

# **MASTERVOLT**

USERS MANUAL

## **CHARGEMASTER**

**12/25-3, 24/12-3**

FULL AUTOMATIC BATTERY CHARGER



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## 1 GENERAL INFORMATION

### 1.1 USE OF THIS MANUAL

This manual serves as a guideline for the safe and effective operation, maintenance and possible correction of minor malfunctions of the ChargeMaster

It is therefore obligatory that every person who works on or with the ChargeMaster must be completely familiar with the contents of this manual and the Important Safety Instructions, and that he/she carefully follows the instructions contained herein.

Installation of, and work on the ChargeMaster may be carried out only by qualified, authorised and trained personnel, consistent with the locally applicable standards and taking into consideration the Important Safety Instructions.

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### 1.2 VALIDITY OF THIS MANUAL

All of the specifications, provisions and instructions contained in this manual apply solely to standard versions of the ChargeMaster delivered by Mastervolt. This manual is only valid for the following models with apparatus version letter "I" and higher (see section 1.4):

Part number	Model
44010250, 4401025x	ChargeMaster 12/25-3
44020120, 4402012x	ChargeMaster 24/12-3

x = OEM Customer specific number

This model is referred to as "ChargeMaster" further in this manual.

### 1.3 USE OF PICTOGRAMS

Safety instructions and warnings are marked in this manual by the following pictograms:



#### WARNING

A WARNING refers to possible injury to the user or significant material damage to the charger if the user does not (carefully) follow the procedures.



#### CAUTION!

Special data, restrictions and rules with regard to preventing damage.



A procedure, circumstance, etc which deserves extra attention.

### 1.4 IDENTIFICATION LABEL

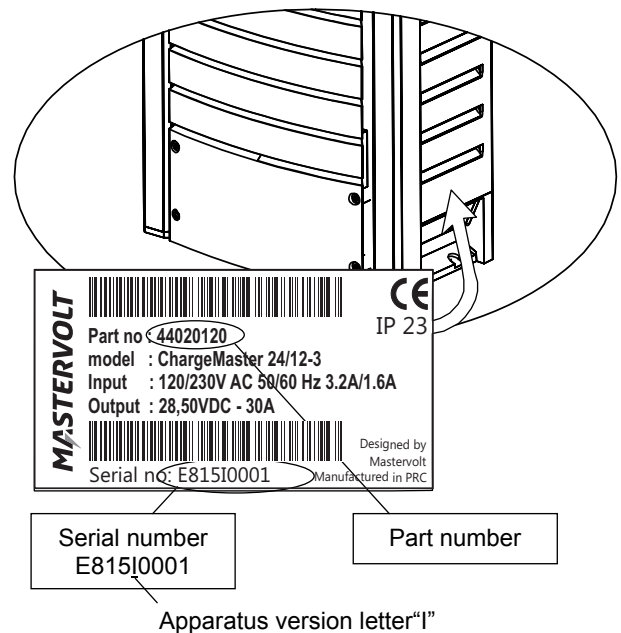


Figure 1: Identification label

The identification label is located at the right-hand side of the ChargeMaster (see Figure 1). Important technical information required for service, maintenance & secondary delivery of parts can be derived from the identification label.



#### CAUTION!

Never remove the identification label.

### 1.5 LIABILITY

Mastervolt can accept no liability for:

- consequential damage due to use of the ChargeMaster;
- possible errors in the manuals and the results thereof.

## 2 OPERATION

### 2.1 FEATURES

The Mastervolt Chargemaster is a fully automatic battery charger. This means that under normal circumstances it may stay switched on with the AC power and batteries connected. The ChargeMaster is suitable for charging the following battery types: Flooded lead acid, AGM, Spiral, Gel, Deep cycle batteries and Mastervolt Li-ion batteries (MLi). It has an auto-ranging input facility which makes it feasible to operate on almost any AC power source in the world. It operates on both 230V and 120V without compromising the output current. The three-step Plus charging method guarantees that the batteries are always charged to 100%.

With an external AC source connected, the Chargemaster charger also serves the function of an AC to DC converter to supply DC loads which are connected to the batteries.



**WARNING**

The MLi charging voltages on this charger fit the Mastervolt Li-ion (MLi) batteries but do not necessarily fit other Li-ion batteries!. Always follow the instructions provided by the battery manufacturer!..

The ChargeMaster is equipped with three equal outputs. The total output current is divided over these three outputs. See chapter 3 for connections.

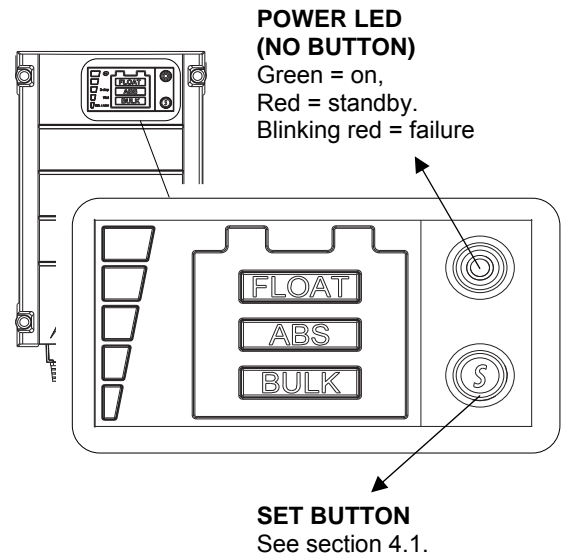


Figure 2: operation of the Chargemaster

### 2.2 SWITCHING ON / OFF

The Chargemaster has no on/off switch. In the event of decommissioning, switch Off the AC power supply.



**WARNING**

Charging will resume as soon as AC power becomes available again.



The Chargemaster can also be operated and monitored remotely by means of a MasterBus remote control panel. See section 4.3 for details.

### 2.3 FRONT PANEL AND DISPLAY

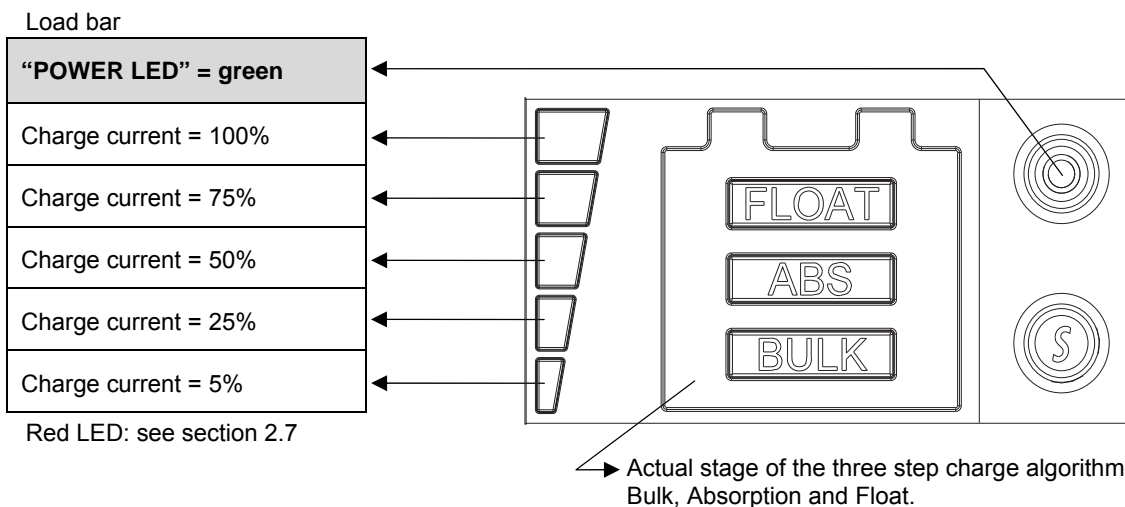


Figure 3: LED display

## 2.4 THREE STEP CHARGE ALGORITHM

See Figure 4. Battery charging is accomplished in three automatic stages: BULK, ABSORPTION and FLOAT.

