

PURE SINE WAVE

DC TO AC POWER INVERTER

60S-12A / 60S-24A
60S-12E / 60S-24E
100S-12A / 100S-24A
100S-12E / 100S-24E
150S-12A / 150S-24A
150S-12E / 150S-24E
200S-12A / 200S-24A
200S-12E / 200S-24E

Instruction manual



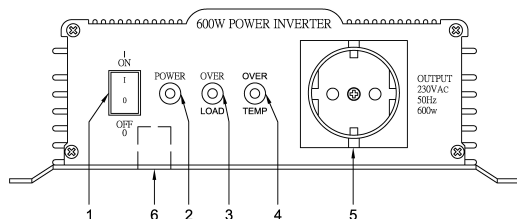
Management
System
ISO 9001:2008

www.tuv.com
ID 9105021425



1

60S-12A
60S-12E
60S-24A
60S-24E
100S-12A
100S-12E
100S-24A
100S-24E



1. Power on / off Switch
2. Green LED - Power output status
3. Red LED - Over load
4. Red LED - Over temperature
5. AC output receptacles (Europe)
6. Remote controller jack

AC Output (available Sockets)

Remote (RC-15)

Australia
New Zealand
*1



United Kingdom

*1



Universal

*1

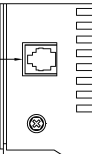


North America

*2

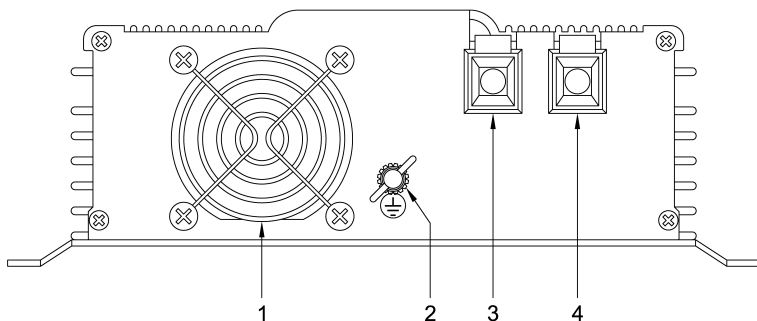


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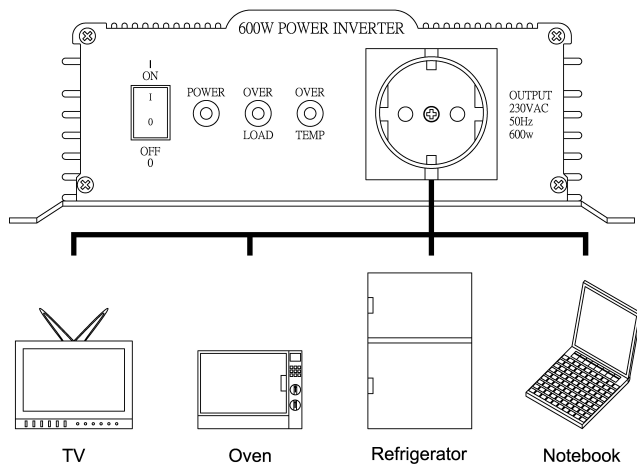
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60S-12A / 60S-12E
60S-24A / 60S-24E
100S-12A / 100S-12E
100S-24A / 100S-24E

