



USERS MANUAL / GEBRUIKERSHANDLEIDING
BETRIEBSANLEITUNG / MANUEL D'UTILISATION
MANUAL DE UTILIZACION / INSTRUZIONI PER L'USO

AC Master


12/300, 12/500, 24/300, 24/500

Switch mode sine wave inverter





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

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 Move the main switch of the AC Master to the OFF position (0).

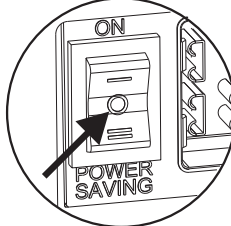


Figure 1

3 Disconnect the electrical power:

- Switch off all consumers,
- Switch off all charging systems.
- Remove the fuse cover and DC fuse(s).
- Check with a suitable voltmeter whether the DC installation is voltage free.

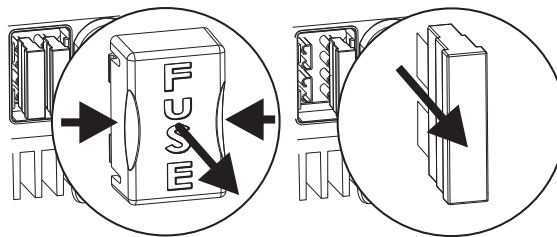


Figure 2

4 Mount the AC Master with four screws vertically to a solid wall. Allow at least 10 cm / 4 inch space around the apparatus!

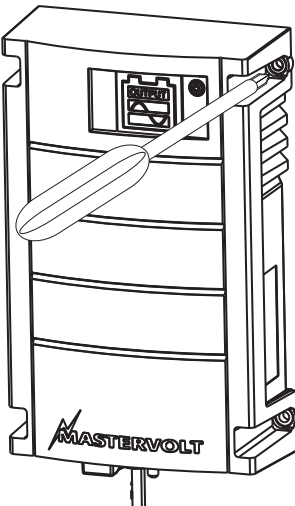
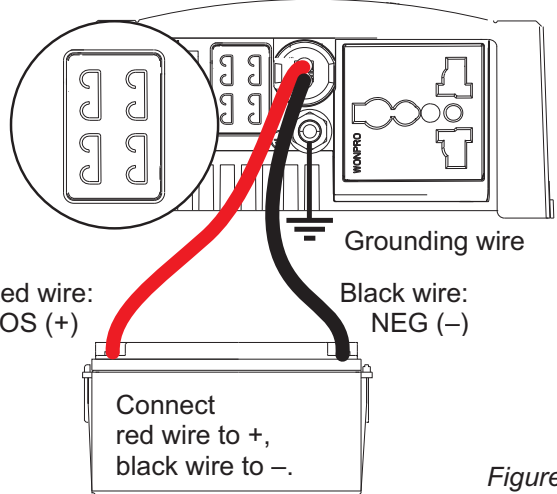


Figure 3

5 Connect the battery to the DC input. Do not place the DC fuse(s) yet.




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

Grounding wire

Connect red wire to +, black wire to -.

Figure 4

 Incorrect polarity will damage the AC Master!

6 The AC load can be connected directly to the AC socket. Different plugs are possible.

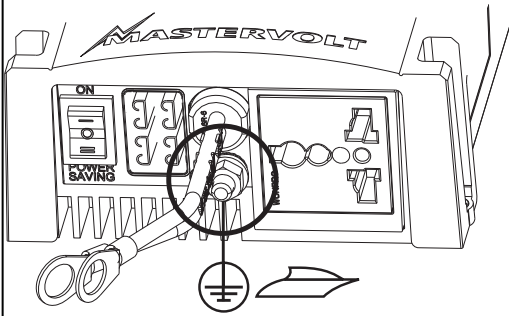


Figure 5

For safe installation:

- Connect the grounding point of the AC Master to the central grounding point of the vehicle/ ship.
- When disconnecting AC load, switch Off the AC Master first.

Refer to locally applicable regulations.

7 Check all wiring. If OK:

- Place the DC fuse(s).
- Close the fuse cover
- Switch on the AC Master (position I or II).

When the fuse is placed, internal capacitors may cause a spark. This is normal.

