MATSON

DC TO AC
POWER INVERTER
USER MANUAL

Pure Sine Wave

MAI301P · MAI601P · MAI1001P · MAI1501P · MAI2001P · MAI3001P

SAFETY INSTRUCTIONS

1. GENERAL SAFETY PRECAUTIONS

WARNING: Before using the inverter, please read the safety and usage instructions

1.1 DO NOT expose the inverter to rain, snow, spray moisture or dust. To reduce the risk of fire, DO NOT cover or obstruct the ventilation openings, and make sure the inverter is installed in a compartment with appropriate clearance.

1.2 To avoid the risk of fire and electric shock, make sure the wiring is appropriately sized and in good condition.

1.3 This equipment contains components which can produce arcs or sparks. To prevent fire or explosion - DO NOT install in a compartment containing batteries, or any other flammable material or atmosphere.

1.4 The inverter incorporates standard AC short circuit protection BUT your application may require additional over-current circuit breaker protection or fusing. If in doubt, seek advice from a qualified electrician.

1.5 Take the following precautions when working on the inverter:
- Remove watches, rings and other metal objects
- Use tools with insulated handles
- Wear rubber gloves and rubber soled shoes

2. OTHER SAFETY NOTES

2.1 When first opening the inverter box, check the inverter for any obvious damage. If you find damage, immediately notify the place of purchase and follow their requests.

2.2 DO NOT operate near water or in excessive humidity.

2.3 DO NOT open or disassemble the inverter, this can be very dangerous and will void the warranty.

2.4 Check the DC input connections are correctly oriented to Positive and Negative, and are secure.

2.5 Be very careful not to drop any metal tool on the battery posts, this will cause a violent short circuit which can cause sparks, fire, explosion or injury.

2.6 Install the inverter in a well ventilated area. DO NOT block front or rear air vents of the inverter.

2.7 Make sure adequate DC input power is supplied to the inverter using appropriately sized cable.

2.8 If possible, mount the inverter horizontally to prevent debris falling in ventilation holes.

2.9 DO NOT operate the inverter close to combustible gas or fire.

2.10 DO NOT operate appliances that may feed power back into the inverter

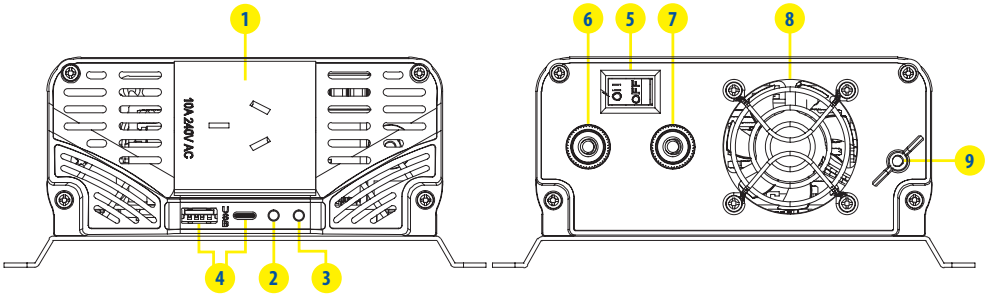
2.11 Operating the inverter outside the temp range of -15C to 35C will reduce the output efficiency.

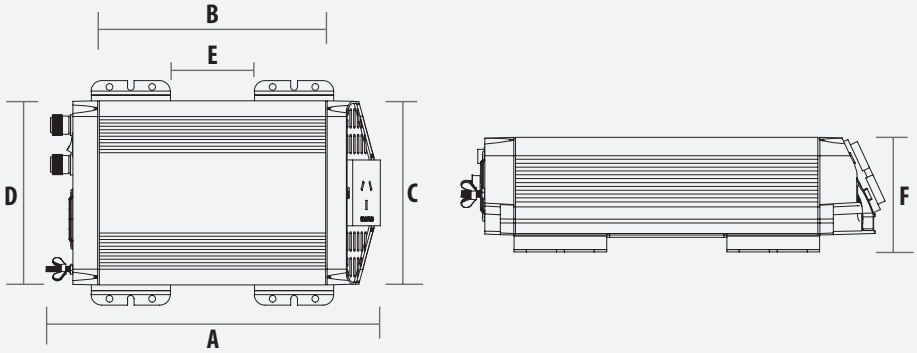
2.12 To extend the lifespan of the inverter, it is recommended to keep the load usage under 85% of the rated output level.

