



USER'S MANUAL

**— POWER INVERTER —**

**APS1000-12, APS2000-24  
& APS4000-48**

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# Important Safety Information



! wb lb D<sup>s</sup>

This manual contains important instructions for APS1000-12 & APS2000-24 models that shall be followed during installation and maintenance of the inverters.

## General Safety Precautions

1. Before installing and using the inverter/charger, read all instructions and cautionary markings on the 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. Install this unit away from direct sun light and where is not exposed to water sprinklers.
3. To reduce risk of fire hazard, do not cover or obstruct the ventilation openings. Do not install the inverter/charger in a zero-clearance compartment. Otherwise overheating may occur.\
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 connect the inverter/charger with damaged or substandard wiring.
6. Do not operate the inverter/charger if it has received a sharp blow, been dropped, or otherwise damaged in any way. If the inverter/charger is damaged, read the warranty section.
7. Do not disassemble the inverter/charger. It contains no user-serviceable parts. See warranty for instructions on obtaining service. Attempting to service the inverter/charger yourself may result in a risk of electrical shock or fire. Internal capacitors remain charged after all power is disconnected.
8. The 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 electric shock, disconnect both AC and DC power from inverter/charger before attempting any maintenance or cleaning or working on any circuits connected to the 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 or the batteries.

## Precautions When Working with Batteries

1. Make sure the batteries are well ventilated. Avoid blocking enclosure vents.
2. Never smoke or allow a spark or flame near the inverter or batteries.
3. Use caution to reduce the risk of dropping a metal tool on the batteries. It could spark or short circuit the battery or other electrical parts and could cause an explosion.
4. Remove all metal items, like rings, bracelets, and watches when working with lead-acid batteries. Lead-acid batteries produce a short circuit current high enough to weld metal to skin.
5. Make sure someone is close enough to aid should anything dangerous occur when you're working near a lead-acid battery.

6. Prepare enough fresh water and soap 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 eyes, immediately flood in cold water and get medical attention immediately.
9. If you need to remove a battery, always remove the ground 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 label to ensure age and type.
12. Batteries are temperature sensitive. For optimal performance, they should be installed in a stable temperature environment.
13. Always recycle old batteries. Contact your local recycling center for proper disposal information.

### General Information

Thank you for purchasing the APS inverter series.

The inverter is a combination of an inverter, charger.

It is packed with unique features and it is one of the most advanced inverter/charger in the market today.

The inverter features an AC bypass circuit, powering your gate operators and access controls or any appliance from the utility power or generator power while charging the battery. When utility power fails, the battery backup system keeps your equipment powered until utility power is restored. Internal protection circuits prevent over-discharging the batteries by shutting down inverter when a low battery condition occurs. When utility or generator power is restored, the inverter transfer to the AC source and recharges the batteries.

The series inverter can also serve as a central hub of renewable energy system. Set the series inverter to battery priority mode to designate it to 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 utility power. The transfer time between inverter and line is short(6ms typically), and such transfers are normally not detected by even highly sensitive loads. Upon restoration of battery capacity, the inverter will transfer back to inverter power (battery).

In the line priority mode, when utility power cuts off (or drops below acceptable range), the transfer relay is de-energized and the load is automatically transferred to inverter output.

Once the qualified utility power is restored, the relay is energized and the load is automatically reconnected to utility power.

It features power factor, 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.

The inverter is equipped with a powerful charger of up to 70Amp (depending on mode). The overload capacity is 125~150% 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 solar priority by DIP switch, this helps to extract maximum power from solar in renewable energy systems.

To get the most out of the power inverter, it must be installed, used and maintain properly.

Please read the instructions in the manual before installing.

## Application

Gate operators, access control devices and accessories.

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

Office equipment such as computers, printers, monitors, facsimile machines, scanners. Household items, vacuum cleaners, fans, fluorescent and incandescent lights, shavers, sewing machines.

Kitchen appliances-coffe makers, blenders, ice makers, toasters.

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

Home entertainment electronics-television, VCRs, video game consoles, stereos, musical instruments, satellite equipment.

