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COSUPER

USER MANUAL

Intelligent MPPT Hybrid Inverter

CPS Series



Utility + Inverter + Charger + Transfer SW + Solar Power + AGS

All in One



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1. Important Safety Information



WARNING!

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

1-1. General Safety Precautions

1. Before installing and using the CPS Inverter/Charger, read all instructions and cautionary markings on the CPS Inverter /Charger and all appropriate sections of this guide. Be sure to read all instructions and cautionary markings for any equipment attached to this unit.
2. This unit is designed for indoor use only. Do not expose the CPS Inverter/Charger to rain, snow, or spray.
3. To reduce risk of fire hazard, do not cover or obstruct the ventilation openings. Do not install the CPS Inverter/Charger in a zero-clearance compartment. Overheating may result.
4. Use only attachments recommended or sold by the manufacturer. Doing otherwise may result in a risk of fire, electric shock, or injury to persons.
5. To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that wire is not undersized. Do not operate the CPS Inverter/Charger with damaged or substandard wiring.
6. Do not operate the CPS Inverter/Charger if it has received a sharp blow, been dropped, or otherwise damaged in any way. If the CPS Inverter/Charger is damaged, see the Warranty section.
7. Do not disassemble the DR Inverter/Charger. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the CPS Inverter/Charger yourself may result in a risk of electrical shock or fire. Internal capacitors remain charged after all power is disconnected.
8. The CPS Inverter contains more than one live circuit (batteries and AC line). Power may be present at more than one source. To reduce the risk of electrical shock, disconnect both AC and DC power from the CPS Inverter/Charger before attempting any maintenance or cleaning or working on any circuits connected to the CPS Inverter/Charger. Turning off controls will not reduce this risk.
9. Use insulated tools to reduce the chance of short-circuits when installing or working with the inverter, the batteries, or PV array.

1-2. Precautions When Working with Batteries

1. Make sure the area around the battery is well ventilated.
2. Never smoke or allow a spark or flame near the engine or batteries.
3. Use caution to reduce the risk of dropping a metal tool on the battery. It could spark or short circuit the battery or other electrical parts and could cause an explosion.
4. Remove all metal items, like rings, brace lets, and watches when working with lead-acid batteries. Lead-acid batteries produce a short circuit current high enough to weld metal to skin, causing a severe burn.
5. Have someone within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
6. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
7. Wear complete eye protection and clothing protection. Avoid touching your eyes while working near batteries.

8. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters your eye, immediately flood it with running cold water for at least twenty minutes and get medical attention immediately.
9. If you need to remove a battery, always remove the grounded terminal from the battery first. Make sure all accessories are off so you don't cause a spark.
10. Always use identical types of batteries.
11. Never install old or untested batteries. Check each battery's date code or label to ensure age and type.
12. Batteries are temperature sensitive. For optimum performance, they should be installed in a stable temperature environment.
13. Always recycle old batteries. Contact your local recycling center for proper disposal information.

2. Introduction

2-1. General Information

Thank you for purchasing the CPS Series Inverter/Charger.

CPS Series Pure Sine Wave Inverter is a combination of an inverter, charger, solar power and Auto-transfer switch into one complete system. It is packed with unique features and it is one of the most advanced inverter/chargers in the market today.

The inverter features an AC pass-through circuit, powering your home appliances from utility or generator power while charging the battery. When utility power fails, the battery backup system keeps your appliances powered until utility power is restored. Internal protection circuits prevent over-discharge of the batteries by shutting down the inverter when a low battery condition occurs. When utility or generator power is restored, the inverter transfers to the AC source and recharges the batteries.

Accessories allow the CPS series to also serve as a central hub of a renewable energy system. Set the CPS Series inverter to battery priority mode, designates the inverter-preferred UPS configuration. In this configuration, the load power is normally provided by the inverter. However, if the inverter output is interrupted, an internal transfer switch automatically transfers the load from the inverter to commercial AC power. The transfer time between inverter and line is short (6ms typical), and such transfers are normally not detected by even highly sensitive loads. Upon restoration of inverter power, the inverter will transfer back to inverter power.

On the line priority mode, when utility AC power cuts off (or falls out of acceptable range), the transfer relay is de-energized and the load is automatically transferred to the Inverter output. Once the qualified AC utility is restored, the relay is energized and the load is automatically reconnected to AC utility.

It features power factor corrected, sophisticated multi-stage charging and pure sine wave output with unprecedentedly high surge capability to meet demanding power needs of inductive loads without endangering the equipment.

CPS Series Inverter is equipped with a powerful charger of up to 120Amp (depending on Model). The overload capacity is 300% of continuous output for up to 20 seconds to reliably support tools and equipment longer

Another important feature is that the inverter can be easily customized to Battery priority via a DIP switch, this helps to extract maximum power from battery in renewable energy systems. Thus, the CPS Series Pure Sine Wave Inverter is suitable for Renewable energy system, Utility, RV, Marine and Emergency appliances.

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

2-2. Application

Power tools—circular saws, drills, grinders, sanders, buffers, weed and hedge trimmers, air compressors.

Office equipment – computers, printers, monitors, facsimile machines, scanners.

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

Kitchen appliances – coffee makers, blenders, ice makers, toasters.

Industrial equipment – metal halide lamp, high – pressure sodium lamp.

Home entertainment electronics – television, VCRs, video games, stereos, musical instruments, satellite equipment.

2.3 Features

- ◆ Smart Remote Control (RMT)
- ◆ Battery Temperature Sensor (BTS)
- ◆ Automatic Generator Starting (AGS)
- ◆ Support Solar Panel with MPPT Function
- ◆ Designed to Operate under Harsh Environment
- ◆ DC Start & Automatic Self-Diagnostic Function
- ◆ Compatible with Both Linear & Non-Linear Load
- ◆ Easy to Install & Easy to Operate & Easy to Solve
- ◆ Low DC Voltage Supports Home & Office Appliances
- ◆ Powerful Charge Rate Up to 120Amp, Selectable From 0%-100%
- ◆ High Efficiency Design & “Power Saving Mode” to Conserve Energy
- ◆ Battery Priority Mode, Designates the Inverter-Preferred UPS Configuration
- ◆ 13 Vdc Battery Recover Point, Dedicated for Renewable Energy Systems
- ◆ 8 pre Set Battery Type Selector plus De-sulphation for Totally Flat Batteries
- ◆ 4-step Intelligent Battery Charging, PFC (Power Factor Correction) for Charger
- ◆ 8 ms Typical Transfer Time Between Utility & Battery, Guarantees Power Continuity
- ◆ 15s Delay Before Transfer when AC Resumes, Protection for Load when Used with Generator

2.4 Electrical Performance

2.4.1 Inverter

Topology

The CPS inverter/charger is built according to the following topology.

Inverter: Full Bridge Topology.

AC Charger: Isolate Boost Topology

Solar Charger: MPPT PV Controller

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% (Min5%, Max 15%) depending of load connected and battery voltage.

The peak efficiency of CPS series is 88%.

Overload Capacity

The CPS series inverters have different overload capacities, making it ideal to handle demanding loads.

1 For $110\% < \text{Load} < 125\% (\pm 10\%)$, 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 $125\% < \text{Load} < 150\% (\pm 10\%)$, beeps 0.5s every 1s and Fault (Turn off) after the 1 minute.

3 For $300\% \cong \text{Load} > 150\% (\pm 10\%)$, beeps 0.5s every 1s and Fault (Turn off) after 20s.

2.4.2 AC Charger

CPS 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, CPS series 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 CPS series 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 capacity battery bank. Fortunately, the liner switch can effectively reduce the max charging current to 20% of its peak. Choosing "0" in the battery type selector will disable 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 0.3V below the boost voltage, then take this time as T0 and $T0 \times 2 = T1$.

