

USER MANUAL

**1.0KVA/1.5KVA
INVERTER / MPPT SCC / AC CHARGER**

VERSION: 1.0

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1 ABOUT THIS MANUAL

1.1 Purpose

This manual describes the assembly, installation, operation and troubleshooting of this unit. Please read this manual carefully before installations and operations. Keep this manual for future reference.

1.2 Scope

This manual provides safety and installation guidelines as well as information on tools and wiring.

2 SAFETY INSTRUCTIONS



WARNING: This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

1. Before using the unit, read all instructions and cautionary markings on the unit, the batteries and all appropriate sections of this manual.
2. **CAUTION** --To reduce risk of injury, charge only deep-cycle lead acid type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.
3. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
4. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
5. **CAUTION** – Only qualified personnel can install this device with battery.
6. **NEVER** charge a frozen battery.
7. For optimum operation of this inverter/charger, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter/charger.
8. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
9. Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.
10. One piece of 150A fuse is provided as over-current protection for the battery supply.
11. **GROUNDING INSTRUCTIONS** -This inverter/charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
12. **NEVER** cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
13. **Warning!!** Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this inverter/charger back to local dealer or service center for maintenance.

3 INTRODUCTION

This is a multi-function inverter/charger, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user-configurable and easy-accessible button operation such as battery charging current, AC/solar charger priority, and acceptable input voltage based on different applications.

3.1 Features

- Pure sine wave inverter
- Configurable input voltage range for home appliances and personal computers via LCD setting
- Configurable battery charging current based on applications via LCD setting
- Configurable AC/Solar Charger priority via LCD setting
- Compatible to mains voltage or generator power
- Auto restart while AC is recovering
- Overload/ Over temperature/ short circuit protection
- Smart battery charger design for optimized battery performance
- Cold start function

3.2 Basic System Architecture

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

- Generator or Utility.
- PV modules

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.

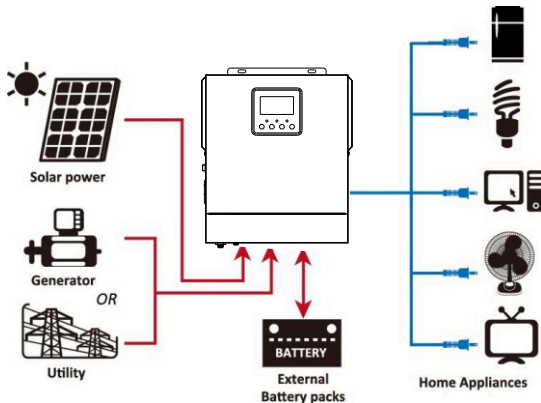
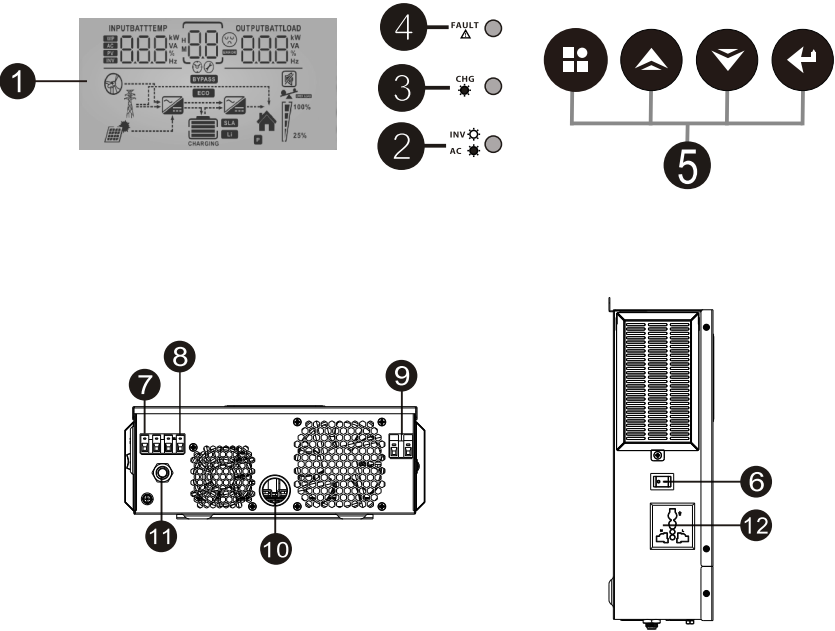


Figure 1 Hybrid Power System

3.3 Product Overview

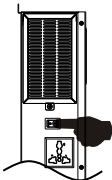


- 1. LCD display
- 2. Status indicator
- 3. Charging indicator
- 4. Fault indicator
- 5. Function buttons
- 6. Power on/off switch
- 7. AC input
- 8. AC output
- 9. PV input
- 10. Battery input
- 11. Circuit breaker
- 12. Output receptacles

4 OPERATION

4.1 Power ON/OFF

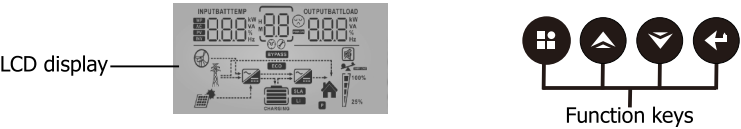
Side view of unit



Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch (located on the button of the case) to turn on the unit.

