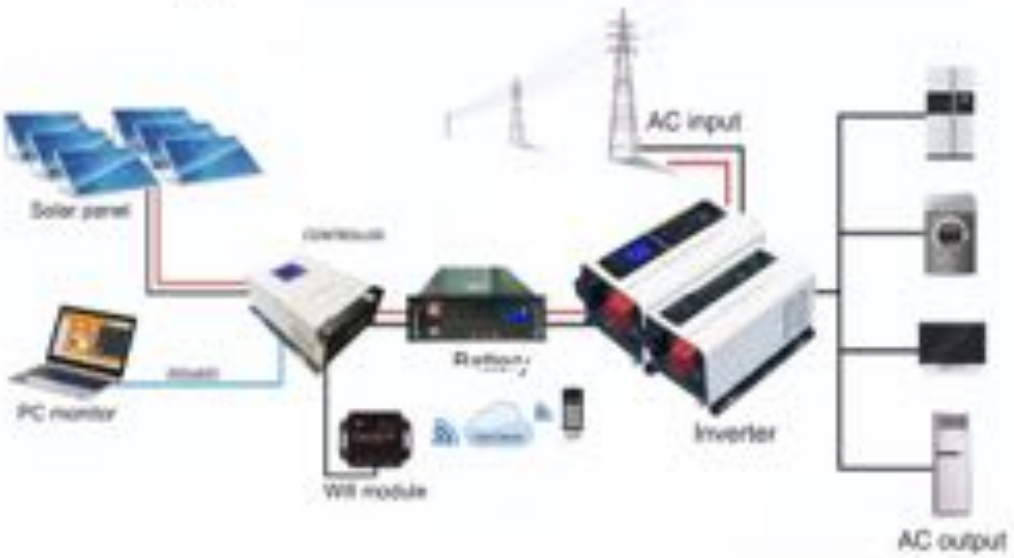
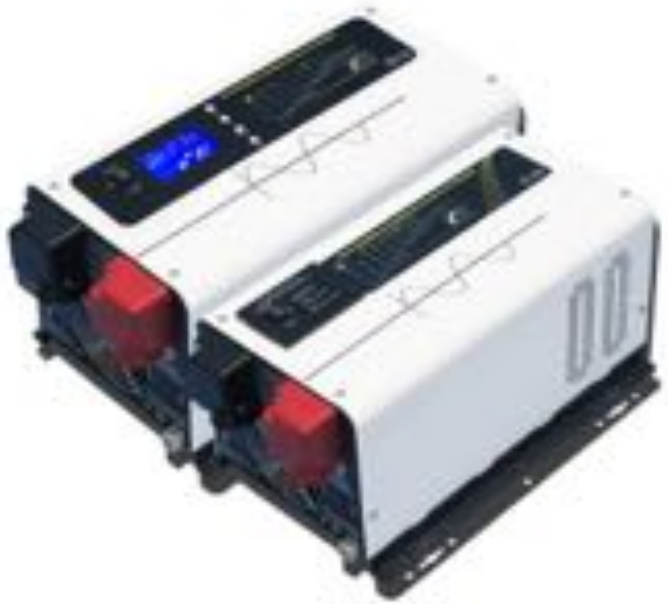
INVERTER USER MANUAL

CONNECTION DIAGRAM OF INVERTER



PURE SINE WAVE POWER INVERTER
WITH BATTERY CHARGER & UPS



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1. Important Safety Information

WARNING!

This manual contains important instructions for all Inverter/Charger models that shall be followed during installation and maintenance of the inverter.

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(11.81 inches) 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 a risk of fire and electronic shock. Make sure that existing wiring is in good electrical condition; and that wire size is not undersized. Do not operate the Inverter with damaged or substandard wiring.

1-1-3. This equipment contains components which can produce arcs or sparks. To prevent fire or explosion do not install in compartments containing batteries or flammable materials or in locations 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 dis-assemble the Inverter/Charger. It contains no user serviceable parts. Attempting to service the Inverter/Charger yourself may result in a risk of electrical shock or fire. Internal cthactors 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, PLEASE NOTE THAT THE HC/HP SERIES 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 soH and water. If acid enters eye, immediately flood eye with running cold water for at least 20 minutes and get medical attention immediately.

