onduleur off-grid

Pure sine wave inverter

CATALOGUE

User Manual

1.Safety Cautions (Please Please read this manual carefully before installing)

- This machine contains high voltage which is potentially dangerous, if any abnormity occurs that must be handled by qualified personnel, do not open the outer cover by yourself.
- Stored in dry place and keep away from water.
- Keep the inverter away from high temperature, fire or direct sunlight.
- Please replace the batteries with same brand and same model, do not mixed use with other different type or model of batteries.
- Keep the batteries or the battery pack away from fire, otherwise it would explode and hurt people.
- Keep the inverter ventilated (at least keep a barrier-free distance of 15cm-long for the front and rear airways).
- Do not pile up sundries upon the inverter.

Warning: The batteries will be deteriorated as the service life grows, and it need to be replaced or handled timely by professionals once the battery failure occurs, otherwise the battery flooding might cause dangers, such as burning. An annual maintenance and checking of batteries is recommended.

No Disassembling | No Humidity | No Fire or High Temperature | Don't Pile Up Sundries | Keep Ventilation

2. Product Introduction

- This series of off-grid inverters are controlled by digitized CPU, and it is true sine wave DC/AC, which use the battery pack to generate energy and convert it into AC voltage output.
- The output is sine wave, and it can work usually under 0%-100% of the load condition.
- Its surge power can increase more than double, which could apply to different types of load, such as inductive load, capacitive load, etc.
- The application range includes computers, communications, yachts, recreational vehicles, family recreational devices, motors, electric tools, industrial-control devices, video players, household appliances, etc.

2.1 Features

- Sine wave output(THD<3%)
- Output up to 92% as maximum efficiency
- Full LED display of working state
- Low battery capacity warning
- All-digital control display
- Products with the CE/FCC/LVD/ROSE norms
- Apply to most AC input products
- One-year free product maintenance and warranty

2.2 Main Specifications

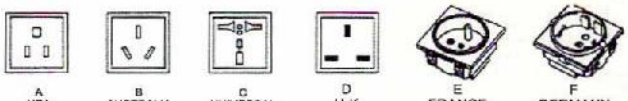
OUTPUT	Model	HS300 HS600 HS1000 HS1500 HS2000 KS2500 KS3000 KS4000 KS5000 KS6000			
	Power	0%-100%state(Continuous Running)-120% 10s-150% 1s			
	Voltage Frequency	Factory Setting:22VAC±3V Through settings:200/220/230/240VAC		Factory Setting:110VAC±3V Through settings:100/110/115/120VAC	
		50±0.5Hz		60±0.5Hz	
	Waveform	rated power input,pure sine wave(THD<3%)			
	Protection	short-circuit ptotection,over-load protection,super-charge protection,over-temperature protection			
INPUT	Battery Voltage		10.5V-15V	20V-30V	40V-60V
	Efficiency		89%	90%	91%
	DC Current Machine Model	HS300 Current	32A	16A	8A
		HS600 Current	64A	32A	16A
		HS1000 Current	107A	54A	27A
		HS1500 Current	161A	81A	41A
		HS2000 Current	214A	107A	54A
		KS2500 Current	268A	134A	67A
		KS3000 Current	321A	161A	81A
		KS4000 Current	428A	214A	107A
		KS5000 Current	535A	268A	134A
		KS6000 Current	642A	321A	161A
	No Load Current Draw	Errors based on different machine models and current			
	Protection	over-current protection,battery-reversal protection(external fuse),low battery warning,power-on protect			

3. Panel Description

3.1 Front Panel Description

(1)POWER ON/OFF Switch: The inverter would start up when switches to ON.

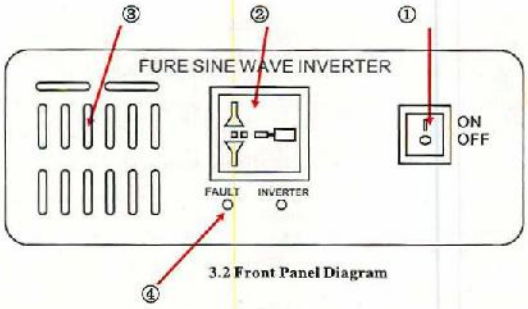
(2)AC output socket: Different types of sockets are provided to meet the demands of users around the world.



A USA | B AUSTRALIA | C UNIVERSAL | D U.K | E FRANCE | F GERMANY

(3)Air inlets: Used for thermal dissipation of the inverter, and keep ventilation to assure maximum life of the products.

(4)LED signals: Display of working condition, battery capacity, working load and abnormal stated warning.



