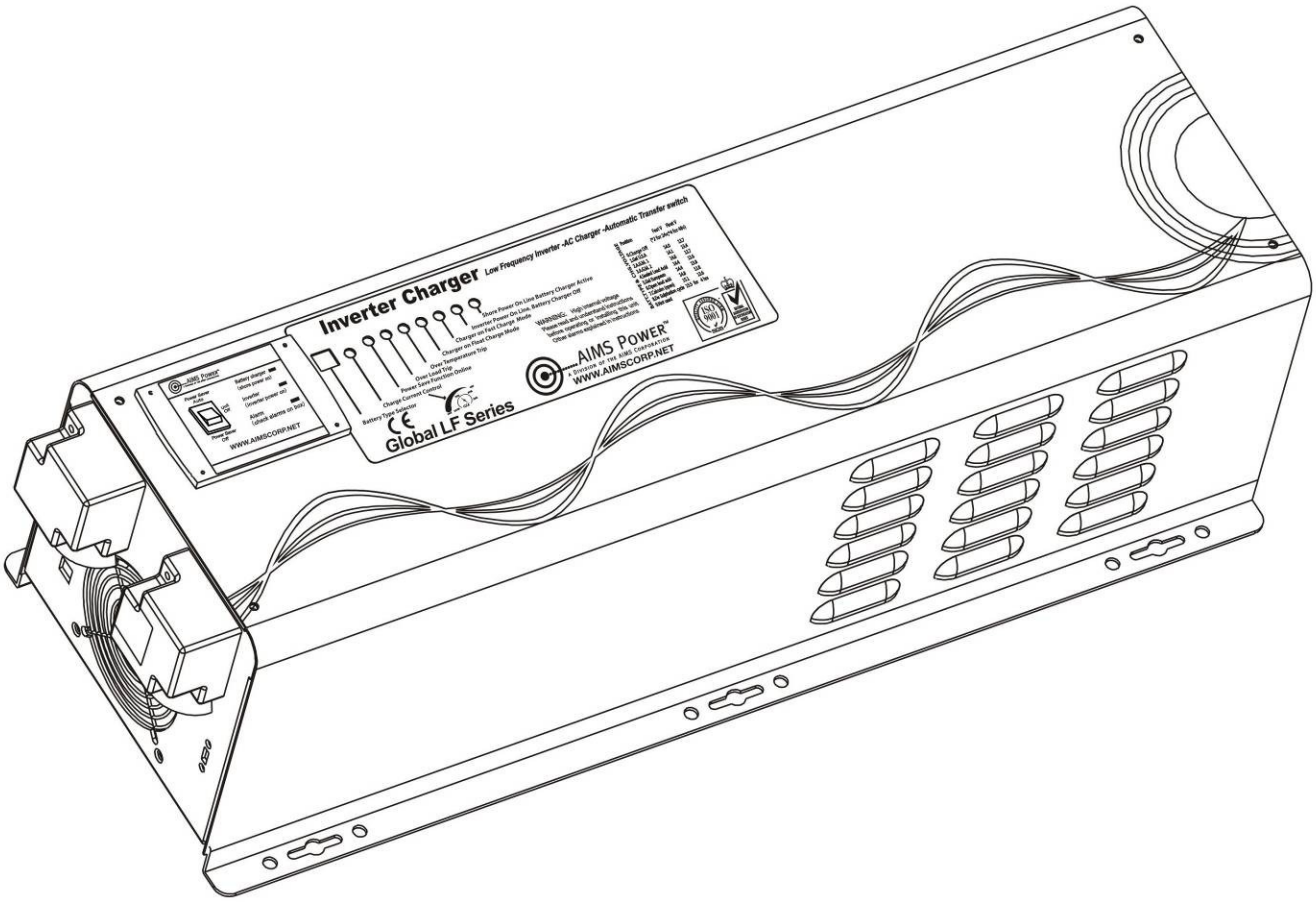
Global LF Series
Pure Sine Wave Inverter/Solar Charger
User's Manual

Version 3.0



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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 of up to 90Amp(depending on model). 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.

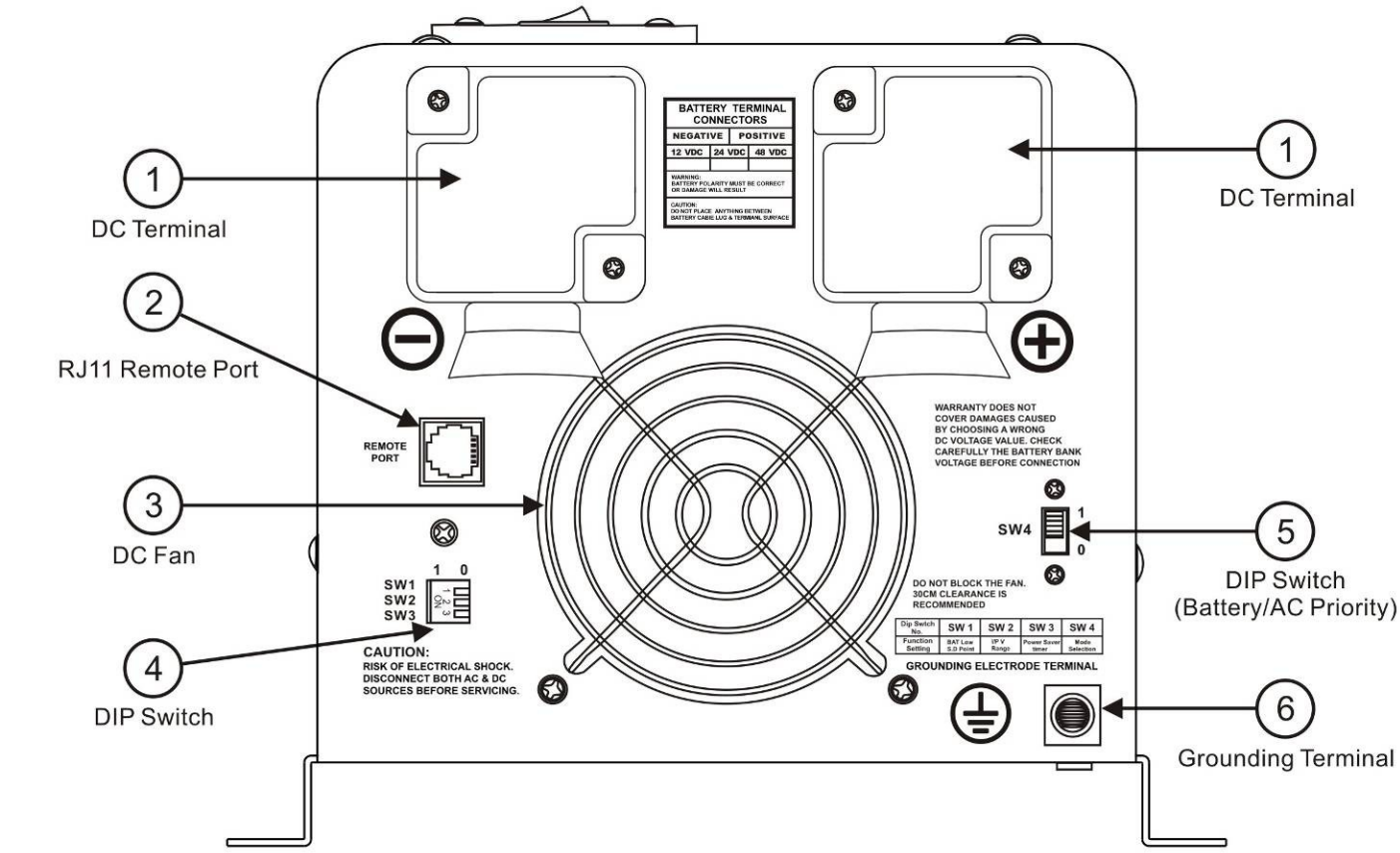
To get the most out of the power inverter, it must be installed, used and maintained properly. Please read the instructions in this manual before installing and operating.

