DENRYO

DIASINE®

Sine Wave Power Inverter
GD150/GD300 Series 100V Model
User's Manual

For S/N: W54xxxxxxx or later

RoHS CE

Ver.1.12E

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This document applies to products with serial number first three digits are W54 or later. Products from W49 to W53 have the specifications described in the User's Manual Ver1.09E.

1. Safety Instructions

This document contains important safety and operating information for DIASINE®. To get the most out of DIASINE®, use DIASINE® only as described in the safety instructions. Read the safety instructions carefully before installing DIASINE®.

⚠ WARNING	This sign indicates that the following contents includes important information. The wrong order of handling may result in death or serious injury.

⚠ CAUTION	This sign indicates that the following contents includes important information. The wrong order of handling may cause damage to the products and the surrounding items.

☞ MEMO	This sign indicates that the following contents includes important information of manuals on functions that contain safety instructions or proper operation of DIASINE®.

Installation Precautions

- Installation and operation of DIASINE® should be performed by personnel knowledgeable about proper safety precautions.
- To avoid the risk of electric shock and fire, read and follow the electrical wiring regulations. Do not disassemble DIASINE®.
- To avoid the risk of electric shock and fire, install DIASINE® out of the reach of children.
- Do not expose DIASINE® to rain, snow, dust or under high humidity environment.
- Do not install DIASINE® under high temperature environment, near fire or under direct sun exposure.
- The temperature of DIASINE® may rise during operation. Be careful when moving or removing it.
- To avoid covering or obstructing the ventilation openings, do not put any objects within 15cm (5.9in) area near DIASINE®.
- To avoid overheating, do not put anything on top of it.
- To connect more than one battery, use the same model of battery from the same manufacturer. Using different batteries at the same time is dangerous.
- Batteries produce explosive gases when discharged. Do not smoke or light fire near the battery.
- DIASINE® contains components that may cause arcs or sparks. To prevent fire or explosion, do not install in compartments with batteries or flammable materials.

⚠ CAUTION	Since battery deteriorates over time, maintenance on a yearly basis is recommended. Change deteriorated batteries to prevent the hazard of fire.

Do Not Disassemble

Keep Dry

Danger High Temperature

No Open Flame

Do Not Stack

Keep Air Ventilation

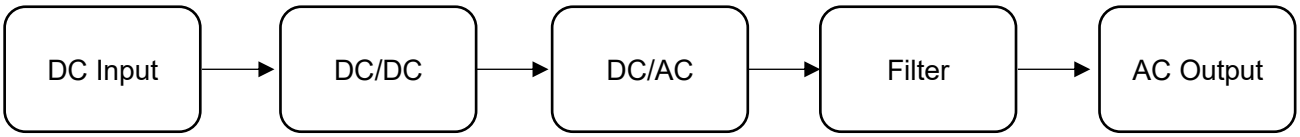
2. General Information

DIASINE® is a pure sine wave inverter that converts DC voltage to AC sine wave voltage. The output waveform is the same as the sine wave of commercial power supply. Total harmonic distortion is less than 3%. High efficiency circuit and switching control achieve 90% (GD150)/89% (GD300) efficiency at full rated load. DIASINE® is downsized presented by fanless structure, cooling by natural convection, which enables it to operate quietly. In addition, DIASINE® is equipped with various protections. Even if the input polarity is reversed, the internal circuit will not be damaged. Moreover, with the capability of inputting wide voltage range, operating under wide temperature range and remote control function, DIASINE® can be used in various environments and applications.

Features

- Input reverse polarity protection by internal circuit
- Fanless quiet operation (natural convection)
- Wide operating temperature range (-20 to +60°C)
- Output voltage/frequency easily switchable by button
- Pure sine wave output (total harmonic distortion less than 3%)
- Light weight and slim design
- High efficiency 90% for GD150, 89% for GD300 (at full rated load)
- Built-in remote-control function
- Various protections: Input voltage warning, shut down, input reverse polarity, output voltage, output short-circuit, overload and over temperature
- Buzzer ON/OFF, LED brightness switchable
- Low power mode and sleep mode
- Wide input voltage range
- Input voltage of 12V/24V/48V by 3 lineups
- Input terminal cover for dust prevention
- Optional communication function (T. B. D.)

Block Diagram



Safety and EMC Certified

Safety standards :EN62368-1: 2014+A11:2017
Immunity standards :EN55024:2010
Emission standards :EN55032:2012

3. Features

3-1 Specification

MODEL		GD150NA-112	GD150NA-124	GD150NA-148
Input	Battery Voltage	12V	24V	48V
	Voltage Range*1	10.5-19.5Vdc	21-39Vdc	42-78Vdc
	Max. Current	16.5A	8A	4A
	No-load Current*2 (Low power mode)	0.4A	0.2A	0.1A
	No-load Current*2 (Normal mode)	0.6A	0.3A	0.2A
	Standby Mode Consumption*2	7mA	7mA	4mA
	Sleep Mode Consumption*2	1mA	3mA	2mA
	Efficiency at Rated Load	90%	90%	91%
Output	Rated Power	150VA		
	Peak Power (3min.)	180VA		
	Surge Power (3sec.)	210VA		
	AC Voltage (switchable)	100 default, 110/115/120Vac		
	Frequency (switchable)	50±0.1Hz default, 50/60Hz		
	Waveform	Sine Wave, <3%THD		
	Voltage Tolerance	±3.0%		
	LED indicators	Operating status, Battery voltage level, Output power level, Protection function, Operation setting		
Function	Remote-control	Output remote ON/OFF control terminal		
	Option terminal	Six-position four-conductor (6P4C) modular jack		
Protection	Input	Undervoltage, Overvoltage, Input reverse polarity		
	Output	Overload, Short-circuit, Output voltage error		
	Others	Over temperature (Detect by internal temperature sensors)		
Environment	Operating Temperature	-20 to +60°C at rated load (Refer to P.7)		
	Operating Humidity	20-90%RH non-condensing		
	Storage Temperature/ Humidity	-30 to +70°C, 10-95%RH		
	Vibration	10-500Hz, 3G 10min./ 1cycle, 60mins. XYZ axes		
Safety & EMC	Safety Standards	Certified EN62368-1: 2014+A11:2017		
	Withstand Voltage	Battery I/P-AC O/P: 3.0kVac AC O/P-Ground: 1.5kVac Battery I/P-Ground:1.5kVac		
	Isolation Resistance	Battery I/P-AC O/P: >1000MΩ/500Vdc/25°C/70% RH AC O/P-Ground: >1000MΩ/500Vdc/25°C/70% RH Battery I/P-Ground: >1000MΩ/500Vdc/25°C/70% RH		
	EMC Immunity	EN55024:2010		
	EMC Emission	EN55032:2012		
Others	Accessories	Cable with plug*3	-	-
	Dimension (L×W×H)	234.0×146.5×44.0mm (9.213×5.768×1.732in)		
	Weight	0.8kg		

