Global LF Series
Pure Sine Wave Inverter/AC Charger
User's Manual

Version 5.0

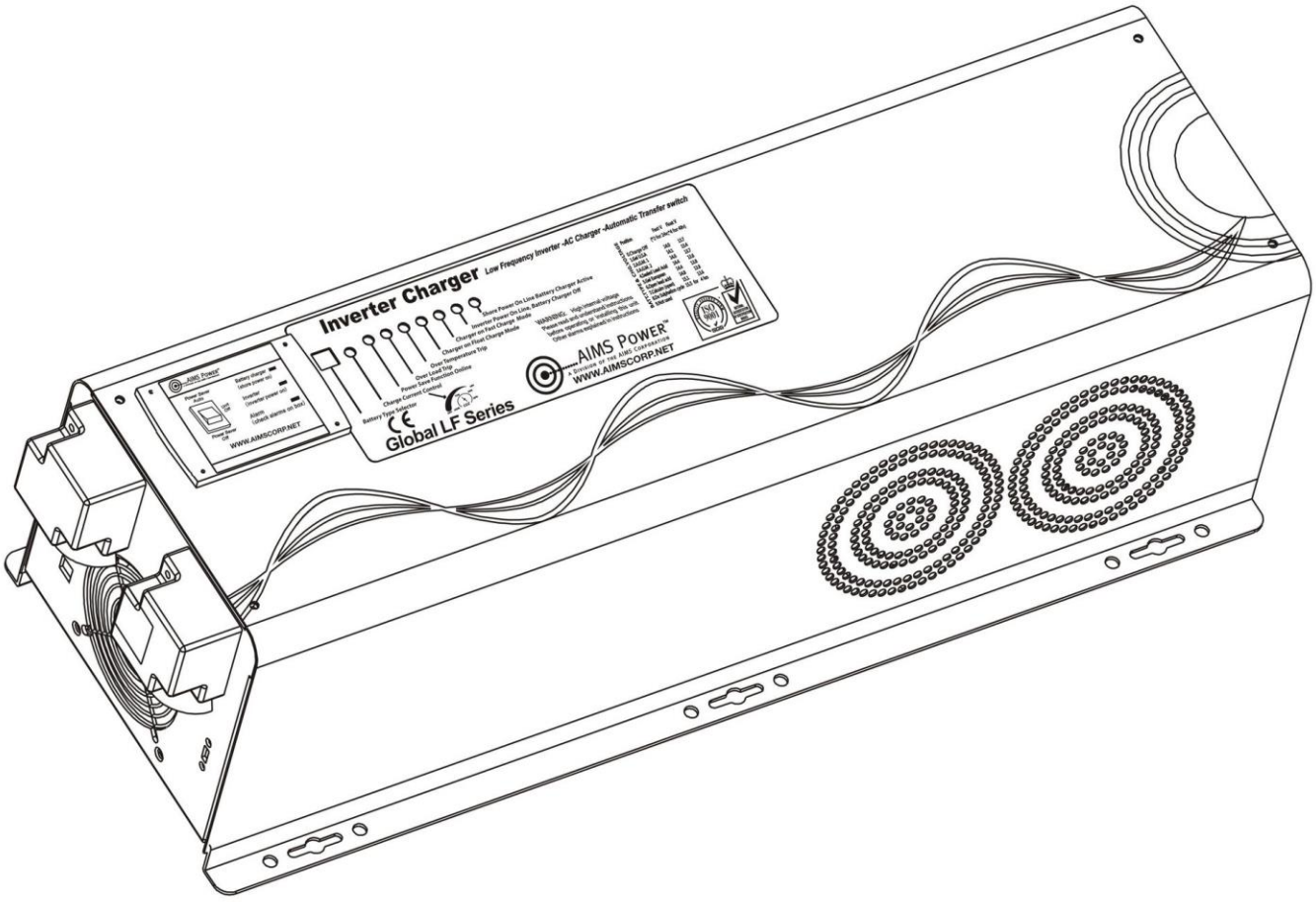


Table of Contents

1. Important Safety Information

⚠ **WARNING!** Before using the Inverter, you need to read and save the safety instructions.

1-1. General Safety Precautions

1-1-1.Do not expose the Inverter to rain, snow, spray, bilge or dust. To reduce risk of hazard, do not cover or obstruct the ventilation openings. Do not install the Inverter in a zero-clearance compartment. Overheating may result. Allow at least 30CM of clearance around the inverter for air flow. Make sure that the air can circulate freely around the unit. A minimum air flow of 145CFM is required.
1-1-2. To avoid risk of fire and electronic shock, make sure that existing wiring is in good electrical condition and that the wire is not undersized. Do not operate the Inverter with damaged or substandard wiring.
1-1-3. This equipment contains components which may produce arcs and/or sparks. To prevent fire and/or explosion do not install in compartments containing batteries or flammable materials or in a location which require ignition protected equipment. This includes any space containing gasoline-powered machinery, fuel tanks, or joints, fittings, or other connection between components of the fuel system.
See Warranty for instructions on obtaining service.
1-1-4. Do not disassemble the Inverter/Charger. It contains no user-serviceable parts. Attempting to service the Inverter/Charger yourself may result in electrical shock or fire. Internal capacitors remain charged after all power is disconnected.
1-1-5. To reduce the risk of electrical shock, disconnect both AC and DC power from the Inverter/Charger before attempting any maintenance or cleaning. Turning off controls will not reduce this risk
CAUTION: Equipment damage
The output side of the inverter's AC wiring should at no time be connected to public power or a generator. This condition is far worse than a short circuit. If the unit survives this condition, it will shut down until corrections are made.
Installation should ensure that the inverter's AC output is, at no time, connected to its AC input.
Warning: Limitations On Use
SPECIFICALLY NOTE THAT THE GLOBAL LF INVERTER/CHARGER SHOULD NOT BE USED IN CONNECTION WITH LIFE SUPPORT SYSTEMS OR OTHER MEDICAL EQUIPMENT OR DEVICES.

1-2. Precautions When Working with Batteries

1-2-1. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water and get medical attention immediately.
1-2-2. Never smoke or allow a spark or flame in the vicinity of a battery or engine.
1-2-3. Do not drop a metal tool on the battery. The resulting spark or short-circuit on the battery may cause an explosion.
1-2-4. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery produces a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
1-2-5. To reduce the risk of injury, charge only deep-cycle lead acid, lead antimony, lead calcium gel cell, absorbed mat, or NiCad/NiFe type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.

2. Introduction

2-1. General Information

Global LF Series Pure Sine Wave Inverter is a combination of an inverter, battery charger and AC auto-transfer switch into one complete system with a peak conversion efficiency of 88%.
It is packed with unique features and it is one of the most advanced inverter/chargers in the market today. It features power factor corrected, sophisticated multi-stage charging and pure sine wave output with unprecedentedly high surge capability to meet demanding power needs of inductive loads without endangering the equipment.

For the regular model, when utility AC power cuts off(or falls out of acceptable range), the transfer relay is de-energized and the load is automatically transferred to the Inverter output. Once the qualified AC utility is restored, the relay is energized and the load is automatically reconnected to AC utility.
The Global LF Series Inverter is equipped with a powerful charger.
The overload capacity is 300% of continuous output for up to 20 seconds to reliably support tools and equipment longer

Another important feature is that the inverter can be easily customized to Battery priority via a DIP switch, this helps to extract maximum power from the battery in renewable energy systems.
Thus, the Global LF Series Pure Sine Wave Inverter is suitable for Renewable energy systems, Utility, RV, Marine and Emergency appliances.

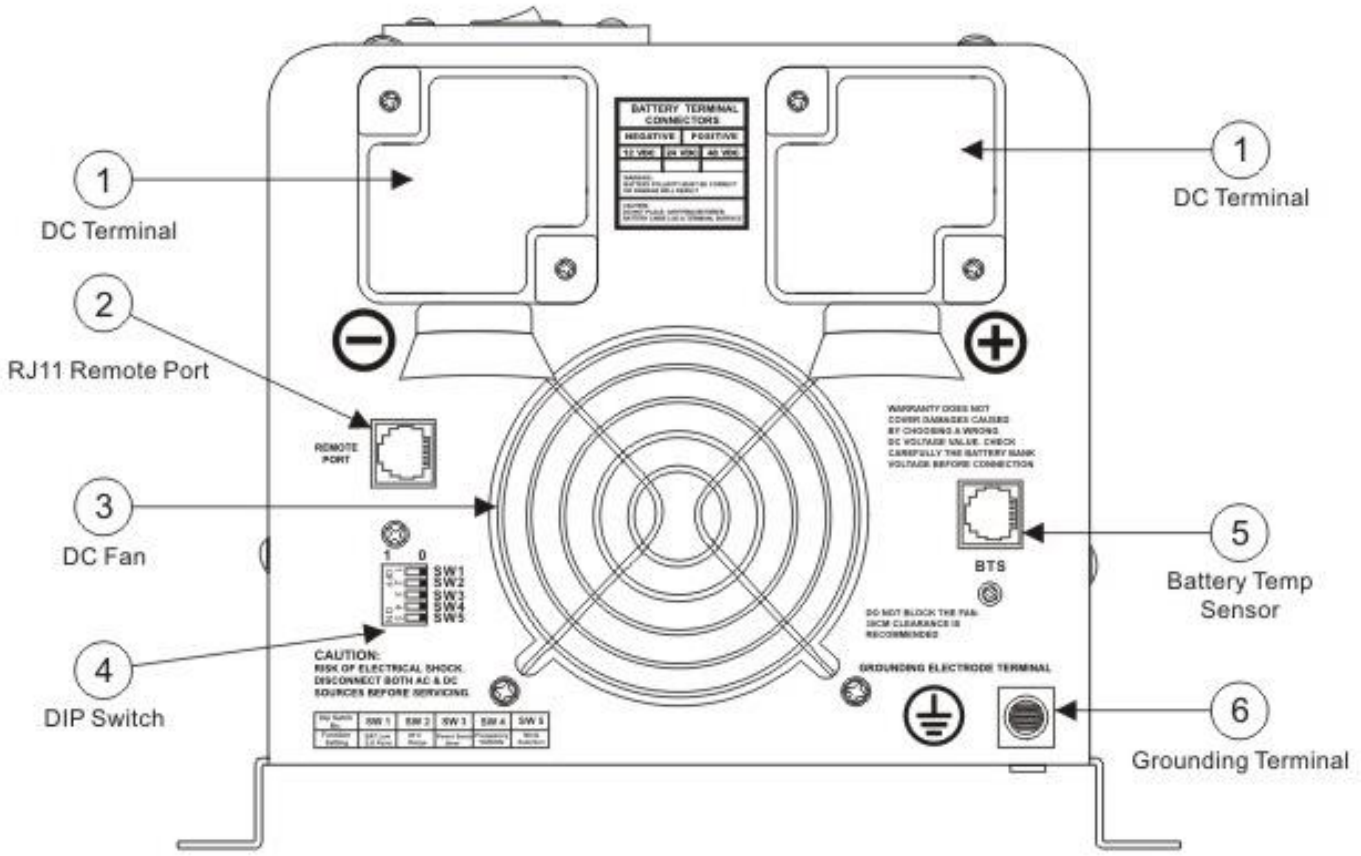
To get the most out of the power inverter, it must be installed, used and maintained properly. Please read the instructions in this manual before installing and operating.