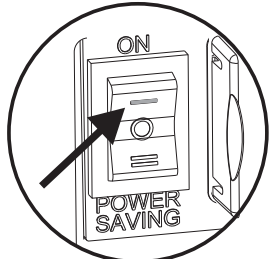


Figure 6

VALIDITY OF THIS MANUAL

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This manual is valid for the following models:

Model	Part number
AC Master 12/300	28010300
AC Master 12/500	28010500
AC Master 24/300	28020300
AC Master 24/500	28020500

From now on, these models will be referred to as "AC Master".

PRODUCT DESCRIPTION AND APPLICATION

The Mastervolt inverter AC Master converts a DC voltage to a pure AC sine wave voltage.

Typical applications (300W or 500W max, depending on AC Master model) are shown below.

- In the household: lamp, fans, sewing machines.
- For office equipment: computers, printers, monitors, scanner.
- For home entertainment electronics: television, DVD recorders, CD players, video games, musical instruments, audio equipment.
- Electrical tools: drilling machines, grinding machines, circular saws.

SAFETY INSTRUCTIONS



WARNING!

Before using the AC Master, read and save the Safety Instructions. Make sure the total power of all connected devices is within the limits!

- Use the AC Master according to the instructions and specifications stated in this manual.
- Connections and safety features must be executed according to the locally applicable regulations.
- Operation of the AC Master without proper grounding may lead to hazardous situations!
- If the positive and negative wires on the DC-input (battery) are reversed, the AC Master will be damaged. Damage of this kind is not covered by guarantee. Check whether all connections are correct before placing the fuse(s).
- Do not connect the AC output of the inverter to an incoming AC source or generator.
- Never connect the AC Master in parallel with any other inverter.
- Never open the housing as high voltages may be present inside!

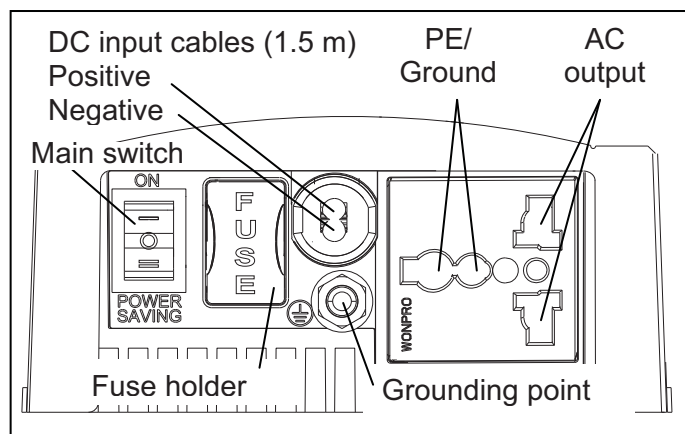


Figure 7: Overview connections

UNPACKING

The delivery consists of the following parts:

- The AC Master
- This user's manual
- 1.5 m/ 5 ft DC input battery cable
- 1 or 2 (see specifications) blade fuses 40 A

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

GUARANTEE TERMS

Mastervolt guarantees that this product was built according to the legally applicable standards and stipulations. If you fail to act in accordance with the regulations and instructions in this user's manual, damage will 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 Mastervolt 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 for this product is 2 years.

LIABILITY


Mastervolt cannot be held liable for:

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

INSTALLATION

Choosing a location to install

- Install the AC Master in a well-ventilated room protected against rain, vapour, moisture and dust.
- Ambient temperature: 0 - 40°C / 32 - 104°F.
- Never use the AC Master at a location where there is danger of gas or dust explosions.
- Do not install the AC Master in the same compartment as the batteries.
- Do not mount the AC Master straight above the batteries because of possible corrosive fumes.
- Mount the AC Master vertically with the cables hanging downwards (figure 8) and so that airflow through the ventilation openings is guaranteed.

 Mounting the AC Master in another position is possible, this however influences the ingress protection degree (IP).

- Make sure no objects are located within a distance of 10 cm / 4 inch around the AC Master.



Figure 8:
Mounting to the wall


Before you start

- Before installing the AC Master make sure the main switch is set to the OFF ("0") position (figure 1).
- 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. Remove the fuse cover and fuse(s) (figure 2).