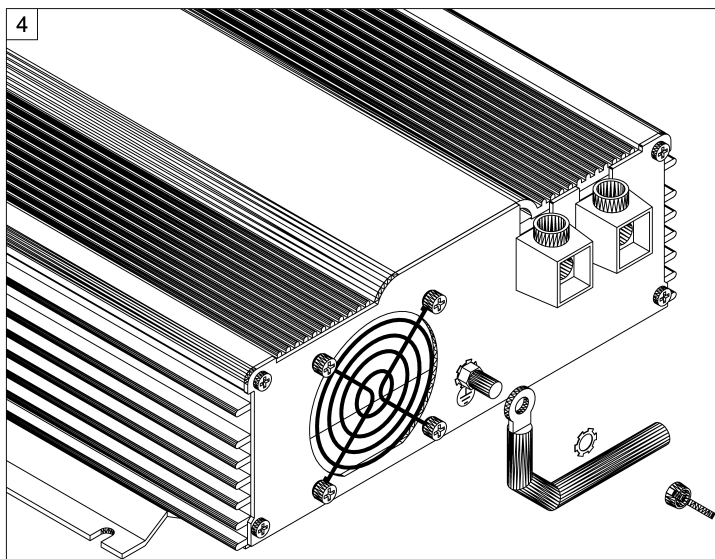


1. Cooling fan
2. Grounding lug
3. DC Input " - "
4. DC Input " + "

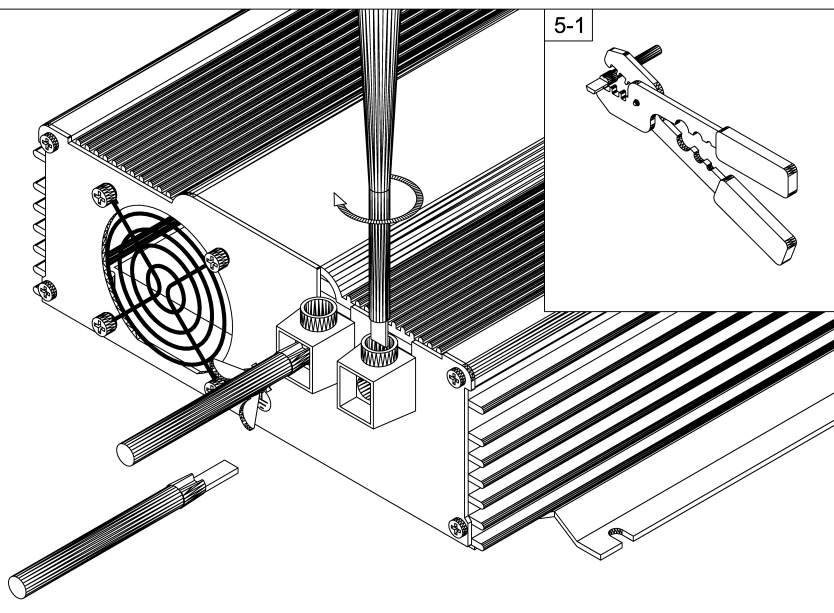
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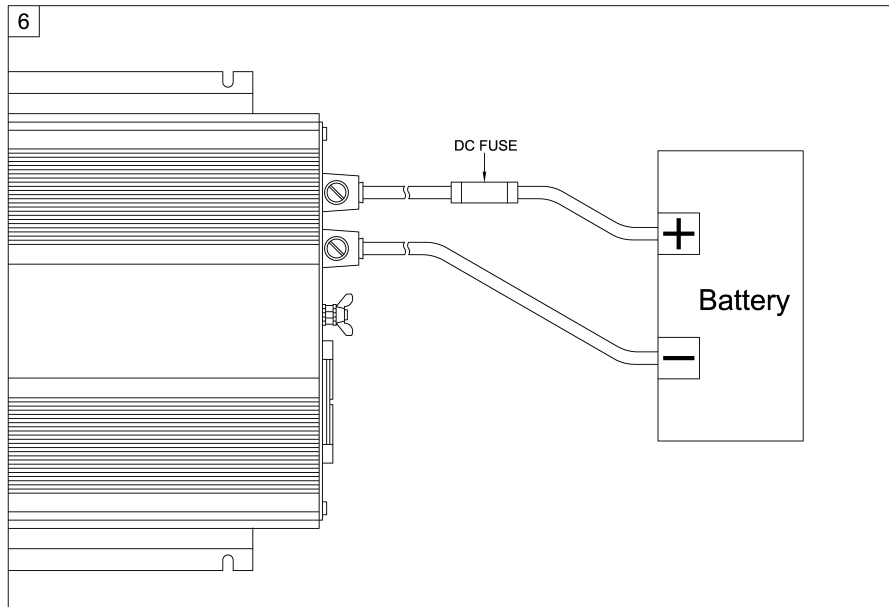
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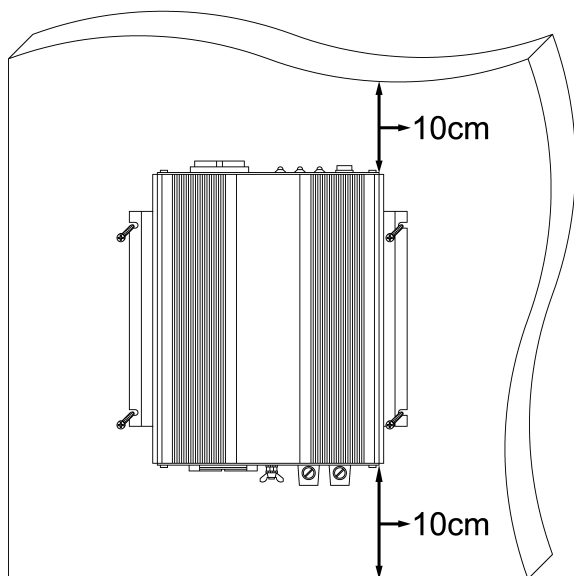
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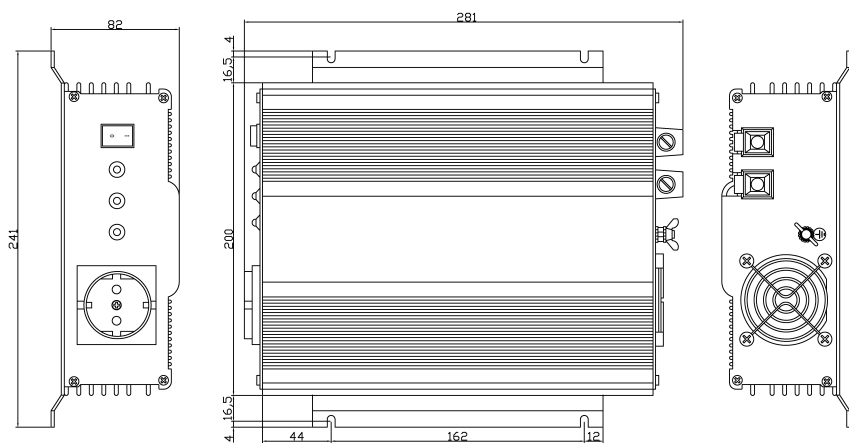