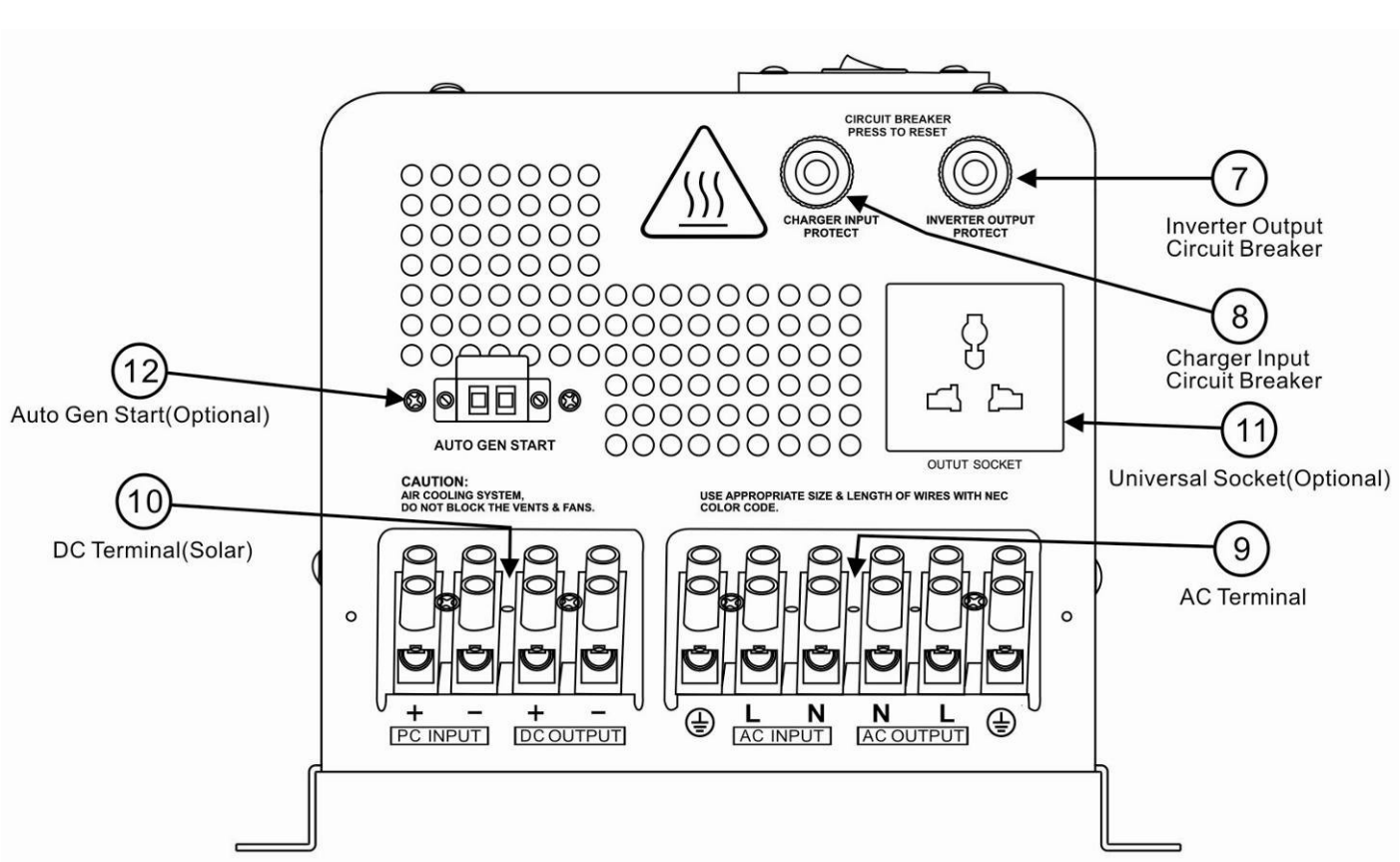
2-2. Application

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.

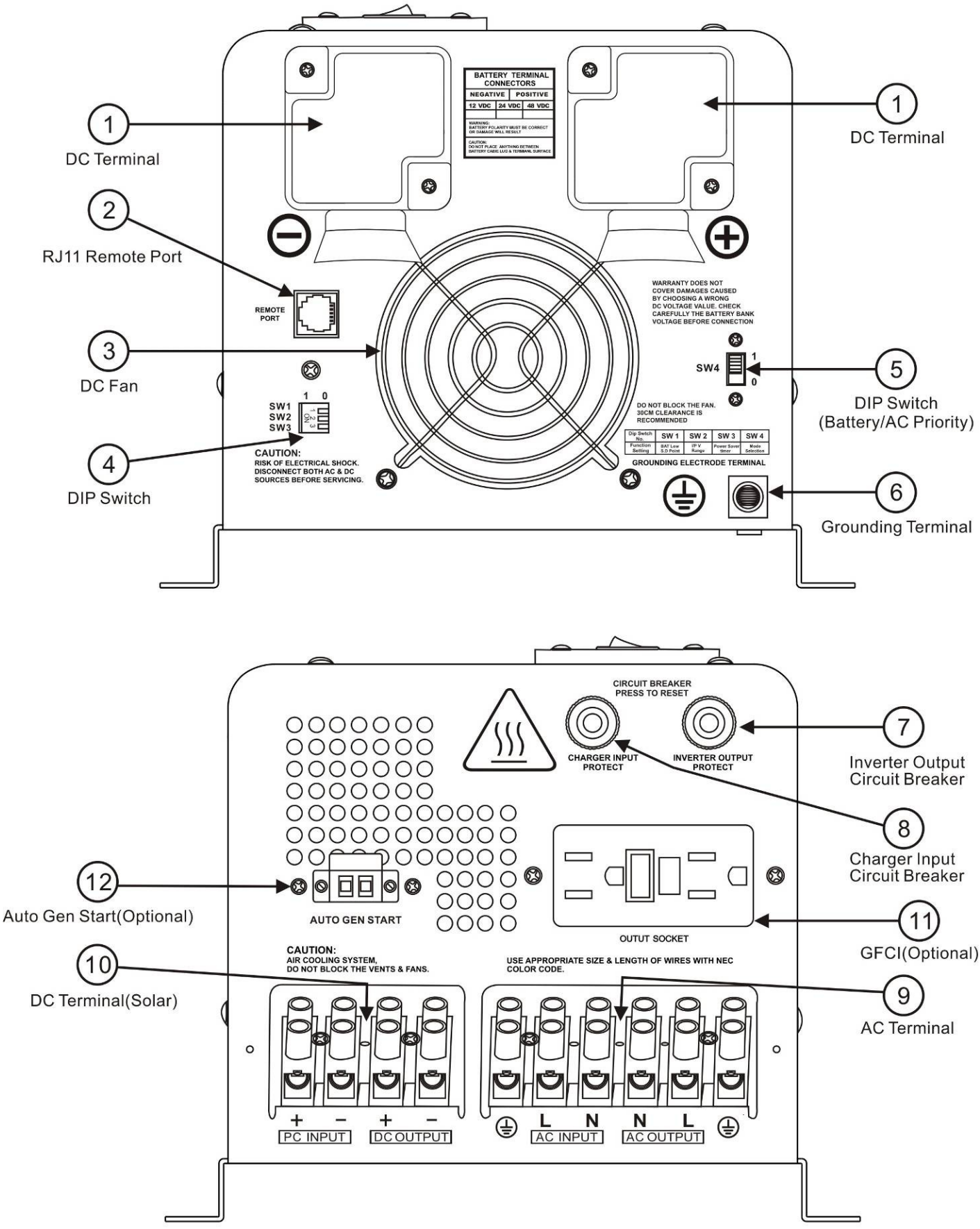
2.3 Mechanical Drawing

Model No: PICGLF15W12V230V (below)