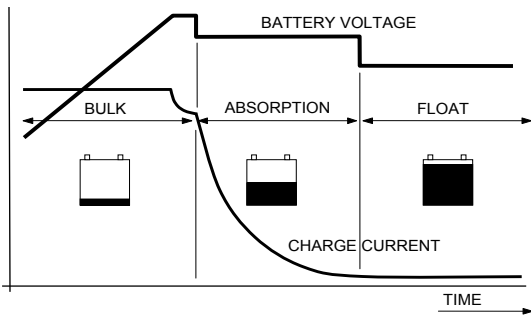


Figure 4: Three step charge system

- **BULK:** At this stage the charger delivers its maximum current for quick charging from 0 to 80%
- **ABSORPTION:** The charger has reached its maximum charge voltage and the charge current will slowly decrease until the battery is charged up to 100%.
- **FLOAT:** This stage begins once the battery is fully charged. The battery remains in fully charged state.

By installing the battery temperature sensor the charge voltages are automatically adapted for deviating temperatures.

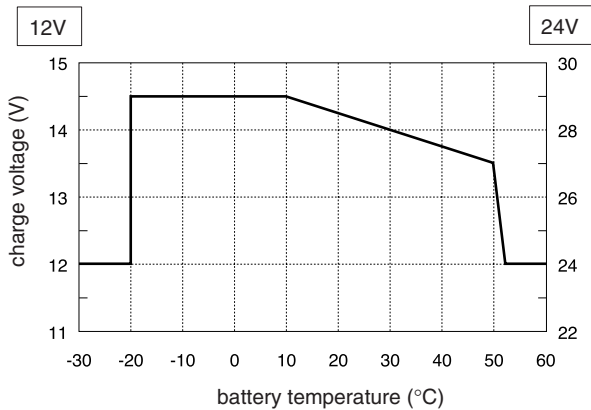


Figure 5: Temperature compensated charging

See Figure 5. When the battery temperature is low, the charge voltage increases. On the other hand, when the battery temperature is high, the charge voltage is decreased. Over charge and gassing are prevented this way. This will extend the life of your batteries



See also APPENDIX for detailed characteristics of the three step Plus charge system.

## 2.5 MASTERBUS (OPTIONAL)

The Chargemaster is compatible with the MasterBus network: a fully decentralized data network for communication between the different Mastervolt system devices such as the inverter, battery charger, generator, batteries and many more. See APPENDIX for details.

## 2.6 MAINTENANCE

No specific maintenance to the ChargeMaster is required. Examine your electrical installation on a regular base, at least once a year. Defects such as loose connections, burnt wiring etc. must be corrected immediately.

If necessary, use a soft clean cloth to clean enclosure of the ChargeMaster. Do not use any liquids or corrosive substances, such as solvents, alcohol, petrol or abrasive components.

## 2.7 FAILURES

The ChargeMaster is protected against overload, short circuit, overheating and under and over voltage. If a fault condition occurs, the POWER LED is blinking red and a load bar segment on the display illuminates indicating the failure cause.

Load bar	Red LED
	<b>Fault condition</b>
	Temperature error
	Charger failure
	Wrong AC voltage
	Battery voltage too high
	Battery voltage low, short circuit. Charger output reduced to 25% of its maximum



### CAUTION!

The ChargeMaster is not protected against:

- reversed polarity on the DC-output,
- over voltage on the AC-input.

### 3 INSTALLATION

During installation and commissioning of the ChargeMaster, the important safety instructions are applicable at all times.

#### 3.1 UNPACKING

In addition to the Chagemaster the delivery includes:

- Battery temperature sensor;
- DC-wiring: 2 pcs. positive (red) and 1 pc. negative (black)
- MasterBus terminating device (see APPENDIX);
- This user's manual
- Important Safety Instructions

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

Check from the identification label (see section 1.4) whether the battery voltage is the same as the nominal output voltage of the ChargeMaster (e.g. 24V battery set for a 24V battery charger).

#### 3.2 ENVIRONMENT

Obey the following stipulations during installation:

- The ChargeMaster is designed for indoor use only.
- Ambient operating temperature: -25°C ... 60°C / -13°F ... 140°F (power derating above 25°C / 77 °F to decrease the internal temperature).
- Humidity: 0-95% non condensing.
- Mount the ChargeMaster preferably to a vertical wall, with the connecting cables downwards.
- Do not expose the Chagemaster to excessive dust, aggressive environments, ammonia or salt.
- Make sure that the hot air developed during operation can be discharged. The ChargeMaster must be mounted so that obstruction of the airflow through the ventilation openings will be prevented.
- No objects must be located within a distance of 10 cm / 4 inches around the ChargeMaster.
- Do not locate the ChargeMaster in the same compartment as the batteries.
- Do not install the ChargeMaster straight above the batteries because of possible corrosive sulphur fumes.
- If the Chagemaster is installed in the immediate vicinity of living areas, take into account that the fan of the Chagemaster can produce noise when operating.
- Although the Chagemaster fully complies with all applicable EMC limits, it may still cause harmful interference to radio communication equipment. If such interference appears, it is recommended to increase the separation between the Chagemaster and the equipment, to relocate the receiving antenna or to

connect the equipment to a circuit different from that to which the Chagemaster is connected.

#### 3.3 WIRING



##### WARNING!

The wire and fuse sizes stated in this manual are given as example only. Prescribed wire and fuse sizes may be different due to local applicable regulations and standards.

##### 3.3.1 DC wiring

Keep in mind that high current will pass through the DC wiring. Keep the cable lengths shortest possible for highest system efficiency. The recommended minimum cross section of maximum 3m/ 9ft length battery cables for output 1, 2 and 3 is:

Model ChargeMaster	DC cable cross section
12/25-3	4 mm <sup>2</sup> / 10 AWG
24/12-3	4 mm <sup>2</sup> / 10 AWG

Use ring terminals on the battery side of the wires, use boot lace ferrules on the charger side. The terminals must be crimped with a proper crimping tool. Use the following wire colours for DC wiring colour or at least different colours to make a clear distinction between the positive and negative wire from the battery:

Wire colour	Meaning	Connect to:
Red	Positive	+ (POS)
Black	Negative	- (NEG)

Lay the positive and negative cables next to each other to limit the electromagnetic field around the cables. The negative cable should be connected directly to the negative post of the battery bank or the ground side of a current shunt. Do not use the chassis frame as the negative conductor. Tighten securely. The positive battery cable must be fused and connected to the positive post of the battery bank.

