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CHARGING SYSTEM

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PRECAUTION

PRECAUTIONS

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

INFOID:0000000013476186

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. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, 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 the SR section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

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

WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery or batteries, and wait at least three minutes before performing any service.**

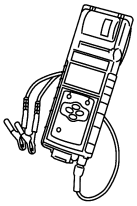
PREPARATION

PREPARATION

Special Service Tool

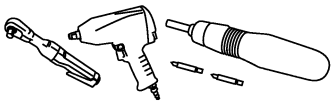
INFOID:0000000012546645

The actual shape of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name	Description
— (165-GR8-1200KIT-NI) Nissan battery and electronics tester  AWIIA1239ZZ	Tests batteries, starting and charging systems and charges batteries. For operating instructions, refer to diagnostic station instruction manual.
— (165-EXP-800-NI) Midtronic hand-held battery tester  JSMIA0806ZZ	Tests batteries and charging systems. For operating instructions, refer to diagnostic analyzer instruction manual.

Commercial Service Tool

INFOID:0000000012546646

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

SYSTEM DESCRIPTION

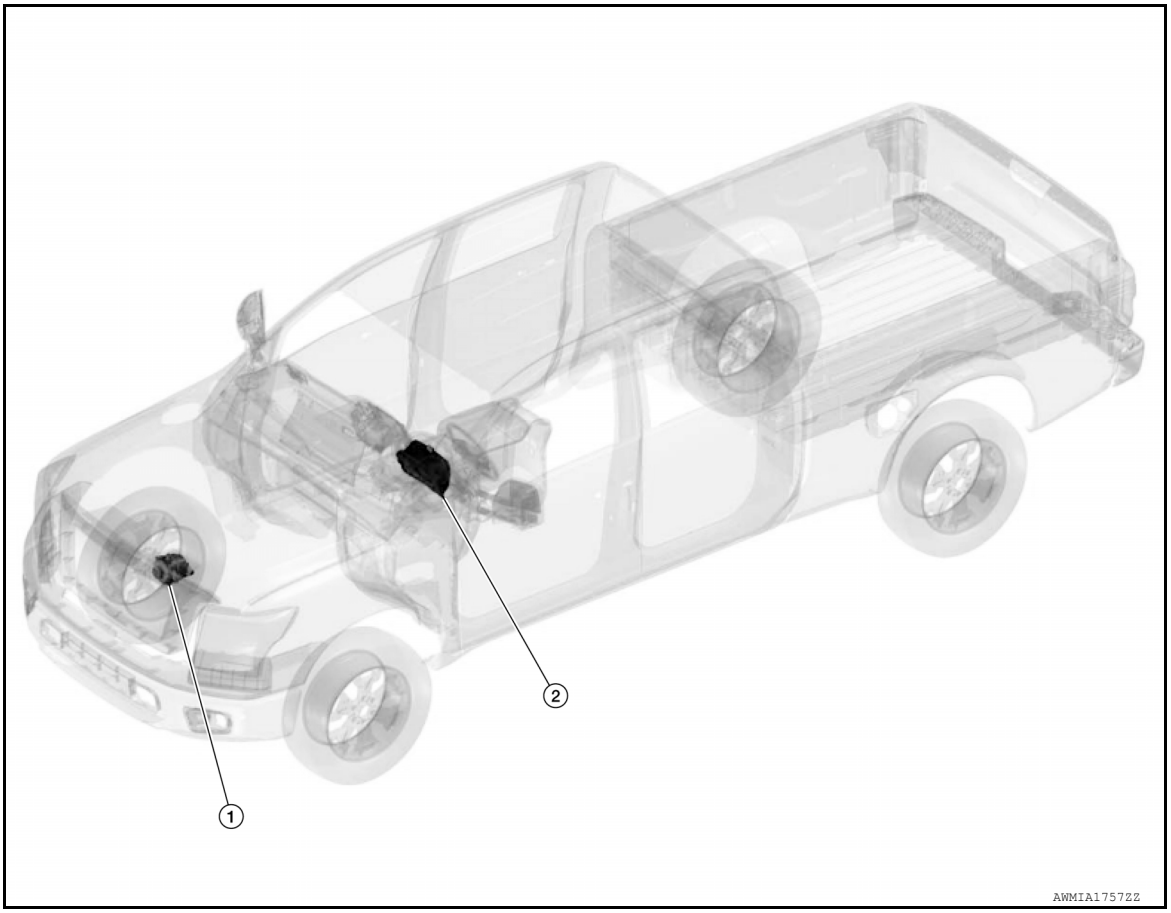
COMPONENT PARTS

CHARGING SYSTEM

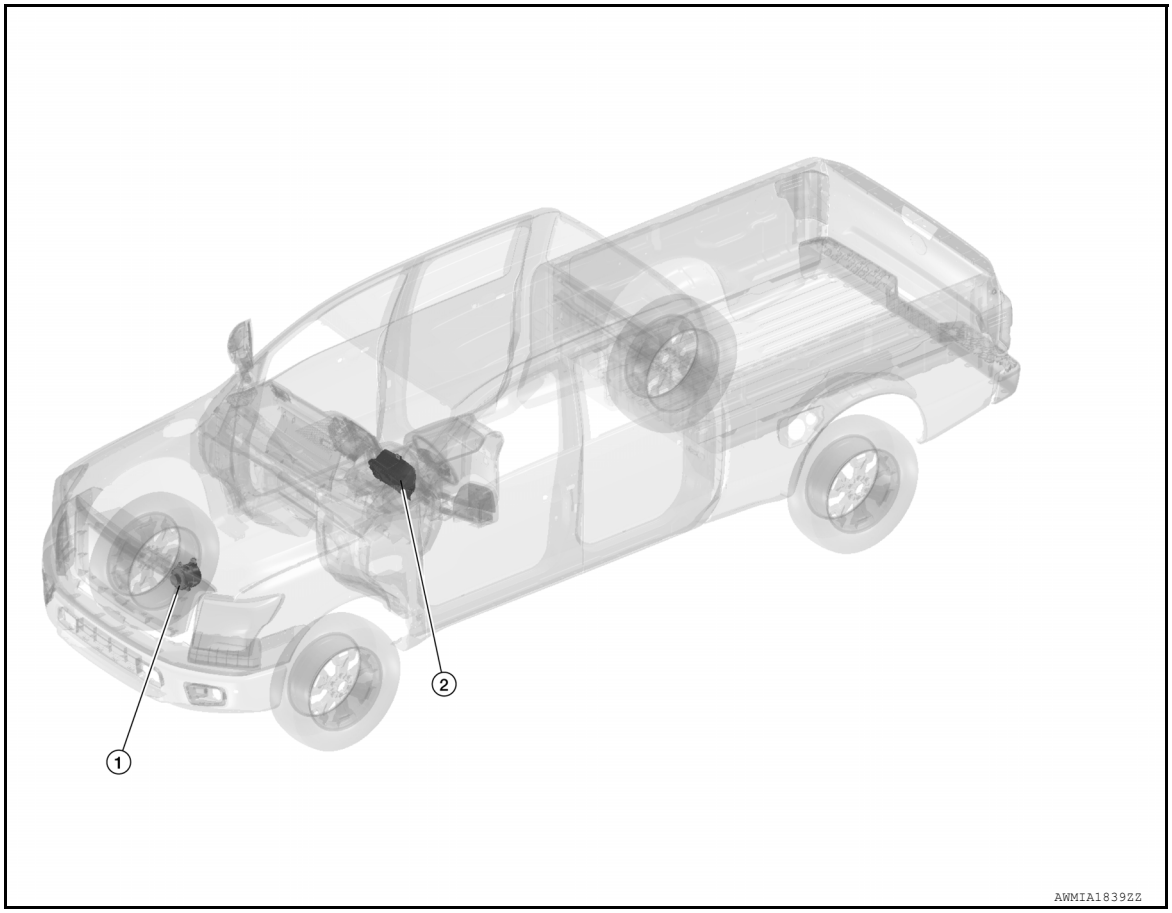
CHARGING SYSTEM : Component Parts Location

INFOID:0000000012992337

WITH CUMMINS 5.0L



No.	Component	Function
1.	Generator	Refer to CHG-6, "CHARGING SYSTEM : Generator".
2.	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 generator is operating: • Excessive voltage is produced. • No voltage is produced.

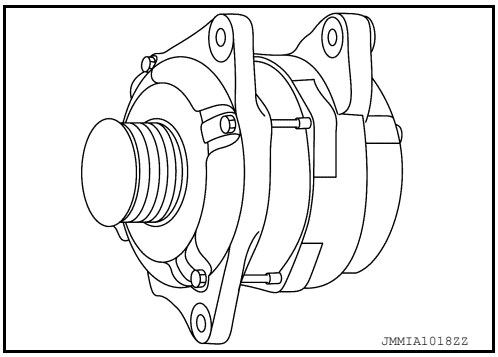


No.	Component	Function
1.	Generator	Refer to CHG-6, "CHARGING SYSTEM : Generator".
2.	Combination meter (Charge warning lamp)	The IC voltage regulator warning function activates to illuminate the charge warning lamp, if any of the following symptoms occur while generator is operating: • Excessive voltage is produced. • No voltage is produced.

CHARGING SYSTEM : Generator

INFOID:0000000012992338

The generator 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.

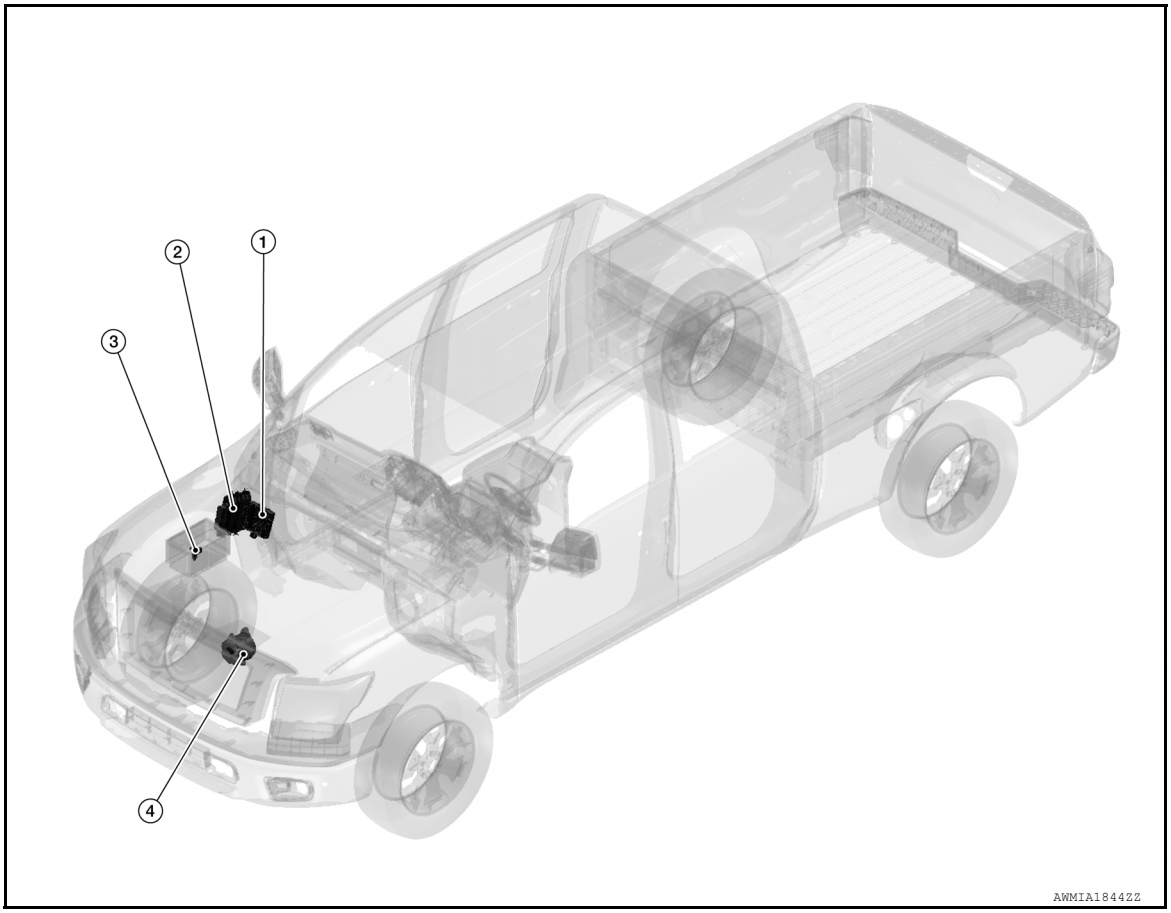


POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : Component

Parts Location- with VK56VD

INFOID:0000000013828740



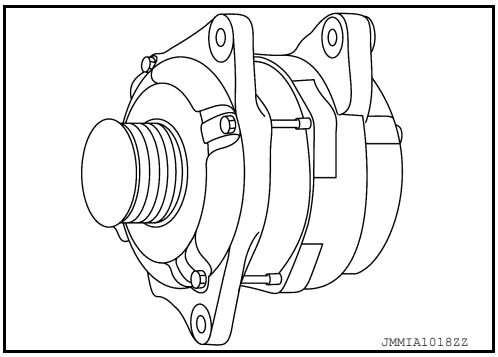
No.	Component	Function
1.	IPDM E/R	IPDM E/R converts the received power generation command value into the power generation command signal (PWM signal) and sends it to the IC voltage regulator. Refer to PCS-5, "Component Parts Location" for detailed installation location.
2.	ECM	ECM judges whether to 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 EC-1276, "ECM" for detailed installation location.
3.	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.
4.	Generator (IC voltage regulator)	Refer to CHG-7, "POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : Generator (IC voltage regulator)".

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : Generator (IC

voltage regulator)

INFOID:0000000013828741

The output voltage of the generator is controlled by the IC voltage regulator inside the generator.
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 generator performs the normal power generation according to the characteristic of the IC voltage regulator.