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 float charge voltage (determined by the Battery Type selection*). In this stage, the batteries are kept fully charged and ready if needed by the inverter.

If the A/C is reconnected or the battery voltage drops below 12Vdc/24Vdc/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

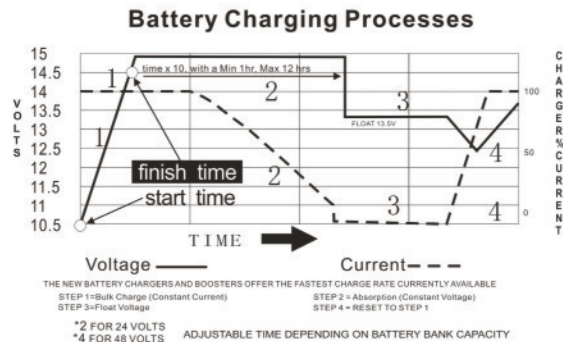


Table 2.5.2 Battery Type Selector

| Switch Setting | Description | Fast Mode / VDC | Float Mode / VDC |
|----------------|------------------|-------------------------|------------------|
| 0 | Charger Off | | |
| 1 | Gel USA | 14.0 | 13.7 |
| 2 | AGM 1 | 14.1 | 13.4 |
| 3 | LiFePO4 | 14.6 | 13.7 |
| 4 | Sealed Lead Acid | 14.4 | 13.6 |
| 5 | Gel EURO | 14.4 | 13.8 |
| 6 | Open Lead Acid | 14.8 | 13.3 |
| 7 | Calcium | 15.1 | 13.6 |
| 8 | De-sulphation | 15.5 (4 Hours then Off) | |

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(nor), 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 CPS series 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 to charge the battery once qualified AC inputs are present.

Before the battery voltage goes below 9VDC, the charging can be activated when the switch is turned to "Off", then to "ON".

When the voltage goes below 9VDC, and you accidentally turn the switch to OFF or disconnect the inverter from battery, the inverter will not be able to charge the battery once again, because the CPU loses memory during this process.

| Model Watt | Battery Voltage | AC Charger Current Max | Model Watt | Battery Voltage | AC Charger Current Max |
|---------------------|-----------------|------------------------|------------|-----------------|------------------------|
| 1.000 ~ 1.500 | 12 Vdc | 45 ± 5 Amp | 2.000 | 12 Vdc | 70 ± 5 Amp |
| | 24 Vdc | 25 ± 5 Amp | | 24 Vdc | 35 ± 5 Amp |
| | 48 Vdc | 15 ± 5 Amp | | 48 Vdc | 20 ± 5 Amp |
| 3.000 | 12 Vdc | 90 ± 5 Amp | 4.000 | 12 Vdc | 120 ± 5 Amp |
| | 24 Vdc | 50 ± 5 Amp | | 24 Vdc | 65 ± 5 Amp |
| | 48 Vdc | 30 ± 5 Amp | | 48 Vdc | 40 ± 5 Amp |
| 5.000 | 24 Vdc | 80 ± 5 Amp | 6.000 | 24 Vdc | 90 ± 5 Amp |
| | 48 Vdc | 50 ± 5 Amp | | 48 Vdc | 60 ± 5 Amp |
| 8.000 | 24 Vdc | 120 ± 5 Amp | 10.000 | 48 Vdc | 100 ± 5 Amp |
| | 48 Vdc | 80 ± 5 Amp | 12.000 | 48 Vdc | 120 ± 5 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 on the size of the generator and rate of charge.

2.4.3 Transfer

While in the Standby Mode, the AC input is continually monitored. Whenever AC power falls below the VAC Trip voltage (154 VAC, default setting for 230VAC, 90VAC for 120VAC), the inverter automatically transfers back to the Invert Mode with minimum interruption to your appliances - as long as the inverter is turned on. The transfer from Standby mode to Inverter mode occurs in approximately 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 from the time the inverter senses that continuously qualified AC is present at the input terminals to when the transfer is made. This delay is built in to provide time for a generator to spin-up to a stable voltage and avoid relay chattering. The inverter will not transfer to generator until it has locked onto the generator's output. This delay is also designed to avoid frequent switching when input utility is unstable.

2.4.4 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 applied to the inverter.

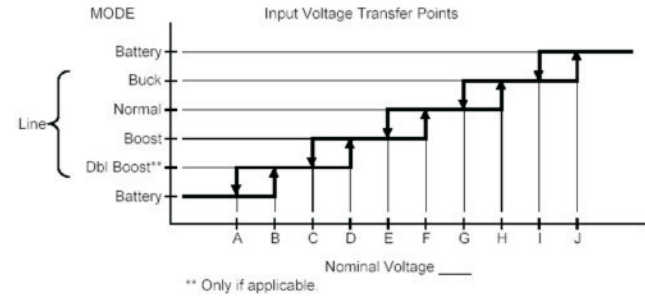
If you want to get 60Hz from a 50Hz inverter, just input 60Hz power, and the inverter will automatically adjust the output freq to 60Hz and vice versa.

2.4.6 Automatic Voltage Regulation(Optional)

The automatic voltage regulation function is for full series of CPS Pure Sine Wave Inverter/ Charger except split phase models including CPS 1000W~6000W. Instead of simply bypassing the input AC to power the loads, the CPS-SV series inverter stabilizes the input AC voltage to a range of 230V/120V±10%. Connected with batteries, the CPSS Series 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.

Function Introduction

Table 2.5.5 Input Voltage Transfer Points

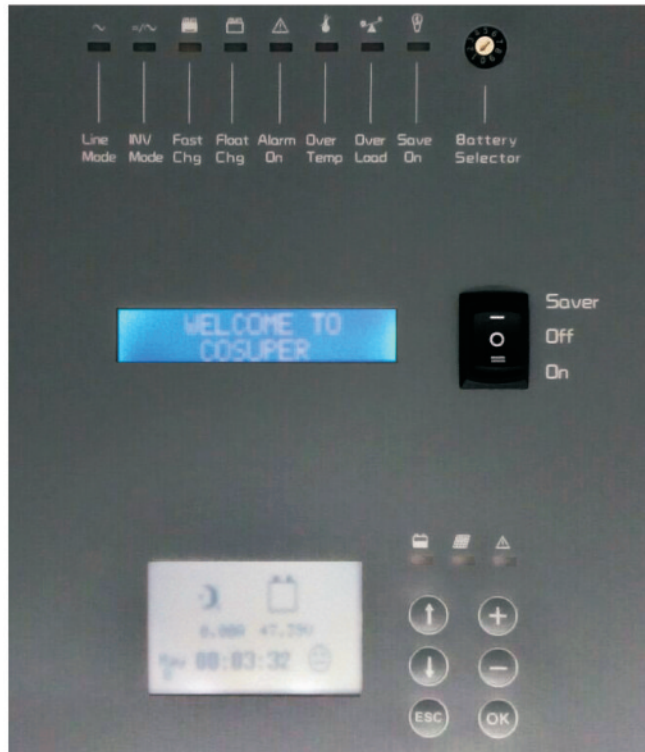


8.000

** Only if applicable.

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

2.4.7 Power Saver Mode



Power saver function is designed to conserve battery power when AC power is not or rarely required by the loads.

In this mode, the inverter pulses the AC output looking for an AC load (i.e., electrical appliance). Whenever an AC load (greater than 25 watts) is turned on, the inverter recognizes the need for power and automatically starts inverting and output goes to full voltage. When there is no load (or less than 25 watts) detected, the inverter automatically goes back into search mode to minimize energy consumption from the battery bank.

4. Inspection Of Batteries

- (1) Battery old/new condition. New batteries will charge the old batteries because of the bad discharge ability of old one.
- (2) Use the same brand and same model battery. Different brands batteries have different discharge ability. Some batteries will charge the other batteries because of the relatively weak discharge ability.
- (3) Make sure battery has no leak or swell before using.