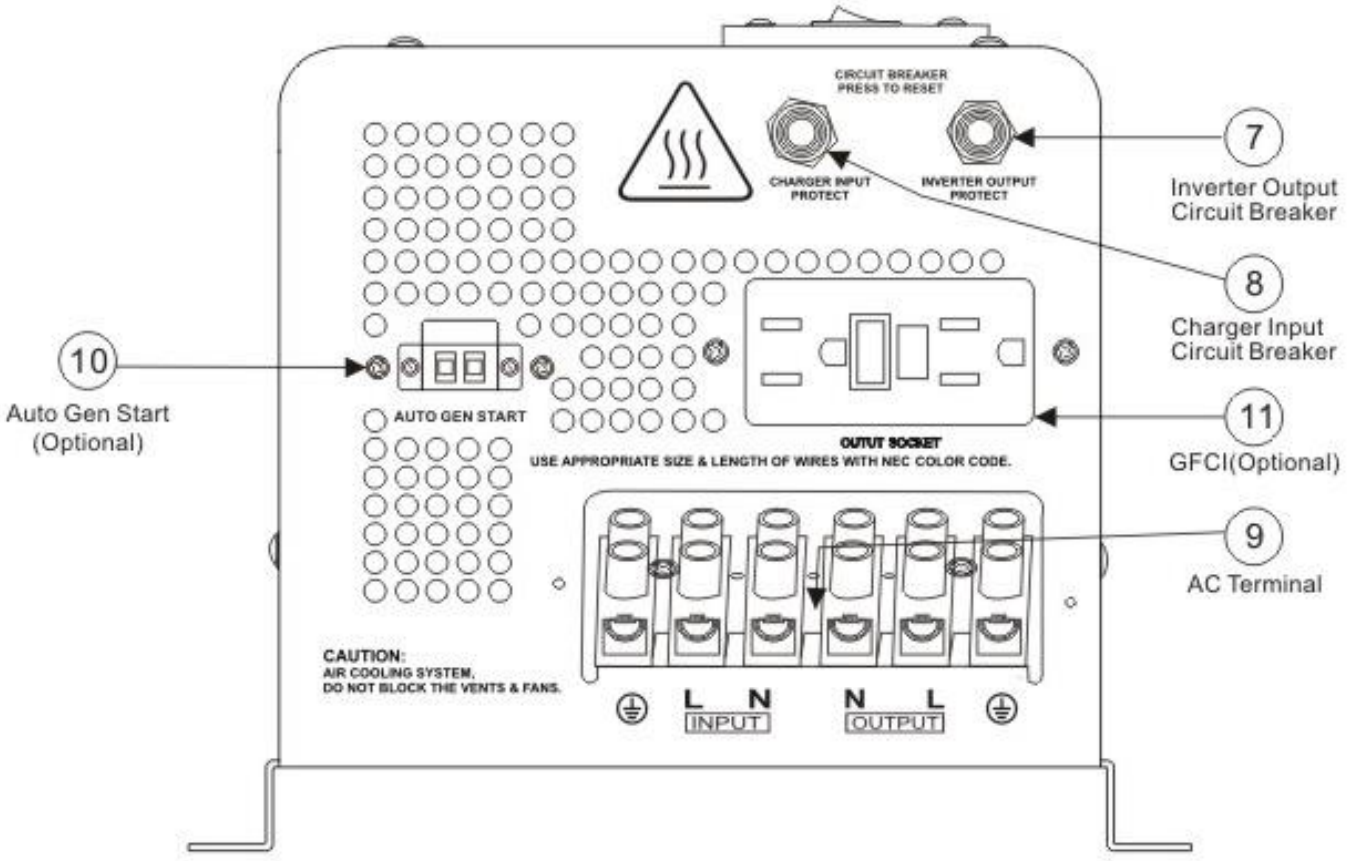
2-2. Application

Power tools–circular saws, drills, grinders, sanders, buffers, weed and hedge trimmers, air compressors.
Office equipment – computers, printers, monitors, facsimile machines, scanners.
Household items – vacuum cleaners, fans, fluorescent and incandescent lights, shavers, sewing machines.
Kitchen appliances – coffee makers, blenders, ice markers, toasters.
Industrial equipment – metal halide lamp, high – pressure sodium lamp.
Home entertainment electronics – television, VCRs, video games, stereos, musical instruments, satellite equipment.