All parameters NOT specially mentioned are measured at 112:12Vdc, 124:24Vdc, 148:48Vdc input, 150VA rated load, power factor=1.0, 25°C of ambient temperature and under the default setting.

*1 Tolerance of voltage: 112±0.5V, 124: ±1V and 148: ±2V.

*2 Average.

*3 Length of cable: 1500±30mm (59±1in)

MODEL		GD300NA-112	GD300NA-124	GD300NA-148
Input	Battery Voltage	12V	24V	48V
	Voltage Range*1	10.5-19.5Vdc	21-39Vdc	42-78Vdc
	Max. Current	33A	16.5A	8A
	No-load Current*2 (Low power mode)	0.6A	0.2A	0.1A
	No-load Current*2 (Normal mode)	0.7A	0.3A	0.2A
	Standby Mode Consumption*2	7mA	7mA	4mA
	Sleep Mode Consumption*2	1mA	3mA	2mA
	Efficiency at Rated Load	89%	90%	90%
Output	Rated Power	300VA		
	Peak Power (3min.)	360VA		
	Surge Power (3sec.)	420VA		
	AC Voltage (switchable)	100 default, 110/115/120Vac		
	Frequency (switchable)	50±0.1Hz default, 50/60Hz		
	Waveform	Sine Wave, <3%THD		
	Voltage Tolerance	±3.0%		
	LED indicators	Operating status, Battery voltage level, Output power level, Protection function, Operation setting		
Function	Remote-control	Output remote ON/OFF control terminal		
	Option terminal	Six-position four-conductor (6P4C) modular jack		
Protection	Input	Undervoltage, Overvoltage, Input reverse polarity		
	Output	Overload, Short-circuit, Output voltage error		
	Others	Over temperature (Detect by internal temperature sensors)		
Environment	Operating Temperature	-20 to +40°C at rated load, +60°C at 70% load (Refer to P.7)		
	Operating Humidity	20-90%RH non-condensing		
	Storage Temperature/ Humidity	-30 to +70°C, 10-95%RH		
	Vibration	10-500Hz, 3G 10min./ 1cycle, 60mins. XYZ axes		
Safety & EMC	Safety Standards	Certified EN62368-1: 2014+A11:2017		
	Withstand Voltage	Battery I/P-AC O/P: 3.0kVac AC O/P-Ground: 1.5kVac Battery I/P-Ground:1.5kVac		
	Isolation Resistance	Battery I/P-AC O/P: >1000MΩ/500Vdc/25°C/70% RH AC O/P-Ground: >1000MΩ/500Vdc/25°C/70% RH Battery I/P-Ground: >1000MΩ/500Vdc/25°C/70% RH		
	EMC Immunity	EN55024:2010		
	EMC Emission	EN55032:2012		
Others	Dimension (L×W×H)	234.0×146.5×44.0mm (9.213×5.768×1.732in)		
	Weight	0.9kg		

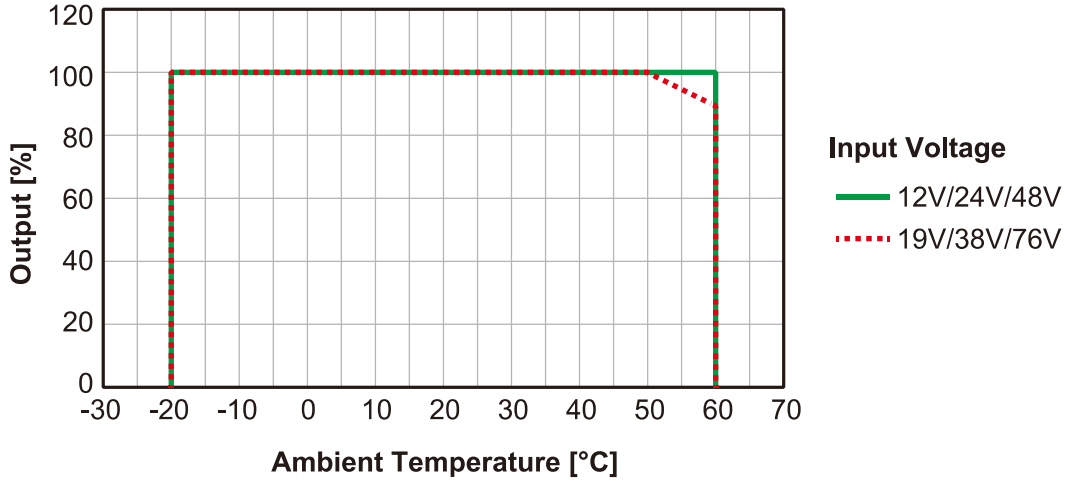
All parameters NOT specially mentioned are measured at 112:12Vdc, 124:24Vdc, 148:48Vdc input, 300VA rated load, power factor=1.0, 25°C of ambient temperature and under the default setting.

*1 Tolerance of voltage: 112: ±0.5V, 124: ±1V and 148: ±2V.

