

MARINCO®

USER'S MANUAL

12/2000-120V / 12/2000-230V
24/2000-120V / 24/2000-230V


Pure sine wave inverter





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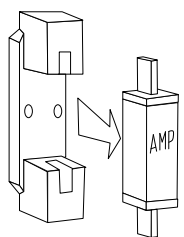
1  This section provides a brief overview of a basic stand alone installation of the Inverter

However; please review the entire manual for connection of additional features and to ensure best performance and years of trouble-free operation.

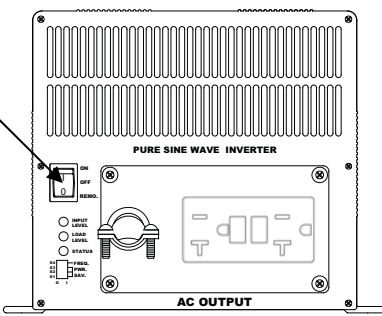
  Use isolated tools!
Read safety instructions (page 3)

2 Disconnect the electrical power:

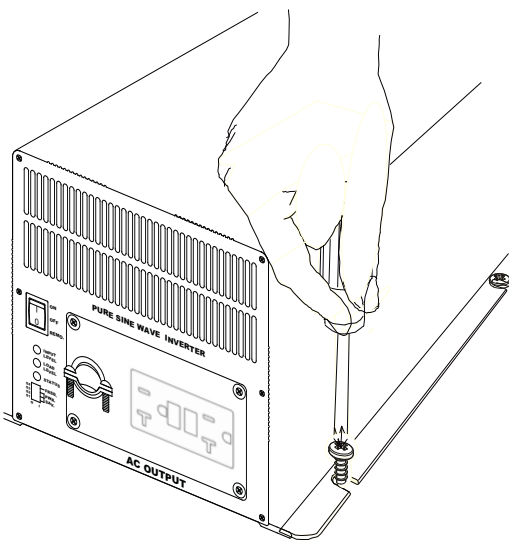
- Switch off all consumers,
- Switch off all charging systems.
- Remove the battery fuse.
- Check with a suitable voltmeter whether the DC installation is voltage free.



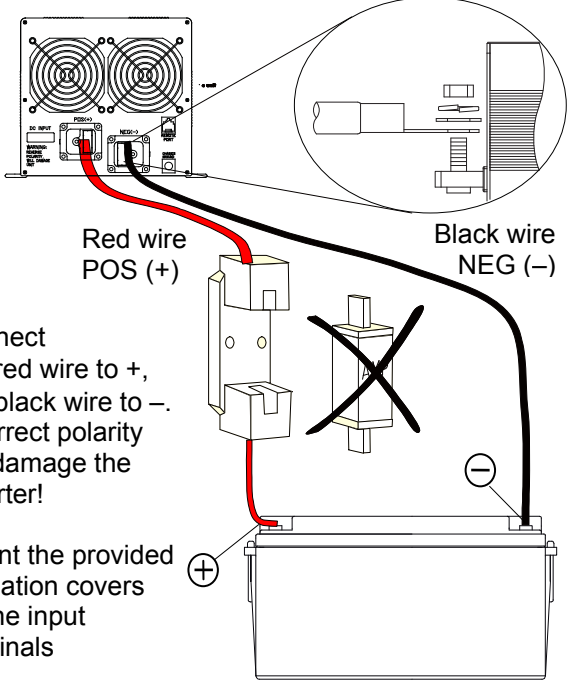
3 Move the main switch of the Inverter to the OFF position



4 Mount the Inverter with four screws to a solid surface. Allow at least 10 cm / 4 inch space around the apparatus!



5 Connect the battery to the DC input. Integrate a fuse holder in the positive battery wire, but do not place the fuse yet.



Red wire POS (+) Black wire NEG (-)

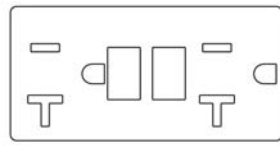
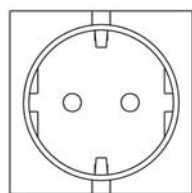
Connect

- red wire to +,
- black wire to -.

Incorrect polarity will damage the Inverter!

