NEXTGEN NRG

USER MANUAL MPS33 SERIES

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CONTENTS

1. APPLICATION SPECIFICATION

1.1   Importance Indication

This manual provides guidance for installation when using inverter and batteries, which also includes relevant solution and maintenance to abnormal conditions during usage.

- This manual must be known to and conserved by a professional.
- This manual does not introduce the detailed technologies
- This manual only applies to the Hybrid Solar Inverter.
- This manual provides the reference when using and guidance when alarming and working.

1.2   Applied Condition

This Inverter is an AC power supply which provides the power supply as the base for your equipment. Please carefully inspect the input and output voltage and frequency and whether they meet the usage requirement. The power supply capacity from the input of Inverter should meet the demand; otherwise the Inverter can't work properly, and may result in safety accidents.

Note: When using a diesel generator as backup power from the input, the diesel generator capacity shall be more than 3 times larger than the Inverter used.

1.3   Working Environment

The environment and preservation of the product may have a certain influence on the life time and failure rate. Therefore, please note not to use the product for a long time under the following circumstances:

Locations where high and low temperature and moisture content are above the technical specifications (temperature between 0-40 degrees Celsius, relevant moisture between).

Safety Rules

Banned Items

1.31 There is high voltage existing with the power equipment. Nobody, except for many technicians or authorised technician is allowed to open the equipment cover; otherwise it may lead to danger of electric shock. In the mean time it will result in termination of qualification warranties.

1.3.2. When following load applications are to be used, make sure to consult with the local distributers to consider special details and designs into the application, setup, management and maintenance:

- Life support system;
- Medical instruments directly linked to the patient's life;
- Elevator or lift which may endanger life safety;

- Similar equipment as above.

1.3.3. Used batteries are prohibited to be burned in the fire to avoid explosions.

Safety notice

1.3.4. The power equipment provided is usually connected with batteries. There may be existing voltage from the output, even without being connected with the Generator input power.

1.3.5. When relocating or rewiring the Inverter, it must be assured that the Inverter is shut down completely , air switches from input, battery input are turn off, otherwise there is possible lead to dangers of electric shock due to output with electric.

1.3.6. To ensure your life safety, the power product for this series has to have ground connection protections. Reliable ground connect have to be adopted before use.

1.3.7. Please keep the ventilations unobstructed. The improper ventilation may lead rise of high temperature, which may shorten the lifetime of the elements, and further affect the lifetime of the machine.

1.3.8. Not allow the liquid or other foreign substances enter into the power cabinets.

1.3.9 .In case of fire around, make sure to use powder fire extinguisher instead of liquid extinguisher, otherwise there is dangers of electric shock.

1.3.10. The battery life will be shortened with the rise of ambient temperature, and the periodic replacement of batteries will not only keep the Inverter in proper working conditions, but also provide sufficient backup time. Replace of batteries have to be made by authorised technician.

1.3.11. In case of long time storage without actual use, Inverter has to be kept in a dry environment with temperature range from -40 - +70 degrees Celsius for the cabinets without batteries.

1.3.12. In case of the power equipment not being used for long time, it is recommended to connect the AC power for more than 12 hours to charge the batteries every 3 month, to avoid damages of batteries without long time usage.

1.3.14. Do not open the battery to avoid the danger of electrolyte harming the skin or eyes. In case of contact with electrolyte accidently, clean and wash the contacted area with water and go to hospital immediately for treatment.

1.3.15. There are lots of high voltage elements inside the cabinets stored with energy. Please don't open the cabinets, otherwise if endanger the physical safety at your own risk. Operation personal should have basic knowledge as an electrician, and should read the operation manual carefully.

1.3.16. No dismantling of any kind of connections cables without authorization.

1.3.17. No random move or strong vibration should be applied to the product due to its large size and heavy weight, and keep good ventilation.

1.3.18. No de-dusting under electric load; No cleaning of dirt with wet towel.

1.3.19. Battery has to be replaced by professionals, and the batteries replaced have to be sent to special recycling institutions for disposal. Battery is regarded as "toxic wastes".

2. THE SPECIFICATION
2.1 Product Description
MPS33 Series Hybrid solar inverter is an intelligent multifunctional power supply. The Solar system inside consists of solar MPPT controller, charger, rectifier, inverter, static transfer switch, Wind energy controller, main control circuit and display alarm circuit.

PV - Battery - Generator (in the environment of Generator steady use solar at most): PV through MPPT controller supply power to inverter then through inverter output pure sine wave AC power to load, meanwhile charge battery group

When solar power is not enough, use battery to supply power, use PV to reduce Generator power supply to save electricity.

After the solar energy is insufficient, the battery low voltage, the equipment is the bypass output. Rectifier is only for battery charging.

- Online working, uninterruptible design
- High efficiency IGBT (Insulated Gate Bipolar Transistor）inverter technology
- The sixth generation low-exhaust and big-power IGBT with excellent high speed switch feature, high voltage feature and large current feature. Drives by electric voltage, only need small control power. The sixth generation with lower saturation voltage, the inverter has high efficiency, low temperature, high reliability.
- LED display, can view work status.
- Perfect protection function
- Input output over &under voltage protection, input surge protection, phase sequence protection, battery overcharge over discharge protection, output overload short circuit protection, temperature protection, plus various protection systems and alarm functions.
- Two modes for Generator and Solar Power Charge (Solar Charge priority).
- Solar - Generator - Battery; Solar – Battery - Generator; choice of mode accessed through display.
- Intelligent communicate: RS232 and RS485 communicate interface realize multifunction communicate and long distance monitor.
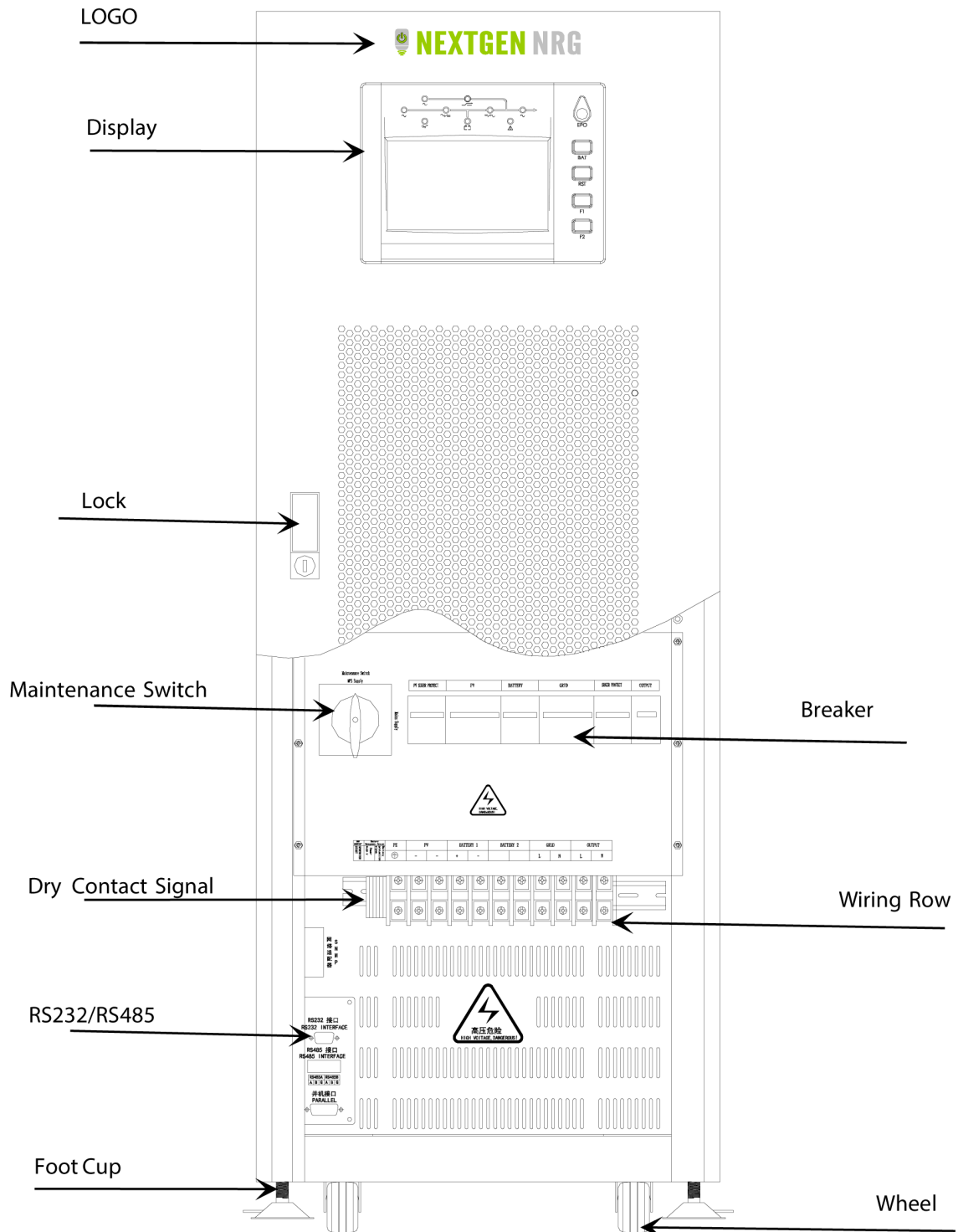
2.2   Technical Parameters

Single phase input, single phase output, Hybrid solar inverter series:

Model Specifications		MPS33-10KW	MPS33-15KW	MPS33-20KW	MPS33-25KW
Nominal capacity (KW)		10	15	20	25
Generator	Max Input current (A)	62	93	125	158
	Type	L + N + G			
	Input Voltage	240/415VAC±20%			
	Input Frequency	50/60±5%			
	Charge Voltage	215/415VAC±1%			
	AC Charge Current	30A(max)			
	Mode	ECO			
MPPT	PV input Open circuit voltage range	300VDC~600VDC			
	Rated operating voltage	219.2VDC±1%			
	Max. PV power	13.2KW		22KW	
	Output Current	60A (max)		100A (max)	
	Max. conversion efficiency	>98%			
Battery	Type	Lead-Acid Gel Battery			
	Battery Voltage	192V (2V battery 96pcs in series or 12 battery 16pcs in series)			
	Battery Capacity	According to requirements			
	Battery low voltage protection	>168V			
Inverter	Inverter output waveform	Pure sine wave, THD <3% (linear load)			
	Inverter Voltage	240VDC±2%			
	Frequency	50/60Hz±0.5%			
	Crest factor	3:1			
	Inverter efficiency	>85% (100% load)			
System parameter	Transfer time	<10ms (inverter – bypass)			
	Rated power	Nominal capacity*1.0 (KW)			
	Protection	Output short circuit, overload, overvoltage, under voltage, over temperature, etc protection, have audible and visual alarm.			
	Display	LCD display input and output voltage, output current, the inverter voltage, frequency, output current, battery voltage, PV voltage, PV charging current, temperature mode, flowcharts, current work status, event record and system information			
	Operating environment	Temperature 0-40 ˚C (Each increase of 1 ˚C, reduce the capacity of 2%)			
	Relative humidity	30% - 95%			
	Work sequence	Solar – Battery – Generator			
	Operation Altitude (max)	<1000 meter (per increase 100 meter power decrease 1%. At most 4000 meter.			
	Computer Communicate Interface	RS232/RS485			
	Cooling method	Force-air cooling			
Size	Size W x D x H (unit: mm)	450*600*1200		600*700*1525	600*800*1825
Weight	Weight (kg)	189kg	203kg	300kg	400kg

