



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

# AC MASTER

Switch mode sine wave inverter

Models 12/200, 12/350, 24/200 & 24/350 - 230V  
12/350 - 120V



MASTERVOLT  
Snijdersbergweg 93, 1105 AN Amsterdam  
The Netherlands  
Tel.: +31-20-342 21 00  
Fax: +31-20-697 10 06  
[www.mastervolt.com](http://www.mastervolt.com)

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v 1.1 February 2007

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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)


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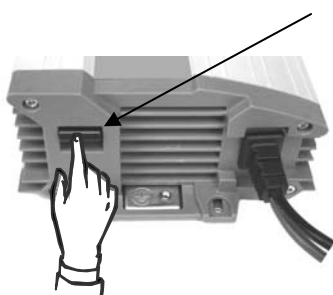
Disconnect the electrical power:

- 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.



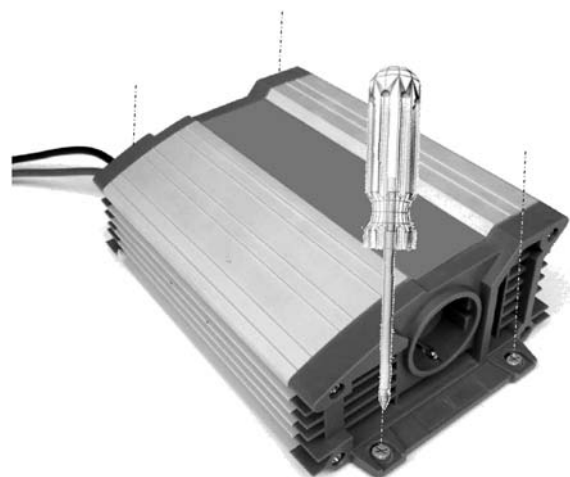
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Move the main switch of the AC Master to the REMOTE /  position



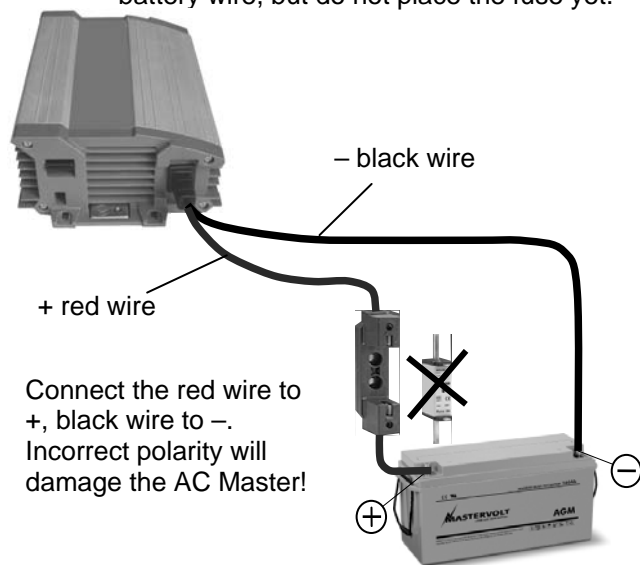
4

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



5

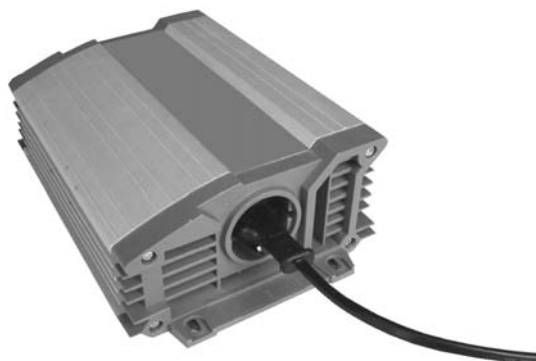
Connect the battery to the DC input. Integrate a fuse holder in the positive battery wire, but do not place the fuse yet.