Table 2.5.6 CPS Series Idle Power Consumption

| Model | Power Saver Off | Power Saver Auto | |
|---------|-----------------|------------------|---------------|
| | Idle | 3Secs(Max) | Stand-By Mode |
| 1.000W | 15W | 7.5W | 6.6W |
| 1.500W | 18W | 7.5W | 6.6W |
| 2.000W | 30W | 11.5W | 6.6W |
| 3.000W | 60W | 20.0W | 6.6W |
| 4.000W | 70W | 20.0W | 6.6W |
| 5.000W | 80W | 25.0W | 6.6W |
| 6.000W | 90W | 25.0W | 6.6W |
| 8.000W | 120W | 30.0W | 6.6W |
| 10.000W | 150W | 35.0W | 6.6W |
| 12.000W | 180W | 35.0W | 6.6W |

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.

2.4.8 Protections

The CPS 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 10.5VDC thru the SW1 on DIP switch.

The inverter will go to Over temp protection when heat sink temp. $\geq 105^{\circ}\text{C}$, and go to Fault (shutdown Output) after 30 seconds. The switch has to be reset to activate the inverter.

The Global LF series Inverter has back feeding protection which avoids presenting an AC voltage on the AC input terminal in Invert mode.

After the reason for fault is cleared, the inverter has to be reset to start working.

2.4.9 Remote control



Apart 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 off

Only when both panels are turned to “Unit Off” position will the inverter be powered off.

The Max length of the cable is 10 meters.

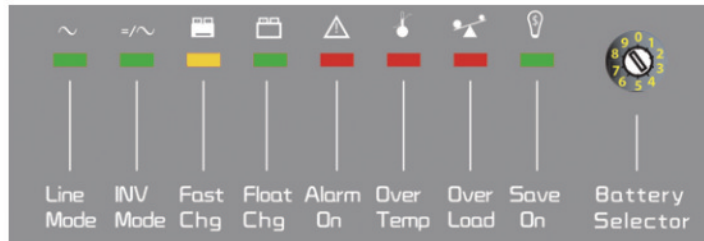


WARNING

Never cut the telephone cable when the cable is attached to inverter and battery is connected to the inverter. Even if the inverter is turned off. It will damage the remote PCB inside if the cable is short circuited during cutting.

2.4.10 LED Indicator & LCD

Table 2.5.7 XPT Series LED Indicators



| | |
|-----------|-----------------------------------|
| Save On | GREEN LED lit in Power Save Model |
| Over Load | GREEN LED lit in Over Load |
| Over Temp | YELLOW LED lit in Over Temp |
| Alarm | GREEN LED lit in Error State |
| Float CHG | RED LED lit in Float Charge |
| Fast CHG | RED LED lit in Fast Charge |
| INV Mode | RED LED lit in Invert mode |
| Line Mode | GREEN LED lit in AC Power Mode |

Table 2.5.8 XPT Series LCD Indicator

2.4.10 LED Indication

| | |
|--|--|
| 1 Greeting message WELCOME TO COSUPER | 2 AC Status & Input Voltage AC:normal I/P-V:230V “AC: abnormal” will be displayed when AC input is not qualified. |
| 3 Output Voltage/Frequency and Battery voltage O/P-V:230V F:50HZ BAT-V:12.5V | 4 Output Current(in percentage) O/P Current: 100% |

Solar Charger Indicates



Charging LED

| Indicator | Status |
|-------------|-------------|
| Green Blink | Charging |
| Green OFF | No charging |



Fault LED

| Indicator | Status |
|----------------------|------------------|
| Red OFF | Normal |
| Red Blink | Current abnormal |
| Charging overcurrent | |
| PV overvoltage | |



Battery LED

| Indicator | Status |
|------------------|--------------------------|
| Green ON | Normal |
| Green slow blink | Full |
| Orange ON | Under voltage warning |
| Red ON | Low voltage disconnect |
| Red Blink | Battery over temperature |
| Green fast blink | High volt disconnect |

All Indicator

| Indicator | Fault Status |
|------------------------------|-----------------------------|
| Blink(Battery LED in Red) | Work voltage error |
| Blink(Battery LED in Orange) | Controller over temperature |
| 4.4 LCD Display & Operation | |

Initialization

LCD will paint the picture as shown on the left as soon as it is powered on. It indicates that initialization is normal when the interface goes automatically to the Rated Info interface.

Rated Info

| |
|---|
| Rated Para. Rat.Volt 48.0V Chrg.Cur 60.0A |
|---|

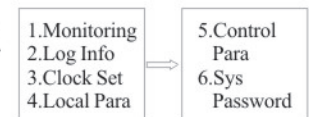
Rated info of the controller will be displayed. Monitor interface will be switched after 3 seconds.

Main Menu

Click ESC button to return main menu in any monitoring interface. There are 9 interfaces for monitoring, as shown in the below picture.

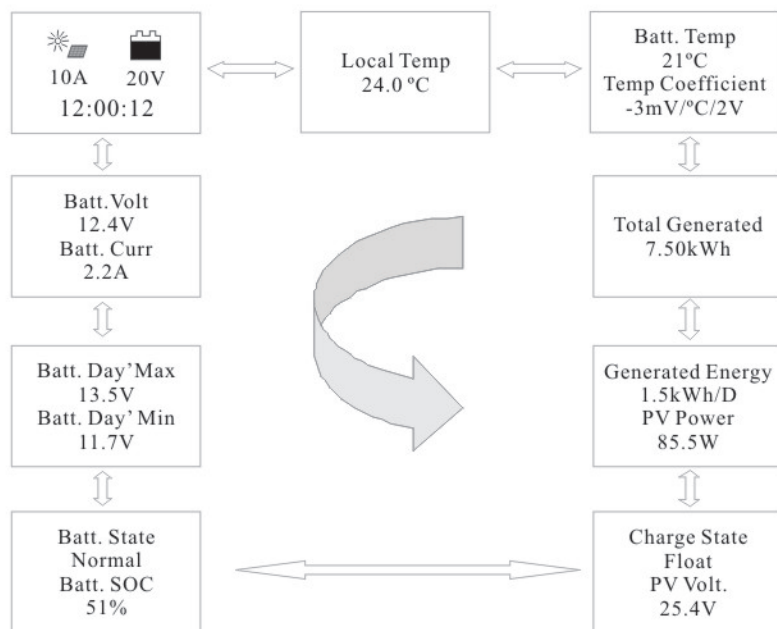
Press ↑ ↓ button to move inverse cursor among 8 menus.

Press OK to enter corresponding interface.



Monitor

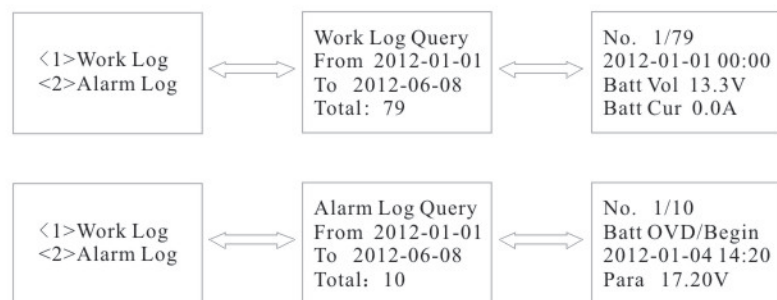
There are 9 interfaces for monitoring, as shown below:



Press OK to enter the monitoring interface when the inverse cursor point to monitor item. The parameters in monitoring interface are only for browse. Press \uparrow \downarrow button to browse the parameters interfaces in turns. There are 5 battery status: Normal, UVW(Under voltage warning), LVD(Low voltage disconnect), Over Voltage, Over Temperature and 4 charging stages: no charging, equalized, boost, float.

Log Info

There are two items of log record as shown below.