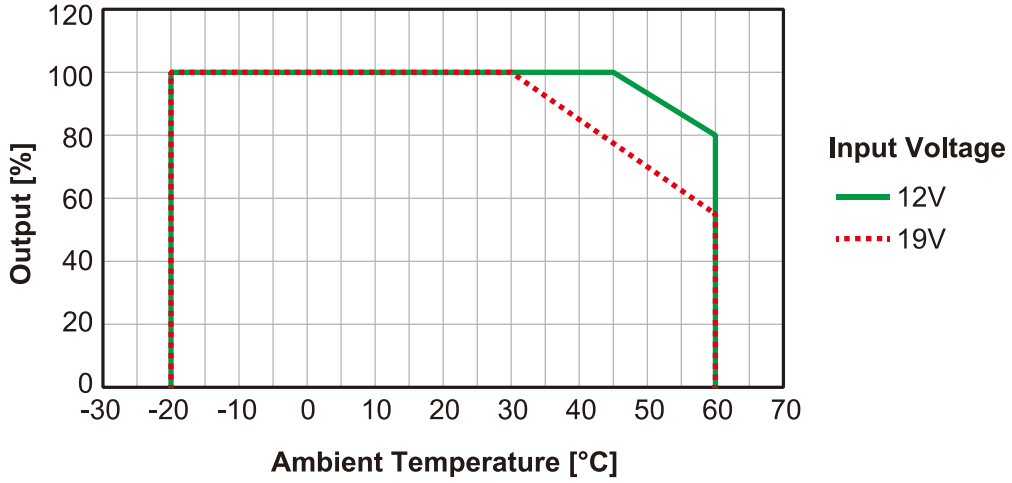
*2 Average.