The recommended DC fuses for outputs 1, 2 and 3 are:

Model Chagemaster	DC fuse
12/25-3	30A
24/12-3	15A

The fuse with the fuse-holder is available from your local Mastervolt distributor or Customer Service Representative.

### 3.3.2 AC-wiring

The AC cable and is pre-assembled to the Chargemaster. The following wiring colours apply:

Wire color	Meaning	Connect to:
Brown	Hot/Line/ Phase	L1
Blue	Neutral	N
Green/Yellow	PE / Ground	PE / GND

### 3.3.3 AC safety grounding



#### WARNING!

The ground wire offers protection only if the enclosure of the Chargemaster is connected to the safety ground. Connect the ground terminal (PE / GND) to the hull or the chassis.



#### CAUTION!

For safe installation it is necessary to insert a Residual Current Device (earth leakage switch) in the AC input circuit of the Chargemaster.

### 3.4 BATTERIES

Always follow the instructions published by battery manufacturer. The minimum required battery capacity for Mastervolt gel batteries (MVG series) is as follows:

Model Chargemaster	Minimum required battery capacity (MVG series)
12/25-3	55Ah
24/12-3	25Ah

### 3.5 THINGS YOU NEED

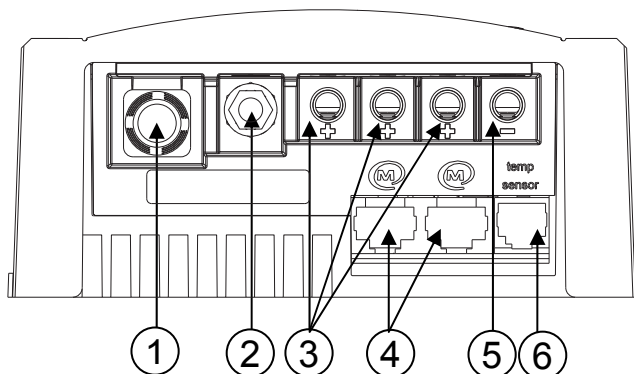
Make sure you have all the parts you need to install the Chargemaster:

- ChargeMaster (included)
- Battery temperature sensor with cable and plug (included)
- DC cables to connect the Chargemaster to the DC-distribution; see section 3.3.1 for specifications
- DC-fuse holder with a DC-fuse, to be integrated in the positive DC-cable; see section 3.3.1 for specifications
- Screws / bolts (Ø 4.5mm) (with plugs) to mount the enclosure to a surface. Use mounting materials which are suitable to carry the weight of the ChargeMaster.
- Batteries; see section 3.4
- Appropriate and reliable cable terminals, cable lugs, battery terminals and cord end terminals

We recommend as a minimum tool kit:

- Flat blade screw driver 1.0 x 4.0 mm to fix the DC cables
- Socket wrench 8mm to fix the Safety ground connection
- Tools to fix the screws / bolts (Ø 4.5mm) with plugs to mount the enclosure to a surface

### 3.6 OVERVIEW CONNECTIONS



1. AC cable
2. Safety ground connection
3. Positive charge output terminal (3x)
4. MasterBus connector (2x)
5. Common negative output terminal
6. Temperature sensor jack

Figure 6: Overview connections

**3.7 CONNECTION**



**WARNING**

Let installation work be done by a licensed electrician.

All electrical systems (AC and DC) must be disconnected from any power source during the entire installation!



**CAUTION!**

Short circuiting or reversing polarity may seriously damage the batteries, the ChargeMaster, the cabling and/or the terminal connections. Fuses between the batteries and the ChargeMaster can not prevent damage caused by reversed polarity. Reverse polarity damage is detectable by the service department and not covered by the warranty.



**CAUTION!**

Too-thin cables and/or loose connections can cause dangerous overheating of the cables and/or terminals. Therefore tighten all connections well, in order to limit transition resistance as far as possible. Use cables of the correct size.



**NOTE:**

If the battery temperature remains within 15-25°C, connection of the battery temperature sensor is optional.



**NOTE:**

The Chargemaster is only feasible for the connection of MasterBus compatible remote control panels.

**3.7.1 Connection example**

This schematic is to illustrate the general placement of the ChargeMaster in a circuit. It is not meant to provide detailed wiring instructions for any particular electrical installation

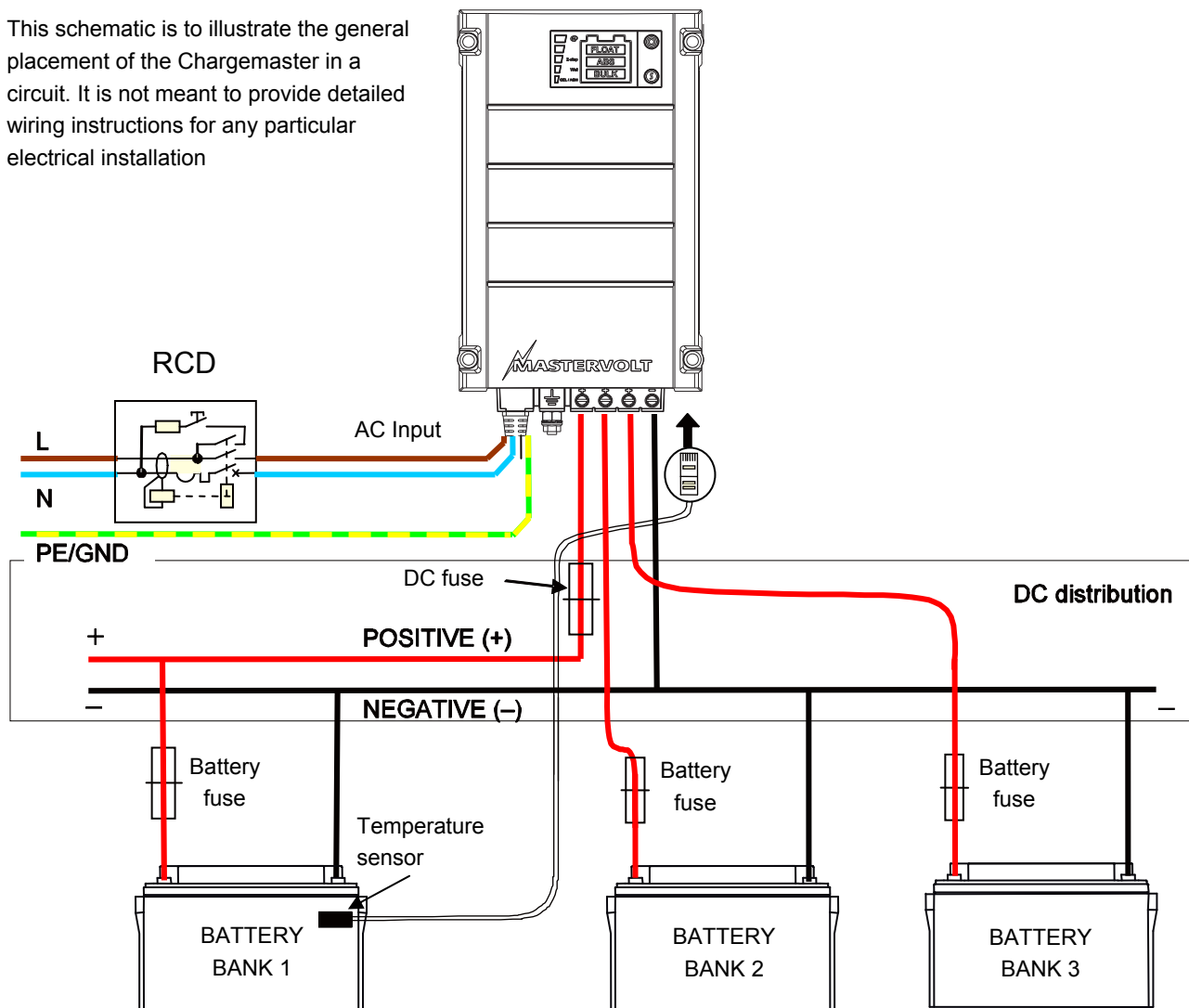
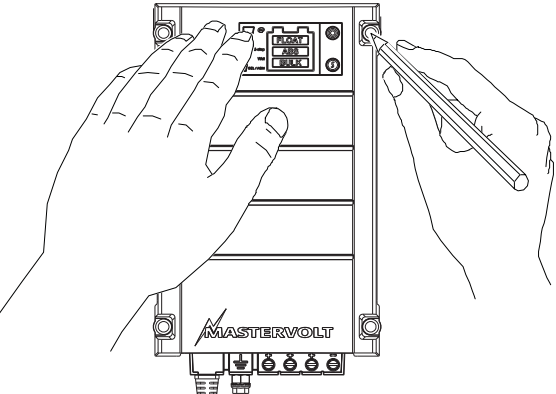


