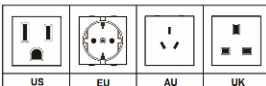


# 24V Input 2000W True Sinewave Power Inverter

**SW2420 (120V model)**  
**SW2420i (230V model)**

## Owner's Manual



# KISAE<sup>SM</sup>

For safe and optimum performance, the Power Inverter 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 **KISAE True Sinewave Power Inverter**. Misuse may result in damage to the unit and/or cause harm or serious injury. Read manual in its entirety before using the unit and save manual for future reference.

## **Product Numbers**

### **120V model:**

SW2420 Power Inverter 24V 2000W 120VAC (NEMA 5-20)

### **230V Model:**

SW2420i-EU Power Inverter 24V 2000W 230VAC (Schuko Socket - CEE 7/4)

SW2420i-UK Power Inverter 24V 2000W 230VAC (British Socket - BS1363)

SW2420i-AU Power Inverter 24V 2000W 230VAC (Australia Socket – NS/NZS3112)

## **Document Part Number**

MUSW2420 Rev A (Nov 30, 2015)

## **Service Contact Information**

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## 1. INTRODUCTION

Thank you for purchasing the KISAE True Sinewave Power Inverter. 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 or Trailer. The Power 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 True Sinewave Power 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 unit 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.

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

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

#### **WARNING: 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.

### FCC and EMC 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 on 120V model and to comply with the limits for CE EMC standard on 230V model. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, 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:

- Re-orient 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 True Sinewave Power Inverter includes the items list below.

- Power Inverter base unit
- Owner's manual

Series	Model No.	Output Rating	AC Output Socket Types
120V model	SW2420	2000W	20A GFCI
230V model	SW2420i-EU,UK,AU	2000W	16A(EU), 13A(UK), 10A(AU)

## 3. INSTALLATION

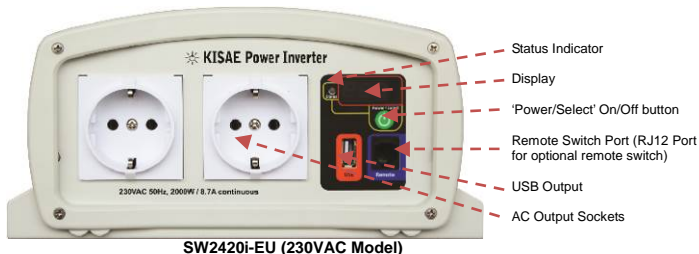
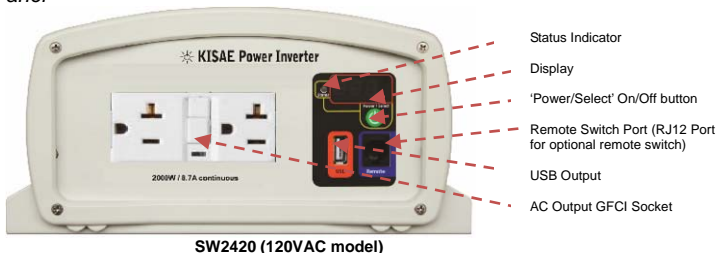
**WARNING:** It is recommended that all wiring be done by a certified technician or electrician to ensure adherence to the applicable electrical safety wiring regulations and installation codes. Failure to follow these instructions can damage the unit and could also result in personal injury or loss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

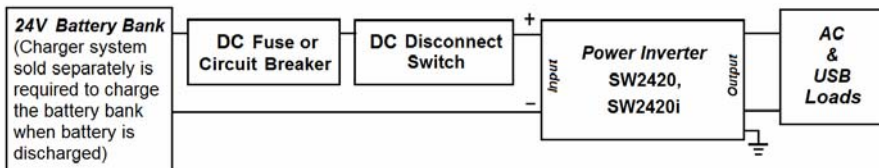


## DC Input Rear Panel



## Preparing for Installation

Typical Wiring block diagram of charger:



### 24V 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 in "Estimated 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.

Fuse/Circuit Breaker Rating	150 Adc
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- Based on the size of your 24V 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
- For Marine application, the over-current protection device needs to be installed within 7 inches (17.8cm) from the battery positive terminals.

### DC Disconnect Switch:

- Use a 24V or higher rated DC Disconnect Switch with the same or higher rating as the selected fuse or circuit breaker. Use ignition protected switches when required by local codes.
- 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:

- All DC cables require insulated multi-strand low resistance cable.
- The DC cables must be copper and must be rated 105°C minimum.

