SECTION CHG
CHARGING SYSTEM

CONTENTS

PRECAUTION 2

PRECAUTIONS 2
Precautions for Removing Battery Terminal 2

PREPARATION 3

PREPARATION 3
Special Service Tools 3
Commercial Service Tools 3

SYSTEM DESCRIPTION 4

COMPONENT PARTS 4
Component Parts Location 4
Alternator 4
Battery Sensor 5

SYSTEM 6

CHARGING SYSTEM 6
CHARGING SYSTEM : System Description 6

ENERGY MANAGEMENT SYSTEM 7
ENERGY MANAGEMENT SYSTEM : System Description 7

DIAGNOSIS SYSTEM (BCM) 8
CONSULT Function (BCM) 8

ECU DIAGNOSIS INFORMATION 14

BCM 14
List of ECU Reference 14

WIRING DIAGRAM 15

CHARGING SYSTEM 15
Wiring Diagram 15

BASIC INSPECTION 21

DIAGNOSIS AND REPAIR WORK FLOW 21
Work Flow (With EXP-800 NI or GR8-1200 NI) 21
Work Flow (Without EXP-800 NI or GR8-1200 NI)...25

CHARGING SYSTEM PRELIMINARY INSPECTION 27
Inspection Procedure 27

DTC/CIRCUIT DIAGNOSIS 28

P065B ALTERNATOR MALFUNCTION 28
DTC Description 28
Diagnosis Procedure 28

B1F45 DISCHARGED BATTERY 30
DTC Description 30
Diagnosis Procedure 30

L TERMINAL CIRCUIT (OPEN) 32
Diagnosis Procedure 32

L TERMINAL CIRCUIT (SHORT) 33
Diagnosis Procedure 33

B TERMINAL CIRCUIT 34
Diagnosis Procedure 34

REMOVAL AND INSTALLATION 35

ALTERNATOR 35

1.6L/2.0L TURBO ENGINE 35
1.6L/2.0L TURBO ENGINE : Exploded View 35
1.6L/2.0L TURBO ENGINE : Removal and Installation 35
1.6L/2.0L TURBO ENGINE : Inspection 36

SERVICE DATA AND SPECIFICATIONS (SDS) 38

SERVICE DATA AND SPECIFICATIONS (SDS) 38
Alternator 38

PRECAUTION

PRECAUTIONS

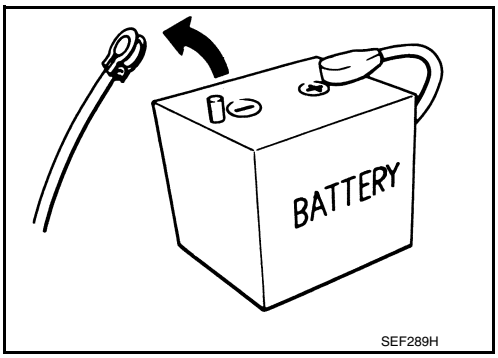
Precautions for Removing Battery Terminal

INFOID:0000000013550557

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	YD25DDTi	: 2 minutes
D4D engine	: 20 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		
V9X engine	: 4 minutes		



SEF289H

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:
- 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.

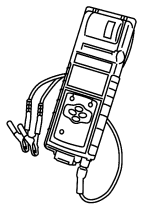
NOTE:
The removal of 12V battery may cause a DTC detection error.

PREPARATION

PREPARATION

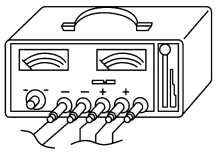
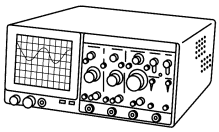
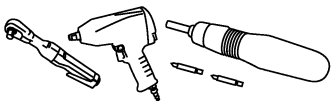
Special Service Tools

INFOID:0000000013566748

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.
— (—) Model EXP-800 NI Battery and electrical diagnostic analyzer	 JSMIA0806ZZ	Tests batteries and charging systems. For operating instructions, refer to diagnostic analyzer instruction manual.

Commercial Service Tools

INFOID:0000000013563080

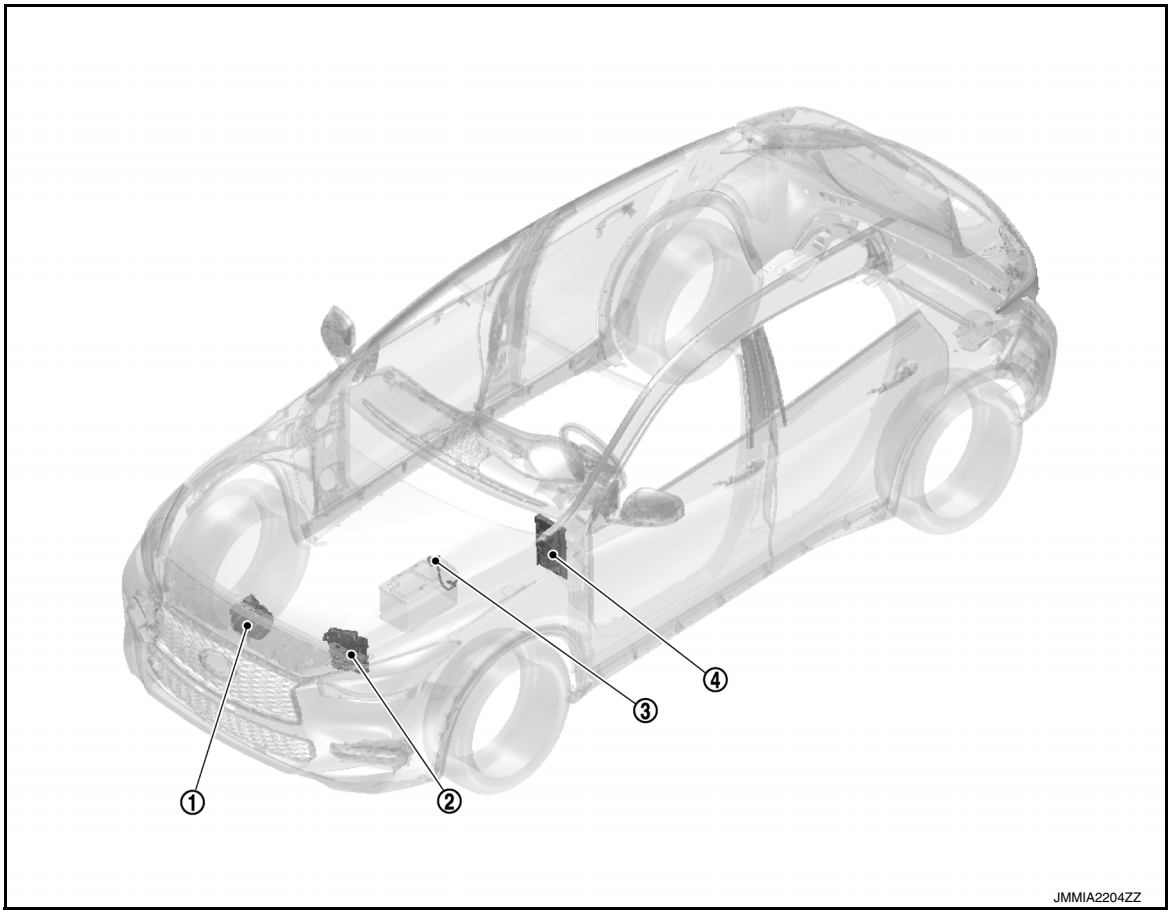
Tool name		Description
Volt/amp(s) tester	 JMMIA2202ZZ	Checking charging current
Engine tester with oscilloscope	 JMMIA2201ZZ	Checking alternator diodes
Power tool	 PIIB1407E	Loosening bolts, nuts and screws

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000013563081

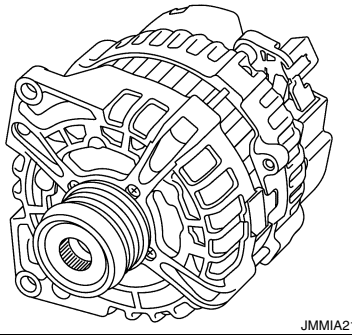


No.	Component	Function
①	Alternator	Refer to CHG-4, "Alternator".
②	ECM	ECM consult the power generation. Refer to EC-27, "Component Parts Location" for detailed installation location.
③	Battery sensor	Refer to CHG-5, "Battery Sensor".
④	BCM	BCM calculates the target power generation voltage. Refer to BCS-8, "BODY CONTROL SYSTEM : Component Parts Location" for detailed installation location.

Alternator

INFOID:0000000013563082

- Alternator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by IC voltage regulator.
- IC voltage regulator is inside 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, alternator performs the normal power generation according to characteristic of IC voltage regulator.