Figure 7: Connection example of the ChargeMaster

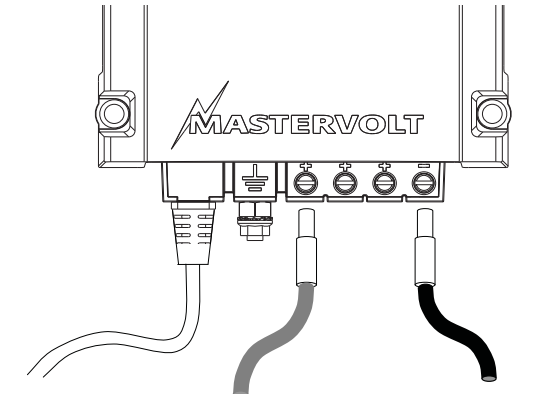


## 3.8 INSTALLATION STEP BY STEP

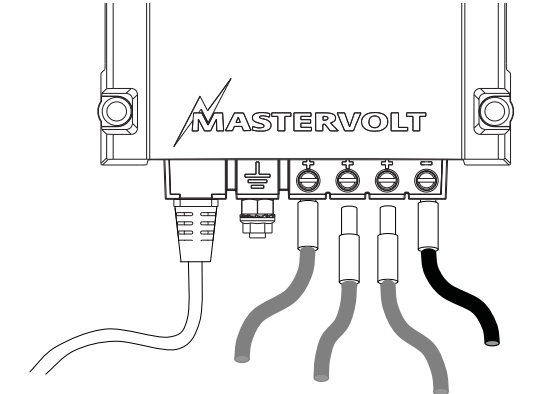
**1** Mark the position of the four mounting spots. Then fix the charger to the wall.



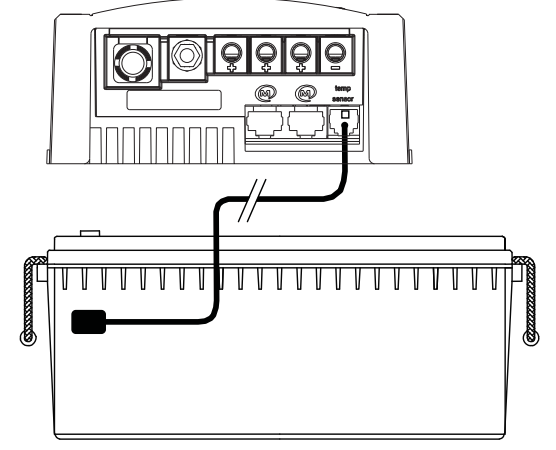
**2** Fit boot lace ferrules to the DC-cables. Connect the DC-cabling of battery bank 1, positive to +, negative to - .



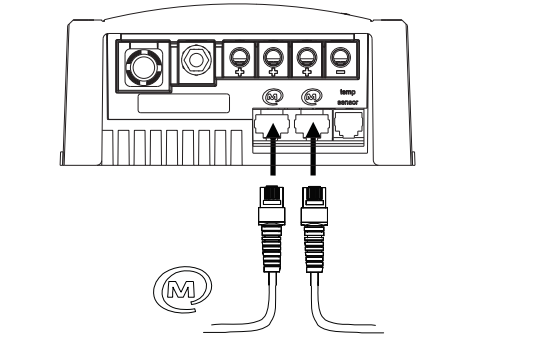
**3** Option: Connect the DC-wiring of the second and third battery bank. These battery banks should have a common negative with the main battery (see Figure 7).



**4** Attach the battery temperature sensor to the casing of battery bank 1. Plug the temperature sensor cable into the "temp.sensor" jack.



**5** Option: Connect the ChargeMaster to the MasterBus network. See APPENDIX.



**6** Connect the AC wiring. See section 3.3.2.

**7** Check all wiring; see also Figure 7 for wiring details.

**8** Continue with section 3.9 for commissioning of the ChargeMaster.

### 3.9 COMMISSIONING AFTER INSTALLATION

#### 3.9.1 General



If your ChargeMaster is not new, you have to take into account that former users may have changed the settings. Reset the ChargeMaster to Factory Settings when there is any doubt (see section 4.3.4).

The factory settings of the ChargeMaster are optimal for most installations. With some applications however, it is desirable to change these settings. Therefore several adjustments can be made. See chapter 4.



**NOTE:**  
Customer specific settings can only be made *after* commissioning.

#### 3.9.2 Commissioning step-by-step



##### CAUTION!

Check the polarity of all wiring before commissioning: positive connected to positive (red cables), negative connected to negative (black cables).

- 1 If all wiring is OK, place the DC-fuse(s) of the DC-distribution to connect the batteries to the Chargemaster.



##### WARNING

When placing this fuse, a spark can occur, caused by the capacitors used in the ChargeMaster. This is particularly dangerous in places with insufficient ventilation, due to the gassing of the batteries an explosion can occur. Avoid having flammable materials close by.

- 2 Switch on the AC power supply

After switching on the AC power supply the ChargeMaster will initiate the charging process.

#### 3.9.3 MasterBus (optional)

During first commissioning the Chargemaster will be recognized by the MasterBus network automatically. The remote control panel of the MasterBus network will indicate that a new device was found.

Some settings can only be changed via the MasterBus interface. See section 4.3 for an overview of all available MasterBus settings. Refer to the user's manual of the remote control panel to change these settings.