Model	Minimum Wire Size	Recommended Cable Length
SW2420, SW2420i	AWG # 2	< 5 feet

**Caution:** Use of smaller gauge cable or longer cable length may cause the inverter to shutdown under heavy load. It may also melt the cable insulation and catch fire and can result in death or serious injury. Choice of the cable size should also match with the rating of the DC fuse used.

**Important:** The recommended cable length is limited to < 5 feet. This is due to the consideration of voltage drop between the battery and the unit. Select a bigger size cable if

long cable length is required.

### **Chassis Grounding Cable Size:**

**Important:** The unit is grounded through the Chassis Ground (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.

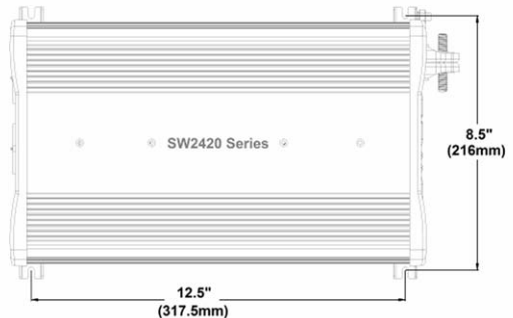
### **Installing the Power Inverter System**

#### **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 only, the unit can be mounted in any direction except with the DC Input panel facing downwards.
- Use the mounting template on the right to mark the positions of the mounting screws.
- Drill the 4 mounting holes and place the Power Inverter in position and fasten the unit to the mounting surface.



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

### **Chassis Grounding Connection:**

**DANGER:** The unit chassis has to be grounded properly. Never operate the Power 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.

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

### **Remote Switch (optional) Connection:**

- Insert the Remote Switch accessory (RM1201-00) to the RJ11 'Remote Switch Port' located

at the Front AC panel of the Power inverter. Please note polarity.

#### **Test the Power Inverter Connection:**

- Turn unit on by pressing and holding the On/Off button on the main unit for about a second until a beeping sound occurs. The 'Status' light turns on indicating the Power Inverter is ON. Check the digital display showing measured battery voltage and output power alternatively. Both AC output and 5V USB are 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. If AC is not available, check for error code on display or troubleshooting section. The unit is successfully installed and functioning properly.

#### **Test the GFCI Monthly: (SW2420 - 120V model only)**

- Use the following instruction to perform a monthly test of the AC Output GFCI Socket to ensure the GFCI is functioning properly.
- Turn unit on and plug a small AC load (e.g. 40W light bulb) to the AC Output GFCI Socket.
- Check that the AC load is ON.
- Press '**Test**' button and observe a clicking sound. Check that the AC load is turned off.
- Press '**RESET**' button and check that the AC load is back ON again.

**Note:** This test is performed when Power Inverter is ON.

## **4. UNIT OPERATION**

#### **Turn ON and OFF the unit**

- Press and hold the "**Power/Select**" button for 1 second until a beep is sounded.
- Display will show the Load Sense setting "LS0" or "LS1" for a few seconds to indicate the load sense setting ('**LS0**' = Load Sense function disabled, '**LS1**' = Load Sense function enabled). See more details in "Understanding and setting the Load Sense Function" below.
- Display will then show the measured battery voltage and output power alternatively. Status LED will turn green. 5V USB and AC output are available.
- Press "**Power/Select**" button to turn unit off.

#### **Remote ON/OFF Switch (Optional)**

- If optional '**Remote Switch**' is used, the ON/OFF momentary switch on the remote switch is connected in parallel with the "**Power/Select**" button on the unit. The switch shares the same function as the "**Power Select**" function on the unit.

#### **Understanding the Display & Status LED**

##### LED Display:

- '**LS0**' Display shows Load Sense setting (LS0 indicates load sense function is disabled)
- '**12.5**' Display shows measured battery voltage
- '**0.80**' Display shows total output AC power in kW (800W as shown)
- '**E01**' Display shows error or warning code. See **Understanding the Error Code** for details

##### Status LED:

Green: Unit operation is normal

Amber: Warning is detected. Unit will shutdown at any time. Please check **Understanding the Error Code and Troubleshooting** section for details.

Red: Error is detected and unit has shutdown. Please check **Understanding the Error Code and Troubleshooting** section for details.

#### **Understanding the Load Sense Function**

The unit load sense function reduces power consumption in order to conserve power draw from the DC source. Every time when the unit is turned on, it shows the load sense setting once (either "**LS0**" or "**LS1**") before it shows the battery voltage and O/P power level in the display. When the load Sense function is enabled ("**LS1**"), the AC output of the unit switches ON once every few seconds to detect the AC load connected to the unit. If the load connected is > 10W, the AC output will remain ON continuously until the AC load is reduced to below 3W. It will then resume back to ON/OFF function until it senses the load connected is > 10W again.



