

8 Battery charger and batteries

8.1 Changing the battery

 Use only batteries provided by CMC.

1. Put the machine being controlled in to a safe position.
2. Turn the terminal OFF.
3. Remove the battery and insert a fully charged one.
4. Turn the terminal ON.
5. Hot swap
 - Terminals with 2 battery compartments can continue to operate without being switched off. Replace only one battery at a time.



8.2 Storage recommendation of battery

The capacity loss of the Li-Ion battery during storing is approx. 5 - 10% per month. The batteries should be fully charged when stored.

Ensure that the batteries are stored in a non condensing atmosphere with no corrosive gas. Avoid direct sunlight, high temperature and high humidity.

Recommended storing temperatures:


Less than 30 days:	-20 to +45°C.
Between 30 and 90 days:	-20 to +30°C.
More than 90 days:	-20 to +20°C.


Life expectation of the battery depends of storage and use. With correct use you can expect 500 cycles without a significant drop in battery capacity.


8.3 Battery charger installation and use


Read these instructions before using the charger


- Consult instructions for use, symbols on charger are meant to support, not replace, these operating instructions.



- This charger applies to the essential requirement of the applicable EC directives.



- The charger is designed for indoor use and should not be exposed to water or dust.


- Do not cover up the charger when in use.
- The charger is turned on by connecting it to mains socket (100 V to 230 V \sim) or to 12-24 V. --- Disconnecting turns it off.
- Control that the power cord is not damaged. If the cord is damaged, the charger must not be used.
- The mains socket should be easily accessible. If an operational error occurs, the plug should be immediately removed from the mains socket.


- The charger is double isolated (insulation class II).


- The charger contains dangerous voltages and the cover should not be removed. The charger is not serviceable. In case of not working it has to be replaced by a new charger. Contact nearest Cavotec sales representative (www.cavotec.com).


- Avoid the charger from coming into contact with oils, grease etc., as most types of plastic can be broken down by chemicals and solvents.
- Electrical and electronic equipment shall not be discarded with the municipal waste, but be disposed of using separate collection, treatment, recovery/recycling and environmentally sound disposal, according to local rules.

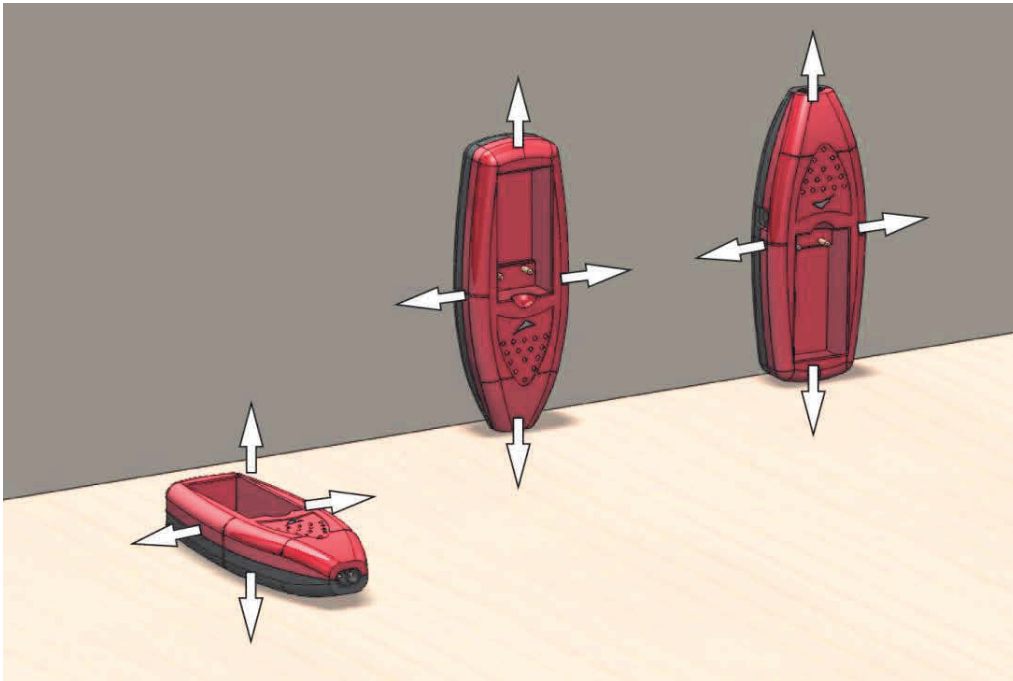

- The charger is intended to charge MC-3 series batteries from Cavotec Micro-control AS, Cavotec Micro-control AS have no responsibility for any injuries caused by other usage, not according to intended use.