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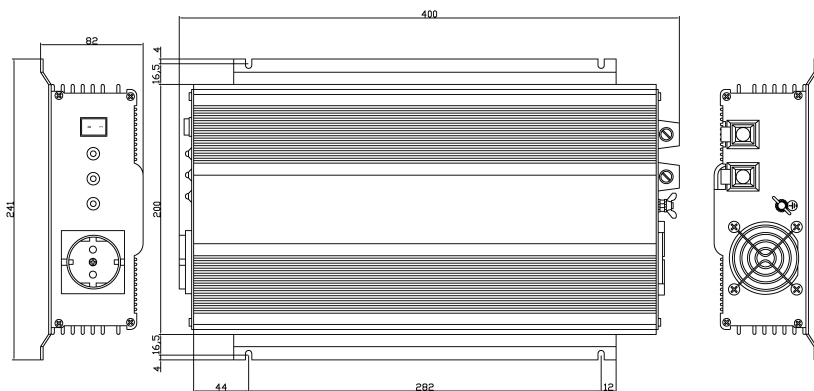
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60S-12A / 60S-12E
60S-24A / 60S-24E



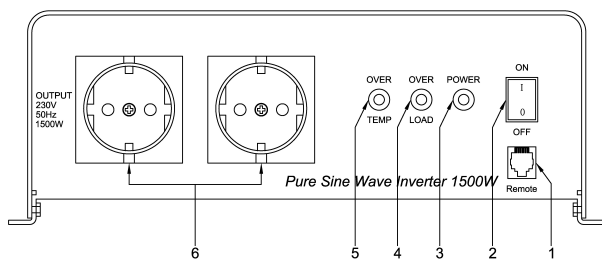
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100S-12A / 100S-12E
100S-24A / 100S-24E



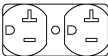
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150S-12A
150S-24A
150S-12E
150S-24E
200S-12A
200S-24A
200S-12E
200S-24E



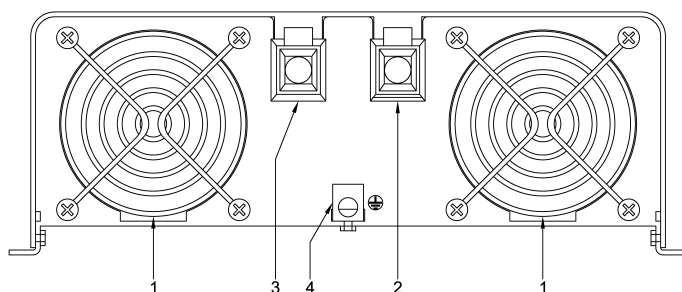
- 1.Remote controller jack
- 2.Power on / off Switch
- 3.Green LED - Power output status
- 4.Red LED - Over load
- 5.Red LED - Over temperature
- 6.AC output receptacles (Europe)

AC Output (available Sockets)

Australia New Zealand *2	United Kingdom *2	Universal *2	North America 1500W *3	North America 2000W *1
				

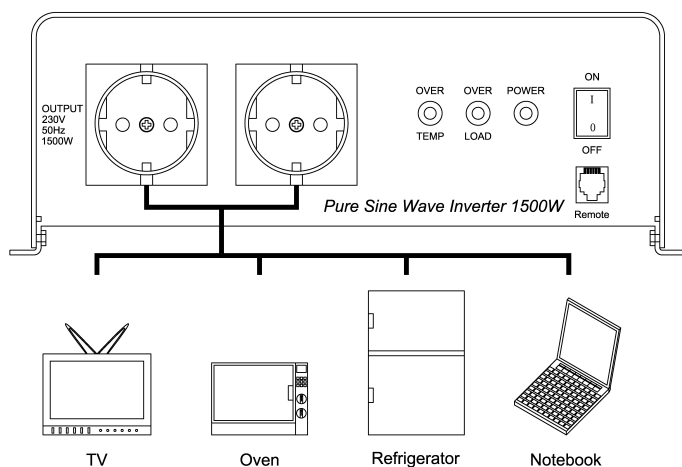
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150S-12A / 150S-24A
 150S-12E / 150S-24E
 200S-12A / 200S-24A
 200S-12E / 200S-24E