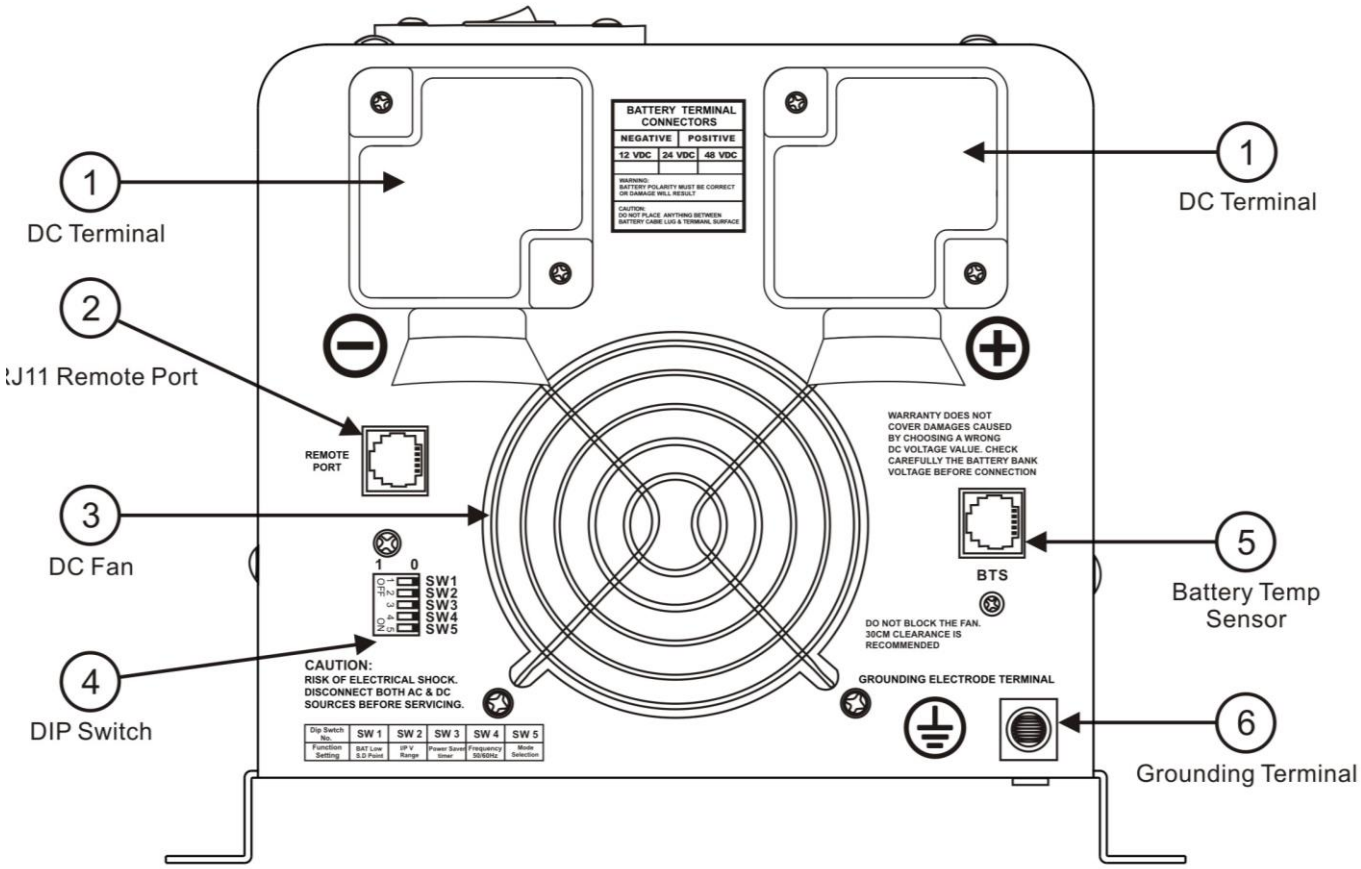
2.3 Mechanical Drawing

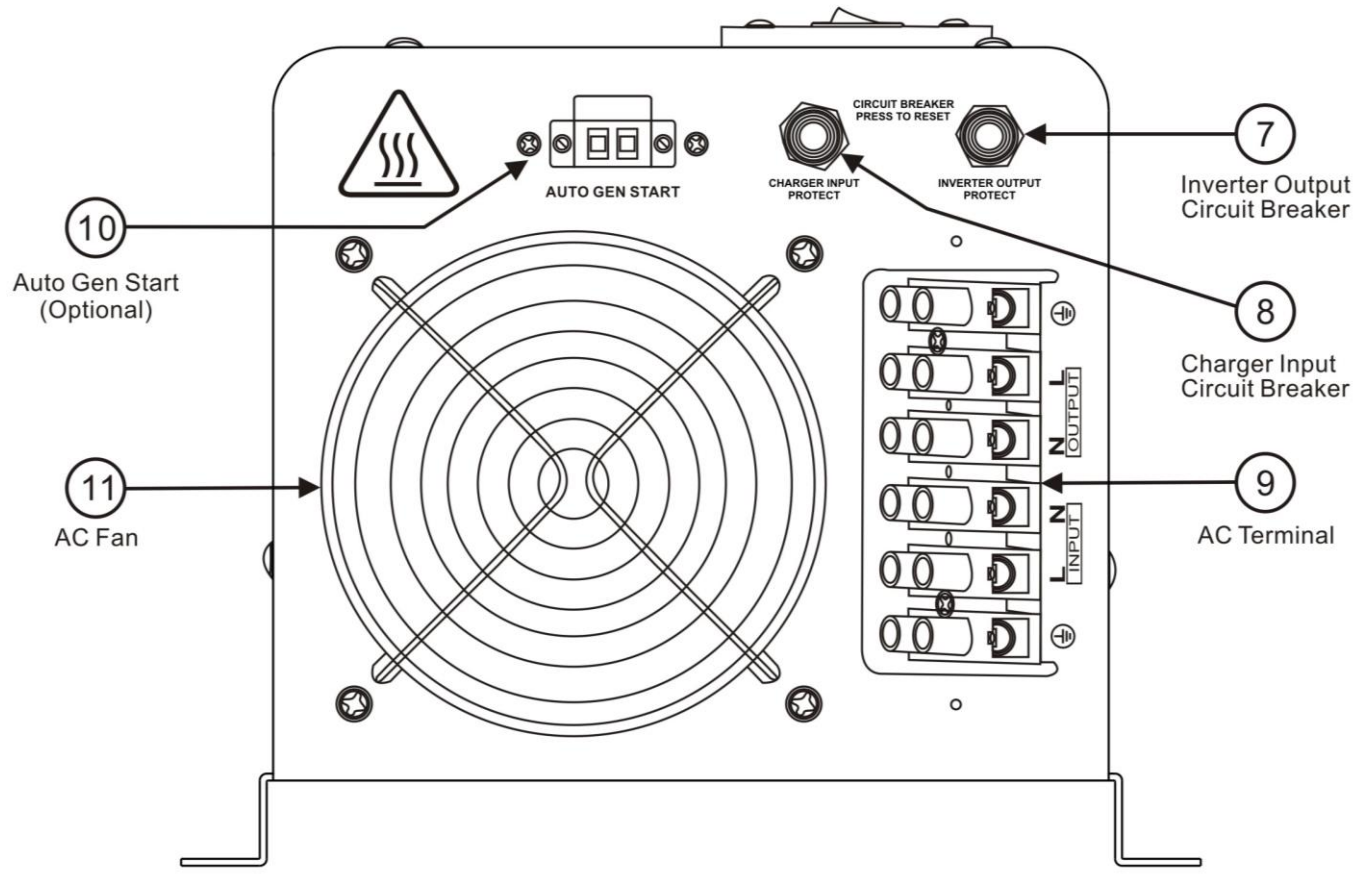
PICOGLF 1-3KW Models



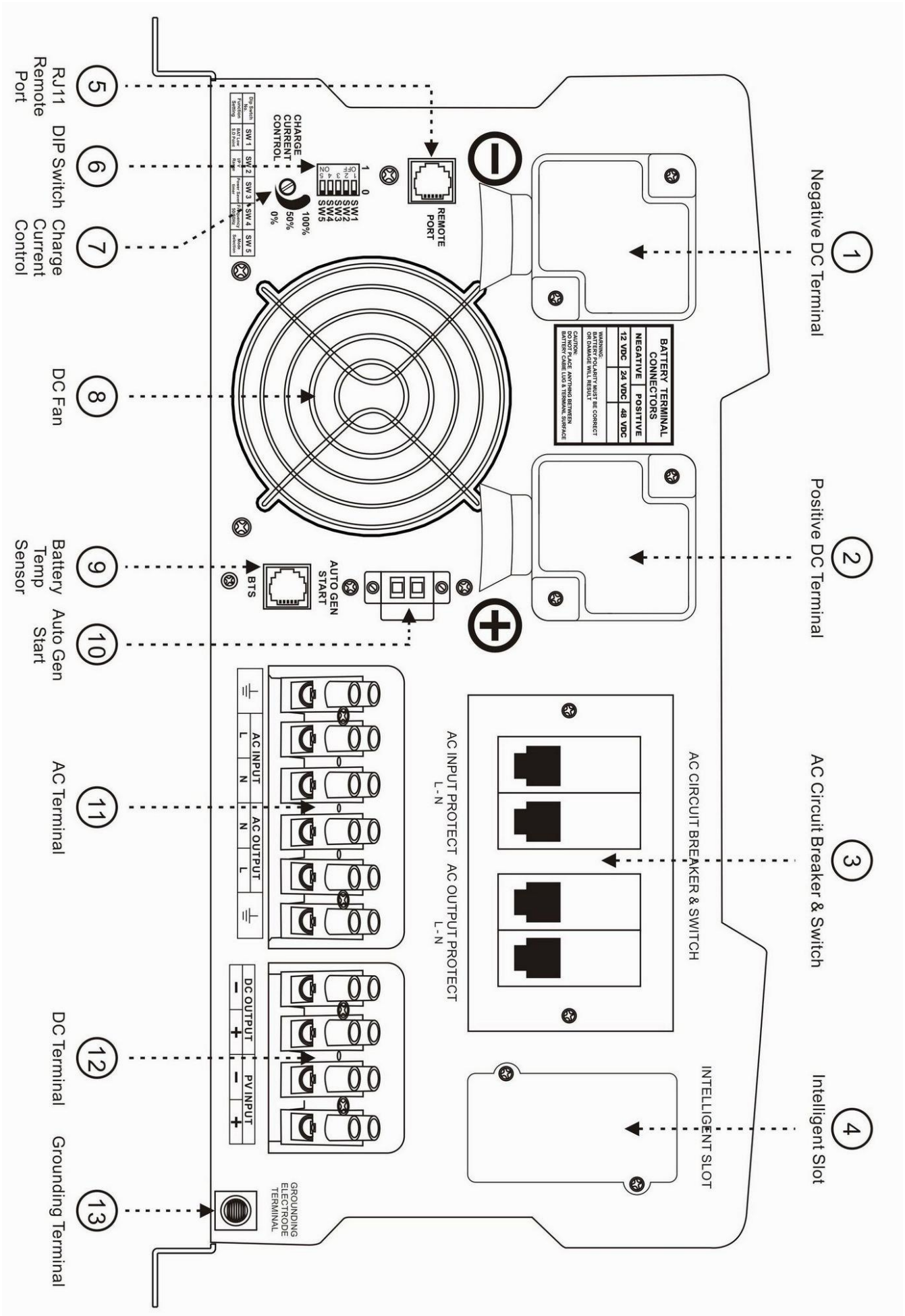


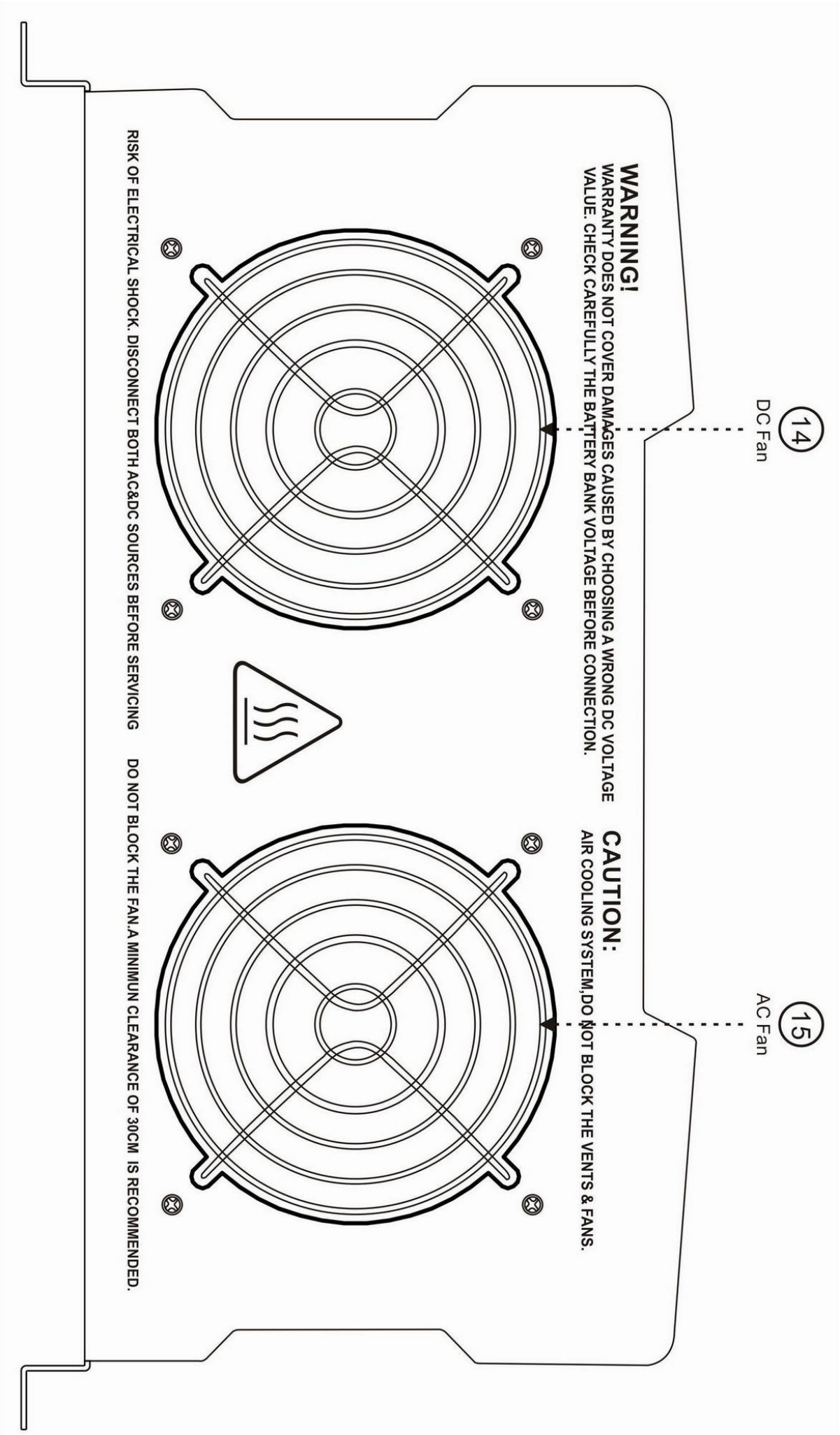
PICOGLF 4-6KW Models(excluding PICOGLF50W24V120V, PICOGLF50W48V120V, PICOGLF60W24V120V, PICOGLF60W48V120V)





PICOGLF8-12KW & PICOGLF50W24V120V, PICOGLF50W48V120V, PICOGLF60W24V120V, PICOGLF60W48V120V




14
DC Fan
15
AC Fan
WARNING!
WARRANTY DOES NOT COVER DAMAGES CAUSED BY CHOOSING A WRONG DC VOLTAGE VALUE. CHECK CAREFULLY THE BATTERY BANK VOLTAGE BEFORE CONNECTION.
CAUTION:
AIR COOLING SYSTEM,DO NOT BLOCK THE VENTS & FANS.
RISK OF ELECTRICAL SHOCK. DISCONNECT BOTH AC&DC SOURCES BEFORE SERVICING
DO NOT BLOCK THE FAN.A MINIMUN CLEARANCE OF 30CM IS RECOMMENDED.

2-4. Features

High overload ability up to 300% of rated power (20 sec)
Low quiescent current, low power “Power Saving Mode” to conserve energy
Automatic Generator Start
4-step intelligent battery charger, PFC (Power Factor Correction) for charger
8 pre-set battery type selector switch plus de-sulphation for totally flat batteries
Powerful charge rate of up to 105Amp, selectable from 0%-100%
10 ms typical transfer time between battery and AC, guarantees power continuity
Smart remote control
15s delay before transfer when AC resumes, extra protection for loads when used with generator
Allows start up and through power with depleted batteries
30A/40A through current ability
Multiple controlled cooling fans
Extensive protections against various harsh situations
13VDC battery recovery point, dedicated for renewable energy systems

2.5 Electrical Performance

2.5.1 Invert

Topology
The Global LF inverter/charger is built according to the following topology.
Invert: Full Bridge Topology.
Charge: Isolated Boost Topology
Because of high efficiency Mosfets and 16bit, 4.9MHZ microprocessor and heavy transformers, it outputs PURE SINE WAVE AC with an average THD of 15% (min 5%, max 25%) depending of load connected and the battery voltage.
The peak efficiency of the Global LF series is 88%.

Overload Capacity
The Global LF series inverters have high overload capacities, making it ideal to handle demanding loads.
1 For 110%<Load<125%(±10%), no audible alarm for 14 minutes, beeps 0.5s every 1s in the 15th minute, and Fault(Turn off) after the 15th minute.
2 For 125%<Load<150%(±10%), beeps 0.5s every 1s and Fault(Turn off) after 1 minute.
3 For 300%≧Load>150%(±10%), beeps 0.5s every 1s and Fault(Turn off) after 20s.

Caution:
After the inverter is switched on, it takes a finite time for it to self diagnose and get ready to deliver full power. Hence, always switch on the load(s) after a few seconds of switching on the inverter. Avoid switching on the inverter with the load already switched on. This may prematurely trigger the overload protection. When a load is switched on, it may require initial higher power surge to start. Hence, if multiple loads are being powered, they should be switched on one by one so that the inverter is not overloaded by the higher starting surge if all the loads are switched on at once.