Mount the provided insulation covers on the input terminals

6 Connect the AC load to the AC socket.

120V:  230V: 

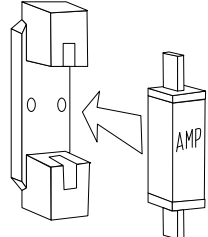
For safe installation,

- The chassis ground terminal (see Figure 1, reference 7) must be connected to the central grounding point of the vehicle/ ship
- The neutral conductor (N) of the AC output of the Inverter must be connected to the safety ground (PE/GND) and a ground fault circuit-interrupter (GFCI) must be integrated in the wiring of the AC output

Refer to section NEUTRAL GROUNDING of this user's manual

7 Check all wiring. If all wiring is OK:

- Place the inverter fuse.
- Switch on the Inverter.



PRODUCT DESCRIPTION AND APPLICATION

The Maringo inverters convert a DC voltage to a pure AC sine wave voltage.

SAFETY INSTRUCTIONS



WARNING!

Before using the Inverter, read and save the safety instructions

- Use the Inverter following the instructions and specifications stated in this manual.
- Connections and safety features must be executed according to the locally applicable regulations
- Operation of the Inverter without proper grounding may lead to hazardous situations!
- Use DC-cables with an appropriate size. Integrate a fuse in the positive wiring and place it nearby the battery. Refer to the specifications.
- If the positive and negative wires on the DC-input (battery) are exchanged, the Inverter will be damaged. Damage of this kind is not covered by guarantee. Check whether all connections are connected correctly before placing the fuse.
- Do not connect the AC-output of the inverter to an incoming AC source.
- Never connect the Inverter in parallel with any other inverter.
- Never open the housing as high voltages may be present inside!

UNPACKING

The delivery consists of the following parts:

- The inverter
- This user's manual
- Two ring terminals
- Two insulation covers with 8 screws

After unpacking, check the Inverter for possible damage. Do not use the Inverter if it is damaged. If in doubt, contact your supplier.

NEUTRAL GROUNDING

For safe installation,

- The chassis ground terminal (see Figure 2, ref. 7) must be connected to the central grounding point of the vehicle/ ship
- The neutral conductor (N) of the AC output of the Inverter must be connected to the safety ground (PE/GND) and a ground fault circuit-interrupter (GFCI) must be integrated in the wiring of the AC output. See below for model specific information.

Refer to locally applicable regulations on these issues!

120V models

With the 120V models the neutral conductor of the AC output circuit of the Inverter is internally connected to the safety ground during inverter operation automatically and a ground fault circuit-interrupter (GFCI) is already integrated in the AC output circuit of the Inverter.

230V models

With the 230V models there is no connection made inside the inverter between either the line or neutral conductor to the safety ground.

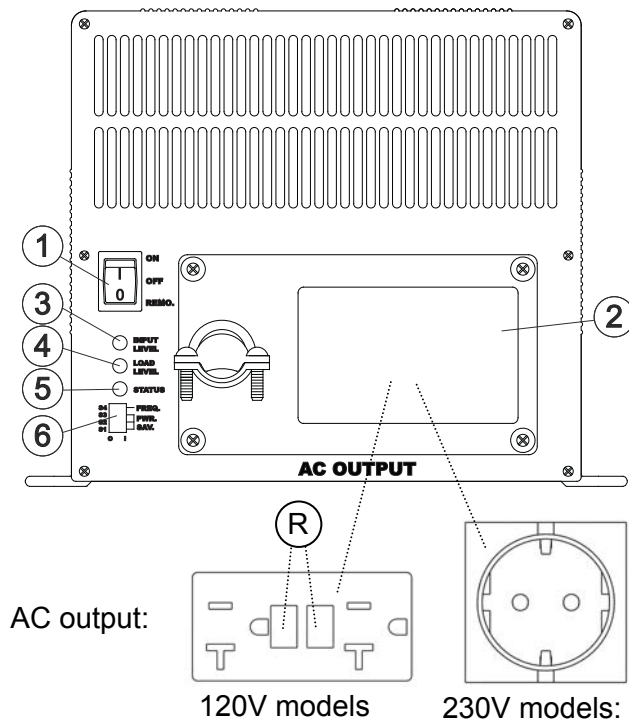


Figure 1: Front side

DIP SWITCH SETTINGS

See Figure 1, ref. 6. Under normal circumstances there is no need to change the default settings of the DIP switches: the inverter is immediately ready for use.