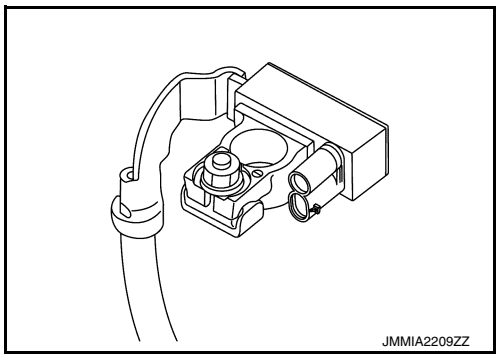


Battery Sensor

INFOID:0000000013563083

BATTERY SENSOR

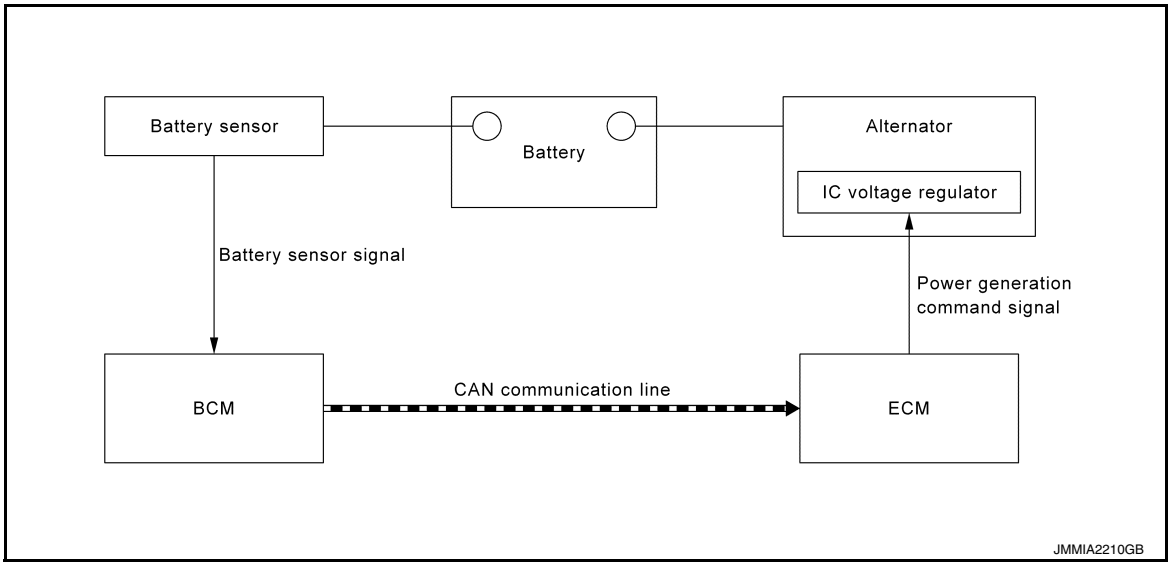
Battery sensor is installed to battery negative cable. Battery sensor measures the voltage, current and the temperature of battery.



SYSTEM
CHARGING SYSTEM
CHARGING SYSTEM : System Description

INFOID:0000000013563084

SYSTEM DIAGRAM



STSTEM DESCRIPTION

- Battery sensor measures the voltage, current and the temperature of battery.
- BCM judges battery condition according to the battery sensor signal.
- BCM calculates the target power generation voltage according to battery condition and sends calculated value as alternator voltage request signal to ECM via CAN communication.
- Signals are exchanged via LIN communication between alternator and ECM, and control response of alternator is controlled in this way. (Alternator interface function)

  NOTE:

  Function requirements for the alternator interface, general points:
  - Engine management is ON
  - Engine is running
- ECM reads in the following signals for alternator control.
- Crankshaft position sensor (with rotational recognition) and engine speed
- Battery voltage
- Alternator status via LIN communication
- ECM regulates the control response of alternator, for example in order to reduce the charging voltage when idling if battery is sufficiently charged.

  This reduces the engine load, thus also reducing fuel consumption and improving exhaust emissions.
- ECM controls the following functions.
- Switching on of alternator dependent on the condition of battery and the requirements from engine.
- Regulation of alternator according to characteristics maps stored in the ECM. To do this the charging voltage is determined by ECM.
- Adapting the charging voltage with a delay in the event of frequent load changes at alternator in idle to stabilize the idling speed.
- Protecting alternator against overheating.
- Generation of "alternator is operating" signal.
- Transmitting the detected malfunctions via CAN communication.
- Keeps charging voltage at a low value and charges battery more strongly in the deceleration phases (fuel saving).
- Alternator performs continuous self-diagnosis and transmits the results when requested to ECM.

  ECM compares the results with other signals (for example, engine speed, battery voltage, time since engine start) and thus detects following alternator malfunctions.
- Open circuit in alternator interface (LIN communication) line or interface driver in ECM malfunction.

  NOTE:

  Charge voltage of 14.3V is specified for this malfunction.

- Electrical and mechanical following malfunction at alternator.
• IC regulator or diodes malfunction
• Stator interruption or short circuit
• Excitation interruption
• Charging voltage and charging current are not reached
• Charging voltage too high
• Cracked or loose drive belt

ENERGY MANAGEMENT SYSTEM

ENERGY MANAGEMENT SYSTEM : System Description

INFOID:0000000013563085

Energy management system manages the provision (supply) and consumption (management) of electrical energy with the aim of ensuring mobility and a stable supply of all electrical consumers. Refer to BCS-15, "ENERGY MANAGEMENT SYSTEM : System Description".

DIAGNOSIS SYSTEM (BCM)

CONSULT Function (BCM)

INFOID:0000000013766963

APPLICATION ITEM

CONSULT performs the following functions via CAN communication with BCM.

Diagnosis mode	Function Description
Work Support	Changes the setting for each function
Self Diagnostic Result	Displays the diagnosis results judged by BCM
Data Monitor	The BCM input/output signals are displayed
Ecu Identification	The BCM part number is displayed
Active Test	The signals used to activate each device are forcibly supplied from BCM
Configuration	Writes the vehicle specification when replacing BCM

SELF DIAGNOSTIC RESULT

Refer to BCS-51, "DTC Index".

WORK SUPPORT

Monitor Item	Description
Replace decoupling relay	Reset the counter of decoupling relay
Replace eco start stop function add battery	Reset the counter of sub battery relay
Deactivate production run	—

DATA MONITOR

NOTE:

The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitor Item	Description
Rear map lamp switch	—
Map lamp switch (FL)	—
FR PERSONAL LAMP	—
Lamp state 1.SR left	—
Lamp state 1.SR right	—
Vehicle tilt cancel switch	—
Intruder cancel switch	—
Breakdown button	—
Info button	—
Telematics switch	—
AUTO LIGHT SW	—
Sunroof/sunshade switch	—
REAR LEFT	—
REAR RIGHT	—
WIND LIFT RLY CONT HIGH	—
WIND LIFT RLY CONT DEEP	—
SUPPLY BATTERY 1	Display the status of power supply
SUPPLY BATTERY 2	Display the status of power supply
SUPPLY BATTERY 3	Display the status of power supply

Monitor Item	Description
SUPPLY BATTERY 4	Display the status of power supply
SUPPLY BATTERY 5	Display the status of power supply
FUEL LEVEL SEN 1 REF	Display the status of fuel level sensor
FUEL LEVEL SEN 2 REF	Display the status of fuel level sensor
HIGH BEAM RIGHT	Display the status of high beam right
HIGH BEAM LEFT	Display the status of high beam left
TURN SIGNAL FRONT RIGHT	Display the status of turn signal front right
TURN SIGNAL FRONT LEFT	Display the status of turn signal front right
PARKING LAMP FRONT RIGHT	Display the status of parking lamp front right
PARKING LAMP FRONT LEFT	Display the status of parking lamp front left
SIDEMARKER FRONT RIGHT	—
SIDEMARKER FRONT LEFT	—
DTRL RIGHT	Display the status of daytime running lamp right
DTRL LEFT	Display the status of daytime running lamp left
PARKING LAMP 2 FR RIGHT	—
PARKING LAMP 2 FR LEFT	—
FOG LAMP RIGHT	Display the status of front fog lamp right
FOG LAMP LEFT	Display the status of front fog lamp left
STOP TAIL LAMP 2 RIGHT	—
STOP TAIL LAMP 2 LEFT	—
STOP TAIL LAMP 1 RIGHT	—
STOP TAIL LAMP 1 LEFT	—
TURN SIGNAL REAR RIGHT	—
TURN SIGNAL REAR LEFT	—
LICENSE PLATE LAMP RIGHT	Display the status of license plate lamp right
LICENSE PLATE LAMP LEFT	Display the status of license plate lamp left
BACK-UP LAMP LEFT	Display the status of back-up lamp left
BACK-UP LAMP RIGHT	Display the status of back-up lamp left
FOG LAMP	Display the status of rear fog lamp
TAIL LAMP RIGHT	Display the status of tail lamp right
TAIL LAMP LEFT	Display the status of tail lamp left
Ambient lamp (blue)	—
START / STOP FUNC ADD BAT	Display the status of sub battery
STAGE OF WIND WIPER	Display the status of front wiper
WIND WIPER IN REST POS	Display the status of front wiper position
STATUS OF CIRCUIT 15X	—
CIRCUIT 15	Display the status of ignition switch power supply
CIRCUIT 15R1 RELAY	Display the status of terminal relay (15R1)
CIRC 15R2 POW OUTLET RLY	Display the status of terminal relay (15R2)
SYMBOL ILLUMINATION	—
OUTSIDE TEMP READING	Display outside temperature
COOLANT LEVEL	Display the status of coolant level
WASHER FLUID LEVEL	Display the status of washer fluid level
BRAKE FLUID LEVEL	Display the status of brake fluid level