Press OK to enter the monitoring interface when the inverse cursor point to monitor item. Press ESC button to exit. Work Log and Event Log could be browsed in this interface, the operation is as follows:

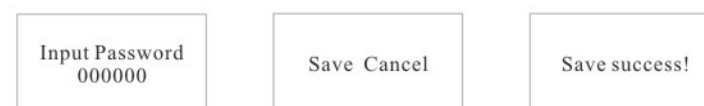
Press OK to enter the Work Log or Event Log interface respectively when the item is chosen in inverse. Press OK again to enter the Edit Mode. Use \uparrow or \downarrow button to move the cursor between the time parameters and data bit. Use + - button to modify the value and set the period of log for browse. When the period is set, press OK to enter the corresponding details. Log Number, time, the voltage and current of battery are included in every work log item and are shown in the Work Log interface. warning event sequence number, warning event, start or end time, the fault status and values are all included in every event log item and are shown in the Event Log interface.

Clock Set

The interface of Clock Set is shown as follow:

Press OK to enter the Clock Set interface when the inverse cursor point to Clock Set item. Press ESC button to exit.

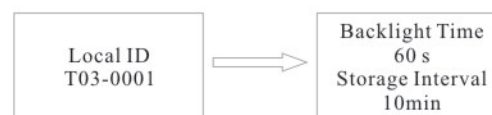
Date and Time can be adjusted in this interface. Press OK and input the 6 digit user password and then Date and Time could be adjusted. The format of date is YYYY-MM-DD; the one of time is HH-MM-SS. When the set is over, press OK to save or press ESC button to cancel. "Save success!" will be promoted if adjusted and save operated successfully.



NOTE: The log after the current time will be erased when the clock has been adjusted.

Device Parameter

There are 3 interfaces about device parameter as shown below:

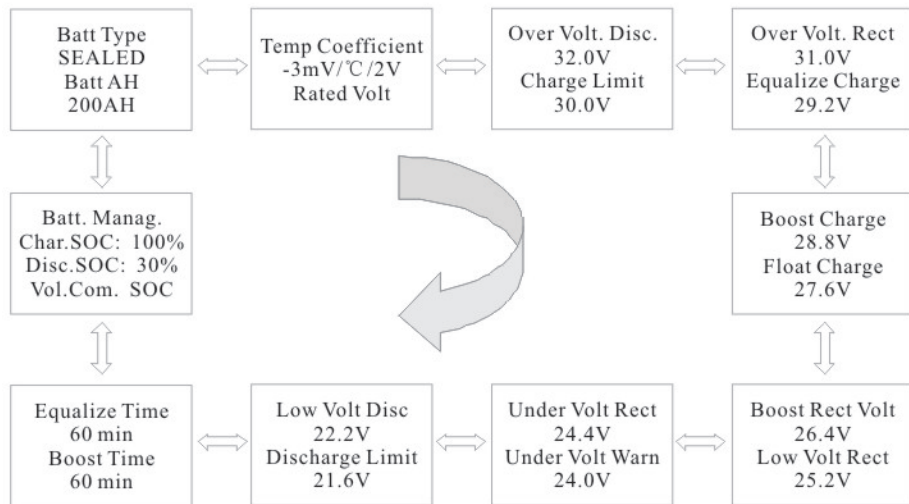


Press OK to enter the Device Parameter interface when the inverse cursor point to Device Para item. Press ESC button to exit.

You should input the user password (see above) before setting the parameters. The first interface shows the 4-digit controller's ID in networking and keeps the ID number unique in the networking or PC software or other device(s) couldn't search it. The 2nd interface shows the backlight time. The range is from 1 to 90 seconds (60seconds default). "-" means that the backlight is never off. The interval log is from 1 to 30 minutes (10minutes default).

Control Parameter

Press OK to enter the Device Parameter interface when the inverse cursor point to Control Para item. Press ESC button to exit. There are 10 interfaces for 'Control Parameters' as shown below.



You should input the user password(see above) before setting the parameters. In setting mode, all the parameters can be modified. And will immediately effect when saved. The detail and value range of control parameter are shown in the tables below:

Battery Charging Setting

| Battery Type | Note |
|------------------|-----------------|
| Sealed (default) | Constant value |
| GEL | Constant value |
| flooded | Constant value |
| User | Defined by user |

Battery Charging Mode

| Charging Mode | Note |
|--------------------|---|
| Voltage Compensate | Controlled by voltage(default) |
| SOC | SOC mode, controlled by SOC charging or discharging value |

Others

| Parameter | Default value | Range |
|------------------------------------|---------------|--|
| Battery capacity | 200Ah | 1~9999Ah |
| Temperature compensate coefficient | -3mV/°C/2V | -9~0 mV/°C/2V |
| Rated system voltage | Auto | 12/24/36/48VDC Auto |
| Percent of charging | 100% | 100% constant value(SOC charging mode) |
| Percent of discharging | 30% | 10~80% (SOC charging mode) |

Battery Control Parameters

All the coefficient is referred to 25°C, and twice in 24V system rate, triple in 36V system rate and quadruple in 48V system rate.

| Battery Type | Gel | Sealed | Flooded | User |
|----------------------------|--------|--------|---------|-----------|
| High Volt Disconnect | 16V | 16V | 16V | 9~17V |
| Charging limit voltage | 15V | 15V | 15V | 9~17V |
| Over Voltage Reconnect | 15V | 15V | 15V | 9~17V |
| Equalization voltage | 14.6V | — | 14.8V | 9~17V |
| Boost voltage | 14.4V | 14.2V | 14.6V | 9~17V |
| Float voltage | 13.8V | 13.8V | 13.8V | 9~17V |
| Boost return voltage | 13.2V | 13.2V | 13.2V | 9~17V |
| Low voltage reconnect | 12.6V | 12.6V | 12.6V | 9~17V |
| Under voltage recover | 12.2V | 12.2V | 12.2V | 9~17V |
| Under voltage warning | 12V | 12V | 12V | 9~17V |
| Low voltage disconnect | 11.1V | 11.1V | 11.1V | 9~17V |
| Discharging limits voltage | 10.6V | 10.6V | 10.6V | 9~17V |
| Equalize duration | 120min | — | 120min | 0~180min |
| Boost duration | 120min | 120min | 120min | 10~180min |

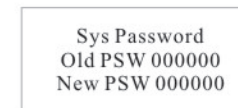
Note: 1. When the battery type is sealed, gel, flooded, the adjusting range of equalize duration is 0 to 180min and boost duration is 10 to 180min.

2. The following rules must be observed when modify the parameters value in user battery type (factory default value is the same as sealed type):

- Rule1: High Volt Disconnect > Charging limit voltage \geq Equalization voltage \geq Boost voltage \geq Float voltage > Boost return voltage;
 Rule2: High Volt Disconnect > Over Voltage Reconnect;
 Rule3: Low voltage reconnect > Low voltage disconnect \geq Charging limit voltage;
 Rule4: Under voltage recover > Under voltage warning \geq Charging limit voltage;
 Rule5: Boost return voltage > Low voltage reconnect;

Password

Press OK to enter the Password Set interface when the inverse cursor points to Password Parameter. Press ESC button to exit.



Note: The factory default password is "000000".

Default Set

Under the main menu interface, when the inverse cursor to restore the default option, press the OK button to enter to restore the default interface.

Default Set
No Yes
Clr Log Record
Retain clear

and clear all logs including work log and event log. Note: all parameters will be set to factory default and couldn't be recovery.