MECHANICAL DRAWINGS

300W, 600W

1. AC socket
2. Power (green)
3. Fault (red)
4. USB port / type-c port
5. On/Off switch
6. DC input " + " (red)
7. DC input " - " (black)
8. Fan
9. Ground



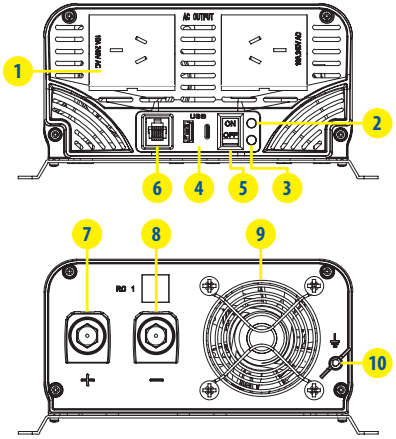


MODEL	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
300W	254	172	170.5	140	82	74.2
600W	287	205	170.5	140	95	74.2

MECHANICAL DRAWINGS

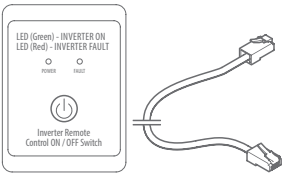
1000W, 1500W, 2000W, 3000W

1. AC socket
2. Power (green)
3. Fault (red)
4. USB port / type-c port
5. On/Off switch
6. Remote Port
7. DC input " + " (red)
8. DC input " - " (black)
9. Fan
10. Ground



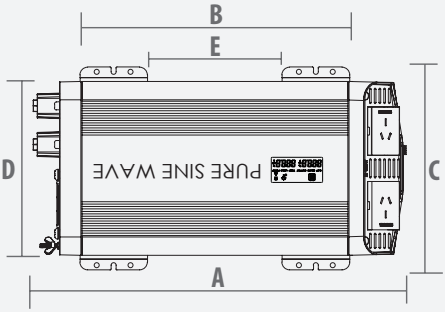
OPTIONAL REMOTE

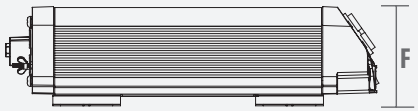
Part No. MAI399R



Status instruction for LED light of Remote Control Panel

Function	LED light	
	Red	Green
Input under voltage alarm	OFF	ON
Input under voltage shut down	ON	ON
Input over voltage shut down	ON	ON
Over load shut down	ON	ON
Over temperature shut down	ON	ON
Output short - circuit	ON	ON





MODEL	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F(mm)
1000W	385.8	275	209.8	180	145	102.1
1500W	385.8	275	209.8	180	145	102.1
2000W	406	290	250	222	130	102.1
3000W	489	370	250	222	210	102.1

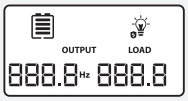
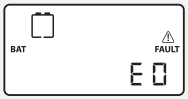
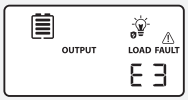
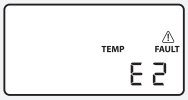
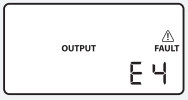
Remote Control Usage: Make sure the switch on the inverter housing is in the "OFF" position to allow the remote switch to function correctly.

DISPLAY SCREEN INFORMATION

The integral display automatically cycles through the following information when the inverter is switched on:

- **Input Voltage (DC):** The voltage of the battery supplying power to the inverter
- **Output Voltage (AC):** The voltage being produced by the inverter
- **Output Frequency (Hz):** The frequency of the AC voltage produced by the inverter
- **Load (Watts):** The power being consumed by the appliance in Watts