3-2 De-rating Curve

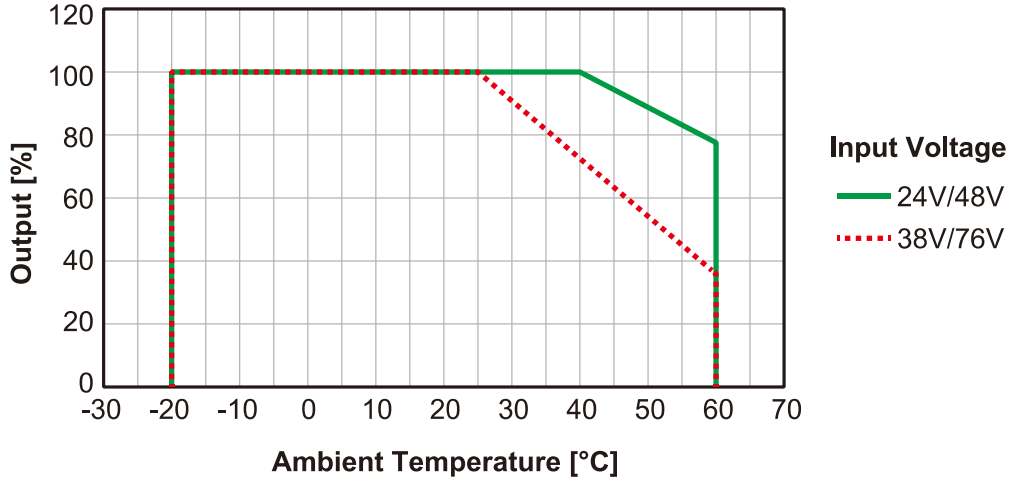
- **GD150NA-112/124/148**



- **GD300NA-112**

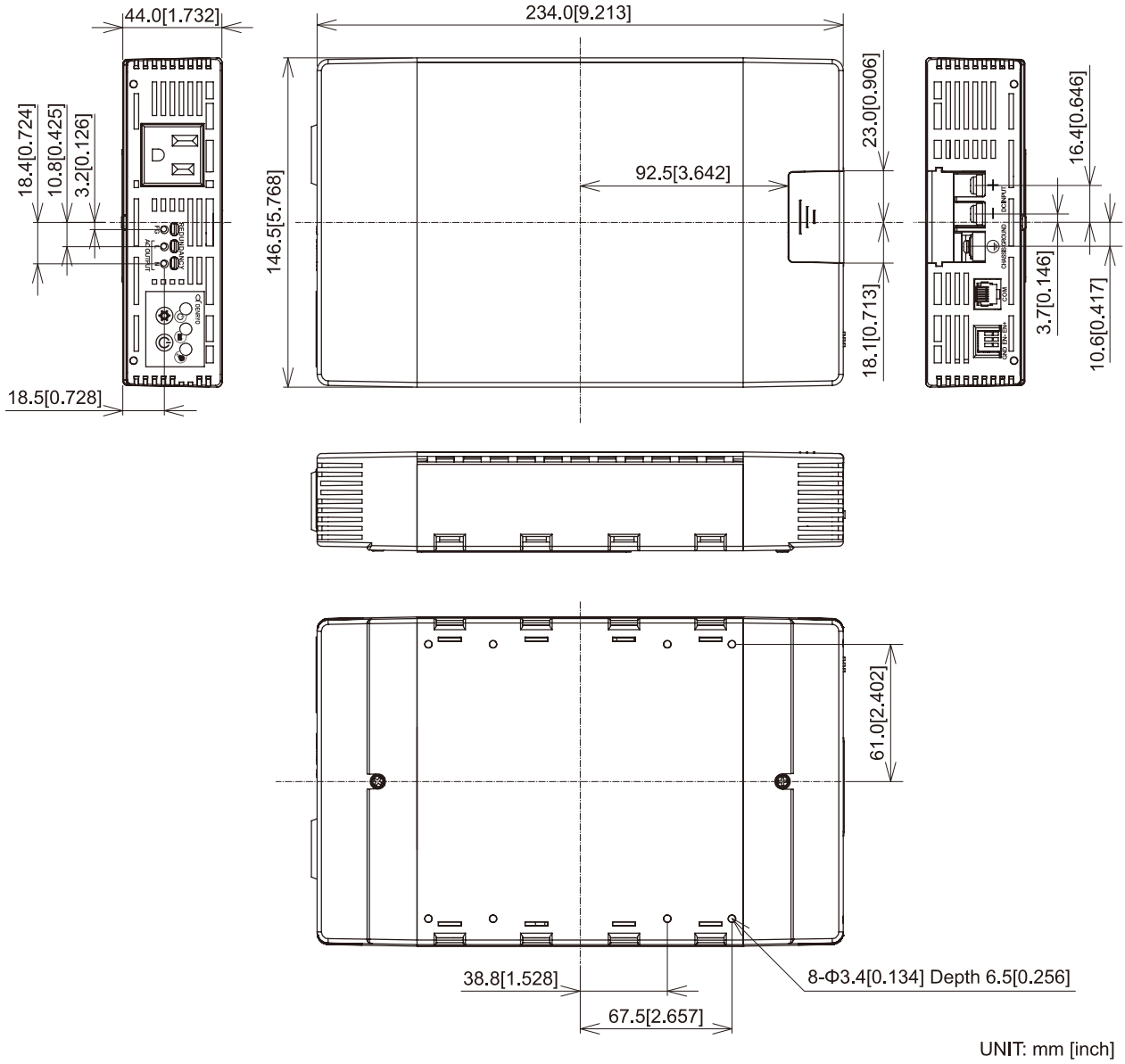


- **GD300NA-124/148**

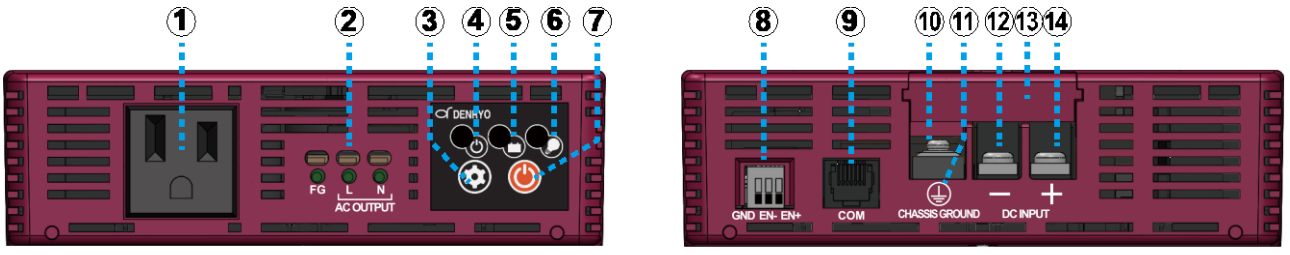


Depending on the environment, the over load protection or the over temperature protection may operate even in the range of the derating curve. For high rated power, please install DIASINE® in an environment with as good ventilation as possible.

3-3 Dimension



3-4 Control Panel



The Front Panel **The Rear Panel**

①	AC Outlet	②	AC Output Terminal	③	Setting Button	④	Power LED
⑤	Battery LED	⑥	Load LED	⑦	Power Button	⑧	Remote Connector
⑨	Optional Terminal	⑩	Grounding Terminal	⑪	Reversed Connection Warning LED		
⑫	Battery Input (-)	⑬	Terminal Cover	⑭	Battery Input (+)		

4. Installation and Wiring

4-1 Installation Guide

Recommended Installation Location

Install DIASINE® on a flat surface or rack with sufficient strength. Avoid mounting and using in a dusty or high temperature environment. For ventilation, do not mount anything within 15cm (6in) area near the DIASINE®.

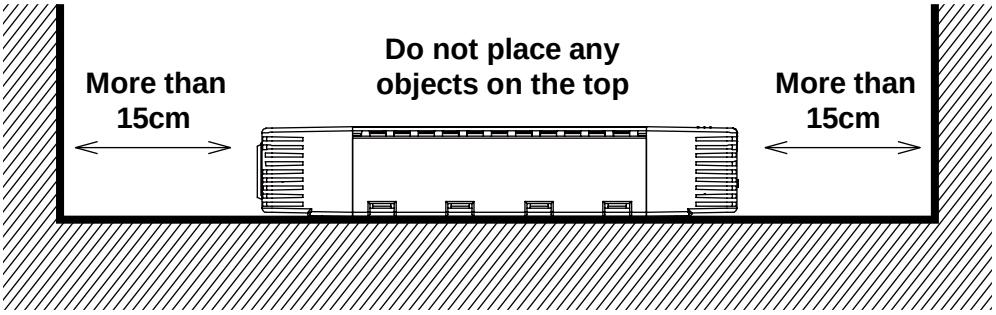


Figure 4.1 The Example of Installation

Recommended Installation Method

There are 8 mounting holes, Φ3.4mm (0.134in), and depth 6.5mm (0.256in), in the bottom of DIASINE® (Refer to P.8) which can be used when installing DIASINE®. The recommended screw length is 6mm(0.236in). It is recommended to install DIASINE® horizontally on a flat surface.

⚠ WARNING	Risk of Electric Shock and Damage Screws longer than the depth of the mounting holes may damage the internal circuit board and cause electric shock or malfunction.

⚠ CAUTION	To avoid the risk of burns, do not touch anything other than the front panel of the DIASINE® during or immediately after use.

Table 4.1 Recommended Wiring Size

Terminal	Cable Size	Length	Screw Size	Terminal Width	Tightening Torque
Battery Input (GD150)	AWG12 (4mm^2)	≤1.5m (59in)	M4	9mm (0.354in)	1.5Nm
Battery Input (GD300)	AWG8 (10mm^2)				
Grounding	AWG10 (6mm^2)	-	M5	14mm (0.551in)	2.0Nm
AC Output	VVF1.6	≤3m (118in)	-	-	-
Remote Connector	AWG28-20 (0.08-0.5mm^2)	-	-	-	-

4-2 Wiring

Battery Wiring

Remove the terminal cover on rear side of the DIASINE®. Slide and push the terminal cover toward DIASINE® bottom to move it. Wire to the battery input terminal. Mount fuse in positive side cable. Refer to Table 4.2 to select fuse size based on system. Use the appropriate wire size for the battery input terminal. The screw size of the battery input terminal is M4; the width of the terminal is 9mm (0.354in). Recommended cable size at full rated load is 12AWG (4mm^2) for GD150, 8AWG (10mm^2) for GD300; recommended torque for installation is 1.5 N·m. Too thin a cable may cause overheating and fire. Recommended length of battery cable should be as short as possible within 1.5m (59in). After connecting to the battery, check that the power LED on the front of the DIASINE® lights orange. If the power LED does not light up, check the battery voltage. In addition, the reversed connection warning LED near the ground terminal on the back of DIASINE® will light red if the polarity is reversed. Please correct the polarity and check if the warning LED turns off.