#### 3.10 DECOMMISSIONING

To put the ChargeMaster out of operation, follow these instructions in order of succession:

- 1 Switch off the AC power supply of the ChargeMaster.
- 2 Remove the DC-fuse(s) and disconnect the batteries.
- 3 Check with a suitable voltage meter whether the inputs and the outputs of the Chargemaster are voltage free.
- 4 Disconnect all the wiring.

Now the Chargemaster can be demounted in a safe way.

#### 3.11 STORAGE AND TRANSPORTATION

When not installed, store the ChargeMaster in the original packing, in a dry and dust free environment.

Always use the original packing for transportation. Contact your local Mastervolt Service Centre for further details if you want to return the apparatus for repair.

#### 3.12 RE-INSTALLATION

To reinstall the Chargemaster, follow the instructions as described in this chapter (chapter 3).

## 4 SETTINGS

Adjustment of the settings of the ChargeMaster can be made in two different ways:

- By entering the Settings Mode on the front panel; see section 4.1
- Via the MasterBus network; see section 4.3.



### CAUTION

Invalid settings of the ChargeMaster can cause serious damage to your batteries and/or the connected load! Adjustments of settings may be undertaken by authorised personnel only.






### 4.1 SETTING MODE

#### 4.1.1 Charge programs

Four different pre-set charge programs can be selected by means of the Setting Mode.



Press the SET button (Figure 2) shortly to display the actual setting for the charge program.

Load bar	Yellow LED
	<b>Setting mode</b>
	Connected to MasterBus (read only)
	MLi
	2-step
	Wet
	Gel/AGM

Setting	Charge program:
MLi	On = Mastervolt MLi battery (Li-ion)
2-step	On: Constant voltage charging (13.8/27.6V) Off = IUoUo, fully automatic / 3step+
Wet	On= Flooded batteries or custom defined via the MasterBus network
Gel/AGM	On= GEL or AGM batteries

To select one of the pre-set charge programs, you have to get access to the Setting Mode. To do so:

- Hold the SET button (Figure 2) pressed until the Gel/AGM LED starts blinking
- Press the SET button shortly to scroll through to the desired pre-set charge program as described above.
- Hold the SET button pressed until the LED stops blinking to confirm the desired charge program.

After confirming the the desired charge program, the Chargemaster returns to the normal operation mode. When no button is touched during 60 seconds, the Chargemaster returns to the normal operation mode without changing a setting.



You can select only one of the available pre-set charge programs. For advanced settings, refer to section 4.3

#### 4.1.2 CEC Energy saving mode



The CEC Energy saving mode is only available on battery chargers that have the BC logo on the Identification label (see section 1.4)

The CEC Energy saving mode is used to meet the requirements of the California Energy Commission (CEC). When enabled, the charger switches to stand-by after finishing the Absorption phase of the three-step charge algorithm. This mode is applicable for battery charging systems in the USA only.

To enable the Energy saving mode:

- Press the SET button (Figure 2) shortly for 5 times; the the actual setting for the Energy saving mode is shown:

Setting	Yellow LED's
Energy saving mode disabled (factory setting)	Bulk + Absorption + Float
Energy saving mode enabled.	Bulk + Absorption

- Press the SET button shortly to select the desired setting for the Energy saving mode as described above.
- To confirm the desired setting, hold the SET button pressed until the LED returns to the normal operation mode.

Minimum battery capacity to meet the requirements of the CEC regulations:

Model Chagemaster	Battery capacity
12/25-3	>200Ah
24/12-3	>160Ah

## 4.2 EQUALIZE MODE



### WARNING

Incorrect use of the equalize mode may lead to hazardous situations.

Do not smoke; use any naked flame or other sources of ignition due to risk of explosion.

Always ventilate the room where the batteries are located and equalized to clear the air.

Equalization is **ONLY** applicable for flooded type batteries and will damage gel, AGM and MLI type batteries.

An equalizing charge can be necessary after very deep discharges and/or inadequate charges. This has to be carried out according to the specifications of the manufacturer of the batteries.

During equalizing the batteries are brought into the gas state and it is possible that the permitted load voltages are exceeded. Therefore appropriate measures must be taken, e.g. disconnect all loads from the battery and ventilate the room. For these reasons use of the equalizing

mode should only be executed by trained technical engineers.

The equalizing mode can only be started when the Chagemaster is in operation and in Float mode. The equalize mode can only be started by means of MasterBus (see section 4.3.4).

## 4.3 MASTERBUS FUNCTIONS

Adjustment of the settings of the ChargeMaster can be made via the MasterBus network (by means of a remote control panel or an interface connected to a PC with MasterAdjust software).



See APPENDIX for more information about MasterBus.

The electric power for the MasterBus network comes from the connected devices. At least one device in the network should have powering capabilities (see specifications). One powering device can power up to three non-powering devices. As long as the Chagemaster is switched on, it will power the MasterBus network. However, when switching off the Chagemaster by means of a MasterBus command (for instance by means of a MasterBus Remote control panel), the Chagemaster will not power the MasterBus anymore. This may lead to loss of communication if no other MasterBus powering device is present. This will even make it impossible to switch on the charger again! Therefore, make sure that there is always a correct balance between MasterBus powering and non-powering devices in the MasterBus network

## 4.3.1 Monitoring

Value	Meaning	Default	Adjustable range
<b>General</b>			
State	Shows charger state (Charging / Stand by / Alarm)		(read only)
On/Stand-by	Button to toggle the charger state		On / Stand-by
Input current	Option to set the maximum AC input current to prevent a generator or shore fuse from overload situations	8.0A	0.0 – 8.0A
Charge State	Actual state of charge algorithm: Bulk/absorption/float		(read only)
Battery temp.	Actual temperature of the main battery bank (in °C)		(read only)
<b>Output</b>			
Charge current	Total output current of charge outputs 1, 2 and 3		(read only)
Output 1	Voltage of charge output 1		(read only)
Output 2	Voltage of charge output 2		(read only)
Output 3	Voltage of charge output 3		(read only)

## 4.3.2 Alarm

Value	Meaning	Default	Adjustable range
<b>Charger</b>			
Temp sense error	Battery temperature sensor is in short circuit		(read only)
Temp error	Battery temperature is out of range <-20°C (-4°F) or >55°C (131°F)		(read only)
Output high	DC output voltage is too high		(read only)
Output low	DC output voltage is too low		(read only)
MSH out of range	DC output voltage of the Chargemaster differs more than 3.0V from the voltage measured by the Mastershunt		(read only)

## 4.3.3 History

This menu shows the absolute maximum readings.

