0 V >> GO TO 9.

More than 16.0 V >> Replace alternator. Refer to [CHG-57, "VR30DDTT : Removal and Installation"](#).

9. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to [CHG-51, "Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Replace alternator. Refer to [CHG-57, "VR30DDTT : Removal and Installation"](#).

NO >> Repair as needed.

10. INSPECTION WITH CHARGE WARNING LAMP (IGNITION SWITCH IS ON)

DIAGNOSIS AND REPAIR WORK FLOW

[VR30DDTT]

< BASIC INSPECTION >

1. Disconnect alternator connector and apply ground to "L" terminal.
2. Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> Replace alternator. Refer to [CHG-57, "VR30DDTT : Removal and Installation"](#).

NO >> GO TO 11.

11. CHECK "L" TERMINAL CIRCUIT (OPEN)

Check "L" terminal circuit (open). Refer to [CHG-52, "Diagnosis Procedure"](#).

>> Repair as needed.

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CHARGING SYSTEM PRELIMINARY INSPECTION

< BASIC INSPECTION >

[VR30DDTT]

CHARGING SYSTEM PRELIMINARY INSPECTION

Inspection Procedure

INFOID:00000001360007

1. CHECK BATTERY TERMINALS CONNECTION

Check if battery terminals are clean and tight.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair battery terminals connection.

2. CHECK FUSE

Check for blown fuse and fusible link.

Unit	Power source (Power supply terminals)	Fuse No.
Alternator	Battery ("S" terminal)	69
Combination meter	Ignition switch ON ("L" terminal)	11

Is the inspection result normal?

YES >> GO TO 3.

NO >> Be sure to eliminate the cause of malfunction before installing new fuse.

3. CHECK "E" TERMINAL CONNECTION

Check if "E" terminal (alternator ground harness) is clean and tight.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair "E" terminal connection.

4. CHECK DRIVE BELT TENSION

Check drive belt tension. Refer to [EM-155, "Inspection"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair as needed.

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

< BASIC INSPECTION >

[VR30DDTT]

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

Inspection Procedure

INFOID:000000013600008

CAUTION:

When performing this inspection, always use a charged battery that has completed the battery inspection. (When the charging rate of the battery is low, the response speed of the voltage change will become slow. This can cause an incorrect inspection.)

1. CHECK ECM (CONSULT)

Perform ECM self-diagnosis with CONSULT. Refer to [EC6-115, "CONSULT Function"](#) (for USA and CANADA) or [EC6-1093, "CONSULT Function"](#) (for MEXICO).

Self-diagnostic results content

No malfunction detected>> GO TO 2.

Malfunction detected>> Check applicable parts, and repair or replace corresponding parts.

2. CHECK OPERATION OF POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

1. Connect CONSULT and start the engine.
2. The selector lever is in "P" or "N" position and all of the electric loads and A/C, etc. are turned OFF.
3. Select "ALTERNATOR DUTY" at "Active Test" of "ENGINE", and then check the value of "BATTERY VOLT" monitor when DUTY value of "ALTERNATOR DUTY" is set to 40.0 %.

"BATTERY VOLT"

2 seconds after setting the DUTY value of "ALTERNATOR DUTY" to 40.0 % : 12 - 13.6 V

4. Check the value of "BATTERY VOLT" monitor when DUTY value of "ALTERNATOR DUTY" is set to 80.0%.

"BATTERY VOLT"

20 seconds after setting the DUTY value of "ALTERNATOR DUTY" to 80.0 % : +0.5 V or more against the value of "BATTERY VOLT" monitor when DUTY value is 40.0 %

Is the measurement value within the specification?

YES >> INSPECTION END

NO >> GO TO 3.

3. CHECK IPDM E/R (CONSULT)

Perform IPDM E/R self-diagnosis with CONSULT. Refer to [PCS-13, "CONSULT Function \(IPDM E/R\)"](#).

Self-diagnostic results content

No malfunction detected>> GO TO 4.

Malfunction detected>> Check applicable parts, and repair or replace corresponding parts.

4. CHECK HARNESS BETWEEN ALTERNATOR AND IPDM E/R

1. Turn ignition switch OFF.
2. Disconnect alternator connector and IPDM E/R connector.
3. Check continuity between alternator harness connector and IPDM E/R harness connector.

Alternator		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F83	4	E124	71	Existed

4. Check continuity between alternator harness connector and ground.

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

< BASIC INSPECTION >

[VR30DDTT]

Alternator		Ground	Continuity
Connector	Terminal		
F83	4		Not existed

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to [PCS-44, "Removal and Installation"](#).

NO >> Repair harness or connector between IPDM E/R and alternator.

B TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[VR30DDTT]

DTC/CIRCUIT DIAGNOSIS

B TERMINAL CIRCUIT

Diagnosis Procedure

INFOID:00000001360009

1. CHECK "B" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if "B" terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair "B" terminal connection. Confirm repair by performing complete Charging system test using EXP-800 NI or GR8-1200 NI (if available). Refer to the applicable Instruction Manual for proper testing procedures.

2. CHECK "B" TERMINAL CIRCUIT

Check voltage between alternator "B" terminal and ground.

(+)		(-)	Voltage (Approx.)
Alternator			
Connector	Terminal		
E131	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check harness for open between alternator and fusible link.

3. CHECK "B" TERMINAL CONNECTION (VOLTAGE DROP TEST)

1. Start engine, then engine running at idle and warm.
2. Check voltage between battery positive terminal and alternator "B" terminal.

(+)	(-)		Voltage (Approx.)
	Alternator		
	Connector	Terminal	
Battery positive terminal	E131	1	Less than 0.2 V

Is the inspection result normal?

YES >> "B" terminal circuit is normal. Refer to [CHG-41, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-45, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

NO >> Check harness between battery and alternator for poor continuity.

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L TERMINAL CIRCUIT (OPEN)

< DTC/CIRCUIT DIAGNOSIS >

[VR30DDTT]

L TERMINAL CIRCUIT (OPEN)

Diagnosis Procedure

INFOID:000000013600010

1. CHECK "L" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if "L" terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair "L" terminal connection. Confirm repair by performing complete Charging system test using EXP-800 NI or GR8-1200 NI (if available). Refer to the applicable Instruction Manual for proper testing procedures.

2. CHECK "L" TERMINAL CIRCUIT (OPEN)

1. Disconnect alternator connector.
2. Apply ground to alternator harness connector terminal.
3. Check condition of the charge warning lamp with the ignition switch in the ON position.

Alternator		Ground	Condition	
Connector	Terminal		Ignition switch position	Charge warning lamp
F83	2	ON	Illuminate	

Does it illuminate?

YES >> "L" terminal circuit is normal. Refer to [CHG-41, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-45, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

NO >> GO TO 3.

3. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the battery cable from the negative terminal.
2. Disconnect the combination meter connector.
3. Check continuity between alternator harness connector and combination meter harness connector.

Alternator		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
F83	2	M57	11	Existed

Is the inspection result normal?

YES >> Replace combination meter.

NO >> Repair the harness or connector.

L TERMINAL CIRCUIT (SHORT)

< DTC/CIRCUIT DIAGNOSIS >

[VR30DDTT]

L TERMINAL CIRCUIT (SHORT)

Diagnosis Procedure

INFOID:000000013600011

1. CHECK "L" TERMINAL CIRCUIT (SHORT)

1. Turn ignition switch OFF.
2. Disconnect alternator connector.
3. Turn ignition switch ON.

Does charge warning lamp illuminate?

YES >> GO TO 2.

NO >> Refer to [CHG-41, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-45, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

2. CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

1. Turn ignition switch OFF.
2. Disconnect the battery cable from the negative terminal.
3. Disconnect combination meter connector.
4. Check continuity between combination meter harness connector and ground.

Combination meter		Ground	Continuity
Connector	Terminal		
M57	11		Not existed

Is the inspection result normal?

YES >> Replace combination meter.

NO >> Repair or replace the harness.

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S TERMINAL CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

[VR30DDTT]

S TERMINAL CIRCUIT

Diagnosis Procedure

INFOID:000000013600012

1. CHECK "S" TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if "S" terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair "S" terminal connection. Confirm repair by performing complete Charging system test using EXP-800 NI or GR8-1200 NI (if available). Refer to the applicable Instruction Manual for proper testing procedures.

2. CHECK "S" TERMINAL CIRCUIT

Check voltage between alternator harness connector and ground.

(+)		(-)	Voltage (Approx.)
Alternator			
Connector	Terminal	Ground	Battery voltage
F83	3		

Is the inspection result normal?

YES >> Refer to [CHG-41, "Work Flow \(With EXP-800 NI or GR8-1200 NI\)"](#) or [CHG-45, "Work Flow \(Without EXP-800 NI or GR8-1200 NI\)"](#).

NO >> Check harness for open between alternator and fuse.

SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:0000000013600013

Symptom	Reference
Discharged battery	Refer to CHG-41, "Work Flow (With EXP-800 NI or GR8-1200 NI)" or CHG-45, "Work Flow (Without EXP-800 NI or GR8-1200 NI)" .
The charge warning lamp does not illuminate when the ignition switch is set to ON.	
The charge warning lamp does not turn OFF after the engine starts.	
The charging warning lamp turns ON when increasing the engine speed.	