1-2-2. Never smoke or allow a spark or flame in vicinity of battery or engine.

1-2-3. Do not drop a metal tool on the battery. The resulting spark or short circuit on the battery of other electrical part 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 rechargeable batteries such as deep-cycle lead acid, lead antimony, lead calcium gel cell, absorbed mat, NiCad/NiFe or Lithium battery . Other types of batteries may burst, causing personal injury and damage.

2. Introduction

2.1 General Information

This 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 cHability to meet demanding power needs of inductive loads without endangering the equipment.

For the regular model, when utility AC power cuts offor falls out of acceptable rangel, 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 This Series Inverter is equipped with a powerful charger of up to110Amps (depending on model).The overload cHacity 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 battery in renewable energy systems. Thus, the Pure Sine Wave Inverter is suitable for Renewable energy system,Utility, RV, Marin and Emergency Hpliances.

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.

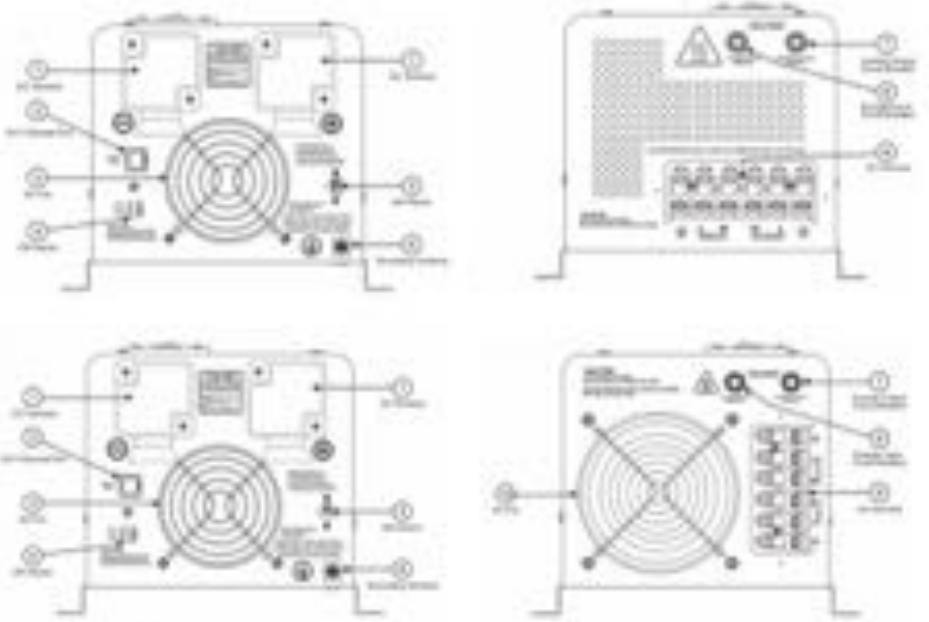
Household items – vacuum cleaners, fans, fluorescent and incandescent lights, shavers, sewing machines.

Kitchen Hpliances – 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



1 DC terminals
2 RJ11 Remote Port
3 DC Fan
4 SW1/SW2/SW3 Switches
5 SW4 Switch
6 Grounding terminals
7 Inverter Output Protection Circuit Breaker
8 Charger Input Protection Circuit Breaker
9 AC Terminal Block

2.4 Features

1. Smart Remote Control (RMT)
2. Designed to Operate under Harsh Environment
3. DC Start & Automatic Self-Diagnostic Function
4. Compatible with Both Linear & Non-Linear Load
5. Easy to Install & Easy to Operate & Easy to Solve
6. Low DC Voltage Supports Home & Office Hpliances
7. Powerful Charge Rate Up to 120Amp, Selectable From 0%-100%
8. High Efficiency Design & "Power Saving Mode" to Conserve Energy
9. Battery Priority Mode, Designates the Inverter-Preferred UPS Configuration
10. 13 Vdc Battery Recover Point, Dedicated for Renewable Energy Systems
11. 8 pre Set Battery Type Selector plus De-sulphation for Totally Flat Batteries
12. 4-step Intelligent Battery Charging, PFC (Power Factor Correction) for Charger
13. 8 ms Typical Transfer Time Between Utility & Battery, Guarantees Power Continuity
14. 15s Delay Before Transfer when AC Resumes, Protection for Load when Used with Generator

2.5 Electrical Performance

2.5.1 Inverter

Topology

The This inverter/charger is built according to the following topology:

Inverter: Full Bridge Topology

AC Charger: 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 10% (Mi<5%, Max 15%) depending of load connected and battery voltage.