## Features

- Pure sine wave output
- AC/Battery priority Via function DIP switch
- Auto generator start. For gate operators Auto open relay.
- Max. AC charge current 35A
- Built-in pure copper transformer
- Low battery trip voltage 10.5V/11.0V setting
- Auto sense 50HZ/60HZ

Generator or Grid. Battery

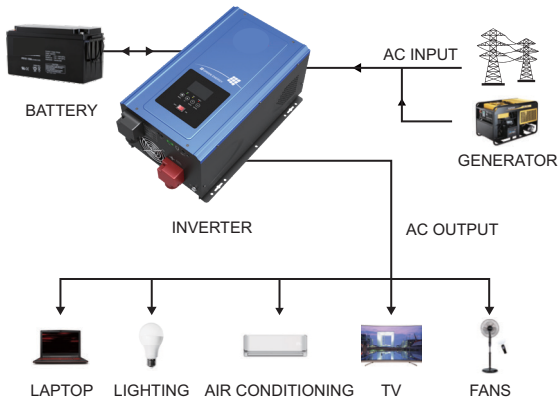
## Basic System Architecture

The following illustration shows basic application for this inverter. It also includes following devices to have a complete running system:

Generator or Utility. Battery

Consult with your system integrator for other possible system architectures depending on your requirements.

This inverter can power all kinds of appliances in home or office environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioner. Also **Gate Operators** and accessories.



Battery pack

**APS1000-12** includes two 35Ahr batteries

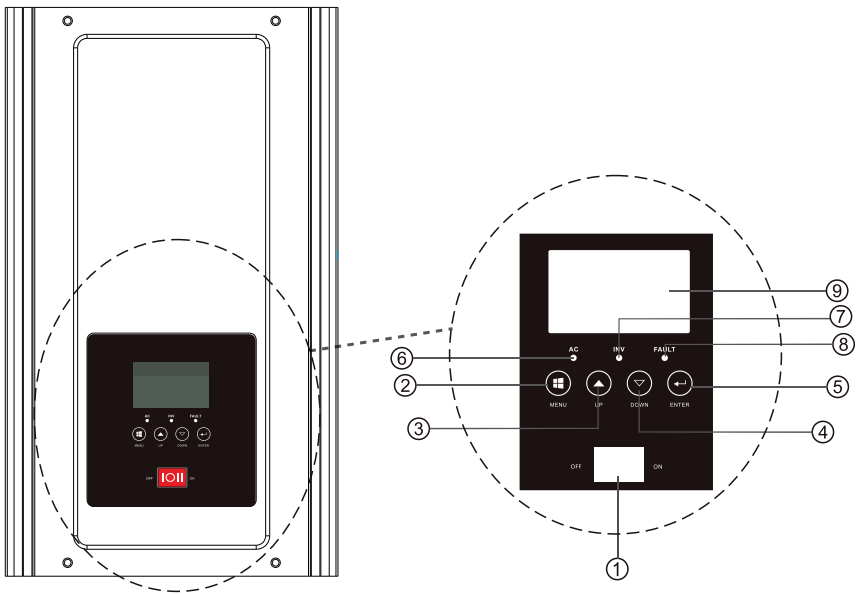
**APS2000-24** includes two 50Ahr batteries

**APS4000-48** includes four 50Ahr batteries

**Features:**

- Pure sine wave output
- Friendly user interface
- 3 Steps charging
- MFD (multi-function display)
- Overload and short-circuit protection
- Set charging voltage/charging current.
- Battery low voltage shutdown point can be set to 10/10.5/11V
- Set utility priority/ Battery priority
- Set utility input wide/narrow range
- Set utility charging on/off switch

**LCD Panel Description**



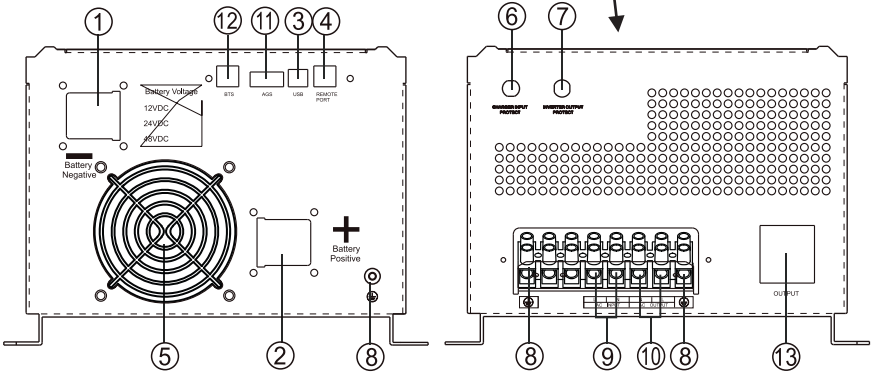
- 1. Switch ON/OFF: POWER ON/OFF Switch
- 2. MENU
- 3. UP
- 4. DOWN
- 5. ENTER

- 6. AC LED
- 7. INV LED
- 8. FAULT
- 9. LCD

<b>Switch</b>	<b>INVERTER OFF</b>	Power totally off (If there is AC power, inverter have charger function)
	<b>ON</b>	Power ON
<b>Protection</b>		
<b>Over Temperature Protection</b>	Heat sink temp. $\geq 105^{\circ}\text{C}$ , Fault (shutdown Output) after 30 seconds	
<b>Back-Feed Protection</b>	Yes	

Connectors 8, 9 and 10 are extended to the inverter front panel for easy wiring.