3.2 Front Panel Diagram

3.3 Indications of LED signals of the front Panel

Status LED: Display real-time working state

LED Display	GREEN	ORANGE	RED
STATE	Normal	Standby Saving Mode	Abnormal/Protection

●When display abnormal, please refer to the instructions 5.2, 5.3 or 7. of the manual to troubleshoot

Battery LED: Display the remaining capacity of the external batteries

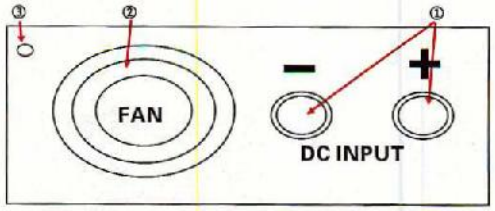
LED Display	Indication of 4 red LEDs
STATE MODEL	Battery = 25%-50%-75%-100%

LOAD LED: Display the current capacity

LED Display	Indication of 4 red LEDs
STATE MODEL	LOAD =25%-50%-75%-100%

3.4 Rear Panel Description

(1)Battery Input Terminals (+)(-) (2)Air Vents (Fan) (3) Earth terminal of the chassis(FG)



4. Settings of Initial Output Voltage, Frequency, Standby Saving Mode

4.1 Instruction of Initial Factory Setting

(1) Factory Setting is 220Vac/50Hz or 110Vac/60Hz

(2) Set the Standby Saving Mode enabled (Not in use)

5. Protection Functions

5.1 Input Protection

(1) Battery polarity reversal protection: When the input voltage of batteries is reversal, the internal or external fuse of the inverter would be blown, then the inverter should be returned to the factory to repair. (For easy replacement: External fuse, supplied with backup fuse, in case of battery reversal, users can open the fuse cover on the front panel to replace with the backup fuse.)

(2) Low battery voltage protection: When the battery voltage is lower than the voltage specification, the inverter would switch off automatically and give an alarm with 3 beep, and the fault light is on.

(3) High battery voltage protection: When the battery voltage is higher than the voltage specification, the inverter would switch off automatically and give an alarm with 4 beep, and the fault light is on.

Warning: When using this series of inverters, with the battery pack input, the setting of voltage is normal operating voltage(the voltage ID in the product specification).

If the voltage is too low (such as the 24V model uses 12V input), the inverter would not be able to start up normally.

If the voltage is too high (such as the 24V model uses 48V input), the inverter would be destroyed destructively.

5.2 Output Protection

When abnormal conditions occurs, the trouble light would appear on the display panel (refer to Form 5.3), for troubleshooting reference.

(1) Over temperature protection (OTP): In the case that the inside temperature of the inverter is too high, the OTP would start and alert.
5 beep (continuous alert), the fault light is on, and it would return to normal state automatically as long as the temperature falls to 50℃

(2) AC output anomaly protection: The inverter would be restarted if the AC output voltage of the inverter was higher or lower.

(3) AC output short circuit protection: If the inverter output was short-circuited or the load increased sharply, the troubleshooting (or the load failure) would recover automatically or manually.

(4) Battery voltage anomaly protection: It would trigger as long as the battery voltage is too high or too low, and the inverter would restart automatically when the battery voltage rise to safe voltage range.

(5) Output overload protection (OLP): When the load reach to 120%, the embedded buzzer would raise a continuous alarm for 10 seconds, then the inverter would power off automatically, and restart in 10 seconds. (Continuous recycling)

(6) Output superload protection: The inverter would power off when the load reach to 150% and last for 1 second, and the FAULT light on the panel would flash.

5.3 Instruction of Fault Signal

Buzzer	Fault Information
1 beep	Normal Startup: Green LED is on, shows the inverter is normal.
2 beep	Undervoltage Warning: The storage battery voltage is running out.
3 beep	Undervoltage Protection: Red LED is on, shows the battery voltage is too low or depleted.
4 beep	Overvoltage Protection: RED LED is on, shows the battery voltage is too high.
5 beep	Overheat Protection: RED LED is on, shows the interior of the inverter is overheat.
Continuous beep	Overload Protection: The inverter would power off in 10 seconds, and wait for 10 seconds to startup automatically. (Continuous recycling)

6. Installation and Wiring

6.1 Battery Wire: The wire should not be longer than 1.5 meter and the wire-diameter should accord with the safety regulatory which could bear the magnitude of current. It would cause the wire overheat even burning if the wire is too thin. Please refer to the Form 6-1 below. And please consult the dealer or the original factory about wiring to ensure safety.

Form 6-1 Wire Using recommendation

Rated Current	Wire CSA (mm²)	AWG	
16A-25A	2.5	12	Safety Wiring Range
25A-32A	4	10	
32A-40A	6	8	
40A-60A	10	6	
63A-80A	16	4	
80A-100A	25	2	
100A-125A	35	1	
⩾125A	50	0	

6.2 Battery Pack Recommendation

1. The battery pack should meet the requirements of minimum safe startup, full load discharge time, and minimum setting capacity. Users could choose larger capacity (meet the demand of discharge time) to your own need.
2. The inverter working time means how to identify a battery's working time under the rating load conditions. Here is the explanation of battery capacity, it is generally used AH for the nominal capacity of battery. AH is the maximum discharge capacity of the battery within one hour, for example, a battery's nominal capacity is 20AH, and its maximum continuous output current is 20A within one hour. And this is the value we can use to calculate the time that a battery needs to drive a load.