To save energy from the battery in no load operation, DIP switches S1, S2 and S3 can be used to adjust the Power Saving Mode. The Power Saving Mode scans the output and when it detects a load which is higher than the selected threshold value, the inverter is switched on automatically.

| Power Saving Mode | S1 | S2 | S3 |
|-------------------|----|----|----|
| DISABLE | 0 | 0 | 0 |
| 40W | 1 | 0 | 0 |
| 80W | 0 | 1 | 0 |
| 125W | 1 | 1 | 0 |
| 170W | 0 | 0 | 1 |
| 210W | 1 | 0 | 1 |
| 245W | 0 | 1 | 1 |
| 280W | 1 | 1 | 1 |

DIP switch S4 is used to select the output frequency

| Output frequency | S4 |
|------------------|----|
| 50Hz | 0 |
| 60Hz | 1 |

INSTALLATION

Choosing a location to install

- Install the Inverter in a well-ventilated room protected against rain, snow, spray, vapour, bilge, moisture and dust.
- Ambient temperature: -25 ... 40°C / -13...104°F;
- Never use the Inverter at a location where there is danger of gas or dust explosions
- Mount the Inverter in such a way that obstruction of the airflow through the ventilation openings is prevented. No objects must be located within a distance of 10 cm / 4 inch around the Inverter.
- Do not install the Inverter in the same compartment as the batteries. Do not mount the Inverter straight above the batteries because of possible corrosive sulphur fumes.

Before you start

- Be sure that the output of the supplying source (battery) is switched off during installation. Also be sure that no consumers are connected to the battery during installation, to prevent hazardous situations.
- Before installing the Inverter make sure the main switch (figure 1, ref. 1) is set to the OFF position.
- Check that the battery voltage is the same as the input voltage of the Inverter (e.g. 24V battery for a

24V input voltage). Also check that the output voltage satisfies loading requirements.

- A DC fuse holder must be integrated in the positive wiring. The DC fuse should be placed last of all.
- Use four Ø4.5mm (No. 8) screws to mount the Inverter to a solid surface. See figure 3.

Wiring

- Connect DC wiring as shown in figure 2: the black terminal (9) NEG (-) to the negative (-) pole of the power source / battery, the red terminal (8) POS (+) to the positive (+) pole of the power source/ battery. Integrate a DC fuse holder in the positive wiring, but do not place the fuse yet. Assemble the DC wiring exactly as indicated. Do not place anything between the ring terminal and the terminal surface. Make sure that all DC connections are tight. Recommended torque: 11.7-13 Nm / 104-115 InLbs.
- Chassis ground: Use a cable AWG8 / 6 mm² to connect the CHASSIS GROUND terminal (7) to the central ground.
- Remote operation switch (option). If you want to operate the Inverter on a remote location, you can install a switch as indicated in Figure 2. When the contact is closed, the Inverter is switched on.