AC terminal panel printing description.



1. BAT -
2. BAT +
3. USB
4. Remote port
5. FAN
6. Charger input protect
7. Inverter output protect

8. GND
9. AC input
10. AC output
11. AGS
12. BTS
13. AC Output 10A(MAX)

# INSTALLATION

## Unpacking and Inspection

Before installation, please inspect the unit. Be sure that nothing inside is damaged. You should see the following items inside the main enclosure of the APS series inverters:

- Main inverter Unit
- Batteries
  - Two 35Ahr for APS1000-12
  - Two 50Ahr for APS2000-24
  - Four 50Ahr for APS4000-48
- Battery breaker on the left side inside enclosure
- AC Input/Output and relay connector on inverter front panel

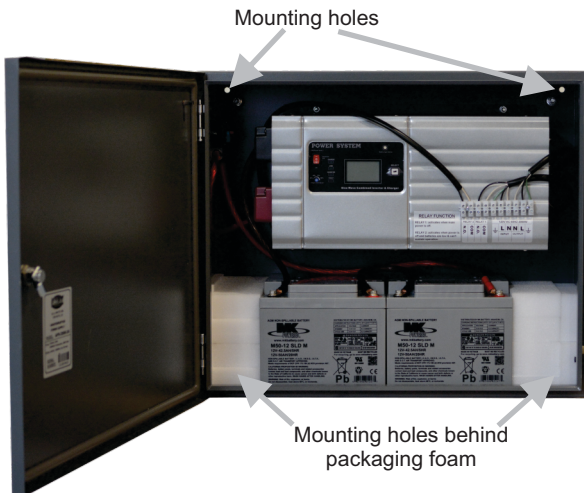
## Mounting the unit

Consider the following before selecting where to install the unit:

- Do not install the inverter on flammable construction materials.
- Mount on a solid surface.
- Install the inverter at eye level in order to read the LCD display clearly.
- For proper air circulation to dissipate heat, leave at least 3" gap above, below and sides of the inverter enclosure.
- The ambient temperature should be between 0°F and 105°F to ensure optimal operation.
- The recommended installation position is to be against the wall horizontally.

**SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON-COMBUSTIBLE SURFACE ONLY.**

**Install the unit using 4 screws on four mounting holes**





## Battery Connection

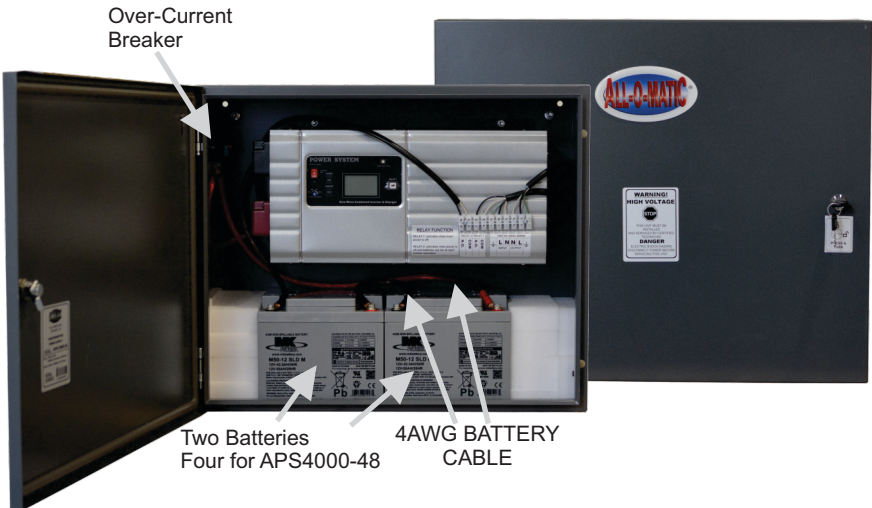
**CAUTION:** For safety and regulation compliance, it's requested to install a separate DC over-current protector between battery and inverter. **DO NOT** bypass the over-current breaker that's installed between inverter and batteries. Doing so, will increase the risk of fire and possible harm to persons.