Monitor Item	Description
FRONT BRAKE LININGS	—
LH ENG HOOD CONTACT SW	—
RH ENG HOOD CONTACT SW	—
LH RR DR ROTARY TUMB SW	—
RH RR DR ROTARY TUMB SW	—
FUEL FILLER FLAP	Display the status of fuel filler lid
TK LID EMERGENCY OP SW	—
LEFT PARKING LAMP	—
RIGHT PARKING LAMP	—
FRONT FOG LAMP BUTTON	Display the status of front fog lamp switch
REAR FOG LAMP BUTTON	Display the status of rear fog lamp switch
AUTO ON/OFF DRIVING LIGHT	—
EXT LT SW IN POS MNL DR LT	—
NIGHT VIEW ASSIST BUTTON	—
STANDING LIGHTS	—
VOLTAGE AT CIRCUIT 30G	Display the status of power supply via latching terminal relay 30g
START / STOP FUNC ADD BAT	—
START / STOP FUNC ADD BAT	—
BATTERY	Display the voltage of battery
BATTERY	Display the current of battery
BATTERY	Display the temperature of battery
INT RESIST	—
ENG STP INHIBI: OBD EL SYS	—
ENG STP INHIBI: LIN ERROR	—
ENG STP INHIBI: DIAGNOSIS	—
ENG STP INHIBI: AMBIENT	—
ENG STP INHIBI: BATTERY	—
RH FUEL LEVEL IND SENSOR	—
LH FUEL LEVEL IND SENSOR	—
REAR WINDOW WIPER RELAY	Display the status of rear wiper relay
TRUNK LAMP	Display the status of luggage room lamp
DOOR HANDLE ILL (RR DOOR)	—
AMBI ILL (IP AND RR DOOR)	—
FOOT LAMP	Display the status of foot lamp
LH FR ILL DOOR SILL MOLD	—
RH FR ILL DOOR SILL MOLD	—
TRUNK LAMP	Display the status of back door lamp
DOOR HANDLE ILL (RR DOOR)	—
AMBI ILL (IP AND RR DOOR)	—
FOOT LAMP	Display the status of foot lamp
LH FR ILL DOOR SILL MOLD	—
RH FR ILL DOOR SILL MOLD	—
SPRAY NOZZ HOSE HEATER	Display the status of spray nozzle hose heater
WIND WASHER SYSTEM PUMP	Display the status of front washer pump

Monitor Item	Description
WIND WASH PUMP: RR WIND	Display the status of rear washer pump
Headlamp washer pump	—
HEADLAMP CLEAN SYS PUMP	—
HORN RELAY	Display the status of horn relay
LICENSE PLATE LAMP	Display the status of license plate lamp
BRAKE / TAILLIGHT 1 LEFT	—
BRAKE / TAILLIGHT 1 RIGHT	—
BRAKE / TAILLIGHT 2 LEFT	—
BRAKE / TAILLIGHT 2 RIGHT	—
CENTER BRAKE LAMP	Display the status of high mounted stop lamp
RUN BOARD COURTE LT LH	—
RUN BOARD COURTE LT RH	—
SIDEMARKER FL	—
SIDEMARKER FR	—
TAIL LAMP LEFT	Display the status of tail lamp left
TAIL LAMP RIGHT	Display the status of tail lamp right
BACK-UP LAMP LEFT	—
BACK-UP LAMP RIGHT	—
FOG LAMP	—
FRONT FOG LAMP LEFT	—
FRONT FOG LAMP RIGHT	—
TURN SIGNAL RL	—
TURN SIGNAL RR	—
TURN SIGNAL FL	—
TURN SIGNAL FR	—
DTRL LEFT	—
DTRL RIGHT	—
LOW BEAM LEFT	—
LOW BEAM RIGHT	—
HIGH BEAMS / IR-RAD LEFT	—
HIGH BEAMS / IR-RAD RIGHT	—
STANDING LIGHT 1 LEFT	—
STANDING LIGHT 1 RIGHT	—
STAND LT 2 / TURN SIG 2 LH	—
STAND LT 2 / TURN SIG 2 RH	—
STOP LAMP	—
CIRCUIT 30G RELAY	Display the status of latching terminal relay 30g
DECOUPLING RELAY	Display the status of decoupling relay
IOD RELAY EARLY COUNTER	—
CIRCUIT 30G RELAY	Display the counter of latching terminal relay 30g
IOD LOW VOLT COUNTER	—
DECOUPLING RELAY	Display the counter of decoupling relay
START/STOP FUNC BAT RLY	Display the counter of sub battery relay
Light sensor present	—

Monitor Item	Description
TUNNEL SENSOR	—
INTERIOR ILLUMINATION	—
LOW BEAM SW	—
RAIN SENSOR	—
LIGHT SENSOR	—
Electrical charge throughput	—
LIFTGATE CENT LCK MOTOR	—
LIFTGATE EXTERNAL OP SW	—
LIFTGATE ROTARY TUMB SW	—

ACTIVE TEST

Monitor Item	Description
Check left front turn signal lamp	—
Check eco start stop function additional battery relay	This function able to check sub battery relay
Check right front turn signal lamp	—
Check right rear turn signal lamp	—
Check left rear turn signal lamp	—
Check right daytime running light headlamp	—
Check left daytime running light headlamp	—
Left front lamp unit	—
Centre brake lamp	This function able to check high mounted stop lamp
LICENSE PLATE LAMPS	This function able to check license plate lamps
Left rear fog lamp	This function able to check left rear fog lamp
Windshield washer system pump	This function able to check front wiper washer
Headlamp clean system pump	—
Resetting reading of frequency counter	This function able to reset the counter of latching terminal relay 30g, decoupling relay and sub battery relay
Tank cap central locking actuator	This function able to check fuel filler flap
Side marker lamp	—
Inner left rear lamp unit	This function able to check left rear combination lamp (back door side)
Left rear power window	This function able to check left rear power window
Right rear lamp unit	This function able to check right rear combination lamp (body side)
Front turn signal lamp	This function able to check front turn signal lamp
ERASE ALARM SOURCES	—
Circuit 30G relay	This function able to check latching terminal relay 30g
Rear fuse box	This function able to check injection relay, terminal relay (15R1), terminal relay (15R2) and rear wiper relay
Engine compartment fuse and relay module	This function able to check injection relay, fanfare relay, front wiper HI/LO relay and front wiper relay
Symbol illumination	—
Activate demo mode of exterior lamp	—
REAR DOORS	This function able to check rear door
Liftgate central locking motor	—
Right rear power window	This function able to check right rear power window
Running board courtesy light	—

Monitor Item	Description
Trunk lid emergency opening switch	—
Illuminated door sill moldings	—
Right front lamp unit	—
Left rear lamp unit	This function able to check left rear combination lamp (body side)
Footwell lamp	This function able to check foot lamp
Backup Lamp	This function able to check back-up lamp
Trunk lamp	—
Spray nozzle hose heater	This function able to check spray nozzle hose heater
Inner right rear lamp unit	This function able to check right rear combination lamp (back door side)
Daytime running light	This function able to check daytime running lamp
WINDSCREEN WIPER	This function able to check front wiper and rear wiper
Eighth to last data record	—
Fifth from last data record	—
Fourth from last data record	—
Last data record	—
Ninth to last data record	—
Second from last data record	—
Seventh to last data record	—
Sixth to last data record	—
Tenth to last data record	—
Third from last data record	—
Front fog lamp	This function able to check front fog lamp
Door handle illumination rear doors	—
Ambiance illumination of rear door	—
Interior Lamp	—
Mirror lamps of sun visors	—
Reading lamp actuation	—
Rear lamp actuation	—
Check component M10 5 RL door power window motor	—
Check component M10 6 RR door power window motor	—
Left rear power window actual value	—
Right rear power window actual value	—
CONFIRMATION OF BATTERY CHANGE	—
OUTPUT FOR THE WIPER ARM HOSE HEATER RELAY HAS A MALFUNCTION	—