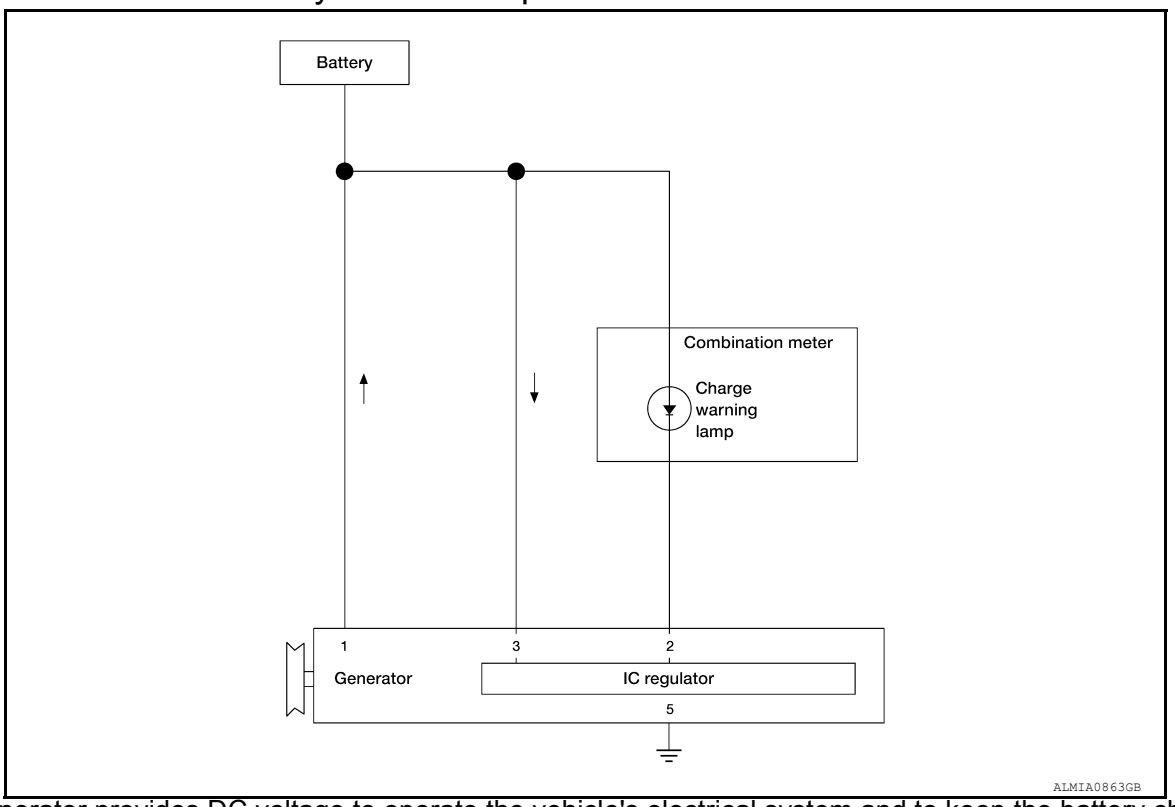


SYSTEM

CHARGING SYSTEM

CHARGING SYSTEM : System Description- with Cummins 5.0L

INFOID:0000000012546650

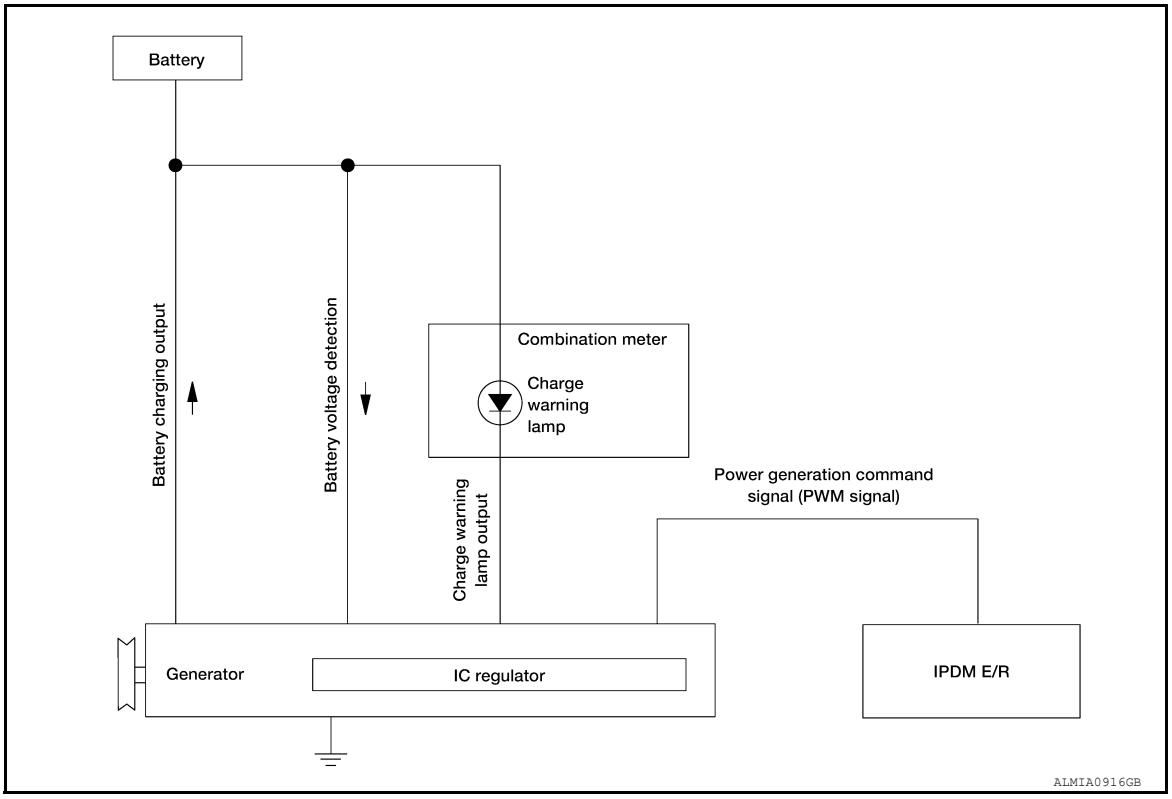


The generator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC regulator.

CHARGING SYSTEM : System Description- with VK56VD

INFOID:0000000013828742

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 generator 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.
- “S” terminal circuit detects the battery voltage to adjust the generator output voltage with the IC voltage regulator.

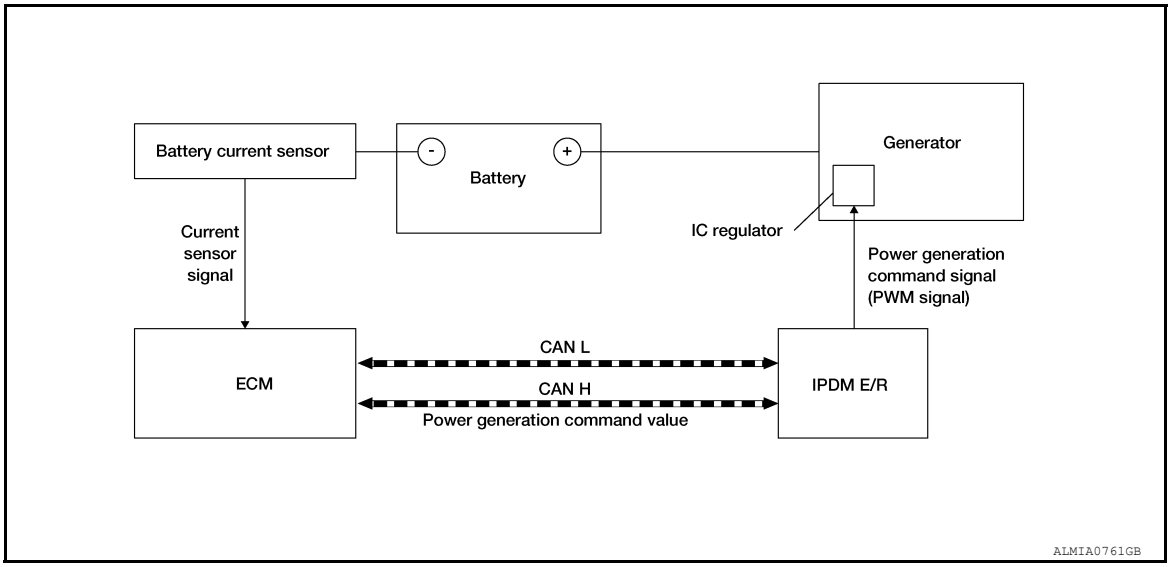
POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM : System De-

scription

INFOID:0000000013828743

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

By performing the power generation voltage variable control, the engine load due to the power generation of the generator 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 generator.

WARNING/INDICATOR/CHIME LIST

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

INFOID:0000000013828744

Item	Design	Reference
Charge warning lamp		For layout, refer to MWI-11, "METER SYSTEM : Design" (with Type A meter), or MWI-117, "METER SYSTEM : Design" (with Type B meter).
		For function, refer to MWI-12, "METER SYSTEM : Combination Meter" (with Type A meter), or MWI-118, "METER SYSTEM : Combination Meter" (with Type B meter).

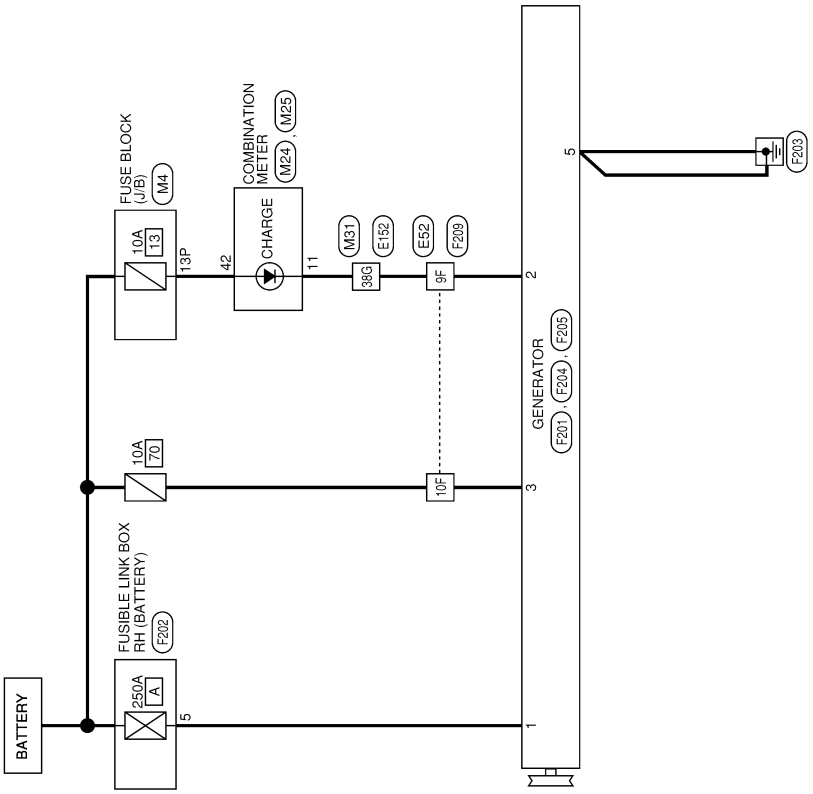
WIRING DIAGRAM

CHARGING SYSTEM

Wiring Diagram- with Cummins 5.0L

INFOID:0000000012546665

CHARGING SYSTEM - WITH Cummins 5.0L



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CHARGING SYSTEM CONNECTORS - WITH Cummins 5.0L

Connector No.	E52
Connector Name	WIRE TO WIRE
Connector Type	RK26FGY-RS20-X6
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1F	Y	TO ENGINE CONTROL NO. 2 HARNESS
2F	B	TO ENGINE CONTROL NO. 2 HARNESS
3F	BR	TO ENGINE CONTROL NO. 2 HARNESS
4F	W/R	TO ENGINE CONTROL NO. 2 HARNESS
5F	B/R	TO ENGINE CONTROL NO. 2 HARNESS
6F	O	TO ENGINE CONTROL NO. 2 HARNESS
7F	GR/Y	TO ENGINE CONTROL NO. 2 HARNESS
8F	V	TO ENGINE CONTROL NO. 2 HARNESS
9F	BR	TO ENGINE CONTROL NO. 2 HARNESS
10F	Y/B	TO ENGINE CONTROL NO. 2 HARNESS
11F	L	TO ENGINE CONTROL NO. 2 HARNESS
12F	R	TO ENGINE CONTROL NO. 2 HARNESS
13F	Y	TO ENGINE CONTROL NO. 2 HARNESS
14F	V	TO ENGINE CONTROL NO. 2 HARNESS
15F	SB	TO ENGINE CONTROL NO. 2 HARNESS
16F	P	TO ENGINE CONTROL NO. 2 HARNESS
17F	Y/R	TO ENGINE CONTROL NO. 2 HARNESS
18F	R	TO ENGINE CONTROL NO. 2 HARNESS
19F	V	TO ENGINE CONTROL NO. 2 HARNESS
20F	BR	TO ENGINE CONTROL NO. 2 HARNESS
21F	L/R	TO ENGINE CONTROL NO. 2 HARNESS
22F	L/W	TO ENGINE CONTROL NO. 2 HARNESS
23F	R/L	TO ENGINE CONTROL NO. 2 HARNESS
24F	W/L	TO ENGINE CONTROL NO. 2 HARNESS
25F	W/R	TO ENGINE CONTROL NO. 2 HARNESS
26F	B/R	TO ENGINE CONTROL NO. 2 HARNESS
27F	Y	TO ENGINE CONTROL NO. 2 HARNESS
28F	W/R	TO ENGINE CONTROL NO. 2 HARNESS
29F	L/O	TO ENGINE CONTROL NO. 2 HARNESS
30F	B	TO ENGINE CONTROL NO. 2 HARNESS
31F	B	TO ENGINE CONTROL NO. 2 HARNESS
32F	V/W	TO ENGINE CONTROL NO. 2 HARNESS
33F	GR	TO ENGINE CONTROL NO. 2 HARNESS
34F	L/R	TO ENGINE CONTROL NO. 2 HARNESS
35F	R/W	TO ENGINE CONTROL NO. 2 HARNESS
36F	L/B	TO ENGINE CONTROL NO. 2 HARNESS
37F	L	TO ENGINE CONTROL NO. 2 HARNESS
38F	R/Y	TO ENGINE CONTROL NO. 2 HARNESS
39F	R/Y	TO ENGINE CONTROL NO. 2 HARNESS
40F	B/R	TO ENGINE CONTROL NO. 2 HARNESS
41F	W	TO ENGINE CONTROL NO. 2 HARNESS
42F	Y	TO ENGINE CONTROL NO. 2 HARNESS
43F	B/P	TO ENGINE CONTROL NO. 2 HARNESS
44F	Y/B	TO ENGINE CONTROL NO. 2 HARNESS
45F	L/Y	TO ENGINE CONTROL NO. 2 HARNESS
46F	O	TO ENGINE CONTROL NO. 2 HARNESS
47F	W/R	TO ENGINE CONTROL NO. 2 HARNESS
48F	L	TO ENGINE CONTROL NO. 2 HARNESS
49F	BR	TO ENGINE CONTROL NO. 2 HARNESS
50F	SHIELD	TO ENGINE CONTROL NO. 2 HARNESS
51F	L	TO ENGINE CONTROL NO. 2 HARNESS
52F	BR	TO ENGINE CONTROL NO. 2 HARNESS

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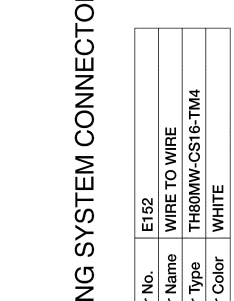
CHARGING SYSTEM CONNECTORS - WITH Cummins 5.0L