   The time that a battery needs to drive a load:
   Battery Capacity(AH)×Battery Voltage(V)×0.8×0.9÷Load=Working Time(Hour)
   Solved: Battery Capacity(AH)×Battery Voltage(V)= Maximum Battery Output Power
3. For batteries could not discharge fully, which means there is 20% of the capacity isn't able to be discharged, and batteries own memory function, which means the batteries are useless once they run out, therefore, the maximum power needs to multiply by 0.8 which is the actual power of batteries. There is also a problem about the conversion efficiency of the inverter, and the general efficiency of quasi-sine is about 90%, so it needs to multiply by 0.9 at here. The formula "Battery Capacity×Battery Voltage×0.8×0.9" can calculate the actual total power generated by the inverter doing work on the load.
   Total Work= Power of an Electrical Appliance×Time, Working Time=Total Work/Work of an Electrical Appliance

   The time that batteries do work on the load through the inverter:
   Working Time= Battery Capacity(AH)×Battery Voltage(V)×0.8×0.9÷Load

   For example: a 12V/60Ah battery, a 220V/100W filament lamp
   Working Time=12(V)×60 (AH) ×0.8×0.9÷100(W)=5.18(Hour)
   Explanation: 12V——Battery Voltage
   60AH——Battery Capacity
   0.8——Battery Discharge Coefficient
   0.9——Inverter Convert Efficiency

100(W)——The nominal power of the bulb
5.18(Hour)——The working time that a 60AH battery works by the power supply of a 100W bulb

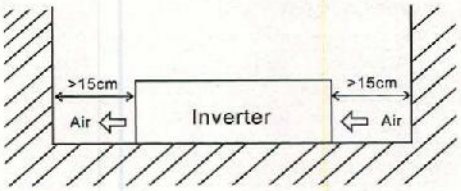
Ps, there are some errors of the actual discharge time base on the conditions, lifetime, maintenance of batteries.

6.3 Installation Requirements

- The machine weight should be taken into consideration when fixing the machine, and avoid high temperature and high pressure environment, in order to guarantee a long service life.
- This machine adopts built-in fan and force-air cooling, which needs to keep the air vents unobstructed, and avoid operating during the high temperature environment or under the overload condition, in case it would cause the machine breakdown or affect its service life.

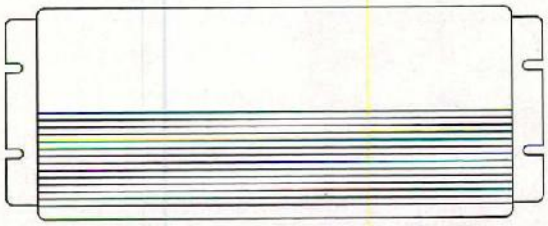
(Please spare a distance of 15cm for the air vents without obstacles.)

6.3 Installation Diagram

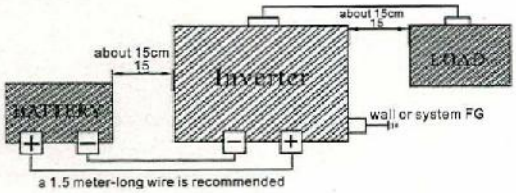


6.4 Fixing Recommendation

As shown, four fixing orifices were reserved on the outer case of the machine, which could be used for fixed (Horizontal Fixed is recommended, and keep the air vents unobstructed)



6.5 Reference Diagram of Setup



7. Troubleshooting

This series of inverters are professional products, any improper use or alter might cause damage or electric shock. We advise users to do the basic troubleshooting according to the table below, if the machine still enable to resume normal work, please consult your dealer or return to the factory to repair.

Fault State	Possible Causes	Recommended Solutions
No AC voltage output	Input voltage abnormal	Check DC voltage (battery voltage) if too low or too high
	Over temperature protection	Check if air vents unblocked or not, or overheat, please reduce loads or lower the ambient temperature
	Overload protection	Check whether the load exceeds the rating or requires large starting current, such as inductive or capacitive devices.
	Short circuit protection	Check whether the load exceeds the rating or short-circuited
Battery discharge time is too short	Battery being used too long or battery fault	Replace battery
	Battery capacity is too small	Confirm specifications, increasing battery capacity is recommended

8. Cautions for the Electrical Load

This series of inverters could be used for most AC devices and provide normal power supply, except some special devices which may cause the inverters could not startup and work normally.

1) As the motor-load devices would generate huge starting current when they start up (about 6-10 times higher than the rated current), please pay attention to the instantaneous starting power whether it exceeds the specification of maximum output power.

2) When the load devices are capacitive or rectificative (such as switching power), we suggest to turn the devices to the no-load or light-load condition, then rise the load slowly after the inverter started, to ensure the inverter start up successfully.

9. Warranty

This product provides one-year- free warranty if it is under normal use, and please do not replace components by your own or conduct any maintenance or modification, in case your warranty is affected.