## DC Wiring Recommendation

It is recommended the battery bank be kept as close as possible to the inverter. the following is the recommended wiring options for 3 feet long cable.

APS series inverters use 4AWG cable that meet or exceed this requirement. If there is a need to replace the battery cables, you must use the proper size to handle the power. If Batteries need to be moved outside the inverter enclosure and need to extend the cable, also increase the wire gauge thickness.

Model	Battery Voltage	Wire gauge/Min (0-3 feet length)
APS1000-12	12VDC	1*4AWG
APS2000-24	24VDC	1*4AWG
APS4000-48	48VDC	1*4AWG



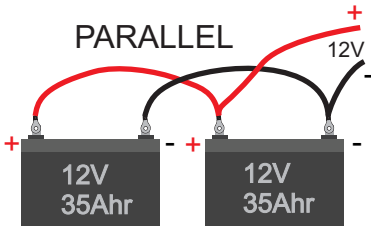
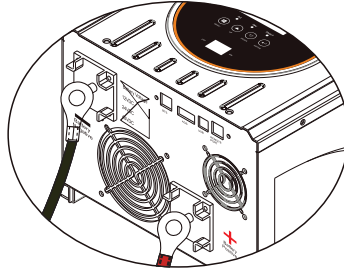
One cable is always best, but cable is just copper and copper is what's required, so it does not matter if you use one cable or 10 cables as long as the square are adds up. Performance of any product will be improved by thicker cable and shorter runs, so it is recommended to keep the cables as short as possible.

Please follow steps below in case battery cables need to be replaced:

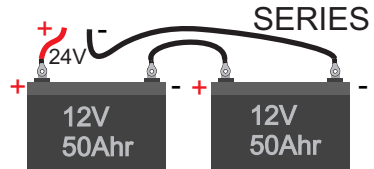
1. Install battery ring terminals on recommended cable and terminal size.
2. Connect battery pack as unit requires. APS1000-12 must have batteries connected in parallel, and the APS2000-24 in series.

NOTE: Please only use Sealed Lead Acid or Sealed GEL/AGM Lead-Acid Batteries.

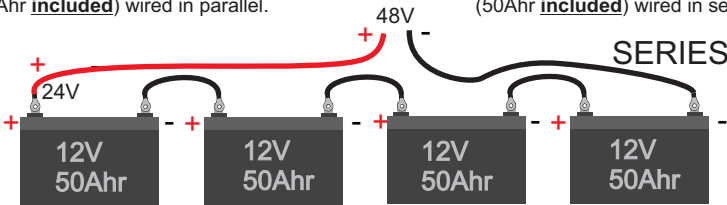
3. Connect ring terminals of battery cable into inverter battery connector and make sure bolts are tightened. Make sure polarity is correct at both ends of the cable (battery terminals and inverter connectors) and that ring terminals are tightly screwed to battery terminals.



APS1000-12 Main battery bank, 12VDC.  
(35Ahr **included**) wired in parallel.



APS2000-24 Main battery bank, 24VDC.  
(50Ahr **included**) wired in series.



APS4000-48 Main battery bank, 48VDC.  
(50Ahr **included**) wired in series.

**WARNING: Shock Hazard**  
Installation must be performed with care due to high battery voltage in series.

**CAUTION!!** Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur.  
**CAUTION!!** Do not apply anti-oxidant substance on the terminals before terminals are connected tightly.  
**CAUTION!!** Before making the final DC connection or closing DC breaker/disconnector, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

## AC Input/Output Connection

**Caution!!** Before connecting AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be safely disconnected during maintenance and fully protected from over current of AC input. The recommended AC breaker is 30A for both APS1000-12 and APS2000-24 models.

**Caution!!** Please don't connect the output AC to "Grid" terminals nor connect the grid to the "Load" terminals. Doing so will permanently damage inverter.

**WARNING!** All wiring must be performed by a qualify person.

**WARNING!** It's very important for system safety and efficiency operation to use appropriate cable for Grid connection. To reduce risk of injury, please use the recommended proper cable size as below.