Connect the red wire to +, black wire to -.  
Incorrect polarity will damage the AC Master!

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The AC load can be connected directly to the AC socket.



For safe installation:

- Connect the grounding point of the AC Master to the central grounding point of the vehicle/ ship.
  - If you need to install a Residual Current Device (RCD) in the wiring of the AC output, both the earth (PE/GND) and the neutral (N) of the AC output of the AC Master must be connected to the grounding point
- Refer to local applicable regulations on these issues.

7

- Place the inverter fuse.
- Switch on the AC Master.



## PRODUCT DESCRIPTION AND APPLICATION

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

## SAFETY INSTRUCTIONS

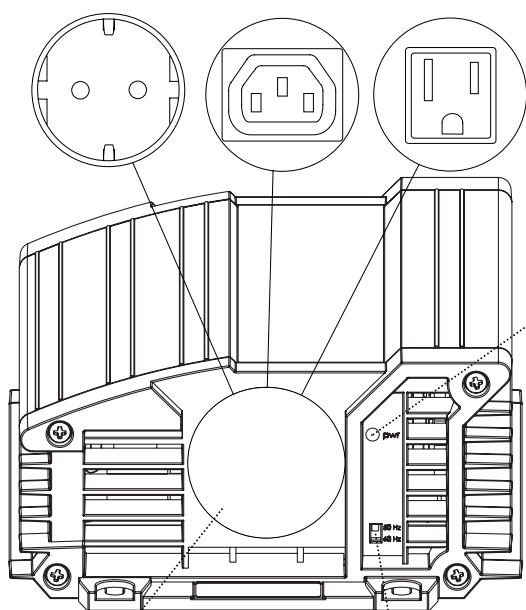


### WARNING!

Before using the AC Master, read and save the safety instructions

- Use the AC Master in accordance with 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!
- 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 AC Master 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 open the housing as high voltages may be present inside!

28010200 28010201  
28010350 28010351  
28020200 28020201  
28020350 28020351 28520350



① AC-output

Front side

③ Output frequency

## UNPACKING

The delivery consists of the following parts:

- The AC Master (incl. DC cables)
- This user's manual

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.

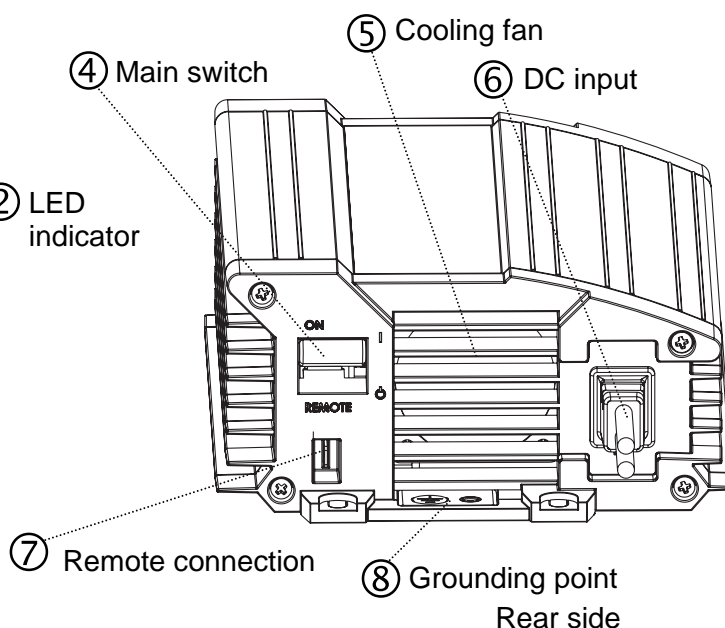
## OUTPUT FREQUENCY

See figure 1. On the front side of the AC Master a small switch (3) can be found to adjust the output frequency.