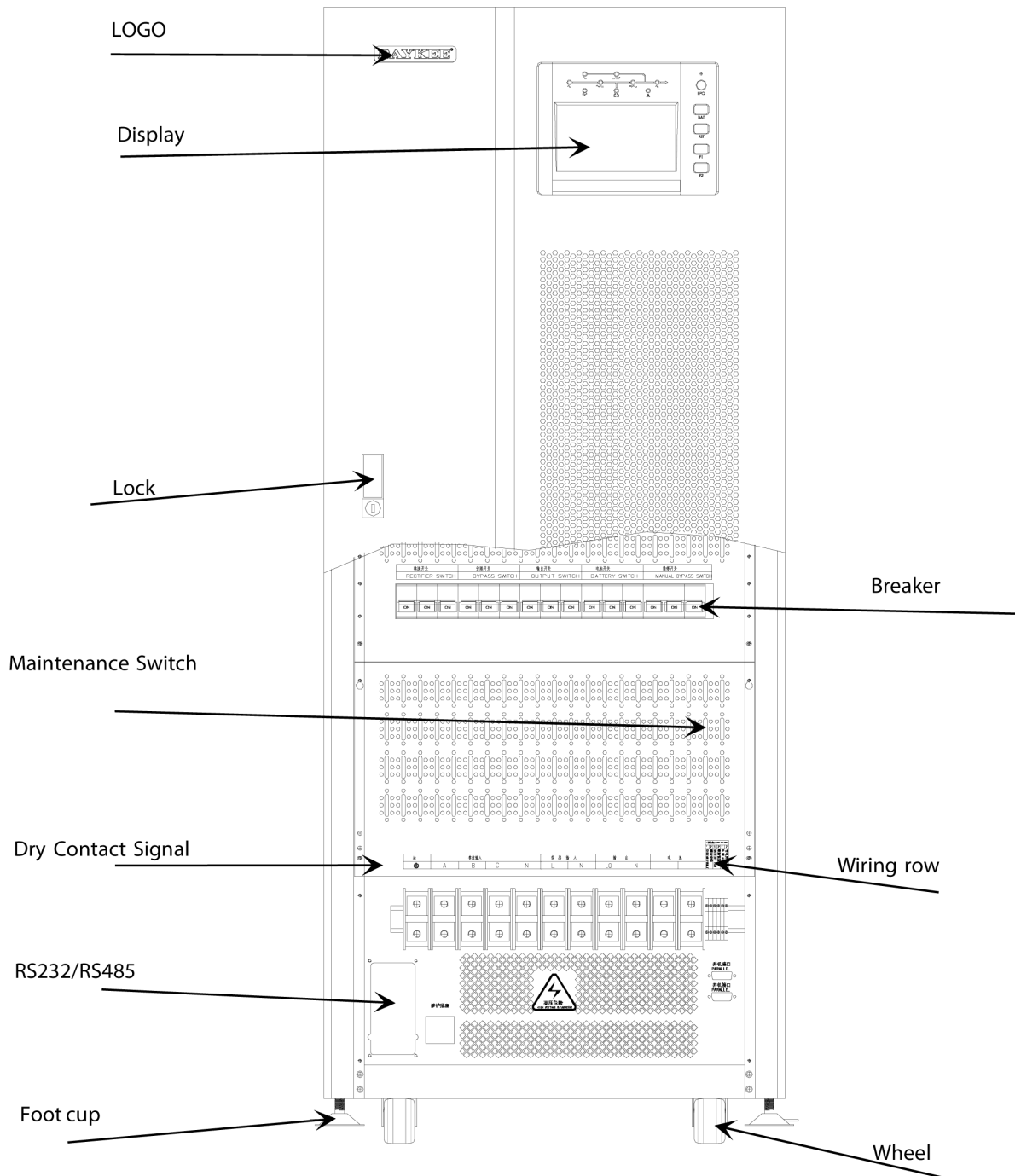** All the above parameters are reference only, contact distributor for further details.

3. APPEARANCE INTRODUCTION

3.1   MPS Series Appearance: (10KW-15KW)

LOGO

Display

Lock

Maintenance Switch

Breaker

Dry Contact Signal

Wiring Row

RS232/RS485

Foot Cup
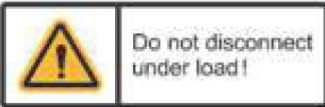
Wheel

Note: The power supply for the inspection devices 24 0VAC, pay attention to safety.

3.2 MPS Series Appearance: (20KW)

LOGO

Display

Lock

Breaker

Maintenance Switch

Dry Contact Signal

Wiring row

RS232/RS485

Foot cup

Wheel

Symbol	Name	Meaning
	Danger high voltage label	Do not touch a running inverter because it generates dangerous high voltages.
	Delay discharge label	Remind maintenance personnel to operate the inverter at least five minutes after it is powered off.
	High temperature label	Do not touch a running inverter because it generates high temperatures on the shell.
	Refer to the instructions label	Remind operators to refer to the documents shipped with the inverter
	Grounding label	Connect the inverter to a ground bar for grounding purposes.
	Operation warning label	Do not remove the DC input connector when the inverter is running.

3.3   MPS33 Series Buttons Operation Instruction
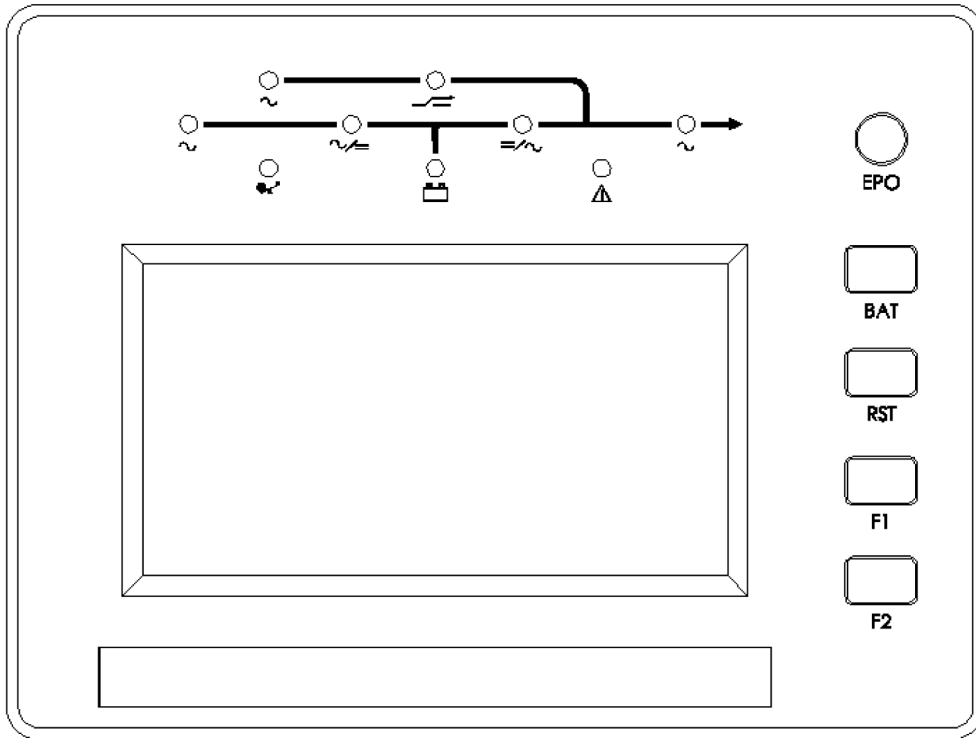
F1 —— Setup button; if customer need setup working mode please be sure the solar inverter in power off status, then press the button 5 seconds.（Press F1 + F2 together means power off, solar inverter will work in bypass mode）.

F2 ——This button is power on button, press this button 2 seconds solar inverter will be power on and after 1 minute transfer into normal inverter work mode.

RST ——This is rest button, press this button means procedure reset

BAT ——In the absence of electricity, the battery starts the switch button.

EPO ——This button is emergency shutdown Hybrid Solar Inverterter.

~ ——Generator input voltage and frequency in normal range indicator lights up.

~/= ——This indicator lights up means rectifier running

=/~ —— inverter work normal indicator lights up.

—— Battery low voltage this indicator lights up.

—— Output load overload this indicator lights up.

⚠ ——Fault this indicator lights up.

Display and Touch Screen Operation Brief Introduction

Colour touch LCD screen display is a multifunctional display module developed by our company, using the most popular and intuitive colour graphic interface. This touch screen display module is easier to operate compared with traditional black/white LCD display module. User can obtain relevant information by pressing the module buttons directly on the display. Operation is simple and easy to understand.

This LCD display uses different colours to show the important degrees and levels of the information for the user to understand at the first glance. The real time clock and memory storage device along with the display could record 256 events together with 20 agendas. It could also self program to achieve timer on/o timer charging and discharging, timer even charging etc.

3.4 Operation Interface Description

3.3.1. Stand by Screen

When starting up the machine, the touch screen display will show the standby screen as in figure 1.When the touch screen is not being touched at the interval of 4 minutes, the display CPU will return automatically to standby screen (in case of alarm, the priority display of alarm information will be there. The display (CPU will not turn on the back light power and return to standby screen before the alarm is cancelled or manually terminated).