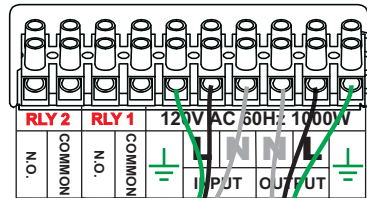
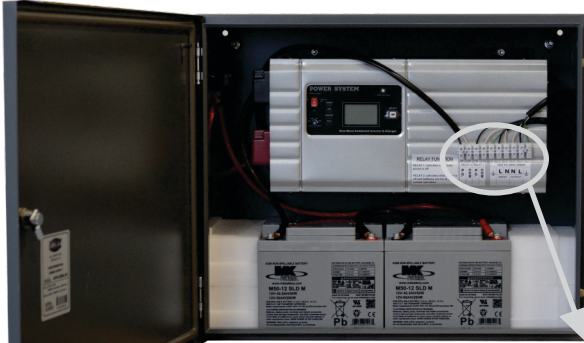
### AC Wiring

We recommend using 12AWG wire to the AC terminal block. If the inverter is installed farther than 70 feet from main power source, wire gauge must be sized properly to avoid big voltage drops. Be sure all wiring is UL compliant, call our tech support if you are not sure how to wire any part of the inverter.

**WARNING!** It's very important to do the wiring correctly on battery terminals and high voltage AC side.

### Suggested cable requirement for AC wires

Model	Gauge	Torque Value
APS1000-12 APS2000-24	12AWG	1.2~1.6Nm
APS4000-48	10AWG	1.2~1.6Nm



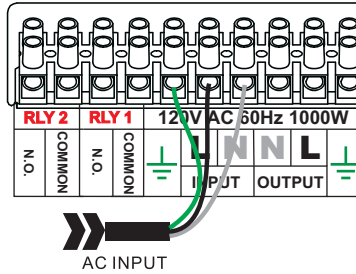
**AC Wiring** (120VAC, Single phase, 60Hz)

Input: Ground +Hot line +Neutral (Main Source)  
Output: Neutral +Hot line +Ground (Load)

Please follow these steps to connect inverter to Load/Grid:

1. Before making Load/Grid connection, be sure to open DC protector/breaker first.
2. Strip each individual wire/conductor about 3/8".
3. Connect grid wires according to polarity indicated on terminal block and tighten the terminal screws. Be sure to connect protective earth conductor (⊕) first.

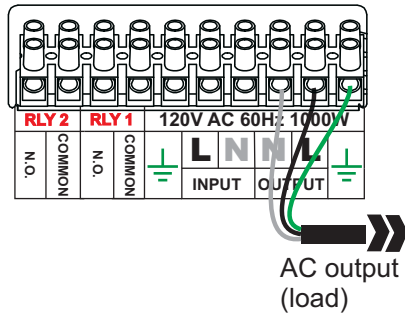
⊕-> Ground (green)  
 L-> LINE (black)  
 N-> Neutral (white)



⚠	<p><b>WARNING:</b>          Be sure that AC power source is disconnected before attempting to hardwire it to the unit.</p>
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4. Then, connect Load (output) wires according to polarity indicated on terminal block and tighten terminal screws. Be sure to connect protective earth conductor (⊕) first.

⊕-> Ground (green)  
 L-> LINE (black)  
 N-> Neutral (white)



5. Make sure all wires are securely connected.

<p><b>CAUTION:</b> Appliances such as air conditioner require at least 2~3 minutes to restart to have enough time to balance refrigerant gas inside of circuits. If a power outage occurs and recovers in a short time, it will cause damage to your connected appliance. To prevent this kind of damage, please check manufacturer of air conditioner if it's equipped with time-delay function before installation. Otherwise, this inverter will trigger overload fault and cut off output to protect your appliance but it is still possible it will cause internal damage to the air conditioner.</p>
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## Electrical Performance

<i>Line Mode Specifications:</i>			
MODEL	Model		
	APS1000-12	APS2000-24	APS4000-48
Input Voltage Waveform	Sinusoidal (utility or generator)		
Nominal Input Voltage	120Vac		
Low Line Disconnect	75Vac $\pm$ 2%		
Low Line Re-connect	80Vac $\pm$ 2%		
High Line Disconnect	140Vac $\pm$ 2%		
High Line Re-connect	135Vac $\pm$ 2%		
Max AC Input Voltage	140Vrms		
Nominal Input Frequency	50Hz/ 60Hz (Auto detection)		
Low Line Frequency Re-connect	44 $\pm$ 0.3Hz for 50Hz;		
Low Line Frequency Disconnect	40 $\pm$ 0.3Hz for 50Hz;		
High Line Frequency Re-connect	75 $\pm$ 0.3Hz for 50Hz;		
High Line Frequency Disconnect	80 $\pm$ 0.3Hz for 50Hz;		
Output Voltage Waveform	Same as Input Waveform		
Over-Load Protection (SMPS load)	Circuit breaker		
Output Short Circuit Protection	Circuit breaker		
Efficiency (Line Mode)	>95%		
Transfer Time (Ac to Dc)	10ms (typical)		
Transfer Time (Dc to Ac)	10ms (typical)		
Pass through without Battery	Yes		
Max Bypass Overload Current	30A	40A	63