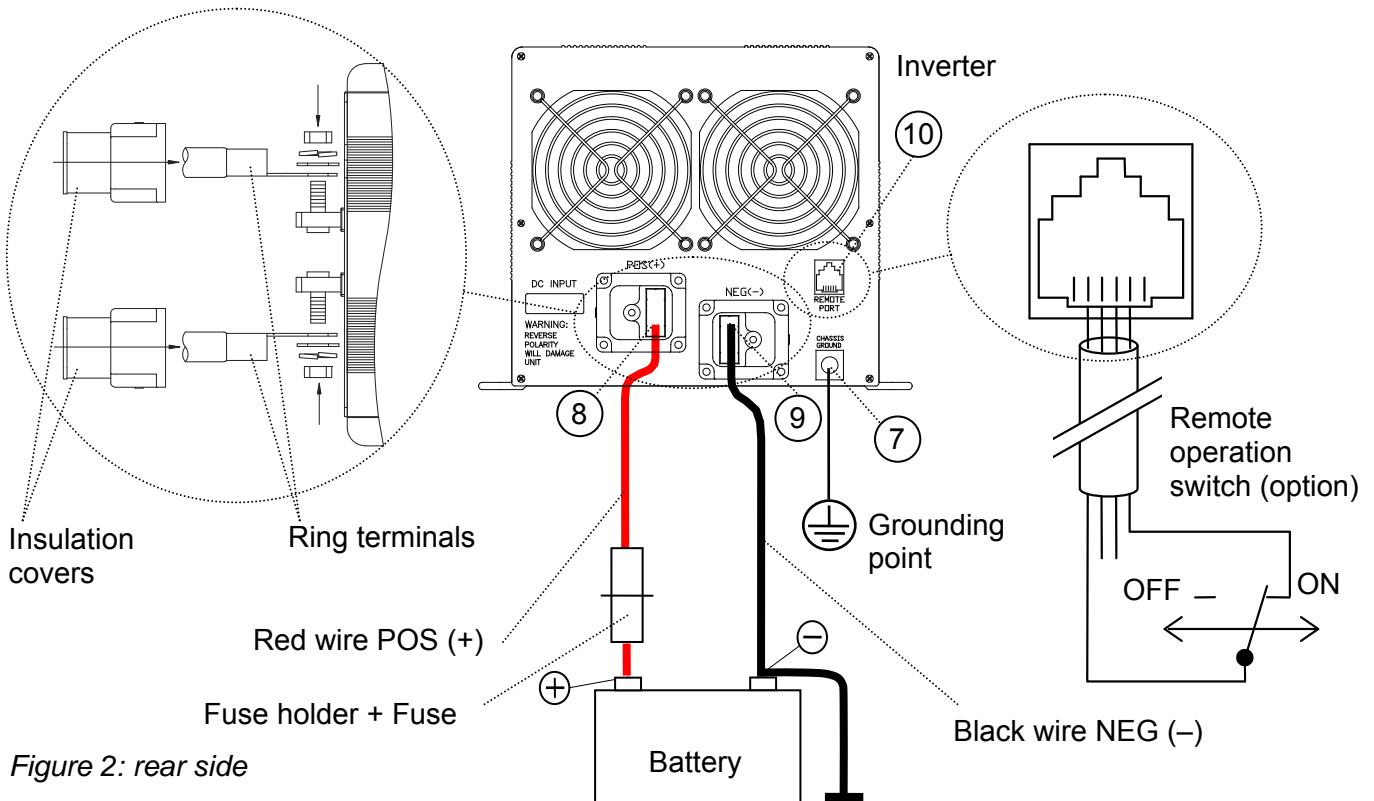


Figure 2: rear side

COMMISSIONING AFTER INSTALLATION

1. Check the polarity of the DC-connections. Do not place the DC fuse if the polarity is not correct.
2. Place a DC-fuse (see SPECIFICATIONS) in the fuse holder. When placing this fuse, a spark may occur, caused by internal capacitors of the Inverter. This is normal.
3. AC voltage: the load can be plugged into the AC-output (Figure 1, ref. 2) directly.

OPERATION

Switching on:

Move the main switch (Figure 1, ref. 1) to "ON". The Inverter will start a self-test indicated by two beeps from the buzzer and flashing LED indicators. This may last for approximate two seconds. Finally the buzzer will produce another beep and the Inverter will switch on, indicated by two green LED indicators.. Now the Inverter is ready to supply load connected to the AC-output.

Switching off:

Move the main switch (Figure 1, ref. 1) to the "OFF" position. Note that switching off the Inverter does not break the connection to the batteries!

Remote operation:

The Inverter can be operated on a remote location by means of an optional remote switch. Move the main switch (Figure 1, ref. 1) to the "REMOTE" position. When the remote contact is closed, the Inverter is switched on.

GFCI (120V models only):

In case of a ground fault, the Ground-Fault Circuit Interrupter (GFCI) trips and cuts off the AC output. To switch on the AC output again, push the reset button (Figure 1, ref. R)

LED indicators

See Figure 1. The operation of the inverter is made visible by means of LED indicators (3), (4) and (5).

