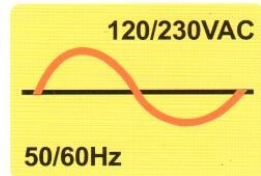


Power Star LW

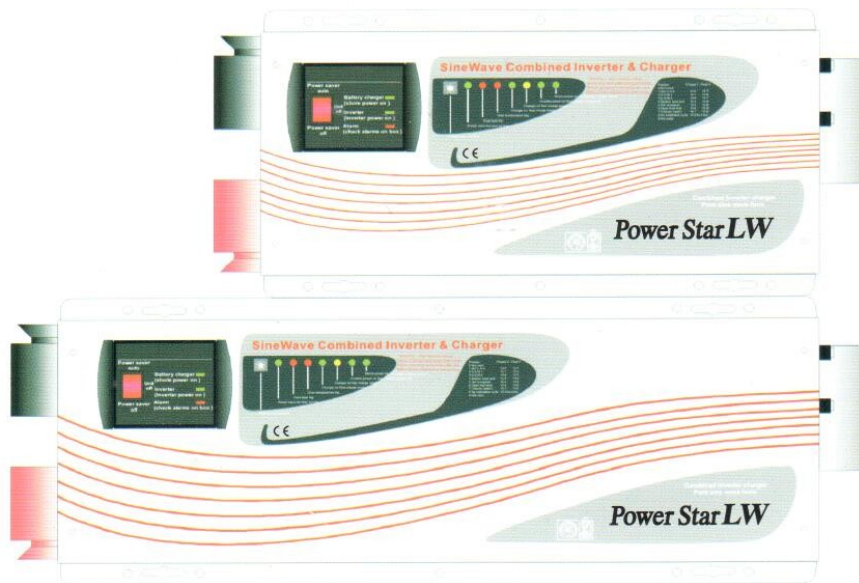
Product Information Guide



1000W	4000W
2000W	5000W
3000W	6000W

Continuous power with P.F.C charger

Sine Wave Combined Inverter & Charger



Models:

LW1000-12, LW1000-24, LW1500-12, LW1500-24, LW2000-12
LW2000-24, LW3000-12, LW3000-24, LW3000-48, LW4000-24
LW4000-48, LW5000-24, LW5000-48, LW6000-24, LW6000-48



Combined Inverter & Charger

Basic wiring for the Power Star LW Series

Warning: High voltage, do not open unless qualified to do so; Please read instructions before working on this product.



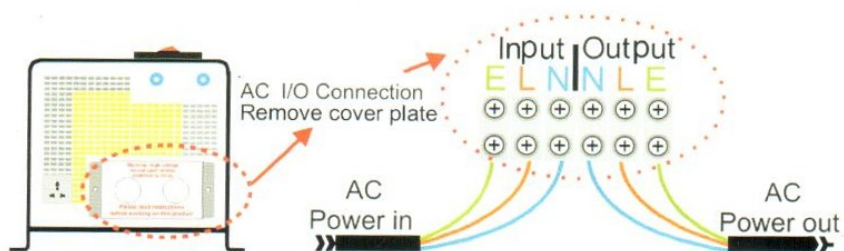
Main domestic battery bank

When the PS LW is in the inverter mode the "through the box" earth line is automatically disconnected from the input earth and joined to the output neutral, complying with the natural earth inverter requirements if you want to maintain a trough earth simply connect the input earth to the output earth.

WHAT CABLE TO USE in mm²

A charger or inverter	Cable run distance 0-1.54m	Cable run distance 1.5-4.0m
125-180A	50mm ²	70mm ²
180-330A	70mm ²	90mm ²

Please note that if there is a problem obtaining, for example 90 mm² cable, use 2*50 mm², or 3*35 mm². To adopt one cable is always the best, cable is simply copper and all require ins the copper, so it does not matter if it is one cable for ten cables as long as the square areas adds up. Performance of any products can be improved by thicker cable and shorter runs, so if just keep the length as short as possible.