2.5.2 AC Charger

Global LF Series is equipped with an active PFC (Power Factor Corrected) multistage battery charger. The PFC feature is used to control the amount of power used to charge the batteries in order to obtain a power factor as close as possible to 1.

Unlike other inverters whose max charging current decreases according to the input AC voltage, Global LF series charger is able to output max current as long as the input AC voltage is in the range of 164-243VAC(95-127VAC for 120V model), and AC freq is in the range of 48-54Hz(58-64Hz for 60Hz model).

The Global LF series inverter has a very rapid charge current available, and the max charge current can be adjusted from 0%-100% via a liner switch to the right of the battery type selector. This will be helpful if you are using our powerful charger on a small capacity battery bank. Fortunately, the liner switch can effectively reduce the max charging current to 20% of its peak.

Choosing “0” in the battery type selector will disable the charging function.

Caution:

Pls turn the charge current control switch gently to avoid breakage due to over-turning.

There are 3 charging stages:

Bulk Charging: This is the initial stage of charging. While Bulk Charging, the charger supplies the battery with controlled constant current. The charger will remain in Bulk charge until the Absorption charge voltage (determined by the Battery Type selection) is achieved.

A software timer will measure the time from A/C start until the battery charger reaches 0.3V below the boost voltage, then take this time asT0 and T0×10 = T1.

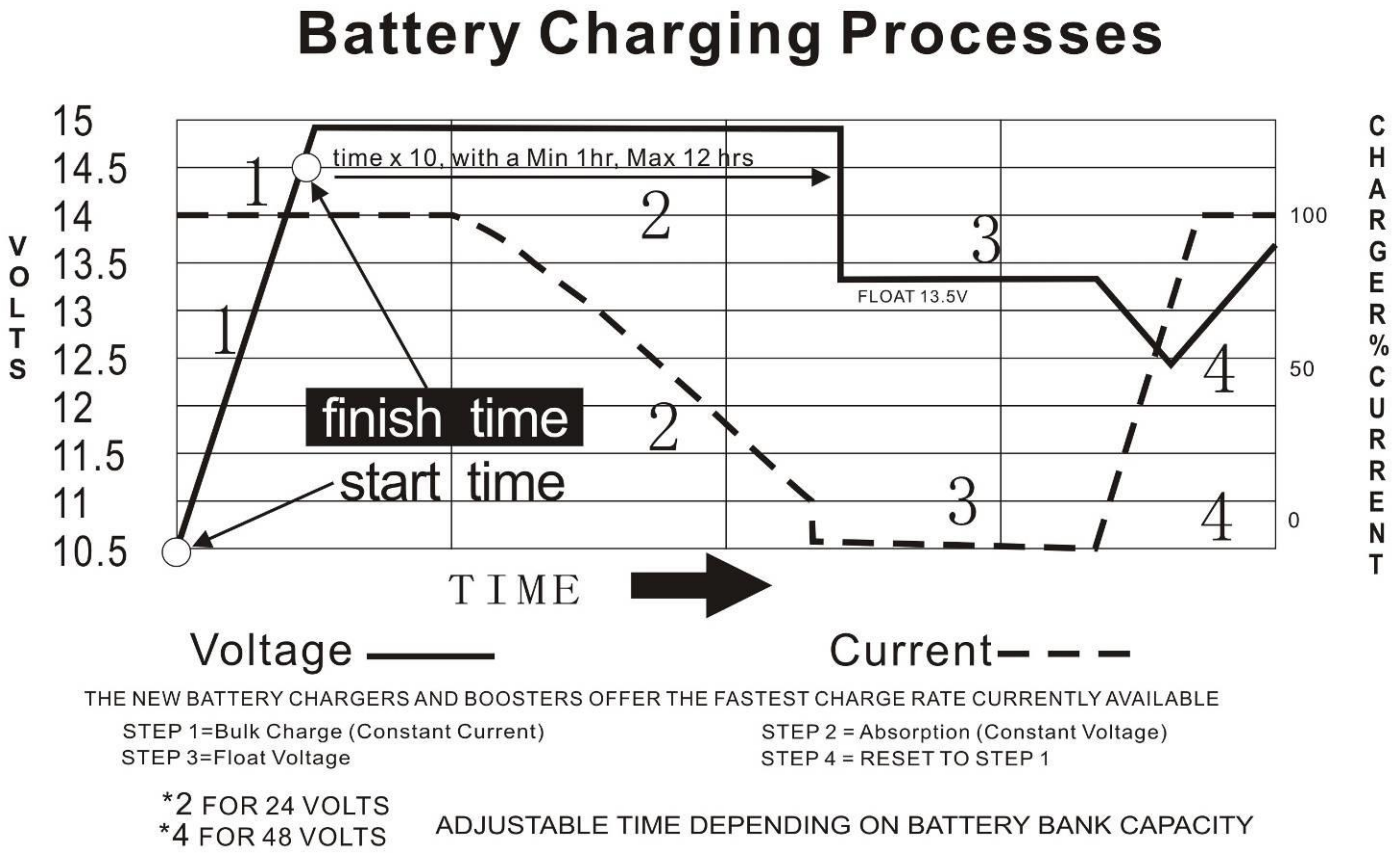
Absorb Charging: This is the second charging stage and begins after the absorb voltage has been reached. Absorb Charging provides the batteries with a constant voltage and reduces the DC charging current in order to maintain the absorb voltage setting.

In this period, the inverter will start a T1 timer; the charger will keep the boost voltage in Boost CV mode until the T1 timer has run out. Then drop the voltage down to the float voltage. The timer has a minimum time of 1 hour and a maximum time of 12 hours.

Float Charging: The third charging stage occurs at the end of the Absorb Charging time. While Float charging, the charge voltage is reduced to the float charge voltage (determined by the Battery Type selection*). In this stage, the batteries are kept fully charged and ready if needed by the inverter.

If the A/C is reconnected or the battery voltage drops below 12Vdc/24Vdc, the charger will restart the above cycle.

If the charge maintains the float state for 10 days, the charger will deliberately reset the cycle to protect the battery.



Battery type selector

Switch setting	Description	Boost / Vdc	Float / Vdc
0	Charger Off		
1	Gel USA	14.0	13.7
2	AGM 1	14.1	13.4
3	AGM 2	14.6	13.7
4	Sealed lead acid	14.4	13.6
5	Gel EURO	14.4	13.8
6	Open lead acid	14.8	13.3
7	Calcium	15.1	13.6
8	De-sulphation	15.5 (4 Hours then Off)	
9	Not used		

12Vdc Mode (*2 for 24Vdc ; *4 for 48Vdc)

De-sulphation

The de-sulphation cycle, switch position 8, is marked in red because this is a very dangerous setting if you do not know what you are doing. Before attempting to use this cycle you must clearly understand what it does and when and how you would use it.

What causes sulphation? This can occur with infrequent use of the batteries, or if the batteries have been discharged so low that they will not accept a charge. This cycle is a very high voltage charge cycle designed to try to break down the sulphated crust that is preventing the plates from taking a charge and thus allow the plates to clean up and accept a charge once again.

Charging depleted batteries

The Global LF series inverter allows start up and through power with depleted batteries.

For 12VDC models: after the battery voltage goes below 10V and the power switch is kept in the "ON" position and the inverter stays connected to the battery and the battery voltage doesn't drop below 2V, the inverter will be able to charge the battery once qualified AC inputs are present.
Before the battery voltage goes below 9VDC, the charging can be activated when the switch is turned to "Off", then to "ON".
When the voltage goes below 9VDC, and you accidently turn the switch to OFF or disconnect the inverter from the battery, the inverter will not be able to charge the battery once again, because the CPU loses memory during this process.

Charging current for each model

Model	Current	Model	Current
PICOGLF10W12V230V	35+/-5A	PICOGLF10W12V120V	20+/-5A
PICOGLF10W24V230V	20+/-5A	PICOGLF10W24V120V	15+/-5A
PICOGLF15W12V230V	45+/-5A	PICOGLF15W12V120V	45+/-5A
PICOGLF15W24V230V	25+/-5A	PICOGLF15W24V120V	25+/-5A
PICOGLF20W12V230V	65+/-5A	PICOGLF20W12V120V	40+/-5A
PICOGLF20W24V230V	30+/-5A	PICOGLF20W24V120V	30+/-5A
PICOGLF20W48V230V	20+/-5A	PICOGLF20W48V120V	15+/-5A
PICOGLF30W12V230V	85+/-5A	PICOGLF30W12V120V	65+/-5A
PICOGLF30W24V230V	45+/-5A	PICOGLF30W24V120V	40+/-5A
PICOGLF30W48V230V	30+/-5A	PICOGLF30W48V120V	25+/-5A
PICOGLF40W12V230VS	105+/-5A	PICOGLF40W12V120V	100+/-5A
PICOGLF40W24V230V	65+/-5A	PICOGLF40W24V120V	50+/-5A
PICOGLF40W48V230V	35+/-5A	PICOGLF40W48V120V	30+/-5A
PICOGLF50W24V230V PICOGLF50W24V230VS	70+/-5A	PICOGLF50W24V120V	55+/-5A
PICOGLF50W48V230V PICOGLF50W48V230VS	40+/-5A	PICOGLF50W48V120V	30+/-5A
PICOGLF60W24V230V PICOGLF60W24V230VS	85+/-5A	PICOGLF60W24V120V	75+/-5A
PICOGLF60W48V230V PICOGLF60W48V230VS	55+/-5A	PICOGLF60W48V120V	45+/-5A
PICOGLF80W48V230VS	80+/-5A		
PICOGLF100W48V230VS	100+/-5A		
PICOGLF120W48V230VS	120+/-5A		

The charging capacity will go to peak charge rate in about 3 seconds. This may cause a generator to drop frequency, making the inverter transfer to battery mode.
It is suggested to gradually put the charging load on the generator by switching the charging switch from min to max. Together with the 15s switch delay our inverter gives the generator enough time to spin up. This will depend on the size of the generator and rate of charge.

2.5.3 Transfer

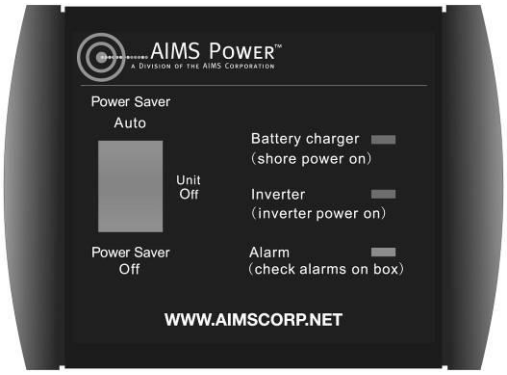
While in the Standby Mode, the AC input is continually monitored. Whenever AC power falls below the VAC Trip voltage (154 VAC, default setting for 230VAC,90VAC for 120VAC), the inverter automatically

transfers back to the Invert Mode with minimum interruption to your appliances - as long as the inverter is turned on. The transfer from Standby mode to Inverter mode occurs in approximately 10 milliseconds. And it is the same time from Inverter mode to Standby mode.
Though it is not designed as a computer UPS system, this transfer time is usually fast enough to keep your equipment powered up.
There is a 15-second delay from the time the inverter senses that continuously qualified AC is present at the input terminals to when the transfer is made. This delay is built in to provide time for a generator to spin-up to a stable voltage and avoid relay chattering. The inverter will not transfer to generator until it has locked onto the generator's output. This delay is also designed to avoid frequent switching when input utility is unstable.

