



# **DC to AC Power Inverter Hardwire Version**

**3000W - 120V (MW1230HW)**

## **Owner's Manual**



For safe and optimum performance, the **KISAE DC to AC Power Inverter (Hardwire Version)** must be used properly. Carefully read and follow all instructions and guidelines in this manual and give special attention to the **CAUTION** and **WARNING** statements.

## **PLEASE KEEP THIS MANUAL FOR FUTURE REFERENCE**

### **Disclaimer**

While every precaution has been taken to ensure the accuracy of the contents of this guide, **KISAE Technology** assumes no responsibility for errors or omissions. Note as well that specifications and product functionality may change without notice.

### **Important**

Please be sure to read and save the entire manual before using your unit. Misuse may result in damage to the unit and/or cause harm or serious injury.

**Document Part Number**  
**MU MW1230HW Rev A**

### **Service Contact Information**

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## 1. INTRODUCTION

Thank you for purchasing the **KISAE DC to AC Power Inverter (Hardwire Version) unit**. With our state of the art, easy to use design, this product will offer you reliable service by providing AC power and 5V USB power for your home, cabin, boat, RV, Caravan or Trailer using battery power. The Inverter can run many AC-powered appliances when you need AC power anywhere. The 5V USB power can charge many USB-powered devices.

This manual will explain how to use this unit safely and effectively. Please read and follow these instructions and precautions carefully.

### IMPORTANT SAFETY INFORMATION

This section contains important safety information for the Inverter. Each time, before using the unit, READ ALL instructions and cautionary markings on or provided with the unit, and all appropriate sections of this guide.

The Inverter contains no user-serviceable parts. See Warranty section for how to handle product issues.

#### **DANGER: Fire and/or Chemical Burn Hazard.**

- Do not cover or obstruct any air vent openings and/or install in a zero-clearance compartment.
- DANGER:** Failure to follow these instructions can result in death or serious injury
- When working with electrical equipment or lead acid batteries, have someone nearby in case of an emergency.
- Study and follow all the battery manufacturer's specific precautions when installing, using and servicing the battery connected to the inverter.
- Wear eye protection and gloves.
- Avoid touching your eyes while using this unit.
- Keep fresh water and soap on hand in the event battery acid comes in contact with eyes. If this occurs, cleanse right away with soap and water for a minimum of 15 minutes and seek medical attention.
- Batteries produce explosive gases. **DO NOT** smoke or have an open spark or fire near the system.
- Keep unit away from moist or damp areas.
- Avoid dropping any metal tool or object on the battery. Doing so could create a spark or short circuit which goes through the battery or another electrical tool that may create an explosion.

#### **DANGER: Shock Hazard. Keep away from children!**

- Avoid moisture. Never expose unit to snow, water etc.
- Unit provides household AC output, treat the AC output socket the same as regular wall AC sockets at home.

#### **DANGER: Explosion hazard!**

- DO NOT use the unit in the vicinity of flammable fumes or gases (such as propane tanks or large engines).
- AVOID covering the ventilation openings. Always operate unit in an open area.
- Prolonged contact to high heat or freezing temperatures will decrease the working life of the unit.
- Do Not connect an AC power source like utility power or generator to the AC outputs of the unit. It will change the unit and may cause fire. Feeding AC to the AC out of the unit is not covered by warranty.

**IMPORTANT:** The AC output generated by the inverter is Modified Sinewave output. Some appliances like speed controllers found in some fans, power tools and some power tools' AC charger may not like the modified sinewave generated by the inverter. Those appliances may not work or may be damaged if they are connected to the inverter. If you are unsure about powering any device with the inverter, contact the manufacturer of the device.

### FCC INFORMATION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection

against harmful interference in a residential installation. This equipment generate, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## LIMITATIONS ON USE

Do not use in connection with life support systems or other medical equipment or devices.

## 2. PRODUCT DESCRIPTION

The Inverter includes the items list below.