The peak efficiency is 88%.

Overload Chacity

The HC/HP/This series inverters have different overload chacities, making it ideal to handle demanding loads.

1 For 110%<Load<125%(±10%), no audible alarm in 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 the 1 minute.

3 For 300%≥Load>150%(±10%), beeps 0.5s every 1s and Fault(Turn off) after 20s.

2.5.2 AC Charger

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, charger is able to output max current as long as 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 inverter is with a strong charging current of 120Amp (for 4KW,12V), 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 chacity 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 charging function.

There are mainly 3 stages:

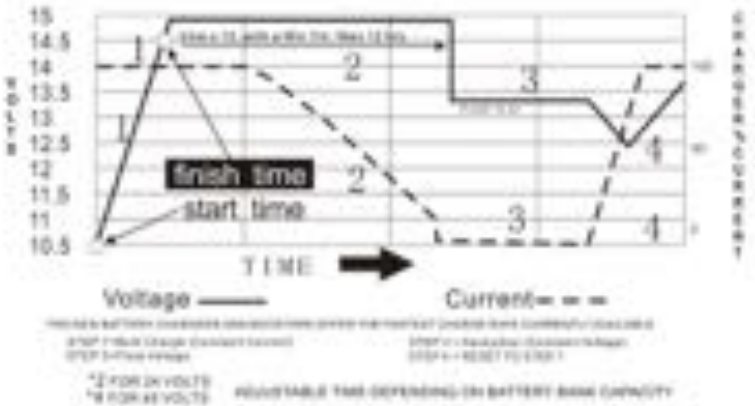
Bulk Charging: This is the initial stage of charging. While Bulk Charging, the charger supplies the battery with controlled constant current. The charger will remain in Bulk charge until the Absorption charge voltage (determined by the Battery Type selection) is achieved. Software timer will measure the time from A/C start until the battery charger reaches 0.2v below the boost voltage, then take this time as T0 and T0×2 = 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 fl oat 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/48Vdc, the charger will reset the cycle above.

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

Table 2.5.1 Battery Charging Processes



*2 FOR 24 VOLTS
*4 FOR 48 VOLTS

Table 2.5.2 Battery Type Selector

Switch Setting	Description	Fast Mode / VDC	Float Mode / VDC
0	Charger Off		
1	Gel (Std)	U401	U417
2	AGM 1	U412	U424
3	LiFePO4	U420	U37
4	Sealed Lead Acid	U424	U38
5	Gel (U.S.)	U414	U34
6	Open Lead Acid	U408	U44
7	Calcium	U411	U24
8	De-sulphation	2.5 V/ Hours then Off	

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

De-sulphation

The de-sulphation cycle on switch position 8 is marked in red because this is a very dangerous setting if you do not know what you are doing. Before ever 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(ner), or if the batteries have been left 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 taking a charge and thus allow the plates to clean up and so accept charge once again.

Charging depleted batteries

The inverter allows start up and through power with depleted batteries.For 12VDC model, after the battery voltage goes below 10V, if the switch is still (and always) kept in "ON" position, the inverter is always connected with battery, and the battery voltage does not drop below 2V, the inverter will be able tochargethe battery once qualified AC inputs are present.Before the batteryvoltage 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 accidentlyturn the switch to OFF or disconnect the inverter from battery, the inverter will not be ableto charge the battery once again, because the CPU loses memoryduring this process.