Value	Meaning	Factory setting	Adjustable. range
<b>Charger</b>			
Ah charged	Total Ampere hours charged (Ah)		(read only)
Total run time	Total run time in charger mode (hours)		(read only)
Temp. Shutdown.	Number of temperature shutdowns		(read only)
Low DC Shutdown	Number of low DC voltage shutdowns		(read only)
High DC Shutdown	Number of high DC voltage shutdowns		(read only)
<b>Battery 1</b>			
Lowest DC volt	Lowest detected DC voltage output 1		(read only)
Highest DC Volt	Highest detected DC voltage output 1		(read only)
<b>Battery 2</b>			
Lowest DC volt	Lowest detected DC voltage output 2		(read only)
Highest DC Volt	Highest detected DC voltage output 2		(read only)
<b>Battery 3</b>			
Lowest DC volt	Lowest detected DC voltage output 3		(read only)
Highest DC Volt	Highest detected DC voltage output 3		(read only)

#### 4.3.4 Configuration

Below parameters can be changed via the MasterBus network by means of a remote control panel or by means of an interface connected to a PC with MasterAdjust software. See applicable user's manuals for details.

Value	Meaning	Factory setting	Adjustable. range
<b>General</b>			
Language	Language that is displayed on a monitoring device connected to the MasterBus	English	EN, NL, DE, FR, ES, IT, NO, SV, FI, DA
Product Name	Name of this device. This name will be recognized by all devices connected to the MasterBus	CHG CM+type*	0-12 chars
Output 1	Name of the battery bank connected to charge output 1	Output 1	0-16 chars
Output 2	Name of the battery bank connected to charge output 2	Output 2	0-16 chars
Output 3	Name of the battery bank connected to charge output 3	Output 3	0-16 chars
Factory Settings	Reset to factory settings		(button)
<b>Charge current</b>			
Max. current	Setting of the maximum output current	$I_{max}$	1A - $I_{max}$
<b>Battery type</b>			
Battery type	Selection of pre-set charge algorithm. Individual adjustments of <i>Bulk</i> , <i>Absorption</i> and <i>Float</i> are only possible if "User defined" is selected here.	Flooded	Flooded, AGM, Gel, MLI, Flooded traction, User defined
<b>Mastershunt</b>			
Mastershunt	A connected MasterShunt can be chosen for feedback on the charged battery.	No connection	No connection, MSH + Product Name
<b>Bulk</b>			
Bulk voltage	Bulk voltage (@ 25°C); see section 2.4	14.40/28.80V	0-15.50/0-31.00V
Max. bulk timer	Maximum time of the Bulk phase since <i>Start bulk timer</i>	480 min	0-1440min
Min bulk timer	Minimum time of the Bulk phase since <i>Start bulk timer</i>	120sec	0-240sec
Start bulk timer	Battery voltage trigger point to start the bulk timer	13.25/26.50V	(read only)
<b>Absorption</b>			
Abs. voltage	Absorption voltage (@ 25°C); see section 2.4	14.25/28.50V	0-15.50/0-31.00V
Max absorp. time	Maximum absorption timer	240min	0-1440min
Min absorp. time	Minimum absorption timer	15min	0-240min
Return amps	Return amps. If the charge current drops below this level, the charger switches from the Absorption to the Float stage (% of $I_{max}$ )	6%	0-50%
<b>Float</b>			
Float voltage	Float voltage (@ 25°C); see section 2.4	13.25/26.50V	0-15.50/0-31.00V
Constant voltage	Charge voltage (@ 25°C) if the charger is set to the Constant voltage charging (2-Step) mode; see section 4.1	13.80/27.60V	0-15.50/0-31.00V
Return to bulk	Return to bulk voltage; If the battery voltage stays below this level for at least the <i>Return to bulk delay time</i> , the charger will start the Bulk stage	12.80/25.60V	0-15.50/0-31.00V
Return to bulk	Return to bulk delay time, see <i>Return to bulk voltage</i>	30sec	0-240sec
<b>Alarms</b>			
DC High on	Upper threshold level to trigger the DC-High alarm	16.00/32.00V	0-16.00/0-32.00V
DC High off	Lower threshold level to stop the DC-High alarm	15.50/31.00V	0-16.00/0-32.00V
DC Low on	Lower threshold level to trigger the DC-Low alarm	10.00/20.00V	0-16.00/0-32.00V
DC Low off	Upper threshold level to stop the DC-Low alarm	11.00/22.00V	0-16.00/0-32.00V
Alarm Delay	Delay time to trigger the DC-Low alarm	30sec	0-240sec
<b>Equalization</b>			
Equalize voltage	Voltage compensation for Equalize charging	+2.25/+4.50V	0 - +2.25/+4.50V
Max equalize tim	Max equalize timer	240min	0-1440min

Value	Meaning	Factory setting	Adjustable. range
Equalize mode	Shows whether the Equalize mode is active ("On") or not ("Off")		(read only)
Equalize	Button to start the equalize mode manually See section 4.2. The equalize mode can only be started when the charger is in the Float stage.		Button
<b>Front panel</b>			
Battery type	Shows the selected <i>Battery type</i> . See <i>Battery type</i> or section 4.1.1 for setting		(read only)
Charge algorithm	Shows the selected Charge algorithm. This setting can only be changed by means of the Setting Mode. See section 4.1.1		(read only)
<b>AC off</b>			
MasterBus on	Option to keep MasterBus powered when the AC supply is switched off. Note that this setting may slowly drain the battery.	Off	Off, On
<b>Charge mode</b>			
CEC charge mode	California Energy Commission (CEC) Energy saving mode setting; see section 4.1.2.	Off	Off, On

\* Depending on model: CM12/25, CM24/12

### 4.3.5 Events

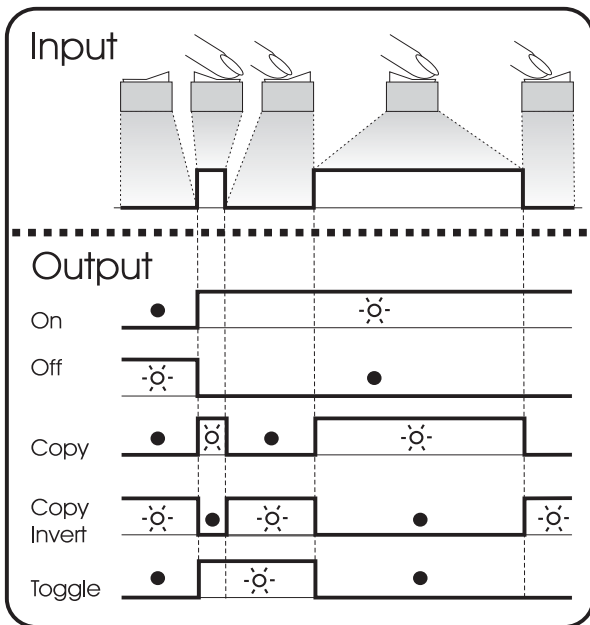


Figure 12 shows the meaning of the event data.

#### Input (pulses)

The input is represented by an on/off switch.

#### Output (data)

**On** changes the status to On at the first signal.

**Off** changes the status to Off at the first signal.

**Copy** lets the status follow the input.

**Copy Invert** lets the status follow the opposite of the input  
**Copy** is used for dimming too by holding the pulse switch pressed for a longer time.

**Toggle** changes the status at the first signal and back at the second signal. It is used in combination with a pulse switch.