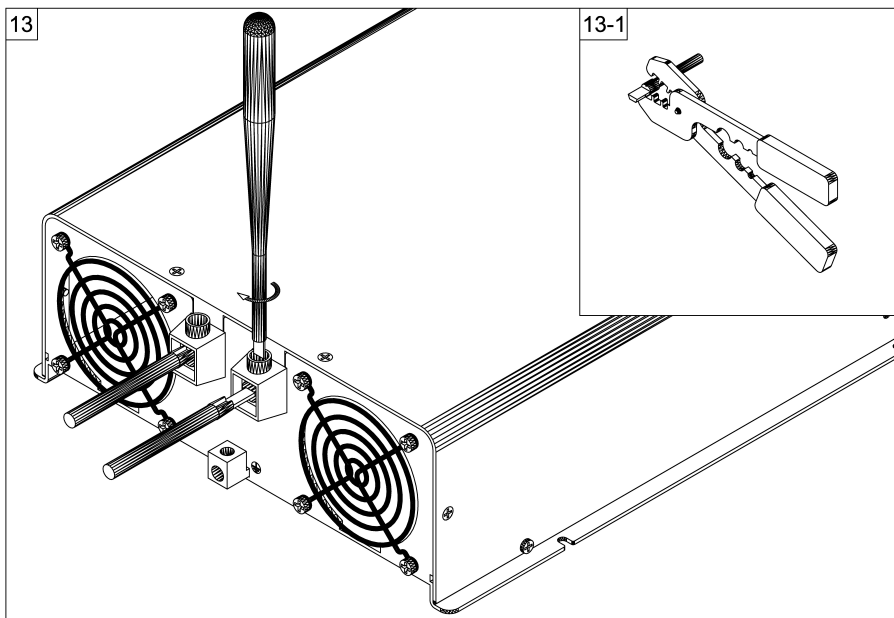
- 1. Cooling fans
- 2. DC Input " - "
- 3. DC Input " + "
- 4. Grounding lug

12

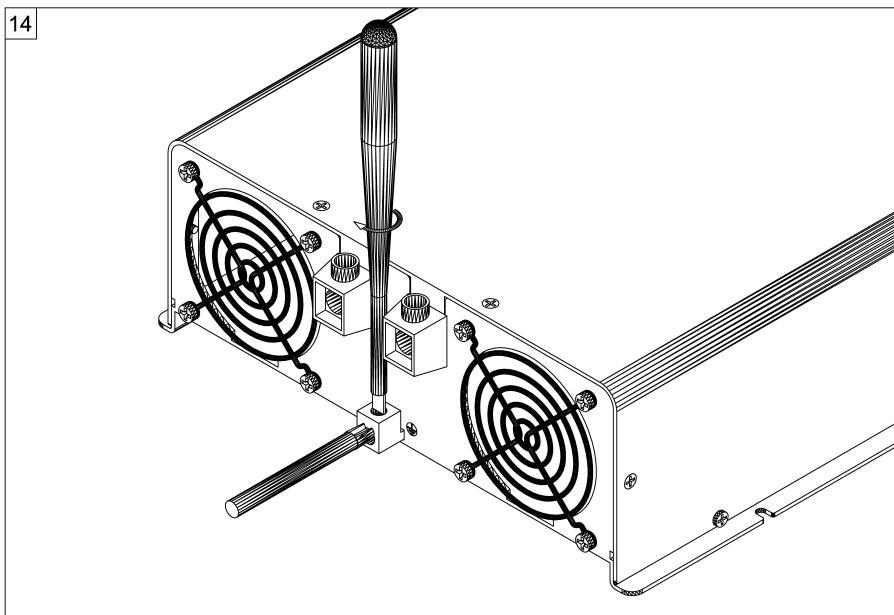


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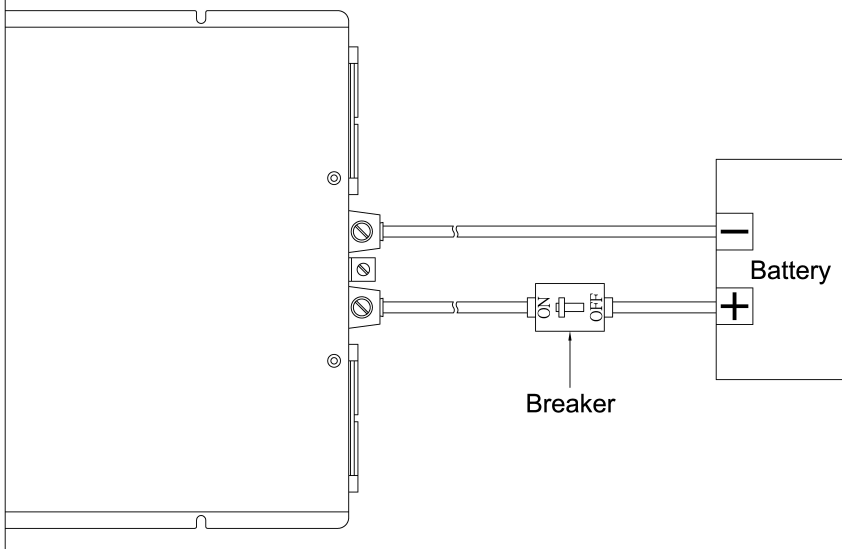
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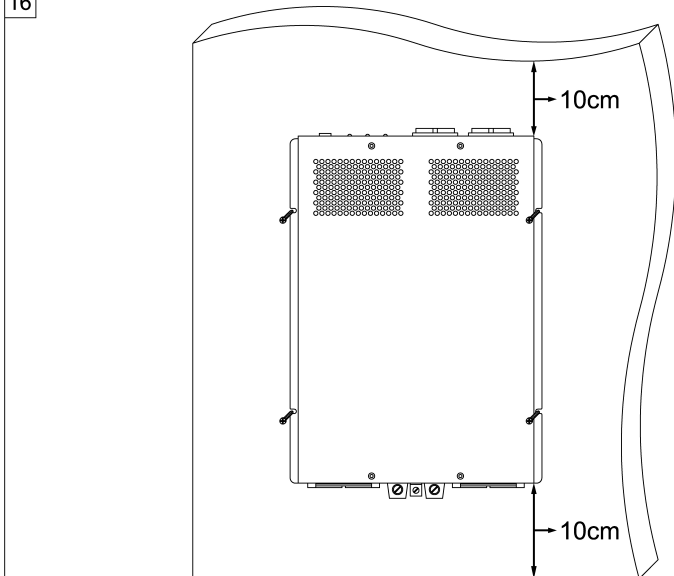
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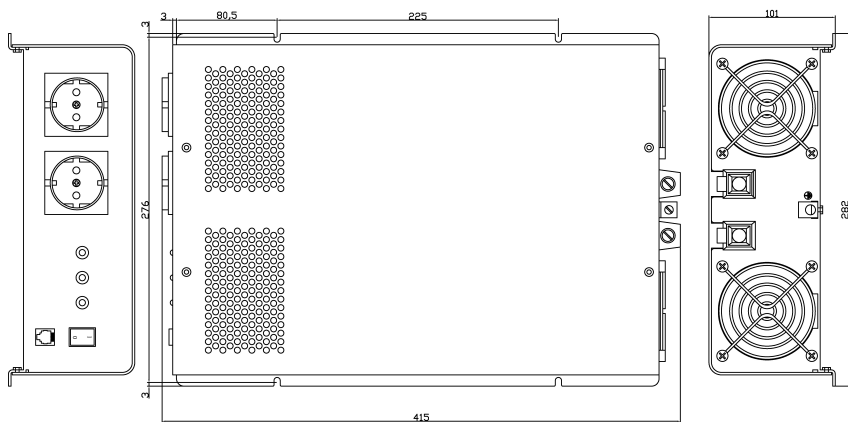