"INPUT LEVEL" (ref. 3) displays the input voltage of the inverter:

| Indication of the LED | Input voltage (V) | |
|-----------------------|-------------------|------------|
| | 12V models | 24V models |
| RED blinking slow | 10.3~10.6 | 20.5~21.2 |
| RED | 10.6~11.0 | 21.2~21.8 |
| ORANGE | 11.0~12.1 | 21.8~24.1 |
| GREEN | 12.1~14.2 | 24.1~28.6 |
| ORANGE blinking | 14.2~15.0 | 28.6~30.0 |
| RED blinking fast | > 15.0 | > 30.0 |

"LOAD LEVEL" (ref. 4) shows the output load level:

| LED indication | Power level (W) |
|----------------|-----------------|
| none (LED off) | 0~160 W |
| GREEN | 160~660 W |
| ORANGE | 660~1500 W |
| RED | 1500~1920 W |
| RED blinking | >1920 W |

"STATUS" (ref. 5) shows the operation mode of the inverter. As long this LED isn't illuminated red, no failure is detected: the inverter is operating normally. If an error occurs, it is detected by the apparatus itself: the "STATUS" LED turns red.

| Indication of the LED | Meaning |
|------------------------------|--|
| GREEN, uninterrupted | Power OK |
| GREEN, slow blinking | Power saving mode, see DIP SWITCH SETTINGS |
| RED, fast blinking | DC-input voltage too high |
| RED, slow blinking | DC-input voltage too low |
| RED, intermittently blinking | Internal temperature too high |
| RED, uninterrupted | Overload / short circuit |

Maintenance

No specific maintenance is required. If necessary, use a soft clean cloth to clean the Inverter. Never use any liquids, acids and/or scourers. Check the wiring on a regular base. Defects such as loose connections, burnt wiring etc. must be corrected immediately.

DECOMMISSIONING

Proceed as follows for decommissioning of the inverter:

1. Move the main switch (ref. 1) to the OFF position.
2. Remove the DC fuse. Be sure that others can not reverse this action taken.
3. Now the inverter can be demounted in a safe way.

TROUBLE SHOOTING

Consult an installer, if you cannot solve the problem by means of the table below.

| Problem | Possible cause | What to do? |
|--|--|---|
| No output voltage, all LED indicators are off | Main switch (ref 1) is set to the OFF position | Set the main switch (ref 1) in ON position |
| | Main switch (ref 1) is set to REMOTE but no remote present | Set the main switch (ref 1) in ON position |
| | The remote switch is off (if applied) | Close the remote operation switch |
| | DC fuse blown | Replace the fuse |
| No output voltage, STATUS LED (ref 5) is slowly blinking green. | Inverter is in power saving mode | Increase the load or adjust the power setting mode; See DIP SWITCH SETTINGS |
| No output voltage, STATUS LED (ref 5) is fast blinking red. | DC input voltage too high | Check battery voltage; switch off charger. The inverter will switch on again when the input voltage is <14.3 / <28.6V |
| No output voltage, STATUS LED is slowly blinking red. | DC input voltage too low (flat battery) | Charge the battery. The inverter will switch on again when the input voltage is >12.7V / >25.2V |
| No output voltage, STATUS LED is intermittently blinking red. | AC Output is overloaded | Reduce the load and let the inverter cool down. The inverter will switch on again when the internal temperature is < 45°C / 113°F |
| | Airflow insufficient | Check the airflow through the inverter. The operation of the cooling fan may not be blocked. |
| No output voltage, STATUS LED is uninterruptedly lit red. | AC output overloaded or short circuit. | Reduce the load and/or check the AC wiring for possible short circuits. Then reset the inverter manually by switching the main switch (ref. 1) off and on again |
| No output voltage, STATUS LED is uninterruptedly lit green | (120V models only:) internal GFCI tripped | Press the reset button of the GCFI (Figure 1, ref. R) |
| Inverter switches on and off. STATUS LED is slowly blinking red. | DC input voltage too low because of voltage drop across the DC cables due to too long or too narrow cables | Reduce the length of the DC cables or use cables with a larger gauge. |
| | Flat battery | Disconnect the load and recharge the battery |
| | Loose or corroded connections | Tighten the connections; burnt cables must be corrected immediately. |
| Some loads like televisions and clocks do not operate correctly | Wrong setting of output frequency | Check the specified input frequency of the load with the output frequency of the Inverter. If necessary, adjust the output frequency. See DIP SWITCH SETTINGS. |

GUARANTEE TERMS

Marinco guarantees that this product was built according to the legally applicable standards and stipulations. During production and before delivery all products are exhaustively tested and controlled. If you fail to act in accordance with the regulations, instructions and stipulations in this user's manual, damage can occur and/or the product will not fulfil the specifications. This may mean that the guarantee will become null and void. The guarantee is limited to the costs of repair and/or replacement of the product by Marinco only. Costs for installation labour or shipping of the defective parts are not covered by this guarantee.