Check list

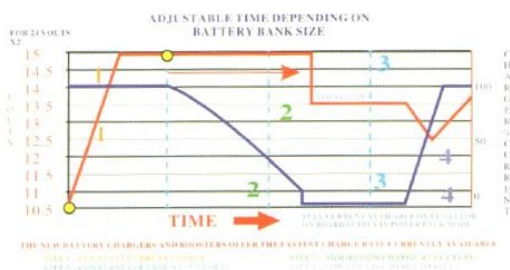
- 1) Ensure that the inverter has the correct DC voltage for your boat or vehicle system. ie 12v or 24v/48v.
- 2) Fit as close to the batteries as possible, the shorter the DC cables the better. Voltage drop on long cables will effect the unit's performance.
- 3) Do not reverse the cables! Connect the red cable to the positive terminal and the black cable to the negative terminal of the battery. In the event of reverse polarity the unit could be totally destroyed.
- 4) Always use the inverter in an environment which is well ventilated, not exposed to direct sunlight or a heat source, away from water, moisture, oil or grease, away from any highly inflammable substance, out of reach from children.
- 5) The output voltage of this unit must never be on your AC system at the same time as any other AC source such as the 230V external mains line or a generator. All external power must go through the PS LW.
- 6) Always switch on the PS LW first, before plugging in any appliance.
- 7) Under new electrical legation only professional electrocutions should install the product. Ensure the fitting instructions are fully understood before fitting this product.

Installation

- 1) Position the unit as close to the main battery bank as possible
- 2) Position in a cool, dry & well ventilated space.
- 3) Orientation of the unit is not critical.
- 4) Either purchase the standard cable set from Dealer which is about 1.5 meters, or if using your own cable, use the cable size chart provided on the installation drawing to ensure you have thick enough cable for the DC leads. In the event of not being able to get the size requested (it can be hard to get thick cable) then simply add multiple length of thinner cable, i.e. if you cannot get 90 mm² cable then use 3*35 mm² cable, at the end of the day its just copper we need.
- 5) Fit a fuse suitable for the job, again look at the installation drawing. We have a full range of high current fuses in the GANLR range of gold fuse products, ranging from 100500 Am Ps. on the DC side
- 6) Connect the cables from the batteries to the fuse then to the unit, this way if there is a fault at the unit the fuse is already in place and this will be safe. In the event of a isolation switch being used, please ensure the rating of the switch can handle the power of the unit.
- 7) Ensure the unit is switched off during installation.
- 8) On the AC side ensure the shore power (all external AC sources) are totally disconnected, connect the output from the inverter to suitable Residual Current Breaker (R.C.D for the earth protection) and current over load trips Fuse the AC input side depending on through power requirements, the max through power is 30Am Ps, so fuse at 40A (allowing also for charger consumption) if you intend to use the full through power for standard 1316 amps throughput then a 20A fuse would be appropriate.
- 9) We recommend Multi core tri rated AC cable, if used on a boat or vehicle, as this is much safer where vibration is likely. Only use single solid household AC cable if the product is being used as a power source for a house or platform free of vibration.
- 10) Before attempting to switch on the unit, please ensure you have selected the correct battery type on the small battery type selector switch on the front of the main box, rotate the switch to your battery types. The progressive charge control software will automatically adjusted for battery bank size and state

Charge Stage Transition Definitions

- Boost CC Stage: If AC input is applied, the charger will run at full current in CC mode until the charger reaches the boost voltage.
- Software timer will measure the time from AC start until the battery charger reaches 0.3V below the boost voltage, then take this time as T_0 and $T_0 * 10 = T_1$.
- Boost CV Stage: Start a T_1 Timer; the charger will keep the boost voltage in Boost CV mode until the T_1 Timer has run out. The drop the voltage down to the float voltage. The timer has minimum time of 1 hour and a maximum time of 12 hours.
- Float Stage: In float mode, the voltage will stay at the float voltage.
- If the AC is reconnected or the battery voltage drops below 12Vdc/24Vdc, the charger will reset the cycle above.
- If the charge maintains the float state for 10days, the charger will reset the cycle.