2.5.4 Manual Frequency Switch

All our Global LF line of inverters have a 50/60 hz selector switch. When the inverter is turned off and shore power is not present, the frequency of the inverter may be selected to be 50 or 60 hz.

2.5.5 Power Saver



There are 2 different working statuses for our Global LF inverter: "Power On" and "Power Off".
When the power switch is in "Unit Off" position, the inverter is powered off.
When the power switch is turned to either of "Power Saver Auto" or "Power Saver Off", the inverter is powered on.
Power saver function is designed to conserve battery power when AC power is not or rarely required by the loads.
In this mode, the inverter pulses the AC output looking for an AC load (i.e., electrical appliance). Whenever an AC load (greater than 25 watts) is turned on, the inverter recognizes the need for power and automatically starts inverting and output goes to full voltage. When there is no load (or less than 25 watts) detected, the inverter automatically goes back into search mode to minimize energy consumption from the battery bank.
In "Power saver on" mode, the inverter will draw power mainly in sensing moments, thus the idle consumption is significantly reduced.
The inverter is factory defaulted to detect a load for 250ms every 30 seconds. This cycle can be customized to 3 seconds thru SW3 on the DIP switch.

Power saver on	Power saver off	Power saver on(Load detected)
		

Note: The minimum power of a load to take inverter out of sleep mode (Power Saver On) is 25 Watts.

The Global LF Series is designed with extraordinarily low idle power consumption which is only a mere 0.8-1.8% of its rated power.

Global LF Series Idle Power Consumption (in Watts)

Model NO	Power Saver Off	Power Saver On (3Secs)
PICOGLF10W12V230V	12.5	7.5
PICOGLF10W12V120V	12.5	7.5
PICOGLF10W24V230V	15	8.4
PICOGLF10W24V120V	16.5	9
PICOGLF15W12V230V	12.5	7.5
PICOGLF15W12V120V	13.5	8
PICOGLF15W24V230V	15	8.4
PICOGLF15W24V120V	16.5	9
PICOGLF20W12V230V	25	11.7
PICOGLF20W12V120V	28	12.7
PICOGLF20W24V230V	24.5	11.5
PICOGLF20W24V120V	26.5	12.2
PICOGLF20W48V230V	25	11.7
PICOGLF20W48V120V	28	12.7
PICOGLF30W12V230V	50	20
PICOGLF30W12V120VS	55	21.7
PICOGLF30W24V230V	38.5	16.2
PICOGLF30W24V120V	46.5	18.9
PICOGLF30W48V230V	45	18.4
PICOGLF30W48V120V	50	20
PICOGLF40W12V120V	44.5	18.2
PICOGLF40W24V230V	48	19.4
PICOGLF40W24V120V	52.5	20.9
PICOGLF40W48V230V	48	19.4
PICOGLF40W48V120V	55.5	21.9
PICOGLF50W24V230V PICOGLF50W24V230VS	62.5	24.2
PICOGLF50W24V120V	70	30
PICOGLF50W48V230V PICOGLF50W48V230VS	68.5	26.2
PICOGLF50W48V120V	70	30
PICOGLF60W24V230V PICOGLF60W24V230VS	76.8	29
PICOGLF60W24V120V	87	35
PICOGLF60W48V230V PICOGLF60W48V230VS	80.7	30.3

PICOGLF60W48V120V	87	35
PICOGLF80W48V230VS	100	30
PICOGLF100W48V230VS	150	35
PICOGLF120W48V230VS	200	40

When in the search sense mode, the green power LED will blink and the inverter will make a ticking sound. At full output voltage, the green power LED will light steadily and the inverter will make a steady humming sound. When the inverter is used as an "uninterruptible" power supply the search sense mode or "Power Saver On" function should be defeated.

Exceptions
Some devices when scanned by the load sensor cannot be detected. Small fluorescent lights are the most common example. (Try altering the plug polarity by turning the plug over.) Some computers and sophisticated electronics have power supplies that do not present a load until line voltage is available. When this occurs, each unit waits for the other to begin. To drive these loads either a small companion load must be used to bring the inverter out of its search mode, or the inverter may be programmed to remain at full output voltage (Power On mode).

2.5.6 Protections

The Global LF series inverter is equipped with extensive protections against various harsh situations/faults. These protections include:
AC Input over voltage protection/AC Input low voltage protection
Low battery alarm/High battery alarm
Over temperature protection/Over load protection
Short Circuit protection (1s after fault)
Back feeding protection

When Over temperature /Over load occur, after the fault is cleared, the master switch has to be reset to restart the inverter.
The Low battery voltage trip point can be customized from a defaulted value of 10VDC to 10.5VDC thru SW1 on the DIP switch.
The inverter will go to Over temp protection when the heat sink temp. ≥105ºC(221℉), and go to Fault (shutdown Output) after 30 seconds. The switch has to be reset to activate the inverter.
The Global LF series Inverter has back feeding protection which avoids presenting an AC voltage on the AC input terminal in Invert mode.
After the reason for the fault is cleared, the inverter has to be reset to start working.

2.5.7 Remote Control

Apart from the switch panel on the front (or top) of the inverter, an extra switch panel connected to the RJ11 port at the DC side of the inverter thru a standard telephone cable can also control the operation of the inverter (sold separately Part # PICGLFREMOTE).
If an extra switch panel is connected to the inverter via "remote control port", together with the panel on the inverter case, the two panels will be connected and operated in parallel.

Whichever first switches from “Off” to “Power saver off” or “Power saver on”, it will power the inverter on.

If the commands from the two panels conflict, the inverter will operate according to the following priority: Power saver on> Power saver off> Power off

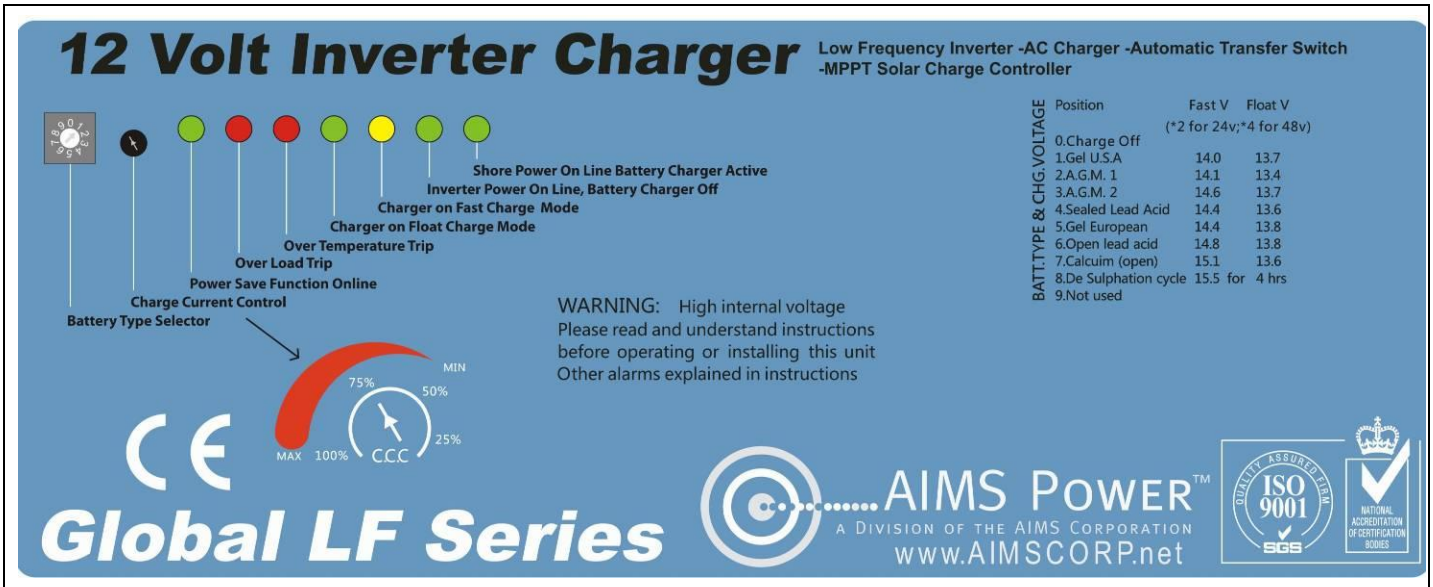
Only when both panels are turned to the “Unit Off” position, will the inverter be powered off.

The Max length of the cable is 10 meters.

WARNING

Never cut the telephone cable when the cable is attached to inverter and battery is connected to the inverter. Even if the inverter is turned off, it will damage the remote PCB inside if the cable is short circuited during cutting.

2.5.8 LED Indicator& LCD



SHORE POWER ON	GREEN LED lit in AC Mode
INVERTER ON	GREEN LED lit in Inverter Mode
FAST CHARGE	Yellow LED lit in Fast Charging Mode
FLOAT CHARGE	GREEN LED lit in Float Charging Mode
OVER TEMP TRIP	RED LED lit in Over Temperature
OVER LOAD TRIP	RED LED lit in Over Load
POWER SAVER ON	GREEN LED lit in Power Saver Mode (Power Saver Load ≦25W)

The LCD will display the following content:

Greeting message of “Welcome to AIMS POWER”

AC Status & Input Voltage
"AC: abnormal" is displayed when AC input is not qualified.

Output Voltage/Frequency and Output Current(in percentage) in Inverter mode

Battery voltage

Note:
When the inverter is in Battery Priority mode, finishes a complete charging cycle and switches to inverter mode "AC:abnormal" will be displayed.
In AC mode, the LCD will not display the status of the AC load.

2.5.9 Audible Alarm

Battery Voltage Low	Inverter green LED lit, and the buzzer beeps 0.5s every 5s.
Battery Voltage High	Inverter green LED lit, and the buzzer beeps 0.5s every 1s and Fault after 60s.
Invert Mode Over-Load	(1)110%<load<125%(±10%), No audible alarm in 14 minutes, Beeps 0.5s every 1s in 15th minute and Fault after 15 minutes; (2)125% <load<150%(±10%), Beeps 0.5s every 1s and Fault after 60s; (3)Load>150%(±10%), Beeps 0.5s every 1s and Fault after 20s;
Over Temperature	Heat sink temp. ≥105ºC(221℉), Over temp red LED Lighting, beeps 0.5s every 1s;

2.5.10 FAN Operation

For 1-3KW models, there is one multiple controlled DC fan which starts to work according to the below logic.
For 4-6KW models, there is one multiple controlled DC fan and one AC fan. The DC fan will work in the same way as the 1-3KW models, while the AC fan will work once there is AC output from the inverter.

So when the inverter is in power saver mode, the AC fan will work from time to time in response to the pulse sent by the inverter in power saver mode.
The Operation of the DC fan at the DC terminal side is controlled by the following logic:

Condition	Enter Condition	Leave condition	Speed
HEAT SINK TEMPERATURE	T ≤ 60℃(140℉)	T > 65℃(149℉)	OFF
	65℃(149℉)≤ T < 85 ℃(185℉)	T ≤ 60℃(140℉) or T ≥ 85℃(185℉)	50%
	T > 85℃(185℉)	T ≤ 80℃(176℉)	100%
CHARGER CURRENT	I ≤ 15%	I ≥ 20%	OFF
	20%< I ≤ 50%Max	I≤ 15% or I > 50%Max	50%
	I > 50%Max	I ≤ 40%Max	100%
LOAD Percentage (INV MODE)	Load < 30%	Load ≥ 30%	OFF
	30% ≤ Load < 50%	Load ≤ 20% or Load ≥ 50%	50%
	Load ≥ 50%	Load ≤ 40%	100%

Allow at least 30CM of clearance around the inverter for air flow. Make sure that the air can circulate freely around the unit.
Fan noise level <60db at a distance of 1m

2.5.11 DIP Switches

On the DC end of inverter, there are 5 DIP switches which enable users to customize the performance of the device.