Figure 1

3.3.2. Flowchart Display Screen

Flowchart display screen is as shown in figure 2. Press the display screen with hand when it is in standby screen to enter into the flowchart display screen. The basic information and working status of the Hybrid solar inverter could also be viewed on this screen. The meanings of each part on the screen are
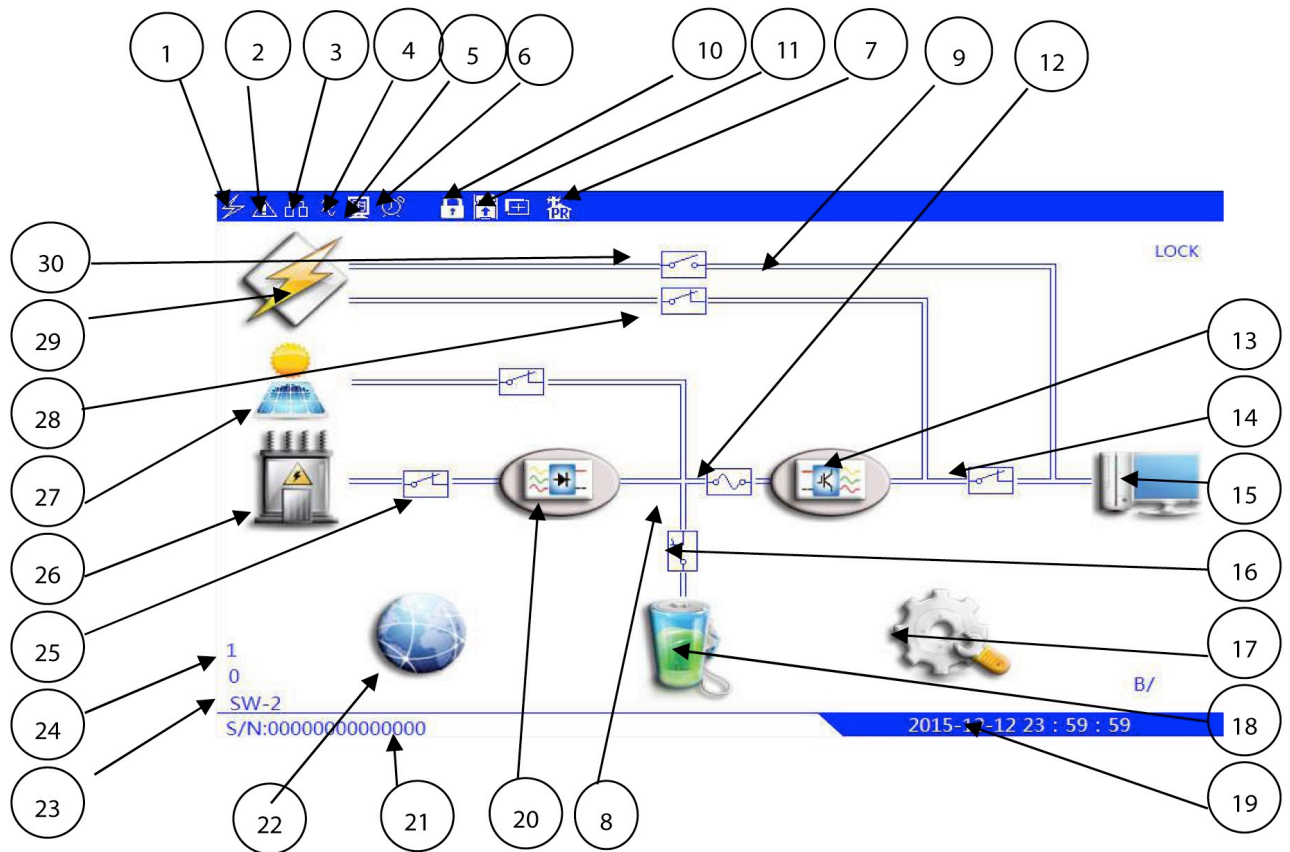
Figure 2

1. Running identification: when this figure appears on the screen, it means that the system is under running; otherwise it means the system is shut off.
2. Alarm logo: when this figure appears on the screen, it means that something abnormal has happened.
3. Slave logo: when the figure appears on the screen, it means that the machine is in the slave machine working mode under parallel system.
4. Phase lock logo: when this figure appears on the screen, it means the inverter wave and bypass power wave are in the same frequency and same phase.
5. Communication logo: when this figure appears on the screen, it means that the system is connected with a remote monitoring device.
6. Timer logo: when this figure appears on the screen, it means timer tasks are being set.
7. Current work mode.
8. Dynamic line: modules under work are being connected with heavy lines, meaning the modules are working.
9. Static line: modules connected with a fine dotted line, means that the modules have stopped working.
10. The system is locked: indicates that it is not unlocked.
11. Memory card flag: indicates that the memory card is connected.
12. Bus line insurance: The model does not have this feature.
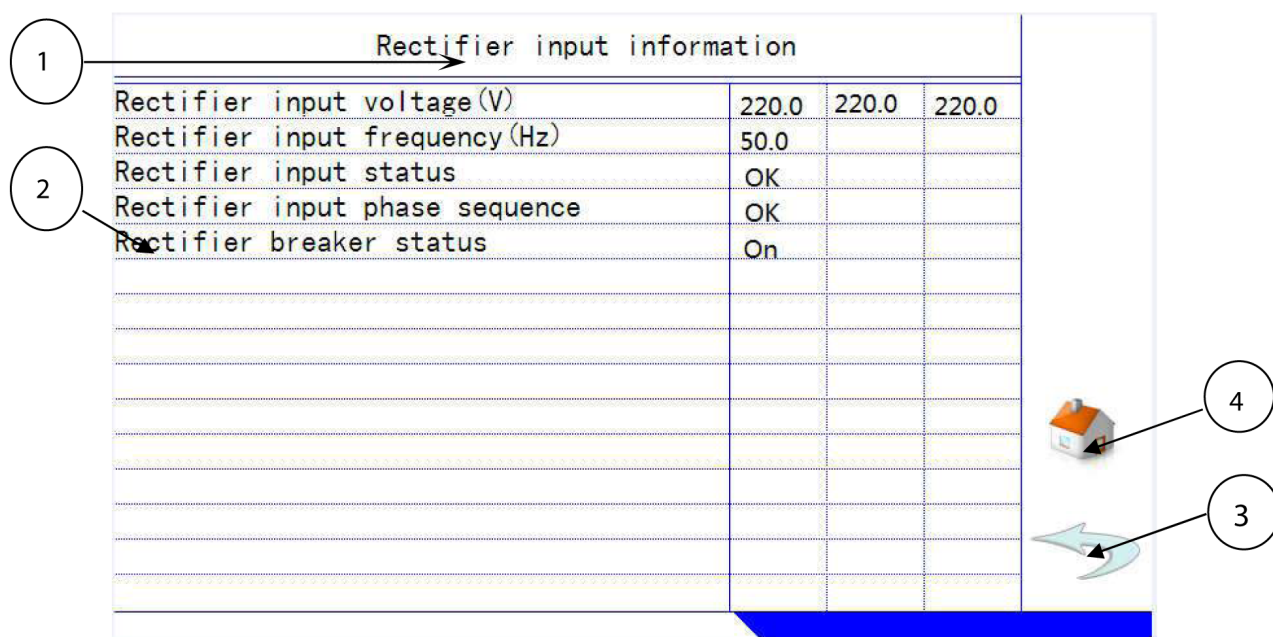13. Inverter button: The model does not have this feature.

14. Output switch: The model does not have this feature.
15. Output button: press this button to check the output status of the system and data.
16. Battery switch: The model does not have this feature.
17. System parameter set-up module: to set system time, language, alarm, etc.
18. Battery button: press this button to check the battery working state and data.
19. System time: real-time system time display.
20. Rectifier button: press this button to check the working status of the rectifier and data.
21. Production information: shows production series number or other information of the system.
22. System management module: it is used to control the system, check the system record and arrange agenda, etc.
23. EPS mode transfer speed: The model does not have this feature.
24. Working mode: When Grid figure appears on the screen, system running Solar-Generator-Batt mode; When Batt figure appears on the screen, system is running Solar-Batt-Generator mode.
25. Generator input switch: shows the status of the Generator input switch. When figure appears on the screen with blue colour, it means that the rectifier switch is closed; when figure appears on the screen with red, it means that the rectifier switch is disconnected.
26. Generator input Icon button: press this button to check the status of Generator and data.
27. The percentage of the solar power.
28. Solar input icon button: press this button to check the status of solar and data.
29. Bypass input switch: The model does not have this feature.
30. Bypass input icon button: press this button to check the input status of the bypass and data.
31. Maintenance bypass switch: shows the status of the maintenance bypass switch. When figure appears on the screen with red colour, it means that the maintenance bypass switch is closed; when figure appears on the screen with blue colour, it means that the maintenance bypass switch is disconnected.

3.3.3. Display Interface of Measurement Data

On the flowchart display screen, press bypass input button, rectifier input button, output button, inverter button, battery button or rectifier button to enter into the display interface of measurement data in relation to their own modules. Figure 3 is an example of output information and data by pressing rectifier button.

The related meanings on the screen are as follows:

1. Tabular header.
2. Tabular contents: display of all status and data.
3. Return button: press this button to return back to higher level directory.
4. Exit button: press this button to exit all directories back to standby screen.

Rectifier input information			
Rectifier input voltage(V)	220.0	220.0	220.0
Rectifier input frequency(Hz)	50.0		
Rectifier input status	OK		
Rectifier input phase sequence	OK		
Rectifier breaker status	On		

3.3.4. Management Display Interface

Management display menu is as shown in figure 4 in the flowchart menu, press the system management module to enter the management display menu. In this menu, relevant operations on the machine could be carried out in accordance with the related buttons. The meanings on the menu are as follows:
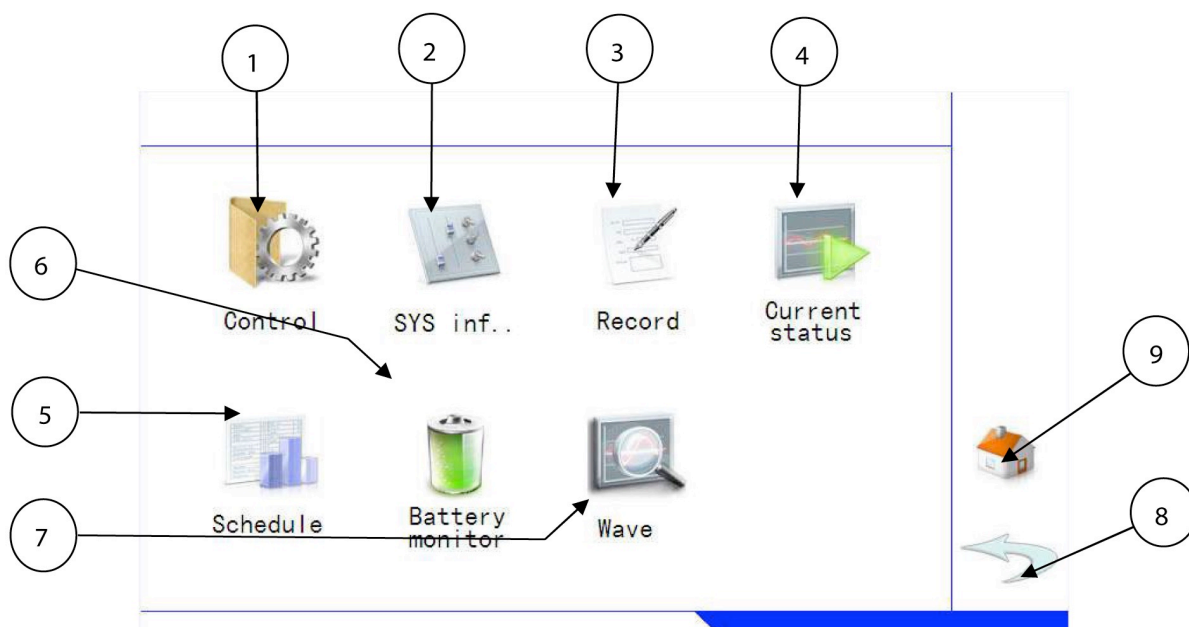

Figure 4

1. Control/operation button: press this button to enter into the system control interface, and carry out direct control of the machine (system will ask for password input to fault operation)

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2. System information: press this button to read the rated information of the system.
3. Event recording: press this button to check and read the event information recorded on the touch screen.
4. Current state: press this button to read the present running state of the system.
5. Schedule: press this button to read or revise the schedules.
6. Battery monitoring: press this button to check each charging and discharging parameter on each battery.
7. Wave: Press this button to view the wave form recording of the past. Must first insert the memory card.
8. Return: press this button to return to the upper directory level.
9. Exit: press this button to exit all the directories back to standby screen.