### ***Inverter Mode Specifications:***

<b>MODEL</b>	<b>Model</b>		
	<b>APS1000-12</b>	<b>APS2000-24</b>	<b>APS4000-48</b>
<b>Output Voltage Waveform</b>	Pure Sine wave		
<b>Rated Output Power (VA)</b>	1000	2000	4000
<b>Rated Output Power (W)</b>	1000	2000	4000
<b>Power Factor</b>	1.0		
<b>Nominal Output Voltage (V)</b>	120VAC		
<b>Nominal Output Frequency (Hz)</b>	60Hz $\pm$ 0.3Hz / 50Hz $\pm$ 0.3Hz		
<b>Auto tracking Main Frequency (Hz)</b>	Yes (Following Main first connection) 50Hz @40-80Hz 60Hz @40-80Hz		
<b>Output Voltage Regulation</b>	$\pm$ 10% rms		
<b>Nominal Efficiency</b>	>80%		
<b>Over-Load Protection (SMPS load)</b>	(110%<load<125%) $\pm$ 10%: Fault (shutdown output) after 2minutes; (125%<load<150%) $\pm$ 10%: Fault (shutdown output) after 20s; Load>150% $\pm$ 10%: Fault (shutdown output) after 2s		
<b>Surge rating</b>	2,000VA	4,000VA	8000VA
<b>Capable of starting electric motor</b>	Instant Reverse Gate Motors Two 1/2 HP or One 1HP	Instant Reverse Gate Motors Four 1/2 HP or Two 1HP	Instant Reverse Gate Motors eight 1/2 HP or four 1HP up to one 5HP
<b>Output Short Circuit Protection</b>	Current limit (Fault after 10s)		
<b>Nominal DC Input Voltage</b>	12V	24V	24V
<b>Min DC start voltage</b>	11V	22V	22V
<b>Low Battery Alarm</b>	11Vdc $\pm$ 0.3Vdc	22Vdc $\pm$ 0.6Vdc	44Vdc $\pm$ 1.2Vdc
<b>Low DC input Shut-down</b>	10.5Vdc $\pm$ 0.3Vdc	21Vdc $\pm$ 0.6Vdc	42Vdc $\pm$ 1.2Vdc
<b>High DC input Alarm &amp; Fault</b>	16Vdc $\pm$ 0.3Vdc	32Vdc $\pm$ 0.6Vdc	64Vdc $\pm$ 1.2Vdc
<b>High DC input Recovery</b>	15.5Vdc $\pm$ 0.3Vdc	31Vdc $\pm$ 0.6Vdc	62Vdc $\pm$ 1.2Vdc

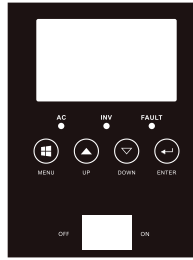
## Charge Mode Specifications:

MODEL	Model		
	APS1000-12	APS2000-24	APS4000-48
Nominal Input Voltage	120Vac		
Input Voltage Range	75-140Vac		
Nominal Output Voltage	Same as input voltage		
MAX Charge Current	30A		
Charge Current Regulation	Charge current adjustable: 25%, 50%, 75%, 100%. (Optional)		
Battery initial voltage	10.5-15.7Vdc	21V-31.4Vdc	42V-62.8Vdc
Charger Short Circuit Protection	Circuit breaker		
Breaker Size	40A		
Over Charge Protection	≥15.7Vdc	≥31.4Vdc	≥62.8Vdc
	Alarm beeps 0.5s second & Fault after 60s		

## Charge Algorithm

Algorithm	<p><b>Three stage:</b>  <b>Boost CC</b> (constant current stage) → <b>Boost CV</b> (constant voltage stage) → <b>Float</b> (constant voltage stage)</p>
Charge Stage Transition Definitions	<ul style="list-style-type: none"> <li>◆ <b>Boost CC Stage:</b> If A/C input is applied, the charger will run at full current in CC mode until the charger reaches the boost voltage.</li> <li>◆ 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 <math>T_0</math> and <math>T_0 \times 10 = T_1</math>.</li> <li>◆ <b>Boost CV Stage:</b> Start a <math>T_1</math> timer; the charger will keep the boost voltage in Boost CV mode until the <math>T_1</math> 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.</li> <li>◆ <b>Float Stage:</b> In float mode, the voltage will stay at the float voltage.</li> <li>◆ If the A/C is reconnected or the battery voltage drops below 12Vdc/24Vdc, the charger will reset the cycle above.</li> <li>◆ If the charge maintains the float state for 10 days, the charger will reset the cycle.</li> </ul> <p style="text-align: center;">ADJUSTABLE TIME DEPENDING ON BATTERY BANK SIZE</p> <p>FOR 24 VOLTS X 2</p> <p style="text-align: center;">FULL CURRENT AVAILABLE ON FLOAT FOR ON BOARD SUPPLY IN POWER PACK MODE</p> <p>THE NEW BATTERY CHARGERS AND BOOSTERS OFFER THE FASTEST CHARGE RATE CURRENTLY AVAILABLE</p> <p>STEP 1 – CONSTANT CURRENT CHARGE      STEP 2 – ABSORPTION CHARGE AT 14.4/14.8 V  STEP 3 – CONSTANT VOLTAGE AT 13.5 VOLTS      STEP 4 – LOW VOLTAGE RESET TO STEP 1</p>