Tabel 2.5.3 AC Charging Current for model

Model	Battery Voltage	AC Charger Current Max	Model	Battery Voltage	AC Charger Current Max
1.0KI	11 Vdc	40 ± 3 Amp		11 Vdc	70 ± 3 Amp
~	24 Vdc	15 ± 3 Amp	2.0KI	24 Vdc	35 ± 3 Amp
1.5KI	48 Vdc	15 ± 3 Amp		48 Vdc	25 ± 3 Amp
3.0KI	11 Vdc	80 ± 3 Amp		11 Vdc	120 ± 3 Amp
	24 Vdc	40 ± 3 Amp	4.0KI	24 Vdc	60 ± 3 Amp
	48 Vdc	15 ± 3 Amp		48 Vdc	40 ± 3 Amp
5.0KI	11 Vdc	80 ± 3 Amp	6.0KI	11 Vdc	90 ± 3 Amp
	48 Vdc	15 ± 3 Amp		48 Vdc	40 ± 3 Amp
8.0I	11Vdc	150 ± 3 Amp	10.0KI	48Vdc	80 ± 3 Amp
	48Vdc	30 ± 3 Amp	12.0KI	48Vdc	120 ± 3 Amp

The charging capacity will go to peak in around 3 seconds. This may cause a generator to drop frequency, making inverter transfer to battery mode.It is suggested to gradually put 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 onthe size of the generator and rate of charge.

2.5.3 Transfer

While in the Standby Mode, the AC input is continually monitored. Whenever ACpower 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 Hpliances - as long as the inverter is turned on.The transfer from Standby mode to Inverter mode occurs in Hproximately 8 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 fromthe 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 with Auto frequency adjust function.The factory default configuration for 220/230/240VAC inverter is 50Hz, and 60Hz for 100/110/120VAC inverter. While the output freq can be easily changed once a qualified freq is hplied to the inverter. If you want to get 60Hz from a 50Hz inverter, just input 60Hz power, and the inverter will automatically adjust the output freq to 60Hz and vice versa.

2.5.5 Solar Charger

Listed are the specifications for solar charger.

Table 2.3 Electrical Specification @ 25℃

Rated Voltage	12Vdc	24Vdc	48Vdc
Rated charge current	30-100Amp		30-100Amp
Input voltage range	15～150Vdc@12V 15～150Vdc@24V		30～150Vdc@48V
Max. PV open circuit array voltage	150Vdc		
Typical idle consumption	Around 1	10mA	
Bulk charge	14.4Vdc	28.2Vdc	56.4Vdc
Floating charge	13.4Vdc	26.8Vdc	53.6Vdc
Equalization charge	14.0Vdc	28.0Vdc	56.0Vdc
Over charge disconnect	14.8Vdc	29.6Vdc	59.2Vdc
Over charge recovery	13.6Vdc	27.2Vdc	54.4Vdc
Over discharge disconnect	10.8Vdc	21.6Vdc	43.2Vdc
Over discharge reconnect	12.5Vdc	24.8Vdc	49.6Vdc
Temperature compensation	-3.2mV/℃	-6.4mV/℃	-9.6mV/℃
Lead acid battery settings	Adjustable		
NiCad battery settings	Adjustable		
Low voltage reconnect	12.0-14.0Vdc	24.0-28.0Vdc	48.0-56.0Vdc
Low voltage disconnect	10.5-12.5Vdc	21.0-25.0Vdc	42.0-50.0Vdc
Ambient temperature	0-40℃ (Full load) 40-60℃ (Derating)		
Altitude	Operating 5000m, Non-Operating 15000m		
Protection class	IP21		
Battery temperature sensor①	BTS Optional remote battery temperature sensor for increased charging precision		
Terminal size (Bare/single wire)	#8 AWG		

NOTE:

① The optional battery temperature sensor automatically adjusts the charging process of the controller according to the type of battery that is selected by user through battery type selector. With the battery temperature sensor installed, the controller will increase or decrease the battery charging voltage depending on the temperature of the battery to optimize the charge to the battery and maintainoptimal performance of the battery.

Maximum Power Point Tracking (MPPT) Function

Maximum Power Point Tracking, frequently referred to as MPPT, is an electronicsystem that operates the Photovoltaic (PV) modules in a manner that allows themodules to produce all the power they are capable of. The PV-seeker Charge controller is a microprocessor-based system designed to implement the MPPT. And it can increase charge current up to 30% or more compared to traditional charge controllers (see figure 1).