3.3.5.　Password Input Interface

Some operations may change the current working state of the machine, like system on/off- etc. At this time, system will ask the　operator to input operation password, or it will ignore operation. The initial system password is 1234; the menu after input of password is as shown in figure 5. The meanings on the menu are as follows:
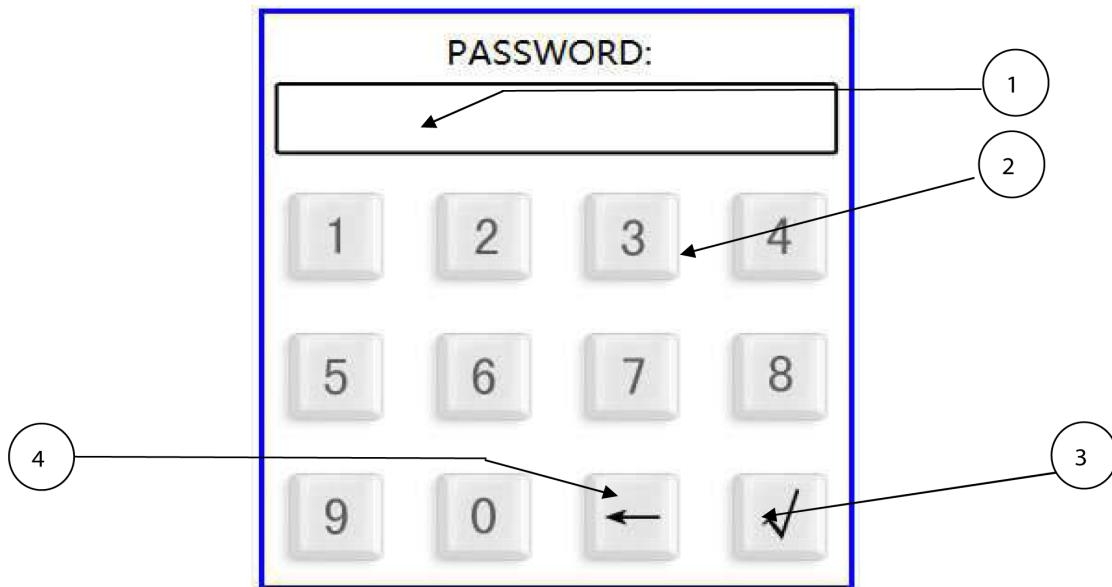
1. Input password: shows the input digits of the password. The digits input by the user will be replaced by "*" to keep secret.
2. Number key: shows relevant numbers input
3. Confirm key: after input, press this key to confirm completion of the password
4. Backspace key: delete previous digits input.

When enter correct password, system will perform accordingly or skips to relevant menu.

3.3.6. Query Interface for Event Recording

Press system recording key under management display to enter into event recording query interface. All the events recorded in the system are shown in this interface, as is shown in figure. The meanings in the menu are as follows:

Figure 6

1. Arrangement order of the events in the memory, with the latest event listed in the front with the smallest serial number.
2. Event code.
3. Time description: time record of the event happened.
4. Event description: description of types of events in details.
5. Flip over one page up: check and read other 9 events.
6. Flip over one page down: check and read other 9 events.
7. Exit key: press this key to exit all directories back to standby screen.
8. Return key: press this key to return to the previous directory level. Recordings of the events will be recorded in the systems with different colours according to the importance of the events, with red showing defects, yellow showing warnings, blue showing ordinary events, black showing empty record. User could rapidly find necessary records from different colours shown.

3.3.7. Schedule Interface

Press system record key and enter correct operation password 1234 under management display menu to enter into schedule interface. The reading and editing of the schedule in the system are as shown in figure 7. The meanings in the menu are as follows:
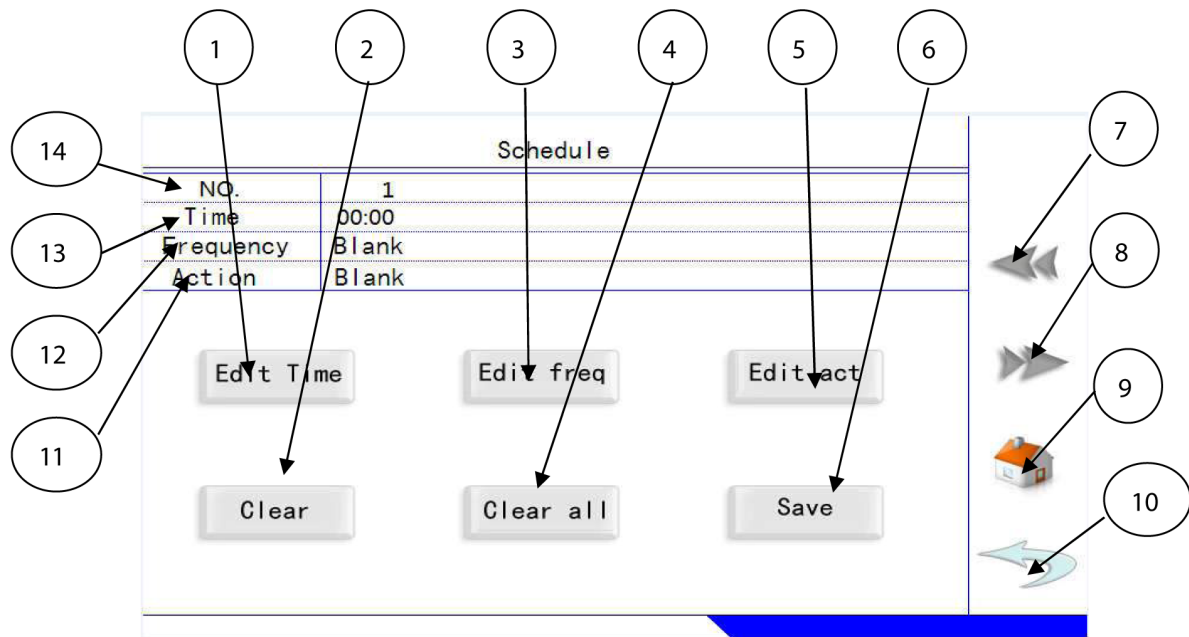
Figure 7

1. Revision of time: to revise the action time under this schedule.
2. Deletion: clearing of this schedule.
3. Revision of cycle: setting of the recycle action period under this schedule.
4. Deletion all: to delete all 20 schedules.
5. Revision of action: setting of actions to be executed under this schedule.
6. Store: to store the current schedule.
7. Flip over one page up: check and read other 9 events.
8. Flip over one page down: check and read other9 events.
9. Exit key: press this key to exit all directories back to standby.
10. Return key: press this key to return to previous directory.
11. Action: shows actions under this schedule.
12. Cycle: shows recycle period under this schedule.
13. Time: shows action time under this schedule.
14. Series number: shows serial numbers under this schedule with total of 20 numbers.

3.3.8. Scheduling Cycle Setting Interface

Press cycle revision key under schedule interface to enter into cycle setting interface. Recycle period is edited under this schedule as shown in figure 8. The meanings in this menu are as follows:
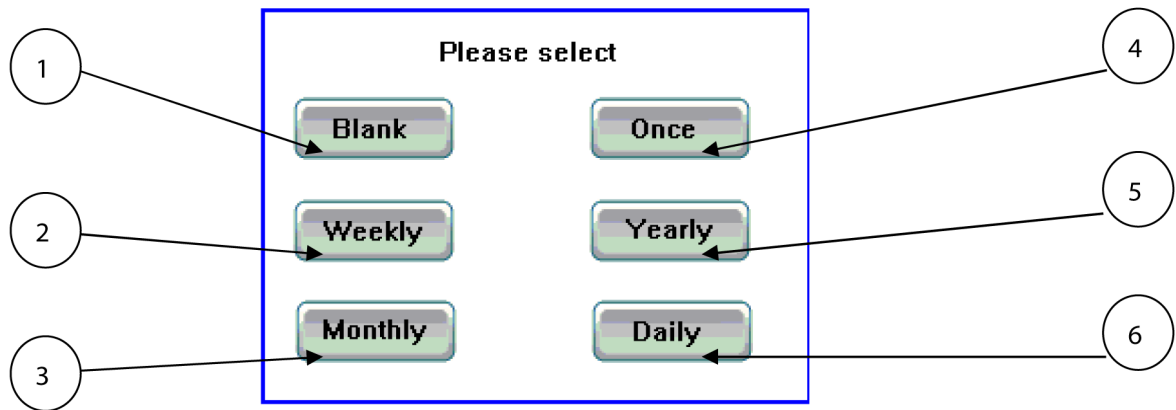
Figure 8

1. Null: select this item to make the execution cycle under this schedule null, which means that this schedule will never be activated.
2. Every week: setting the recycle period of this schedule as one week.
3. Every month: setting the recycle action period as one month.
4. One time: setting of this schedule to be executed once.
5. Every year: setting the recycle execution period of this schedule as one year.
6. Every day: setting the recycle execution period of this schedule as every day.

3.3.9. Schedule Action Setting Interface

Press this key under schedule interface to enter into action setting menu. The actions of the schedule are edited under this interface as shown in figure 9. The meanings of this menu are as follows:
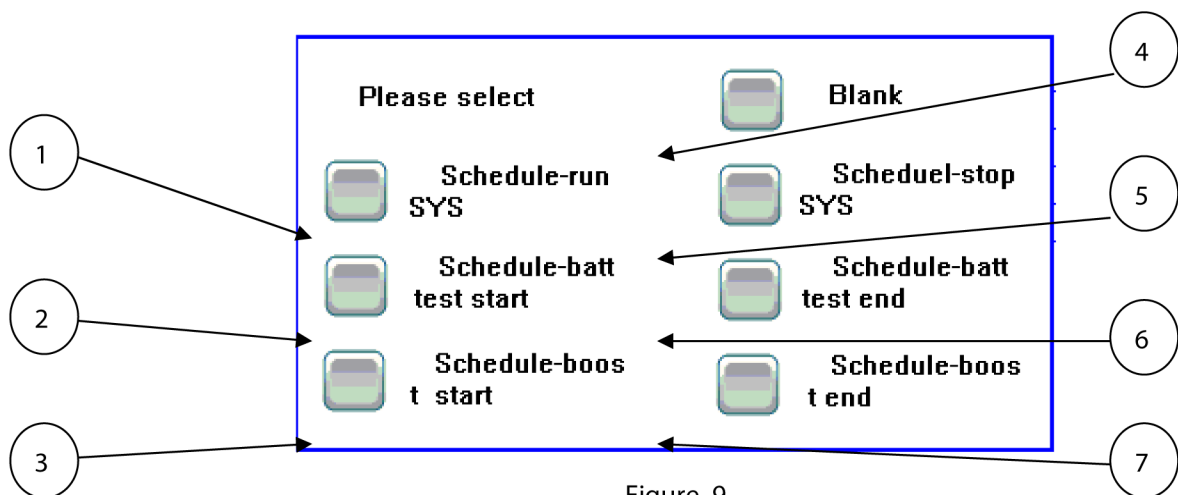
Figure 9

1. Schedule-on: select schedule action as on
2. Schedule-battery test start: select schedule action as start of battery test
3. Schedule-even charging start: select schedule action as start of battery even charging

4. Null: selection of this item means null. Null means that this schedule will never be activated.
5. Schedule-o: selection of this schedule action means the schedule is o
6. Schedule-battery test end: selection of this schedule action means to end battery even charging
7. Schedule- even charging end: selection of this action means battery even charging is finished.