ECU DIAGNOSIS INFORMATION

BCM

List of ECU Reference

INFOID:0000000013563087

BCM

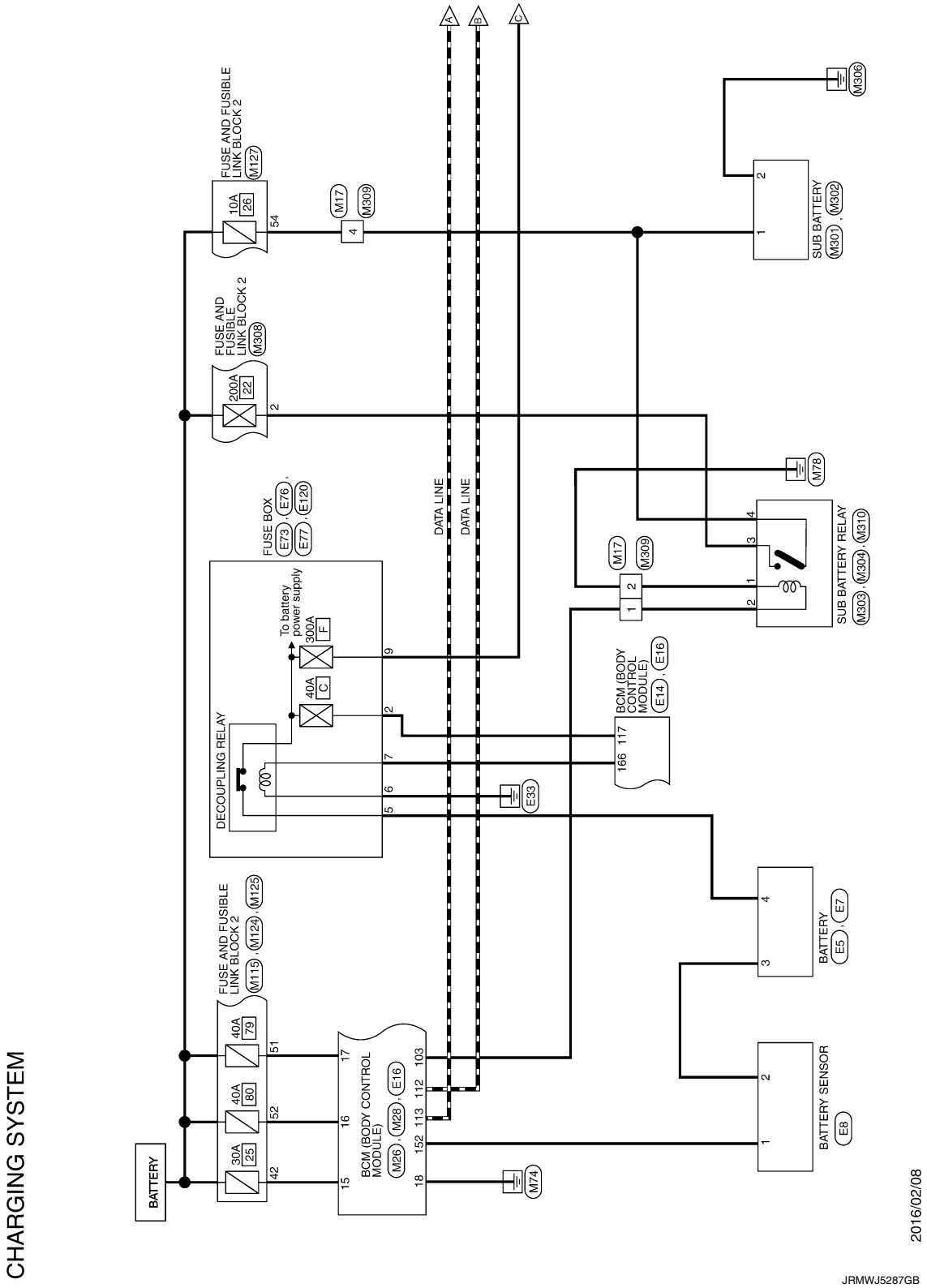
ECU	Reference
BCM	BCS-32, "Reference Value"
	BCS-50, "Fail-safe"
	BCS-51, "DTC Index"

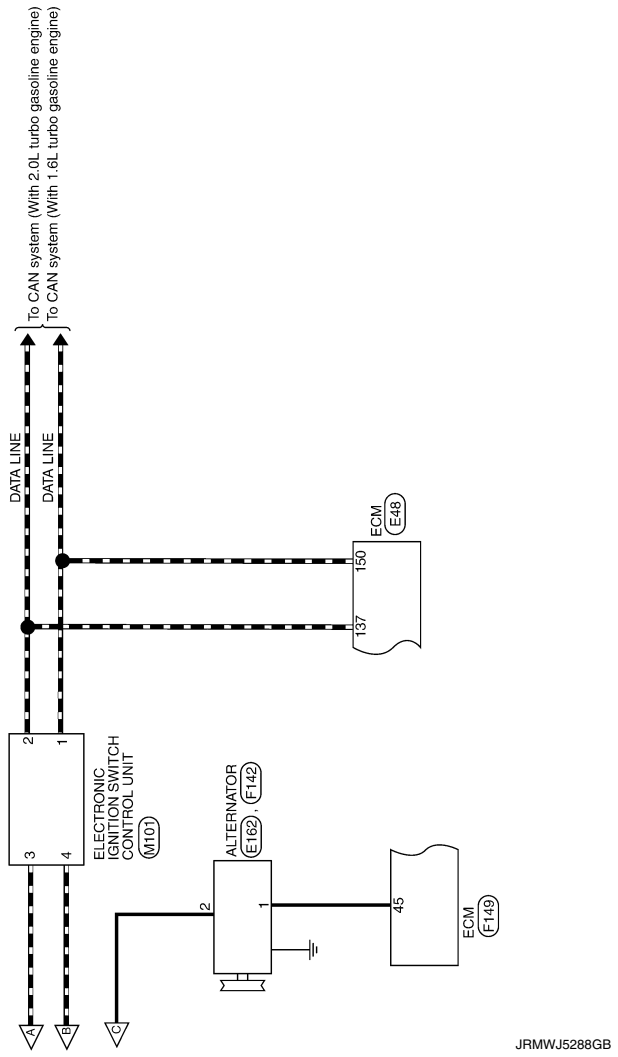
WIRING DIAGRAM

CHARGING SYSTEM

Wiring Diagram

INFOID:0000000013563088




To CAN system (With 2.0L turbo gasoline engine)
To CAN system (With 1.6L turbo gasoline engine)
DATA LINE
DATA LINE
ECM
E48
150
137
2
1
ELECTRONIC IGNITION SWITCH CONTROL UNIT
M101
3
4
ALTERNATOR
E162
F142
2
1
45
ECM
F149
A
B
C
JRMWJ5288GB

CHARGING SYSTEM

Connector No.	E5
Connector Name	BATTERY
Connector Type	DIN46225A_2.5-6_8.4_ISO

H.S.

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

3

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

Connector No.	E7
Connector Name	BATTERY
Connector Type	MB_A2469820102

H.S.

4

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

Connector No.	E8
Connector Name	BATTERY SENSOR
Connector Type	MB_A0065400281

H.S.

Connector No.	E14
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	MB_A0235458926

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
115	R	BAT (VIA DECOUPLING RELAY)
117	R	BAT (VIA DECOUPLING RELAY)
118	BR	GND

Connector No.	E16
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	MB_A1665400181

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
143	Y	FRONT FOG LAMP RH
144	W	HIGH BEAM RH
145	GR	LOW BEAM LH
146	P	FRONT TURN SIGNAL RH
148	V	FR BRAKE WEAR SENSOR RH
150	GR	PARKING LAMP RH
152	L	LIN (BAT SENSOR)
154	Y	HEADLAMP AIMING RH
157	O	SSK STAT
158	R	COOLANT LEVEL SW SIG
159	BR	COOLANT LEVEL SW GND
161	P	AMBIENT SENSOR GND
162	G	AMBIENT SENSOR SIG
164	O	BRAKE FLUID LEVEL SW GND
165	V	HEADLAMP AIMING LH
166	R	DECOUPLING RELAY CONT

Connector No.	E48
Connector Name	ECM
Connector Type	MB_A0075406981

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
97	R	POWER SUPPLY (ECM)
98	BR	ECM GROUND
99	V	POWER SUPPLY (ECM)
100	BR	ECM GROUND
101	R	POWER SUPPLY (ECM)
102	B	ECM GROUND
103	L	COOLING FAN CONTROL SIGNAL
104	R	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 1)
105	G	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 2)
106	BR	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR1)
111	B	IGNITION SIGNAL
112	Y	POWER SUPPLY (BATTERY)
116	W	STARTER RELAY-L
119	GR	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 2)
120	O	SENSOR GROUND
122	R	HOT START SIGNAL
123	GR	MOTOR RELAY CONTROL SIGNAL
127	O	FUEL PUMP ON SIGNAL
132	G	ACCELERATOR PEDAL POSITION SENSOR 1
136	Y	POWERTRAIN SENSOR CAN-H
137	W	CAN-H
138	GR	POWERTRAIN CAN-H
141	B	WATER PUMP RELAY CONTROL SIGNAL
145	W	ACCELERATOR PEDAL POSITION SENSOR 2
146	G	FUEL TANK PRESSURE SENSOR
147	L	CRASH SIGNAL
148	W	STARTER RELAY-H

149	B	POWERTRAIN SENSOR CAN-L
150	G	CAN-L
151	L	POWERTRAIN CAN-L
152	V	EVAP CANISTER VENT CONTROL VALVE
153	BR	EVAP PURGE CONTROL VALVE

Connector No.	E73
Connector Name	FUSE BOX
Connector Type	MB_A0035462340

H.S.