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1G	G	TO MAIN HARNESS
2G	B/R	TO MAIN HARNESS
3G	W/B	TO MAIN HARNESS
4G	BR/W	TO MAIN HARNESS
5G	BR	TO MAIN HARNESS
6G	P	TO MAIN HARNESS - (WITH VK56VD)
6G	R/W	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
7G	Y	TO MAIN HARNESS
8G	G	TO MAIN HARNESS
9G	R	TO MAIN HARNESS
10G	W	TO MAIN HARNESS
11G	R/G	TO MAIN HARNESS
12G	W/B	TO MAIN HARNESS
13G	BR	TO MAIN HARNESS
14G	Y/B	TO MAIN HARNESS
15G	G/W	TO MAIN HARNESS
16G	G	TO MAIN HARNESS
17G	G/Y	TO MAIN HARNESS
18G	G/Y	TO MAIN HARNESS
19G	Y/V	TO MAIN HARNESS
20G	G/Y	TO MAIN HARNESS
21G	B/Y	TO MAIN HARNESS
22G	G/R	TO MAIN HARNESS
23G	Y/R	TO MAIN HARNESS
24G	G/B	TO MAIN HARNESS
25G	R/W	TO MAIN HARNESS
26G	R	TO MAIN HARNESS
27G	LG	TO MAIN HARNESS
28G	G/B	TO MAIN HARNESS
29G	G/B	TO MAIN HARNESS
30G	BR/Y	TO MAIN HARNESS
31G	P	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
31G	R	TO MAIN HARNESS - (WITH VK56VD)
32G	P	TO MAIN HARNESS
33G	Y/L	TO MAIN HARNESS
34G	GR	TO MAIN HARNESS
35G	G/R	TO MAIN HARNESS
36G	SB	TO MAIN HARNESS
37G	R/W	TO MAIN HARNESS
38G	BR	TO MAIN HARNESS
39G	BR	TO MAIN HARNESS
40G	-	TO MAIN HARNESS
41G	R/G	TO MAIN HARNESS
42G	O	TO MAIN HARNESS
43G	B	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
43G	G	TO MAIN HARNESS - (WITH VK56VD)
44G	R/Y	TO MAIN HARNESS
45G	G	TO MAIN HARNESS
46G	LG	TO MAIN HARNESS
47G	R	TO MAIN HARNESS
48G	W	TO MAIN HARNESS
49G	-	TO MAIN HARNESS
50G	BR	TO MAIN HARNESS
51G	R	TO MAIN HARNESS
52G	L	TO MAIN HARNESS
53G	W	TO MAIN HARNESS
54G	W	TO MAIN HARNESS
55G	G	TO MAIN HARNESS
56G	W	TO MAIN HARNESS
57G	Y	TO MAIN HARNESS
58G	BG	TO MAIN HARNESS
59G	BG	TO MAIN HARNESS
60G	BG	TO MAIN HARNESS
61G	B	TO MAIN HARNESS
62G	W	TO MAIN HARNESS
63G	R	TO MAIN HARNESS
64G	W/L	TO MAIN HARNESS
65G	W/R	TO MAIN HARNESS
66G	BG	TO MAIN HARNESS
67G	BG	TO MAIN HARNESS
68G	B	TO MAIN HARNESS
69G	Y	TO MAIN HARNESS
70G	L	TO MAIN HARNESS
71G	R/W	TO MAIN HARNESS
72G	L/W	TO MAIN HARNESS
73G	SHIELD	TO MAIN HARNESS
74G	W	TO MAIN HARNESS
75G	R	TO MAIN HARNESS
76G	R/G	TO MAIN HARNESS
77G	G	TO MAIN HARNESS
78G	W	TO MAIN HARNESS
79G	-	TO MAIN HARNESS
80G	R	TO MAIN HARNESS
81G	L	TO MAIN HARNESS
82G	R	TO MAIN HARNESS
83G	L	TO MAIN HARNESS
84G	L	TO MAIN HARNESS
85G	W/B	TO MAIN HARNESS
86G	B/R	TO MAIN HARNESS
87G	W/B	TO MAIN HARNESS
88G	P	TO MAIN HARNESS
89G	L	TO MAIN HARNESS
90G	G	TO MAIN HARNESS
91G	G	TO MAIN HARNESS
92G	V/W	TO MAIN HARNESS
93G	BR	TO MAIN HARNESS
94G	G	TO MAIN HARNESS
95G	G	TO MAIN HARNESS
96G	W	TO MAIN HARNESS
97G	R	TO MAIN HARNESS
98G	W/B	TO MAIN HARNESS
99G	BR	TO MAIN HARNESS
100G	GR/W	TO MAIN HARNESS

Connector No.	F201
Connector Name	GENERATOR (WITH CUMMINS 5.0L)
Connector Type	E-BA506
Connector Color	-

H.S.

Terminal No.	Color of Wire	Signal Name
5	B	GROUND

Connector No.	F202
Connector Name	FUSIBLE LINK BOX RH (BATTERY)
Connector Type	24340_JA04D
Connector Color	-

H.S.

Terminal No.	Color of Wire	Signal Name
5	B	BATTERY

Connector No.	F204
Connector Name	GENERATOR (WITH CUMMINS 5.0L)
Connector Type	24340_EN013
Connector Color	-

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	BATTERY

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CHARGING SYSTEM CONNECTORS - WITH Cummins 5.0L

Connector No.	F205
Connector Name	GENERATOR (WITH CUMMINS 5.0L)
Connector Type	HS03FB
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
2	BR/W	CHARGING IND
3	G/Y	BATTERY
4	–	–

Connector No.	F209
Connector Name	WIRE TO WIRE
Connector Type	RK26MGY-RS20-X6
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1F	Y/R	TO ENGINE ROOM HARNESS
2F	B	TO ENGINE ROOM HARNESS
3F	B/Y	TO ENGINE ROOM HARNESS
4F	W/R	TO ENGINE ROOM HARNESS
5F	B/R	TO ENGINE ROOM HARNESS
6F	O/L	TO ENGINE ROOM HARNESS
7F	GR	TO ENGINE ROOM HARNESS
8F	P	TO ENGINE ROOM HARNESS
9F	BR/W	TO ENGINE ROOM HARNESS
10F	G/Y	TO ENGINE ROOM HARNESS
11F	L/W	TO ENGINE ROOM HARNESS
12F	R/W	TO ENGINE ROOM HARNESS
13F	G/Y	TO ENGINE ROOM HARNESS
14F	V/W	TO ENGINE ROOM HARNESS
15F	LG	TO ENGINE ROOM HARNESS
16F	R/Y	TO ENGINE ROOM HARNESS
17F	BR/Y	TO ENGINE ROOM HARNESS
18F	R	TO ENGINE ROOM HARNESS
19F	V	TO ENGINE ROOM HARNESS
20F	BR	TO ENGINE ROOM HARNESS
21F	L/R	TO ENGINE ROOM HARNESS
22F	L/LG	TO ENGINE ROOM HARNESS
23F	SB	TO ENGINE ROOM HARNESS
24F	W/L	TO ENGINE ROOM HARNESS
25F	W/B	TO ENGINE ROOM HARNESS
26F	B/Y	TO ENGINE ROOM HARNESS
27F	Y	TO ENGINE ROOM HARNESS
28F	W/R	TO ENGINE ROOM HARNESS
29F	L/O	TO ENGINE ROOM HARNESS
30F	B	TO ENGINE ROOM HARNESS
31F	B	TO ENGINE ROOM HARNESS
32F	V	TO ENGINE ROOM HARNESS
33F	BG	TO ENGINE ROOM HARNESS
34F	L/R	TO ENGINE ROOM HARNESS
35F	R/W	TO ENGINE ROOM HARNESS
36F	L/B	TO ENGINE ROOM HARNESS
37F	L/O	TO ENGINE ROOM HARNESS
38F	Y/W	TO ENGINE ROOM HARNESS
39F	R/Y	TO ENGINE ROOM HARNESS
40F	G/B	TO ENGINE ROOM HARNESS
41F	W	TO ENGINE ROOM HARNESS
42F	Y	TO ENGINE ROOM HARNESS
43F	B/P	TO ENGINE ROOM HARNESS
44F	Y/B	TO ENGINE ROOM HARNESS
45F	L/Y	TO ENGINE ROOM HARNESS
46F	O	TO ENGINE ROOM HARNESS
47F	W/L	TO ENGINE ROOM HARNESS
48F	L	TO ENGINE ROOM HARNESS
49F	BR	TO ENGINE ROOM HARNESS
50F	SHIELD	TO ENGINE ROOM HARNESS
51F	L	TO ENGINE ROOM HARNESS
52F	BR	TO ENGINE ROOM HARNESS

Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS16FW-CS
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1P	R	IGNITION
2P	Y	IGNITION
3P	G	IGNITION RELAY OUT
4P	B/W	RR DEF RLY
5P	B/W	RR DEF RLY
6P	O	RR DEF RLY OUT
7P	G	IGNITION
8P	W	IGNITION
9P	L	BATTERY
10P	–	–
11P	–	–
12P	–	–
13P	R	BATTERY
14P	Y	BATTERY
15P	Y/LG	BATTERY
16P	W	BLOWER FAN RELAY OUT

Connector No.	M24
Connector Name	COMBINATION METER (WITH TYPE A)
Connector Type	TH40FW-NH
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	GND(STRG/SATELLITE SW GND)
2	–	–
3	–	–
4	–	–
5	–	–
6	–	–
7	V	SECURITY
8	–	–
9	BG	AS BELT SW (W/O ODS)
10	LG	TOW MODE SW
11	BR	CHG
12	BR	LED HEAD LAMP (R)
13	W	LED HEAD LAMP (L)
14	R	ACC SW
15	–	–
16	O	AIR BAG
17	–	–
18	P	TRIP RESET SW
19	–	–
20	R	OUTSIDE TEMP GND
21	–	–
22	P	STRG SW A
23	R	STRG SW B
24	W	WASHER SW
25	–	–
26	G	PKB SW
27	P/L	AS BELT SW
28	O/B	DR BELT SW
29	–	–
30	–	–
31	–	NOT M RANGE
32	BR	AT SHIFT UP
33	V/W	AT SHIFT DOWN
34	–	–
35	–	–
36	W	ILL UP SW
37	R	ILL DOWN SW
38	G	8P/R OUTPUT
39	–	–
40	–	–

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CHARGING SYSTEM CONNECTORS - WITH Cummins 5.0L

Connector No.	M25
Connector Name	COMBINATION METER (WITH TYPE A)
Connector Type	TH12FW-NH
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
41	W	IGN
42	R	BAT
43	Y/V	FUEL SENSOR GND
44	GR	ILL CONT OUTPUT
45	P	CAN-L
46	L	CAN-H
47	B	G1
48	BR/Y	FUEL SENSOR
49	–	–
50	–	–
51	LG	M CAN-L
52	SB	M CAN-H

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	G	TO ENGINE ROOM HARNESS
2G	B/R	TO ENGINE ROOM HARNESS
3G	W	TO ENGINE ROOM HARNESS
4G	BR/W	TO ENGINE ROOM HARNESS
5G	BR	TO ENGINE ROOM HARNESS
6G	R/W	TO ENGINE ROOM HARNESS
7G	Y	TO ENGINE ROOM HARNESS
8G	G	TO ENGINE ROOM HARNESS
9G	R	TO ENGINE ROOM HARNESS
10G	W	TO ENGINE ROOM HARNESS
11G	R/G	TO ENGINE ROOM HARNESS
12G	W/B	TO ENGINE ROOM HARNESS
13G	BR	TO ENGINE ROOM HARNESS
14G	Y/B	TO ENGINE ROOM HARNESS
15G	G/W	TO ENGINE ROOM HARNESS
16G	G	TO ENGINE ROOM HARNESS
17G	O	TO ENGINE ROOM HARNESS
18G	G/Y	TO ENGINE ROOM HARNESS
19G	Y/V	TO ENGINE ROOM HARNESS
20G	G/Y	TO ENGINE ROOM HARNESS
21G	B/Y	TO ENGINE ROOM HARNESS
22G	G/R	TO ENGINE ROOM HARNESS
23G	Y/R	TO ENGINE ROOM HARNESS
24G	G/B	TO ENGINE ROOM HARNESS
25G	R/W	TO ENGINE ROOM HARNESS
26G	R	TO ENGINE ROOM HARNESS
27G	LG	TO ENGINE ROOM HARNESS
28G	G/B	TO ENGINE ROOM HARNESS
29G	G/B	TO ENGINE ROOM HARNESS
30G	BR/Y	TO ENGINE ROOM HARNESS
31G	R	TO ENGINE ROOM HARNESS
32G	R	TO ENGINE ROOM HARNESS
33G	Y/L	TO ENGINE ROOM HARNESS
34G	GR	TO ENGINE ROOM HARNESS
35G	G/R	TO ENGINE ROOM HARNESS
36G	SB	TO ENGINE ROOM HARNESS
37G	R/W	TO ENGINE ROOM HARNESS
38G	BR	TO ENGINE ROOM HARNESS
39G	BR	TO ENGINE ROOM HARNESS
40G	–	TO ENGINE ROOM HARNESS
41G	R/G	TO ENGINE ROOM HARNESS
42G	O	TO ENGINE ROOM HARNESS
43G	G	TO ENGINE ROOM HARNESS
44G	R/Y	TO ENGINE ROOM HARNESS
45G	G	TO ENGINE ROOM HARNESS
46G	LG	TO ENGINE ROOM HARNESS
47G	R	TO ENGINE ROOM HARNESS
48G	W	TO ENGINE ROOM HARNESS
49G	–	TO ENGINE ROOM HARNESS
50G	BR	TO ENGINE ROOM HARNESS
51G	R	TO ENGINE ROOM HARNESS
52G	L	TO ENGINE ROOM HARNESS
53G	W	TO ENGINE ROOM HARNESS
54G	W	TO ENGINE ROOM HARNESS
55G	G	TO ENGINE ROOM HARNESS
56G	W	TO ENGINE ROOM HARNESS
57G	Y	TO ENGINE ROOM HARNESS
58G	BG	TO ENGINE ROOM HARNESS
59G	BG	TO ENGINE ROOM HARNESS
60G	BG	TO ENGINE ROOM HARNESS
61G	O	TO ENGINE ROOM HARNESS
62G	W	TO ENGINE ROOM HARNESS
63G	O	TO ENGINE ROOM HARNESS
64G	W/L	TO ENGINE ROOM HARNESS
65G	W/R	TO ENGINE ROOM HARNESS
66G	BG	TO ENGINE ROOM HARNESS
67G	O	TO ENGINE ROOM HARNESS
68G	B	TO ENGINE ROOM HARNESS
69G	Y	TO ENGINE ROOM HARNESS
70G	L	TO ENGINE ROOM HARNESS
71G	R/W	TO ENGINE ROOM HARNESS
72G	L/W	TO ENGINE ROOM HARNESS
73G	SHIELD	TO ENGINE ROOM HARNESS
74G	W	TO ENGINE ROOM HARNESS
75G	R	TO ENGINE ROOM HARNESS
76G	R/G	TO ENGINE ROOM HARNESS
77G	BG	TO ENGINE ROOM HARNESS
78G	P	TO ENGINE ROOM HARNESS
79G	–	TO ENGINE ROOM HARNESS
80G	R	TO ENGINE ROOM HARNESS
81G	L	TO ENGINE ROOM HARNESS
82G	R	TO ENGINE ROOM HARNESS
83G	L	TO ENGINE ROOM HARNESS
84G	L	TO ENGINE ROOM HARNESS
85G	W	TO ENGINE ROOM HARNESS
86G	B/R	TO ENGINE ROOM HARNESS
87G	W	TO ENGINE ROOM HARNESS
88G	G	TO ENGINE ROOM HARNESS
89G	P	TO ENGINE ROOM HARNESS
90G	G	TO ENGINE ROOM HARNESS
91G	P	TO ENGINE ROOM HARNESS
92G	V/W	TO ENGINE ROOM HARNESS
93G	BR	TO ENGINE ROOM HARNESS
94G	B	TO ENGINE ROOM HARNESS
95G	G	TO ENGINE ROOM HARNESS
96G	R	TO ENGINE ROOM HARNESS
97G	R	TO ENGINE ROOM HARNESS
98G	W/B	TO ENGINE ROOM HARNESS
99G	R	TO ENGINE ROOM HARNESS
100G	GR/W	TO ENGINE ROOM HARNESS