Table 4.2 Recommended Fuse Size

Model	Current	Model	Current
GD150NA-112	Under 20A	GD300NA-112	Under 40A
GD150NA-124	Under 10A	GD300NA-124	Under 20A
GD150NA-148	Under 5A	GD300NA-148	Under 10A

⚠ WARNING	Explosion Hazard It is very dangerous to short-circuit the battery. Always wire the input terminal of the DIASINE® before connecting the battery.

Grounding Connections

Wire the grounding terminal in the rear of the DIASINE® to the system. The screw size of the grounding terminal is M5; the width is 14mm (0.551in). Use solderless terminals, such as R5.5-5, and fasten it with a screw. Recommended cable size is 10AWG (6mm^2) and torque is 2.0 N·m.

Load Wiring

Connect the load from the AC outlet or AC output terminal in the front of the DIASINE®. Select a cable with the appropriate voltage rating for the AC output terminal. VVF1.6 cable is recommended. Peel off approximately 13-15mm (0.5-0.6in) of the cable jacket. Insert the cable into the hole marked AC OUTPUT on the front panel until the stripped portion is completely inserted. Make sure the line (L) and neutral (N) are not shorted. When removing the cable, insert a flathead screwdriver into the oval hole above the insertion hole and pull the cable out while pressing the flathead screwdriver.

⚠ CAUTION	Terminal damage. The terminal may be damaged if the flat-blade screwdriver is pressed obliquely and forcefully.

⚠ WARNING	Shock Hazard Make sure the core wire is fully inserted and not exposed. Make sure DIASINE® is not output when wiring the AC terminal.

Be careful NOT to short-circuit line (L) and neutral (N). Be sure to wire L and N correctly when wiring both the outlet and AC terminals of the DIASINE®.

Precautions About Load

Most loads can work with the AC power supplied by DIASINE®. However, some loads may not work even when keeping supplying with 150VA (GD150)/300VA (GD300).

(1) An extremely large current, about 6-10 times the rated power of the load, is required to start inductive loads or motors. DIASINE® cannot handle loads with peak current above the specification. Check the peak current required by the loads before selecting an inverter.

(2) When connecting a capacitive load or a rectifier such as a switching power supply, do not activate the load and start DIASINE® at the same time to ensure complete startup of DIASINE®. Alternatively, start DIASINE® with a smaller load and then increase the load. If more than two loads are connected, activate one load at a time after DIASINE® starts outputting.

Remote Connector Wiring

Using the remote connector function in the rear of the DIASINE® (Refer to P.17), DIASINE® GD series can be turned ON/OFF without pressing the power button. The recommended cable size for the remote connector is 20-28AWG (0.08-0.5mm^2).

Optional Terminal Wiring

Optional terminal in the rear of the DIASINE® use a six-position four-conductor (6P4C) modular connector to adapt to various applications. Check DENRYO Official Website for more details.