2.4.11 Audible Alarm

Table 2.5.9 XPT Series Audible Alarm Spec

| | |
|------------------------------|---|
| Battery Voltage Low | Inverter green LED lit, and the buzzer beeps 0.5s every 5s. |
| Battery Voltage High | Inverter green LED lit, and the buzzer beeps 0.5s every 1s and Fault after 60s. |
| Invert Mode Over-Load | (1)110%<load<125%(±10%), No audible alarm in 14 minutes, Beeps 0.5s every 1s in 15th minute and Fault after 15 minutes; (2)125% <load<150%(±10%), Beeps 0.5s every 1s and Fault after 60s; (3)Load>150%(±10%), Beeps 0.5s every 1s and Fault after 20s; |
| Over Temperature | Heatsink temp. ≥105°C, Over temp red LED Lighting, beeps 0.5s every 1s; |

2.4.12 FAN Operation

For 1-3KW, there is one multiple controlled DC fan which starts to work according to the following logic.

For 4-12KW, 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):

| Condition | Enter condition | Leave condition | Speed |
|------------------------------|--|---|-------|
| HEAT SINK TEMPERATURE | $T \leq 60^{\circ}\text{C}$ | $T > 65^{\circ}\text{C}$ | OFF |
| | $65^{\circ}\text{C} \leq T < 85^{\circ}\text{C}$ | $T \leq 60^{\circ}\text{C} / T \geq 85^{\circ}\text{C}$ | 50% |
| | $T > 85^{\circ}\text{C}$ | $T \leq 80^{\circ}\text{C}$ | 100% |
| CHARGER CURRENT | $I \leq 15\%$ | $I \geq 20\%$ | OFF |
| | $20\% < I \leq 50\%$ | $I \leq 15\% / I \geq 50\%$ | 50% |
| | $I > 50\%$ | $I \leq 40\%$ | 100% |
| LOAD% (INV MODE) | Load < 30% | Load ≥ 30% | OFF |
| | $30\% \leq \text{Load} < 50\%$ | Load ≤ 20% / Load ≥ 50% | 50% |
| | Load ≥ 50% | Load ≤ 40% | 100% |

Allow at least 30CM of clearance around the inverter for air flow. Make sure that the air can circulate freely around the unit.

2.4.13 DIP Switches

On the rear panel of inverter, there are 5 DIP switches which enable users to customize the performance of the device.

Table 2.5.11 XPT Series Dip Switch Function Setting

| DIP Switch NO. | Switch Function | Position: 0 | Position: 1 |
|----------------|---------------------------|----------------------------|---------------------------|
| SW1 | Low Battery Trip Volt | 10.0Vdc | 10.5Vdc |
| | | *2 for 24Vdc, *4 for 48Vdc | |
| SW2 | AC Input Range / (AVR) | 230Vac HV | 184-253Vac / (176-276Vac) |
| | | 120Vac LV | 154-253Vac / (150-276Vac) |
| SW3 | Power Saver Auto Setting | Detect Load Per 5Secs | Night Charge Function |
| SW4 | O/P Frequency Setting | 50Hz | 60Hz |
| SW5 | Solar/AC Priority Setting | Utility Priority | Solar Priority |

2.4.14 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 13Vdc/26Vdc/52Vdc (with power switch still in the "On" position). This function helps to save the users extra labor to reactivate the inverter when the low battery voltage returns to an acceptable range in the renewable energy systems. The built in battery charger will automatically reactivate as soon as city/generator ac has been stable for 15 seconds.



WARNING

Never leave the loads unattended, some loads (like a Heater) may cause accident in such cases.

It is better to shut everything down after low voltage trip than to leave your load on, due to the risk of fire.

Auto Gen Start

The inverter can be customized to start up a generator when battery voltage goes low.

When the inverter goes to low battery alarm, it can send a signal to start a generator, and turn the generator off after battery charging is finished.

The auto gen start feature will only work with generators designed to work with this feature. There is an open/closed relay that will short circuit the positive and negative cable from a generator. The input DC voltage can vary, but the Max current the relay can carry is 16Amp.

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°C - 40°C

Storage temperature: - 40 - 70°C

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

Cooling: Forced air

3.2 DC Wiring recommendation

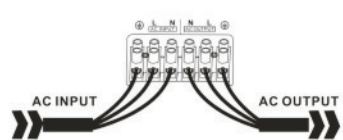
It is suggested the battery bank be kept as close as possible to the inverter. The following table is a suggested wiring option for 1 meter DC cable. Please find the following minimum wire size. In case of DC cable longer than 1m, please increase the cross section of cable to reduce the loss.

| Model Watt | Battery Voltage | Wire Gage /Min | | Model Watt | Battery Voltage | Wire Gage /Min | |
|---------------------|-----------------|--------------------|--------------------|------------|-----------------|--------------------|--------------------|
| | | 0~1.0m | 1.0~5.0m | | | 0~1.0m | 1.0~5.0m |
| 1.000 ~ 1.500 | 12 Vdc | 30mm ² | 40mm ² | 2.000 | 12 Vdc | 60mm ² | 75mm ² |
| | 24 Vdc | 15mm ² | 20mm ² | | 24 Vdc | 30mm ² | 45mm ² |
| | 48 Vdc | 10mm ² | 15mm ² | | 48 Vdc | 15mm ² | 25mm ² |
| 3.000 | 12 Vdc | 90mm ² | 120mm ² | 3.000 | 12 Vdc | 120mm ² | 150mm ² |
| | 24 Vdc | 45mm ² | 60mm ² | | 24 Vdc | 60mm ² | 75mm ² |
| | 48 Vdc | 25mm ² | 30mm ² | | 48 Vdc | 30mm ² | 40mm ² |
| 5.000 | 24 Vdc | 75mm ² | 95mm ² | 6.000 | 24 Vdc | 90mm ² | 120mm ² |
| | 48 Vdc | 40mm ² | 50mm ² | | 48 Vdc | 45mm ² | 60mm ² |
| 8.000 | 24 Vdc | 120mm ² | 150mm ² | 10.000 | 48 Vdc | 75mm ² | 95mm ² |
| | 48 Vdc | 60mm ² | 75mm ² | | 12.000 | 48 Vdc | 90mm ² |

Please note that if there is a problem obtaining for example 90mm² cable, use 2*50mm² or 3*35mm². 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.

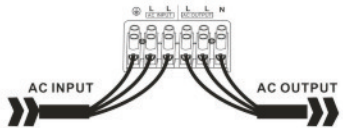
3.3 AC Wiring

We recommend using 10-5Awg 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.



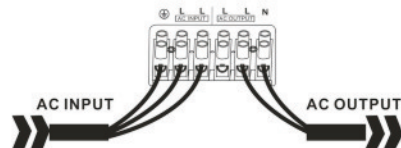
Wiring Option 1

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

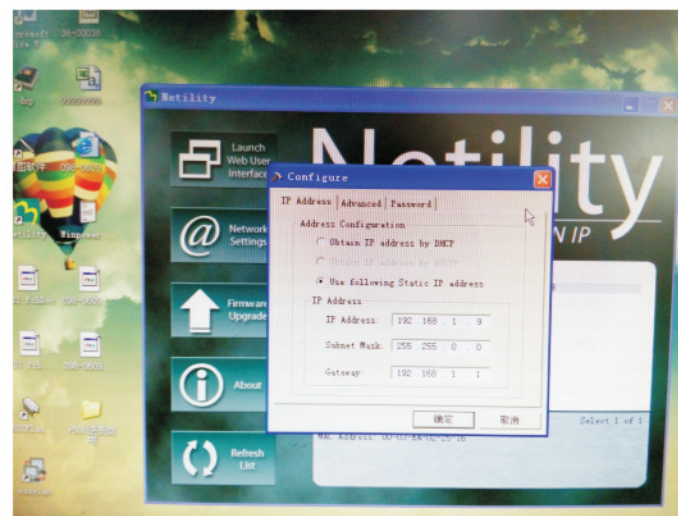
Remark: In such cases, each output hotline can only carry a max of half the rated capacity.