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Wiring Diagram- with VK56VD

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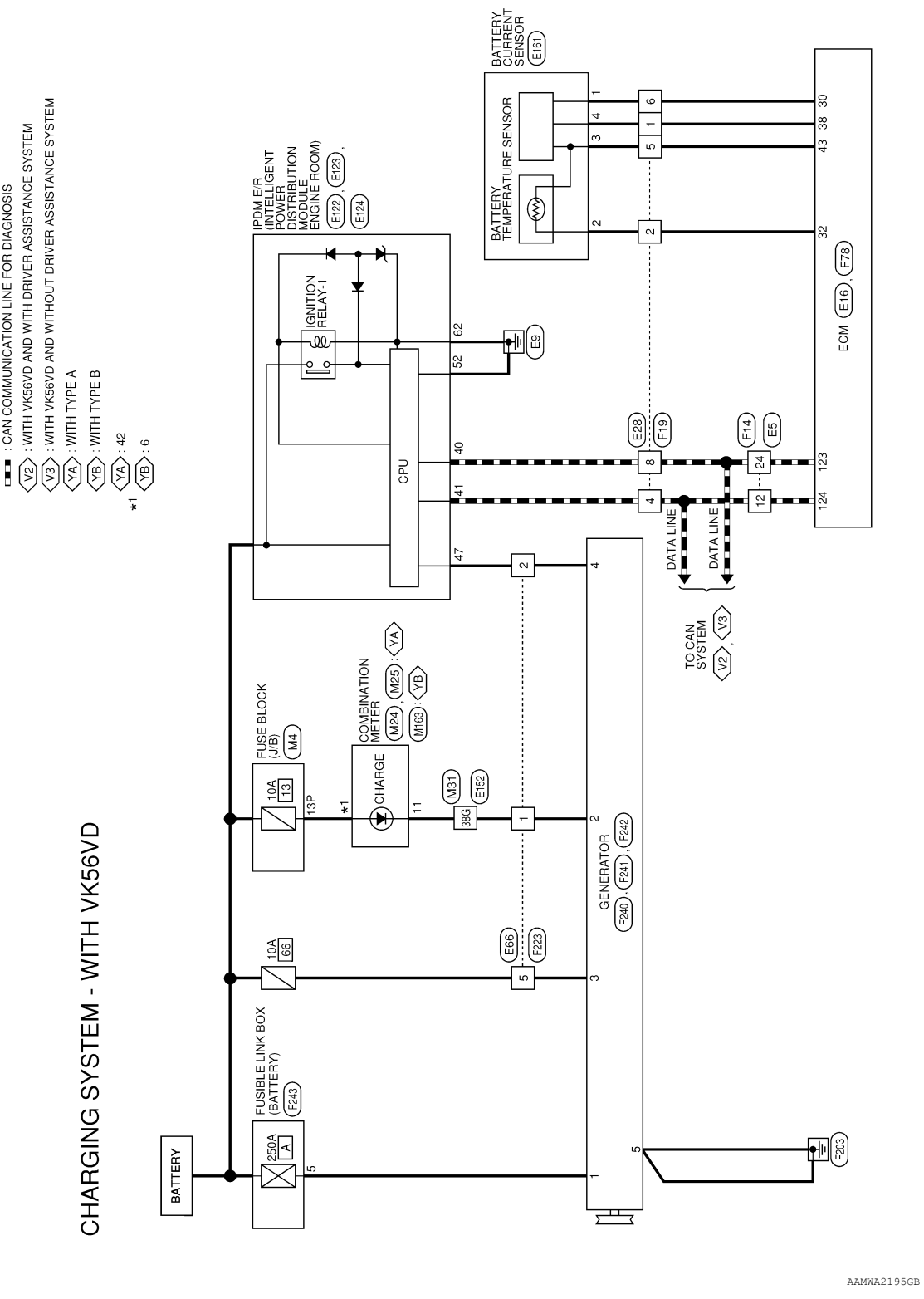
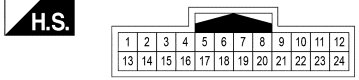


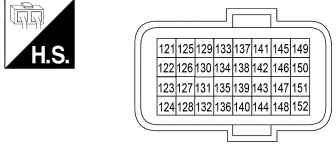
CHARGING SYSTEM CONNECTORS - WITH VK56VD

Connector No.	E5
Connector Name	WIRE TO WIRE
Connector Type	TH24MW-NH
Connector Color	WHITE



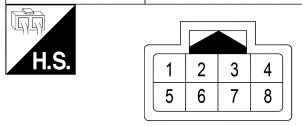
Terminal No.	Color of Wire	Signal Name
1	L/R	TO ENGINE CONTROL HARNESS
2	BR	TO ENGINE CONTROL HARNESS
3	V	TO ENGINE CONTROL HARNESS
4	L/O	TO ENGINE CONTROL HARNESS
5	W	TO ENGINE CONTROL HARNESS
6	B/R	TO ENGINE CONTROL HARNESS
7	Y/R	TO ENGINE CONTROL HARNESS
8	BR	TO ENGINE CONTROL HARNESS
9	W/L	TO ENGINE CONTROL HARNESS
10	L/Y	TO ENGINE CONTROL HARNESS
11	SB	TO ENGINE CONTROL HARNESS
12	L	TO ENGINE CONTROL HARNESS
13	W/R	TO ENGINE CONTROL HARNESS
14	Y	TO ENGINE CONTROL HARNESS
15	B	TO ENGINE CONTROL HARNESS
16	B	TO ENGINE CONTROL HARNESS
17	R	TO ENGINE CONTROL HARNESS
18	B	TO ENGINE CONTROL HARNESS
19	B/R	TO ENGINE CONTROL HARNESS
20	GR	TO ENGINE CONTROL HARNESS
21	V/R	TO ENGINE CONTROL HARNESS
22	B	TO ENGINE CONTROL HARNESS
23	B	TO ENGINE CONTROL HARNESS
24	P	TO ENGINE CONTROL HARNESS

Connector No.	E16
Connector Name	ECM (WITH VK56VD)
Connector Type	MAA24FB-MEA8-RH
Connector Color	BLACK



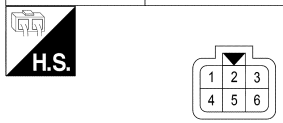
Terminal No.	Color of Wire	Signal Name
121	O/B	EVAP CONTROL SYSTEM PRESSURE SENSOR
122	–	–
123	P	CAN COMMUNICATION LINE (CAN-L)
124	L	CAN COMMUNICATION LINE (CAN-H)
125	SB	SENSOR POWER SUPPLY
126	–	–
127	–	–
128	V/W	FUEL TEMPERATURE SENSOR
129	–	–
130	R/W	FUEL PUMP CONTROL MODULE (FPCM) CHECK
131	–	–
132	–	–
133	W	IGNITION SWITCH
134	G/Y	ASCD STEERING SWITCH
135	B/Y	SENSOR GROUND
136	GR	FUEL PUMP CONTROL MODULE (FPCM)
137	R/W	ENG COMMUNICATION LINE
138	W	ENG COMMUNICATION LINE
139	R/G	STOP LAMP SWITCH
140	G/Y	BRAKE PEDAL POSITION SWITCH
141	Y	EVAP CANISTER VENT CONTROL VALVE
142	L/W	SENSOR POWER SUPPLY
143	O	ACCELERATOR PEDAL POSITION SENSOR 2
144	P/L	SENSOR GROUND
145	W	POWER SUPPLY FOR ECM
146	W/G	SENSOR POWER SUPPLY
147	B	ECM GROUND
148	R	SENSOR GROUND
149	B	ECM GROUND
150	W/R	ACCELERATOR PEDAL POSITION SENSOR 1
151	R/Y	SENSOR GROUND
152	B	ECM GROUND

Connector No.	E28
Connector Name	WIRE TO WIRE
Connector Type	RH08MB
Connector Color	BLACK



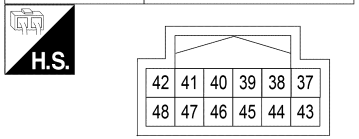
Terminal No.	Color of Wire	Signal Name
1	V	TO ENGINE CONTROL HARNESS
2	G	TO ENGINE CONTROL HARNESS
3	–	TO ENGINE CONTROL HARNESS
4	L	TO ENGINE CONTROL HARNESS
5	R	TO ENGINE CONTROL HARNESS
6	SB	TO ENGINE CONTROL HARNESS
7	L	TO ENGINE CONTROL HARNESS
8	P	TO ENGINE CONTROL HARNESS

Connector No.	E66
Connector Name	WIRE TO WIRE
Connector Type	RS06FGY-PR
Connector Color	GRAY



Terminal No.	Color of Wire	Signal Name
1	BR	TO ENGINE CONTROL NO. 2 HARNESS
2	Y	TO ENGINE CONTROL NO. 2 HARNESS
3	SB	TO ENGINE CONTROL NO. 2 HARNESS
4	W/L	TO ENGINE CONTROL NO. 2 HARNESS
5	Y/B	TO ENGINE CONTROL NO. 2 HARNESS
6	L/Y	TO ENGINE CONTROL NO. 2 HARNESS

Connector No.	E122
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH12FW-NH
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
37	–	–
38	–	–
39	L/Y	WIPER AUTO STOP SW
40	P	CAN-L
41	L	CAN-H
42	BR	DTRL RLY
43	–	–
44	W/B	START CONT
45	GR	FUEL RLY CONT
46	Y	HOOD SW
47	Y	ALT C - (WITH VK56VD)
48	R/W	HORN RLY CONT

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CHARGING SYSTEM CONNECTORS - WITH VK56VD

Connector No.	E123
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	NS08FBR-CS
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
49	Y/B	A/C COMP - (WITH CUMMINS 5.0L)
49	GR/R	A/C COMP - (WITH VK56VD)
50	BR	TRAILER TOW
51	–	–
52	B	S-GND
53	–	–
54	–	–
55	–	–
56	–	–

Connector No.	E124
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	M06FB-LC
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
57	W/B	RR DEF
58	BR	FUEL PUMP - (WITH CUMMINS 5.0L)
58	B/Y	FUEL PUMP - (WITH VK56VD)
59	–	–
60	–	–
61	–	–
62	B	P GND

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	G	TO MAIN HARNESS
2G	B/R	TO MAIN HARNESS
3G	W/B	TO MAIN HARNESS
4G	BR/W	TO MAIN HARNESS
5G	BR	TO MAIN HARNESS
6G	P	TO MAIN HARNESS - (WITH VK56VD)
6G	R/W	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
7G	Y	TO MAIN HARNESS
8G	G	TO MAIN HARNESS
9G	R	TO MAIN HARNESS
10G	W	TO MAIN HARNESS
11G	R/G	TO MAIN HARNESS
12G	W/B	TO MAIN HARNESS
13G	BR	TO MAIN HARNESS
14G	Y/B	TO MAIN HARNESS
15G	G/W	TO MAIN HARNESS
16G	G	TO MAIN HARNESS
17G	G/Y	TO MAIN HARNESS
18G	G/Y	TO MAIN HARNESS
19G	Y/V	TO MAIN HARNESS
20G	G/Y	TO MAIN HARNESS
21G	B/Y	TO MAIN HARNESS
22G	G/R	TO MAIN HARNESS
23G	Y/R	TO MAIN HARNESS
24G	G/B	TO MAIN HARNESS
25G	R/W	TO MAIN HARNESS
26G	R	TO MAIN HARNESS
27G	LG	TO MAIN HARNESS
28G	G/B	TO MAIN HARNESS
29G	G/B	TO MAIN HARNESS
30G	BR/Y	TO MAIN HARNESS
31G	P	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
31G	R	TO MAIN HARNESS - (WITH VK56VD)
32G	P	TO MAIN HARNESS
33G	Y/L	TO MAIN HARNESS
34G	GR	TO MAIN HARNESS
35G	G/R	TO MAIN HARNESS
36G	SB	TO MAIN HARNESS
37G	R/W	TO MAIN HARNESS
38G	BR	TO MAIN HARNESS
39G	BR	TO MAIN HARNESS
40G	–	TO MAIN HARNESS
41G	R/G	TO MAIN HARNESS
42G	O	TO MAIN HARNESS
43G	B	TO MAIN HARNESS - (WITH CUMMINS 5.0L)
43G	G	TO MAIN HARNESS - (WITH VK56VD)
44G	R/Y	TO MAIN HARNESS
45G	G	TO MAIN HARNESS
46G	LG	TO MAIN HARNESS
47G	R	TO MAIN HARNESS
48G	W	TO MAIN HARNESS
49G	–	TO MAIN HARNESS
50G	BR	TO MAIN HARNESS
51G	R	TO MAIN HARNESS
52G	L	TO MAIN HARNESS
53G	W	TO MAIN HARNESS
54G	W	TO MAIN HARNESS
55G	G	TO MAIN HARNESS
56G	W	TO MAIN HARNESS
57G	Y	TO MAIN HARNESS
58G	BG	TO MAIN HARNESS
59G	BG	TO MAIN HARNESS
60G	BG	TO MAIN HARNESS
61G	B	TO MAIN HARNESS
62G	W	TO MAIN HARNESS
63G	R	TO MAIN HARNESS
64G	W/L	TO MAIN HARNESS
65G	W/R	TO MAIN HARNESS
66G	BG	TO MAIN HARNESS
67G	BG	TO MAIN HARNESS
68G	B	TO MAIN HARNESS
69G	Y	TO MAIN HARNESS
70G	L	TO MAIN HARNESS
71G	R/W	TO MAIN HARNESS
72G	L/W	TO MAIN HARNESS
73G	SHIELD	TO MAIN HARNESS
74G	W	TO MAIN HARNESS
75G	R	TO MAIN HARNESS
76G	R/G	TO MAIN HARNESS
77G	G	TO MAIN HARNESS
78G	W	TO MAIN HARNESS
79G	–	TO MAIN HARNESS
80G	R	TO MAIN HARNESS
81G	L	TO MAIN HARNESS
82G	R	TO MAIN HARNESS
83G	L	TO MAIN HARNESS
84G	L	TO MAIN HARNESS
85G	W/B	TO MAIN HARNESS
86G	B/R	TO MAIN HARNESS
87G	W/B	TO MAIN HARNESS
88G	P	TO MAIN HARNESS
89G	L	TO MAIN HARNESS
90G	G	TO MAIN HARNESS
91G	G	TO MAIN HARNESS
92G	V/W	TO MAIN HARNESS
93G	BR	TO MAIN HARNESS
94G	G	TO MAIN HARNESS
95G	G	TO MAIN HARNESS
96G	W	TO MAIN HARNESS
97G	R	TO MAIN HARNESS
98G	W/B	TO MAIN HARNESS
99G	BR	TO MAIN HARNESS
100G	GR/W	TO MAIN HARNESS

Connector No.	E161
Connector Name	BATTERY CURRENT SENSOR
Connector Type	SAZ04FGY
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	SB	VCC
2	G	TEMP OUT
3	R	GND
4	V	CURRENT OUT

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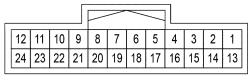
CHARGING SYSTEM CONNECTORS - WITH VK56VD

Connector No.	F14
Connector Name	WIRE TO WIRE
Connector Type	TH24FW-NH
Connector Color	WHITE

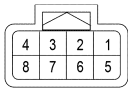
H.S.