Switch NO	Switch Function	Position: 0	Position: 1
SW1(Utility Priority)	Low Battery Trip Point	10.0VDC	10.5VDC
SW1(Battery Priority)		10.5VDC	11.5VDC
SW2(230V)	AC Input Range	184-253VAC	154-264VAC(40Hz+)
SW2(120V)	AC Input Range	100-135VAC	90-135VAC(40Hz+)
SW3	Power Save Override ON/OFF	Inverter Off	Saver On 3 sec
SW4	Frequency Switch	50Hz	60Hz
SW5	Battery/AC Priority	AC Priority	Battery Priority

Low Battery Trip Point(SW1):
Deep discharge of the lead acid battery leads to high losses in capacity and early aging. In different applications a different low voltage disconnection level is preferred. For example, for solar applications, user may intend to have less DOD to prolong the battery life cycle. While for mobile applications users may intend to have more DOD to reduce battery capacity and on board weight.
For 12VDC models, when the inverter is in utility priority mode(SW5 at "0"),Low Battery Trip Point is selectable at 10.0/10.5VDC. It can be customized to 10.5/11.5VDC via SW5. This is to prevent batteries from over-discharging while there is only a small load applied on the inverter.
*2 for 24VDC, *4 for 48VDC

AC Input Range(SW2):
There are different acceptable AC input ranges for different kinds of loads.
For some relatively sensitive electronic devices, a narrow input range of 184-253VAC (100-135V for

120VAC model) is required to protect them.
While for some resistive loads which work in a wide voltage range, the input AC range can be customized to 154-264VAC (90-135V for 120VAC model), this helps to power loads with the most AC input power without frequent switches to the battery bank.
In order to make the inverter accept dirty power from a generator, when the SW2 is switched to position "1", the inverter will bypass an AC input with a wider voltage and frequency (40Hz plus for 50Hz/60Hz). Accordingly, the AC charger will also work in a wider voltage and frequency range (43Hz plus for 50Hz/60Hz).
This will avoid frequent switches between battery and generator. But some sensitive loads will suffer from the low quality power.
The pros and cons should be clearly realized.

Power Save Override ON/OFF (SW3):
Under the Battery Priority Mode (SW5 in position "1"), the inverter can be switched between two modes: Power Saver Mode (SW3 in position "1") and Unit Off Charging Mode (SW3 in position "0"). The power Switch should be in "Power saver on" position all the time for using these functions.
In Power Saver Mode, the inverter is initially in standby mode and sends a pulse to detect the presence of a load every 3 seconds. Each pulse lasts for 250ms. The inverter will remain in standby mode until a load has been detected. Then it will wake up from standby mode and start to invert electricity from the battery bank to supply the load. As this function is under Battery Priority, the inverter will always prefer to invert electricity from battery first even there is a qualified AC input present.Only when the battery voltage is lower than the low voltage alarm point, will the inverter switch to AC input power to charge the battery and supply the load at the same time.
This Power Saver Mode can be changed to Unit Off Charging mode via SW3 by switching it to "0" position. (SW5 still in "1")
In Unit Off Charging mode, the inverter will stay in standby mode without sensing loads. It won't output any power even if a load is turned on or a qualified AC input is present. The inverter will not perform any function and only stay idle in this mode, unless the battery voltage is low. Then it will start charging the battery. This feature is ideally suitable for applications where energy conservation is required. Charging will only be activated when required.

Frequency Switch(SW4):
The output frequency of the inverter can be set at either 50Hz or 60Hz by SW4.

AC/Battery Priority(SW5):
Our inverter is designed with AC priority by default. This means, when AC input is present, the battery will be charged first, and the inverter will transfer the input AC to power the load. Only when the AC input is stable for a continuous period of 15 days will the inverter start a battery inverting cycle to protect the battery. After 1 normal charging cycle ac through put will be restored.
The AC Priority and Battery Priority switch is SW5. When you choose battery priority, the inverter will invert from battery despite the AC input. Only when the battery voltage reaches the low voltage alarm point(10.5Vdc for 12Vdc, 21Vdc for 24Vdc, 42Vdc for 48Vdc) will the inverter transfer to AC Input, charge battery, and switch back to battery when the battery is fully charged. This function is mainly for wind/solar systems using utility power as back up.

Note: In battery priority mode, when qualified AC inputs for the first time and the battery voltage is below 12.5Vdc(12.5Vdc for 12Vdc, 25Vdc for 24Vdc, 51Vdc for 48Vdc), the inverter will go into battery priority mode only after a cycle of bulk charging and absorb charging is finished. The inverter will not go into float charging mode.

2.5.12 Other Features

Battery voltage recovery start
After low battery voltage shut off (10V for 12V model or 20V for 24V model or 40V for 48V model), the inverter is able to restore operation after the battery voltage recovers to 13V/26V/52V (with power switch still in the "On" position). This function helps to save the users extra labor to reactivate the inverter when the low battery voltage returns to an acceptable range in renewable energy systems. The built in battery charger will automatically reactivate as soon as city/generator ac has been stable for 15 seconds.

WARNING
Never leave the loads unattended, some loads (like a Heater) may cause accidents in such cases.
It is better to shut everything off after low voltage trip than to leave your load on, due to the risk of fire.

Auto Gen Start
The inverter can be customized to start up a generator when the battery voltage goes low.
When the inverter goes to low battery alarm, it can send a signal to start a generator, and turn the generator off after battery charging is finished.
The auto gen start feature will only work with generators designed to work with this feature. There is an open/close relay that will short circuit the positive and negative cable from a generator. The input DC voltage can vary, but the Max current the relay can carry is 16Amp.

Conformal Coating
AIMS Power entire line of Global LF inverters have been processed with a conformal coating on the PCB, making it water, rust, and dust resistant as well as corrosion resistant.
While these units are designed to withstand corrosion from the salty air, they are not splash proof.

3 Installation

3.1 Location

Follow all the local regulations to install the inverter.
Please install the equipment in a location of Dry, Clean, Cool with good ventilation.
Working temperature: －10℃－40℃(-14℉to 104℉)
Storage temperature: －40－70℃(-40℉to 158℉)
Relative Humidity: 0% to 95%，non-condensing
Cooling: Forced air

3.2 DC Wiring

It is suggested the battery bank be kept as close as possible to the inverter. The following is a suggested wiring option for 3 meter DC cable.

Please find the following minimum wire size. In case of DC cable longer than 3m, please increase the cross section of cable to reduce the loss.

Power	DC Input voltage	Wire Gage
1KW	12V	AWG 1/0
1KW	24V	AWG 4
1.5KW	12V	AWG 1/0
1.5KW	24V	AWG 4
2KW	12V	AWG 1/0
2KW	24V	AWG 1/0
2KW	48V	AWG 4
3KW	12V	AWG 4/0
3KW	24V	AWG 1/0
3KW	48V	AWG 4
4KW	24V	AWG 1/0
4KW	48V	AWG 1/0
5KW	24V	AWG 4/0
5KW	48V	AWG 1/0
6KW	24V	AWG 4/0
6KW	48V	AWG 1/0

CAUTION

The torque rating range for DC terminal is 12.5NM-20.5NM, and the suggested torque rating is 17NM. Over torqueing may cause the bolt to break.

WARNING

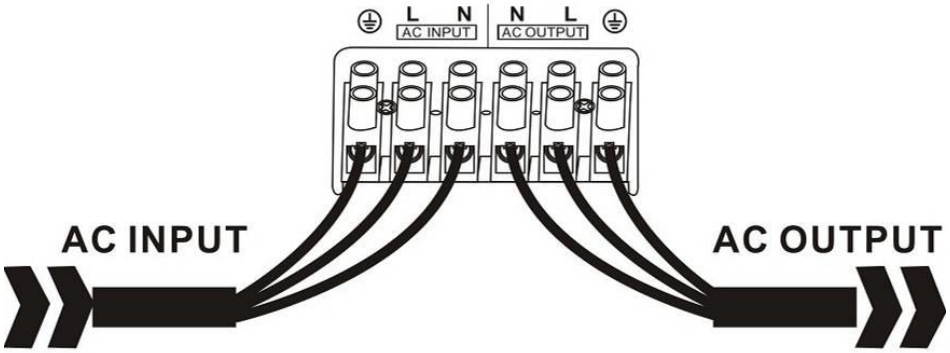
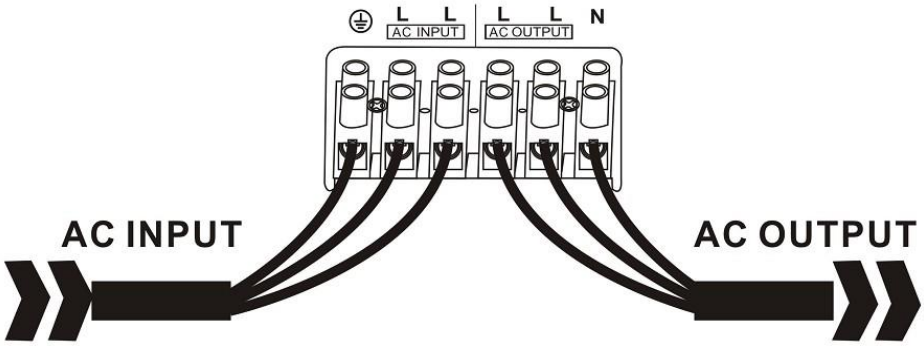
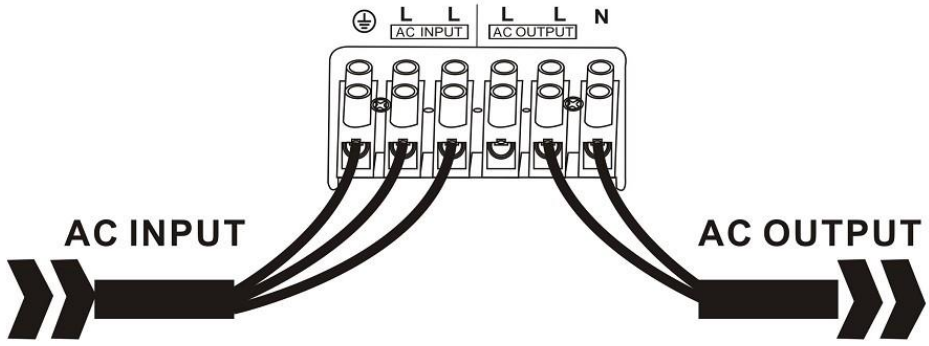
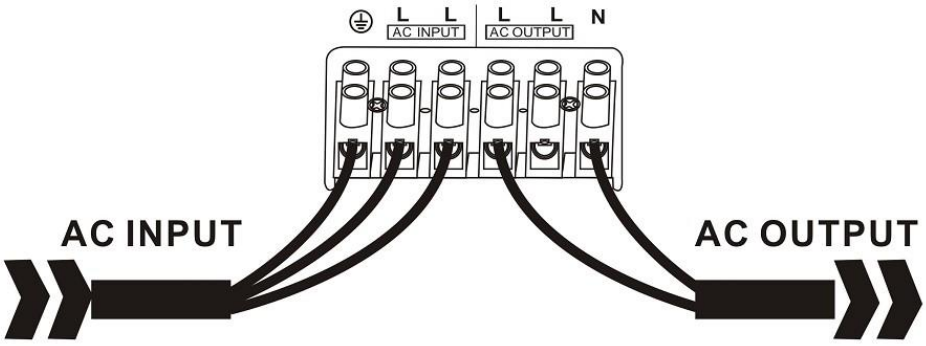
In the event of reverse polarity the unit could be totally destroyed and warranty voided!