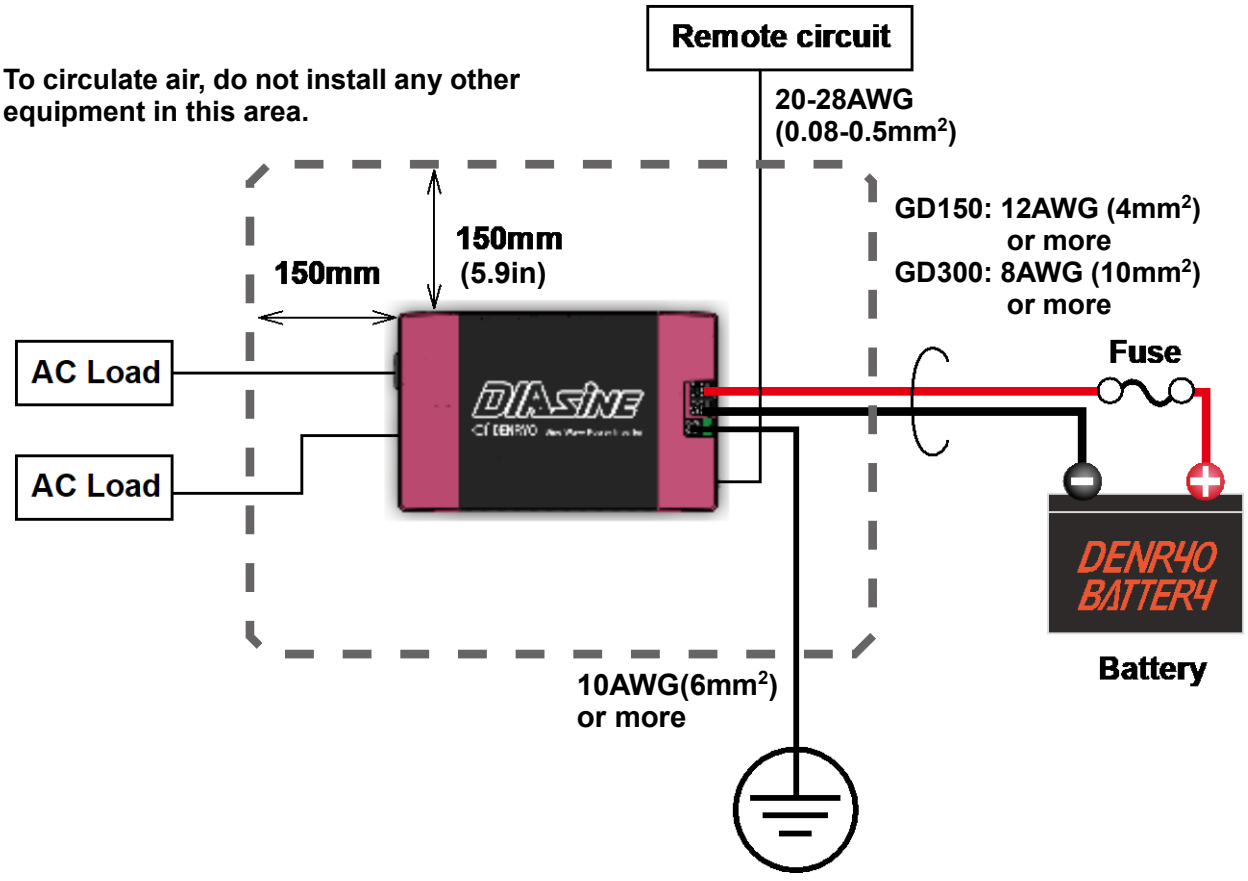


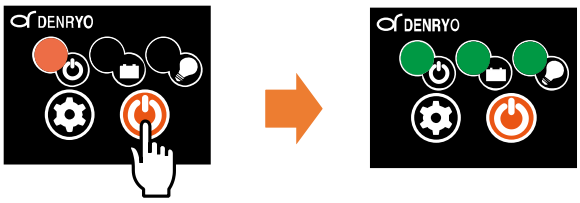
Figure 4.2 System Wiring Diagram

4-3 Checking the Current Setting

The default settings of the DIASINE® GD series are output voltage 100Vac, output frequency 50Hz, low power mode (Refer to P.14), buzzer ON, and LED bright. Press setting button on the front panel to change settings (Refer to P.13). Settings are retained even if battery power is exhausted.

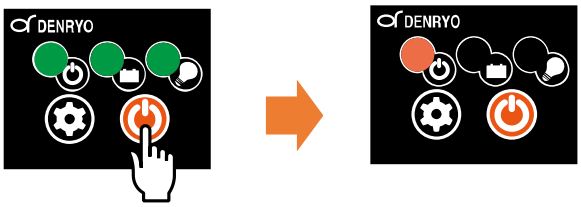
4-4 How to Start Up

Press and hold the power button for 1 second. Check the LED indicators that no protection circuit is working (Refer to P.19), and then turn on the load.



4-5 How to Power Off

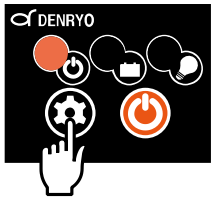
Press and hold the power button for 1 second. DIASINE® will stop the output and switch to standby mode.



5. Functions

5-1 Change Settings

1. After connected to the battery, DIASINE® is switched to standby mode. The power LED lights orange and other LEDs are off in standby mode. Do not connect anything to AC outlet and AC output terminal.
2. Pressing the setting button in standby mode will display the current setting for about 3 seconds. To change the setting, long press (for about 2 seconds) the setting button. The buzzer* sounds, and only the power LED lights. Release the setting button and proceed to the next step.
   *DIASINE® does not sound once buzzer is set OFF.
3. Refer to Table 5.1, press the setting button to select the color of the power LED until it matches the output frequency and operating mode you selected. Long press the setting button. The buzzer* sounds, and only the battery LED lights. Release the setting button and proceed to the next step.
4. Refer to Table 5.1, press the setting button to select the color of the battery LED until it matches the output voltage you selected. Long press the setting button. The buzzer* sounds, and only the load LED lights. Release the setting button and proceed to the next step.
5. Refer to Table 5.1, press the setting button to select the color of the load LED until it matches buzzer setting ON/OFF and LED brightness you selected. Long press the power to complete setting process and back to standby mode. If long press the setting button, setting mode begins again from step 3.
6. Press the setting button. Check the setting is the same as the setting you selected.
7. The setting is saved even if the battery is removed.



Operating	Description
Long-press the setting button	Standby mode to Setting mode
	Change the setting items
Press the setting button	Chose the parameter
Long-press the power button	Finish and save the settings

Figure 5.1 LED and Setting Button

Table 5.1 LED Color of Settings

LED / LED Color		Power LED	Battery LED	Load LED
Green	●	50Hz, Low power mode*	100Vac*	Buzzer ON, bright LED*
Yellow	●	60Hz, Low power mode	110Vac	Buzzer ON, dark LED
Blue	●	50Hz, Normal mode	115Vac	Buzzer OFF, bright LED
Purple	●	60Hz, Normal mode	120Vac	Buzzer OFF, dark LED

*Default setting

5-2 The Indicators of Setting during Operation

It is possible to check the current settings during operation by pressing the setting button, refer to Table 5.1. The settings cannot be changed during operation.

5-3 Operation Mode

The DIASINE® GD series has 2 operation modes. Set it in combination with the output frequency.

Low Power Mode: In low power mode, the GD series optimizes its operating condition depending on the input voltage and load to suppress power consumption at low load. It is particularly effective when the GD series operates for a long time with a small load of 0 to 100W. Changing the mode setting will not change the output waveform. However, under low power mode condition, if the load suddenly increased, such as at the moment of load activating, the output waveform may be interrupted for a half cycle time of about 10 milliseconds in the case of 50Hz output.

Normal Mode: Without regard to the load, to not to interrupt the output waveform, please choose the normal mode. Regardless of the operation mode, the output may stop momentarily when output current exceeds the full rated current. The self-consumption at low load is higher than in low power mode, but at high load it is the same as in low power mode.

5-4 Output Frequency

The output frequency can be set in combination with the operation mode.

50Hz/60Hz: The default setting is 50Hz.

5-5 Output Voltage

The output voltage can be set.

100V/110V/115V/120V: The default setting is 100V.

5-6 Buzzer ON/OFF

The buzzer on/off can be set in combination with the LED brightness.

Buzzer on/off: The default setting is buzzer on. The buzzer sounds when the button is pressed, power on/off, warning and protections work. The warning buzzer sounds 3 beeps every 5 seconds, and sounds 5 beeps every 5 seconds when protections work. Set the buzzer off to disable all of these sounds.

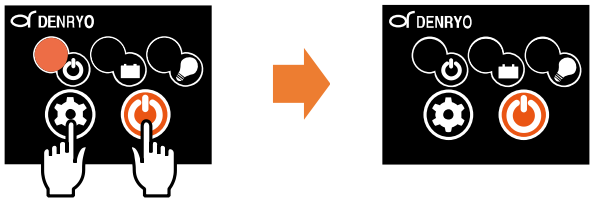
5-7 LED Brightness

The LED brightness can be set in combination with the buzzer on/off.

LED bright/dark: The default setting is LED bright. The LED becomes darker when chose the LED dark.