4. Network via RS232

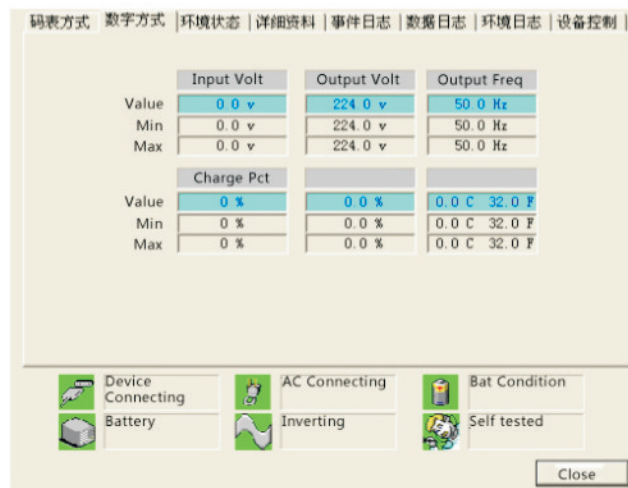
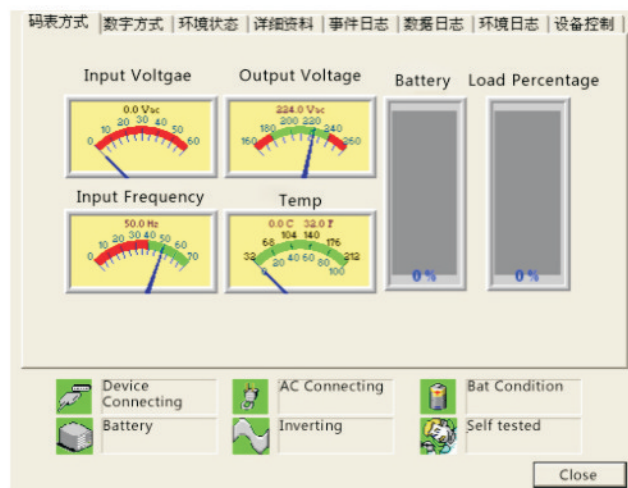
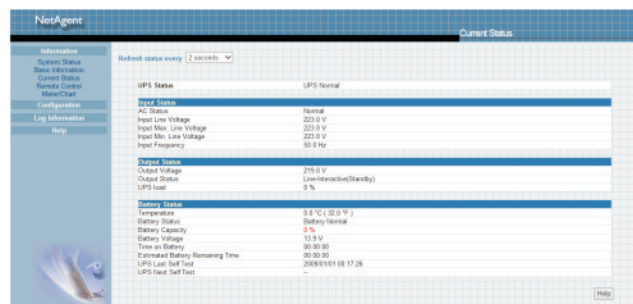
1. Install the software. Please use Windows operation system higher than XP version. Install Netility(Windows V4.53), ClientMate(Windows V5.62), SNMPView V5.73



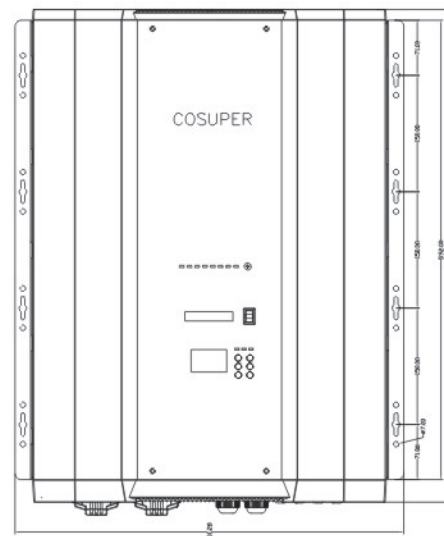
1. Make the correct connection of TCP/IP server
2. Run Netility, Set your IP address:
IP address: 192.168.1.9
Subnet Mask: 255.255.0.0
Gateway: 192.168.1.1



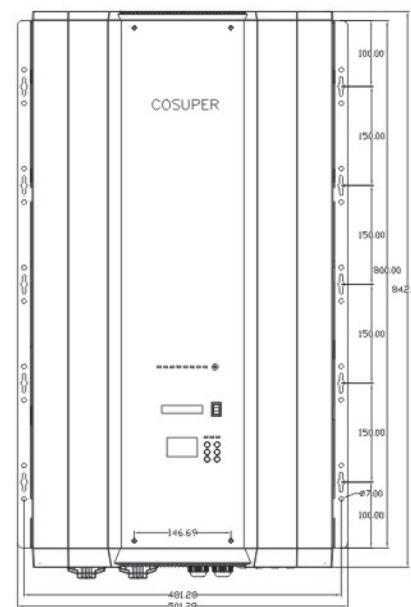
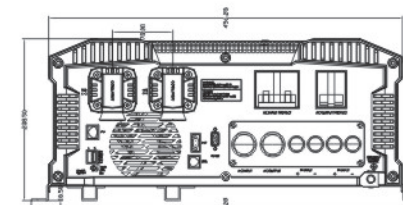
4. Go to 192.168.1.9 in your browser.



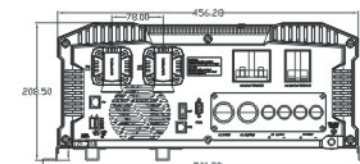
5. Install Flange

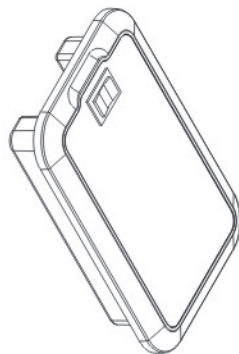
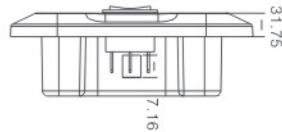
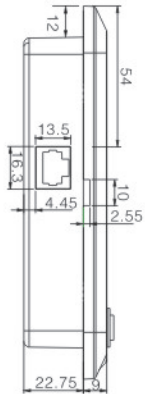
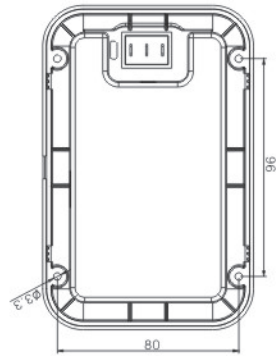
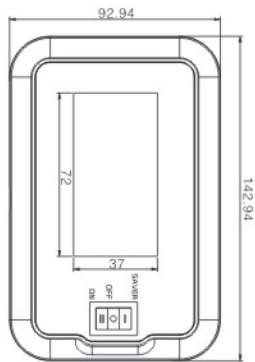


CPS3-12KW(No Controller)/3-6KW-45/60A



CPS3-6KW-90A





PTM-12

6. Attention

When you install this power supply, please read the safety instructions in the part of the first section manual. Install with the follow step after full understanding.

1. Opening the package, there should be: a, inverter b, manual c, Accessories AC protective cover, a DC protective cover and the fixing screws (Accessories LED remote control is optional).
2. Install the inverter on the position you want to. Inverter fan need space for air convection. And then install the screws to the inverter.
3. Make sure the switch is off. Then connect the DC and AC inputs, DC ignition is the normal phenomenon.
4. Make sure terminal is locked when connect the DC input or would be ignition. Do not reverse positive and negative load.
5. Connect the loads and AC power into AC input/output terminal.
6. Make sure inverter is grounded and no other grounding systems conflict.
7. Re-check the wiring is completely correct, and then turn on the inverter.
8. Refer to the instructions on the LED indicator to see if the inverter is working properly.

7. Inspection Of Batteries

- (1) Battery old/new condition. New batteries will charge the old batteries because of the bad discharge ability of old one.
- (2) Use the same brand and same model battery.
- (3) Make sure battery has no leak or swell before using.

Sequence Of Loads Launching

Please accord to the order of launching:

- (1) Launch Inductive loads with priority
- (2) Launch other type loads 10 seconds after inductive loads being launched.