- Make sure that the battery voltage is the same as the input voltage of the AC Master (e.g. 24V battery for a 24V input voltage). Also check that your loads comply with the 230V output voltage.
- The integrated DC fuse(s) should be placed last of all.
- Use four Ø4.5 mm (No. 8) screws to mount the AC Master to a solid surface (figure 8).


Wiring

- Connect DC wiring as shown in figure 4: the black terminal NEG (-) to the negative (-) pole of the power source / battery, the red terminal POS (+) to the positive (+) pole of the power source/ battery. Do not place the fuse(s) in the integrated fuse holder yet.
- Chassis ground: Use a cable AWG8 / 6 mm² to connect the GROUNDING POINT (figure 7) to the central ground.

 The neutral connector N of the AC output (figure 7) is NOT connected to the Grounding point!

COMMISSIONING AFTER INSTALLATION

1. Check the polarity of the DC connections: Red cable positive, black cable negative. Only place the DC fuse(s) if the polarity is correct.
2. Place the DC-fuse(s) in the fuse holder (see Specifications on page 7).

 When the fuse is placed, internal capacitors may cause a spark. This is normal.

3. AC voltage: the load can be plugged into the AC output (figure 7) directly.

OPERATION

Switching ON and Power Saving

Move the main switch (figure 9) to position I (“ON”) or II (“Power saving”). With the power switch in position II, the battery is saved when the load is under 40 W. The AC Master is in scan mode then and switches on when it detects a load. When the AC Master switches on, it will produce a short beep.

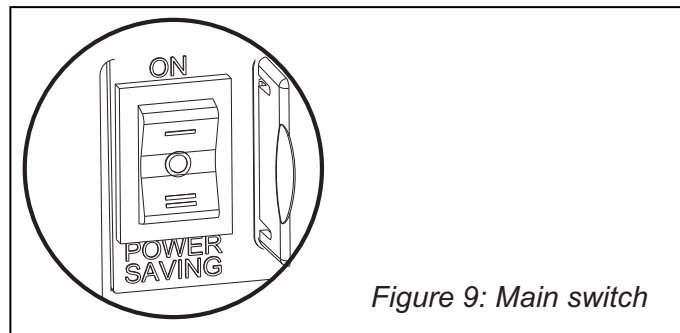


Figure 9: Main switch

Switching OFF

Move the main switch (figure 9) to the position O (“OFF”). Note that switching off the AC Master does not disconnect the batteries!

USER INTERFACE

Alarms

Four beep modes distinguish the alarm modes and switching on. See Trouble shooting for more information.

LED indicators

See figure 10. The operation of the inverter is made visible by means of three LED indicators: Output LED, Sine wave LED and Power LED. Five different stages are indicated. See Trouble shooting section for more information.

MAINTENANCE

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

DECOMMISSIONING

Proceed as follows for decommissioning of the inverter:

1. Move the main switch (figure 9) to position 0 (“OFF”).
2. Remove the DC fuse(s). Be sure that others can not reverse this action taken.
3. Now the inverter can be demounted in a safe way.

The diagram shows a rectangular display panel with three sections. The left section is labeled 'OUTPUT' and contains a sine wave icon. The middle section contains a sine wave icon. The right section contains a circular LED icon. Lines connect the labels in the table below to these icons.

Output LED	Sine wave LED	Power LED	Stage
Continuous (green)	Continuous (green)	Continuous (green)	Inverter OK
Blinking (green)	Blinking (green)	Continuous (green)	Power saving
Off	Continuous (red)	Continuous (green)	Inverter fault
Off	Blinking slowly (red)	Continuous (green)	Battery voltage low/ high
Off	Blinking fast (red)	Continuous (green)	Short circuit
Off	Off	Off	Inverter off

Figure 10: Display LEDs and their function

TROUBLE SHOOTING

Consult an installer, if the output voltage cannot be retrieved by means of the table below.