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17

150S-12A / 150S-24A
150S-12E / 150S-24E
200S-12A / 200S-24A
200S-12E / 200S-24E



Please read this manual carefully before installing and starting up and store it in a safe place. If the device is resold, this instruction manual must be handed over to the purchaser along with the device.

Contents

- 1 Notes on using the instruction manual. P11
- 2 General safety instructions P11
- 3 Scope of delivery P13
- 4 Proper use P13
- 5 Technical descriptionP14
- 6 Installing the inverter P14
- 7 Connecting the inverter P16
- 8 Using the inverter. P17
- 9 Rectifying faultsP19
- 10 Cleaning and caring for the inverter. P20
- 11 GuaranteeP20
- 12 DisposalP20
- 13 Technical dataP21

1 Notes on using the instruction manual

**Caution!**

Safety instruction, failure to observe this instruction can cause material damage and impair the function of the device.
Supplementary information for operating the device.

**Caution!**

Safety instruction relating to a danger from electrical current or voltage. Failure to observe this instruction can cause material damage and personal injury and impair the function of the device.

**Note**

Supplementary information for operating the device.

- **Action:** this symbol indicates that you need to do something.
The required action is described step-by-step.
- ✓ This symbol indicates the result of an action.

Please observe the following safety instructions.

2 General safety instructions

2.1 General safety

**Caution!**

We will not be held liable for claims for damage resulting from the following:

- Faulty assembly or connection.
- Damage to the device resulting from mechanical influences or overvoltage.
- Alterations to the device without the explicit permission from us.
- Usage for purposes other than those described in the installation manual.

- Use the device only as intended.
- Do **not** operate the device in a damp or wet environment.
- Do **not** operate the device in areas that are potentially explosive.
- Maintenance and repair work must only be carried out by qualified personnel who are familiar with the risks involved and the relevant regulations.

2.2 Safety when installing the device

- Ensure that the device has a firm foundation.
The device must be set up and fastened in such a way that it cannot tip over or fall down.
- Take the precautions necessary to ensure that children cannot interfere with operation.
Dangerous situations may occur which cannot be recognized by children!
- Do not expose the device to a heat source (such as direct sunlight or heating). Avoid additional heating to the device.

For installation on boats

- If electrical devices are incorrectly installed on boats, corrosion damage might occur. Have the inverter installed by a specialist (marine) electrician.

Electrical cables

- If cables have to be fed through metal walls or other walls with sharp edges, use ducts or wire bushings to prevent damage.
- Do not lay cables which are loose or bent next to electrically conductive material (metal).
- Do not pull on the cables.
- Do not lay the 115V/230 V mains cable and the 12/24 V DC cable in the same duct.
- Fasten the cables well.
- Lay the cables so that they cannot be tripped over or damaged.

**Caution!**

Note the following basic safety information when using electrical devices:

- Electric shock
 - Fire hazard
 - Injury
- Operate the device only if you are certain that the housing and the cables are undamaged.
 - Make sure the air inlets and outlets of the device are not covered.
 - Ensure good ventilation.
 - Do not connect the 115V/230 V output of the inverter (fig. 3, page 2 / fig. 12, page 6) to an appliance not using the source of 115V/230 V.
 - Even after the fuse triggers, parts of the inverter remain live.
 - Always disconnect the power supply when working on the device.