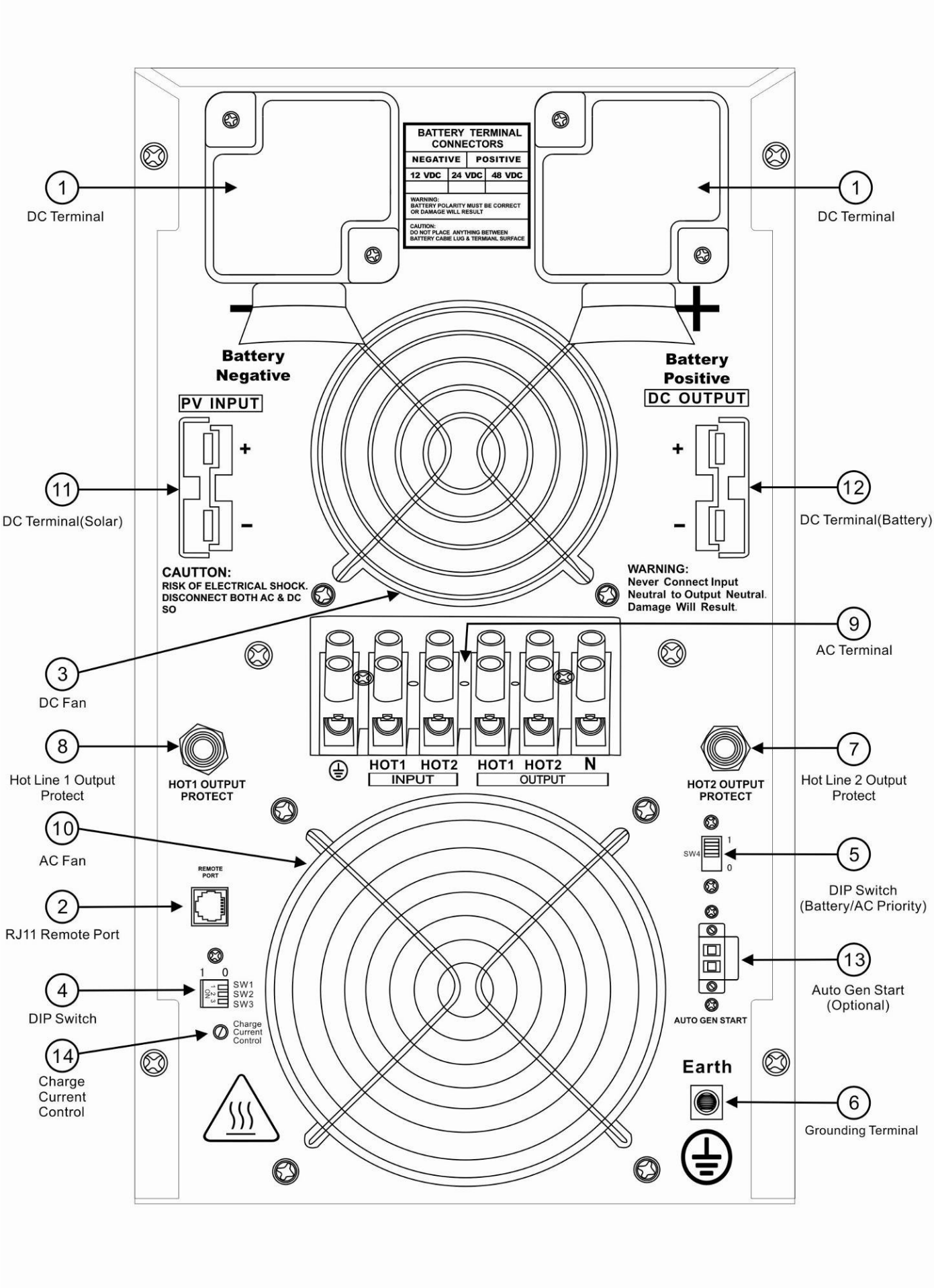




Model No: PICGLF15W12V120V, PICGLF30W12V120V, PICGLF30W24V120V (below)



Model No: PICGLF60W24V240VS



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
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 90Amp, 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: Isolate 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 on the 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.