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ALTERNATOR

< REMOVAL AND INSTALLATION >

[VR30DDTT]

REMOVAL AND INSTALLATION

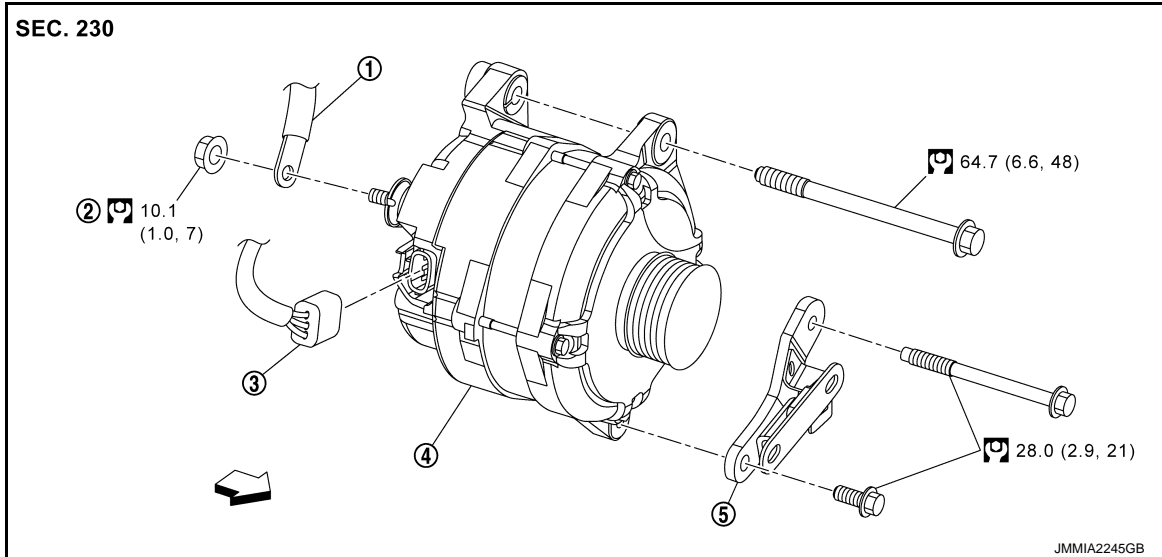
ALTERNATOR

VR30DDTT

VR30DDTT : Exploded View

INFOID:000000013600014

REMOVAL



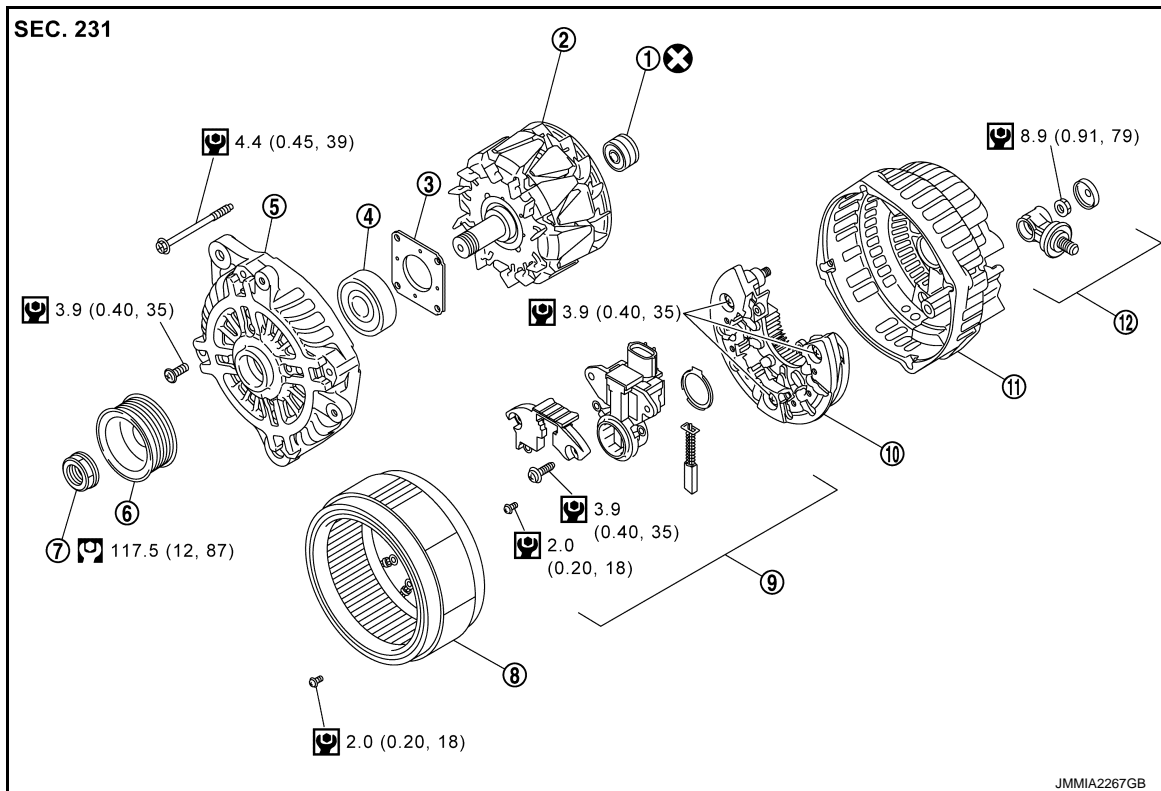
DISASSEMBLY

ALTERNATOR

< REMOVAL AND INSTALLATION >

[VR30DDTT]

A003TX2391



- | | | |
|------------------|--------------------------|---------------------------------|
| ① Rear bearing | ② Rotor assembly | ③ Retainer |
| ④ Front bearing | ⑤ Front bracket assembly | ⑥ Pulley |
| ⑦ Pulley nut | ⑧ Stator assembly | ⑨ IC voltage regulator assembly |
| ⑩ Diode assembly | ⑪ Rear bracket assembly | ⑫ Terminal set |

⊗ : Always replace after every disassembly.

🔧 : N·m (kg-m, in-lb)

🔧 : N·m (kg-m, ft-lb)

VR30DDTT : Removal and Installation

INFOID:000000013600015

REMOVAL

1. Disconnect battery cable from the negative terminal. Refer to [PG-259, "VR30DDTT : Removal and Installation"](#).
2. Remove fan shroud assembly. Refer to [CO-45, "Removal and Installation"](#).
3. Remove air duct (bank 1) and air cleaner body bracket. Refer to [EM-165, "Exploded View"](#).
4. Remove front under cover. Refer to [EXT-35, "FRONT UNDER COVER : Removal and Installation"](#).
5. Remove drive belt. Refer to [EM-154, "Removal and Installation"](#).
6. Remove idler pulley. Refer to [EM-164, "Removal and Installation"](#).
7. Disconnect alternator connector.
8. Remove "B" terminal nut and disconnect "B" terminal harness.
9. Disconnect oil pressure switch connector and oil temperature sensor connector and remove harness clip from alternator stay.
10. Remove alternator mounting bolt and alternator stay mounting bolt, and then remove alternator stay.
11. Remove alternator mounting bolt, and then remove alternator assembly upward from vehicle.