3 Scope of delivery

Quantity	Description
----------	-------------

1	Sine wave inverter
1	Operating Instructions

4 Proper use

The Pure Sine Wave Inverters convert 12 V (60S-12A/E, 100S-12A/E, 150S-12A/E, 200S-12A/E) or 24 V (60S-24A/E, 100S-24A/E, 150S-24A/E, 200S-24A/E) direct current to a 115V or 230V alternating current at a frequency of 50 Hz or 60Hz.

**Warning!**

Reverse polarity connection of the battery wires can damage the inverter.

5 Technical description

The inverters can be operated wherever there is a 12 V DC supply (60S-12A/E, 100S-12A/E, 150S-12A/E, 200S-12A/E) or a 24 V DC supply (60S-24A/E, 100S-24A/E, 150S-24A/E, 200S-24A/E). With its low weight and the compact design, the inverter can be easily installed into Camping mobiles, commercial vehicles or motor and sailing yachts.

The output voltage corresponds to the socket standard (pure sinus-voltage)

Please observe the values for constant output power and peak output power (for a max. of 10 min.) as indicated in section „Technical data“ on page 21. Never connect an appliance that has a higher power requirement.



Note

Note the electrical driving appliances (such as power drills or refrigerators) often need more power than is stated on the type plate.

6 Installing the inverter

6.1 Tools required

For **installation and assembly** you require the following tools:

- Pencil
- Drill bit set
- Drill
- Screwdriver

For making and testing the **electrical connection** the following tools are required:

- Crimping tool
- 3 different flexible cable connections. The required cable diameter can be taken from the table in the section „Connecting the inverter“ on page 16.
- Various terminals, multicore cable ends

For fixing the inverter you need the following mounting devices:

- Screws (M4) with spacers and self-locking nuts or sheet metal screws resp. wood screws.
- Mounting size (fig. 8, page 4/fig. 9, page 5/fig 17, page9)

6.2 Installation instructions

When selecting the installation location, observe the following instructions:

- Installing the inverter can be set horizontal or vertical.
- The Inverter has to be installed in a dry and clean place not exposed to humidity.
- Make sure that the place is well ventilated. If installed inside a housing, ensure proper ventilation. At least, keep a free space of 10 cm around the inverter. (fig. 7, page 4 / fig. 16, page 8).
- The air intake and the air outlet of the inverter should not be blocked.
- The installation surface must be level and of sufficient strength.



Caution!

Before making any drill holes, ensure that no electrical cables or other parts of the vehicle can be damaged by drilling, sawing and filing.

6.3 Installing the inverter

- Adjust the inverter to the chosen installation place and mark the fixing points.
- Fix the inverter by using the self-chosen fixing method.

7 Connecting the inverter

7.1 General instructions

- In case the inverter is installed into vehicles or boats it has to be connected to the chassis (ground).
- On building up an electricity supply network the safety regulations according to the VDE 0100 standard are to be kept.
- Observe the required cable cross section (see table).

Device	Required cable cross section
--------	------------------------------

60S-12A/E 60S-24A/E	25 – 50 mm ²
------------------------	-------------------------

100S-12A/E 100S-24A/E	35 – 50 mm ²
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150S-12A/E 150S-24A/E	50 – 70 mm ²
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200S-12A/E 200S-24A/E	50 – 85 mm ²
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7.2 Connecting the inverter

- Lay the flexible connecting cable (plus and minus) from the battery to the connecting poles of the inverter (fig. 6, page 3 / fig. 15, page 8).



Warning!

Make sure that the the connection is not polarity reversed. Reverse polarity connection will blow the internal fuses. It requires the expert to change the fuses.

- Bind the cable and the terminal firm and well together.
(fig. 5-1, page 3/fig13-1, page 7)
- Firsrt connect the negative cable to the white negative terminal.
(fig. 6, page 3 / fig. 15, page 8)
- Install a DC fuse or a breaker in the positive side of the circuit within 18

inches of the battery. Connect the positive cable to the red positive terminal.

**Warning!**

In order for the integrated residual current-operated protective device of the 60S-12A/E, 60S-24A/E, 100S-12A/E, 100S-24A/E, 150S-12A/E, 150S-24A/E, 200S-12A/E and 200S-24A/E inverters to work properly, the earth connection of the inverter (fig. 4, page 2 / fig. 14, page 7) must be electrically connected to the chassis of the vehicle or boat.

- Lay the flexible earth cable from the earthing point of the vehicle to the earthing point of the inverter.
- Connect the earth cable to the chassis terminal (fig. 4, page 2 / fig. 14, page 7).

**Warning!**

Reverse polarity connection of the battery wires can damage the inverter.

8 Using the inverter

60S-12A/E, 60S-24A/E, 100S-12A/E, 100S-24A/E:

Always connect only one consumer unit to the 115V or 230 V socket (fig. 1.5, page 1) on the front of the device.