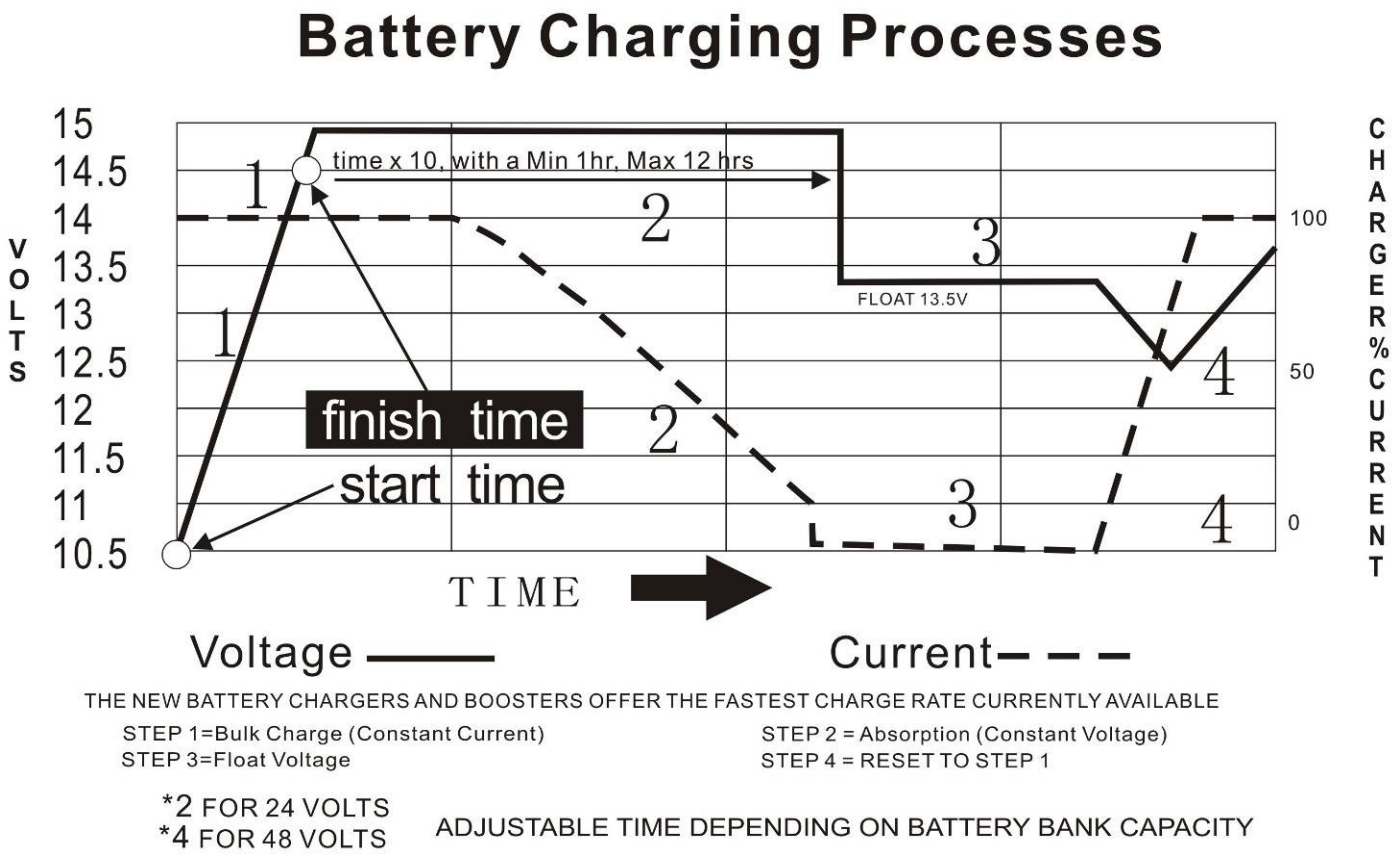
2.5.2 AC Charger

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 at 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
PICGLF10W12V230V	35+/-5A	PICGLF10W12V120V	20+/-5A
PICGLF10W24V230V	20+/-5A	PICGLF10W24V120V	15+/-5A
PICGLF15W12V230V	45+/-5A	PICGLF15W12V120V	45+/-5A
PICGLF15W24V230V	25+/-5A	PICGLF15W24V120V	25+/-5A
PICGLF20W12V230V	65+/-5A	PICGLF20W12V120V	40+/-5A
PICGLF20W24V230V	30+/-5A	PICGLF20W24V120V	30+/-5A
PICGLF20W48V230V	20+/-5A	PICGLF20W48V120V	15+/-5A
PICGLF30W12V230V	85+/-5A	PICGLF30W12V120V	65+/-5A
PICGLF30W24V230V	45+/-5A	PICGLF30W24V120V	40+/-5A
PICGLF30W48V230V	30+/-5A	PICGLF30W48V120V	25+/-5A
PICGLF40W12V230V	105+/-5A	PICGLF40W12V120V	100+/-5A
PICGLF40W24V230V	65+/-5A	PICGLF40W24V120V	50+/-5A
PICGLF40W48V230V	35+/-5A	PICGLF40W48V120V	30+/-5A
PICGLF50W24V230V PICGLF50W24V230VS	70+/-5A		
PICGLF50W48V230V PICGLF50W48V230VS	40+/-5A		
PICGLF60W24V230V PICGLF60W24V230VS	85+/-5A		
PICGLF60W48V230V PICGLF60W48V230VS	55+/-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 Auto Frequency Adjust

The inverter is designed with an Auto Frequency adjust function.
The factory default configuration for inverters sold in American market is 60Hz.
If the output frequency needs to be changed this is done by putting in a valid input Power Source to the inverter's input lines. Once the inverter validates the input, the output will automatically change.
NOTE: The inverter will output factory set frequency of 60Hz after it restarts. Customers who can only accept 50Hz frequency at startup, should notify AIMS Power when ordering.

2.5.5 Solar Charger

Listed below are the specs for the solar chargers

Table 1 Electrical Specifications @ **25℃(77℉)**

Rated Voltage	12 Vdc	24Vdc
Rated charge current (includes load current)	60Amp	
Load current	15Amp	
Input voltage range	15-30Vdc	30-55Vdc
Max DC input Current	60Amp	
Max. PV DC voltage input	30Vdc	55Vdc
Overload protection (DC load)	2.0 * I(Rated)>5s 1.5 * I(Rated) >20s 1.25 * I(Rated) temperature controlled	
Typical idle consumption	At idle < 10mA	
Bulk charge	14.6Vdc (default)	29.2Vdc (default)
Floating charge	13.4Vdc (default)	26.8Vdc (default)
Equalization charge	14.0Vdc (default)	28.0Vdc (default)
Over charge disconnect	14.8Vdc	29.6Vdc
Over charge recovery	13.6Vdc	27.2Vdc
Over discharge disconnect	10.8Vdc (default)	21.6Vdc (default)
Over discharge reconnect	12.3Vdc	24.6Vdc
Temperature compensation	-13.2mV/℃	-26.4mV/℃
Lead acid battery settings	Adjustable	
NiCad battery settings	Adjustable	
Low voltage reconnect	12.0-14.0Vdc	24.0-28.0Vdc
Low voltage disconnect	10.5-12.5Vdc	21.0-25.0Vdc
Ambient temperature	0-40℃(32-104℉) full capacity; 40－60℃(104-140℉) de-rating	
Altitude	Operating 5000 m, Non-Operating 16000 m	
Protection class	IP21	

Terminal size (fine/single wire)	#8 AWG

Maximum Power Point Tracking (MPPT) Function

Maximum Power Point Tracking, frequently referred to as MPPT, is an electronic system that operates the Photovoltaic (PV) modules in a manner that allows the modules to produce the maximum power they are capable of.

The PV-seeker Charge controller is a microprocessor-based system designed to implement the MPPT.

It can increase the charge current up to 30% or more compared to traditional charge controllers (see figure 1).

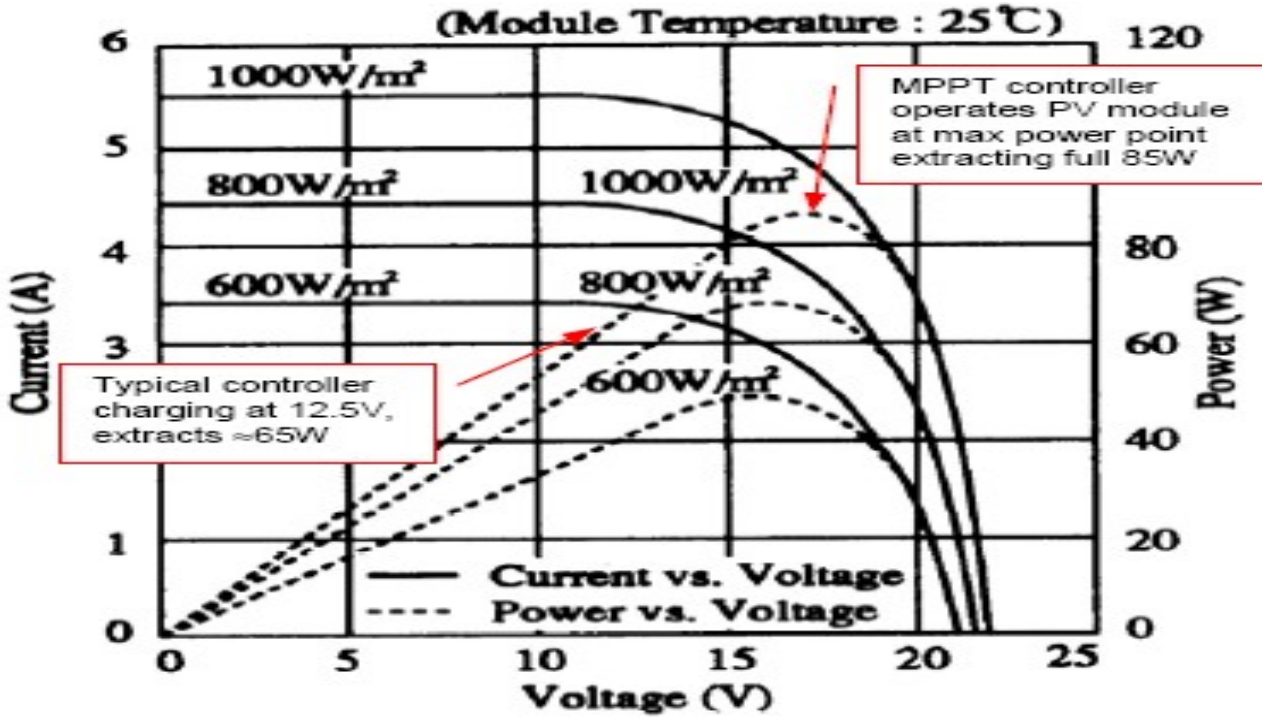


Figure 1 Current, Power vs. Voltage Characteristics

The Charge controller built in was designed with 12/24V battery voltage auto detecting function.