The battery type and charge voltage recommendations are set out above For 24V unit x the above by

2. Some battery types may look confusing such as GEL USA and GEL EURO, AGM USA and AGM EURO. If you find this confusion then join the club, we had the different voltage curves supplied to us by different companies from the U.S.A. and Europe for what we seem the same product, however it's not our call, we simply supply the options, if in doubt call your battery supplier and ask which charge voltage they want you to use for their battery type, and select the closest to it. If totally confused then use the lower voltage setting until you have had a higher voltage setting confirmed to you by whoever supplied the batteries to you.

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 even 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 left discharged so low that they will not accept a charge. This cycle is very high voltage charge cycle designed to try to break down the sulphate 'crust' that is preventing the plates taking a charge and thus allow the plates to clean up and so accept charge once again.

How to use this function. (only suitable for open lead acid batteries)

- 1) Ensure the battery bank is totally isolated from anything else on the boat or vehicle; the high voltage applied by this setting could destroy all your electronics and other electrical equipment still connected (hence all these instructions are in red, this is a very dangerous mistake.)
- 2) Make sure the battery compartment is very well ventilated and battery caps are removed.
- 3) Switch the battery type selector to the correct position, then switch the AC power on.
- 4) Because this is such a dangerous setting there is a 4 hr time out period build into the software, however on a very large battery bank this may not be enough and the unit may need to be switched off and on again to do another cycle.
- 5) What to expect on this cycle.

I would recommend you monitor the voltage of the sulphated battery bank. When you switch on the cycle the voltage should shoot up to the full 15.5volts very fast (within minutes) this is because the batteries cannot accept the charge (assuming they are sulphated). However, over a period of 1-2 hrs the voltage should start to drop (as the plates start to clean and the batteries start to take charge) the voltage could drop way down to about 12.5 volts then start to rise. These shows the batteries are now taking a charge and starting to fill up. In this case it would be safe to switch the unit off and select your normal charging curve and hopefully this will bring your batteries back from the dead. You may need to repeat the process a few times. Please note this is a professional guess tool, which most times helps, but its not magic, so expect the worst and hope for the best. Never leave a system unattended when on this mode. If the battery temperature reaches above 50deg c (ie. If the batteries are almost too hot to touch) then stop the process).

Install remote control.

Isolate the unit before attempting this so there are no high voltages. The local control panel on the front of the unit can also be used as a remote control, reveal the screws holding the panel onto the main box, carefully remove the panel and disconnect it from the connection socket behind the unit. Using the remote cable supplied then reconnect the panel to the unit

Operation and what to expect

- 1) After the unit is installed, using the panel on the front of the unit, and with the shore power (120/230VAC) still disconnected, switch the unit on. The leds will cycle through the test routine, then the unit should go into inverter mode and 120/230V should be produced on the output AC terminals (provided the batteries are over 11 volts).
- 2) If the above is ok, then connect the shore power to feed 120/130V into the PS LW, after a short while, the inverter should go off line, and feed the shore power through the inverter. Changeover is about 20 millisees (so fast that you should not be able to notice it) and the battery charger should come online and go through it's charge sequence ending, after 110hrs, with float voltage.

Common Faults:

There are numerous faults which the unit can detect and transmit the fault to you by the use of LED lights and alarm on the unit itself. The remote control gives a little help but the real fault finding can only take place at the unit. Please see the fault finding chart over the page for full information.