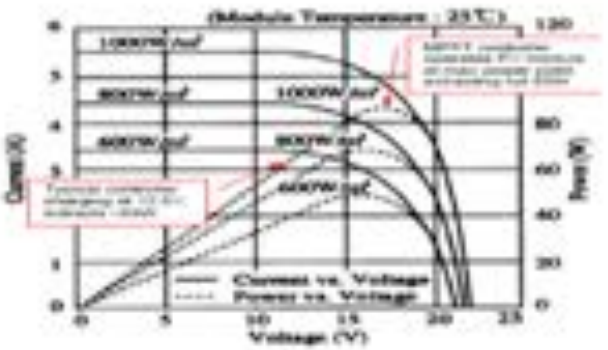


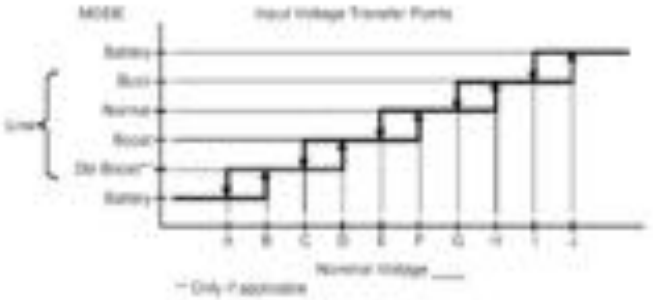
Figure 1 Current, Power vs. Voltage Characteristics

The Charge controller built in is with 12/24V battery voltage auto detecting function. For 12VDC inverter, the output voltage of solar charger will be accordingly 12VDC, and the qualified DC input volt range is 15v-150VDC.For 24VDC inverter, the output voltage of solar charger will be accordingly 24VDC, and the qualified DC input volt range is 30v-150VDC.If the voltage fallsout 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 full series of Pure Sine Wave Inverter/ Charger except instead of simply bypassing the input AC to power the loads, the inverter stabilizes the input AC voltage to a range of 230V/120V±10%.Connected with batteries, the inverter will function as a UPS with max transfer time of 10 ms.With all the unique features our inverter provides, it will bring you long-term trouble free operation beyond your expectation.

Table 2.5.5 Input Voltage Transfer Points



(Optional)	this Series					
	(NA/JPN)			(INT'L)		
Acceptable input Voltage Range (Vac)	0-150			0-300		
Nominal Input Voltage: (Vac)	100	110	120	220	230	240
(A) Line low loss N/W (On battery)	75/85	84/72	92/78	168/145	176/154	185/158
(B) Line Low comeback N/W (On Boost)	80/70	88/77	97/83	178/151	186/160	195/168
(C) Line 2nd boost threshold (On Boost)	**	**	**	**	**	**
(D) Line 2nd boost comeback (On Normal)	**	**	**	**	**	**
(E) Line 1st boost threshold (On Boost)	90	99	109	198	207	219
(F) Line 1st boost comeback (On Normal)	93	103	112	205	215	225
(G) Line buck comeback (On Normal)	106	116	126	231	246	256
(H) Line buck threshold (On Buck)	110	121	132	242	253	264
(I) Line high comeback (On Buck)	117	127	139	253	260	278
(J) Line high loss (On Battery)	120	132	144	263	276	288

2.5.7 Power Saver Mode

There are 3 different working status for this inverter: "Power Saver Auto" "Power Saver Off" and "Power Off". When power switch is in "Unit Off" position, the inverter is powered off.When 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 Hpliance). 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 load for 25Ωms every 00 seconds. This cycle can be customized to 2 seconds turn SW3 on the DIP switch.

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

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.

2.5.8 Protections

The This 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 batter voltage trip point can be customized from defaulted value 10VDC to 18.5VDC thru the SW1 on DIP switch.The inverter will go to Over temp protection when heat sink temp. ≥105℃, and go to Fault (shutdown Output) after 10 seconds. The switch has to be reset to activate the inverter.The Inverter has back feeding protection which avoids presenting an AC voltage on the AC input terminal in Invert mode.After the reason for fault is cleared, the inverter has to be reset to start working.

2.5.9 Remote control （Optional）

Hart from the switch panel on the front 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.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 accept command according to the following priority:Power saver on> Power saver off> Power offOnly when both panels are turned to "Unit Off" position will the inverter be powered off.The Max length of the cable is 10 meters.

IN GENERAL

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.