## Operation



### Operation key instructions:

- Switch button to control the machine On and off.
- There are four buttons: MENU, UP, DOWN, ENTER.
- Via UP and DOWN can check the various parameters display.
- Long press MENU to enter the setting menu page, MENU and ENTER turn over the menu page, UP and DOWN to set the parameters. After setting, long press ENTER 2s to exit, except the inverter frequency and inverter voltage parameters, The setting parameters are not saved to the EEPROM. The EEPROM is saved only when the parameters are normally set. (To ensure that the parameters can be successfully saved, so every time after setting the parameters need restart the machine).

### Setting key instructions:

MENU	Function key	Function description	
01	Battery/AC priority setting	Utility priority(default) [01] UT <sub>1</sub>	If choice UTI, the inverter work in AC model until AC cut off or over the AC range.
		Battery priority [01] 56U	The inverter work in AC model if battery less 20set value. The inverter work in DC model if battery more than 21set value continue 1min.
02	110 Utility power range setting	vdE: Wide(default) [02] vdE	If set Wide, the AC range 70-140V.
		NRU: Narrow [02] N-U	If set NRU, the AC range 90-140V.
	220 Utility power range setting	vdE: Wide(default) [02] vdE	If set Wide, the AC range 140-270V.
		NRU: Narrow [02] N-U	If set NRU, the AC range 180-270V.
03	120V Mode Inverter voltage setting	110V(default) [03] 110 <sub>v</sub>	110/115/120V
	220V Mode Inverter voltage setting	220V(default) [03] 220 <sub>v</sub>	220/230/240V
04	Inverter frequency setting	50HZ(default) [04] 500 <sub>Hz</sub>	60HZ [04] 600 <sub>Hz</sub>



13	AC charging setting	Rated current(default) [13] 40 <sup>Ⓐ</sup>	Range of adjustment: 10A - Max Regulation step 5A
17	Boost voltage setting	14.1V(default) [17] 14.1 <sup>V</sup>	Range of adjustment 13.8-14.5V
18	Floating charging setting	13.5V(default) [18] 13.5 <sup>V</sup>	Range of adjustment 13.5-13.7V
19	Battery low voltage shutdown point setting	10.5V(default) [19] 10.5 <sup>V</sup>	Range of adjustment 10-11V
20	SBU Battery low voltage power point	11.5V(default) [20] 11.5 <sup>V</sup>	Range of adjustment 10.5-12.0V If you choice SBU, when the battery voltage less than value, the inverter will work in AC model
21	SBU Battery high voltage inverter point	13.5V(default) [21] 13.5 <sup>V</sup>	Range of adjustment 13V-14.0V If you choice SBU, when the battery voltage more than value continue 1min, the inverter will work in DC model.
23	LCD back light settings	LCD ON [23] LON	The LCD back light on.
		LCD OFF(default) [23] LOF	Press any button to light up continue 1min.
24	Buzzer switch settings	Buzzer ON(default) [24] BON	Buzzer OFF [24] BOF
27	Save mode switch settings	SEN [27] SEN	Save mode enable inverter is set to detect the load every 5/30 seconds
		Sdi(default) [27] Sdi	Save off The save model disenable.
28	Search time settings in Save mode	5s(default) [28] 5	5s inverter is set to detect the load every 5 seconds, 30s inverter is set to detect the load every 30 seconds.
29	AC charging switch settings	AC charging on(default) [29] UCE	AC charging off [29] UCd
UP	Page up key		
DOWN	Page down key		
ENTER	Confirm the exit key		



## Fault Mode

### LED instruction

LED	LED state	information
LED AC(green)	Off	No AC input
	On	AC normal
	Blink	AC over range
LED Inv(yellow)	On	Inverter mode
LED Fault(red)	Off	normal
	On	fault
	Blink	caution

### BUZZER instruction


Buzzer state	information
Buzzer off	normal
Buzzer beep	caution
Buzzer on	fault

## Other features

### Battery voltage restart

After low battery voltage shut off (10.5V for 12V model / 20V for 24V model), the inverter is able to restore operation after the battery recovers to 13V for 12V model and 26V for 24V model (with power switch still in the "ON" position). This function helps to save the users extra work reactivating 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 utility/generator ac has been stable for 15 seconds.