4.2 Operation and Display Panel

The operation and display panel, shown in below chart, is on the front panel of the inverter. It includes three indicators, four function keys and a LCD display, indicating the operating status and input/output power information.



LED Indicator

LED Indicator		Messages	
AC / INV	Green	Solid On	Output is powered by utility in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
CHG	Green	Solid On	Battery is fully charged.
		Flashing	Battery is charging.
FAULT	Red	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.

Function Keys

Function Key	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

4.3 LCD Setting

After pressing and holding ENTER button for 3 seconds, the unit will enter setting mode. Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or ESC button to exit.

Setting Programs:

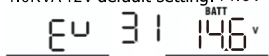

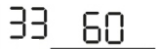
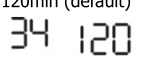
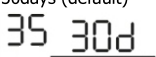
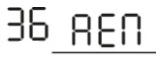
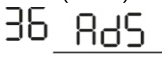
Program	Description	Selectable option	
00	Exit setting mode	Escape (default) 00 00E	One-button restore setting options
		00 00H	
01	Output source priority: To configure load power source priority	Utility first (default) 01 0Ub	Utility will provide power to the loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available.
		Solar first 01 5Ub	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, utility will supply power to the loads at the same time. Battery provides power to the loads only when any one condition happens: - Solar energy and utility is not available. - Solar energy is not sufficient and utility is not available.
		SBU priority 01 5bU	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 12.
		MKS priority 01 nTs	Solar energy provides power to the loads as first priority , if solar energy is not sufficient to power all connected loads , utility energy will supply power to the loads at the same time. The battery only supplies energy to the load as a backup power.

02	Maximum charging current: To configure total charging current for solar and utility chargers. (Max. charging current = utility charging current + solar charging current)	10A 02 10 ^A	20A 02 20 ^A
		30A 02 30 ^A	40A (default) 02 40 ^A
		50A 02 50 ^A	60A 02 60 ^A
		70A 02 70 ^A	80A 02 80 ^A
03	AC input voltage range	Appliances (default) 03 APL	If selected, acceptable AC input voltage range will be within 90-280VAC.
		UPS 03 UPS	If selected, acceptable AC input voltage range will be within 170-280VAC.
05	Battery type	AGM (default) 05 AGM	Flooded 05 FLd
		User-Defined 05 USE	If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 26, 27 and 29.
06	Auto restart when overload occurs	Restart disable (default) 06 Lfd	Restart enable 06 LfE
07	Auto restart when over temperature occurs	Restart disable (default) 07 Lfd	Restart enable 07 LfE
09	Output frequency	50Hz (default) 09 50 ^{Hz}	60Hz 09 60 ^{Hz}
10	Output voltage	220V 10 220 ^v	230V (default) 10 230 ^v
		240V 10 240 ^v	

11	Maximum utility charging current Note: If setting value in program 02 is smaller than that in program 11, the inverter will apply charging current from program 02 for utility charger.	2A 11 2A	10A 11 10A
		20A 11 20A	30A (default) 11 30A
		40A 11 40A	
12	Setting battery stop discharge voltage in "SBU priority""MKS priority"	1.5KVA 24V default setting:23V 12 ^{BATT} 23.0 _v	
		1.0KVA 12V default setting:11.5V 12 ^{BATT} 11.5 _v	
		Setting range is from 21.0V to 26.2V for 1.5KVA model 10.5V to 13.1V for 1.0KVA model Increment of each click is 0.1V	
13	Setting battery recovery discharge voltage in "SBU priority""MKS priority"	1.5KVA 24V default setting:27V 13 ^{BATT} 27.0 _v (default)	Battery fully charged 13 ^{BATT} FUL
		1.0KVA 12V default setting:13.5V 13 ^{BATT} 13.5 _v (default)	Battery fully charged 13 ^{BATT} FUL
		Setting range is from 24.0V to 29.2V for 1.5KVA model 12V to 14.6V for 1.0KVA model Increment of each click is 0.1V	
14	Battery discharge current in "SBU Priority" and "Line Mode"	10A 14 10 ^A	20A (default) 14 20 ^A
		30A 14 30 ^A	40A 14 40 ^A