Reason: Surge power is huge when inductive loads start. Make sure the inverter has capacity to start inductive loads.

Inverter Environment

Inverter should be placed on the dry, ventilated and cool environment.

Please keep away from dust and fog. Static from dust will make the electronic components be short circuit. In addition that fog will make the components be rusty.

8. Troubleshooting Guide

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

Indicator and Buzzer

| Status | Item | Indicator On Front Panel | | | | | | | | Indicator On Remote Module | | | Buzzer |
|---------------|----------------------------|--------------------------|-------------|-------------|--------------|-------|----------------|----------------|---------------|----------------------------|-------------|-------|--------------------------|
| | | Utility Power On | Inverter On | Fast Charge | Float Charge | Alarm | Over-Temp Trip | Over-Load Trip | Power Save On | CHARGER ON | INVERTER ON | ALARM | |
| Line Mode | C.C | √ | × | √ | × | × | × | × | × | √ | × | × | × |
| | C.V | √ | × | √, Blink | × | × | × | × | × | √ | × | × | × |
| | Float | √ | × | × | √ | × | × | × | × | √ | × | × | × |
| | Standby | √ | × | × | × | × | × | × | × | × | × | × | × |
| Inverter Mode | Inverter On | × | √ | × | × | × | × | × | × | × | √ | × | × |
| | Power Saver | × | × | × | × | × | × | × | √ | × | × | × | × |
| Inverter Mode | Battery Low | × | √ | × | × | √ | × | × | × | × | √ | √ | Beep 0.5s every 5s |
| | Battery High | × | √ | × | × | √ | × | × | × | × | √ | √ | Beep 0.5s every 1s |
| | Overload On 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 Feed Short | × | × | × | × | × | × | × | × | × | × | × | Beep continuous |

| Symptom | Possible Cause | Recommended Solution |
|--|---|---|
| Inverter will not turn on during initial power up. | Batteries are not connected, loose battery -side connections. Low battery voltage. | Check the batteries and cable connections. Check DC fuse and breaker. Charge the battery. |
| No AC output voltage and no indicator lights ON. | Inverter has been manually transitioned to OFF mode. | Press the switch to Power saver on or Power saver off position. |
| AC output voltage is low and the inverter turns loads OFF in a short time. | Low battery. | Check the condition of the batteries and recharge if possible. |
| Charger is inoperative and unit will not accept AC. | AC voltage has dropped out-of-tolerance | Check the AC voltage for proper voltage and frequency. |
| Charger is supplying a lower charge rate. | Charger controls are improperly set. Low AC input voltage. Loose battery or AC input connections. | Refer to the section on adjusting the "Charger Rate". Source qualified AC power.. Check all DC /AC connections. |
| Charger turns OFF while charging from a generator. | High AC input voltages from the generator. | Load the generator down with a heavy load. Turn the generator output voltage down. |
| Sensitive loads turn off temporarily when transferring between grid and inverting. | Inverter's Low voltage trip voltage may be too low to sustain certain loads. | Choose narrow AC voltage in the DIP switch, or Install a UPS if possible. |
| Noise from Transformer/case* | Applying specific loads such as hair drier | Remove the loads |

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

When in inverter mode sometimes the transformer and/or case of the inverter may vibrate and make noise.

If the noise comes from transformer:

According to the characteristics of our inverter, mainly there is one type of load which most likely may cause rattles of transformer.

That is half wave load: A load that uses only half cycle of the power (see figure 1). This tends to cause an imbalance of the magnetic field of the transformer, reducing its rated working freq from 20KHz to maybe 15KHz (it varies according to different loads). In such a case the frequency of noise falls exactly into the range (200Hz-20KHz) that human ears can hear.

The most common load of such kind is a hair drier.

If the noise comes from the case:

Normally when loaded with inductive loads, the magnetic field generated by the transformer keeps attracting or releasing the steel case at a specific freq, this may also cause noise.

Reducing the load power or using an inverter with bigger capacity will normally solve this problem.

The noise will not do any harm to the inverter or the loads.

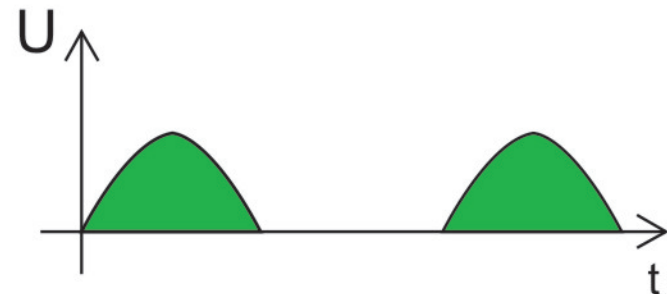


Figure 1 Half Cycle Load Waveform

9. Warranty

Dear Customers,

Many thanks for selecting products from Cosuper. In order to extend better service to you, pls read our product manual carefully and keep warranty card. Welcome to log in www.cosuper.com to enjoy full scale support and service.

The products are under strict inspection before delivery. We offer 18 month limited warranty:

I In the warranty period, we will provide free repair and service parts when the machine is under normal use. Damaged parts shall be owned by Cosuper.

II The following cases are not covered under warranty.

- 1 Change the company trademark unauthorized
- 2 Damage due to misoperation, negligence use, and irresistible factors
- 3 Repair, modification or remove the label unauthorized

10. Ordering Information

Model Identification and Numbering Conventions

The CPS Inverter is identified by the model/serial number labels. The Serial Number can be located on the mounting rail or inside the top cover. Model Number labels may be located on the bottom side of the front cover or possibly inside the front cover. All the necessary information is provided on the label such as AC output voltage, power and frequency (punch holes).

The inverter also has a letter designator followed by 4-6 digits (depending on revision). The model number describes the type of inverter, the output specifications, the required battery voltage and the output voltage and frequency.

Appendix 1 See 30 to 33 pages.

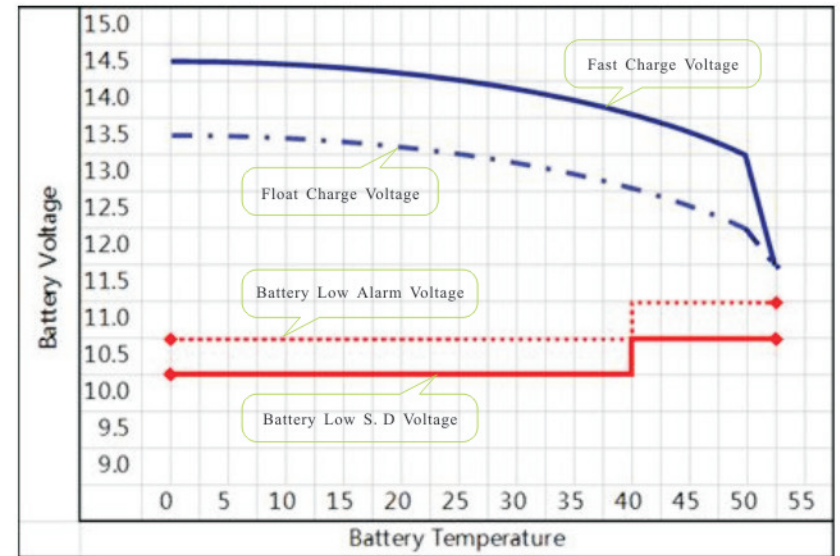
Appendix 2 Loads Types

1. Linear loads: Less than 80% of inverter rated power
2. Inductive loads: Less than 30% of inverter rated power
3. Full flow endurance: Less than 3 hours.

| | |
|-----------------|---|
| Linear loads | heater strip, water heater, electric pot. etc |
| Inductive loads | motors, air conditions, water pump, air compressor, dust collector, induction cooker. etc |
| Capacitive load | TV, computer. etc |

Appendix 3 Battery Temperature Compensation

| Condition | INV/CHG Status | Transfer Point |
|---------------|--------------------|-----------------------------|
| Charger Mode | CHG On >>> CHG Off | BTS \geq 50°C |
| | CHG Off >>> CHG On | BTS \leq 40°C |
| Inverter Mode | S.D Point + 0.5Vdc | 40°C \leq BTS \leq 50°C |
| | Over Temp Fault | BTS \geq 50°C |



Default output voltage for Float and Absorption are at 25°C.