- Inverter base unit with detachable Remote Panel
- Remote Panel Cable
- Owner's Manual

## 3. INSTALLATION

**WARNING:** It is recommended that all wiring be done by a certified technician or electrician to ensure adherence to the applicable electrical safety wiring regulations and installation codes. Failure to follow these instructions can damage the unit and could also result in personal injury or loss of life.

### **CAUTION:**

Before beginning unit installation, please consider the following:

- The unit should be used or stored in an indoor area away from direct sunlight, heat, moisture or conductive contaminants.
- When placing the unit, allow a minimum of three inches of space around the unit for optimal ventilation.

## Understanding the unit features

### *AC Output Front Panel*

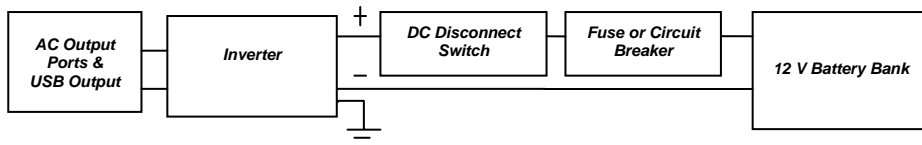


### *DC Input Rear Panel*



## Preparing for Installation

Typical Wiring block diagram of the Power Inverter:



### **12V Battery Bank:**

- The use of a deep cycle battery is highly recommended for power inverter application
- For battery size, you need to identify what you wish to operate, and for how long. It is recommended that you purchase as much battery capacity as possible. See more on Battery Run Time in Section 4.

### **DC Fuse or Circuit Breaker:**

- DC-rated fuse or DC-rated circuit breaker connected along the DC positive line is required. Select a fuse or circuit breaker with a minimum of 450 Adc
- Based on the size of your 12V Battery Bank, determine the overall short circuit current rating of the battery bank from the battery manufacturer. The fuse or circuit breaker chosen has to be able to withstand the short circuit current that may be generated by the battery bank

### **DC Disconnect Switch:**

- Select a DC Disconnect Switch with the same or higher rating of the selected fuse or circuit breaker.
- The DC Disconnect Switch is used to disconnect the DC power between the unit and the battery bank during service, maintenance or trouble shooting.

### **DC Input Cable Size:**

- Use of isolated multi-strand low resistance wire is required for all the DC connections between the unit and the battery bank.
- Use minimum #4/0 AWG wire with maximum cable length of 5 feet.

**Important:** Use of smaller gauge cable or longer cable length may cause the inverter to shutdown under heavy load and may also melt the cable insulation and catch fire and can result in death or serious injury.

### **Grounding Cable Size:**

**Important:** The unit is grounded through the ground stud located near the DC Input terminal and the chassis of the unit has to be grounded properly before use.

- For Marine application, the DC grounding cable size may be one size smaller than the minimum size conductor required for the DC current-carrying conductors and the conductor is no smaller than #10AWG.
- For Recreational Vehicle or Caravan application, the unit has to be grounded to the vehicle chassis with a minimum #8 AWG copper conductor.

## Installing the Inverter System

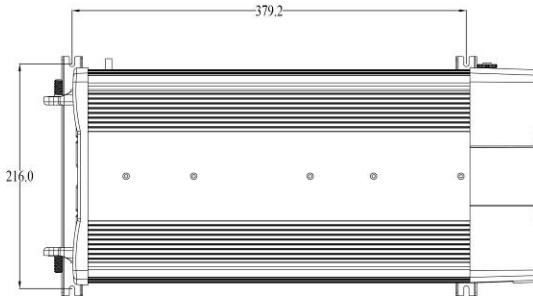
### **WARNING: Electrical Shock Hazard**

The unit 'On/Off' switch does not disconnect the DC power from the battery. Use the DC Disconnect Switch or disconnect the DC input cables to disconnect the DC power from the battery before working on any circuits connected to the unit. Failure to follow these instructions can result in death or serious injury.