2

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

Connector No.	E76
Connector Name	FUSE BOX
Connector Type	MB_A0045460440

H.S.

5

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

JRMWJ5289GB

CHARGING SYSTEM

Connector No.	E77
Connector Name	FUSE BOX
Connector Type	MB_A0225452026

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
6	BR	-
7	R	-

Connector No.	E120
Connector Name	FUSE BOX
Connector Type	MB_A0039824102

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
9	-	-

Connector No.	E162
Connector Name	ALTERNATOR
Connector Type	A0255454726

H.S.

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

Connector No.	F142
Connector Name	ALTERNATOR
Connector Type	A0255454726

H.S.



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

Connector No.	F149
Connector Name	ECM
Connector Type	A0075407381

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	BR/B	FUEL INJECTOR (No. 1)
2	GY	FUEL INJECTOR (No. 1)
3	Y/BR	PARTIAL LOAD OPERATION CRANKCASE VENTILATION VALVE
4	G/W	COOLANT THERMOSTAT HEATER ELEMENT
7	L	IGNITION COIL (No. 2)
10	R/Y	SENSOR GROUND
11	G/Y	SENSOR GROUND
12	R/V	SENSOR GROUND
13	BR	SENSOR GROUND
14	BR/G	SENSOR GROUND
16	W/B	SENSOR POWER SUPPLY
17	BR/W	SENSOR POWER SUPPLY
18	W/V	SENSOR POWER SUPPLY
23	B/BR	DIVERT AIR SWITCHOVER VALVE
24	L/R	THROTTLE VALVE MOTOR (+)
25	L/G	FUEL INJECTOR (No. 4)
26	W/L	FUEL INJECTOR (No. 4)
28	W/R	ENGINE OIL PUMP VALVE
29	B	INTAKE CAMSHAFT ACTUATOR
31	V/L	IGNITION COIL (No. 4)
33	BR/O	INTAKE CAMSHAFT VALVE LIFT SWITCHOVER ACTUATOR
34	Y/L	EXHAUST CAMSHAFT POSITION SENSOR
36	O/B	EVAP CONTROL SYSTEM PRESSURE SENSOR
37	GY/L	HEATED OXYGEN SENSOR
38	GY/R	THROTTLE POSITION SENSOR 2
40	BR/GY	CHARGE AIR TEMPERATURE SENSOR DOWNSTREAM OF THROTTLE VALVE
41	Y/B	PRESSURE SENSOR UPSTREAM OF THROTTLE VALVE
45	L/W	LIN
48	G/V	THROTTLE VALVE MOTOR (-)
49	BR/L	FUEL INJECTOR (No. 3)
50	B/Y	FUEL INJECTOR (No. 3)
51	BR/Y	BOOST PRESSURE CONTROL VACUUM TRANSDUCER
53	P/Y	EXHAUST CAMSHAFT ACTUATOR
54	BR/B	COOLANT PUMP SWITCHOVER VALVE
55	G	IGNITION COIL (No. 3)
58	R/B	INTAKE CAMSHAFT POSITION SENSOR
59	V/GY	KNOCK SENSOR 2
60	G/B	KNOCK SENSOR 1
61	BR/R	CHARGE AIR TEMPERATURE SENSOR UPSTREAM OF THROTTLE VALVE
62	Y/GY	THROTTLE POSITION SENSOR 1
63	L/R	AIR FUEL RATIO (A/F) SENSOR
64	B/Y	AIR FUEL RATIO (A/F) SENSOR
65	Y/R	FUEL TEMPERATURE SIGNAL
67	W/L	FUEL PRESSURE SIGNAL
72	R/GY	INTAKE CAMSHAFT VALVE LIFT SWITCHOVER POSITION SENSOR 2
73	B/R	FUEL INJECTOR (No. 2)
74	B/W	FUEL INJECTOR (No. 2)
75	V	QUANTITY CONTROL VALVE (LOW)
76	G/B	QUANTITY CONTROL VALVE (HIGH)
77	R/B	AIR FUEL RATIO (A/F) SENSOR HEATER
78	V/G	FULL LOAD OPERATION VENT LINE HEATER ELEMENT
79	P	IGNITION COIL (No. 1)
81	Y/W	CRANKSHAFT POSITION SENSOR
82	O	ENGINE OIL LEVEL SWITCH
83	P/G	KNOCK SENSOR 2
84	W/Y	KNOCK SENSOR 1
86	GY/Y	ENGINE COOLANT TEMPERATURE SENSOR
87	V	AIR FUEL RATIO (A/F) SENSOR
88	GY/B	AIR FUEL RATIO (A/F) SENSOR
90	O/G	PRESSURE SENSOR DOWNSTREAM OF AIR FILTER
91	GY	PRESSURE SENSOR DOWNSTREAM OF THROTTLE VALVE
95	R	HEATED OXYGEN SENSOR HEATER
96	L/Y	INTAKE CAMSHAFT VALVE LIFT SWITCHOVER POSITION SENSOR 1

Connector No.	M17
Connector Name	WIRE TO WIRE
Connector Type	MB_A2205453928

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
1	V	-
2	BR	-
4	L	-

Connector No.	M26
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	MB_A0235459826

H.S.



Terminal No.	Color Of Wire	Signal Name [Specification]
15	W	BAT (FUSE)
16	BR	BAT (FUSE)
17	R	BAT (FUSE)
18	B	GND

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CHARGING SYSTEM

Connector No.	M28
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	MB_A1665400481

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
67	V	BACK DOOR UNLOCK
69	GR	STOP LAMP (BODY RH)
70	B	REAR TURN SIGNAL LH
71	GR	BACK-UP LAMP RH
72	Y	LICENSE PLATE LAMP RH
73	L	RR POWER WINDOW SW RH UP
74	B	RR POWER WINDOW SW RH DOWN
75	L	RR POWER WINDOW SW RH GND
76	GR	HALL SENSOR RH POWER SUPPLY
77	R	SUB BAT-
78	B	TERMINAL RELAY 15R1 CONT
80	B	REAR WIPER RELAY CONT
82	GR	TAIL LAMP (BODY LH)
83	P	TERMINAL RELAY 15R2 CONT
85	B	TAIL LAMP (BK LH)
87	R	BAT (VIA LATCHING TERMINAL RELAY 30G)
89	O	HALL SENSOR RH GND
90	V	HALL SENSOR RH SIGNAL
91	P	FUEL LEVEL SENSOR GND
92	L	FUEL LEVEL SENSOR
93	GR	FUEL LEVEL SENSOR
94	Y	FUEL FILLER LID STATUS
97	G	LATCHING TERMINAL RELAY 30G CONT 1
98	B	LATCHING TERMINAL RELAY 30G GND 1
99	W	LATCHING TERMINAL RELAY 30G GND 2
100	V	LATCHING TERMINAL RELAY 30G CONT 2
101	Y	REAR DOOR INSIDE HANDLE LAMP CONT
102	GR	AMBIENT LAMP CONT
103	V	SUB BAT RELAY CONT
105	G	RR DOOR LH UNLOCK
106	W	FUEL FILLER LID UNLOCK
107	L	RR DOOR LH LOCK
108	R	SUB BAT+
109	O	LIN (ROOF)
112	BR	CAN-L (BODY 1)
113	R	CAN-H (BODY 1)

114	B	INJECTION RELAY CONT

Connector No.	M101
Connector Name	ELECTRONIC IGNITION SWITCH CONTROL UNIT
Connector Type	MB_A0265458426

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
1	G	CHASSIS CAN-L
2	W	CHASSIS CAN-H
3	R	BODY CAN 1-H
4	BR	BODY CAN 1-L
6	W	STEERING LOCK OPERATION
9	GR	REMOTE KEYLESS
10	W	POWER SUPPLY
11	BR	DIAGNOSTIC CAN-L
12	L	DIAGNOSTIC CAN-H

Connector No.	M115
Connector Name	FUSE AND FUSIBLE LINK BLOCK 2
Connector Type	MB_A0065450901

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
42	W	-

Connector No.	M124
Connector Name	FUSE AND FUSIBLE LINK BLOCK 2
Connector Type	MB_A0065452901

H.S.

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

Connector No.	M125
Connector Name	FUSE AND FUSIBLE LINK BLOCK 2
Connector Type	MB_A0065453101

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
52	BR	-

Connector No.	M127
Connector Name	FUSE AND FUSIBLE LINK BLOCK 2
Connector Type	MB_A0065454201

H.S.

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

Connector No.	M301
Connector Name	SUB BATTERY
Connector Type	MB_A2049821402

H.S.