Installation requirements

According to the local power requirements, the inverter should be installed in a dry, clean and well ventilated place.
Working temperature: - 10 ℃ - 40 ℃ Storage temperature: - 40-70 ℃ ℃
Relative humidity: 0% - 95%, non condensing Cooling: Forced ventilation

2.5.10 LED Indicator & LCD

Table 2.5.7 LED Indicators

PV CHARGE	GREEN LED lit as PV Mode
MSOBE POWER ON	GREEN LED lit as AC Mode
INVERTER ON	GREEN LED lit as Inverter Mode
FAST CHARGE	Yellow LED lit as Fast Charging Mode
FLOAT CHARGE	GREEN LED lit as Float Charging Mode
OVER TEMP TRIP	RED LED lit as Over Temperature
OVER LOAD TRIP	RED LED lit as Over Load
POWER SAVER ON	GREEN LED lit as Power Saver Mode (Power Saver Load: 0.25W)

Table 2.5.8 LCD Indicator

2.5.11 FAN Operation

For 1-3KW, there is one multiple controlled DC fan which starts to work according to the following logic.For 4-6KW, there is two multiple controlled DC fan and one AC fan. The DC fan will work in the same way as the one on 1-3KW, 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(Refer to Table 2.5.10):

Table 2.5.10 Fan Operation Logic

Switch NO	Switch Function	Position: 0	Position: 1
SW1	Battery/AC Priority	Utility Priority	Battery Priority
SW2	AC Input Range	184-253VAC	154-264VAC(40Hz+)
SW3	Load Sensing Cycle	30 seconds	3 seconds

SW1:Solar/AC 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, the inverter will start a battery inverting cycle to protect the battery. After 1 cycle normal charging and ac through put will be restored.The AC Priority and Battery Priority switch is SW4. When you choose battery priority, the inverter will inverting from battery despite the AC input. Only when the battery voltage is reaches low voltage alarm point(10.5V for 12V), the inverter transfers to AC input, charges battery, and switches back to battery when battery is charged full. This function is mainly for wind/solar systems taking utility power as back up.

SW2: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 (100-115V 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 154-253VAC (90-135V for 120VAC model), this helps to power loads with the most AC input power without frequent switches to the battery bank.

SW3:Power Saver Auto Setting :

The inverter is factory defaulted to detect load for 250ms in every 5 seconds. This cycle can be customized to 3 seconds through the DIP switch.

2.5.12 Other features

Battery voltage recover start

After low battery voltage shut off (10V for 12V model/20V for 24V model/40V for 48V model), the inverter is able to restore operation after the battery voltage recovers to 12Vdc/24Vdc/48Vdc (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 fi

Conformal Coating

The entire line of inverters have been processed with a conformal coating on the PCB, making it water, rust, and dust 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℃

Storage temperature: -40-70℃

Relative Humidity: 0%-95% , non-condensing

Cooling: Forced air

3.2 DC Wiring recommendation

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.

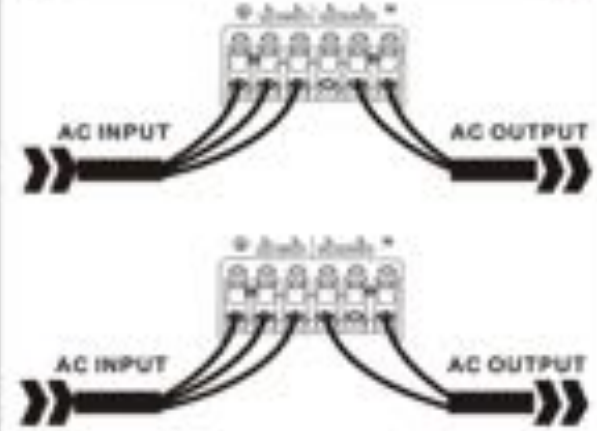
Model/Watt	Battery Voltage	Wire Gage (Mm²)		Model/Watt	Battery Voltage	Wire Gage (Mm²)	
		0~1.0m	1.0~5.0m			0~1.0m	1.0~5.0m
1.000 ~ 1.500	12 Vdc	30mm²	40mm²	3.000	12 Vdc	60mm²	75mm²
	24 Vdc	15mm²	20mm²		24 Vdc	30mm²	40mm²
	48 Vdc	10mm²	15mm²		48 Vdc	15mm²	25mm²
2.000	12 Vdc	60mm²	100mm²	4.000	12 Vdc	120mm²	150mm²
	24 Vdc	40mm²	60mm²		24 Vdc	60mm²	75mm²
	48 Vdc	25mm²	30mm²		48 Vdc	30mm²	40mm²
3.000	24 Vdc	75mm²	95mm²	5.000	24 Vdc	95mm²	120mm²
	48 Vdc	40mm²	50mm²		48 Vdc	40mm²	60mm²
5.000	24 Vdc	120mm²	150mm²	10.000	48 Vdc	75mm²	95mm²
	48 Vdc	60mm²	75mm²	12.000	48 Vdc	95mm²	120mm²