For 12VDC inverter, the output voltage of the solar charger will be accordingly 12VDC, and the qualified DC input volt range is 15v-30VDC.

For 24VDC inverters, the output voltage of the solar charger will be accordingly 24VDC, and the qualified DC input volt range is 30v-55VDC.

If the voltage falls out of this range, the charger will not work properly. Special attention should be paid to this when configuring the solar array.

2.5.6 Automatic Voltage Regulation

The automatic voltage regulation function is for the full series of Global LF Pure Sine Wave Inverter/ Chargers with the exception of split phase models, including PICGLF50W24V230VS, PICGLF50W48V230VS, PICGLF60W24V230VS, and PICGLF60W48V230VS.

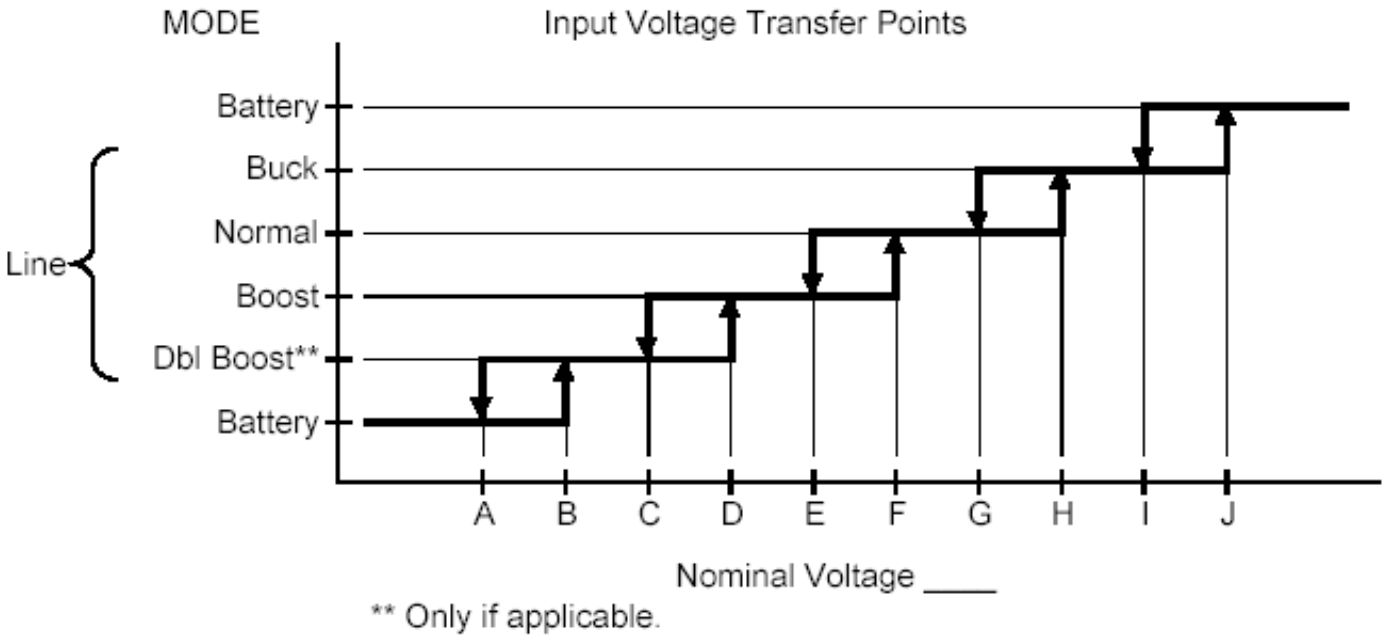
Instead of simply bypassing the input AC to power the loads, the Global LF series inverter stabilizes the input AC voltage to a range of 230V/120V±10%.

Connected with batteries, the Global LF inverter will function as a UPS with max transfer time of 10 ms.

With all the unique features and top quality minded design our inverter provides, it will provide you with

long-term trouble free operation.

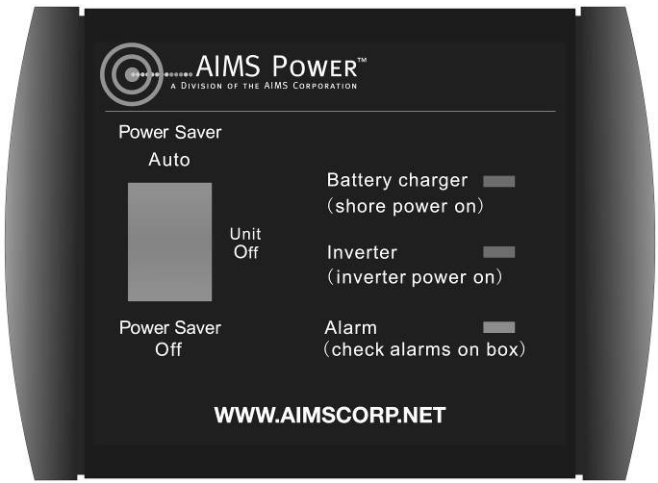
Global LF Function Introduction



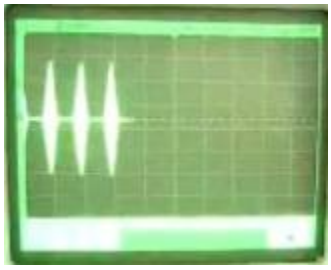
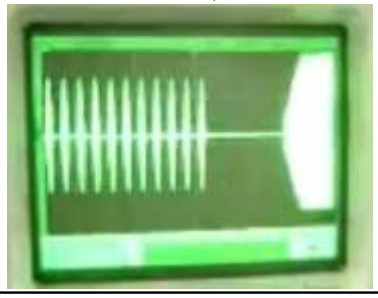
Global LF Function	Global LF Series					
	LV (NA/JPN)			HV (INTL)		
Acceptable Input Voltage Range (Vac)	**0-160**			**0-300**		
Nominal Input Voltages (Vac)	**100**	**110**	**120**	**220**	**230**	**240**
(A) Line low loss N/W (On battery)	75/65	84/72	92/78	168/143	176/150	183/156
(B) Line Low comeback N/W (On Boost)	80/70	89/77	97/83	178/153	186/160	193/166
(C) Line 2nd boost threshold (On Boost)	**	**	**	**	**	**
(D) Line 2nd boost comeback (On normal)	**	**	**	**	**	**
(E) Line 1st boost threshold (On Boost)	90	99	108	198	207	216
(F) Line 1st boost comeback (On normal)	93	103	112	205	215	225
(G) Line buck comeback (On Normal)	106	118	128	235	246	256
(H) Line buck threshold (On Buck)	110	121	132	242	253	264
(I) Line high comeback (On Buck)	115	127	139	253	266	278
(J) Line high loss (On Battery)	120	132	144	263	276	288

2.5.7 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 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)	Power Saver On (30Secs)
PICGLF10W12V230V	12.5	7.5	5.3
PICGLF10W12V120V	12.5	7.5	5.3
PICGLF10W24V230V	15	8.4	5.4
PICGLF10W24V120V	16.5	9	6
PICGLF15W12V230V	12.5	7.5	5.3
PICGLF15W12V120V	13.5	8	5.8
PICGLF15W24V230V	15	8.4	5.4
PICGLF15W24V120V	16.5	9	6
PICGLF20W12V230V	25	11.7	5.7
PICGLF20W12V120V	28	12.7	5.8
PICGLF20W24V230V	24.5	11.5	5.7
PICGLF20W24V120V	26.5	12.2	5.8
PICGLF20W48V230V	25	11.7	5.7
PICGLF20W48V120V	28	12.7	5.8
PICGLF30W12V230V	50	20	6.5
PICGLF30W12V120V	55	21.7	6.7
PICGLF30W24V230V	38.5	16.2	6.2