No output voltage	Possible cause	What to do?
All LED indicators are off.	Main switch (figure 9) is set to the OFF position.	Put the main switch (figure 9) in the ON position.
	DC fuse(s) blown	Replace the fuse(s).
	AC feedback, feedback protection has caused the inverter to switch off.	Take away the extra AC power source and switch on the AC Master. To avoid damage do not install AC Masters in parallel.
Output LED blinks green, Sine wave LED blinks green, Power LED continuous green.	<i>Power saving:</i> Inverter is in Power saving mode.	Increase the load or put the main switch (figure 9) in position I.
Output LED off, Sine wave LED continuous red, Power LED continuous green, Continuous beep.	<i>Inverter fault:</i> Over temperature Reduce the load and let the inverter cool down. It will switch on again when the internal temperature is sufficiently low.	Check the airflow through the inverter. See section Installation.
Output LED off, Sine wave LED continuous red, Power LED continuous green, One short beep every 2 seconds.	<i>Inverter fault:</i> Overload. Inverter attempts a restart 5 times. If it still fails, the AC Master remains in Overload and produces a continuous beep.	Reduce the load and/ or check the AC wiring for possible short circuits. Then reset the inverter manually by switching the main switch off and on again.
Output LED off, Sine wave LED continuous red, Power LED continuous green, Three short beeps every 2 seconds.	<i>Inverter fault:</i> Fan fault.	Contact your Mastervolt supplier.
Output LED off, Sine wave LED blinks red slowly, Power LED continuous green, One short beep every 2 seconds.	<i>Battery voltage low:</i> DC input voltage too low (flat battery).	Check the battery. At low voltage, disconnect the load and charge the battery. The inverter will switch on again when the input voltage is > 11.0 V / >22.0 V.
	DC input voltage too low: voltage drops 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 diameter.
	<i>Battery voltage high:</i> DC input voltage is too high.	Check battery voltage; switch off charger. The inverter will switch on again when the input voltage is <14.5 / <29.0 V.
Output LED off, Sine wave LED blinks red fast, Power LED continuous green, one short beep every 2 seconds.	<i>Short circuit.</i> Inverter attempts a restart 5 times. If it still fails, the AC Master remains in Short circuit and produces a continuous beep.	Switch off the AC Master and check the AC wiring. Only switch the inverter on when the wiring problem has been solved.

SPECIFICATIONS

Model AC Master	12/300-230V EU	12/500-230V EU	24/300-230V EU	24/500-230V EU
Part number:	28010300	28010500	28020300	28020500
Function	Conversion of a DC voltage to an AC voltage.			
Supplier:	Mastervolt, Amsterdam, the Netherlands.			
General				
Nominal battery voltage	12V	12V	24V	24V
Input voltage:	10 - 15.5 V	10 - 15.5 V	20 - 32 V	20 - 32 V
Nom Power $T_{amb}=25^{\circ}C$, cos phi=1	300 VA	500 VA	300 VA	500 VA
Max. peak load during 5 seconds	600 VA	800 VA	600 VA	800 VA
Output waveform	True sine	True sine	True sine	True sine
Maximum efficiency	90 %	90 %	91 %	91 %
Output voltage	230 V +/- 5 %	230 V +/- 5 %	230 V +/- 5 %	230 V +/- 5 %
Frequency	50 Hz +/- 0.1 %	50 Hz +/- 0.1 %	50 Hz +/- 0.1 %	50 Hz +/- 0.1 %
Harmonic distortion typical	<6 %	<6 %	<6 %	<6 %
AC connection	Universal	Universal	Universal	Universal
Dimensions (HxWxD)	See figure 11: dimensions in mm [inch].			
Weight:	1.2 kg (2.6 lbs)	1.2 kg (2.7 lbs)	1.2 kg (2.6 lbs)	1.2 kg (2.7 lbs)
Technical				
Technology	HF Switch mode	HF Switch mode	HF Switch mode	HF Switch mode
Shut down voltage low battery	10 V +/- 3 %	10 V +/- 3 %	20 V +/- 3 %	20 V +/- 3 %
Restart voltage low battery	11 V +/- 3 %	11 V +/- 3 %	22 V +/- 3 %	22 V +/- 3 %
Shut down voltage high battery	16 V +/- 3 %	16 V +/- 3 %	32 V +/- 3 %	32 V +/- 3 %
Restart voltage high battery	14.5 V +/- 3 %	14.5 V +/- 3 %	29 V +/- 3 %	29 V +/- 3 %
Maximum allowed ripple on DC	10 % RMS	10 % RMS	10 % RMS	10 % RMS
Input current @ nominal load	22.5 A	37.5 A	11 A	19 A
DC fuse required (slow blow)	40 A x 2	40 A x 2	40 A	40 A
Minimum battery capacity:	60 Ah	100 Ah	30 Ah	50 Ah
DC cable for battery connection:	1.5 m included	1.5 m included	1.5 m included	1.5 m included
<i>No load power consumption:</i>				
Off mode	0 mA	0 mA	0 mA	0 mA
On mode @ save mode	0.33 A/ 4W	0.33 A/ 4W	0.16 A/ 4W	0.16 A/ 4W
On mode @ high mode	0.58 A/ 7W	0.58 A/ 7W	0.29 A/ 7W	0.29 A/ 7W
Operating temperature specified (will meet specified tolerances)	Full specifications at ambient temperature 0 to 40°C (32 to 104°F). Derating ≥ 40°C (104 °F). Shutdown at 50°C (22°F), auto recover after cooling down.			
Cooling:	Natural/ forced	Natural/ forced	Natural/ forced	Natural/ forced
Storage temperature	Ambient temperature -30°C to 70°C / -22°F to 158°F.			
Relative humidity	Max 90% relative humidity, non-condensing.			
Standards and approvals	CE, E	CE, E	CE, E	CE, E
Vibration and shock levels	EN 68-2, 5-50 Hz, max amplitude of 20 mm/sec			
Protections	Overload, short circuit, DC over / under voltage, over temperature.			
Reversed polarity protection	No, reversed polarity may lead to permanent damage.			
Power saving	With the power switch in position II, power saving mode is active when the load is below 40 W +/- 5 %			
Protection degree	IP 23	IP 23	IP 23	IP 23