### **Installation:**

- Choose an appropriate mounting location.
- For indoor use, the unit can be mounted in any direction except with the DC Input panel facing downwards.
- Use the mounting template below to mark the positions of the mounting screws.

- Drill the 4 mounting holes and place the Inverter in position and fasten the unit to the mounting surface.



#### ***Chassis Grounding Connection:***

**DANGER:** The unit chassis has to be grounded properly. Never operate the Inverter without proper grounding. Failure to do so will result in death or serious injury.

- Connect the grounding cable's ring terminal to the unit ground screw.
- Connect the other side of the cable to the common grounding point.

**Important:** Field wiring DC terminals tightening torque 12-13 Nm.

#### ***DC Input Connection:***

**CAUTION:** Reversing the DC Input terminal will damage the unit and it cannot be repaired. Damage caused by reverse polarity connection is not covered by the warranty.

- Connect one end of the negative DC input cable to the Inverter DC negative terminal. Connect the other end of the cable to the battery negative terminal.
- Make sure the Disconnect Switch is in the OFF position.
- Connect one end of the positive DC input cable to the Power Inverter DC positive terminal.
- Connect the other end of the positive DC input cable to one of the terminals of the Disconnect Switch.
- Connect a DC input cable between the other terminal of the Disconnect Switch and one side of the terminal of the fuse holder.
- Connect a DC input cable between the other terminal of the fuse holder and the battery positive terminal.
- Install the selected fuse to the fuse holder.
- Turn Disconnect Switch to ON position.

#### ***AC Output Connections:***

**CAUTION:** Please be sure that the DC disconnect switch is turned OFF.

The AC Output has two types of AC connections:

- 1) Use of the provided AC sockets – NEMA 5-20 (Port 1 and 2) for AC load:  
This configuration does not require AC Output installation. Plug in the AC load to the provided AC output sockets. Each AC output port (Port 1 and 2) is limited to 20A and each port is protected by it's 20A supplementary breaker.
- 2) Use of the provided Hardwire AC Output terminal (Port 3).
  - Remove the 4 screws that secure the AC compartment cover located on the front panel of the unit.
  - Hardwire the AC load or any external AC socket to the AC Output ports 3. Please verify the Line 'L' and NEUTRAL 'N' connection on the AC Output ports. The AC Output port can provide the maximum power of 3000W, 25A AC current.
  - Re-install the AC compartment cover.

### Remote Display Connection:

- The Remote Display on the unit is detachable. To install the remote in a different location, the provided 6 pin standard RJ12 cable is used.
- Remove the 2 screws at the front of the Display Panel and disconnect the small RJ12 cable from the unit.
- Install the RJ12 cable in your desired location.
- Connect one end of the RJ12 cable to the unit and the other end of the cable to the Display Panel. Please note polarity.

### Test the Inverter connection:

- Switch DC disconnect switch to ON to provide battery power to the unit.
- 'Status' LED turns green indicates the unit is running and AC output is available on all four AC output ports.
- 'Display' LED turns on and the digital display will alternatively shows battery voltage in Volts (e.g. '12.5' means 12.5V) and total AC Output power in KW.
- 5V USB is now available.
- Plug in a small AC load like a 40W table lamp or small appliance to the AC socket to verify AC is available.
- The unit is successfully installed and functioning properly.

## 4. UNIT OPERATION

### Understanding the Detachable Display Function:



Status LED	Display LED	Display	Function/Status
Green	Green	'12.5'	Display shows battery voltage in DC volts
	Amber	'0.80'	Display shows output power in KW (e.g. '0.80' means 0.80KW=800W)
Red (solid)	OFF	E01-E07	Unit has shutdown. Display shows error code (See error code chart below)

### Understanding the Power and Select push button function during normal operation

A beep sound will occur every time when the 'Power' or 'Select' button is triggered.