PICGLF30W24V120V	46.5	18.9	6.4
PICGLF30W48V230V	45	18.4	6.4
PICGLF30W48V120V	50	20	6.5
PICGLF40W12V120V	44.5	18.2	6.4
PICGLF40W24V230V	48	19.4	6.5
PICGLF40W24V120V	52.5	20.9	6.6
PICGLF40W48V230V	48	19.4	6.5
PICGLF40W48V120V	55.5	21.9	6.7
PICGLF50W24V230V PICGLF50W48V230VS	62.5	24.2	7
PICGLF50W48V230V PICGLF50W48V230VS	68.5	26.2	7.2
PICGLF60W24V230V PICGLF60W24V230VS	76.8	29	7.4
PICGLF60W48V230V PICGLF60W48V230VS	80.7	30.3	7.6

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).

2.5.8 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.

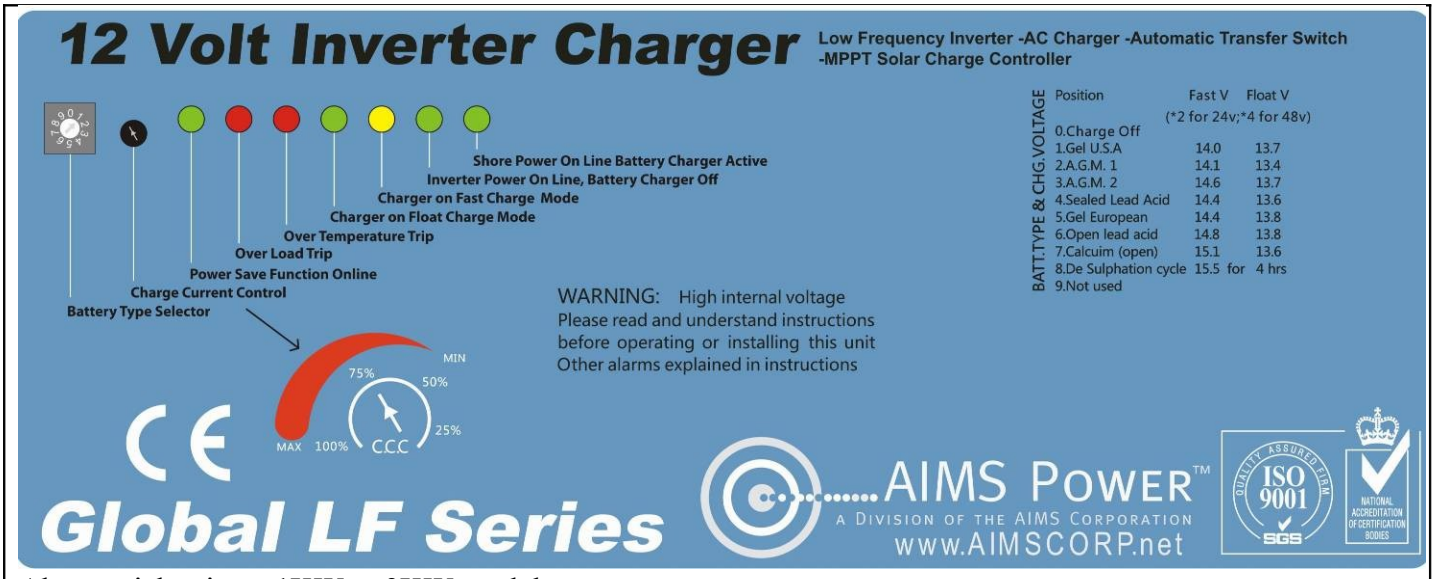
2.5.9 Remote Control

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.

2.5.10 LED Indicator & LCD



Above sticker is on 1KW to 3KW models.

Above sticker is on 4KW to 6KW models.

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.

2.5.11 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;

2.5.12 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

2.5.13 DIP Switches

On the DC end of inverter, there are 4 DIP switches which enable users to customize the performance of the device.

Switch NO	Switch Function	Position: 0	Position: 1
SW1	Low Battery Trip Volt	10.0VDC	10.5VDC
		*2 for 24VDC, *4 for 48VDC	
SW2(230V)	AC Input Range	184-253VAC	154-264VAC(40Hz+)
SW2(120V)	AC Input Range	100-135VAC	90-135VAC(40Hz+)
SW3	Load Sensing Cycle	30 seconds	3 seconds
SW4	Battery/AC Priority	Utility Priority	Battery Priority

Low Battery Trip Volt:
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, the Low Battery Trip Volt is set at 10.0VDC by default. It can be customized to 10.5VDC using SW1. 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:
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 freq 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.

Load Sensing Cycle:
The inverter is factory defaulted to detect load for 250ms in every 30 seconds. This cycle can be customized to 3 seconds thru the SW3 on the DIP switch.

AC/Battery Priority:
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 SW4. 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(10.5V for 12V) 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, the inverter will only go into battery priority mode after a cycle of bulk charging and absorb charging is finished. The inverter will not go into float charging mode.

2.5.14 Output Socket

The inverter is either equipped with a dual GFCI socket (rated at 30Amps) or an universal socket (rated at 10Amps) for more convenient wiring.

2.5.15 Other Features

Battery voltage recovery start
After low battery voltage shut off (10V for 12V model or 20V for 24V model), the inverter is able to restore operation after the battery voltage recovers to 13V/26V (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 the 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 accident in such cases.

It is better to shut everything down 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 that is Dry, Clean, Cool and that has good ventilation.
Working temperature: -10℃-40℃(-14℉to 104℉)
Storage temperature: -40-70℃(-40℉to 158℉)
Relative Humidity: 0%-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 able is a suggested wiring option for 1 meter DC cable.
Please find the following minimum wire size. In case of DC cable longer than 1m, 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.