5-8 Sleep Mode

DIASINE® switches to standby mode after connecting batteries; power LED lights orange and other LEDs light off. Under standby mode, hold power button and setting button simultaneously for 3 seconds, turns DIASINE® to sleep mode. Under sleep mode, all LEDs are off, power consumption can be suppressed more than standby mode. DIASINE® in sleep mode, is the same as in standby mode, can be activated by the power button or by the remote control connector. However, the settings cannot be confirmed or changed by pressing the setting button in sleep mode. Hold the power button and setting button again for 3 seconds turns DIASINE® back to standby mode. Disconnect the battery to cancel the sleep mode.



5-9 Protections

To prevent error operation, the DIASINE® GD series is equipped with protections listed below.

Input Reverse Polarity:

Reversed connection warning LED near the grounding terminal in the rear of the DIASINE® lights red when the battery polarity is reversed. Please reconnect to correct polarity.

Reversed Connection Warning LED

Input Undervoltage:

When the battery voltage is lower than the undervoltage warning value, the buzzer beeps 3 times consecutively around every 5 seconds. When the battery voltage is lower than the undervoltage shutoff value, DIASINE® automatically shuts off the output, buzzer beeps 5 times consecutively around every 5 seconds and the battery LED blinks red. When the battery voltage is higher than the undervoltage recovery value, DIASINE® automatically resumes output. The buzzer will not sound if the buzzer setting is off.

☞ **MEMO**	The undervoltage protection may work under conditions such as the load consuming too much power at the time of engine start. It may cause DIASINE® to shut off the output as the battery voltage drops.

Input Overvoltage:

When the battery voltage is higher than the overvoltage warning value, the buzzer beeps 3 times consecutively around every 5 seconds. When the battery voltage is higher than overvoltage shutoff value, DIASINE® automatically shuts off the output, buzzer beeps 5 times consecutively around every 5 seconds and the battery LED lights red. When the battery voltage is lower than the overvoltage recovery value, DIASINE® automatically resumes output. The buzzer will not sound if the buzzer setting is off.

⚠ **CAUTION**	Damage Hazard Please choose battery within the DIASINE® input voltage range. If 12V battery is used with 24V model, the battery voltage is lower than input voltage range, DIASINE® will not work. Conversely, if 48V battery is used with 24V model, the battery voltage is higher than input voltage range, DIASINE® may be damaged.

Over Temperature:

When the internal temperature is higher than the over temperature warning value, the buzzer beeps 3 times consecutively around every 5 seconds. If the internal temperature continues to rise, the overtemperature protection is activated and DIASINE® automatically shuts off the output, the buzzer beeps 5 times consecutively around every 5 seconds and the power LED lights red. When the internal temperature drops below the value, DIASINE® automatically resumes output.

Output Voltage Error:

When the AC output voltage is too high or too low, DIASINE® shuts off the output, the buzzer beeps 5 times consecutively around every 5 seconds, and the load LED lights red. To cancel the error status, please restart DIASINE®.

Internal Voltage Error:

If the internal voltage becomes higher than specified, such as when the DIASINE® repeatedly starts, stops and starts when the battery voltage is higher than the overvoltage warning, the protection will be activated. To cancel the error status, stop the DIASINE®, wait a few tens of seconds, and then restart the DIASINE®.

Output Short-circuit:

When the output terminal is short-circuited or the load suddenly increases, DIASINE® stops the AC output, the buzzer beeps 5 times continuously every 5 seconds, and the load LED lights red. To cancel this protection, please restart DIASINE®.

Overload:

The overload protection works in either of the 2 conditions described in Table 5.2. One is 100%-120% of rated power and continues for about 3 minutes or more. The other is output more than 120% of rated power and continues for about 3 seconds. When the overload protection is activated, the DIASINE® stops the AC output and the buzzer beeps 5 times consecutively every 5 seconds and the load LED lights red. To cancel this protection, please restart DIASINE®.

Table 5.2 The conditions of overload protection

Overload Protection	load	Output Time
Condition 1	100%-120%	3 minutes or more
Condition 2	More than 120%	3 seconds or more

☞ **MEMO**	Protections can be canceled by turning DIASINE® on/off via the remote connector. Find out the possible causes of the protections work. Remove these faults first before restarting DIASINE®.

Refer to Table 5.3 for input voltage setting values of protections. Also, refer to Table 6.4 for LED indicators when protections are operating.

Table 5.3 The Input Voltage Setting Value of Protection

Model	Input Undervoltage			Input Overvoltage		
	Warning	Shut off	Resume	Warning	Shut off	Resume
112	11.5Vdc	10.5Vdc	12.5Vdc	18.5Vdc	19.5Vdc	18.5Vdc
124	23.0Vdc	21.0Vdc	25.0Vdc	37.0Vdc	39.0Vdc	37.0Vdc
148	46.0Vdc	42.0Vdc	50.0Vdc	74.0Vdc	78.0Vdc	74.0Vdc

When warnings or protections are operating, the buzzer could be turned on/off temporarily by pressing setting button. If the buzzer was turned off by this method, the buzzer will beep again when other warnings or protections are working. In addition, even the warning status is cancelled, the buzzer will beep again when it returns to warning status.

Example 1. Undervoltage warning is working and buzzer is beeping. Press the setting button to turn off the buzzer. When DIASINE® shuts off due to undervoltage protection, the buzzer will beep again.

Example 2. Over temperature warning is working and buzzer is beeping. Press the setting button to turn off the buzzer. After temperature drops and the warning released, the buzzer will beep again when the temperature warning is working again.

Change the setting to disable the buzzer (Refer to P.13).

If the AC output is stopped by the protections, such as input undervoltage, input overvoltage and over temperature, DIASINE® will automatically recover. For other errors, manual recovery (power OFF and ON) is required.