'Power' button function:

- Turns inverter On/Off. Press and hold for 1 second to turn unit ON or OFF.

'Select' button function:

- Check unit setting: Press once to check or verify unit's present set functions

### Understanding the Error Code

Code	Condition	Corrective Action
E01	Input battery voltage is too low and unit has shutdown	Recharge battery immediately and restart unit
E02	Input battery voltage is too high and unit has shutdown	Check battery voltage or determine if any external charger is connected to the battery bank
E03	AC output is overloaded or short circuited and unit has shutdown	Check load connected to the output. Reduce load and restart the unit
E04	Internal temperature is too high and unit has shutdown	Turn unit off and wait for 15 minutes before restarting. Check if any object has blocked the air flow of the unit
E05	Input battery voltage is low and warning occurs	Recharge battery as unit will shutdown shortly



E06	AC output load connected is close to overload limit	Reduce load
E07	Internal temperature is high and is close to shutdown limit	Reduce load and check if any ventilation of the unit is blocked

### **AC Load on Inverter**

Although the Power Inverter can provide high surge power up to two times the rated output power, some high surge loads like sump-pumps, heavy duty motors etc. may still trigger the inverter protection system even though the load falls within the power rating of the inverter. A higher power Inverter is required for these appliances.

**Important:** Each 3-pin AC socket provided can only handle 20A AC current. For appliances that require more than 2400W (20A) AC Power, hardwiring to the AC Output port 3 is required. Do not plug surge-protected power bars into the unit's 120 VAC outlets. The surge protected components on the surge-protected power bar may not like the modified sinewave output generated by the inverter.

Some appliances like speed controllers found in some fans, power tools and some power tools' AC charger may not like the modified sinewave generated by the inverter. Those appliances may not work or may be damaged if they are connected to the inverter. If you are unsure about powering a device with the inverter, contact the manufacturer of the device.

### **Estimated Run Time**

Following run times are estimates for reference, based on using different battery bank sizes. Actual run times may vary.

AC Load	Estimate run time on different 12V Battery Bank Size				
	60AH	120AH	180AH	240AH	300AH
<b>50 W</b>	11 hrs.	22 hrs.	33 hrs.	44 hrs.	55 hrs.
<b>100 W</b>	5 hrs.	11.5 hrs.	17 hrs.	23 hrs.	29 hrs.
<b>200 W</b>	2.5 hrs.	5 hrs.	8 hrs.	11 hrs.	13.5 hrs.
<b>500 W</b>	49 mins	2 hrs.	3 hrs.	4 hrs.	5 hrs.
<b>1000 W</b>	15 mins	49 mins	1.5 hrs.	2 hrs.	2.5 hrs.
<b>1500 W</b>	8 mins	27 mins	49 mins	1 hr	1.5 hrs
<b>2000 W</b>	N.R.	15 mins	34 mins	49 mins	1 hrs
<b>2500 W</b>	N.R.	11 mins	25 mins	37 mins	49 mins
<b>3000 W</b>	N.R.	N.R.	17 mins	27 mins	37 mins

**Note: N.R. - Not Recommended**

## **5. FEATURE SETTING**

To understand more about the unit features, read the following section and follow the instructions to make desired changes to the setting.

### **Understanding the Unit Settings**

Battery Under Voltage Setting	
SdL	Battery under voltage protection setting is set to LOW (used for normal operation) Under voltage alarm: 11.0 Vdc Under voltage alarm recovery: 11.3 Vdc Under voltage shutdown: 10.5 Vdc Under voltage recovery: 12.0 Vdc
SdH	Battery under voltage protection setting is set to HIGH (setting to avoid battery over discharge, this setting is used when the inverter is connected to the car start battery) Under voltage alarm: 12.1 Vdc Under voltage alarm recovery: 12.3 Vdc Under voltage shutdown: 11.8 Vdc Under voltage recovery: 12.6 Vdc
Alarm Setting	

AL0	Fault and warning audible alarm is disabled. Display panel only shows error code and audible alarm will not sound.
AL1	Audible alarm will sound when fault or warning occurs.
<b>Factory Default Setting</b>	
Fd	Set unit back to factory default setting (AL1, SdL)

### Enter Function Menu for unit setting:

To enter unit Function Menu, press and hold “Power” and “Select” button together for about 5 seconds until a beep is sounded.