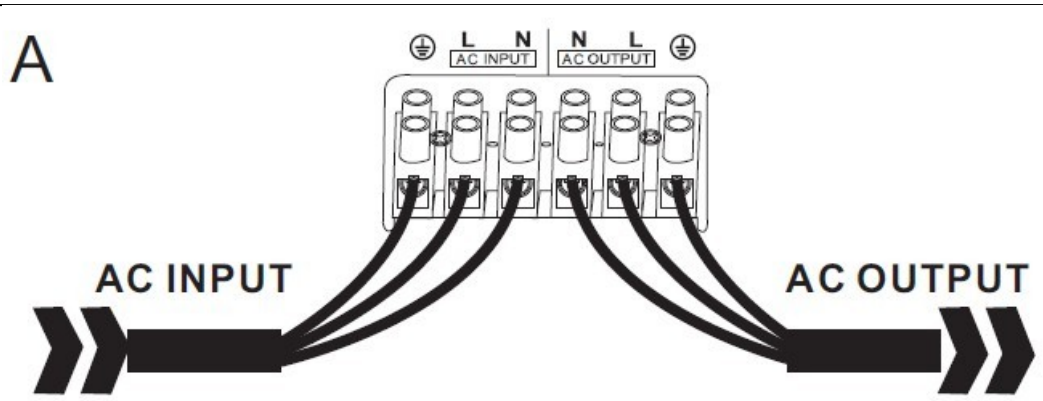
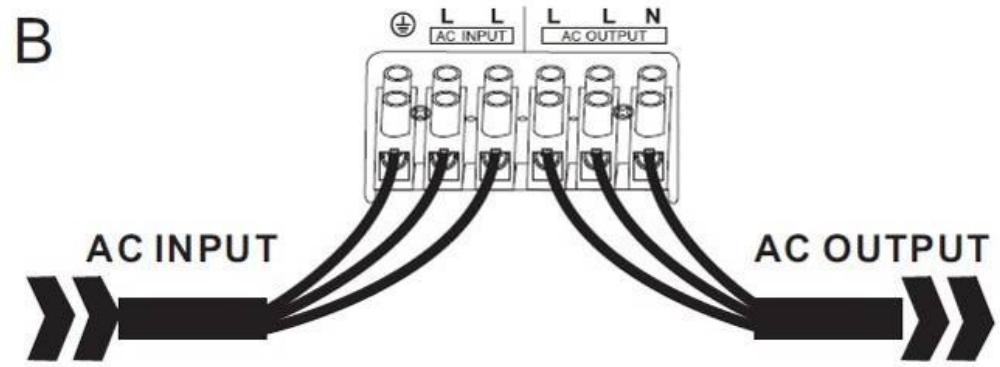
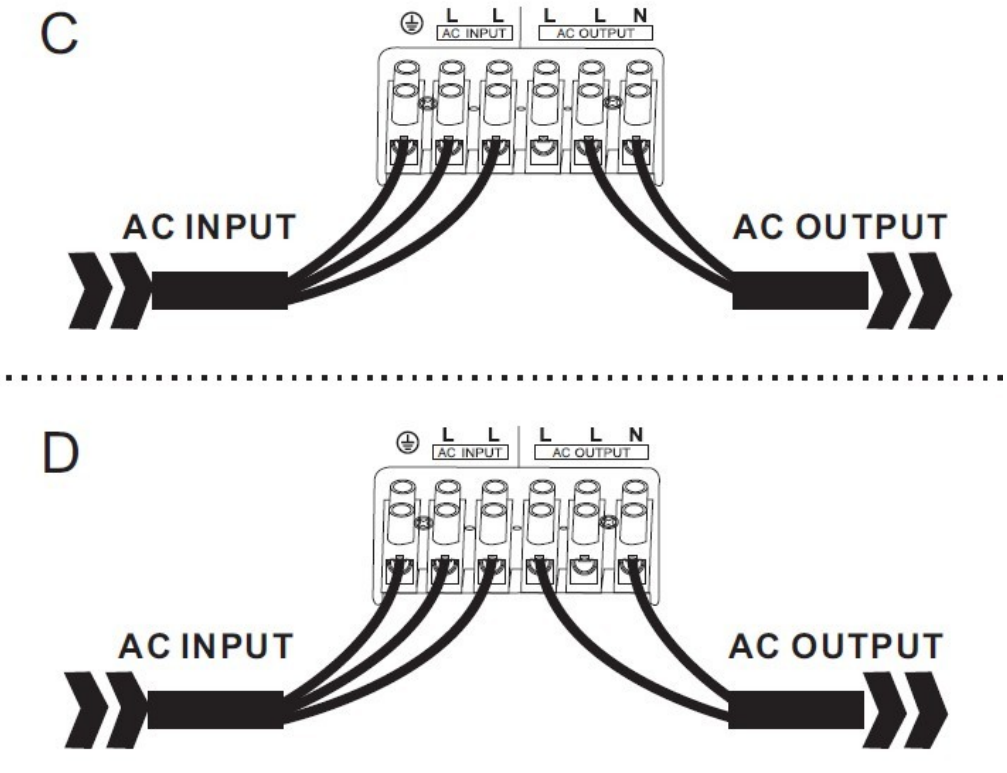
WARNING

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 cases, 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 models:
PICGLF50W24V230VS, PICGLF50W48V230VS, PICGLF60W24V230VS, PICGLF60W48V230VS.
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.

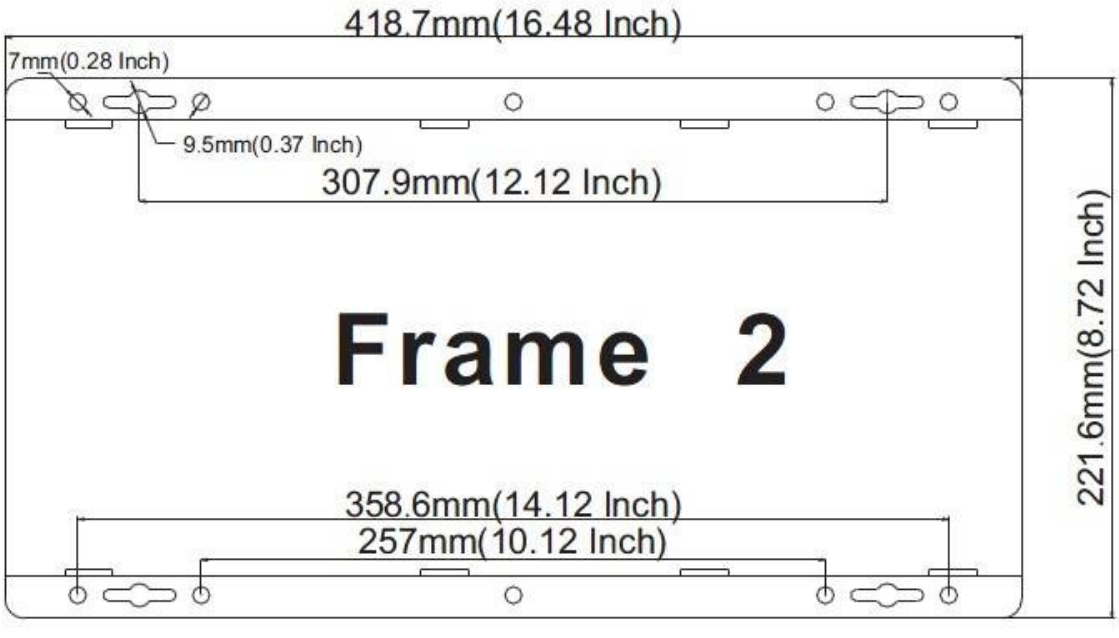
WARNING

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.