The output frequency is factory set to the correct value. If necessary, use a small flat-blade screw driver to adjust the output frequency (50 or 60Hz)

## 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
- Mount the AC Master 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 AC Master.
- Use the included battery cables to connect the AC Master to the DC supply
- 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 sulphur fumes.



④ Main switch

⑤ Cooling fan

⑥ DC input

② LED indicator


⑦ Remote connection

⑧ Grounding point  
Rear side

Figure 1

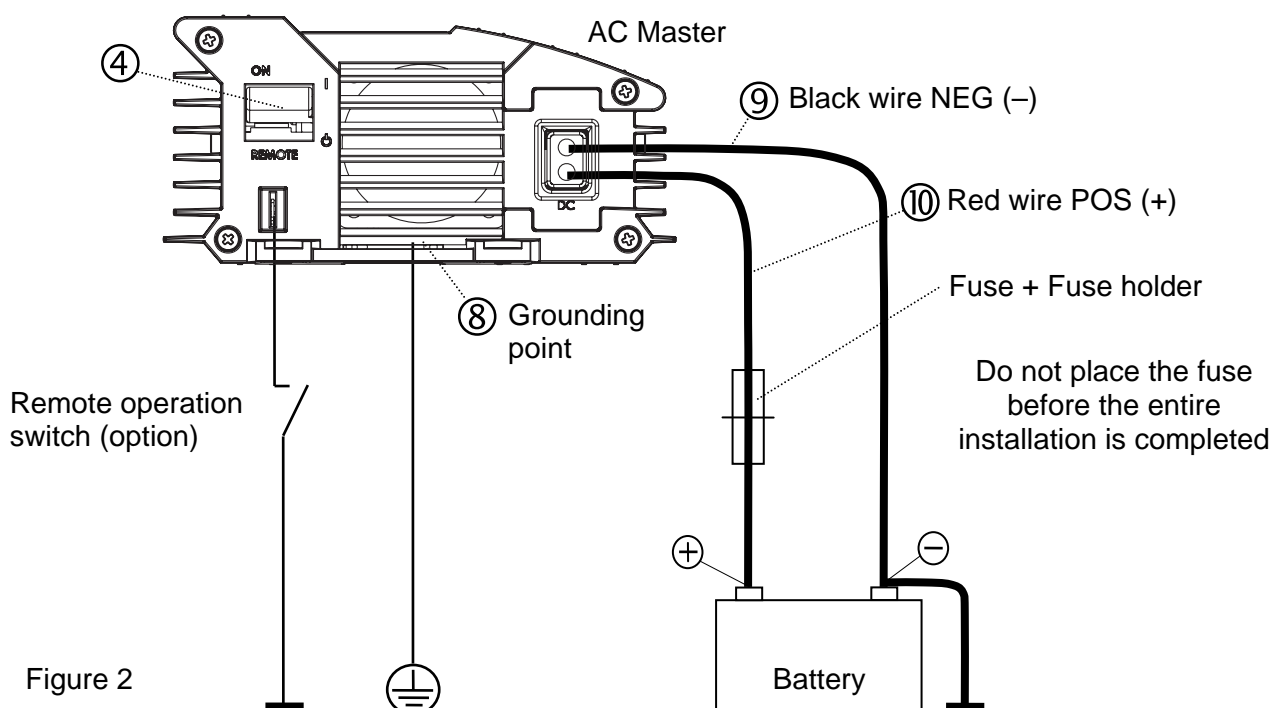
## INSTALLATION

### 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 AC Master make sure the main switch (figure 1, ref. 4) is set to the REMOTE /  position.
- Check 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 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 AC Master to a solid surface. See figure 3.