Table 5.4 Protections and Auto Recovery

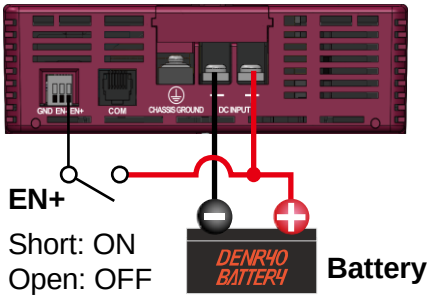
Protections	Auto Recovery	Protections	Auto Recovery
Input Undervoltage	Yes	Overload / Output Short-circuit	No
Input Overvoltage	Yes	Output Voltage Error	No
Over Temperature	Yes	Internal Error	No

5-10 Remote Connector

As the Figure 5.2 method 1, connect the battery (+) to the ENABLE+ (EN+) terminal of the remote connector can start up the DIASINE® GD series. When ENABLE+ (EN+) is removed, the GD series enters standby mode or sleep mode. As the Figure 5.2 method 2, connect the ENABLE- (EN-) terminal and the GND terminal can start up GD series. Disconnect EN- terminal and GND terminal, GD series enters standby mode or sleep mode. GD series can be operated by either method 1 or method 2. The power LED lights blue when GD series is turned ON by remote connector.

If the power button is pressed when the GD series has been turned on by remote connector, the GD series can enter standby mode or sleep mode, and cannot be turned on again until remote connector is disconnected.

・Method 1



・Method 2

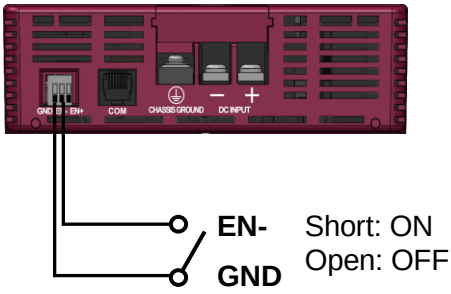


Figure 5.2 The Wiring of Remote Connector

5-11 Optional Terminal

DIASINE® can achieve various applications by using optional terminals on the rear of panel. Check DENRYO Official Website for more details.

6. LED Indicators

MEMO	The blinking frequency of each LED indicator is once every two seconds, repeat on and off.

6-1 The LED Indicator in Normal Status

Power LED: The power LED indicates output ON/OFF status or over temperature warning status. Refer to Table 6.1 for LED color and status indicators.

Table 6.1 Power LED Indicators

LED / LED Colors		Power LED
Orange		Standby
Orange Blink		Standby/ Sleep (Turned ON by remote connector*)
Green		Power ON
Blue		Power ON (Remote is operating)
Yellow Blink		Over temperature warning

*When DIASINE® is turned ON by the remote connector, and turned OFF by the power button, the power LED blinks orange. In this case, the output cannot be turned on until the remote connector is removed once. The power LED also [blinks orange in sleep mode.

Battery LED: The Battery LED indicates the voltage value of the battery during operation. Refer to Table 6.2 for LED color and battery voltage indicators. For battery voltage values on 124 and 148 models, multiply the values listed below by 2 or 4.

Table 6.2 Battery LED Indicators

LED / LED Colors		Battery LED
Yellow Blink		Input voltage 10.5-11.5Vdc (Input Undervoltage Warning)
Yellow		Input voltage 11.5-12.0Vdc
Green		Input voltage 12.0-14.0Vdc
Blue		Input voltage 14.0-16.5Vdc
Purple		Input voltage 16.5-18.5Vdc
Purple Blink		Input voltage 18.5-19.5Vdc (Input Overvoltage Warning)

Load LED: The Load LED indicates the percentage of output power during operation. Refer to Table 6.3 for LED color and percentage output power indicators.

Table 6.3 Load LED Indicators

LED / LED Colors		Load LED
Blue		0-40% output power
Green		40-70% output power
Yellow		70-100% output power
Yellow Blink		Over than 100% output power (Overload Warning)

6-2 LED Indicators when Protection Activates

When the protection is operating, the LED indicates the status of the protection and the output shutoff. Refer to Table 6.4 for the LED indicators and status of the protections.

Table 6.4 The Indicators of Protections

Lighting LED / Indicators		Power LED	Battery LED	Load LED	All LED
Red Blink		---	Input undervoltage	AC output error	Internal voltage error
Red		Over temperature	Input overvoltage	Overload/Load terminal short-circuited	Internal error*

* If the internal error occurs, remove the load, and check that the input voltage is within the normal range. Please contact your dealer if the internal error still occurs.

7. Troubleshooting Guide

Error Condition	Possible Cause	Solution
No AC output voltage	Input voltage error Battery LED lights / blinks red	Check the DC input voltage and make sure the input voltage is within the specification.
	Over temperature protection Power LED lights red	Check if ventilation is blocked or air temperature is too high. Reduce the load capacity or lower the air temperature around the DIASINE®.
	Overload protection Load LED lights red	Check whether the load capacity and the instantaneous value exceed the rated power of the DIASINE® or not.
	Short-circuit protection Load LED lights red	Check whether the load wiring is short-circuited or not.
	AC output terminal wiring problem	Check that the wiring to the AC output terminal is correct or not.
	Internal error All LEDs light / blink red	Internal parts of DIASINE® may be damaged. Please contact the dealer.
Short operation time of DIASINE®	Battery problem	Please replace the battery.
	Lack of battery capacity	Please check the battery specifications and increase the battery capacity.
Output voltage, frequency error	Wrong setting	Change the settings (Refer to P.13)
Power LED does not light up even connecting battery	Reversed connection of battery polarity Reversed connection warning LED lights red	Reconnect the correct polarity
	Internal fuse cuts off	Internal parts of DIASINE® may be damaged. Please contact the dealer.
	Under sleep mode	Press and hold the power button and setting button for 3 seconds. If LED still does not light, disconnect battery and reconnect after 5 seconds.
Remote connector does not work	Wiring problem	Check that the remote connector is properly connected.
Unusual noises when loads operate such as radio	Switching noise	Try the methods* below to reduce noise: 1. Keep DIASINE® away from loads 2. Wire grounding terminal 3. Install appropriate line filter circuit
Overvoltage protection works even battery voltage is in the specification	Old version of GD Series	Check the serial number. The products with the serial number first three digits are W49 to W53 have the specifications described in the user's manual Ver1.09E.

* Effect may differ depending on environment or device.

If the error condition cannot be solved, please contact dealer.

DENRYO

DENRYO CO., LTD.

28-5, Nishinippori 2Chome, Arakawa-ku,
Tokyo 116-0013, Japan
Phone : +81-3-3802-3671
FAX : +81-3-3802-2974
Email: info-en@denryo.com
www.denryo.com/en

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