16	Charger source priority: To configure charger source priority	If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below:	
		Solar first 16 <u>CSO</u>	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Solar and Utility (default) 16 <u>SNU</u>	Solar energy and utility will charge battery at the same time.
		Only Solar 16 <u>OSO</u>	Solar energy will be the only charger source no matter utility is available or not.
		If this inverter/charger is working in Battery mode or Power saving mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.	
18	Alarm control	Alarm on (default) 18 <u>bon</u>	Alarm off 18 <u>bof</u>
19	Auto return to default display screen	Return to default display screen (default) 19 <u>ESP</u>	If selected, no matter how users switch display screen, it will automatically return to default display screen (Input voltage /output voltage) after no button is pressed for 1 minute.
		Stay at latest screen 19 <u>LEP</u>	If selected, the display screen will stay at latest screen user finally switches.
20	Backlight control	Backlight on (default) 20 <u>LON</u>	Backlight off 20 <u>LOF</u>
22	Beeps while primary source is interrupted	Alarm on (default) 22 <u>AON</u>	Alarm off 22 <u>AOF</u>
23	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 23 <u>byd</u>	Bypass enable 23 <u>byE</u>

25	Record Fault code	Record enable (default) 25 FEN	Record disable 25 FdS
26	Bulk charging voltage (C.V voltage)	1.0KVA 12V default setting: 14.1V CU 26 14.1 ^{BATT} v	
		1.5KVA 24V default setting: 28.2V CU 26 28.2 ^{BATT} v	
		If self-defined is selected in program 5, this program can be set up. Setting range is from 12V to 15V for 1.0KVA 12V model and 24V to 30V for 1.5KVA 24V model. Increment of each click is 0.1V.	
27	Floating charging voltage	1.0KVA 12V default setting: 13.5V FLU 27 13.5 ^{BATT} v	
		1.5KVA 24V default setting: 27.0V FLU 27 27.0 ^{BATT} v	
		If self-defined is selected in program 5, this program can be set up. Setting range is from 12V to 15V for 1.0KVA 12V model and 24V to 30V for 1.5KVA 24V model. Increment of each click is 0.1V.	
29	Low DC cut-off voltage	1.0KVA 12V default setting: 10.0V COU 29 10.0 ^{BATT} v	
		1.5KVA 24V default setting: 20.0V COU 29 20.0 ^{BATT} v	
		If self-defined is selected in program 5, this program can be set up. Setting range is from 10.0V to 12.0V for 1.0KVA 12V model and 20.0V to 24.0V for 1.5KVA 24V model. Increment of each click is 0.1V. Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.	
30	Battery equalization	Battery equalization 30 EEN	Battery equalization disable (default) 30 EdS
		If "Flooded" or "User-Defined" is selected in program 05, this program can be set up.	

31	Battery equalization voltage	1.0KVA 12V default setting: 14.6V 	
		1.5KVA 24V default setting: 29.2V 	
		Setting range is from 12V to 15V for 2.0KVA 12V model and 24V to 30V for 1.5KVA 24V model. Increment of each click is 0.1V.	
33	Battery equalized time	60min (default) 	Setting range is from 5min to 900min. Increment of each click is 5min.
34	Battery equalized timeout	120min (default) 	Setting range is from 5min to 900 min. Increment of each click is 5 min.
35	Equalization interval	30days (default) 	Setting range is from 0 to 90 days. Increment of each click is 1 day
36	Equalization activated immediately	Enable 	Disable (default) 
		If equalization function is enabled in program 30, this program can be set up. If "Enable" is selected in this program, it's to activate battery equalization immediately and LCD main page will shows "E9". If "Disable" is selected, it will cancel equalization function until next activated equalization time arrives based on program 35 setting. At this time, "E9" will not be shown in LCD main page.	

4.4 Fault Reference Code

Fault Code	Fault Event	Icon on
01	Fan is locked when inverter is off.	
02	Over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited or over temperature is detected by internal converter components.	
06	Output voltage is too high.	
07	Overload time out	
08	Bus voltage is too high	
09	Bus soft start failed	
51	Over current or surge	
52	Bus voltage is too low	
53	Inverter soft start failed	
55	Over DC voltage in AC output	
57	Current sensor failed	
58	Output voltage is too low	
59	PV voltage is over limitation	

4.5 Warning Indicator

Warning Code	Warning Event	Audible Alarm	Icon flashing
01	Fan is locked when inverter is on.	Beep three times every second	
03	Battery is over-charged	Beep once every second	
04	Low battery	Beep once every second	
07	Overload	Beep once every 0.5 second	
10	Output power derating	Beep twice every 3 seconds	
15	PV energy is low.	Beep twice every 3 seconds	
E9	Battery equalization	None	