Figure 12: Event data

Value	Meaning	Factory setting	Adjustable. range
<b>Events</b>			
Event x source	<i>Event-based command</i> Event by the ChargeMaster that should result in an action by another device on the <i>MasterBus</i> network.	Disabled	(See List of event sources, section 4.3.6)
Event x target	<i>Event-based command</i> Selection of device on the <i>MasterBus</i> network that should take action due to an event by the ChargeMaster.		(See Device list)
Event x command	<i>Event-based command</i> Action to be taken by the selected device.		(See <i>List of event commands</i> in the manual of the selected device.)
Event x data	<i>Event-based command</i> Value of the action to be taken by the selected device.		(See <i>List of event commands</i> in the manual of the selected device.)
Event x+1	The next event appears after enabling Event x.	Disabled	See Event x.

**4.3.6 List of event sources (ChargeMaster as event source)**

Below the list of event sources of the *ChargeMaster* is shown. These event sources can be used to initiate an event command and an event action at another device that is connected to the *MasterBus*.

Event source	Description
Not used	(no event programmed)
On	ChargeMaster state is On
Bulk	State of charge is Bulk
Absorption	State of charge is Absorption
Float	State of charge is Float
Failure	Charger failure <i>MasterBus</i> alarm
LED 1	Bottom yellow LED of the <i>MasterView Read Out</i> illuminates (see manual <i>MasterView Read Out</i> )
LED 2	2nd yellow LED from bottom of the <i>MasterView Read Out</i> illuminates (see manual <i>MasterView Read Out</i> )
LED 3	3rd yellow LED from bottom of the <i>MasterView Read Out</i> illuminates (see manual <i>MasterView Read Out</i> )
LED 4	4th yellow LED from bottom of the <i>MasterView Read Out</i> illuminates (see manual <i>MasterView Read Out</i> )
LED 5	Top yellow LED of the <i>MasterView Read Out</i> illuminates (see manual <i>MasterView Read Out</i> )

**4.3.7 List of list of event commands (ChargeMaster as event target)**

Below is shown the list of event commands and event data of the *ChargeMaster*. Other devices connected to the *MasterBus* can be programmed to initiate these commands and actions at the *ChargeMaster*.

Event command	Description
State	Command to switch on the ChargeMaster
Bulk	Command to start the Bulk state of charge
Abs	Command to start the Absorption state of charge
Float	Command to start the Float state of charge



## 5 TROUBLE SHOOTING

If you cannot solve a problem with the aid of this chapter, contact your local Mastervolt Service Centre. Make sure you have the following information present if you have to contact your local Mastervolt Service Center to solve a problem:

- Article and serial number; see section 1.4.
- Firmware version; double click on ChargeMaster icon in MasterView System software Configuration.

Malfunction	Possible cause	What to do
No output voltage and/or current	No AC-input	Check AC wiring, check remote control panel.
	AC-input voltage too low (< 90VAC)	Check input voltage, check generator.
	AC input frequency out of range	Check input voltage, check generator.
Output voltage too low, charger supplies maximum current	Load that is connected to the batteries is larger than charger can supply.	Reduce load taken from the batteries.
	Batteries not 100% charged	Measure battery voltage. After some time this will be higher.
	Wrong setting of the charge voltages	Check settings (see chapter 4).
Charge current too low	Batteries almost fully charged	Nothing, this is normal when the battery is almost fully charged.
	High ambient temperature	Nothing; if ambient temperature is more than the setting limit the charge current is automatically reduced.
	Low AC input voltage. At lower AC input voltages the charge current is reduced. See APPENDIX.	Check AC-input voltage.
Batteries not fully charged	Charge current too low	See "Charge current too low" in this table.
	Current to load is too high	Reduce load taken from the batteries.
	Charge time too short	Use a battery charger with higher capacity.
	Battery temperature too low	Use the battery temperature sensor.
	Defective or old battery	Check battery and replace if necessary.
Batteries are discharged too fast	Wrong setting of the charge voltages	Check settings (see chapter 4).
	Battery capacity reduced due to wastage or sulphation, stagnation	Charge and recharge a few times, this might help. Check battery and replace if necessary.
Batteries are too warm, gassing	Defective battery (short circuit in cell)	Check battery and replace if necessary.
	Battery temperature too high	Use the battery temperature sensor.
	Charge voltage too high	Check settings (see chapter 4).
No MasterView display function.	Display is switched off.	Switch on display, refer to display manual.
	Error in the wiring.	Check the MasterBus cables.
Slow or no MasterBus communication.	Error in the MasterBus wiring.	Check the MasterBus cables.
	No terminating device placed at the ends of the network.	MasterBus needs a terminating device on both ends of the network. Check if connected.
	MasterBus network is configured as a ring network.	Ring networks are not allowed. Check the connections of the network.
ChargeMaster cannot be switched on through MasterBus	No powering MasterBus device available; See section 4.3	Add a powering device to the MasterBus.

## 6 TECHNICAL DATA

### 6.1 SPECIFICATIONS

Model	12/25-3	24/12-3
Article no.	44010250	44020120
Nominal input voltage**:	120/230V	120/230V
Nominal input frequency:	50/60Hz	50/60Hz
Full load consumption:	450VA	435VA
Efficiency at full load (@ 230V AC):	≥81% (V <sub>o</sub> =13.25V, I <sub>o</sub> =25A)	≥84% (V <sub>o</sub> =26.5V, I <sub>o</sub> =12A)
Nominal output voltage*:	12V	24V
Total maximum charge current (I <sub>max</sub> ):	25A at 13.25V / 13.5V	12A at 26.5V / 27.0V
Number of battery outputs:	3	3
Output voltage range adjustable*	0 to 15.5V DC	0 to 31V DC
Charge characteristic*:	I <sub>UoUo</sub> , automatic, three step	I <sub>UoUo</sub> , automatic, three step
Charge voltage Bulk*:	14.4V (MLi: 14.25V)	28.8V (MLi: 28.5V)
Charge voltage Absorption*:	14.25V	28.5V
Charge voltage Float*:	13.25V (AGM, GEL: 13.8V, MLi: 13.5V)	26.5V (AGM, GEL: 27.6V, MLi: 27.0V)
Max. Absorption and max. Bulk timer*:	8 hours (start max. bulk timer at 13.25V)	
Minimum absorption time*:	15 min.	15 min.
Maximum ripple voltage on DC	≤100mV pp	≤200mV pp
Battery type settings*:	Flooded / gel / AGM / spiral / MLi (adjustable by means of display or MasterBus)	
Dimensions in mm/ inch:	See section 6.2	See section 6.2
Weight:	< 1.8 kg/ 4.0Lbs including AC cable	< 1.8 kg/ 4.0Lbs including AC cable
Recommended battery capacity:	> 55 Ah (see section 3.4)	> 25 Ah (see section 3.4)
Input Power factor	≥ 0.98	≥ 0.98
Voltage compensation	Yes	Yes
Temperature compensation	Yes, automatic compensation with battery temperature sensor.	
DC consumption, MasterBus OFF ***	<2mA	<2mA
DC consumption, MasterBus ON ***	85mA	100mA
Temperature range	-25°C ... 60°C / -13°F ... 140°F. Power derating 2.85%/°C (5.13%/°F) above 25°C / 77 °F to decrease the internal temperature. From -25°C to 0°C / -13°F to 32°F, 90% derating.	
Cooling	Vario fan and natural cooling to ensure optimized cooling.	
Sound level	<50dBA / 1m	<50dBA / 1m
Protection degree	IP23	IP23
MasterBus connectivity	Yes	Yes
Powering capabilities for MasterBus	Yes, when the charger is switched on, it can power up to three non-powering devices. See section 4.3	
MasterBus languages available	EN, NL, DE, FR, ES, IT, NO, SV, FI, DA	

\* Adjustable, see chapter 4 for settings.