For making an appeal on warranty you can directly contact your supplier, mentioning your complaint, application, date of purchase and part number / serial number.

The standard guarantee period is 2 years.

LIABILITY

Marinco cannot be held liable for:

- Possible errors in this manual and the consequences of these.
- Use that is inconsistent with the purpose of the product.

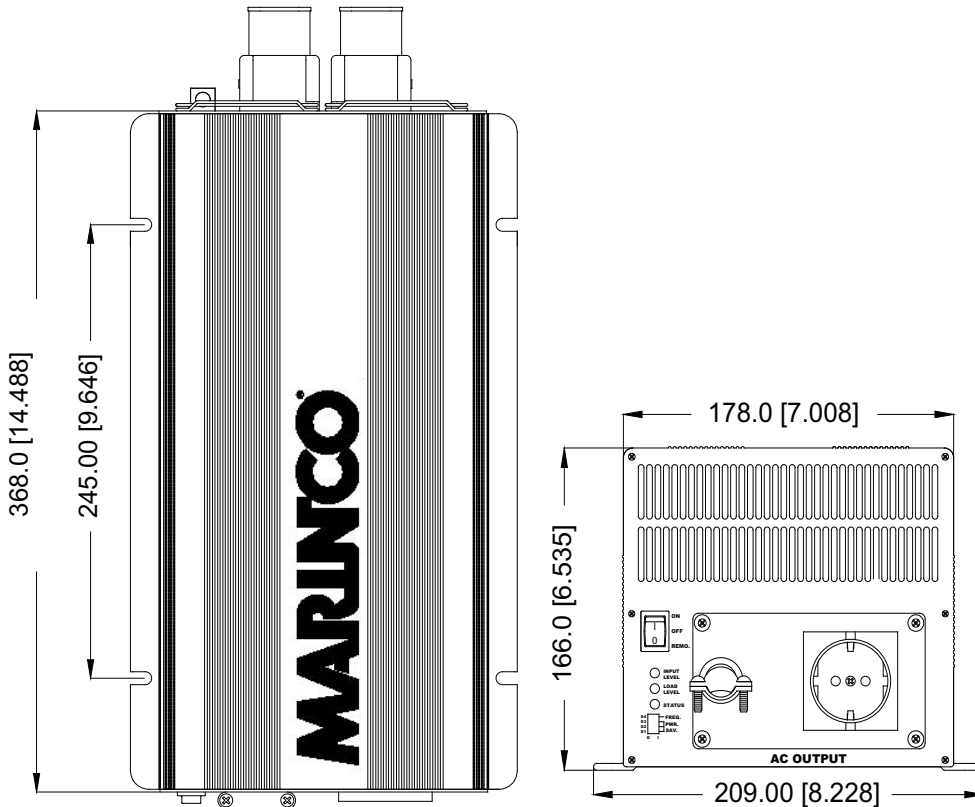
SPECIFICATIONS 2000W models

| Model Inverter | 12/2000-120V | 24/2000-120V | 12/2000-230V | 24/2000-230V |
|--|---|----------------------------|---|----------------------------|
| Part number: | INV20122000 | INV20242000 | INV10122000 | INV10242000 |
| Function of the apparatus: | Conversion of a DC voltage to a pure AC sine wave voltage | | | |
| Supplier: | Marinco | | | |
| Input voltage: | 12VDC (10.5-15.0VDC) | 24VDC (21.0-30.0VDC) | 12VDC (10.5-15.0VDC) | 24VDC (21.0-30.0VDC) |
| Nom Power $T_{amb}=40^{\circ}C, \cos\phi 1$ | 2000W | 2000W | 2000W | 2000W |
| Max. peak load | 4000W | 4000W | 4000W | 4000W |
| Output waveform | True sine wave (THD <3%) | | | |
| Maximum efficiency | 89% | 92% | 91% | 94% |
| Output voltage | 120V+/-5% | 120V+/-5% | 230V ±5% | 230V ±5% |
| Frequency (selectable) | 50/60 Hz ±0.05Hz | 50/60 Hz ±0.05Hz | 50/60 Hz ±0.05Hz | 50/60 Hz ±0.05Hz |
| AC outlet | GFCI | GFCI | Schuko | Schuko |
| Dimensions | See chapter Dimensions | | | |
| Weight: | 9.7 kg / 21.4 Lbs | 9.7 kg / 21.4 Lbs | 9.7 kg / 21.4 Lbs | 9.7 kg / 21.4 Lbs |
| Protection degree | IP21 | IP21 | IP21 | IP21 |
| Technology | HF / Switch mode | | | |
| Shut down voltage low battery | 10.2V (±0.5V) | 20.3V (±0.5V) | 10.2V (±0.5V) | 20.3V (±0.5V) |
| Restart voltage low battery | 12.7V (±0.5V) | 25.2V (±0,5) | 12.7V (±0.5V) | 25.2V (±0,5) |
| Shut down voltage high battery | 15.3V (±0.5V) | 30.6V (±0.5V) | 15.3V (±0.5V) | 30.6V (±0.5V) |
| Restart voltage high battery | 14.3V (±0.5V) | 28.8V (±0.5V) | 14.3V (±0.5V) | 28.8V (±0.5V) |
| Maximum allowed ripple on DC | 5% RMS | 5% RMS | 5% RMS | 5% RMS |
| Input current @ nominal load | 180A | 90A | 180A | 90A |
| External DC fuse required | 250A | 125A | 250A | 125A |
| Recommended battery capacity: | ≥200Ah | ≥150Ah | ≥200Ah | ≥150Ah |
| DC cable (up to 3m / 10ft) | 70mm ² - 2/0AWG | 50mm ² - 1/0AWG | 70mm ² - 2/0AWG | 50mm ² - 1/0AWG |
| No load power consumption: | | | | |