General specification

Power star LW

Input Wave Form:	Sine wave (Utility or Generator)					
Nominal Voltage:	120VAC	230VAC				
Low Voltage Trip:	90V±4%	184V/154V±4%				
Low Voltage re engage:	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 (Auto detect)					
Low freq trip:	47Hz for 50Hz, 57Hz for 60Hz					
High freq trip:	55Hz for 50Hz, 65Hz for 60Hz					
Output wave form:	(Bypass mode) same as input					
Overload protection:	Circuit breaker					
Short circuit protection:	Circuit breaker					
Transfer switch rating:	30amp or 40amp					
Efficiency on line transfer mode:	95%+					
Line transfer time:	10ms Typical					
Bypass without battery connected:	Yes					
Max bypass current:	30amp or 40amp					
Bypass over load current:	35amp or 45amp: Alarm					
Inverter Specification/output						
Output wave form:	Pure sine wave					
Output continuous power Watts:	1000	2000	3000	4000	5000	6000
Output continuous power VA:	1000	2000	3000	4000	5000	6000
Power factor:	0.9-1.0					
Nominal output voltage rms:	120/230VAC					
Output voltage regulation:	+/- 10% RMS					
Output frequency:	50Hz ± 0.3Hz or 60Hz ± 0.3Hz					
Nominal efficiency:	>88%					
Surge ratings:	3000	6000	9000	1200	1500	18000
Short circuit protection:	Yes, fault after 10 secs					
Inverter Specification/input						
Nominal Input voltage:	12V	24V	48V			
Minimum start voltage:	10V	20V	40V			
Low battery alarm:	10.5V	21V	42V			
Low battery trip:	10V	20V	40V			
High voltage alarm:	16V	32V	64V			
Power saver:	Below 25 watts when enabled					
Power saver:	Same switched on/off on remote					
Charger Mode specification						
Input voltage range:	95-127VAC 194243VAC/164243VAC(W)					
Output voltage:	Dependent on battery type					
Charger current:	35A / 70A					
Battery initial voltage for start up:	0-15.7v for 12v (*2 for 24v, *4 for 48v)					
Over charge protection shutdown:	15.7v for 12v (*2 for 24v, *4 for 48v)					
Charger curve(4 stage constant current)Battery types						
4 step digital controlled progressive charge						
Battery type:	Fast V	Float V (*2 for 24v, *4 for 48v)				
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				
Desulphation	15.5 for 4hrs					
Remote control/RS232/USB	Yes, Optional					
Size: in mm	1000/2000/3000 Model : 442*218*179					
	4000/5000/6000 Model : 598*218*179					
Weight:	1000	2000	3000	4000	5000	6000
	18kg	20kg	22kg	35kg	38kg	40kg

Ordering Information

Typical part number ▶ **LW - 1000 - E - 12**

1. Basis series

Low frequency pure sine wave
Inverter & Charger

2. Power Rating

1000=1000W 2000=2000W 3000=3000W
4000=4000W 5000=5000W 6000=6000W

3. AC Voltage

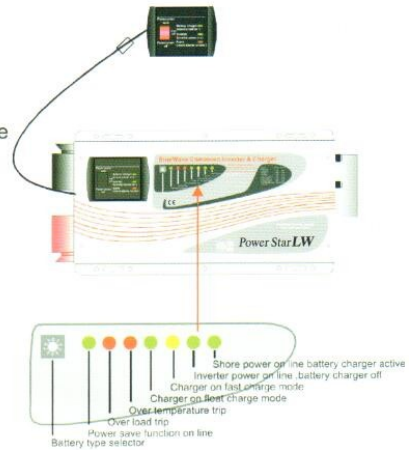
E=110VAC NC=220VAC

3. Battery Voltage

12=12VDC 24=24VDC 48=48VDC

Remote control installation

remove 4 screws holding this panel and disconnect the cable behind it



Indication & fault finding chart

Status	Function	L.E.D.s on main unit			L.E.D.s on remote		
Charge Function	Constant current charge	on	on	on	on	on	on
	Constant voltage charge	flash	on	on	on	on	on
	Float	on	on	on	on	on	on
	Standby		on	on			
Inverter mode	Inverter on		on			on	
	Power saver on	on					
Alarms	Battery low voltage		on		on	on	on
	Battery high voltage		on		on	on	on
	Over load (inverter mode)	on		on	on	on	on
	Over temp (inverter mode)	on		on	on	on	on
	Over temp (line mode)	on	on	on	on	on	on
	Over charge	on	on	on	on	on	on
Fault Mode	Fan lock						
	Battery high voltage		on			on	
	Inverter mode overload	on					
	Over temperature	on					
	Back voltage			flash			flash