DIMENSIONS

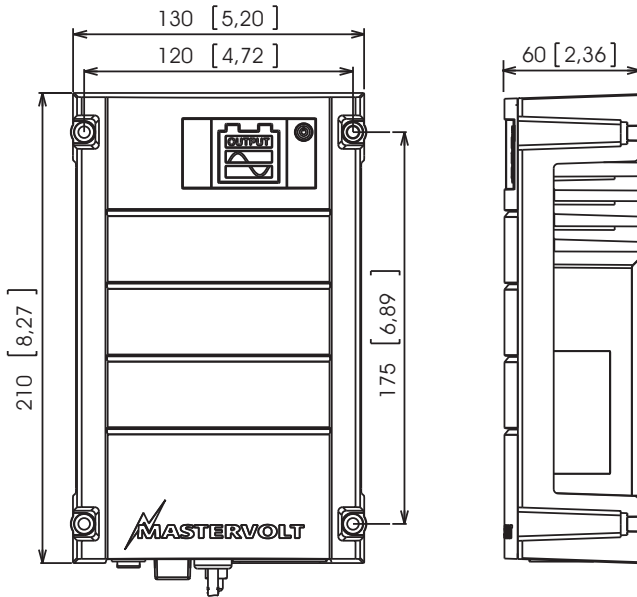


Figure 11:
Dimensions in mm [inch]

EC DECLARATION OF CONFORMITY

Supplier: Mastervolt
Address: Snijdersbergweg 93, 1105 AN Amsterdam, The Netherlands



Herewith declares that product:

28010300	AC Master 12/300 230V/50Hz EU
28010500	AC Master 12/500 230V/50Hz EU
28020300	AC Master 24/300 230V/50Hz EU
28020500	AC Master 24/500 230V/50Hz EU

Is in conformity with the provision of the EC EMC directive 2004/108/EC

The following harmonised standards have been applied:

Emission	EN 55022
	EN55014 only test conducted emission and radiated disturbances
Harmonics	EN 61000-3-2
Dips, variations, flicker	EN 61000-3-3
Immunity	EN 61000-6-2
LV directive	2006/95/EC
Electrical safety	EN 60950-1:2001 +A11:2004
Vibration and shock levels	EN 68-2-6
E-marking	95/54 EC

Amsterdam,

P.F. Kenninck,
General Manager MASTERVOLT

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