3.3 AC Wiring

We recommend using 10 to 5Awg wire to connect to the ac terminal block.

When in AC mode the AC input power will supply both the loads and AC charger, a thicker wire gauge for AC Input is required. Pls consult a qualified electrician about the specific wire gauge required in terms of wire material and inverter power.

There are 3 different ways of connecting to the terminal block depending on the model. All the wirings are CE compliant, call our tech support if you are not sure about how to wire any part of your inverter.

Wiring Option 1 230V single phase/120V single phase Input: Hot line+Neutral+Ground Output: Hot line+Neutral+Ground	
Wiring Option 2 230V split phase Input: Hot line+ Hot line +Ground Output: Hot line+ Hot line +Neutral	
Wiring Option 3 230V split phase Input: Hot line+ Hot line +Ground Output: Hot line +Neutral Remark: In such case, each output hotline can only carry a max of half the rated capacity.	 

Caution:

Wiring Option 2 and Wiring Option 3 are only allowed for the following split phase models with an ending "S" in model number.

Pls wire all the other models according to Wiring Option 1.

WARNING

For split phase models, AC input neutral is not required in wiring. Never Connect Input Neutral to Output Neutral. Damage will result which is not covered under warranty.
Always switch on the inverter before plugging in any appliance.

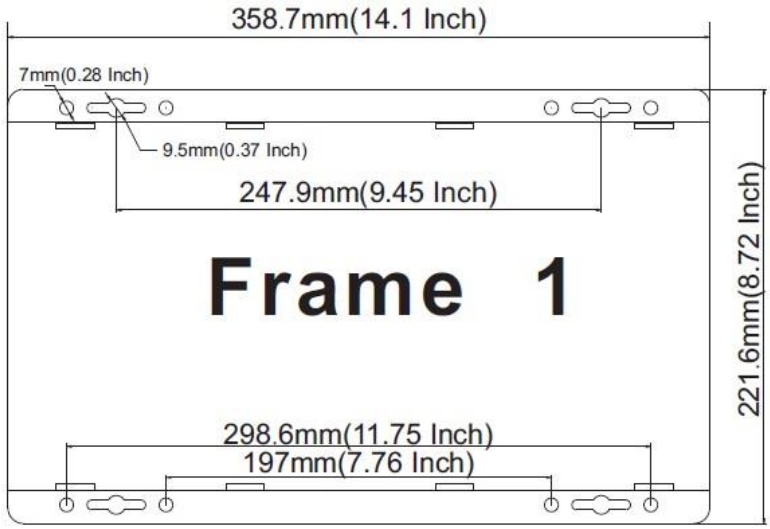
WARNING

The output voltage of this unit must never be connected in its input AC terminal, overload or damage may result.
Always switch on the inverter before plugging in any appliance.

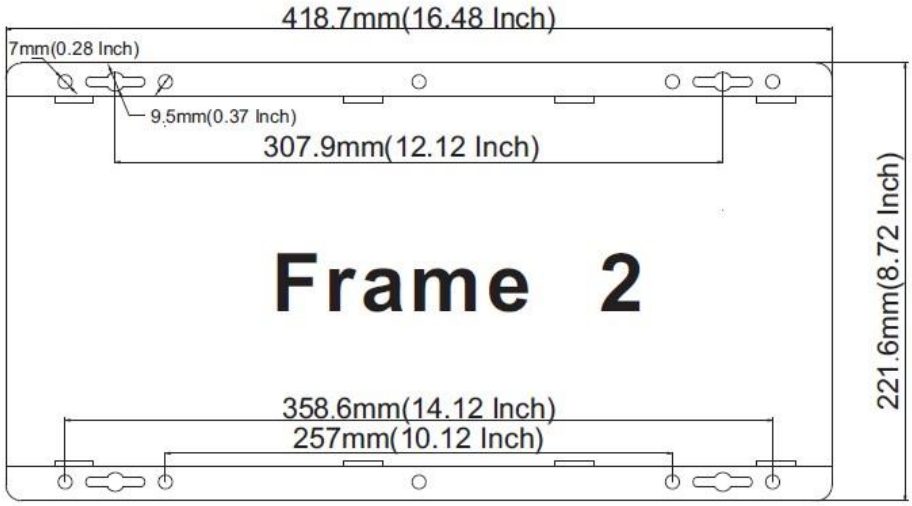
3.4 Grounding

Connect an AWG 8 gauge or greater copper wire between the grounding terminal on the inverter and the earth grounding system or the vehicle chassis.

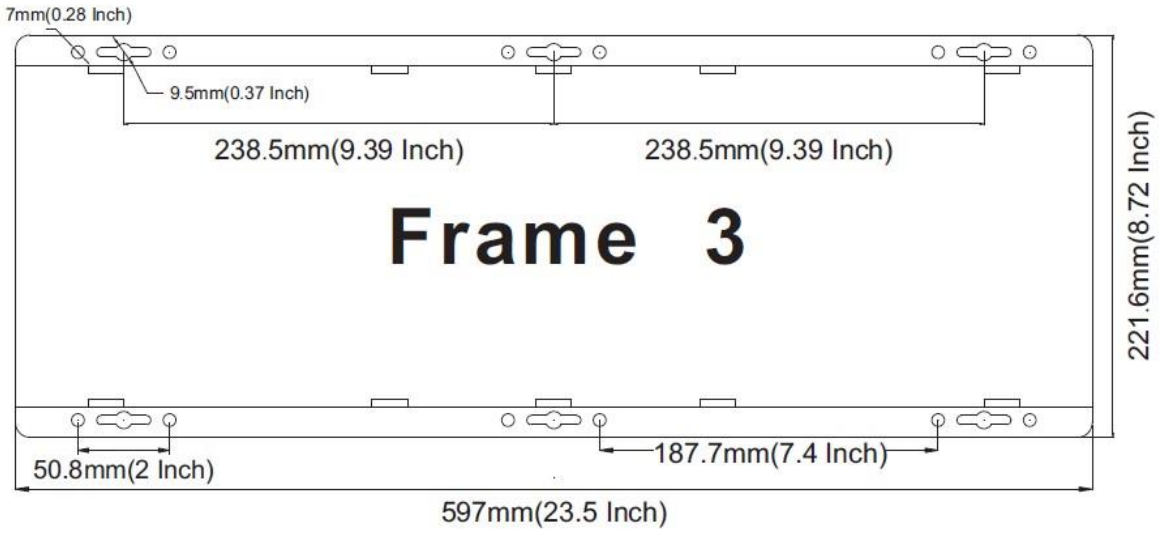
3.5 Install Flange



	1000W to 1500W Models

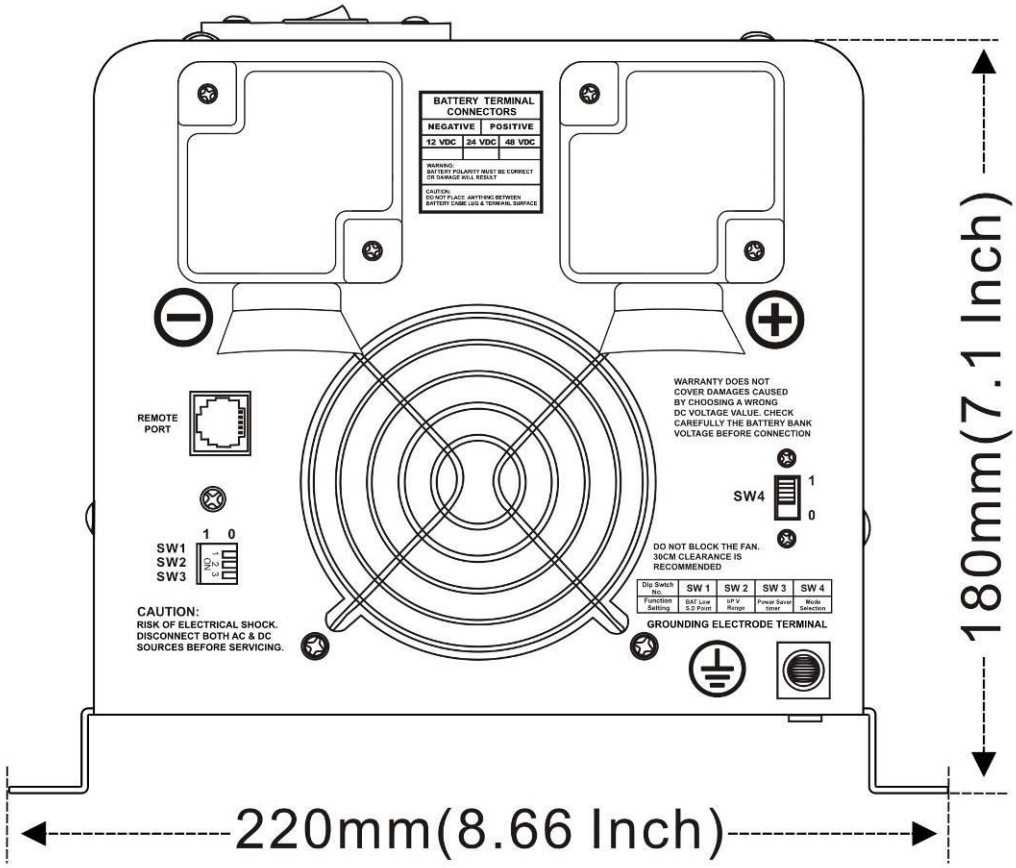


2000W to 3000W Models



4000W to 6000W Models(excluding PICOGLF50W24V120V , PICOGLF50W48V120V , PICOGLF60W24V120V , PICOGLF60W48V120V)

Side View


BATTERY TERMINAL CONNECTORS
NEGATIVE
POSITIVE
12 VDC
24 VDC
48 VDC
REMOTE PORT
SW1
SW2
SW3
1 0
CAUTION:
RISK OF ELECTRICAL SHOCK.
DISCONNECT BOTH AC & DC
SOURCES BEFORE SERVICING.
WARRANTY DOES NOT
COVER DAMAGES CAUSED
BY CHOOSING A WRONG
DC VOLTAGE VALUE. CHECK
CAREFULLY THE BATTERY BANK
VOLTAGE BEFORE CONNECTION
SW4
1
0
DO NOT BLOCK THE FAN.
30CM CLEARANCE IS
RECOMMENDED
Dip Switch No.
SW 1
SW 2
SW 3
SW 4
Function Setting
BAT Low S.D Point
HPV Range
Power Saver timer
Mode Selection
GROUNDING ELECTRODE TERMINAL
180mm(7.1 Inch)
220mm(8.66 Inch)

4 Troubleshooting Guide

Troubleshooting contains information about how to troubleshoot possible error conditions while using the Global LF Inverter & Charger.
The following chart is designed to help you quickly pinpoint the most common inverter failures.