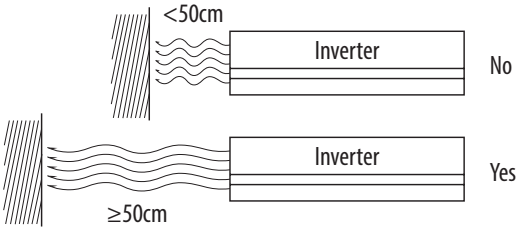
FAULT CONDITIONS AND REMEDIES

Condition	LCD Display	Green LED	Red LED	Alarm	AC Output	Remedy
Low input voltage alarm		ON	OFF	Continuous	Yes	Stop using, recharge the battery or replace with charged battery
Low input voltage shut-down		ON	ON	Beeping	No	Stop using, recharge the battery or replace with charged battery
High input voltage shut-down		ON	ON	Beeping	No	Stop using, check the battery is not damaged, or replace with a correct voltage battery
Output overload shut-down		ON	ON	Beeping	No	The appliance draws too much power, or there are too many appliances. Reduce the ouput load and reset by manually restarting the inverter, or wait 4-6 mins for auto restart
High temp Shut-down		ON	ON	Beeping	No	Stop using, wait for the inverter to cool before restarting
Ouput short circuit		ON	ON	Beeping	No	Stop using, check the connections, cables, and the appliance. Restart after troubleshooting

1. INSTALLATION

1. Choose an area to install the inverter that:

   - Has adequate ventilation. Ideally there should be 50cm or more of clear space behind the exhaust vents to effectively dissipate heat from the unit. If the inverter is hot, its output capacity will be reduced.



   - Is protected from dust, debris, water and moisture.
   - IS NOT in the same enclosure as the batteries.

2. Mount the inverter using 4mm screws appropriate for the surface the inverter will be on. Orient the inverter so that objects cannot fall into the ventilation holes.
3. Check the inverter ON/OFF switch is in the OFF position.
4. Choose the correct cable size, then measure, cut and terminate the required length, if it is different from the cable supplied. Use this table for guidance on sizing:

Model	Ouput (MAX AC Watts)	Ouput (Cont. AC Watts)	Load (Max Cont. DC Amps)	Cable Gauge	Nominal Area
MAI301P	600	300	25	8 B&S	10mm^2
MAI601P	1200	600	50	6 B&S	15mm^2
MAI1001P	2000	1000	83	4 B&S	20mm^2
MAI1501P	3000	1500	125	3 B&S	25mm^2
MAI2001P	4000	2000	166	2 B&S	35mm^2
MAI30001P	6000	3000	250	1B&S	50mm^2
IF IN DOUBT - USE A LARGER SIZE!!!					

5. Connect the Red, Positive (+) cable to the Red DC Input point on rear of the inverter and the Black, Negative DC cable to the Black DC Input point on the rear of the inverter. Check these connections are tight.
6. Then connect the Red, Positive (+) and Black, Negative DC cables to the corresponding Positive and Negative terminals on the battery or other 12V DC power source. Check these connections are correct and tight.
7. After checking the connections are the correct polarity, make sure all appliances are disconnected, then turn on the inverter to verify it is operational.

2. OPERATION INSTRUCTIONS

1) Check the Inverter is switched "OFF"
2) Check the equipment to be powered by the inverter is in safe working condition.
3) Make sure the inverter is correct for the application. For example, if the appliance requires 650Watt, the inverter must be able to produce this amount of continuous power. In this example, a 1000W inverter would be required. To check the electrical requirement of the appliance, check the compliance plate or sticker. If unknown, consult the manufacturer.
4) Check the appliance is turned OFF.
5) Connect the appliance to the inverter. If connecting multiple appliances, start with the largest electrical load first.
6) Turn on the inverter.
7) Turn on the appliance. If running multiple appliances, turn the largest load on first. Once it is running normally, turn on the next appliance. Continue this way for remaining appliances.