### Wiring

- DC Wiring. Connect DC wiring as shown in figure 2: the black wire (9) NEG (–) to the negative (–) pole of the power source / battery, the red terminal (10) 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. Make sure that all DC connections are tight.
- Chassis ground: Use a cable AWG8 / 6 mm<sup>2</sup> to connect the CHASSIS GROUND terminal (8) to the central ground.
  - 120V models (part nr. 28520350): the neutral connector N of the AC output (1) is automatically connected to the CHASSIS GROUND terminal when the inverter is in operation.
  - 230V models: the neutral connector N of the AC output (1) is not connected to the CHASSIS GROUND terminal.
- Remote operation switch (option). If you want to operate the AC Master on a remote location, you can install a switch as indicated in figure 2. When the contact is closed, the AC Master is switched on.



## 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 AC Master. This is normal.
3. AC voltage: the load can be plugged into the AC-output (1) directly. Do not connect the AC-output of the AC Master to an incoming AC source.

## OPERATION

### Switching on:

Move the main switch (4) to "ON". The AC Master will start a self-test indicated by two beeps from the buzzer and a flashing LED indicator (2). This may last for approximate two seconds. Finally the buzzer will produce another beep and the AC Master will switch on, indicated by an illuminating green LED-indicator (2). Now the AC Master is ready to supply load connected to the AC-output (1).

### Switching off:

Move the main switch (4) to the "REMOTE / ⏻" position. Note that switching off the AC Master does not break the connection to the batteries!

### Remote operation:

The AC Master can be operated on a remote location by means of an optional remote switch. Move the main switch (4) to the "REMOTE / ⏻" position. When the remote contact is closed, the AC Master is switched on .

### LED indicator

The operation mode of the AC Master is made visible by means of the LED indicator (2)

As long this LED isn't illuminated red, no failure is detected: the AC Master is operating normally. If an error occurs, it is detected by the apparatus itself: the LED indicator turns red.

Indication of the LED	Meaning
GREEN	Inverter is working normally
RED	Failure. Possible causes: overload / short circuit
RED blinking	Failure. Possible causes: DC-input voltage too high or too low, internal temperature too high,

## 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 etc. must be corrected immediately.

## DECOMMISSIONING

Proceed as follows for decommissioning of the AC Master:

1. Move the main switch (4) to the REMOTE / ⏻ position.
2. Remove the DC fuse. Be sure that others can not reverse this action taken.
3. Now the AC Master can be demounted in a save way.

## GUARANTEE TERMS

Mastervolt 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 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 is 2 years.

## LIABILITY

Mastervolt 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.

## 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, the LED indicator (2) is off	Main switch (4) is set to REMOTE / $\phi$ , but no remote present	Set the main switch (4) in ON position
	The remote switch is off (if applied)	Close the remote operation switch
	DC fuse blown	Replace the fuse
No output voltage, the LED indicator (2) is lit red.	AC Output overloaded	Reduce the load and let the inverter cool down. The AC Master will switch on again when the internal temperature has reduced
No output voltage, the LED indicator (2) is blinking red.	DC input voltage too high	Check battery voltage; switch off charger. The inverter will switch on again if the input voltage is < 15.5V or < 31.0V
	DC input voltage too low (flat battery)	Charge the battery. The inverter will switch on again when the input voltage is > 14.6V or > 29.2V
	Airflow insufficient	Check the airflow through the inverter. The operation of the cooling fan (5) should not be blocked.
Inverter switches on and off. LED indicator (2) is blinking alternately red and green	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 cross section.
	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 AC Master. If necessary, adjust the output frequency. See OUTPUT FREQUENCY.

## EC DECLARATION OF CONFIRMITY

Manufacturer Mastervolt  
 Address Snijdersbergweg 93, 1105 AN Amsterdam , The Netherlands  
 Herewith declares that product::



28010200 / 28010201	AC Master 12/200-230V	28020200 / 28020201	AC Master 24/200-230V
28010350 / 28010351	AC Master 12/350-230V	28020350 / 28020350	AC Master 24/350-230V

Is in conformity with the provision of the EC EMC directive 89/336/EEC and amendments 92/31/EEC, 93/68/EEC.