3.3.10. Schedule Activation Time Interface

Press revision time key under schedule interface to enter into activation time setting interface. The detailed activation time under this schedule could be edited as shown in figure 10. The meanings of the menu are as follows:

1. Activation time setting: numbers not input is indicated with"?", numbers not necessary for input is indicated with"X." The input order in turn is year, month, date, hour, minute, and week
2. Number key: input relevant numbers
3. Confirm key: press this key to confirm completion of input.
4. Space back key: delete last input of numbers.
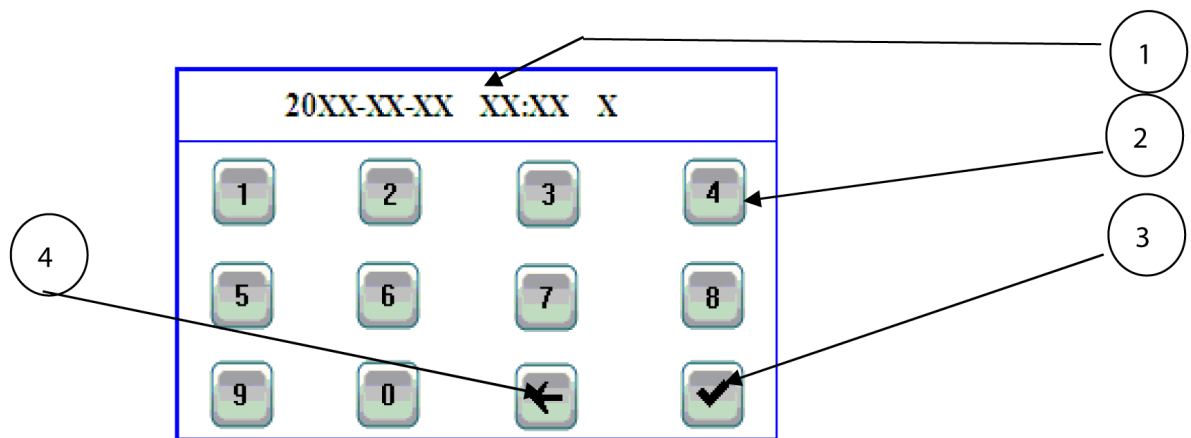
Figure 10

3.3.11. Setup Display Interface

The setup of display interface is as shown in figure 11. Press system setting module key under flowchart display screen to enter into setup screen. Relevant operations on the machine could be made by pressing the related keys in this menu. The meanings of this menu are as follows:

1. Clock setup: press this key to adjust system time.
2. Revision of password: press this key to revise operation password of the touch screen.
3. Deletion of record: press this key to delete all system record. Use has to be very careful with this key. Once details are deleted, it will not be restored any more.

4. Language selection: press this key to change the display in the menu and types of language to be used.
5. Advanced setting: press this key to setup advanced data.
6. Alarm voice: press this key to select the types of alarm voice, two selections with beeping and language.
7. Communicate setting: Set the inverter address and the baud rate.
8. CHRGC Setting: Set up the solar charge controller of voltage and current.
9. Return key: press this key to return back to previous directory.
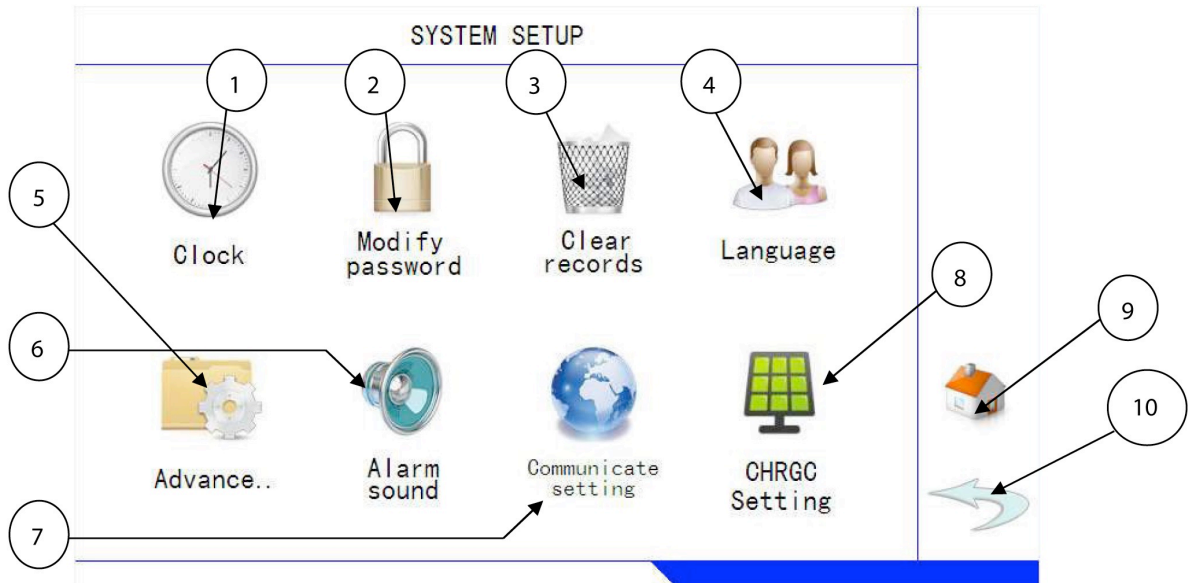10. Exit key: press this key to exit all directories back to standby.

Figure 11

3.3.12 .Clock Setup Interface

Clock setup menu is as shown in figure 12. Press clock setup key on the setup display to enter into clock setup interface. This interface is used to setup new system time. The meanings of this menu are as follows:
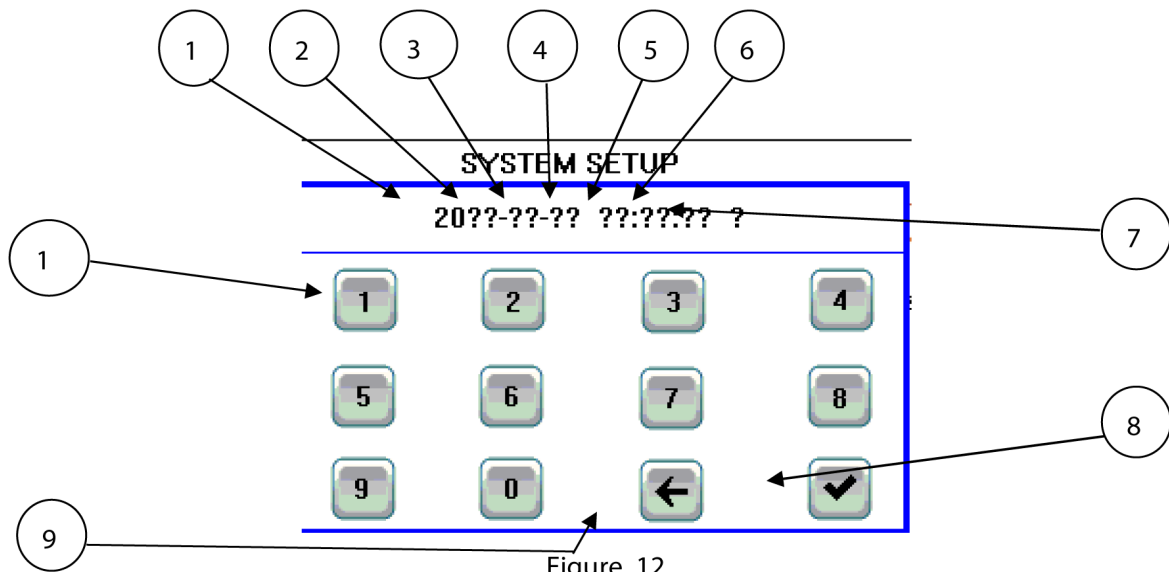
Figure 12

1-6. The setup is respectively year, month, date, hour, minute, second."?"is shown before the input of new numbers; When user inputs new numbers from number key, such numbers are shown.

7. Week: Display of week after input of new clock."?" is shown before input of new numbers, when user inputs new numbers, such numbers are shown. Input of 1-6 respectively shows Monday to Saturday, other numbers show Sunday.

8. Confirm key: press this key after completion of input.

9. Space back key: deletion of previous numbers input.

10. Number key: input relevant numbers.

Cautions: setup has to be made by the user from left to right, namely the setup order is year-month-date-hour-minute-second-week. Every input of a number, the cursor moves automatically one space right, and the relevant "? " is replaced by the numbers input by the user.

3.3.13. Alarm interface

When the system is in the alarm mode, the display module will automatically display alarm Interface as priority. The display module will always show alarm interface before alarm information is deleted, until the alarm information is deleted or manually removed. The alarm interface is as shown in figure 13, and the meanings of the menu are as follows:
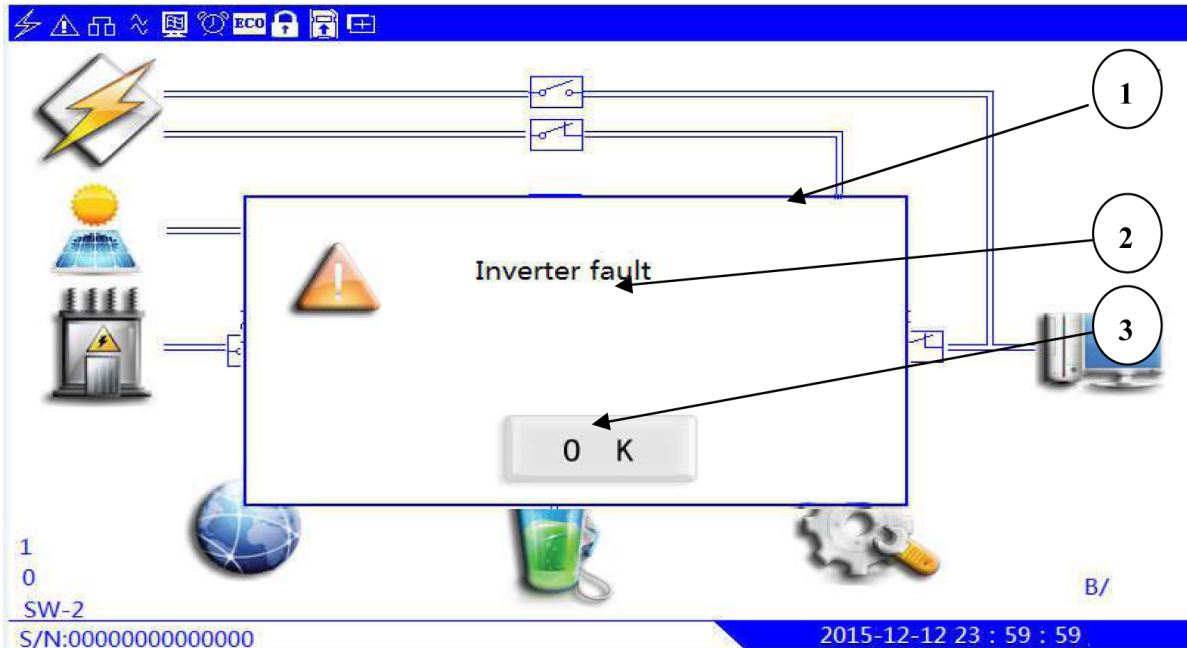
Figure 13