## 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 has sensed high and is close to shutdown 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 Power 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.

### Estimated Run time

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

AC Load	Estimate run time on different 24V Battery Bank Sizes				
	30AH	60AH	90AH	120AH	150AH
50 W	11 hrs.	22 hrs.	33 hrs.	44 hrs.	55 hrs.
100 W	5 hrs.	11.5 hrs.	17 hrs.	23 hrs.	29 hrs.
200 W	2.5 hrs.	5 hrs.	8 hrs.	11 hrs.	13.5 hrs.
500 W	49 mins	2 hrs.	3 hrs.	4 hrs.	5 hrs.
1000 W	15 mins	49 mins	1.5 hrs.	2 hrs.	2.5 hrs.
1500 W	8 mins	27 mins	49 mins	1 hr	1.5 hrs
2000 W	N.R.	15 mins	34 mins	49 mins	1 hrs
Note: N.R. - Not Recommended					

Following run time is an estimate based on the typical load using a 24V-60AH battery bank for reference. Actual run time may vary.

Load	Consumption	Estimate Run time
Cordless Phone	5W	180 hrs.
Clock/Radio	8W	135 hrs.
Table Lamp	40W/60W	27 hrs. / 18 hrs.
Freezer (8.8 cu. ft.)	80W	15 hrs.
20" LCD TV	100W	11.5 hrs.
Refrigerator (18 cu. ft.)	120W	9 hrs.
Sump Pump (1/2 hp)	350W	3 hrs.
Microwave (mid-size)	1000W	49 min
Coffee Maker	1200W	37 min

## 5. FEATURE SETTING

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

### Default Factory Setting:

“LS0” = Load Sense feature is disable

### Understanding and Setting the Load Sense Function:

The load sense feature allows you to reduce the no load current draw when no AC load is connected to the inverter. To enable/disable the Load sense function, Press and hold the

“**Power/Select**” button for 5 second to enter **Load Sense** select mode, display shows current setting (“**LS0**” = Load sense is disable, “**LS1**” = Load Sense is disable). Press “**Power/Select**” button once to change setting. The unit will automatically exit the select mode after 5 seconds.

## 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	Possible Cause/Condition	Solution
No AC Output. All the LEDs and the display are off.	The unit is off.	Turn the unit ON (Press and hold the “ <b>Power/Select</b> ” button for a second until a beep is sounded)
	No power coming into unit.	Check if the DC Fuse or the DC Disconnect switch (if installed) is either blown or turned OFF.
No AC Output. Status LED is in Amber	Check error code on display	Verify the error condition and make correction
	GFCI on 120V model (SW2420) is tripped	Check load for Ground Fault and reset the GFCI
AC Output is turning ON and OFF every few seconds	Load Sense function is enabled and Load connected to unit is less than the threshold setting. (<10W)	Disable Load Sense function by changing the unit setting or increase the AC load connected to unit to >10W

## 7. SPECIFICATIONS

Note: Specifications are subject to change without notices.

Specification	True Sine Wave Series	
	SW2420	SW2420i -EU,UK,AU
<b>Inverter</b>		
AC Output Power	2000W	
AC Output Current	16.7A	8.7A
AC Surge Power (Peak)	4000W	
AC Output Voltage / Frequency	120 VAC / 60 Hz	230 VAC / 50 Hz
AC Output Waveform	True Sinewave	
AC Output Socket	2 pc ( 20A GFCI)	2 pc
Nominal DC Input Voltage	25.0 VDC	
No Load battery draw	< 0.6 ADC (with Load Sense OFF) < 0.1 ADC (with Load Sense ON)	
DC Input Voltage operating range	21.0 – 31.0 VDC	
Under Voltage Alarm	22.4 VDC	
Under Voltage Shutdown	21.0 VDC	
Under Voltage Recovery	23.6 VDC	
Over Voltage Shutdown	31.0 VDC	
<b>Load Sense</b>		
'ON' Threshold	>10W	
'OFF' Threshold	< 3W	
<b>USB</b>		
USB Port	5V, 2.1 A	
<b>Safety and Environmental</b>		
Conformance	cETLus	CE EMC & LVD
Agency Markings	ETL	CE
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	11.5 lbs. (5.2 kg)	
Dimensions	16.3 x 9.1 x 4.3" ( 41.4 x 23 x 11 cm)	

## 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. 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.



### **Service Contact Information**

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