| Off mode | 0mA | 0mA | 0mA | 0mA |
| Power Saving Mode | 0.60A | 0.30A | 0.60A | 0.25A |
| ON @ Unom | 2.8A | 1.5A | 2.6A | 1.3A |
| Operating temperature specified (will meet specified tolerances) | Full specifications at ambient temperature 0 to 40°C (32 to 104°F), Derating with 5%/°C (3%/°F) at 40 to 60°C (104 to 140°F), Shutdown at over temperature, auto recover after cooling down | | | |
| Practical operating temperature (may not meet specified tolerances) | Ambient temperature -25 to 40°C (-13 to 104°F) Derating with 5%/°C (3%/°F) at 40°C to 60°C (104 to 140°F). Shutdown at over temperature, auto recover after cooling down | | | |
| Cooling: | Temperature and load regulated fan | | | |
| Non-operating temperature (storage temperature) | Ambient temperature -30°C to 70°C / -22°F to 158°F | | | |
| Relative humidity | Protected against humidity and condensing air by conformal coating on both sides of all PCB's. Max 95% relative humidity, non-condensing. | | | |
| Safety: | Meet UL458 | | EN60950-1 | |
| EMC | FCC class A | | EN55022, EN61000-3-2, EN61000-3-3, EN55024 | |
| e-mark | N/A | N/A | N/A | N/A |
| Protections: | Overload, short circuit, over / under voltage, over temperature | | | |
| Reversed polarity: | Internal fuse, reversed polarity may lead to permanent damage | | | |

ORDERING INFORMATION

| Part number | Description |
|--------------------|-----------------------------------|
| INVR-1 | Remote panel for Marinco inverter |

DIMENSIONS



EC DECLARATION OF CONFORMITY



We, Manufacturer **Marinco**
 Address **N85 W12545 Westbrook Crossing, Menomonee Falls, WI 53051, USA**

Represented in the EU by: **Mastervolt B.V.**
 Address: **Snijdersbergweg 93, 1105 AN Amsterdam, The Netherlands**

declare under our sole responsibility that products:
 INV10122000 **Marinco Inverter 12/2000-230V EU**
 INV10242000 **Marinco Inverter 24/2000-230V EU**

are in conformity with the provisions of the following EU directives:
 2004/108/EC (EMC Directive)
 2006/95/EC (Low Voltage Directive)
 2011/65/EU (RoHS Directive)

The following harmonised standards have been applied:
 Generic emission standard: **EN 55022: 2010**
 Generic Immunity standard: **EN 55024: 2010**
 Low voltage standard: **EN 60950-1:2006 + A11:2009 + A1:2010**

Amsterdam, 30 September 2013

M. Person

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