Please note that if there is a problem obtraining for example 90mm²cable, use 2*50mm²or 3*25mm². One cable is always best , but cable is simply copper and all you require is the copper, so it does not matter if it is one cable or 10 cables as long as the square area adds up. Performance of any product can be improved by thicker cable and shorter runs, so if in doubt round up and keep the length as short as possible.

3.3 AC Wiring

We recommend using 10-14awg wire to connect to the ac terminal block.

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	

⚠ 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 Hpliance.

4. Troubleshooting Guide

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

Line Mode	CC	○	○	○	○	○	○	○	○	○	○	○
	CV	○	○	○	○	○	○	○	○	○	○	○
	Float	○	○	○	○	○	○	○	○	○	○	○
	Standby	○	○	○	○	○	○	○	○	○	○	○
Inverter Mode	Inverter On	○	○	○	○	○	○	○	○	○	○	○
	Power Save	○	○	○	○	○	○	○	○	○	○	○
Inverter Mode	Battery Low	○	○	○	○	○	○	○	○	○	○	Beep 0.5s every 1s
	Battery High	○	○	○	○	○	○	○	○	○	○	Beep 0.5s every 1s
	Overload On Inverter Mode	○	○	○	○	○	○	○	○	○	○	Refer to "Audible alarm"
	Over Temp On Inverter 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 Fred Short	○	○	○	○	○	○	○	○	○	○	Beep continuous

Status	Mode	OFF Indicator on Inverter							ON Indicator on Inverter				Note
		1	2	3	4	5	6	7	8	9	10	11	
Line Mode	LO						√		√	√			
	LO						X Flash		√	√			
	Fault					√			√	√			
	Standby								√				
Inverter Mode	Inverter On							√			√		
	Normal Mode	√											
Battery Mode	Battery Low				√			√			√	√	Beep every 1 second.
	Battery High				√			√			√	√	Beep every 1 second.
	Overload On Inverter Mode		√		√			√			√	√	Beep every 1 second.
Standby Mode	Over Temp On Inverter Mode			√	√			√			√	√	Beep every 1 second.
	Over Temp On Line Mode			√	√		√		√	√		√	Beep every 1 second.
	Over Charge				√		√		√	√		√	Beep every 1 second.
Fault Mode	Fan Lock												Beep continuously
	Battery High							√			√		Beep continuously
	Inverter Mode Overload		√										Beep continuously
	Output Short												Beep continuously
	Over Temp			√									Beep continuously
	Over Charge						√			√			Beep continuously
	Bad Fuse Open												Beep continuously

Symptom	Possible Cause	Recommended Solution
Inverter will not turn on during initial power up.	Batteries are not connected. Loose battery cable 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 saving on or Power on/ off position.
AC output voltage is low and the inverter name beats OFF as a alarm tones.	Low battery.	Check the condition of the batteries and recharge if possible.
Charger is inoperative and 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 "Charge Rate". Assure qualified AC power. Check all DC -AC connections.
Charger turns OFF while charging from a generator.	High AC input voltage from the generator.	Load the generator down with a heavy load. Trim 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 severe AC voltage in the UPS switch, or install a UPS if possible.
Noise from transformer?	Highway specific loads such as hair dryer.	Remove the loads

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

When in inverter mode and the transformer and/or case of the inverter sometimes may vibrate and make noise. The noise may come from transformer.According to the characteristics of our inverter, there is one type of load which will most likely to cause rattles of transformer, that is a half-wave load, loadthat uses only a half cycle of the powersee figure 1). This trends to cause imbalance of magnetic fieldof transformer, reducing its rated working freq from 20KHz to, say, maybe 15KHz (it varies according to different loads). This way, the freq of noise falls exactly into the range (200Hz-20KHz) that human ear can sense.The most common load of such kind is hair drier.