Terminal No.	Color of Wire	Signal Name
1	L/R	TO ENGINE ROOM HARNESS
2	BR	TO ENGINE ROOM HARNESS
3	V	TO ENGINE ROOM HARNESS
4	L/O	TO ENGINE ROOM HARNESS
5	W	TO ENGINE ROOM HARNESS
6	B/R	TO ENGINE ROOM HARNESS
7	Y/R	TO ENGINE ROOM HARNESS
8	BR	TO ENGINE ROOM HARNESS
9	W/L	TO ENGINE ROOM HARNESS
10	L/Y	TO ENGINE ROOM HARNESS
11	SB	TO ENGINE ROOM HARNESS
12	L	TO ENGINE ROOM HARNESS
13	W/R	TO ENGINE ROOM HARNESS
14	Y	TO ENGINE ROOM HARNESS
15	B	TO ENGINE ROOM HARNESS
16	B	TO ENGINE ROOM HARNESS
17	R	TO ENGINE ROOM HARNESS
18	B	TO ENGINE ROOM HARNESS
19	B/R	TO ENGINE ROOM HARNESS
20	GR	TO ENGINE ROOM HARNESS
21	V/R	TO ENGINE ROOM HARNESS
22	SHIELD	TO ENGINE ROOM HARNESS
23	SHIELD	TO ENGINE ROOM HARNESS
24	P	TO ENGINE ROOM HARNESS

Connector No.	F19
Connector Name	WIRE TO WIRE
Connector Type	RH08FB
Connector Color	BLACK

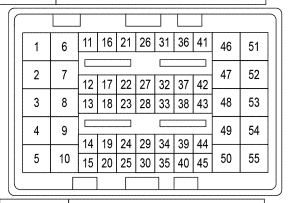
H.S.



Terminal No.	Color of Wire	Signal Name
1	V	TO ENGINE ROOM HARNESS
2	LG	TO ENGINE ROOM HARNESS
3	–	TO ENGINE ROOM HARNESS
4	L	TO ENGINE ROOM HARNESS
5	R	TO ENGINE ROOM HARNESS
6	SB	TO ENGINE ROOM HARNESS
7	L	TO ENGINE ROOM HARNESS
8	P	TO ENGINE ROOM HARNESS

Connector No.	F78
Connector Name	ECM (WITH VK56VD)
Connector Type	MAB35FB-MEB20-LH
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	R	FUEL INJECTOR DRIVER POWER SUPPLY
2	SB	HIGH PRESSURE FUEL PUMP DRIVER POWER SUPPLY
3	B/R	FUEL INJECTOR NO. 8 (LO)
4	O	FUEL INJECTOR NO. 3 (LO)
5	G	FUEL INJECTOR NO. 2, 3 (HI)
6	R	FUEL INJECTOR DRIVER POWER SUPPLY
7	V/B	FUEL INJECTOR NO. 5, 8 (HI)
8	B/W	FUEL INJECTOR NO. 5 (LO)
9	R/W	INJ-L #2
10	B	ECM GROUND
11	–	–
12	L/Y	REFRIGERANT PRESSURE SENSOR
13	W/L	SENSOR GROUND
14	SHIELD	SHIELD
15	W	KNOCK SENSOR (BANK 1)
16	–	–
17	V	EXHAUST GAS TEMPERATURE SENSOR (BANK 2)
18	W	KNOCK SENSOR (BANK 2)
19	GR/R	EXHAUST GAS TEMPERATURE SENSOR (BANK 1)
20	SHIELD	SENSOR GROUND
21	–	–
22	L/Y	ENGINE OIL TEMPERATURE SENSOR
23	L/Y	ENGINE OIL PRESSURE SENSOR
24	P/GR	POWER STEERING PRESSURE SENSOR
25	V/W	FUEL RAIL PRESSURE SENSOR
26	–	–
27	W/G	SENSOR POWER SUPPLY
28	Y/R	SENSOR POWER SUPPLY
29	SB	SENSOR POWER SUPPLY
30	SB	SENSOR POWER SUPPLY
31	BR	FAN CLUTCH ASSEMBLY SIGNAL
32	LG	BATTERY TEMPERATURE SENSOR
33	R/W	CRANKSHAFT POSITION SENSOR (POS)
34	–	–
35	R/W	ENGINE COOLANT TEMPERATURE SENSOR 1
36	G/O	INTAKE AIR TEMPERATURE SENSOR
37	G/B	MASS AIR FLOW SENSOR
38	V	BATTERY CURRENT SENSOR
39	–	–
40	L/R	CAMSHAFT POSITION SENSOR (PHASE) (BANK 1)
41	P	EXHAUST VALVE TIMING CONTROL POSITION SENSOR (BANK 1)
42	R	SENSOR GROUND
43	R	SENSOR GROUND
44	G/W	SENSOR GROUND
45	BR/W	SENSOR GROUND
46	SB	HIGH PRESSURE FUEL PUMP DRIVER POWER SUPPLY
47	BR	FUEL INJECTOR NO. 1, 6 (HI)
48	Y	FUEL INJECTOR NO. 1 (LO)
49	L	FUEL INJECTOR NO. 4 (LO)
50	B	ECM GROUND
51	P	HIGH PRESSURE FUEL PUMP DRIVER POWER SUPPLY
52	R	FUEL INJECTOR NO. 6 (LO)
53	V	FUEL INJECTOR NO. 7 (LO)
54	W	FUEL INJECTOR NO. 4, 7 (HI)
55	B	ECM GROUND

Connector No.	F223
Connector Name	WIRE TO WIRE
Connector Type	RS06FGY-PR
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	BR	TO ENGINE ROOM HARNESS
2	Y	TO ENGINE ROOM HARNESS
3	SB	TO ENGINE ROOM HARNESS
4	W/L	TO ENGINE ROOM HARNESS
5	Y/B	TO ENGINE ROOM HARNESS
6	L/Y	TO ENGINE ROOM HARNESS

Connector No.	F240
Connector Name	GENERATOR (WITH VK56VD)
Connector Type	E-LA6
Connector Color	-

H.S.

Terminal No.	Color of Wire	Signal Name
5	B	–

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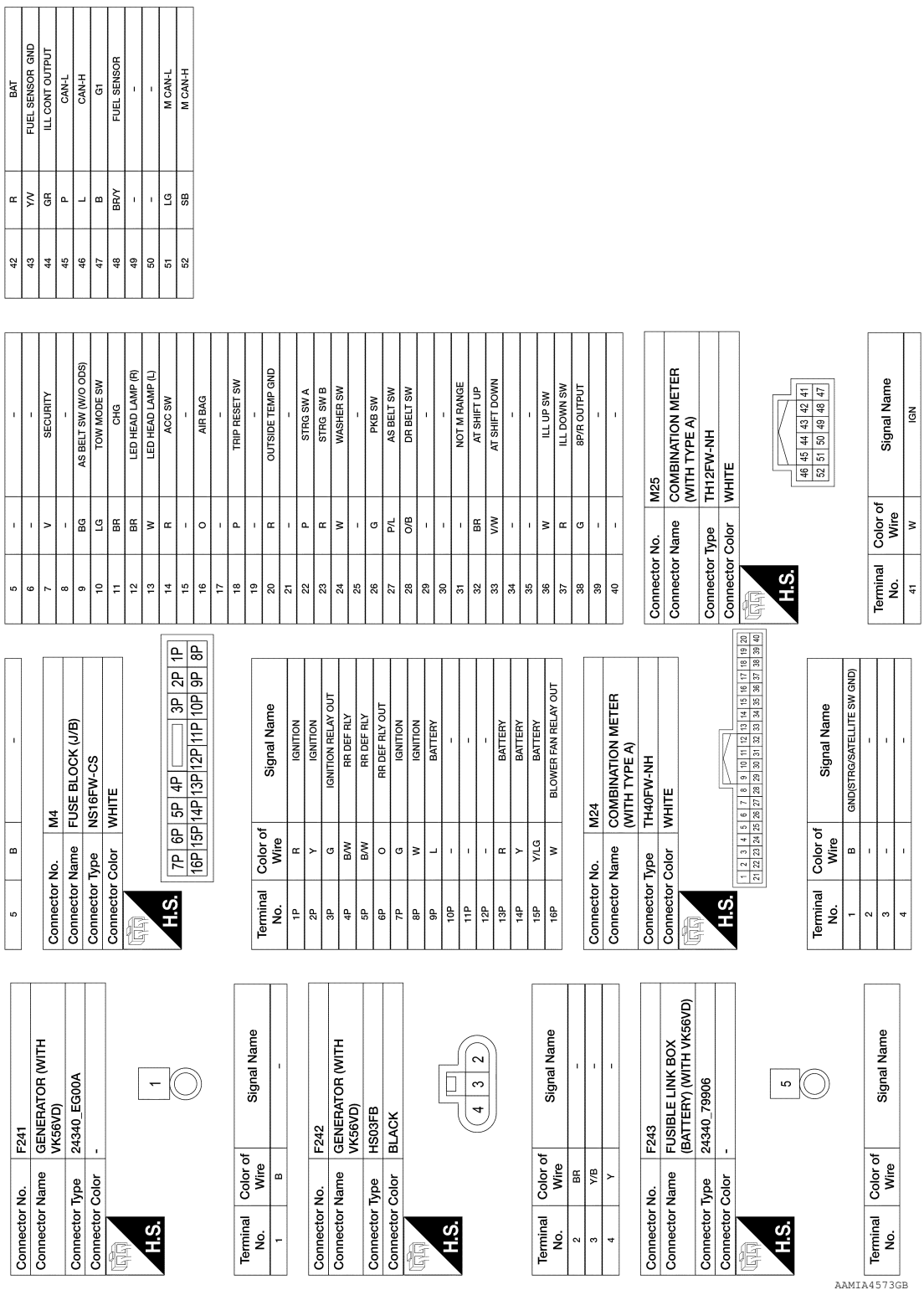
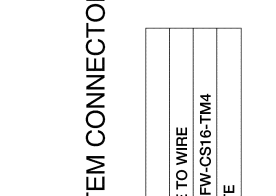
CHARGING SYSTEM CONNECTORS - WITH VK56VD



CHARGING SYSTEM CONNECTORS - WITH VK56VD

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1G	G	TO ENGINE ROOM HARNESS
2G	B/R	TO ENGINE ROOM HARNESS
3G	W	TO ENGINE ROOM HARNESS
4G	BR/W	TO ENGINE ROOM HARNESS
5G	BR	TO ENGINE ROOM HARNESS
6G	R/W	TO ENGINE ROOM HARNESS
7G	Y	TO ENGINE ROOM HARNESS
8G	G	TO ENGINE ROOM HARNESS
9G	R	TO ENGINE ROOM HARNESS
10G	W	TO ENGINE ROOM HARNESS
11G	R/G	TO ENGINE ROOM HARNESS
12G	W/B	TO ENGINE ROOM HARNESS
13G	BR	TO ENGINE ROOM HARNESS
14G	Y/B	TO ENGINE ROOM HARNESS
15G	G/W	TO ENGINE ROOM HARNESS
16G	G	TO ENGINE ROOM HARNESS
17G	O	TO ENGINE ROOM HARNESS
18G	G/Y	TO ENGINE ROOM HARNESS
19G	Y/V	TO ENGINE ROOM HARNESS
20G	G/Y	TO ENGINE ROOM HARNESS
21G	B/Y	TO ENGINE ROOM HARNESS
22G	G/R	TO ENGINE ROOM HARNESS
23G	Y/R	TO ENGINE ROOM HARNESS
24G	G/B	TO ENGINE ROOM HARNESS
25G	R/W	TO ENGINE ROOM HARNESS
26G	R	TO ENGINE ROOM HARNESS
27G	LG	TO ENGINE ROOM HARNESS
28G	G/B	TO ENGINE ROOM HARNESS
29G	G/B	TO ENGINE ROOM HARNESS
30G	BR/Y	TO ENGINE ROOM HARNESS
31G	R	TO ENGINE ROOM HARNESS
32G	R	TO ENGINE ROOM HARNESS
33G	Y/L	TO ENGINE ROOM HARNESS
34G	GR	TO ENGINE ROOM HARNESS
35G	G/R	TO ENGINE ROOM HARNESS
36G	SB	TO ENGINE ROOM HARNESS
37G	R/W	TO ENGINE ROOM HARNESS
38G	BR	TO ENGINE ROOM HARNESS
39G	BR	TO ENGINE ROOM HARNESS
40G	–	TO ENGINE ROOM HARNESS
41G	R/G	TO ENGINE ROOM HARNESS
42G	O	TO ENGINE ROOM HARNESS
43G	G	TO ENGINE ROOM HARNESS
44G	R/Y	TO ENGINE ROOM HARNESS
45G	G	TO ENGINE ROOM HARNESS
46G	LG	TO ENGINE ROOM HARNESS
47G	R	TO ENGINE ROOM HARNESS
48G	W	TO ENGINE ROOM HARNESS
49G	–	TO ENGINE ROOM HARNESS
50G	BR	TO ENGINE ROOM HARNESS
51G	R	TO ENGINE ROOM HARNESS
52G	L	TO ENGINE ROOM HARNESS
53G	W	TO ENGINE ROOM HARNESS
54G	W	TO ENGINE ROOM HARNESS
55G	G	TO ENGINE ROOM HARNESS
56G	W	TO ENGINE ROOM HARNESS
57G	Y	TO ENGINE ROOM HARNESS
58G	BG	TO ENGINE ROOM HARNESS
59G	BG	TO ENGINE ROOM HARNESS
60G	BG	TO ENGINE ROOM HARNESS
61G	O	TO ENGINE ROOM HARNESS
62G	W	TO ENGINE ROOM HARNESS
63G	O	TO ENGINE ROOM HARNESS
64G	W/L	TO ENGINE ROOM HARNESS
65G	W/R	TO ENGINE ROOM HARNESS
66G	BG	TO ENGINE ROOM HARNESS
67G	O	TO ENGINE ROOM HARNESS
68G	B	TO ENGINE ROOM HARNESS
69G	Y	TO ENGINE ROOM HARNESS
70G	L	TO ENGINE ROOM HARNESS
71G	R/W	TO ENGINE ROOM HARNESS
72G	L/W	TO ENGINE ROOM HARNESS
73G	SHIELD	TO ENGINE ROOM HARNESS
74G	W	TO ENGINE ROOM HARNESS
75G	R	TO ENGINE ROOM HARNESS
76G	R/G	TO ENGINE ROOM HARNESS
77G	BG	TO ENGINE ROOM HARNESS
78G	P	TO ENGINE ROOM HARNESS
79G	–	TO ENGINE ROOM HARNESS
80G	R	TO ENGINE ROOM HARNESS
81G	L	TO ENGINE ROOM HARNESS
82G	R	TO ENGINE ROOM HARNESS
83G	L	TO ENGINE ROOM HARNESS
84G	L	TO ENGINE ROOM HARNESS
85G	W	TO ENGINE ROOM HARNESS
86G	B/R	TO ENGINE ROOM HARNESS
87G	W	TO ENGINE ROOM HARNESS
88G	G	TO ENGINE ROOM HARNESS
89G	P	TO ENGINE ROOM HARNESS
90G	G	TO ENGINE ROOM HARNESS
91G	P	TO ENGINE ROOM HARNESS
92G	V/W	TO ENGINE ROOM HARNESS
93G	BR	TO ENGINE ROOM HARNESS
94G	B	TO ENGINE ROOM HARNESS
95G	G	TO ENGINE ROOM HARNESS
96G	R	TO ENGINE ROOM HARNESS
97G	R	TO ENGINE ROOM HARNESS
98G	W/B	TO ENGINE ROOM HARNESS
99G	R	TO ENGINE ROOM HARNESS
100G	GR/W	TO ENGINE ROOM HARNESS