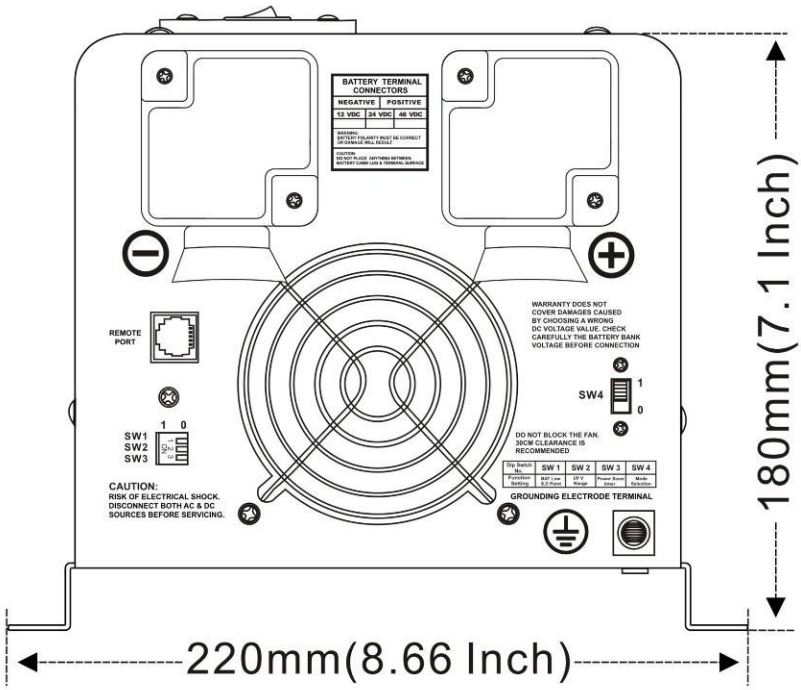
3.4 Grounding

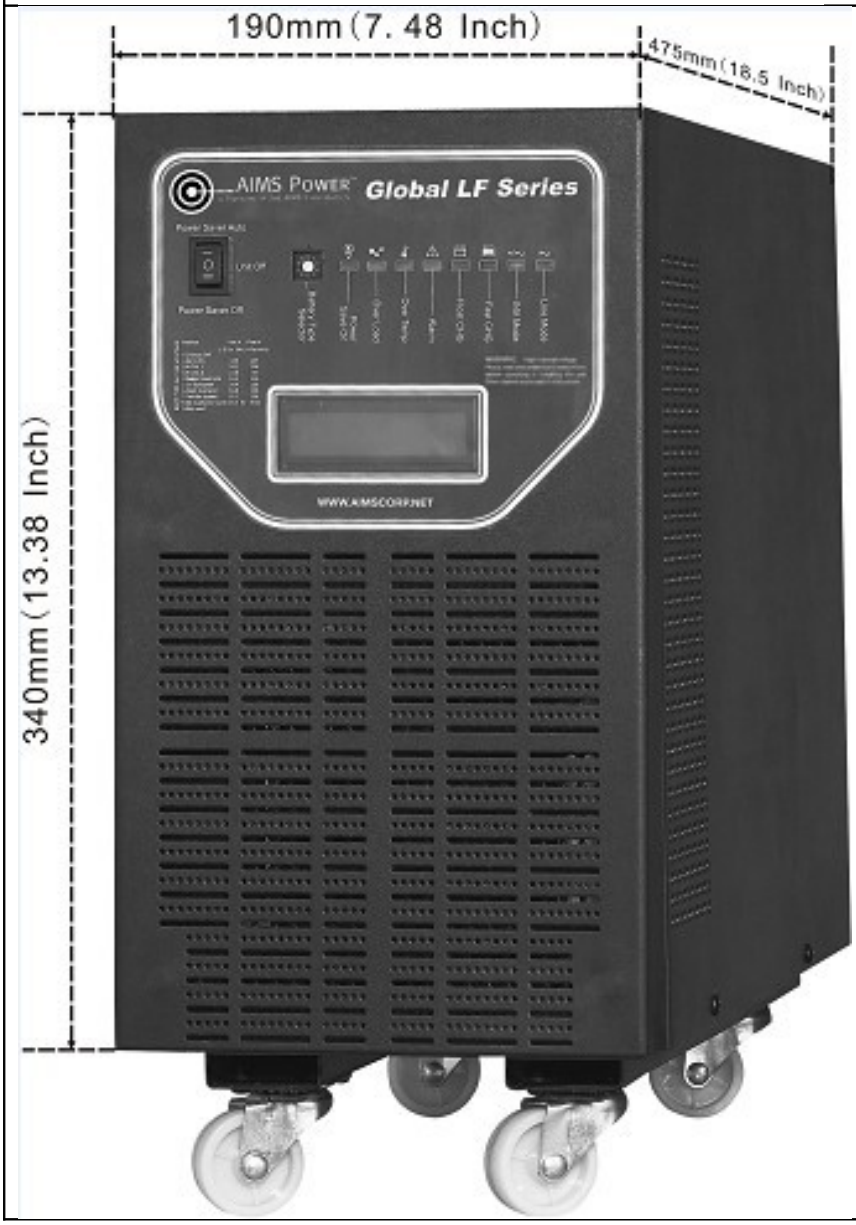
Connect an AWG 8 gauge or greater copper wire between the grounding terminal on the inverter and the earth grounding system or the vehicle chassis.

3.5 Install Flange



1-3KW Model





4-6KW Models

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.	Refer to the section on adjusting the “Charger Rate”. Source qualified AC power..

	Loose battery or AC input connections.	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, mainly there is one type of load which most likely may cause rattles of transformer.

That is half wave load: A load that uses only half 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 Operating in a condensing 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.

To activate the 1 year warranty on this product register it at:
http://www.aimscorp.net/product_registration.php
Save your receipt and/or invoice in case the product needs servicing.
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

Electrical Specifications								
	Model	1000W	1500W	2000W	3000W	4000W	5000W	6000W
Inverter Output	Continuous Output Power	1000W	1500W	2000W	3000W	4000W	5000W	6000W
	Surge Rating(20s)	3000W	4500W	6000W	9000W	12000W	15000W	18000W
	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	50Hz ± 0.3Hz/60Hz ± 0.3Hz						
	Short Circuit Protection	Yes(10s after fault)						
	Typical Transfer Time	10ms(Max)						
	THD	< 10%						
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	16.0Vdc						
	Low Battery voltage recover	15.5Vdc						
	Idle Consumption-Search Mode	< 25 W when Power Saver On						
Charger	Input Voltage Range	Narrow: 100~135VAC / 194~243VAC; **Wide: 90~135VAC / 154-264VAC;**						
	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
	Charger Breaker Rating(120Vac)	10A	20A	20A	30A	40A		
	Max Charge Rate	See specific charge rates in “2.5.2 AC Charger” section						
	Battery Initial Voltage for Start Up	10-15.7V for 12V(*2 for 24V, *4 for 48V)						
	Over Charge Protection Shutdown	15.7V for 12V (*2 for 24V, *4 for 48V)						
	Remote Control	Yes. Optional						
Bypass & Protection	Input Voltage Waveform	Sine wave (Grid or Generator)						
	Nominal Voltage	110Vac		120Vac		220Vac	230Vac	240Vac
	Max Input AC Voltage	150VAC				270VAC		
	Nominal Input Frequency	50Hz or 60Hz (Auto detect)						
	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						
	Overload protection(SMPS load)	Circuit breaker						
	Output Short circuit protection	Circuit breaker						
	Bypass breaker rating (230Vac)	10A	15A	20A	30A	30A	40A	40A
	Bypass breaker rating (120Vac)	20A	20A	30A	40A	50A		
AVR Function	Input AC Voltage Range	90-140V±4%				154-253V±4%		
	Stabilized Output Voltage rms	120VAC±10% RMS				230VAC±10% RMS		
Solar Charger	Rated Voltage	12V/24V						
	Solar Input Voltage Range	15-30Vdc/30-55Vdc						
	Max DC input Current	60A						
	Rated Charge Current	60A						
	Rated Output Current	15A						
	Self Consumption	< 10mA						
	Bulk Charge	14.5V(default)						(*2 for 24Vdc, *4 for 48Vdc)
	Floating Charge	13.5V(default)						
	Equalization Charge	14.0V(default)						
	Over Charge Disconnection	14.8V						
	Over Charge Recovery	13.6V						
	Over Discharge Disconnection	10.8 V(default)						
	Over Discharge Reconnection	12.3V						
	Temperature Compensation	- 13.2mV/℃						
	Ambient Temperature	0-40℃(full load) 40－60℃(derating)						
Mechanical Specifications	Mounting	Wall/Ground mount				Tower		
	Inverter Dimensions(L*W*H)	598*218*179mm 23.54*8.58*7.05”				470*190*340mm		
	Inverter Weight	21KG	22kg	23KG	27KG	38KG	48KG	51KG
	Shipping Dimensions(L*W*H)	775*335*325mm				660*400*500mm		
	Shipping Weight	24KG	25kg	26KG	30KG	45KG	55KG	58KG
	Display	Status LEDs / Status LEDs+LCD						
	Standard Warranty	1 Year						

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