150S-12A/E, 150S-24A/E, 200S-12A/E, 200S-24A/E:

Always connect max two consumer unit to each of the 115V or 230 V sockets (fig. 10.6, page 5) on the front of the device.

Switching on

Switching on the inverter via the ON/OFF-switch (fig. 1.1, page 1 / fig. 10.2, page 5). When switching on, the "Power" LED (fig. 1.2, page 1 / fig. 10.3, page 5) illuminates.

Malfunctions

When the battery voltage falls below 10.7 V (60S-12A/E, 100S-12A/E, 150S-12A/E, 200S-12A/E) resp. 21.4 V (60S-24A/E, 100S-24A/E,

150S-24A/E, 200S-24A/E), the OVER-LOAD“ LED (fig. 1.3, page 1 / fig. 10.4, page 5) illuminates and an audible signal is given. The inverter shuts down automatically in case of a battery voltage down to 10 V resp. 20 V. If the device overheats, the inverter shuts down – the “OVER TEMP” LED (fig. 1.4, page 1 / fig. 10.5, page 5) lights up.

- If this happens, switch off the inverter via the switch.
- Ensure that the inverter is sufficiently ventilated
- Wait for approx. 5 - 10 minutes and switch on the inverter manually.

When operating the inverter at high load for lengthy periods, you have to pay attention to voltage of battery. If voltage is not enough, please charge the battery immediately or replace battery.

There is a modular jack for remote control (fig. 1.6, page 1 / fig. 10.1, page 5) for 1500W and 2000W on the front panel and for 600W (option) and 1000W on the bottom plate.

GFCI for 60S-12A/E, 60S-24A/E, 100S-12A/E, 100S-24A/E is an option
GFCI for 150S-12A/E, 150S-24A/E, 200S-12A/E, 200S-24A/E is a must

An un-intentional electric path between a source of current and a grounded surface is referred to as a “ground fault”. Ground faults occur when current is leaking somewhere. In effect, electricity is escaping to the ground. How it leaks is very important. If your body provides a path to the ground for this leakage you could be injured, burned, severely shocked or electrocuted. A GFCI protects people from electric shock by detecting leakage and cutting off the AC source.

In case there is a leakage of >5mA for 115VAC ver. or >30mA for 230VAC ver. due to ground fault, the output will be shut down. The green LED will be switched off and the red overload LED will be lighted. The inverter gets latched in this condition. To reset, the power on/off switch is required to be switched off and on again. Before switching on the inverter again, ensure that the cause of the ground fault is removed.

9 Rectifying faults

Fault	Cause	Remedy
No output voltage, LED not illuminated	Bad connection between battery and inverter. Internal fuses defect.	Check the cables and contact In this case send the unit back to supplier.
No output voltage, OVER-TEMP LED illuminates	The inverter has been overheated.	Switch off the inverter and the power consuming units. Wait for approx. 5 - 10 minutes and switch on the inverter only. Reduce the loading and ensure a better ventilation for the inverter. Then switch back on the consuming unit.
Overload LED illuminates	Current consumption of the consuming unit is too high. Possibly, there is a short circuit in the consuming unit.	Switch off the inverter and disconnect the consuming units. Switch back on the inverter only. If the OVERLOAD LED is off, there is a short circuit at the consuming unit or the total load was higher than the performance specified within the technical data table. Check the connecting cable of the consuming unit for mechanical damages.
Acoustic signal in case of loading	Battery voltage too low. In case of loading battery voltage falls below 10.7 V resp. 21.4 V.	The battery must be recharged.

10 Cleaning and caring for the inverter



Caution!

Do not use sharp or hard objects for cleaning as these may damage the device.

- Occasionally clean the device with a damp cloth.

11 Guarantee

Our general guarantee conditions apply. If the product is defective, please send it back to us. For repair and guarantee processing, the following documents must be sent along with the device:

- A copy of the receipt with purchasing date
- A reason for complaint or description of the fault

12 Disposal

12.1 Disposing of packaging material

Do not simply throw the packaging material away. Please observe the following instructions:

- The cardboard packaging material should be disposed of in a waste-paper bin.
- Ask your local authority for the location of the recycling centre closest to you.

13 Technical data

600W Pure Sine Wave Inverter

Item number	60S-12E	60S-24E	60S-12A	60S-24A
Rated input voltage	12 V DC	24 V DC	12 V DC	24 V DC
Constant output power	600 W			
Peak output power (a max. of 10 min.)	1000 W (650 W)			
Maximum input current	80A	40A	80A	40A
Output voltage	230VAC +/- 3%		115VAC +/- 3%	
Output frequency	50 Hz or 60Hz to be specified			
Output Wave Form	Pure Sine Wave			
Total Harmonic Distortion	3%			
No Load Current	<0.8A	<0.6A	<0.6A	<0.45A
Input voltage range	10.7 V – 16.5 V	21.4 V – 33 V	10.7 V – 16.5 V	21.4 V – 33 V
Low voltage alarm	10.7 V	21.4 V	10.7 V	21.4V
Low voltage shutdown	10 V	20 V	10 V	20 V
Efficiency up to	85 %			
Dimension (LxWxH)	280 x 236 x 83 mm			
Weight	2.46kgs			
Remote controller	RC-15(Optional)			
GFCI	Option			
Safety Certification	EN60950-1 :			
EMC	EN55022 : Class B EN55024 : EN61000-3-2 : EN61000-3-3 :			
E Mark	E13 10R-02 3659			
Protection : Reset mode * Input low voltage.....Automatic * Input over voltage.....Automatic * Low battery alarm.....Automatic * Over temperature.....Automatic * Over load.....Manual * Short circuitManual				