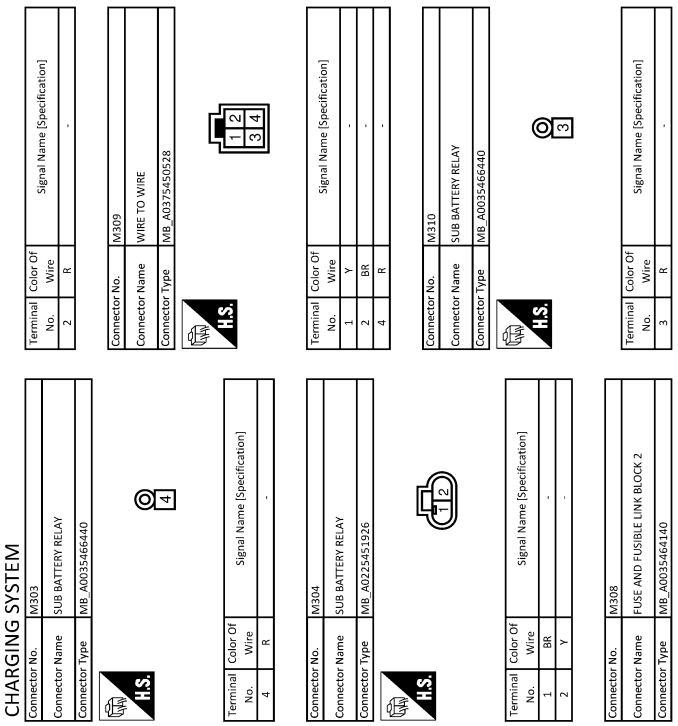
Terminal No.	Color Of Wire	Signal Name [Specification]
1	R	-

Connector No.	M302
Connector Name	SUB BATTERY
Connector Type	MB_A2049821502

H.S.

Terminal No.	Color Of Wire	Signal Name [Specification]
2	BR	-

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JRMWJ5292GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

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

INFOID:0000000013566745

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

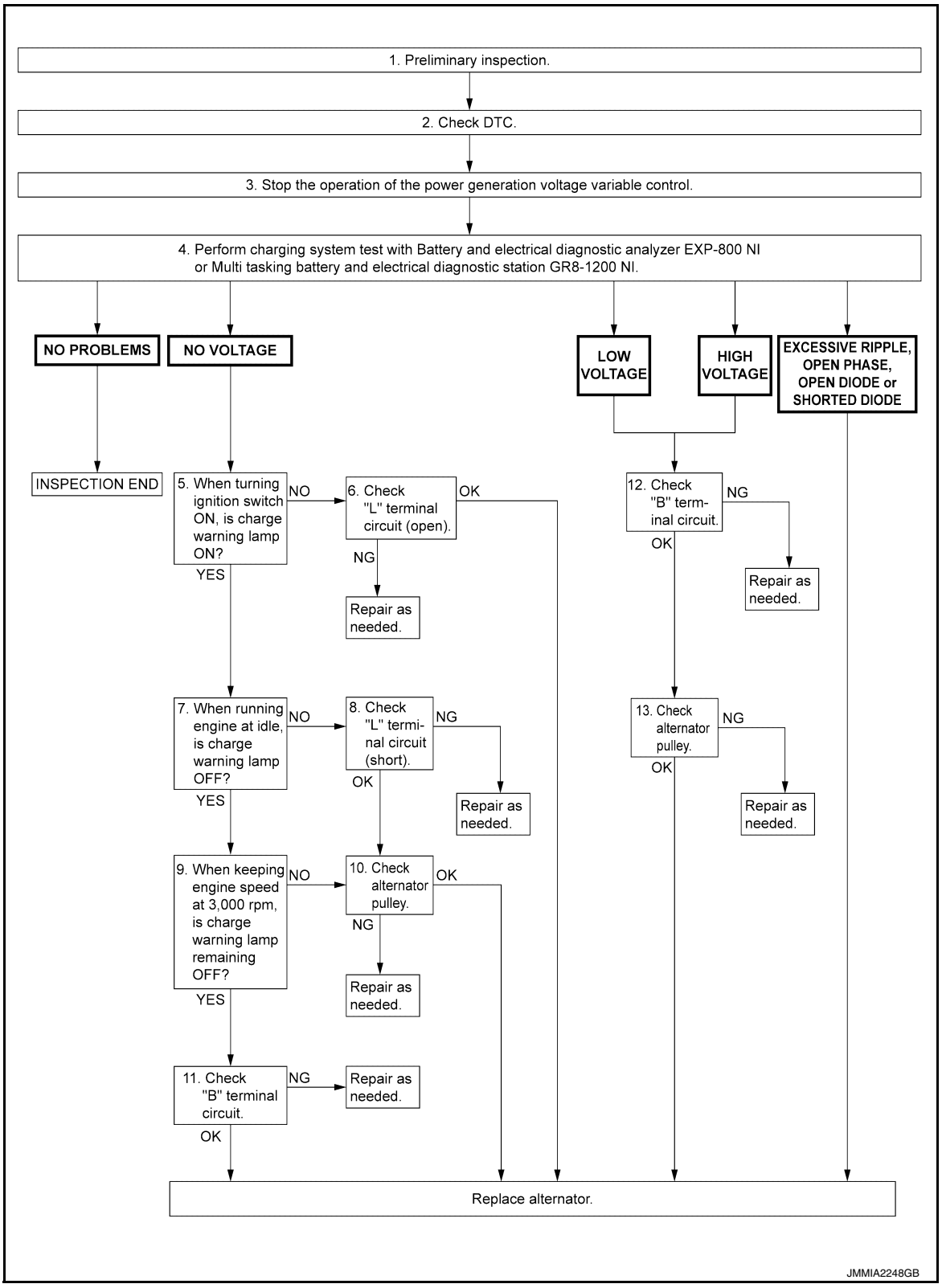
To test the charging system, use the following special service tools:

- 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.

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-27, "Inspection Procedure".

>> GO TO 2.

2.CHECK DTC

Perform self diagnosis with CONSULT

Is any DTC detected?

YES >> • BCM: Refer to BCS-51, "DTC Index".
• ECM: refer to EC-142, "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-32, "Diagnosis Procedure".

Is the “L” terminal circuit normal?

YES >> Replace alternator. Refer to CHG-35, "1.6L/2.0L TURBO 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-33, "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.

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-36, "1.6L/2.0L TURBO ENGINE : Inspection".

Is alternator pulley normal?

YES >> Replace alternator. Refer to CHG-35, "1.6L/2.0L TURBO ENGINE : Removal and Installation".
NO >> Repair as needed.

11. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to CHG-34, "Diagnosis Procedure".

Is "B" terminal circuit normal?

YES >> Replace alternator. Refer to CHG-35, "1.6L/2.0L TURBO ENGINE : Removal and Installation".
NO >> Repair as needed.

12. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to CHG-34, "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-36, "1.6L/2.0L TURBO ENGINE : Inspection".

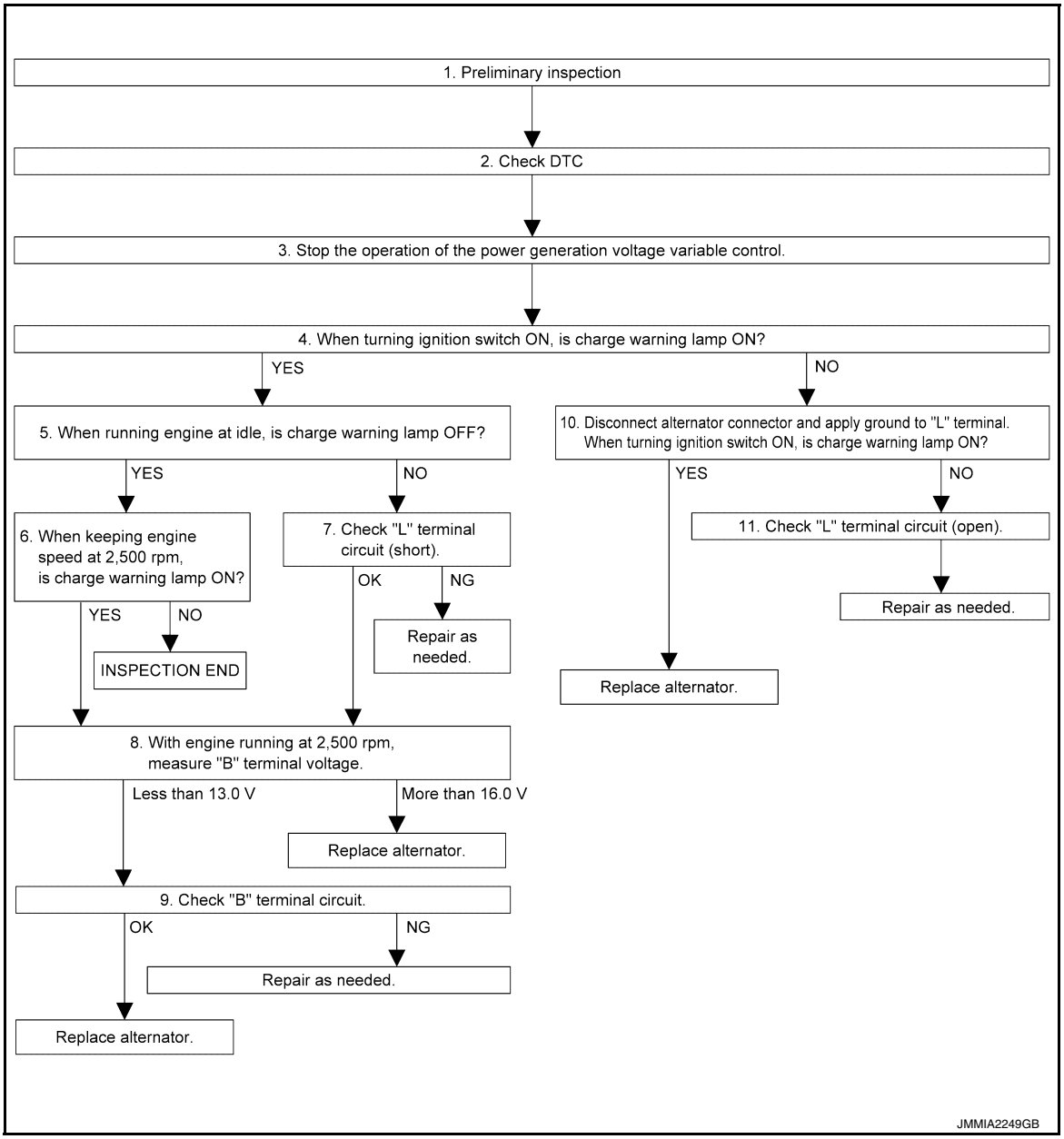
Is alternator pulley normal?