1. Alarm information box: alarm information is shown here.
2. Detailed alarm information display.
3. Confirm key: press this key to delete system alarm sound, and also exit the alarm interface

3.3.14. Sebior Pro Set

Press F1 + F2, equipment was turned off, then press the F1 button on the display panel for 5 seconds, it will enter into the state of the battery set, in Settings, the display will automatically jump to the interface operations. The user must input the password, default password is 6666. Enter the password, and then the display will automatically jump to the next screen. Please see below:
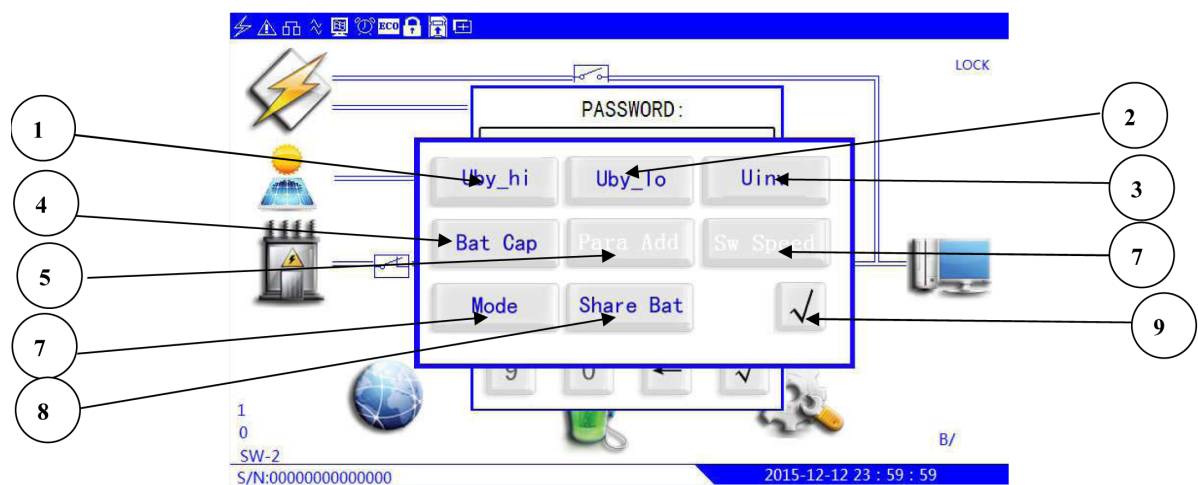
Figure 16

Images of the significance of each part are as follows:

1. The bypass the input voltage range is the upper limit of voltage value; Up to 275v. The lower limit of the bypass the input voltage range voltage value; Minimum 165v
2. The inverter output voltage value;
3. The battery capacity, at the same time changed the mains charging current; The weaver address; (the aircraft cannot set)
4. ECO mode switching speed (bypass - inverter); Value: 1-5. (the aircraft cannot set)
5. Working mode;
6. Battery sharing mode;

Click on the corresponding button, the pop-up dialogue. Fill in the corresponding numerical or button, click on the confirmation. Click on it again. Exit the dialogue box, equipment back to work.

The system will automatically record the important events with date and time, for future check and management. The max storage capacity is 256 events, with different codes for each event. Press system record key under system management operation interface to check event recordings. On the tables, the display screen will not only show the time and code for each recording, but will also show a simple description of the event, as is shown in sheet13 below for detailed event code and description of events:

Sheet 13

Event Code	Detailed Incident Description
000	Blank, no record
001	Bypass input error
002	Bypass input rotation error
003	Rectifier input error
004	Rectifier input rotation error
005	
006	
007	Battery Voltage Low
008	DC input error
009	
010	Temp fault
011	Overload
012	
013	Manual bypass breaker on
014	DC fuse is off
015	Rectifier breaker off
016	Bypass breaker off
017	Output breaker off
018	Battery breaker off
019-039	
040	Bypass input recovery
041	Bypass input rotation recovery
042	Rectifier input recovery
043	Rectifier input rotation recovery
044	
045	
046	Battery Recovery
047	DC input recovery
048	
049	Temp Recovery

050	Load Recovery
051	
052	Manual Bypass Breaker off
053	DC Fuse on
054	Rectifier Breaker on
055	Bypass Breaker on
056	Output Breaker on
057	Battery Breaker on
058-079	
080	Bypass Output
081	Inverter Output
082-099	
100	Communicate Fault
101	Communicate Ok
102-109	
110	Schedule-run SYS
111	Schedule-stop SYS
112	Schedule-batt test start
113	Schedule-batt test end
114	Schedule-boost start
115	Schedule-boost end
116-129	
130	Rectifier run start
131	Rectifier off
132-149	Rectifier off event code
150	Inverter on start
151	Inverter off
152-179	Inverter event code
180	System run start
181	System off
182-209	System off event code
210	Boost charging start
211	Boost charging end
212	Start forced run
213	Exit Start forced
214	Battery test start
215	Exit Battery test
216-233	
234	Remote Cancel Countdown
235	Remote Battery Test
236	
237	Remote Countdown
238	Remote Run Countdown
239	Shutdown
240	Starting up
241-244	
245	Manual Battery Test
246	Manual Silence
247-255	

3.4 RS232 Intelligent Communication

3.4.1. End definition adopts DB9 Standard Port

NC---1

RXD---2

TXD---3

NC---4

Signal GND--------------------------------5

NC---6

NC---7

NC---8

NC---9

2 pin: Receiving end, receive computer RS-232 communication data in the Hybrid Solar Inverter.

3 pin: Sending end, send computer RS-232 communication data in the Hybrid Solar Inverter.

5 pin：communication "GND ";

Other pin：no connect.

3.4.2. RS-232 communication provides the following functions:

- Monitor Hybrid Solar Inverter current power supplying status.
- Monitor Hybrid Solar Inverter current alarming status.
- Monitor Hybrid Solar Inverter current running parameters.
- Control of the Hybrid Solar Inverter timing, turning it on/off and setting the system.

3.4.3. RS-232 communication data format

Baud rate ----------------------2400bps

Byte------------------------------8bit

Over No -----------------------1bit

Parity check -------------------no

3.4.4. Connection of computer RS-232 and Inverter RS232

Computer----------------------- Inverter

RXD （2 pin） <------------------ RX （2 pin）

TXD （3 pin） -------------------- TX （3 pin）

GND （5 pin） -------------------- GND （5 pin）

3.5. RS485 Intelligent Communication

Port definition (from left to right)

1 pin：RS-485 communication port A （DATA+ ） port;

2 pin：RS-485 communication port B （DATA- ） port;

3 pin：RS-485 communication GND

4 pin：RS-485 communication port A （DATA+ ） port

5 pin：RS-485 communication port B （DATA- ） port

6 pin：communication GND ；

RS-485 communication method provides the same function with RS-232

RS-485 communication data format provides the same function with RS-232

How to connect Hybrid Solar Inverter with RS-485

How to connect ---------- Hybrid Solar Inverter

DATA ＋ port---------------- A port （1 pin）

DATA － port---------------- B port （2 pin）

GND port ------------------ communication source （3 pin）

How to connect Hybrid Solar Inverter with Hybrid Solar Inverter RE-485

Hybrid Solar Inverter 1 ----------------- Hybrid Solar Inverter 2

A port （4 pin） ----------------- A port （1 pin）

B port （5 pin） ----------------------- B port （2 pin）

Communication GND （6 pin） ---------- communication GND （3 pin）

3.6. Communications SNMP and Distant Web

Port Definition

T568A standard and T568B standard

T568A standard description order from left to right is: 1-white & green 、2-green、3-white & 28 orange、4-blue、5-white& blue、6-orange、7-white& brown、8-brown

T568B standard description order from left to right is: 1-white and brown、2-orange、3-white

& green、4-blue、5-white& blue、6-green、7-white& brown、8-brown

SNMP card has the following functions:

- Provide SNMP MIB to monitor the Hybrid Solar Inverter status.
- Automatically detect and transform the 10/100M fast ETHERNET SPEED
- Set the functions through internet, web browser or NMS
- Support TCP/IP, UDP, SNMP 、TELNET 、SNTP 、PPP、HTTP 、SMTP agreements.
- Provide facility installation and updating tools which applied to MS-windows. No need for the time-costing RS232 traditional way to set.
- Send SNMP TRAP, EMAIL and pager to inform the operator when battery receives errors.
- Can be set to sending daily history record via email.
- Able to match shutdown software to protect computer system to save documents safely and turning off the machine.
- Net Agent-3 ports generation: able to link out NETFEELER LITE environment detecting system and external modems. Also able to use the dial-up methods.

4. MPS SERIES SOLAR INVERTER WORKING PRINCIPLE

4.1 System principle block diagram:
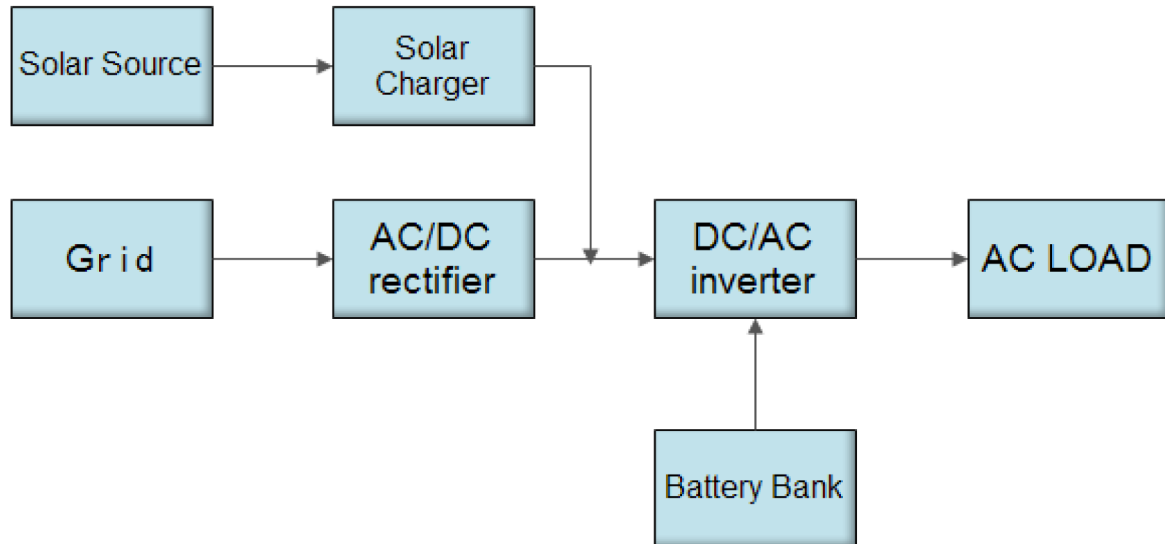
4.2 Working Principle

When solar energy is sufficient, photovoltaic arrays can satisfy load demand and charge the battery at the same time;

When solar energy is insufficient, the battery is supplied to the load.