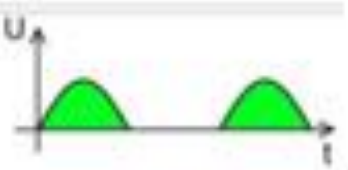


Figure 1

If the noise comes from case.

Normally when loaded with inductive loads, the magnetic field generated by 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 chacity 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 wet environment.

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

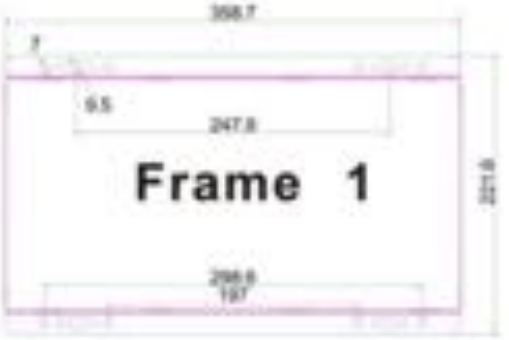
6. Product parameters

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

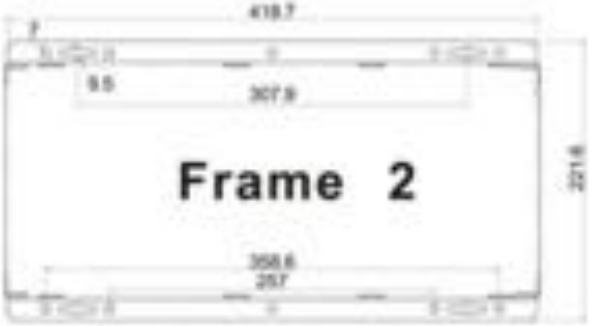
Parameter								
	Model (HC)	1000W	1500W	2000W	3000W	4000W	5000W	7000W
	Continuous Output Power	1000W	1500W	2000W	3000W	4000W	5000W	7000W
	Surge Rating(20s)	3000W	4500W	6000W	9000W	12000W	15000W	21000W
	Capable of Starting Electric Motor	1HP	1.5HP	2HP	3HP	4HP	5HP	7HP
1SVAC/DC Output	Output Waveform	Pure Sine wave(Same as input/Bypass mode)						
	Nominal Efficiency	>88%(Peak)						
	Line Mode Efficiency	>90%						
	Power Factor	0.9						
	Nominal Output Voltage	100-110-120Vac / 220-230-240Vac						
	THD	< 10%						
DC Input	Nominal Input Voltage	12.0VDC 24VDC, 48VDC						
	Minimum Start Voltage	10.6VDC						
	Idle Consumption (search Mode	< 15 W when Power Saver On						
Charge	Input Voltage Range	Wide: 90~135VAC / 164~243VAC Narrow: 100~135VAC / 154~243VAC						
	Output Voltage	Depends on battery type						
	Max Charge Rate	35A / 70-80A Max (Charger Current Control)						
	Remote Control	Yes, Optional						
Bypass & Protection	Input Voltage Waveform	Sine wave (Grid or Generator)						
	Nominal Voltage	120Vac				230Vac		
	Low Voltage Trip	86Vac/90Vac±4%				154Vac/164Vac±4%		
	High Voltage Trip	140Vac±4%				264Vac±4%		
	Max Input AC Voltage	150VAC				276VAC		
	Nominal Input Frequency	50Hz or 60Hz (Auto-detect)						
Mechanical Specification	Mounting	Wall mount						
	Inverter Dimension(L*W*H)	38.2*21.8*16.6mm		44.2*21.8*19.6cm		60.4*21.8*19.6cm		
	Inverter Weight	10KG	10KG	13KG	21KG	19KG	19KG	34KG
	Shipping Dimension(L*W*H)	51.5*33.5*40.6mm		58.5*33.5*40.6mm		76.5*33.5*39.6mm		
	Shipping Weight	14KG	15KG	21KG	24KG	23KG	24KG	38KG
	Display	Status LEDs / Status LEDs+LCD						

The controller is equipped with 20-120a

7. base installation



1-1.5KW base



2-3KW base

4-7KW base