Reduce Float voltage follows Float voltage and Raised Absorption voltage follows Absorption voltage.

In a adjust mode temperature compensation does not apply.

Sequence Of Loads Launching

Please ensure the sum of all loads' watt less than the rated power of inverter.

Please accord to the order of launching:

(1) Launch Inductive loads with priority

(2) Launch other type loads 10 seconds after inductive loads being launched.

Reason: Surge power is huge when inductive loads start. Make sure the inverter has capacity to start inductive loads.

6. Inverter Environment

Inverter should be placed on the dry, ventilated and cool environment.

Please keep away from dust and fog. Static from dust will make the electronic components be short circuit. In addition that fog will make the components be rusty.

Note: Specifications subject to change without notice.

Electrical Specifications

| | Model | 3.0KW | 4.0KW | | 5.0KW | 6.0KW | 8.0KW | 10.0KW | 12.0KW | |
|---------------------|---------------------------------------|--|--------|--|--------|--------|---------------|--------|--------|--|
| Inverter Output | Continuous Output Power | 3.0KW | 4.0KW | | 5.0KW | 6.0KW | 8.0KW | 10.0KW | 12.0KW | |
| | Surge Rating(20ms) | 9.0KW | 12.0KW | | 15.0KW | 18.0KW | 24.0KW | 30.0KW | 36.0KW | |
| | Output Waveform | Pure Sine wave/Same as input(Bypass Mode) | | | | | | | | |
| | Nominal Efficiency | >88%(Peak) | | | | | | | | |
| | Line Mode Efficiency | >95% | | | | | | | | |
| | Power Factor | 0.9-1.0 | | | | | | | | |
| | Nominal Output Voltage rms | 100-110-120Vac / 220-230-240Vac | | | | | | | | |
| | Output Voltage Regulation | ±10% RMS | | | | | | | | |
| | Output Frequency | 50Hz ± 0.3Hz/60Hz ± 0.3Hz | | | | | | | | |
| | Short Circuit Protection | Yes(1sec after fault) | | | | | | | | |
| | Typical transfer Time | 10ms(Max) | | | | | | | | |
| | THD | < 10% | | | | | | | | |
| DC Input | Nominal Input Voltage | 24.0Vdc / 48.0Vdc | | | | | 48.0Vdc | | | |
| | Minimum Start Voltage | 20.4Vdc/21.0Vdc for 24Vdc Mode | | | | | *2 for 48Vdc; | | | |
| | Low Battery Alarm | 21.0Vdc/22.0Vdc for 24Vdc Mode | | | | | | | | |
| | Low Battery Trip | 20.0Vdc/21.0Vdc for 24Vdc Mode | | | | | | | | |
| | High Voltage Alarm | 32.0Vdc for 24Vdc Mode | | | | | | | | |
| | Low Battery voltage recover | 31.0Vdc for 24Vdc Mode | | | | | | | | |
| | Idle Consumption-Search Mode | < 25 W when Power Saver On.(Refer to Table) | | | | | | | | |
| Charger | Output Voltage | Depends on battery type (Refer to Table 2.5.2) | | | | | | | | |
| | Charger Breaker Rating | 20A | 20A | | 30A | 30A | 40A | 40A | 40A | |
| | Max Charge Power Rate | 150VAC For 120Vac LV Mode; 300VAC For 230Vac HV Mode; | | | | | | | | |
| | Battery Initial Voltage for Start | 20-31.4Vdc for 24Vdc Mode | | | | | *2 for 48Vdc; | | | |
| | Over Charge Protection S.D. | 31.4Vdc for 24Vdc Mode | | | | | | | | |
| BTS | Battery Temperature Sensor (Optional) | Yes(Refer to the table) Variances in Charging Voltage & S.D Voltage Base on the Battery Temperature. | | | | | | | | |
| Bypass & Protection | Input Voltage Waveform | Sine wave (Grid or Generator) | | | | | | | | |
| | Nominal Voltage | 120/230/240Vac | | | | | | | | |
| | Max Input AC Voltage | 150VAC For 120Vac LV Mode; 300VAC For 230Vac HV Mode; | | | | | | | | |

| | | | | | | | | | | | |
|---------------------------|---|--------------------------------------|--------|--|--------|--------|---------------|--------|--------|--|--|
| | Nominal Input Frequency | 50Hz or 60Hz | | | | | | | | | |
| | Low Freq Trip | 47±0.3Hz for 50Hz, 57±0.3Hz for 60Hz | | | | | | | | | |
| | High Freq Trip | 55±0.3Hz for 50Hz, 65±0.3Hz for 60Hz | | | | | | | | | |
| | Overload protection (SMPS load) | Circuit Breaker | | | | | | | | | |
| | Output Short circuit protection | Circuit Breaker | | | | | | | | | |
| | Bypass breaker rating | 30A | 40A | | 40A | 40A | 50A | 63A | 63A | | |
| | Transfer switch rating | 40Amp for UL | | | | | 80Amp for UL | | | | |
| | Bypass without battery connected | Yes (Optional) | | | | | | | | | |
| | Max bypass current | 40Amp | | | | | 80Amp | | | | |
| Solar Charger (Optional) | Rated Voltage | 12Vdc / 24Vdc / 48Vdc | | | | | | | | | |
| | Solar Input Voltage Range | 15-30Vdc / 30-55Vdc / 55-100Vdc | | | | | | | | | |
| | Rated Charge Current | 40 ~ 60A | | | | | | | | | |
| | Rated Output Current | 15A | | | | | | | | | |
| | Self Consumption | < 10mA | | | | | | | | | |
| | Bulk Charge(Default) | 29.0Vdc for 24Vdc Mode | | | | | *2 for 48Vdc2 | | | | |
| | Floating Charge(Default) | 27.0Vdc for 24Vdc Mode | | | | | | | | | |
| | Equalization Charge(Default) | 28.0Vdc for 24Vdc Mode | | | | | | | | | |
| | Over Charge Disconnection | 29.6Vdc for 24Vdc Mode | | | | | | | | | |
| | Over Charge Recovery | 27.2Vdc for 24Vdc Mode | | | | | | | | | |
| | Over Discharge Disconnection | 21.6Vdc for 24Vdc Mode | | | | | | | | | |
| | Over Discharge Reconnection | 24.6Vdc for 24Vdc Mode | | | | | | | | | |
| Temperature Compensation | -26.4mV/°C for 24Vdc Mode | | | | | | | | | | |
| Ambient Temperature | 0 ~ 40°C (Full load) 40 ~ 60°C (Derating) | | | | | | | | | | |
| Mechanical Specifications | Mounting | Wall Mount | | | | | | | | | |
| | Inverter Dimensions(L*W*H) | 650*505*210mm | | | | | | | | | |
| | Inverter Weight(Solar Chg)KG | 50+2.5 | 43+2.5 | | 43+2.5 | 59+2.5 | 70+2.5 | 50+2.5 | 77+2.5 | | |
| | Shipping Dimensions(L*W*H) | 760*25*385mm | | | | | | | | | |
| | Shipping Weight(Solar Chg)KG | 62+2.5 | 55+2.5 | | 55+2.5 | 71+2.5 | 80+2.5 | 62+2.5 | 89+2.5 | | |
| | Display | Status LEDs / Status LEDs+LCD | | | | | | | | | |
| | Standard Warranty | 18months (Optional) | | | | | | | | | |