YES >> Replace alternator. Refer to CHG-35, "1.6L/2.0L TURBO ENGINE : Removal and Installation".
NO >> Repair as needed.

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

INFOID:0000000013566746

OVERALL SEQUENCE



DETAILED FLOW

1.PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to CHG-27, "Inspection Procedure".

>> GO TO 2.

2.CHECK DTC

Perform self diagnosis with CONSULT

Is any DTC detected?

YES >> • ECM: Refer to EC-142, "DTC Index".
• BCM: refer to BCS-51, "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. 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-33, "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-35, "1.6L/2.0L TURBO ENGINE : Removal and Installation".

9. “B” TERMINAL CIRCUIT INSPECTION

Check “B” terminal circuit. Refer to CHG-34, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace alternator. Refer to CHG-35, "1.6L/2.0L TURBO 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-35, "1.6L/2.0L TURBO ENGINE : Removal and Installation".
NO >> GO TO 11.

11. CHECK “L” TERMINAL CIRCUIT (OPEN)

Check “L” terminal circuit (open). Refer to CHG-32, "Diagnosis Procedure".

>> Repair as needed.

CHARGING SYSTEM PRELIMINARY INSPECTION

Inspection Procedure

INFOID:0000000013563090

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 ALTNAOTR INSTALLATION CONDITION (ALTERNATOR GROUND)

Check alternator installation condition.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Tighten alternator bolt to the specified torque.

3.CHECK DRIVE BELT TENSION

Check drive belt tension. Refer to EM-14, "Inspection".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair as needed.

DTC/CIRCUIT DIAGNOSIS

P065B ALTERNATOR MALFUNCTION

DTC Description

INFOID:0000000013563091

DTC DETECTION LOGIC

DTC		CONSULT screen items		DTC detecting condition	
		(Trouble diagnosis content)	[Malfunction type]		
P065B	13	Alternator has a malfunction	[CIRC OPEN]	Diagnosis condition	• Engine running • Power generation on
				Signal (terminal)	–
				Threshold	Battery voltage, discharge current and utilization of alternator are lower than standard value.
				Diagnosis delay time	–

POSSIBLE CAUSE

- Harness from alternator to fuse box
- Harness from battery sensor to BCM and battery

FAIL-SAFE

-

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn ignition switch ON.
2. Select “Self Diagnostic Result” mode of “BCM” using CONSULT.

Is DTC detected?

YES >> Refer to CHG-28, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013563092

1.CHECK “B” TERMINAL CIRCUIT

Check “B” terminal circuit. Refer to CHG-34, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace harness.

2.CHECK BATTERY SENSOR CIRCUIT

1. Disconnect battery negative terminal and positive terminal.
2. Disconnect battery sensor connector and BCM connector.
3. Check continuity between battery sensor connector and BCM connector.

Battery sensor		BCM		Continuity
Connector	Terminal	Connector	Terminal	
E8	1	E16	152	Existed

4. Check continuity between battery sensor connector and battery positive terminal connector.

Battery sensor		Battery positive terminal		Continuity
Connector	Terminal	Connector	Terminal	
E8	2	E5	3	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3. ERASE DTC

With CONSULT

1. Connect battery sensor connector and BCM connector.
2. Connect battery negative terminal and positive terminal.
3. Turn ignition switch ON.
4. Select “Self Diagnostic Result” mode of “BCM” using CONSULT.
5. Erase DTC, and then repeat “DTC CONFIRMATION PROCEDURE”. Refer to CHG-28, "DTC Description".

Is DTC “P065B-13” detected?

YES >> Replace BCM. Refer to BCS-248, "Removal and Installation".
NO >> INSPECTION END

B1F45 DISCHARGED BATTERY

DTC Description

INFOID:0000000013563093

DTC DETECTION LOGIC

DTC		CONSULT screen items (Trouble diagnosis content)	CONSULT screen items [Malfunction type]	DTC detecting condition	
B1F45	00	Battery has excessive resistance	[NO SUBTYPE INFO]	Diagnosis condition	Engine running
				Signal (terminal)	-
				Threshold	Resistance of battery is larger than standard value
				Diagnosis delay time	-

POSSIBLE CAUSE

- Battery deeply discharged
- Battery malfunction

FAIL-SAFE

-

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn ignition switch ON.
2. Select “Self Diagnostic Result” mode of “BCM” using CONSULT.

Is DTC detected?

YES >> Refer to CHG-30, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-56, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000013563094

1.CHECK BATTERY CONDITION

Check battery condition. Refer to PG-102, "MAIN BATTERY : Work Procedure" (main battery) and PG-104, "SUB BATTERY : Work Procedure" (sub battery).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace battery. Refer to PG-109, "MAIN BATTERY : Removal and Installation" (main battery) or PG-113, "SUB BATTERY : Removal and Installation" (sub battery).

2.CHECK “L” TERMINAL CIRCUIT (OPEN)

Check “L” terminal circuit. Refer to CHG-32, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace harness.

3.CHECK “L” TERMINAL CIRCUIT (SHORT)

Check “L” terminal circuit. Refer to CHG-33, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace harness.

4.CHECK “B” TERMINAL CIRCUIT

Check “B” terminal circuit. Refer to CHG-34, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace harness.

5.CHECK ALTERNATOR

Check alternator. Refer to CHG-36, "1.6L/2.0L TURBO ENGINE : Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace alternator. Refer to CHG-35, "1.6L/2.0L TURBO ENGINE : Removal and Installation".

6.ERASE DTC

With CONSULT

1. Turn ignition switch ON.
2. Select “Self Diagnostic Result” mode of “BCM” using CONSULT.
3. Erase DTC, and then repeat “DTC CONFIRMATION PROCEDURE”. Refer to CHG-30, "DTC Description".

Is DTC “B1F45-00” detected?

YES >> Replace BCM. Refer to BCS-248, "Removal and Installation".
NO >> INSPECTION END

L TERMINAL CIRCUIT (OPEN)

Diagnosis Procedure

INFOID:0000000013563095

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.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

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

Alternator		ECM		Continuity
Connector	Terminal	Connector	Terminal	
F142	1	F149	45	Existed

Is the inspection result normal?

YES >> “L” terminal circuit (open) is normal. Refer to CHG-21, "Work Flow (With EXP-800 NI or GR8-1200 NI)" (with EXP-800 NI or GR8-1200 NI) or CHG-25, "Work Flow (Without EXP-800 NI or GR8-1200 NI)" (without EXP-800 NI or GR8-1200 NI).
NO >> Repair harness or connector.

L TERMINAL CIRCUIT (SHORT)

Diagnosis Procedure

INFOID:0000000013563096

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-21, "Work Flow (With EXP-800 NI or GR8-1200 NI)" (with EXP-800 NI or GR8-1200 NI) or CHG-25, "Work Flow (Without EXP-800 NI or GR8-1200 NI)" (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 negative terminal.
3. Disconnect ECM connector.
4. Check continuity between ECM harness connector and ground.

ECM		—	Continuity
Connector	Terminal		
F149	45	Ground	Not existed

Is the inspection result normal?

YES >> “L” terminal circuit (short) is normal. Refer to CHG-21, "Work Flow (With EXP-800 NI or GR8-1200 NI)" (with EXP-800 NI or GR8-1200 NI) or CHG-25, "Work Flow (Without EXP-800 NI or GR8-1200 NI)" (without EXP-800 NI or GR8-1200 NI).
NO >> Repair or replace harness.