## Important:

Battery Type Setting  BATTERY TYPE SELECTOR	Switch setting	Description	Boost	Float
			Voltage	Voltage
			APS1000-12/APS2000-24	APS1000-12/APS2000-24
	0	Battery prefer mode	Low trip to AC model 11.5V/23V	High trip to battery 14V/28V
	1	Gel USA	14V/28V	13.4V/27.4V
	2	AGM 1	14.1V/28.2V	13.4V/26.8V
	3	AGM 2	14.6V/29.2V	13.7V/27.4V
	4	Sealed lead acid	14.4V/28.8V	13.6V/27.2V
	5	Gel EURO	14.4V/28.8V	13.8V/27.6V
		Open lead acid	14.8V/29.6V	13.3V/26.6V
	7	Calcium	15.1V/30.2V	13.6V/27.2V
		De sulphation	15.5V/31V	4 hours then off
	9	Not used	-	-

Note: APS series inverter include Sealed Lead Acid Batteries. If different chemistry batteries are used, this setting must be adjusted to match the charging voltage appropriate for the type of battery.

## LCD display instruction

When inverter alarm, even it back to recovery mode. We must restart inverter to clear fault.

Fault code	Fault	Fault instruction
	Fan fault	Fan stop run
	Over temperature	BTS over temperature: $T_{battery} > 65^{\circ}\text{C}$ 1s 1 time for 1min then fault alarm 02; $T_{battery} < 60^{\circ}\text{C}$ recovery Inverter over temperature: $T_{inv} > 90^{\circ}\text{C}$ 1s 1 time for 1min then fault alarm 02; $T_{inv} < 85^{\circ}\text{C}$ recovery
	DC voltage too high	Battery over voltage: $\text{DC} > V_{(\text{charge voltage}+1\text{V})/12}$ , alarm for 30s then fault code 03 Over voltage recovery: $\text{DC} < V_{(\text{charge voltage}+1\text{V})-0.2\text{V}/12\text{V}}$
	DC voltage too low	Low voltage alarm: $\text{DC} < V_{(\text{cutoff}+0.5\text{V})/12\text{V}}$ Alarm recovery: $\text{DC} > V_{(\text{cutoff}+0.5)+0.2/12\text{V}}$ Low voltage fault: $\text{DC} < V_{\text{cutoff}}$ fault code 04
	Output short circuit in DC model	Output short circuit: short circuit test fault 05
	Output over voltage	Output over voltage: $V_{\text{output}} > 135\text{V}/270\text{V}$ 500ms fault 06
	Output over load	overload: $100\% < \text{Load} < 110\%$ alarm per every second (5min later inverter cutoff output and fault 07) $110\% < \text{Load} < 125\%$ alarm per every second (60s later inverter cutoff output and fault 07) $\text{Load} > 125\%$ alarm per every second (10s later cut off output and fault 07)
	Output over current	Inverter Output over current: 1-3K: $I_{\text{rms}} > 40\text{A}$ . 4-6K: $I_{\text{rms}} > 80\text{A}$ 200ms fault 51
	Output low voltage in DC model	Output low voltage: $V_{\text{output}} < 85\text{V}/170\text{V}$ 500ms fault 58

## Trouble shooting

If machine enters into fault mode, please remove input power. And according to the table, deal with the following problems.

LED/Buzzer	LCD	Explanation / Possible cause	What to do
Buzzer beeps continuously and red LED is on	Fault code 01	Fan stop run	Check the fan.
	Fault code 02	Temperature of machine is too high.	Power off and waiting for minute
	Fault code 03	Battery voltage is too high.	Check the battery specifications
	Fault code 04	Battery voltage is too low.	Check the battery specifications
	Fault code 05	Output short circuited	Remove your load and restart
	Fault code 06	Inverter output voltage is high.	Return to repair center
	Fault code 07	Over load	Decrease your load
	Fault code 51	Output over current	Check if wiring is connected well and remove abnormal load.
	Fault code 58	Output voltage is too low.	Decrease your load