VOLTAGE AND TEMPERATURE PERFORMANCE

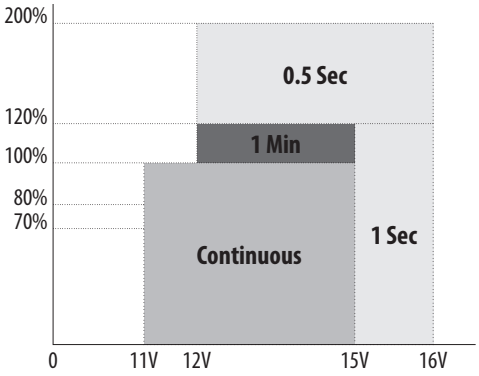


Figure 1 : Output power vs,input voltage

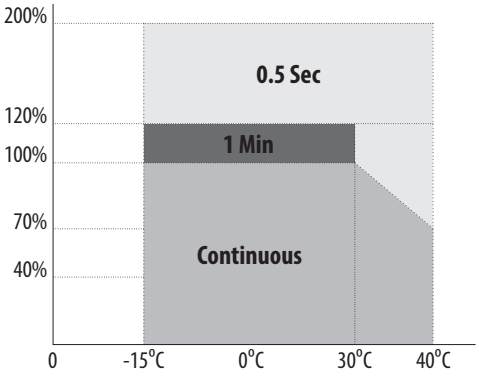


Figure 2 : Output power vs,temperature

ELECTRICAL SPECIFICATION

Model		300W	600W	1000W	1500W	2000W	3000W
Input	Rated input voltage	DC 13V (@12V Inverter)					
	Operating voltage range	DC 11V - 15V (@12V Inverter)					
Output	No load output voltage	AC 230V +/- 10V (@ Rated input voltage)					
	Load output voltage	AC 210V ~ AC 240V (@ Rated input voltage)					
	Output frequency	50Hz +/- 1Hz					
	USB Output	1 x USB2.0 (5V 2.1A) & 1 x USB-C (5/9/12V 18W)					
	Continuous Power	300W	600W	1000W	1500W	2000W	3000W
	Peak Power	600W	1200W	2000W	3000W	4000W	6000W
	Output Wave	Pure sine wave					
Max Efficiency		≥85%					
No load current	12V Input	≤ 0.8A	≤ 1.0A	≤ 1.1A	≤1.3A	≤1.6A	≤2.0A
Low Voltage	Input Low-Voltage Alarm	DC 10.5V +/-0.3V (@12V Inverter)					
	Input Low-Voltage Shut Down	DC 9.5V +/-0.3V (@12V Inverter)					
	Low Voltage Recovery Voltage	12V Inverter : When the input voltage rises to 12V +/-0.3V, the inverter will automatically resume operation					
Over Voltage	Input Over Voltage Shut Down	DC 16V +/-0.3V (@12V Inverter)					
	Over-voltage Recovery Voltage	12V Inverter: When the input voltage drops to 14V+/-0.3V, the inverter will automatically resume operation					
Overload	Overload protection	Yes (350-400W)	Yes (650-750W)	Yes (1100-1250W)	Yes (1550-1800W)	Yes (2150-2300W)	Yes (3150-3400W)
	Overload Recovery	Reduce the load in the rated power range					
		Restart or wait 6-7 minutes for the inverter to recover automatically					
Over Temp	Over Temperature protection	Yes					
	Over Temperature Recovery	When the temperature inside the inverter decreases to the set point, the inverter will restart automatically					
Short Circuit	Output Short Circuit Protection	Yes					
	Short Circuit Recovery	After troubleshooting, re-start the inverter by switching Off, then back On					
Reverse Polarity Protection		Reverse polarity connection will blow the internal fuses, and potentially damage the inverter. Replacement must be performed by Tridon Australia or a qualified electrician					
Other	Operating Temperature	- 15°C ~ 35°C (output reduced over 35°C)					
	Fuse (@12V Inverter)	40A*1	35A*2	35A*4	40A*4	35A*7	35A*10
	Cooling Method	By Fan					
	LCD Display Information	No	Yes				
	Remote Control	No		Optional, RJ12 port, 6m cable			

MAINTENANCE

- Make sure that the fan vents are not blocked
- Vacuum any dust away from vents as required
- When cleaning, use a soft dry cloth. If case or front panel is dirty, use a neutral, non-abrasive detergent. Do not use alcohol or ammonia based solutions.
- Check DC input connections are secure
- Check mounting screws are secure
- Clean surrounding environment of dust or moisture if required

WARNING! Do not open or disassemble the inverter! Attempting to do so may damage the inverter, void your warranty, or even result in electric shock or fire. If you think there is a problem with the inverter, contact the place of purchase, or Tridon Australia.