B TERMINAL CIRCUIT

Diagnosis Procedure

INFOID:0000000013563097

1.CHECK “B” TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check that “B” terminal is clean and tight.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair “B” terminal connection.

2.CHECK “B” TERMINAL CIRCUIT

Check voltage between alternator “B” terminal and ground.

(+)		(–)	Voltage (V) (Approx.)
Alternator			
Connector	Terminal		
E162	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check harness for open between alternator and battery terminal with 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 (V) (Approx.)
	Alternator		
	Connector	Terminal	
Battery positive terminal	E162	2	Less than 0.2

Is the inspection result normal?

YES >> “B” terminal circuit is normal. Refer to CHG-21, "Work Flow (With EXP-800 NI or GR8-1200 NI)" (with EXP-800 NI or GR8-1200 NI) or CHG-25, "Work Flow (Without EXP-800 NI or GR8-1200 NI)" (without EXP-800 NI or GR8-1200 NI).
NO >> Check harness between battery and alternator for poor continuity.

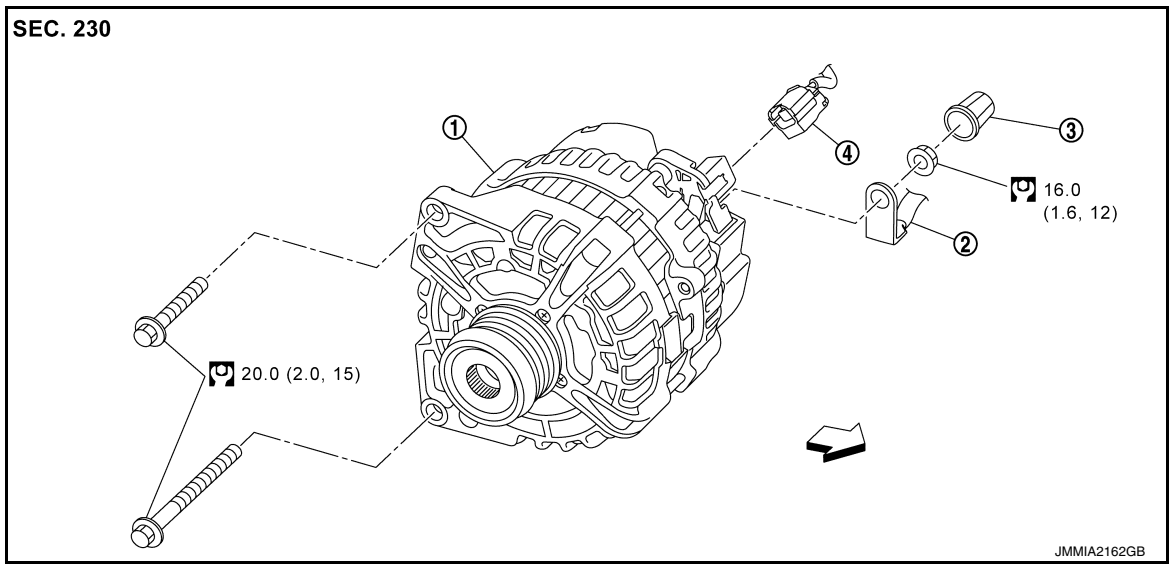
REMOVAL AND INSTALLATION

ALTERNATOR

1.6L/2.0L TURBO ENGINE

1.6L/2.0L TURBO ENGINE : Exploded View

INFOID:0000000013563098



① Alternator
② "B" terminal harness
③ Terminal cap
④ Alternator connector
⇦ : Vehicle front
: N·m (kg-m, ft-lb)

1.6L/2.0L TURBO ENGINE : Removal and Installation

INFOID:0000000013563099

REMOVAL

1. Disconnect battery cable from battery negative terminal. Refer to PG-109, "MAIN BATTERY : Removal and Installation" (main battery) and PG-113, "SUB BATTERY : Removal and Installation" (sub battery).
2. Remove air duct (inlet). Refer to EM-23, "Removal and Installation".
3. Remove front bumper fascia. Refer to EXT-21, "Removal and Installation".
4. Remove charge air hose from turbocharger. Refer to EM-37, "Removal and Installation".
5. Remove cooling fan unit assembly. Refer to CO-16, "Removal and Installation".
6. Remove heat insulator. Refer to EM-42, "Removal and Installation".
7. Remove engine under cover. Refer to EXT-44, "ENGINE UNDER COVER : Removal and Installation".
8. Remove charge air hose1. Refer to EM-42, "Removal and Installation"
9. Remove drive belt. Refer to EM-13, "Removal and Installation".
10. Remove terminal cap and "B" terminal nut, and then disconnect "B" terminal harness.
11. Disconnect alternator connector.
12. Remove low pressure flexible hose fixing bolt from alternator.
13. Disconnect compressor harness connector and disengage harness connector fixing clip from compressor.
14. Remove compressor mounting bolts and then move compressor from oil pan to a location where it does not inhibit work with attached hoses. Refer to HA-25, "Removal and Installation"
    CAUTION:
    Never strong force to low pressure flexible hose and high pressure pipe.
15. Remove alternator mounting bolts.

16. Remove alternator assembly upward from the vehicle.

INSTALLATION

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

CAUTION:

- **Temporarily tighten the alternator bolts in order from the upper to the lower, and then tighten them in order from the upper to the lower.**
  For the alternator, the front side (pulley side) surface is the reference surface. Fit the reference surface to the alternator mounting part, and then tighten the bolts.
- **Be careful to tighten "B" terminal nut to the specified torque.**
- **Install alternator, and check tension of belt. Refer to EM-14, "Inspection".**

1.6L/2.0L TURBO ENGINE : Inspection

INFOID:0000000013563100

ALTERNATOR PULLEY INSPECTION

Perform the following.

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

CHARGING CURRENT INSPECTION

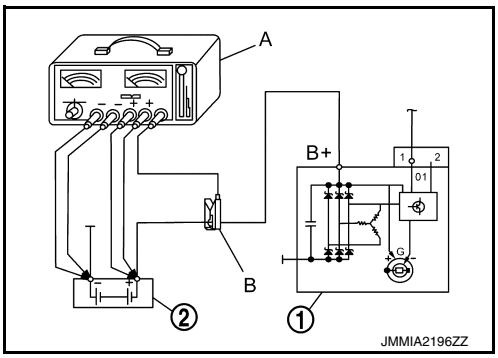
CAUTION:

Before inspection, perform the following.

- **Check drive belt. Refer to EM-14, "Inspection".**
- **Check electrical lines to battery, alternator, starter motor and on the ground point for the battery in the engine compartment for tight seating and check for a perfect condition.**
- **Check ground cable between engine and body for tight seating and proper condition.**

1. Connect volt/amp(s) tester (A) with current clamp (B) as shown in the figure.

   ① : Alternator
   ② : Battery



2. Start engine.
3. Check charging current when apply load to battery using volt/amp(s) tester at specified engine speed.
   CAUTION:
   - **Alter load resistance long enough until the maximum charging current is achieved.**
   - **Charging voltage must not drop below 12.7V while this inspection.**

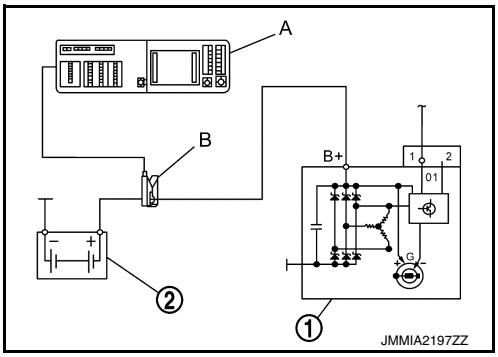
   Charging current : Refer to CHG-38, "Alternator".

4. If charging current is below the specified value, check alternator diodes.

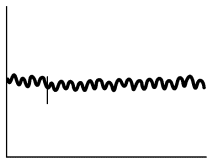
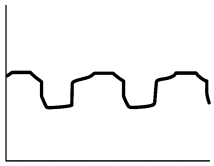
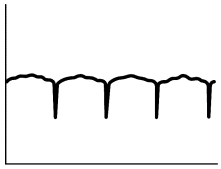
ALTERNATOR DIODES INSPECTION

1. Connect engine tester with oscilloscope (A) with DC clip-on probe (B) as shown in the figure.

   ① : Alternator
   ② : Battery



2. Start engine and turn on headlamp low beam.
3. Check the harmonics on engine tester with oscilloscope at engine speed is 3,000 rpm.

Diodes condition	Harmonics
Diodes are Ok (peak voltage possible but of no significance)	 JMMIA2198ZZ
Positive diodes is malfunction (example)	 JMMIA2199ZZ
Negative diodes is malfunction (example)	 JMMIA2200ZZ

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Alternator

INFOID:0000000013563101

Applied model		1.6L/2.0L turbo engine
Type		0 125 711 030
		BOSCH make
Charging current (at engine speed is 2,000 rpm)	max.	150 A
	min.	95 A
Gear ratio		2.86