The following harmonised standards have been applied:

Generic emission standard:	EN 55022: 1998+A1: 2000+A2: 2003
Generic Immunity standard:	EN 55024: 1998+A1: 2001+A2: 2003
Harmonic current emissions:	EN 61000-3-2: 2000
Fluctuations and flicker:	EN 61000-3-3: 1995 + A1: 2001

Safety directive 73/23/EEC and amendment 93/68/EEC, with the following standard:

Low voltage standard:	EN 60950: 2000
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Amsterdam,

R.J. ter Heide,  
 General Manager MASTERVOLT

**SPECIFICATIONS**

Model AC Master	12/200-230V	12/350-230V	24/200-230V	24/350-230V	12/350-120V
Part number:	28010200* 28010201**	28010350* 28010351**	28020200* 28020201**	28020350* 28020351**	28520350***
Function of the apparatus:	Conversion of a DC voltage to a pure AC sine wave voltage				
Manufacturer:	Mastervolt, Amsterdam, the Netherlands				
General					
Nominal battery voltage:	12VDC	12VDC	24VDC	24VDC	12VDC
Nom Power T <sub>amb</sub> =40°C, cos phi 1	200W	350W	200W	350W	350W
Max. peak load	400W	700W	400W	700W	700W
Output waveform	True sinewave				
Maximum efficiency	90%	86%	93%	89%	84%
Output voltage	230V ±5%	230V ±5%	230V ±5%	230V ±5%	120V ±5%
Frequency (selectable)	50Hz ±0.03Hz	50Hz ±0.03Hz	50Hz ±0.03Hz	50Hz ±0.03Hz	60Hz ±0.03Hz
Dimensions	74 x 152 x 242 mm / 2.91 x 5.98 x 9.53 inch				
Weight:	1.65kg/3.6Lbs	1.85kg/4.1Lbs	1.65kg/3.6Lbs	1.85kg/4.1Lbs	1.85kg/4.1Lbs
Protection degree	IP21	IP21	IP21	IP21	IP21
Technical					
Technology	HF / Switch mode				
Shut down voltage low battery	10.3V (±0.5V)	10.3V (±0.5V)	20.6V (±0.5V)	20.6V (±0.5V)	10.3V (±0.5V)
Restart voltage low battery	12.3V (±0.5V)	12.3V (±0.5V)	24.6V (±0,5)	24.6V (±0.5V)	12.3V (±0.5V)
Shut down voltage high battery	15.3V (±0.5V)	15.3V (±0.5V)	30.6V (±0.5V)	30.6V (±0.5V)	15.3V (±0.5V)
Restart voltage high battery	14.6V (±0.5V)	14.6V (±0.5V)	29.2V (±0.5V)	29.2V (±0.5V)	14.6V (±0.5V)
Maximum allowed ripple on DC	5% RMS				
Input current @ nominal load	23A	38A	15A	25A	38A
External DC fuse required	30A	40A	20A	30A	40A
Recommended battery capacity:	>50Ah	>80Ah	>25Ah	>40Ah	>80Ah
DC cable	included				
No load power consumption (off mode):	0mA	0mA	0mA	0mA	0mA
No load power consumption ON @ U <sub>nom</sub> :	0.8A	0.8A	0.5A	0.5A	0.8A
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:	EN 60950-1				
EMC	EN55022, EN61000-3-2, EN61000-3-3, EN55024				FCC class A
E-mark (95/54 CE)	E13 - 3496				n/a
Protections					
Protections:	Overload, short circuit, over / under voltage, over temperature				
Reversed polarity:	Internal fuse, reversed polarity may lead to permanent damage				

\* AC connection: Continental European socket CEE-7/7    \*\* AC connection: IEC 320    \*\*\* AC connection: US/NEMA 5-15  
Other variants upon request