\*\* See also APPENDIX for AC input characteristics

\*\*\* See section 4.3.3 for settings (AC off- MasterBus on)

Specifications are subject to change without prior notice.

## 6.2 DIMENSIONS

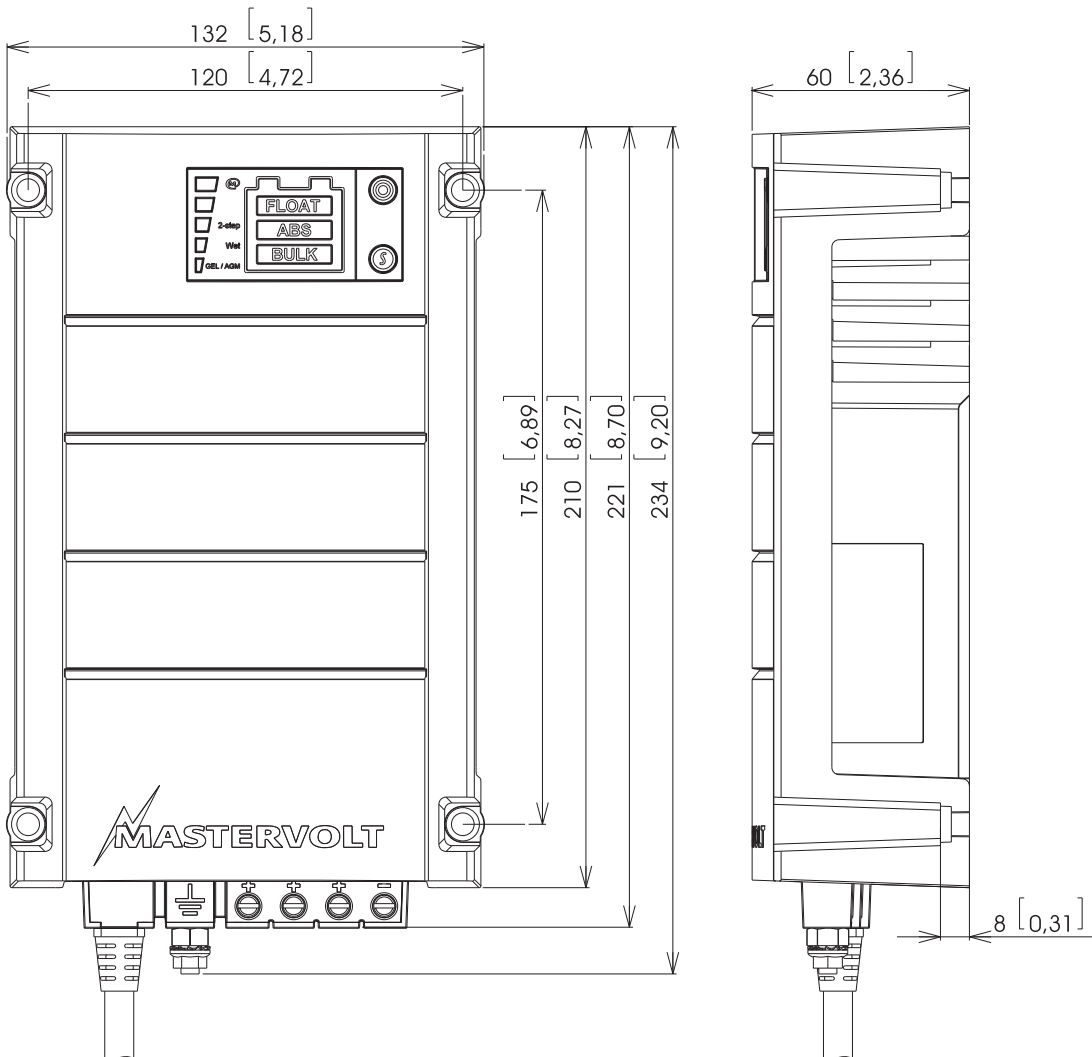


Figure 13: Dimensions in mm [inch] Chargemaster models 12/25-3 and 24/12-3

## 6.3 CORRECT DISPOSAL OF THIS PRODUCT (WASTE ELECTRICAL & ELECTRONIC EQUIPMENT)



This product is designed and manufactured with high quality materials and components, which can be recycled and reused. When this crossed-out wheeled bin symbol is attached to a product, it means the product is covered by the European Directive 2012/19/EU.

Please be informed about the local separate collection system for electrical and electronic products.

Please act according to your local rules and do not dispose of your old products with your normal household waste. The correct disposal of your old product will help prevent potential negative consequences to the environment and human health.

## 7 ORDERING INFORMATION

### 7.1 MASTERBUS INSTALLATION COMPONENTS

Part number	Description
77040000	MasterBus terminating device
77040020	MasterBus connection cable (UTP patch cable), 0,2m / 0.6ft
77040050	MasterBus connection cable (UTP patch cable), 0,5m / 1.6ft
77040100	MasterBus connection cable (UTP patch cable), 1,0m / 3.3ft
77040300	MasterBus connection cable (UTP patch cable), 3,0m / 10ft
77040600	MasterBus connection cable (UTP patch cable), 6,0m / 20ft
77041000	MasterBus connection cable (UTP patch cable), 10m / 33ft
77041500	MasterBus connection cable (UTP patch cable), 15m / 49ft
77042500	MasterBus connection cable (UTP patch cable), 25m / 82ft
77050100	100m / 330ft MasterBus cable (UTP cable)
77050200	50 pcs. modular jacks
77050000	Complete set to assemble UTP patch cables. Delivery includes: 100m / 330ft UTP cable, 50 pcs. modular jacks and crimping tool
77030100	MasterConnect USB interface, required as interface between your PC and the MasterBus when using MasterAdjust software.
77010305	MasterView Easy MkII, Touch screen to control and monitor all MasterBus products
77010400	MasterView System, Full-colour touch screen to control and monitor all MasterBus products
77020100	MasterShunt 500, DC-distribution module for exact readout of battery voltage, charge / discharge current, and state of charge on the display of the ChargeMaster. continuous rating: 250A, peak current: 500A

### 7.2 MISCELLANEOUS

Part number	Description
604015	ATC Fuse 15A (2 pcs)
604030	ATC Fuse 30A (2 pcs)
607017	In line ATC Fuse holder
701	Battery switch 275A with knob
41500500	Battery temperature sensor, incl. 6 metres / 19 ft cable
41500800	Battery temperature sensor, incl. 15 metres / 49 ft cable
77040000	MasterBus Terminator

Mastervolt offers a wide range of products for your electrical installation, AGM, Gel and MLI (Li-ion) batteries, shore power connections, DC distribution kits and many more.