INSTALLATION

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

ALTERNATOR

< REMOVAL AND INSTALLATION >

[VR30DDTT]

CAUTION:

- Be careful to tighten “B” terminal nut to the specified torque.
- Install alternator, and check tension of belt. Refer to [EM-155, "Inspection"](#).
- For this model, the power generation voltage variable control system that controls the power generation voltage of the alternator has been adopted. Therefore, the power generation voltage variable control system operation inspection should be performed after replacing the alternator, and then check that the system operates normally. Refer to [CHG-49, "Inspection Procedure"](#).

VR30DDTT : Inspection

INFOID:000000013600016

ALTERNATOR PULLEY INSPECTION

Perform the following.

- Make sure that alternator pulley does not rattle.
- Make sure that alternator pulley nut is tight.

Tighten pulley nut to the specified torque. Refer to [CHG-56, "VR30DDTT : Exploded View"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[VR30DDTT]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Alternator

INFOID:0000000013600017

Applied model		VR30DDTT
Type		A003TX2391
		MITSUBISHI make
Nominal rating	[V - A]	12 -170
Ground polarity		Negative
Minimum revolution under no-load (When 13.5 V is applied)	[rpm]	Less than 1,300
Hot output current (When 13.5 V is applied)	[A/rpm]	More than 138/2,500 More than 168/5,000
Regulated output voltage	[V]	14.1 – 14.7*
Minimum length of brush	[mm (in)]	More than 5.00 (0.1969)
Brush spring pressure	[N (g, oz)]	4.1 - 5.3 (439 - 520, 15.5 - 18.4)
Slip ring minimum outer diameter	[mm (in)]	More than 22.1 (0.870)
Rotor (Field coil) resistance	[Ω]	2.0 - 2.3

*: Adjustment range of power generation voltage variable control is 11.4 - 15.6 V.

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