OUTLINE DRAWING

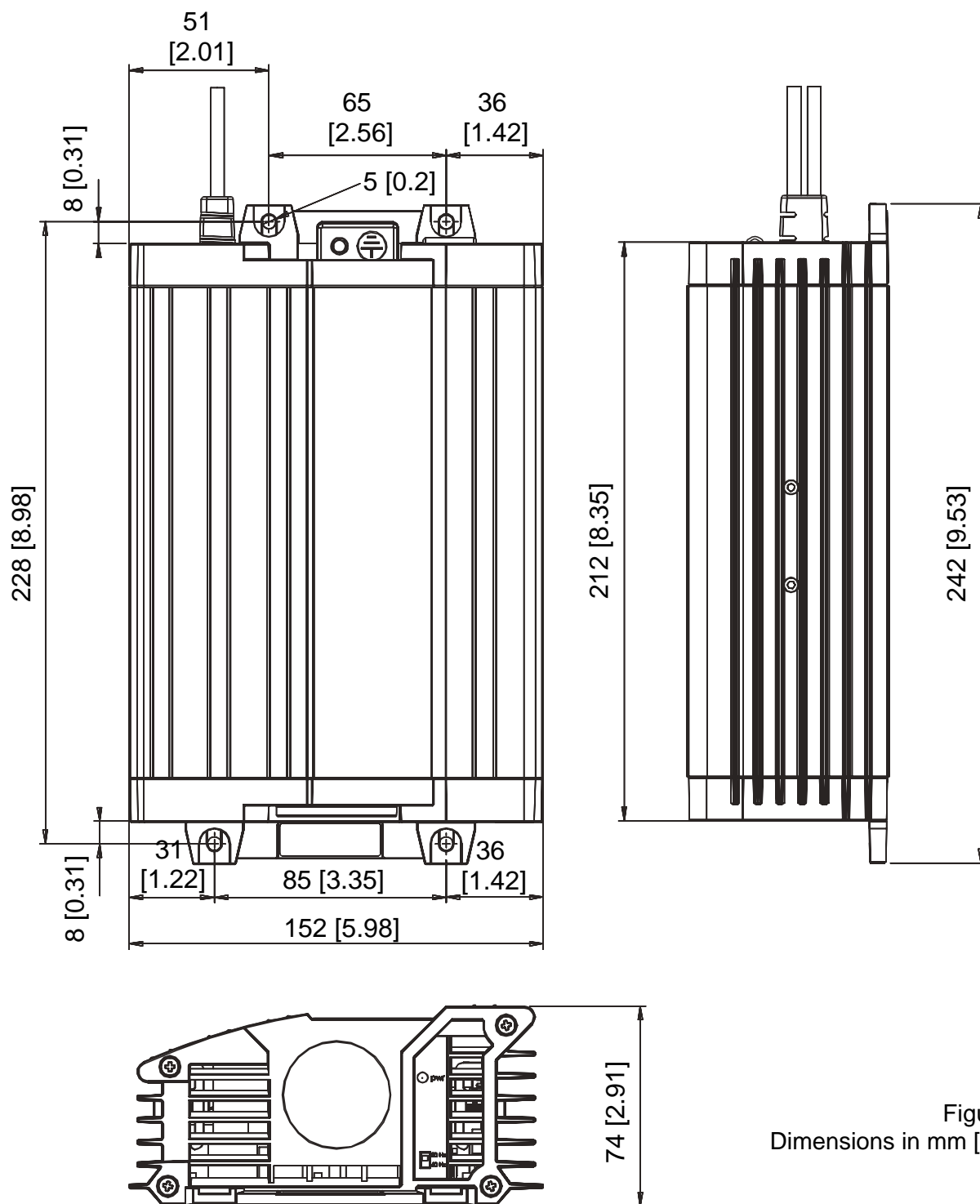


Figure 3  
Dimensions in mm [inch]



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Tel: + 31-20-3422100 Fax: + 31-20-6971006 Email: [info@mastervolt.com](mailto:info@mastervolt.com)

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