Connector No.	M163
Connector Name	COMBINATION METER (WITH TYPE B)
Connector Type	TH40FW-NH
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name
1	B	GND (ILL)
2	B	GND (CIRCUIT)
3	B	GND (POWER)
4	–	–
5	–	–
6	R	BAT
7	V	SECURITY
8	W	IGN
9	BG	AS BELT SW
10	LG	TOW MODE SW
11	BR	CHG
12	B	SATELLITE SW GND
13	B	STRG SW GND
14	R	ACC
15	W	OUTSIDE TEMP SENSOR
16	O	AIR BAG
17	–	–
18	P	TRIP RESET SW
19	–	OIL LEVEL GND
20	R	OUTSIDE TEMP GND
21	–	–
22	P	STRG SW A
23	R	STRG SW B
24	W	WAHSER SW
25	–	BRAKE OIL SW
26	G	PKB SW
27	–	–
28	O/B	DR BELT SW
29	–	–
30	Y/V	FUEL SENSOR GND
31	BR/Y	FUEL SENSOR
32	BR	AT SHIFT UP
33	V/W	AT SHIFT DOWN
34	L	CAN-H
35	P	CAN-L
36	W	ILL UP SW
37	R	ILL DOWN SW
38	G	8P/R OUTPUT
39	–	–
40	GR	ILL CONT OUT

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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow (With EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)

INFOID:0000000012546647

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

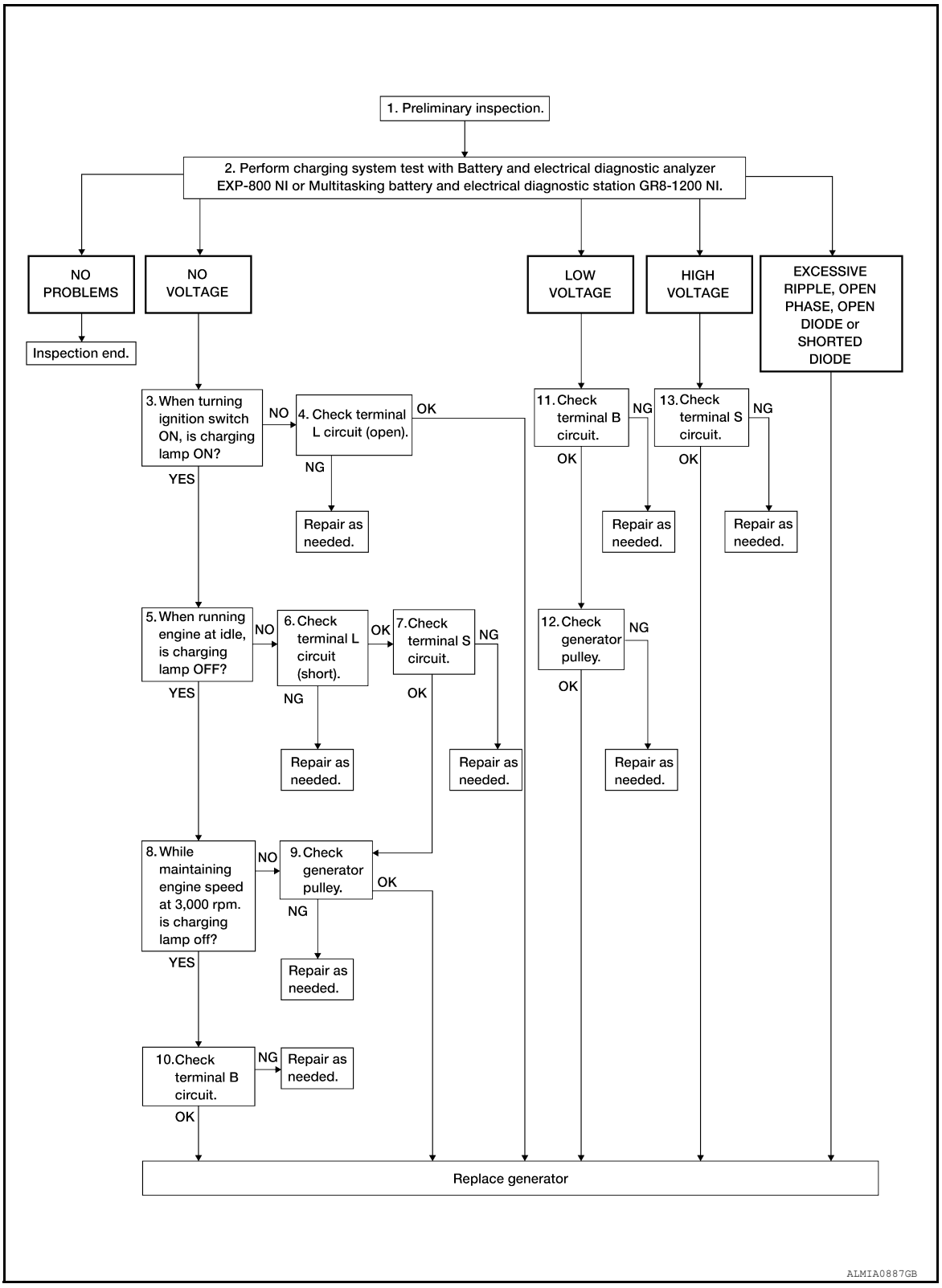
To test the charging system, use the following special service tools:

- 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 generator test segments must be done as a set from start to finish.

1. PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to CHG-34, "Inspection Procedure".

>> GO TO 2.

2.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 3.
LOW VOLTAGE>>GO TO 11.
HIGH VOLTAGE>>GO TO 13.
EXCESSIVE RIPPLE, OPEN PHASE, OPEN DIODE or SHORTED DIODE>>Replace the generator. Refer to CHG-45, "Removal and Installation: Cummins 5.0L". 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.

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

Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> GO TO 5.
NO >> GO TO 4.

4.TERMINAL L CIRCUIT (OPEN) INSPECTION

Check terminal L circuit (open). Refer to CHG-38, "Diagnosis Procedure".

Is the terminal L circuit normal?

YES >> Replace generator. Refer to CHG-45, "Removal and Installation: Cummins 5.0L".
NO >> Repair as needed.

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 8.
NO >> GO TO 6.

6.TERMINAL L CIRCUIT (SHORT) INSPECTION

Check terminal L circuit (short). Refer to CHG-41, "Diagnosis Procedure".

Is the terminal L circuit normal?

YES >> GO TO 7.
NO >> Repair as needed.

7.TERMINAL S CIRCUIT INSPECTION

Check terminal S circuit. Refer to CHG-42, "Diagnosis Procedure".

Is the terminal S circuit normal?

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

8.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 10.
NO >> GO TO 9.

9.INSPECTION OF GENERATOR PULLEY

Check generator pulley. Refer to CHG-45, "Removal and Installation: Cummins 5.0L".

Is generator pulley normal?

YES >> Replace generator. Refer to CHG-45, "Removal and Installation: Cummins 5.0L".

NO >> Repair as needed.

10.TERMINAL B CIRCUIT INSPECTION

Check terminal B circuit. Refer to CHG-37, "Diagnosis Procedure".

Is terminal B circuit normal?

YES >> Replace generator. Refer to CHG-45, "Removal and Installation: Cummins 5.0L".
NO >> Repair as needed.

11.TERMINAL B CIRCUIT INSPECTION

Check “B” terminal circuit. Refer to CHG-37, "Diagnosis Procedure".

Is “B” terminal circuit normal?

YES >> GO TO 12.
NO >> Repair as needed.

12.INSPECTION OF GENERATOR PULLEY

Check generator pulley. Refer to CHG-45, "Removal and Installation: Cummins 5.0L".

Is generator pulley normal?

YES >> Replace generator. Refer to CHG-45, "Removal and Installation: Cummins 5.0L".
NO >> Repair as needed.

13.TERMINAL S CIRCUIT INSPECTION

Check terminal S circuit. Refer to CHG-42, "Diagnosis Procedure".

Is the terminal S circuit normal?

YES >> Replace generator. Refer to CHG-45, "Removal and Installation: Cummins 5.0L".
NO >> Repair as needed.

Work Flow (With EXP-800 NI or GR8-1200 NI) (with VK56VD)

INFOID:0000000013828747

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

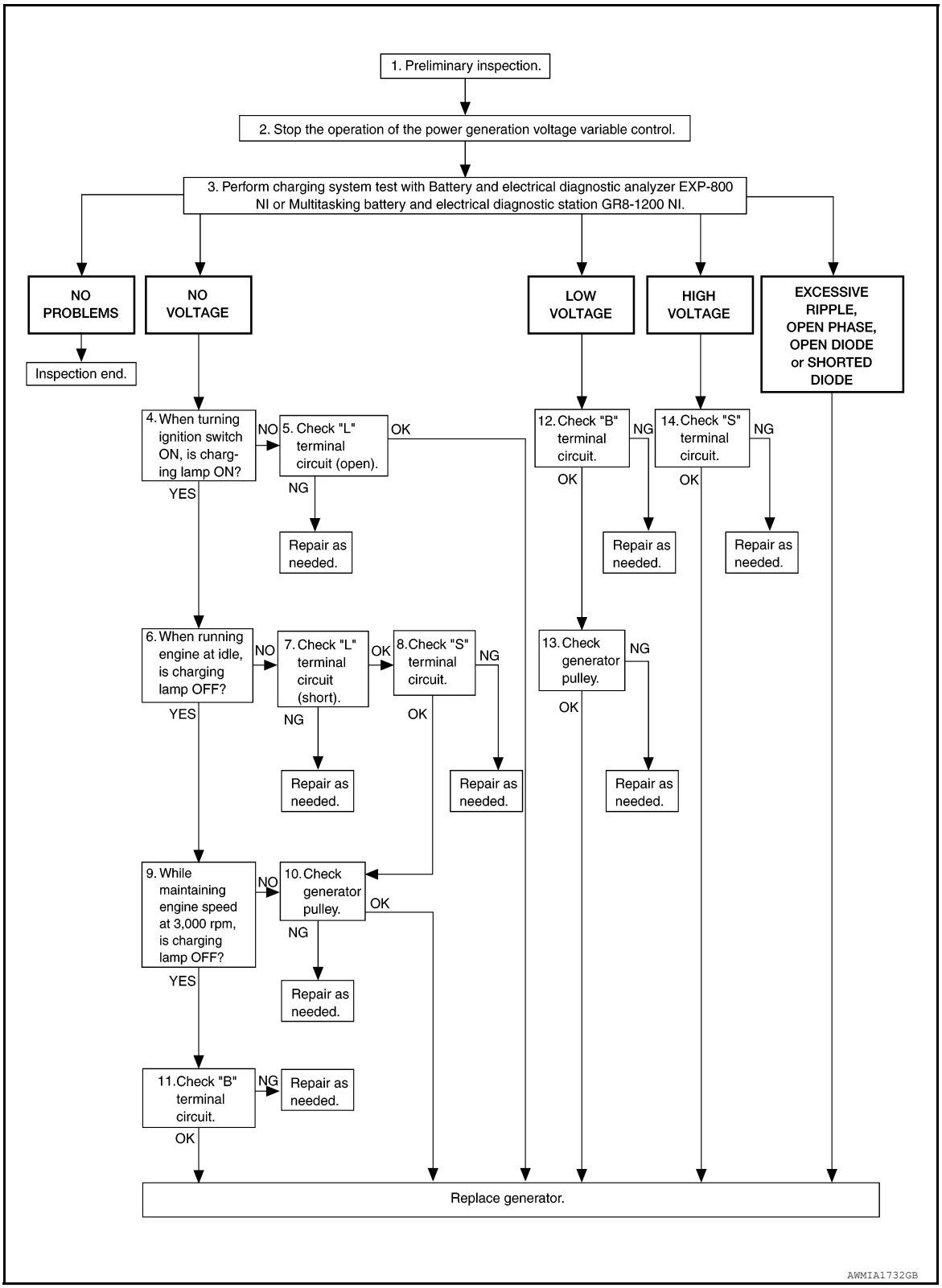
To test the charging system, use the following special service tools:

- 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 generator test segments must be done as a set from start to finish.

1.PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to CHG-34, "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” 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 generator.)
- 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 generator. Refer to CHG-44, "Removal and Installation: VK56VD". 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-38, "Diagnosis Procedure".

Is the “L” terminal circuit normal?

YES >> Replace generator. Refer to CHG-44, "Removal and Installation: VK56VD".
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-41, "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-42, "Diagnosis Procedure".

Is the “S” 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 GENERATOR PULLEY

Check generator pulley. Refer to CHG-44, "Removal and Installation: VK56VD".

Is generator pulley normal?

YES >> Replace generator. Refer to CHG-44, "Removal and Installation: VK56VD".
NO >> Repair as needed.

11. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to CHG-37, "Diagnosis Procedure".

Is "B" terminal circuit normal?

YES >> Replace generator. Refer to CHG-44, "Removal and Installation: VK56VD".
NO >> Repair as needed.

12. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to CHG-37, "Diagnosis Procedure".

Is "B" terminal circuit normal?

YES >> GO TO 13.
NO >> Repair as needed.

13. INSPECTION OF GENERATOR PULLEY

Check generator pulley. Refer to CHG-44, "Removal and Installation: VK56VD".

Is generator pulley normal?

YES >> Replace generator. Refer to CHG-44, "Removal and Installation: VK56VD"..
NO >> Repair as needed.

14. "S" TERMINAL CIRCUIT INSPECTION

Check "S" terminal circuit. Refer to CHG-42, "Diagnosis Procedure".

Is the "S" terminal circuit normal?

YES >> Replace generator. Refer to CHG-44, "Removal and Installation: VK56VD".
NO >> Repair as needed.