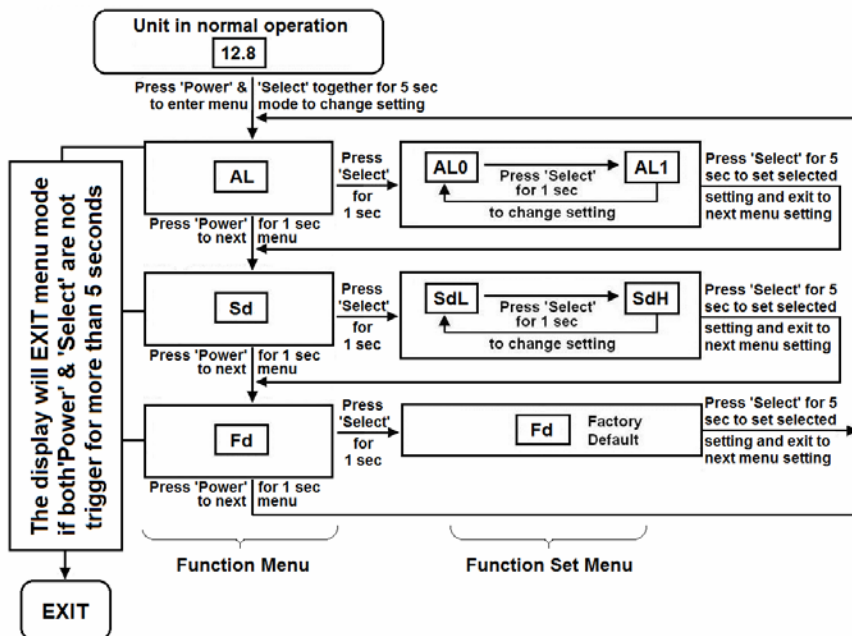
*When you are in Function Menu:*

- Press ‘Power’ button for 1 second to toggle between different Functions like, ‘AL’, ‘Sd’, and ‘Fd’ etc.
- Press ‘Select’ button for 1 second to enter Individual Function Set Menu and you can make changes to the settings.
- The unit will EXIT the Main Menu automatically if ‘Power’ and ‘Select’ buttons are not triggered for more than 5 seconds.

*When you are in Individual Function Set Menu:*

- Press ‘Select’ button for 1 second to toggle between different setting values.
- Press ‘Select’ button for 5 seconds to set selected setting and exit to next Main Menu

See more details on flow chart below.



## 6. TROUBLESHOOTING

To troubleshoot the unit, please note the error code displayed on the main unit and review “Understanding the Error Codes” in section 4.

Problem	Symptom	Solution
No AC output. Status LED is	The unit is off	Turn unit ON by following the instruction in Section 4 to turn unit ON

	No power to unit	Check DC fuse and disconnect switch
No AC output. Status LED is Green	Circuit Breaker is tripped	Check load and reset the related circuit breakers located by the side of the unit and the AC output front panel
No Output. Status LED is in Red	Circuit Breaker is tripped Check error code on display	Check load and reset the related circuit breakers Verify the error condition and make correction
Products connected to unit malfunction or overheat	Products connected to unit do not accept Modified Sinewave output	Products are not compatible with the Modified Sinewave output generated by the inverter. See "AC Load on Inverter" in section 4.