When the battery is insufficient, the device turns the bypass output.

Power grid through the rectifier to charge the battery. (Set the time period of the

power grid charging.)

5. SOLAR INVERTER INSTALLATION

5.1 Disassemble and Inspect

When open up packages, and take out Hybrid Solar Inverter, check if it has any damage during transportation. At the same time, make sure all the switches are cut o, Hybrid Solar Inverter inside should include: warranty card, instruction, installation manual, RS232 CD-ROM, RS232 cable.

This inverter is already set to Australia Standard Configuration.

5.2 Hybrid Solar Inverter Positioning

Environmental requirements of installation:

- Temperature: 0℃ ~ +40℃
- Relative humidity: 30% ~ 90%
- Height: less than1000 M, if height exceeds1000M, reduce10% usage per1000M
- No dust

Having a good cooling system, there are some feasible methods as following:

A. Natural ventilation system: only apply to low heat and broad space.

B. Artificial ventilation system: when temperature of machine shell (TA) higher than exterior temperature (TE), then it is necessary to install an air condition. When these two temperatures are close, the capacity of ventilation system needs to be increased relatively.
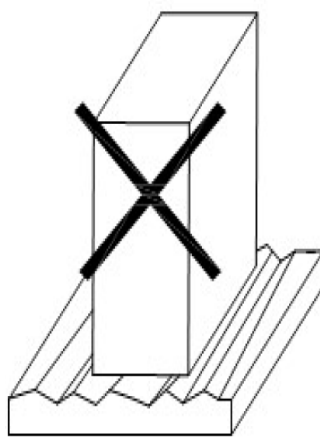
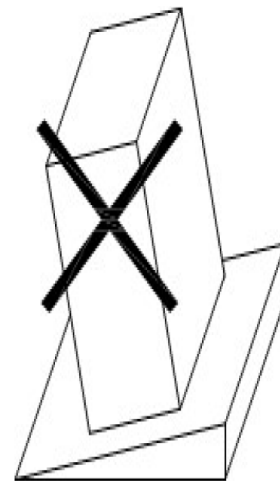Hybrid Solar Inverter should not be exposed to any of the following conditions:
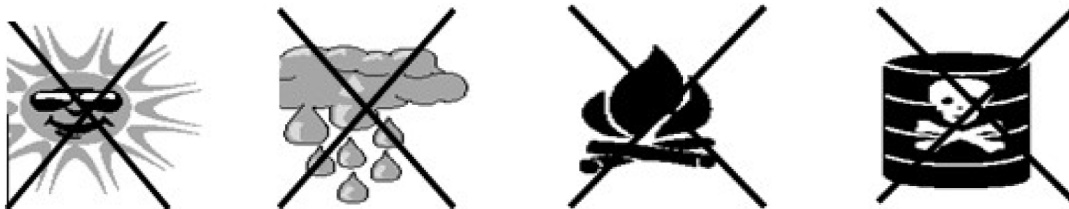
- Avoid direct sunlight
- Avoid raining and humidity
- Avoid fire and high temperature
- Avoid rot-gas
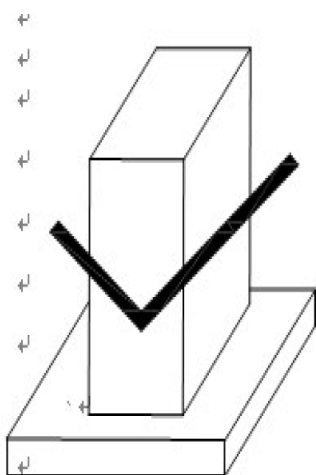
Level off   Do not place on unsmooth ground   Do not place on oblique ground

Installation location:

- Floor load bearing require 1500kg²/m
- Distance of machine back from wall or any object should be at least 800 mm
- At the top of Hybrid Solar Inverter should not be placed any object
- The front, right and left sides of Equipment should be prepared enough space for maintenance operation.
- Equipment battery should be installed in the right-hand side of machine, and reserve sufficient space for battery overhauling.

5.3 Hybrid Solar Inverter Wires Connection

MPS33 series cables specification suggestion: (unit: mm2)

Capacity	Input			Output		Solar		Battery	
	ABCN		PE	ABCN1		+	-	+	-
MPS33-10KW	25	25	6	16	16	16	16	25	25
MPS33-15KW	35	35	10	25	25	16	16	35	35
MPS33-20KW	50	50	16	50	50	16	16	50	50

Capacity	AC Input Switch and ammeter	Output Switch	PV Switch	Batter Switch
MPS33-10KW	100A	63A	63A-2P	100A
MPS33-15KW	150A	100A	63A-2P	150A
MPS33-20KW	200A	125A	63A-2P	200A

MPS33 series 10K W – 15KW main cable connection

DRY CONTACT	BATTERY MANAGEMENT SYSTEM			PE	PV		BATTERY 1		BATTERY 2		GRID		OUTPUT	
GENERATOR START	Power Supply	Battery protection signal	Temperature Probe	⏚	+	-	+	-	+	-	L	N	L	N

Before Hybrid Solar Inverter installation, turn off all switches as shown above, PE for earth line; PV connect to the PV Combiner Box, Generator input connect to city power；output connect to the load ； Battery +、- connect the battery positive, negative.

MPS33 series 20KW main cable connection

PV 1		PV 2		WIND			BATTERY		GRID		OUTPUT		PE	DRY CONTACT		BATTERY MANAGEMENT SYSTEM		
														1	2		1	2	Battery Protection Signal
+	−	+	−	A	B	C	+	−	L	N	L	N	⏚	GENERATOR START		POWER SUPPLY			Temperature Probe

Before Hybrid Solar Inverter installation, turn off all switches as shown above, PE for earth line; PV connect to the PV Combiner Box, Generator input connect to city power；output connect to the load；Battery +、- connect the battery positive, negative, A, B, C to connect to Wind Input.

DRY CONTACT	Battery Management System		
GENERATOR START	Power supply	signal Battery protection	

GENERATOR START：When the battery is low, send a signal to the generator and turn on to auto. Power supply Supply power to the inspector of the battery device (240VAC)

Battery protection signal：The inspector of the battery device detected a faulty signal and send to MPS.

MPS33-10KW printing of the switches

PV Surge Protect	PV	Battery	Grid	Surge Protect	Output

MPS33-20KW printing of the switches

PV1 Surge Protect	PV2 Surge Protect	PV1 Switch	PV2 Switch	Wind Switch	Battery Switch	Grid Switch	Surge Protect	Output Switch

PV switch--- Control PV input status (on / off)

BATTERY switch---Control battery input status (on / off)

GRID switch---Control grid input status (on / off)

OUTPUT switch ---Control load status (on / off)

MAINTENANCE switch --- Manual repair bypass

MPS supply -- Power supply by inverter

Mains supply—Power supply by city power

WIND SWITCH--Wind power input (Need to customize)

Battery Connection:

1. Before connecting battery, please check manufacturers of each battery, specifications and models, and terminal voltage to make sure whether they are inconsistent (because different manufacturers' battery internal resistances are different. When battery pack runs in series, because of uneven voltage, the whole battery pack can be damaged; meanwhile, the old and new batteries from same manufacturers cannot be mixed as well.

2. Hybrid Solar Inverter battery input voltage is equal to the battery bank voltage，the nominal voltage is the sum of all batteries in series voltage. For example, each100AH/12VDC the nominal is 12VDC, instead of the measure voltage；for example MPS33 series 6KVA ～20KVA battery input voltage 192VDC，then 12VDC ×16＝192VDC; or 200AH/2VDC the nominal is 2VDC, 2VDC ×96=192VDC); MPS33 series 10KVA ～60KVA battery input voltage 360VDC，then 12VDC ×30＝360VDC; or 200AH/2VDC the nominal is 2VDC, 2VDC ×180= 360VDC)

3. Series and parallel connection of battery: When the capacity of a single battery pack meet required backup time, then all the batteries should be connected in series; or couples of series connected batteries should be connected in parallel, the bus voltage of battery must be the same when connecting in parallel, capacity is equivalent to the summation of parallel battery pack.
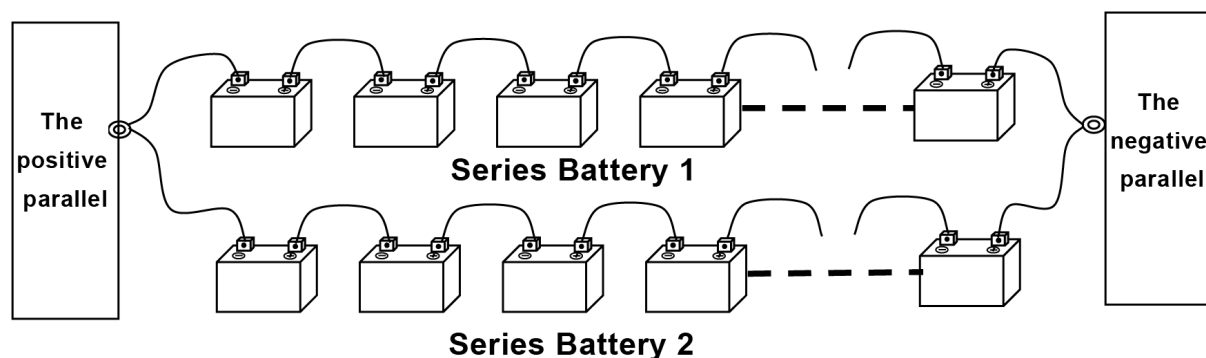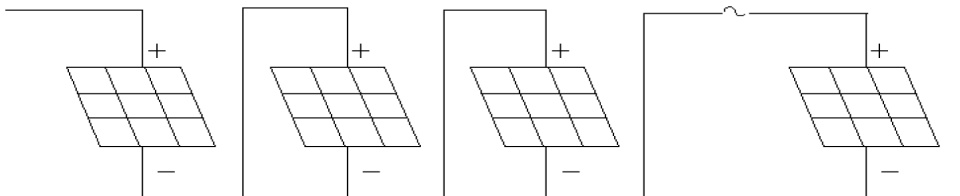

When connecting in series, the first battery's anode is connected to the second battery's cathode, the second battery's anode is connected to the second battery's cathode, and so is the other battery's connection. When connecting in parallel, the battery pack's anodes are connected together; the battery pack's cathodes are connected together.

Open the chassis of battery box connect according the above methods. Install battery on the appropriate position; connect battery wire rightly according to the above connecting methods.

Connect the cable of battery to Hybrid Solar Inverter's battery terminal board.

- Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions
- When replacing batteries, replace with the same type and number of batteries or battery packs
- General instructions regarding removal and installation of batteries
- Battery temperature Sensor is not included.
- For battery temperature sensor, we recommend THERMOCOUPLE TYPE.
- CAUTION: Do not dispose of batteries in a fire. The batteries may explode.
- CAUTION: Do not open or damage batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- CAUTION: A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries:
  - A) Remove watches, rings, or other metal objects
  - B) Use tools with insulated handles
  - C) Wear rubber gloves and boots
  - D) Do not lay tools or metal parts on top of batteries
  - E) Disconnect charging source prior to connecting or disconnecting battery terminals
  - F) Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

Solar Panel Connection:

Negative positive and second solar cells connected in series when the first section of the solar cell is connected with the anode, cathode and third solar battery second solar battery connected to the solar cell and so on will all series. The series of positive and negative pole can be connected to the junction box, junction box through a plurality of groups of solar batteries in parallel. MPS 33 series can be equipped with 10pcs 250W solar panels (maximum power point voltage of about 31V) a group. Each road is the largest with 10.5KW, output 50A, and voltage 220V with 5 sets.

When the photovoltaic array is exposed to light, it supplies a d.c. voltage to the unit.

RS232 Cable Connections:

Connect one end of DB9 signal cable which is distributed from Hybrid Solar Inverter to the serial port of computer's DB9, connect the other end to the interface of Hybrid Solar Inverter's RS232. If the distance is too far to connect, then you can increase the standard length of communication wire of D89, however, the distance should not exceed 30 meters, or it cannot communicate normally.

RS485 Cable Connection:

According to Hybrid Solar Inverter's A, B and G, use communication wires to connect the interfaces of computer's RS485 and Hybrid Solar Inverter's RS485. The longest linking distance should be less than 4,000m, or it cannot communicate normally.

Connection method of SNMP card:

The international standard of producing twisted-pair: EIA/TIA568A and EIA/TIA568B. Both ends of plug should follow 568 A or 568 B standard. One end of a well pressed network cable connects to Hybrid Solar Inverter's SNMP card, the other one connects to the switch or hub of LAN (local area network).

Connection inspection

After connecting all the wires and cables, check the following items:

Whether all of battery cables are connected correctly and in a good contacting status, whether all of input, output, grounding wires have been properly connected to corresponding connation field on equipment, whether Hybrid Solar Inverter's input voltage, frequency, and phase sequence are consistent with Hybrid Solar Inverter's bypass voltage, frequency, and phase sequence.

6. OPERATION AND MANAGEMENT

6.1 Preparations before turning on the machine

6.1.1. Test Tool

- Millimetre
- Ammeter
- Computer for communication test
- Load (actual load)

6.1.2. Wiring Inspections

- Check the input line to make sure all of them meet the requirements.
- Input supply test
- Use millimetre to test input voltage and frequency, to make sure whether they are in the input range.
- Load test
- Check the output load by millimetre to make sure if there is a short circuit. And calculate the battery polarity test

- Check whether the polar is right or not by millimetre and the voltage of battery belongs to the input range of Hybrid Solar Inverter.

6.2 Testing in AC Mode Operation

Procedures of turning on the machine:

1. Turn off the Grid switch and output switch and check whether the machine bypass is in normal condition. The rectifier will be done automatically.
2. A low-voltage battery indicator light will extinguish and inverter indicator will lighten.
3. Turn on the battery switch, and battery will be tested by Hybrid Solar Inverter.
4. The battery will be charging again, when it becomes normal, use the concurrent ammeter charging current.

6.3 Testing in Battery Mode Operation

1. Turn off the grid switch to simulate the inverter of battery and check whether the supply is normal.
2. Turn on the rectifier switch to change the inverter of city electricity and charge the battery.

6.4 Testing in Solar Mode Operation

1. Turn on the PV switch, and Solar will be tested by the Hybrid Solar Inverter. Automation will become inverter running, when it becomes normal.
2. Turn on the output switch and simulate load
3. Use the concurrent ammeter to test output current.

6.5 Daily Operation Management

The opening procedures of the Hybrid Solar Inverter:

Although the Hybrid Solar Inverter is equipped with a battery switch, it must follow the following to open:

1. Turn on the grid switch (up)
2. When low battery, the light is out, turn on the battery switch. When Hybrid Solar Inverter is in the absence of any alarm status indication, it will automatically switch to normal work, and turn on the battery switch PV switch and output switch. No grid input and No Solar input, the battery is in inverter mode.
3. Turn on the battery switch, press the battery cool start button, when the indicator is in the panel display,
4. Hybrid Solar Inverter automatically turns inverter on，close the output switch when Hybrid Solar Inverter works in normal mode, inverter output now can with loads.
5. Urgency turning off program
6. This program only suggests to be started when fire, electricity attaching and electricity is arcing.
7. Cut down all the switches.

6.6 Set the Schedule – the time for batteries, solar power

Follow the process sequence diagram below. To install the diagram, click the red square button.

1.

2.

3.

4.


5.

6.

7.

8.

9.

10.

38

Click "Wave" to do the setup. Turn to the next schedule. According to the setup of the previous schedule, set the "Daily", "End of the battery mode", "23:30", and "Wave". Setup is complete from the interface.
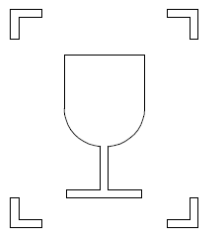
6.7. Calibration Time

The exact effect of time on battery discharge time. Adjust the time for each boot. Refer to the method in directory 3.3.12.
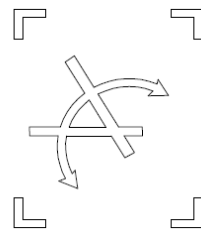
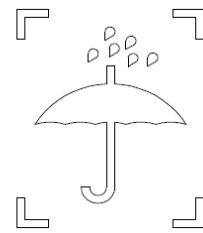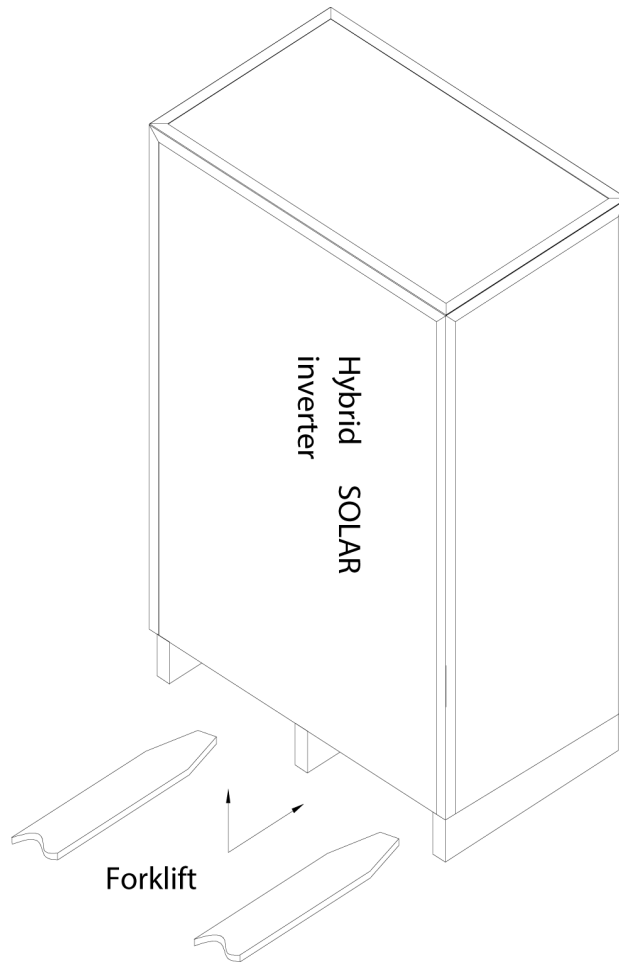**7. TRANSPORT HANDLING REQUIREMENTS**

7.1. Transport Labels
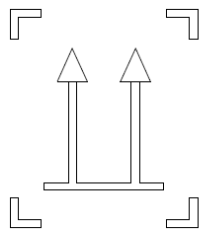
| Upwards	Fragile	No Turning Over	No Rainfall

7.2. Loading, unloading and transport

Loading and unloading by forklift:

Hybrid SOLAR inverter

Forklift

Drive the forklift into the opposite side from the bottom of the packaged machine, and lift it upwards. Make sure slow lifting and falling speed due to the heaviness of the machine to avoid damages.

Loading and unloading by crane:
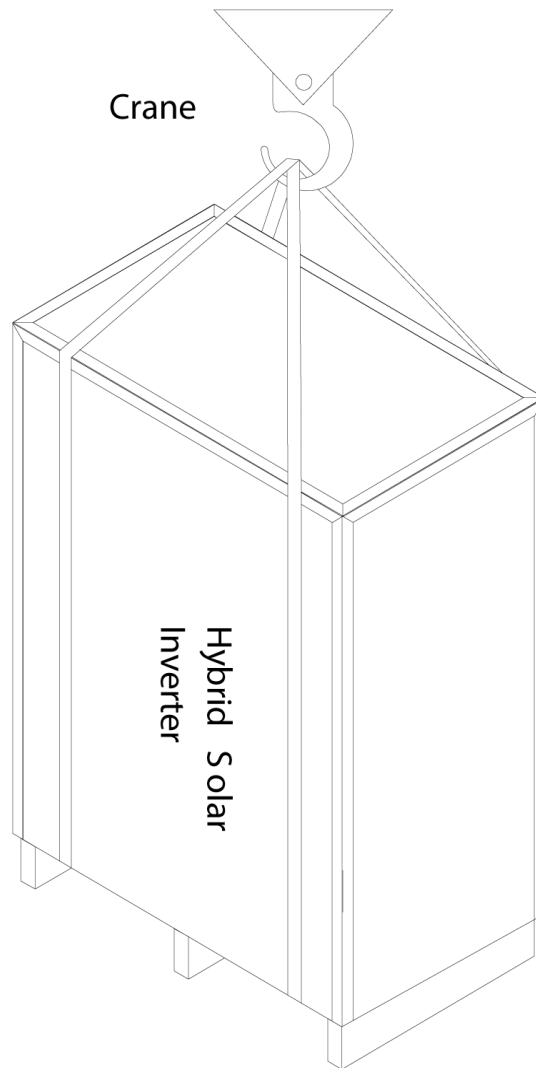
Fasten the packaged machine form the bottom to top with lifting rope and hook the rope to lift up and down.

Transport

Place the packaged machine evenly onto the truck and fix the machine with rope to avoid vibration during truck transport. Although the packaging is designed with anti-vibration treatment, extra anti-vibration measures have to be taken on bumpy roads, and driving has to be very slow.

8. PACKING LIST

Packing List

Serial	Name	Qty/Unit	Configuration	Remark
1	Hybrid Solar Inverter	1pcs	✔	
2	User manual	1pcs	✔	
3	Certificate of Approval	1pcs		
4	Warranty Card	1pcs	✔	
5	Product Inspection report	1pcs		
6	Key	1pcs	✔	
7	RS384 port socket	1pcs	✔	
8	CD	1pcs		
9	RS232 communication wire	1pcs		
10	DP15F/F (parallel communication line)	1pcs		

Please consult with our company if the manual could not be understood or detailed explanations are needed during application. We would be more than happy to serve you. **This manual is subject to any changes without prior notice.**

CONTACT

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