13 Technical data

1000W Pure Sine Wave Inverter

Item number	100S-12E	100S-24E	100S-12A	100S-24A
Rated input voltage	12 V DC	24 V DC	12 V DC	24 V DC
Constant output power	1000 W			
Peak output power (a max. of 10 min.)	2000 W (1200 W)			
Maximum input current	160A	80A	160A	80A
Output voltage	230VAC +/- 3%		115VAC +/- 3%	
Output frequency	50 Hz or 60Hz to be specified			
Output Wave Form	Pure Sine Wave			
Total Harmonic Distortion	3%			
No Load Current	<1.2A	<0.8A	<0.8A	<0.6A
Input voltage range	10.7 V – 16.5 V	21.4 V – 33 V	10.7 V – 16.5 V	21.4 V – 33 V
Low voltage alarm	10.7 V	21.4 V	10.7 V	21.4V
Low voltage shutdown	10 V	20 V	10 V	20 V
Efficiency up to	85 %			
Dimension (LxWxH)	395 x 236 x 83 mm			
Weight	4kgs			
Remote controller	RC-15(Optional)			
GFCI	Option			
Safety Certification	EN60950-1 :			
EMC	EN55022 : Class B EN55024 : EN61000-3-2 : EN61000-3-3 :			
E Mark	E13 10R-02 9726			
Protection : Reset mode				
* Input low voltage.....Automatic				
* Input over voltage.....Automatic				
* Low battery alarm.....Automatic				
* Over temperature.....Automatic				
* Over load.....Manual				
* Short circuitManual				

13 Technical data

1500W Pure Sine Wave Inverter

Item number	150S-12E	150S-24E	150S-12A	150S-24A
Rated input voltage	12 V DC	24 V DC	12 V DC	24 V DC
Constant output power	1500 W			
Peak output power (a max. of 10 min.)	3000 W (1800 W)			
Maximum input current	200A	100A	200A	100A
Output voltage	230VAC +/- 3%		115VAC +/- 3%	
Output frequency	50 Hz or 60Hz to be specified			
Output Wave Form	Pure Sine Wave			
Total Harmonic Distortion	3%			
No Load Current	<1.6A	<1A	<1A	<0.6A
Input voltage range	10.7 V – 16.5 V	21.4 V – 33 V	10.7 V – 16.5 V	21.4 V – 33 V
Low voltage alarm	10.7 V	21.4 V	10.7 V	21.4V
Low voltage shutdown	10 V	20 V	10 V	20 V
Efficiency up to	85 %			
Dimension (LxWxH)	415 x 283 x 100 mm			
Weight	5.75kgs			
Remote controller	RC-15(Optional)			
GFCI	Yes,please refer to page 18.			
Safety Certification	EN60950-1 :			
EMC	EN55022 : Class B EN55024 : EN61000-3-2 : EN61000-3-3 :			
E Mark	E13 10R-02 9727			
Protection : Reset mode				
* Input low voltage.....Automatic				
* Input over voltage.....Automatic				
* Low battery alarm.....Automatic				
* Over temperature.....Automatic				
* Over load.....Manual				
* Short circuitManual				

13 Technical data

2000W Pure Sine Wave Inverter

Item number	200S-12E	200S-24E	200S-12A	200S-24A
Rated input voltage	12 V DC	24 V DC	12 V DC	24 V DC
Constant output power	2000 W			
Peak output power (a max. of 10 min.)	4000 W (2200 W)			
Maximum input current	240A	120A	240A	120A
Output voltage	230VAC +/- 3%		115VAC +/- 3%	
Output frequency	50 Hz or 60Hz to be specified			
Output Wave Form	Pure Sine Wave			
Total Harmonic Distortion	3%			
No Load Current	<1.6A	<1A	<1A	<0.8A
Input voltage range	10.7 V – 16.5 V	21.4 V – 33 V	10.7 V – 16.5 V	21.4 V – 33 V
Low voltage alarm	10.7 V	21.4 V	10.7 V	21.4V
Low voltage shutdown	10 V	20 V	10 V	20 V
Efficiency up to	85 %			
Dimension (LxWxH)	415 x 283 x 100 mm			
Weight	5.9kgs			
Remote controller	RC-15(Optional)			
GFCI	Yes,please refer to page 18.			
Safety Certification	EN60950-1 :			
EMC	EN55022 : Class B EN55024 : EN61000-3-2 : EN61000-3-3 :			
E Mark	E13 10R-02 9594			
Protection : Reset mode				
* Input low voltage.....Automatic				
* Input over voltage.....Automatic				
* Low battery alarm.....Automatic				
* Over temperature.....Automatic				
* Over load.....Manual				
* Short circuitManual				

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