## 7. SPECIFICATIONS

*Note: Specifications are subject to change without notices.*

	<b>MW1230HW</b>
<b>Specification</b>	<b>3000W</b>
<b>Inverter</b>	
AC Output Power (30 min)	3000W
AC Output Power (Continuous)	2400W
AC Output Current	25.0A
AC Surge Power (Peak)	6000W
AC Output Voltage/Frequency	120VAC / 60 Hz
AC Output Waveform	Modified Sinewave
Nominal DC Input Voltage	12 VDC
No Load battery draw	< 1.2 ADC
DC Input Voltage operating range	10.5 – 15.5 VDC
Under Voltage Alarm (SdL / SdH)	11.0/12.1 VDC
Under Voltage Alarm Recovery (SdL / SdH)	11.3/12.3 VDC
Under Voltage Shutdown (SdL / SdH)	10.5/11.8 VDC
Under Voltage Recovery (SdL / SdH)	12.0/12.6 VDC
Over Voltage Shutdown	15.5 VDC
<b>USB</b>	
USB Port	5V, 750 mA
<b>AC Output</b>	
AC Output Port 1, 2	NEMA 5-20 (20A max)
AC Output Port 3	Hardwire (25A max)
<b>Display</b>	
Display Panel Port	RJ12 (6 pins)
Inverter Mode	Battery Voltage, Output Power
<b>Safety and Environmental</b>	
Agency Markings	cETLus
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-20°C to 60°C (-4°F to 140°F)
Relative Humidity	5-90% noncondensing
Operating Altitude	Up to 9,843ft (3000m) above sea level
<b>Weights and Dimensions</b>	
Weights	5.83 Kg
Dimensions	487 x 230 x 114 (cm)

*Note: The product can conforms to UL STD. 458 and certified to CSA STD. C22.2 NO.107.1*

## **8. WARRANTY**

### **One Year Limited Warranty**

The limited warranty program is the only one that applies to this unit, and it sets forth all the responsibilities of KISAE Technology. There is no other warranty, other than those described herein. Any implied warranty of merchantability of fitness for a particular purpose on this unit is limited in duration to the duration of this warranty.

This unit is warranted, to the original purchaser only, to be free of defects in materials and workmanship for one year from the date of purchase without additional charge. The warranty does not extend to subsequent purchasers or users.

Manufacturer will not be responsible for any amount of damage in excess of the retail purchase price of the unit under any circumstances. Incidental and consequential damages are specifically excluded from coverage under this warranty.

This unit is not intended for commercial use. This warranty does not apply to damage to units from misuse or incorrect installation/connection. Misuse includes wiring or connecting to improper polarity power sources.

### **RETURN/REPAIR POLICY:**

If you are experiencing any problems with your unit, please contact our customer service department at [info@kisaetechnology.com](mailto:info@kisaetechnology.com) or Phone 1-877-897-5778 before returning product to retail store. After speaking to a customer service representative, if products are deemed non-working or malfunctioning, the product may be returned to the purchasing store within 30 days of original purchase. Any defective unit that is returned to manufacturer within 30 days of the date of purchase will be replaced free of charge.

If such a unit is returned more than 30 days but less than one year from the purchase date, manufacturer will repair the unit or, at its option, replace it, free of charge. If the unit is repaired, new or reconditioned replacement parts may be used, at manufacturer's option. A unit may be replaced with a new or reconditioned unit of the same or comparable design. The repaired or replaced unit will then be warranted under these terms for the remainder of the warranty period. The customer is responsible for the shipping charges on all returned items.

### **LIMITATIONS:**

This warranty does not cover accessories, such as adapters and batteries, damage or defects result from normal wear and tear (including chips, scratches, abrasions, discoloration or fading due to usage or exposure to sunlight), accidents, damage during shipping to our service facility, alterations, unauthorized use or repair, neglect, misuse, abuse, failure to follow instructions for care and maintenance, fire and flood.

If your problem is not covered by his warranty, call our Customer Service Department at [info@kisaetechnology.com](mailto:info@kisaetechnology.com) or 1-877-897-5778 for general information if applicable.