Work Flow (Without EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)

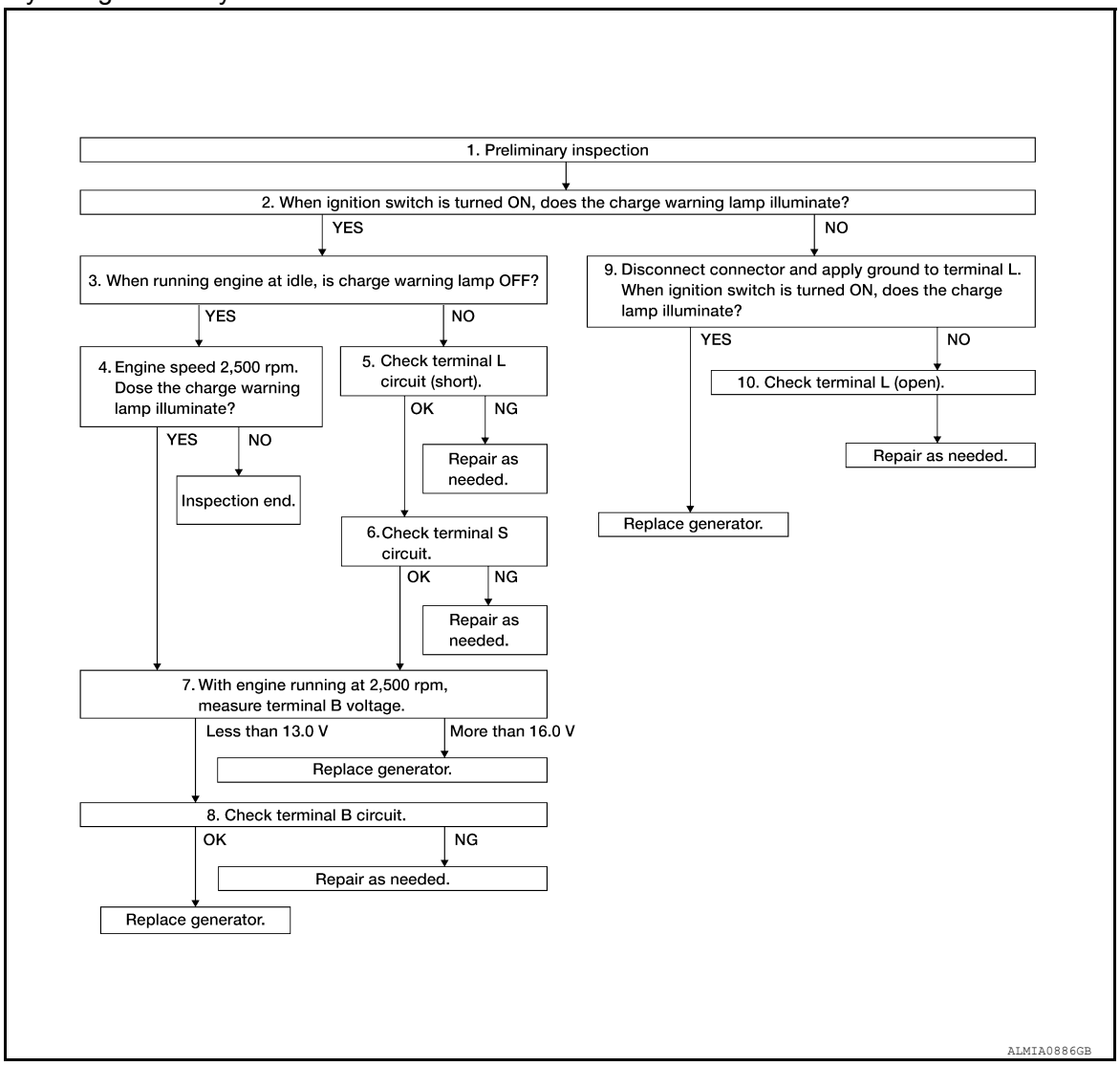
INFOID:0000000013387426

OVERALL SEQUENCE

Before performing a generator test, make sure that the battery is fully charged. A 30-volt voltmeter and suitable test probes are necessary for the test.

- Before starting, inspect the fusible link.

• Use fully charged battery.



DETAILED FLOW

1.PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to CHG-34, "Inspection Procedure".

>> GO TO 2.

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

Turn the ignition switch ON.

Does the charge warning lamp illuminate?

YES >> GO TO 3.
NO >> GO TO 9.

3.INSPECTION WITH CHARGE WARNING LAMP (IDLING)

Start the engine and run it at idle.

Does the charge warning lamp turn OFF?

YES >> GO TO 4.
NO >> GO TO 5.

4.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 7.
NO >> Inspection End.

5.TERMINAL L CIRCUIT (SHORT) INSPECTION

Check terminal L circuit for short. Refer to CHG-41, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair as needed.

6.TERMINAL S CIRCUIT INSPECTION

Check terminal S circuit. Refer to CHG-42, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair as needed.

7.MEASURE TERMINAL B VOLTAGE

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

What voltage does the measurement result show?

Less than 13.0 V>> GO TO 8.
More than 16.0 V>> Replace generator. Refer to CHG-45, "Removal and Installation: Cummins 5.0L".

8.TERMINAL B CIRCUIT INSPECTION

Check “B” terminal circuit. Refer to CHG-37, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace generator. Refer to CHG-45, "Removal and Installation: Cummins 5.0L".
NO >> Repair as needed.

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

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

Does the charge warning lamp illuminate?

YES >> Replace generator. Refer to CHG-45, "Removal and Installation: Cummins 5.0L".
NO >> GO TO 10.

10.CHECK TERMINAL L CIRCUIT (OPEN)

Check terminal L circuit open. Refer to CHG-38, "Diagnosis Procedure".

>> Repair as needed.

Work Flow (Without EXP-800 NI or GR8-1200 NI) (with VK56VD)

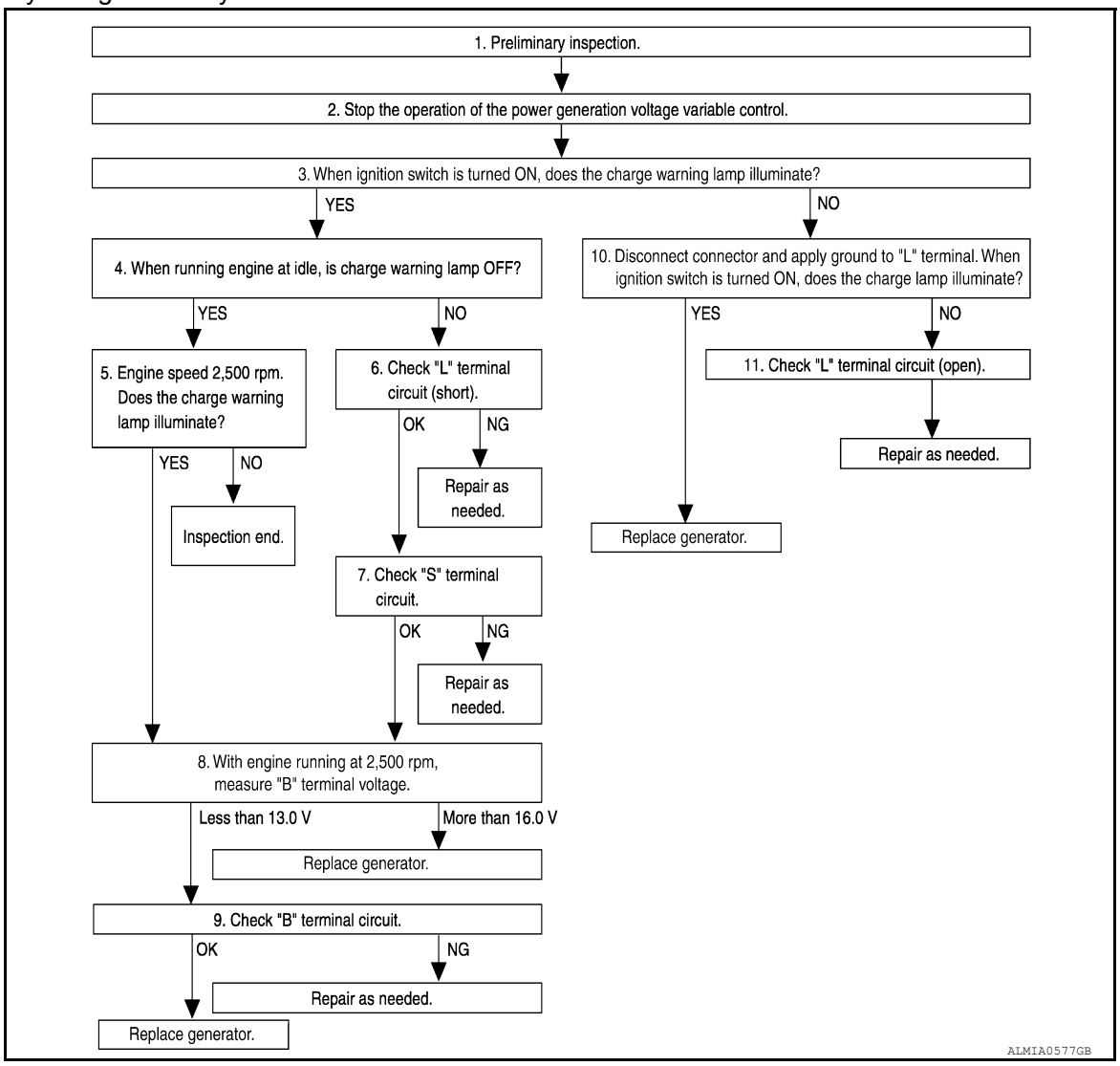
INFOID:0000000013828748

OVERALL SEQUENCE

Before performing a generator test, make sure that the battery is fully charged. A 30-volt voltmeter and suitable test probes are necessary for the test.

- Before starting, inspect the fusible link.

• Use fully charged battery.



DETAILED FLOW

1.PRELIMINARY INSPECTION

Perform the preliminary inspection. Refer to CHG-34, "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” using CONSULT, set the DUTY value of “ALTERNATOR DUTY” to 0 % by selecting “ALTERNATOR DUTY” with “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 generator.)
- 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 terminal "L" circuit for (short). Refer to CHG-41, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair as needed.

7. "S" TERMINAL CIRCUIT INSPECTION

Check terminal "S" circuit. Refer to CHG-42, "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 generator. Refer to CHG-44, "Removal and Installation: VK56VD".

9. "B" TERMINAL CIRCUIT INSPECTION

Check "B" terminal circuit. Refer to CHG-37, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace generator. Refer to CHG-44, "Removal and Installation: VK56VD".
NO >> Repair as needed.

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

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

Does the charge warning lamp illuminate?

YES >> Replace generator. Refer to CHG-44, "Removal and Installation: VK56VD".
NO >> GO TO 11.

11. CHECK "L" TERMINAL CIRCUIT (OPEN)

Check "L" terminal circuit (OPEN). Refer to CHG-38, "Diagnosis Procedure".

>> Repair as needed.

CHARGING SYSTEM PRELIMINARY INSPECTION

Inspection Procedure

INFOID:0000000013387428

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:

With Cummins 5.0L

Unit	Power source (Power supply terminals)	Fuse or Fusible Link
Generator	Battery (terminal 3)	Fuse 70 (10 A)
	Battery (terminal 1)	Fusible Link **A** (250 A)
Combination meter	Ignition switch ON or START (terminal 2)	Fuse 13 (10 A)

With VK56VD

Unit	Power source (Power supply terminals)	Fuse or Fusible Link
Generator	Battery (terminal 3)	Fuse 66 (10 A)
	Battery (terminal 1)	Fusible Link **A** (250 A)
Combination meter	Ignition switch ON or START (terminal 2)	Fuse 13 (10 A)

Is the inspection result normal?

YES >> GO TO 3.
NO >> Be sure to eliminate cause of malfunction before installing new fuse or fusible link.

3.CHECK GENERATOR GROUND TERMINAL CONNECTION

Verify connector F201 (generator ground harness) terminal 5 is clean and tight.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair connection.

4.CHECK DRIVE BELT TENSION

Check drive belt tension. Refer to CHG-44, "Removal and Installation: VK56VD".

Is the inspection result normal?

YES >> Inspection End.
NO >> Repair as needed.

DTC/CIRCUIT DIAGNOSIS

POWER GENERATION VOLTAGE VARIABLE CONTROL SYSTEM OPERATION INSPECTION

Diagnosis Procedure

INFOID:0000000013828749

Regarding Wiring Diagram information, refer to CHG-17, "Wiring Diagram- with VK56VD".

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 EC-1325, "CONSULT Function".

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 A/T shift selector is in “P” or “N” position and all of the electric loads and A/C, etc. are turned OFF.
3. Select “ALTERNATOR DUTY” in “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-11, "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 GENERATOR AND IPDM E/R

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

Generator		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
F242	4	E122	47	Yes

4. Check continuity between generator harness connector and ground.

Generator		–	Continuity
Connector	Terminal		
F242	4	Ground	No

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-43, "Removal and Installation of IPDM E/R".
NO >> Repair harness or connector between IPDM E/R and generator.

B TERMINAL CIRCUIT

Description

INFOID:0000000012546657

The terminal “B” circuit supplies power to charge the battery and to operate the vehicle’s electrical system.

Diagnosis Procedure

INFOID:0000000012546658

Regarding Wiring Diagram information, refer to CHG-12, "Wiring Diagram- with Cummins 5.0L", or CHG-17, "Wiring Diagram- with VK56VD".

1.CHECK TERMINAL “B” CONNECTION

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

Is the inspection result normal?

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

Check voltage between generator connector and ground.

(+)		(–)	Voltage (Approx.)
Connector	Terminal		
F204 (with Cummins 5.0L) F241 (with VK56VD)	1	Ground	Battery voltage

Is voltage reading as specified?

YES >> GO TO 3.
NO >> Check harness for open between generator and fusible link.

3.CHECK TERMINAL “B” CONNECTION (VOLTAGE DROP TEST)

1. Start engine, then engine running at idle and warm.
2. Check voltage between battery positive terminal and generator connector.

(+)		(–)	Voltage (Approx.)
Connector	Terminal		
F204 (with Cummins 5.0L) F241 (with VK56VD)	1	Battery positive terminal	Less than 0.2V

Is the voltage reading as specified?

YES >> Terminal “B” circuit is normal. Refer to CHG-23, "Work Flow (With EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)", CHG-26, "Work Flow (With EXP-800 NI or GR8-1200 NI) (with VK56VD)", CHG-29, "Work Flow (Without EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)", or CHG-31, "Work Flow (Without EXP-800 NI or GR8-1200 NI) (with VK56VD)".
NO >> Check harness between battery and generator for high resistance.

L TERMINAL CIRCUIT (OPEN)

Description

INFOID:0000000012546659

The terminal “L” circuit controls the charge warning lamp. The charge warning lamp turns ON when the ignition switch is set to ON or START. When the generator is providing sufficient voltage with the engine running, the charge warning lamp turns OFF. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Diagnosis Procedure

INFOID:0000000012546660

Regarding Wiring Diagram information. Refer to CHG-12, "Wiring Diagram- with Cummins 5.0L", or CHG-17, "Wiring Diagram- with VK56VD".

1.CHECK TERMINAL “L” CONNECTION

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair terminal “L” connection. Confirm repair by performing complete Charging system test using EXP-800 NI or GR8-1200 NI (if available). Refer to applicable Instruction Manual for proper testing procedures.

2.CHECK TERMINAL “L” CIRCUIT (OPEN)

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

Generator		Ground	Condition	
Connector	Terminal		Ignition switch position	Charge warning lamp
F205 (with Cummins 5.0L) F242 (with VK56VD)	2		ON	Illuminate

Does it illuminate?

YES >> Terminal “L” circuit is normal. Refer to CHG-23, "Work Flow (With EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)", CHG-26, "Work Flow (With EXP-800 NI or GR8-1200 NI) (with VK56VD)", CHG-29, "Work Flow (Without EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)", or CHG-31, "Work Flow (Without EXP-800 NI or GR8-1200 NI) (with VK56VD)".
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 generator harness connector and combination meter harness connector.

With Cummins 5.0L

Generator		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
F205	2	M25	11	Yes

With VK56VD (with type A combination meter)

Generator		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
F242	2	M25	11	Yes

With VK56VD (with type B combination meter)

Generator		Combination meter		Continuity
Connector	Terminal	Connector	Terminal	
F242	2	M163	11	Yes

Is the inspection result normal?

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

4. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

Check continuity between combination meter harness connector and fuse block (J/B).

With Cummins 5.0L

Combination meter		Fuse box (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
M24	42	M4	13P	Yes

With VK56VD (with type A combination meter)

Combination meter		Fuse box (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
M24	42	M4	13P	Yes

With VK56VD (with type B combination meter)

Combination meter		Fuse box (J/B)		Continuity
Connector	Terminal	Connector	Terminal	
M163	6	M4	13P	Yes

Is the inspection result normal?

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

5. CHECK POWER SUPPLY CIRCUIT

1. Connect the battery cable to the negative terminal.
2. Check voltage between combination meter harness connector and ground.