Indicator and Buzzer

		Indicator on top cover							LED on Remote Switch			
Status	**Item**	SHORE POWER ON	INVERTER ON	FAST CHG	FLOAT CHG	OVER TEMP TRIP	OVER LOAD TRIP	POWER SAVER ON	BATT CHG	INVERTER	Alarm	Buzzer
Line Mode	CC	√	×	√	×	×	×	×	√	×	×	×
	CV	√	×	√, blink	×	×	×	×	√	×	×	×
	Float	√	×	×	√	×	×	×	√	×	×	×
	Standby	√	×	×	×	×	×	×	×	×	×	×
Inverter Mode	Inverter On	×	√	×	×	×	×	×	×	√	×	×
	Power Saver	×	×	×	×	×	×	√	×	×	×	×
Inverter Mode	Battery Low	×	√	×	×	×	×	×	×	√	√	Beep 0.5s every 5s
	Battery High	×	√	×	×	×	×	×	×	√	√	Beep 0.5s every 1s
	Overload On Invert Mode	×	√	×	×	×	√	×	×	√	√	Refer to “Audible alarm”
	Over-Temp On Invert Mode	×	√	×	×	√	×	×	×	√	√	Beep 0.5s every 1s
	Over-Temp On Line Mode	√	×	√	×	√	×	×	√	×	√	Beep 0.5s every 1s
	Over Charge	√	×	√	×	×	×	×	√	×	√	Beep 0.5s every 1s
Fault Mode	Fan Lock	×	×	×	×	×	×	×	×	×	×	Beep continuous
	Battery High	×	√	×	×	×	×	×	×	√	×	Beep continuous
	Inverter Mode Overload	×	×	×	×	×	√	×	×	×	×	Beep continuous
	Output Short	×	×	×	×	×	√	×	×	×	√	Beep continuous
	Over-Temp	×	×	×	×	√	×	×	×	×	×	Beep continuous
	Over Charge	×	×	√	×	×	×	×	√	×	×	Beep continuous

	Back Feed Short	×	×	×	×	×	×	×	×	×	×	Beep continuous

Symptom	Possible Cause	Recommended Solution
Inverter will not turn on during initial power up.	Batteries are not connected, loose battery-side connections. Low battery voltage.	Check the batteries and cable connections. Check DC fuse and breaker. Charge the battery.
No AC output voltage and no indicator lights ON.	Inverter has been manually transitioned to OFF mode.	Press the switch to Power saver on or Power saver off position.
AC output voltage is low and the inverter turns loads OFF in a short time.	Low battery.	Check the condition of the batteries and recharge if possible.
Charger is inoperative and unit will not accept AC.	AC voltage has dropped out-of-tolerance	Check the AC voltage for proper voltage and frequency.
Charger is supplying a lower charge rate.	Charger controls are improperly set. Low AC input voltage. Loose battery or AC input connections.	Refer to the section on adjusting the "Charger Rate". Source qualified AC power.. Check all DC /AC connections.
Charger turns OFF while charging from a generator.	High AC input voltages from the generator.	Load the generator down with a heavy load. Turn the generator output voltage down.
Sensitive loads turn off temporarily when transferring between grid and inverting.	Inverter's Low voltage trip voltage may be too low to sustain certain loads.	Choose narrow AC voltage in the DIP switch, or Install a UPS if possible.
Noise from Transformer/case*	Applying specific loads such as hair drier	Remove the loads

***The reason for the noise from transformer and/or case**

When in inverter mode sometimes the transformer and/or case of the inverter may vibrate and make noise.

If the noise comes from transformer:

According to the characteristics of our inverter, there is one type of load which most likely may cause rattles of transformer.

That is a half wave load: A load that uses only half a cycle of the power. This tends to cause an imbalance of the magnetic field of the transformer, reducing its rated working freq from 20KHz to, say, maybe 15KHz (it varies according to different loads). In such a case the frequency of noise falls exactly into the range (200Hz-20KHz) that human ears can hear.

The most common load of such kind is a hair drier.

If the noise comes from the case:

Normally when loaded with inductive loads, the magnetic field generated by the transformer keeps attracting or releasing the steel case at a specific freq, this may also cause noise.

Reducing the load power or using an inverter with bigger capacity will normally solve this problem.

The noise will not do any harm to the inverter or the loads.

5 Warranty

We offer a 1 year limited warranty.
The following cases are not covered under warranty.

1 DC polarity reverse.
The inverter is designed without DC polarity reverse protection. A polarity reverse may severely damage the inverter.

2 Wrong AC wiring

3 Operation in a moist environment.

4 Operating with an undersized generator or generator with unqualified wave form.

AIMS Operating Corp., Inc. dba AIMS Power Warranty Instructions:
This product is designed using the most modern digital technology and under very strict quality control and testing guide lines. If however you feel this product is not performing as it should, please contact us: techsupport@aimscorp.net or (775)359-6703.
We will do our best to resolve your concerns. If the product needs repair or replacement, make sure to keep your receipt/invoice, as that will need to be sent back along with the package and RA# prepaid to AIMS. You have a full 1 year from date of purchase warranty.
This warranty is valid world wide with the exception that freight and duty charges incurred outside the contiguous 48 United States will be prepaid by customer.
Except as provided above, AIMS makes no warranty of any kind, express or implied, including without limitation the implied warranties of merchantability and fitness for a particular purpose. In no event shall AIMS be liable for indirect, special or consequential damages. This warranty only applies to AIMS Power branded products. All other name brand products are warranted by and according to their respective manufacturer. Please do not attempt to return non-AIMS Power branded products to AIMS Power.
For additional products such as:

- Modified sine wave inverters
- Pure sine wave inverters
- Solar Charge Controllers
- On Grid Inverters
- Inverter Chargers and Automatic transfer switches
- Custom cut cables
- Batteries
- Solar Panels

Please visit our web site: www.aimscorp.net

To find out where to buy any of our products, you may also e-mail:sales@aimscorp.net or call (775)359-6703.

Appendix 1

Global Low Freq Series Inverter & Charger

Electrical Specifications

	Model	HP 1KW	HP 1.5KW	HP 2KW	HP 3KW	HP 4KW	HP 5KW	HP 6KW	HP 8KW	HP 10KW	HP 12KW
Inverter Output	Continuous Output Power	1000W	1500W	2000W	3000W	4000W	5000W	6000W	8000W	10000W	12000W
	Surge Rating(20s)	3000W	4500W	6000W	9000W	12000W	15000W	18000W	24000W	30000W	36000W
	Capable of Starting Electric Motor	1HP	1.5HP	2HP	3HP	4HP	5HP	6HP	8HP	10HP	12HP
	Output Waveform	Pure Sine wave/Same as input(Bypass mode)									
	Nominal Efficiency	>88%(Peak)									
	Line Mode Efficiency	>95%									
	Power Factor	0.9-1.0									
	Nominal Output Voltage RMS	100-110-120Vac / 220-230-240Vac									
	Output Voltage Regulation	±10% RMS									
	Output Frequency	50/60Hz ± 0.3Hz									
	Short Circuit Protection	Yes, Current Limit Function (Fault after 1sec)									
	Typical transfer Time	10ms(Max)									
	THD	Typically <7%, Max 10% under full linear load									
DC Input	Nominal Input Voltage	12.0Vdc(*2 for 24Vdc, *4 for 48Vdc)									
	Minimum Start Voltage	10.0Vdc									
	Low Battery Alarm	10.5Vdc / 11.0Vdc									
	Low Battery Trip	10.0Vdc / 10.5Vdc									
	High Voltage Alarm & Fault	16.0Vdc									
	High DC Input Recovery	15.5Vdc									
	Low Battery Voltage Recover	13.0Vdc									
	Search Mode	> 25 W when Power Saver On									
Charge	Input Voltage Range	Narrow: 100~135VAC / 194~243VAC; Wide: 90~135VAC / 164~243VAC;									
	Input Frequency Range	Narrow: 47-55±0.3Hz for 50Hz, 57-65±0.3Hz for 60Hz Wide:43±0.3Hz plus for 50Hz/60Hz									
	Output Voltage	Depends on battery type									
	Charger Breaker Rating(230Vac)	10A	10A	10A	20A	20A	30A	30A	40A	40A	40A
	Charger Breaker Rating(120Vac)	10A	20A	20A	30A	40A	63A	63A			
	Max Charge Rate	See specific charge rates in “2.5.2 AC Charger” section									
	Over Charge Protection Shutdown	15.7V for 12Vdc (*2 for 24Vdc, *4 for 48Vdc)									

	Battery type	Fast Vdc				Float Vdc					
	Gel U.S.A	14.0				13.7					
	A.G.M 1	14.1				13.4					
	A.G.M 2	14.6				13.7					
	Sealed Lead Acid	14.4				13.6					
	Gel Euro	14.4				13.8					
	Open Lead Acid	14.8				13.3					
	Calcium	15.1				13.6					
	De-sulphation	15.5 for 4hrs									
	Remote Control	Yes. Optional									
Bypass & Protection	Input Voltage Waveform	Sine wave (Grid or Generator)									
	Nominal Voltage	120Vac				230Vac					
	Low Voltage Trip	80V/90V±4%				184V/154V±4%					
	Low Voltage re engage	90V/100V±4%				194V/164V±4%					
	High Voltage Trip	140V±4%				253V±4%					
	High Voltage re engage	135V±4%				243V±4%					
	Max Input AC Voltage	150VAC				270VAC					
	Nominal Input Frequency	50Hz or 60Hz (Manual Set)									
	Low Freq Trip	Narrow: 47±0.3Hz for 50Hz, 57±0.3Hz for 60Hz Wide:40±0.3Hz for 50Hz/60Hz									
	Low Freq re engage	Narrow: 48±0.3Hz for 50Hz, 58±0.3Hz for 60Hz Wide:45±0.3Hz for 50Hz/60Hz									
	High Freq Trip	Narrow: 55±0.3Hz for 50Hz, 65±0.3Hz for 60Hz Wide: No up limit for 50Hz/60Hz									
	High Freq re engage	Narrow: 54±0.3Hz for 50Hz, 64±0.3Hz for 60Hz Wide: No up limit for 50Hz/60Hz									
	Output Short circuit protection	Circuit breaker									
	Bypass breaker rating(230Vac)	10A	15A	20A	30A	30A	40A	40A	50A	63A	63A
	Bypass breaker rating(120Vac)	20A	20A	30A	40A	50A	80A	80A			
Mechanical Specification	Mounting	Wall mount									
	Inverter Dimensions(L*W*H)	382*218*179mm 15*8.5*7”		442*218*179mm 17.5*8.5*7”		598*218*179mm 23.5*8.5*7”			588*415*200mm 23.3*16.3*7.9”		
	Inverter Weight	35.3lbs	37.5 lbs	44.1 lbs	53 lbs	77.2 lbs	97 lbs	74 lbs	132 lbs	145.5 lbs	154 lbs
	Shipping Dimensions(L*W*H)	530*325*315mm 20.75*12.75*12.5”		595*330*320mm 23.5*13*12.5”		800*360*350mm 30.5*14.25*13.75”			760*540*410mm 30*21.3*16.1”		
	Shipping Weight	18KG 39.7 lbs	19KG 41.9 lbs	22KG 48.5 lbs	26KG 57.3 lbs	37KG 81.6 lbs	46KG 101.4 lbs	47KG 103.6 lbs	68KG 150 lbs	79KG 174 lbs	82KG 181 lbs
	Display	Status LEDs+LCD									
	Standard Warranty	1 Year									

※Specifications in this manual are subject to change without prior notice.