5 SPECIFICATIONS

Table 1 Line Mode Specifications

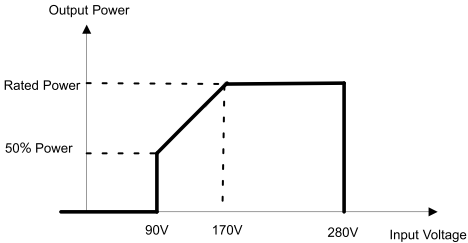
INVERTER MODEL	1.0KVA-12V	1.5KVA-24V
Input Voltage Waveform	Sinusoidal (utility or generator)	
Nominal Input Voltage	230Vac	
Low Loss Voltage	170Vac±10V (UPS); 90Vac±10V (Appliances)	
Low Loss Return Voltage	180Vac±10V (UPS); 100Vac±10V (Appliances)	
High Loss Voltage	280Vac±10V	
High Loss Return Voltage	270Vac±10V	
Max AC Input Voltage	300Vac	
Nominal Input Frequency	50Hz / 60Hz (Auto detection)	
Low Loss Frequency	40±1Hz	
Low Loss Return Frequency	42±1Hz	
High Loss Frequency	65±1Hz	
High Loss Return Frequency	63±1Hz	
Output Short Circuit Protection	Circuit Breaker	
Efficiency (Line Mode)	>95% (Rated R load, battery full charged)	
Transfer Time	10ms	
Output power derating: When AC input voltage drops to 170V, the output power will be derated.		

Table 2 Inverter Mode Specifications

INVERTER MODEL	1.0KVA-12V	1.5KVA-24V
Rated Output Power	1000VA/1000W	1500VA/1500W
Output Voltage Waveform	Pure Sine Wave	
Output Voltage Regulation	230Vac±5%	
Output Frequency	50Hz	
Peak Efficiency	94%	
Overload Protection	5s@ ≥150% load; 10s@ 100% ~ 150% load	
Surge Capacity	2* rated power for 5 seconds	
Nominal DC Input Voltage	12Vdc	24Vdc
Cold Start Voltage	11.5Vdc	23.0Vdc
Low DC Warning Voltage		
@ load < 50%	11.0Vdc	22.0Vdc
@ load ≥50%	10.5Vdc	21.0Vdc
Low DC Warning Return Voltage		
@ load < 50%	11.5Vdc	22.5Vdc
@ load ≥50%	11.0Vdc	22.0Vdc
Low DC Cut-off Voltage		
@ load < 50%	10.2Vdc	20.5 Vdc
@ load ≥50%	9.6Vdc	20.0Vdc
High DC Recovery Voltage	15.5Vdc	31Vdc
High DC Cut-off Voltage	16.0Vdc	32Vdc
No Load Power Consumption	<25W	<35W

Table 3 Charge Mode Specifications

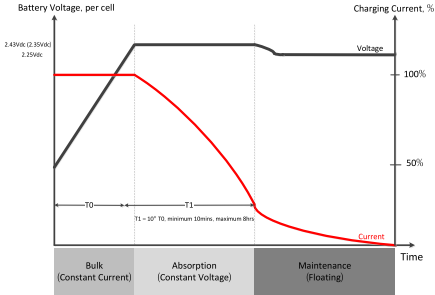
Utility Charging Mode			
INVERTER MODEL		1.0 KVA-12V	1.5KVA-24V
Charging Algorithm		3-Step	
AC Charging Current (Max)		40Amp (@V _{L/P} = 230Vac)	40Amp (@V _{L/P} = 230Vac)
Bulk Charging Voltage	Flooded Battery	14.6	29.2
	AGM / Gel Battery	14.1	28.2
Floating Charging Voltage		13.5Vdc	27Vdc
Charging Curve			
MPPT Solar Charging Mode			
INVERTER MODEL		1.0KVA-12V	1.5KVA-24V
Max. PV Array Power		550W	1080W
Nominal PV Voltage		240Vdc	
PV Array MPPT Voltage Range		20~150Vdc	30~150Vdc
Max. PV Array Open Circuit Voltage		150Vdc	
Max Charging Current (AC charger plus solar charger)		80Amp	

Table 4 General Specifications

INVERTER MODEL	1.0KVA-12V	1.5KVA-24V
Safety Certification	CE	
Operating Temperature Range	-10° C to 50° C	
Storage temperature	-15° C~ 60° C	
Humidity	5% to 95% Relative Humidity (Non-condensing)	
Dimension (D* W* H) , mm	280X240X91	
Net Weight, kg	3	3.5

技术要求：单页尺寸142*210mm;
材质：封面105g铜版纸,内页80g书写纸;
料号打于后封面左下角;
颜色：黑白印刷
注：此技术要求不用印刷