With Cummins 5.0L

(+)		(–)	Condition	Voltage (Approx.)
Combination meter				
Connector	Terminal			
M24	42	Ground	When the ignition switch is in ON position	Battery voltage

With VK56VD (with type A combination meter)

(+)		(–)	Condition	Voltage (Approx.)
Combination meter				
Connector	Terminal			
M24	42	Ground	When the ignition switch is in ON position	Battery voltage

With VK56VD (with type B combination meter)

(+)		(–)	Condition	Voltage (Approx.)
Combination meter				
Connector	Terminal			
M163	6	Ground	When the ignition switch is in ON position	Battery voltage

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-108, "Removal and Installation".

NO >> Repair or replace the harness or connectors.

L TERMINAL CIRCUIT (SHORT)

Description

INFOID:0000000012546661

The terminal “L” circuit controls the charge warning lamp. The charge warning lamp turns ON when the ignition switch is set to ON or START. When the generator is providing sufficient voltage with the engine running, the charge warning lamp turns off. If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

Diagnosis Procedure

INFOID:0000000012546662

Regarding Wiring Diagram information, refer to CHG-12, "Wiring Diagram- with Cummins 5.0L", or CHG-17, "Wiring Diagram- with VK56VD".

1.CHECK TERMINAL “L” CIRCUIT (SHORT)

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

Does charge warning lamp illuminate?

YES >> GO TO 2.
NO >> Refer to CHG-23, "Work Flow (With EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)", CHG-26, "Work Flow (With EXP-800 NI or GR8-1200 NI) (with VK56VD)", CHG-29, "Work Flow (Without EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)", or CHG-31, "Work Flow (Without EXP-800 NI or GR8-1200 NI) (with VK56VD)".

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 the combination meter harness connector and ground.

With Cummins 5.0L

Combination meter		Ground	Continuity
Connector	Terminal		
M25	11		No

With VK56VD (with type A combination meter)

Combination meter		Ground	Continuity
Connector	Terminal		
M25	11		No

With VK56VD (with type B combination meter)

Combination meter		Ground	Continuity
Connector	Terminal		
M163	11		No

Is the inspection result normal?

YES >> Replace the combination meter. Refer to MWI-108, "Removal and Installation".
NO >> Repair or replace the harness or connectors.

S TERMINAL CIRCUIT

Description

INFOID:0000000012546663

The output voltage of the generator is controlled by the IC regulator at terminal “S” detecting the input voltage. Terminal “S” circuit detects the battery voltage to adjust the generator output voltage with the IC regulator.

Diagnosis Procedure

INFOID:0000000012546664

Regarding Wiring Diagram information, refer to CHG-12, "Wiring Diagram- with Cummins 5.0L", or CHG-17, "Wiring Diagram- with VK56VD".

1.CHECK TERMINAL “S” CONNECTION

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair terminal “S” 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 VOLTAGE REGULATOR CIRCUIT

Check voltage between generator harness connector and ground.

(+)		(–)	Voltage (Approx.)
Connector	Terminal		
F205 (with Cummins 5.0L) F242 (with VK56VD)	3	Ground	Battery voltage

Does battery voltage exist?

YES >> Refer to CHG-23, "Work Flow (With EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)", CHG-26, "Work Flow (With EXP-800 NI or GR8-1200 NI) (with VK56VD)", CHG-29, "Work Flow (Without EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)", CHG-31, "Work Flow (Without EXP-800 NI or GR8-1200 NI) (with VK56VD)".
NO >> Check harness for open between generator and fuse.

SYMPTOM DIAGNOSIS

CHARGING SYSTEM

Symptom Table

INFOID:0000000012546666

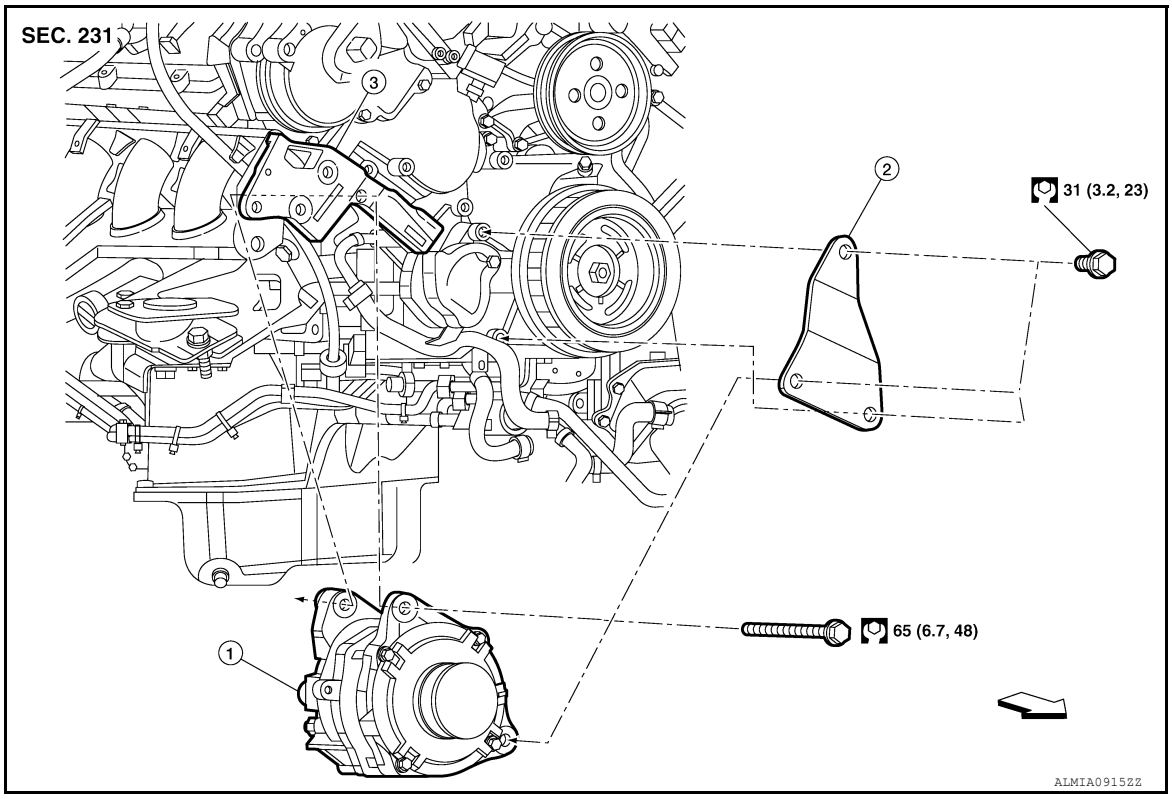
Symptom	Reference
Battery discharged	Refer to CHG-23, "Work Flow (With EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)" or CHG-29, "Work Flow (Without EXP-800 NI or GR8-1200 NI) (with Cummins 5.0L)".
The charge warning lamp does not illuminate when the ignition switch is set to ON.	
The charge warning lamp does not turn OFF after the engine starts.	
The charging warning lamp turns ON when increasing the engine speed.	

REMOVAL AND INSTALLATION

GENERATOR

Removal and Installation: VK56VD

INFOID:0000000012546667

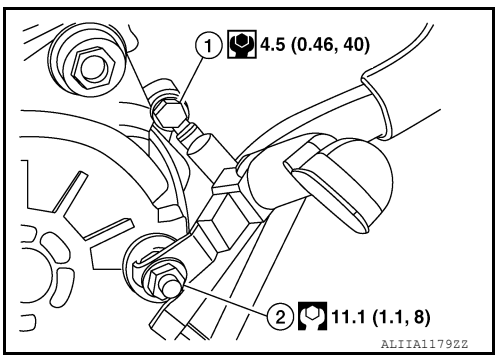


1. Generator
2. Generator front bracket
3. Generator rear bracket

⇦ Front

REMOVAL

1. Disconnect the battery. Refer to PG-174, "Battery Disconnect".
2. Remove drive belt. Refer to EM-23, "Removal and Installation".
3. Remove the wheel and tire (RH) using a power tool. Refer to WT-69, "Removal and Installation".
4. Position the front wheels to the RH stop.
5. Remove the RH front fender protector. Refer to EXT-32, "Removal and Installation - Front Fender Protector".
6. Disconnect the generator harness connector (2) and position aside.
7. Remove the generator ground wire (1).



8. Remove generator front bracket mounting bolt.
9. Remove generator rear bracket mounting bolt.

10. Remove the generator.

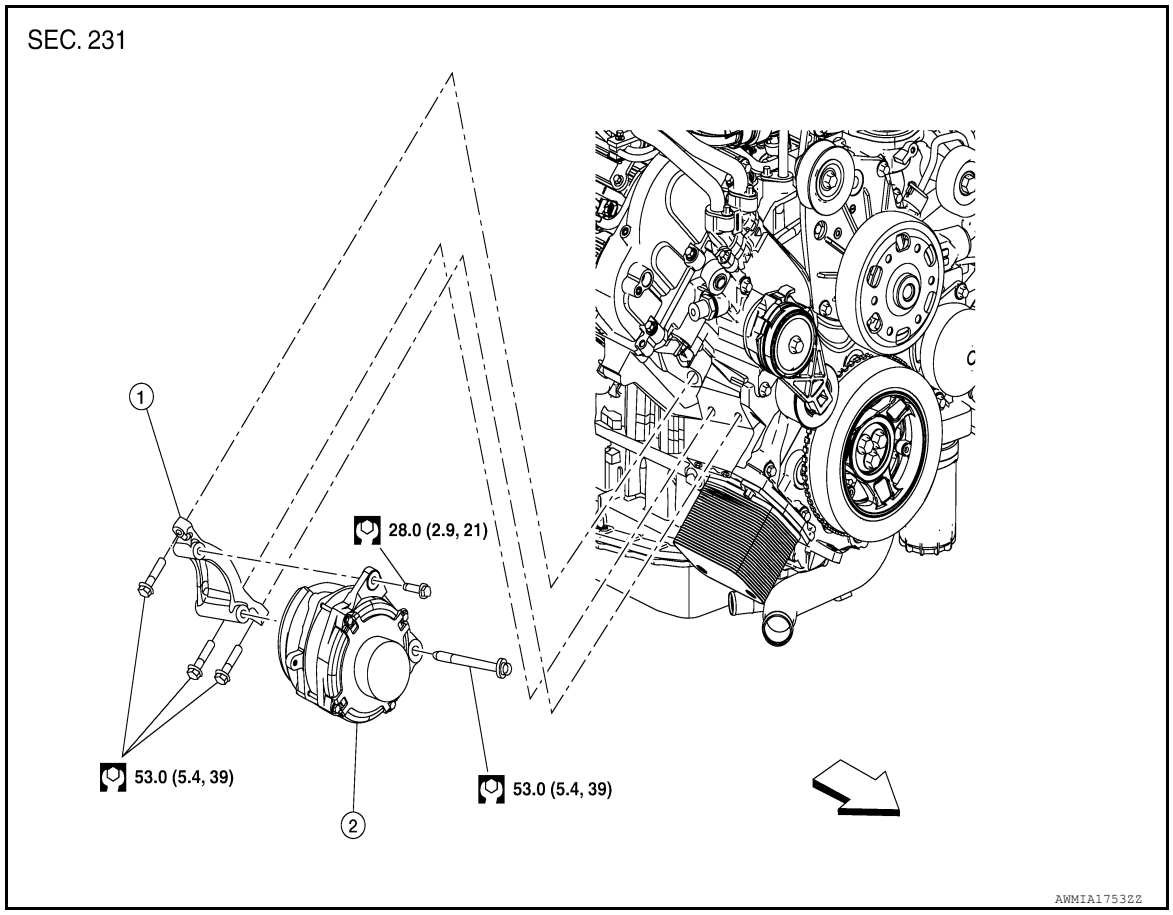
INSTALLATION

Installation is in the reverse order of removal.

- Hand-tighten generator bracket mounting bolts, then tighten to specified torque.

Removal and Installation: Cummins 5.0L

INFOID:0000000013928876

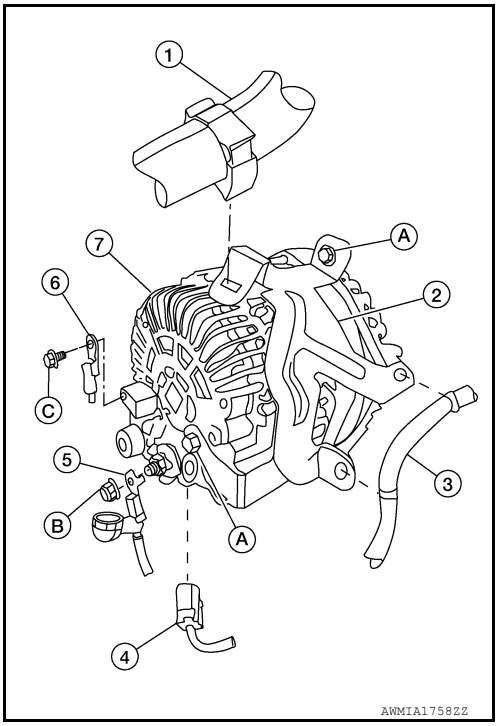


1. Generator	2. Lower bracket	3. Upper bracket
A. Upper bolts	B. Upper bracket bolt	C. Lower bracket bolt

REMOVAL

1. Disconnect the battery or batteries. Refer to PG-174, "Battery Disconnect".
2. Remove the drive belt. Refer to EM-190, "Removal and Installation - Drive Belt".
3. Remove the wheel and tire (RH) using power tool. Refer to WT-69, "Removal and Installation".
4. Remove the front mudguard (RH). Refer to EXT-36, "Removal and Installation".
5. Remove the front fender protector (RH). Refer to EXT-32, "Removal and Installation - Front Fender Protector".

6. Disconnect the engine harness retainer (1) from the engine harness bracket (2) and position aside.
7. Disconnect negative battery cable (3) from engine harness bracket (2) and push aside
8. Disconnect engine harness connector (4) from bottom of generator (7).
9. Remove bolt (C) and engine harness cable (6) from back of generator (7).
10. Remove terminal nut (B) and engine harness cable (5) from back of generator (7).
11. Remove upper and lower mounting bolts and generator from vehicle.
12. Remove three mounting bolts and generator bracket from engine (if necessary).
13. Remove two bolts (A) and engine harness bracket (2) from generator (7) (if necessary).



INSTALLATION

Installation is in the reverse order of removal.

- Hand-tighten generator bracket mounting bolts, then tighten to specified torque.This model includes the variable voltage control system. Therefore be sure to inspect the variable voltage control system after replacing the generator to ensure the system operates normally.
- Hand-tighten generator mounting bolts, then tighten to specified torque.
- Hand-tighten terminal nut (B) and bolt (C), then tighten to specified torque.

CAUTION:

Tighten terminal nut carefully.

Terminal nut	**: 10.8 N·m (1.1 kg-m, 8 ft-lb)**
Terminal bolt	**: 4.46 N·m (0.45 kg-m, 39 in-lb)**

SERVICE DATA AND SPECIFICATIONS (SDS)

GENERATOR

Generator

INFOID:0000000012546668

Model* VK56VD Cummins 5.0L	 A003TX2191ZC A003TX2291ZC
Manufacturer	Mitsubishi
Nominal rating	13.5V-200A
Ground polarity	Negative
Minimum revolution under no-load	1,000 rpm
Hot output current (When 13.5 volts is applied)	More than 155A/2,500 rpm More than 197A/5,000 rpm
Regulated output voltage	14.4V @ 20°C (68°F)

*: Always check with the Parts Department for the latest parts information.