GENERAL INFORMATION

DETERMINING AC POWER LOAD

When a motorized appliance or a tool turns on, there is an initial surge of power to start. This surge of power is referred to as the "starting load" or "peak load." Once started, the tool or appliance requires less power to operate. This is referred to as the "continuous load" in terms of power requirements. You will need to determine how much power your tool or appliance requires to start up (starting load) and its continued running power requirements (continuous load).

Power consumption is rated in watts, or it can be calculated from amperes (amps). This information is usually stamped or printed on most appliances and equipment. If this information is not indicated on the appliance or equipment, check the owner's manual. For electrically sensitive equipment, contact the manufacturer to determine if the device you are using is compatible with PURE sine wave AC Inverters.

Multiply: **AC AMPS X 230** (AC voltage) = **WATTS**

This formula yields a close approximation of the continuous load of your appliance.

Multiply: **WATTS X 2** = Starting Load for most appliances

This formula yields a close approximation of the starting load of most appliances. Exceptions are motorized appliances such as pumps, freezers and air conditioners. These appliances can have start-up loads of up to eight times the rated watts.

DETERMINING DC POWER REQUIREMENTS

Powering appliances from an inverter requires a 12 volt power supply, usually a battery or bank of batteries (several batteries). To calculate the approximate power in amps a 12 volt battery bank has to supply you need to know the current, or amps required for powering the continuous AC load. A shortcut method for estimating is to divide the continuous AC load wattage by the battery voltage (in this case 12V). For example, the continuous AC load is 1200 watts. The current (amps) is: 1200/12 or 100 amps at 12V DC.

SIZING THE BATTERY BANK

To determine the minimum battery bank ampere-hour rating that you will need to operate appliances from the inverter, and any DC appliances powered by the battery bank, follow these steps:

1. List the maximum wattage that the inverter has to provide (as above).
2. Estimate the number of hours the appliances will be in use between battery recharges. This will differ depending on appliances. As an example, a typical camping fridge draws 60 watts when cooling, then about 12 watts maintaining the temperature of the fridge once cool. Typical use of a microwave is only for a few minutes, but can draw up to 1500 watts. Some longer operating time appliances are lamps, TVs etc.
3. Determine the total watt-hours of energy needed - multiply the average power consumption in watts by the number of hours of run time. For example: 1200 watts for 10 hours = 12,000 watt hours. Divide the watt hours by the battery voltage to get the required amp hour capacity – 12,000wh/12V = 1000Ah. Therefore, to power a 1200 watt appliance continuously for 10 hours, a 1000Ah (amp hour) battery bank would be required. This could be achieved by connecting 10 x 100Ah 12V batteries together in parallel.

This example is extreme, a battery bank that size of regular deep cycle batteries would weigh about 200kg, but it is important to note that battery capacity requirements are frequently underestimated. Some battery types can only be discharged to 50% of their capacity, meaning that you would need to double the amount of batteries again.

There are other conditions that determine actual run time. These include:

- Cable gauge and length (cable resistance losses)
- Charge level of the batteries (between use, chargers have to be able to fully charge the batteries)
- Temperature of the batteries (colder batteries provide fewer amps)
- Age and condition of the batteries (older batteries lose capacity/amp hours)
- Compliance with turning off unnecessary AC and DC loads.

If there is any doubt about sizing the battery bank, it is safer to overestimate the amp hour requirements of the battery bank. Consult a battery expert for advice.

Note: The type of batteries you use to power your inverter is important. Operating an inverter will routinely discharge batteries and they will require frequent recharging. Batteries used to start engines are not designed to repeatedly deeply charge and discharge. MATSON® recommends using "deep-cycle" or "marine" rated batteries.

WARRANTY

Products developed and sold by Tridon Australia Pty Ltd come with a guarantee for the reasonable life of the product, for the purpose it is commonly used. This is in addition to the rights of the consumer under the Australian Consumer Law. To be considered for warranty please take the product with proof of purchase to the store where you purchased the product or contact Tridon Australia

The warranty is given by: Tridon Australia, 21-25 Derby St, Silverwater, NSW 2128.
Tel: 1300 362 263.
Email: mail@tridon.com.au

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage incurred if the product fails when used for the purpose for which it was intended. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Tridon Australia will bear costs associated with claiming legitimate warranties. Proof of expenses incurred must be submitted to Tridon Australia Pty Ltd.