Important

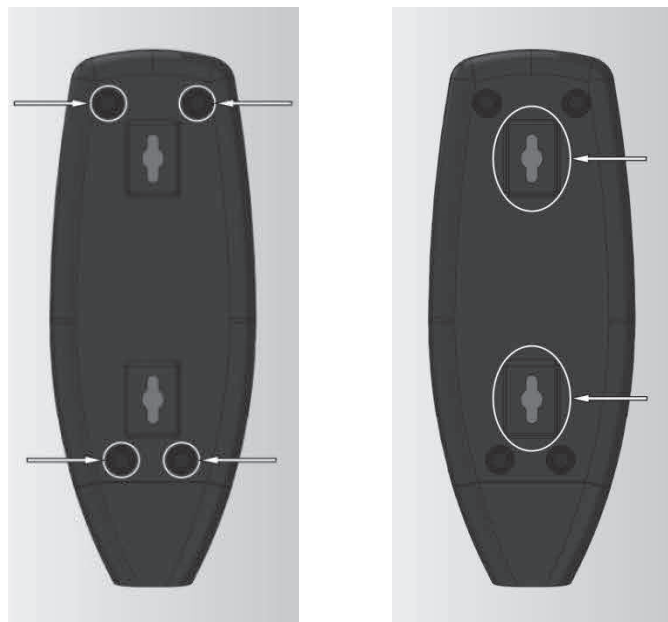
The charger is designed for indoor use only!

8.3.1 Placing and mounting of the charger

When the charger is connected to AC or DC current it shall be placed on a plane surface or mounted vertically on its longitudinal direction. See illustration pictures below.



On the battery chargers back side there is four rubber knobs which secure a stable placing. There are also two mounting holes for wall mounting on the back side. It is recommended to use 4mm screws with head diameter of \varnothing 5,5 – 7mm and head height of 1,5 – 2mm. Screw type and length need to be adapted to which material and thickness of the wall it shall be mounted on. See illustration pictures below.



8.3.2 Charger description and functionality

The MC-3 series charger is designed for CMC battery packs, MC-BATTERY3 and MC-EX-BATTERY3. The battery packs contain two 3,7 V Lithium Ion batteries connected in series. Charge end voltage is 8.4 V. Capacity of the battery pack is 1600-2030 mAh for the MC-BATTERY3 and 1100-1230 mAh for the MC-EX-BATTERY3.

The MC-3 series charger is an advanced charger for Li-Ion batteries. It is developed for optimal performance and battery power conservation.

The charger is equipped with one tri-color LED (light emitting diode) at the front displaying charge status. The charger may be used for 100-230 V_{AC}/50 and 60Hz or for 12V_{DC}-24 V_{DC}. (only AC or DC at a time, not both). The charger is designed for DC operation in vehicles. AC and DC has separate inputs. The battery compartment is on the top of the charger.

The charger should not be used to charge other batteries than Micro-control batteries!

The MC-3 series charger is a constant current charger during the main period of charging. When the battery voltage is below a certain level, the charger is in constant current mode, delivering close to 1100 mA. Fast charge continues until voltage is close to 8.4 V, then the charger goes into constant voltage mode and charge current decreases. Charge termination occurs when charge current is about 100 mA. Typical charge time for MC-BATTERY3 is 2,5 hours and for the MC-EX-BATTERY3 is 1,5 hours. The battery capacity will decrease during the battery lifecycle, when capacity is to low (to low operational time) then replace the batteries with new ones.

8.3.3 Charger operating instructions

Normal charge cycle

To charge a MC-BATTERY3 or MC-EX-BATTERY3, simply place it into the MC-3 series charger. Charging will start automatically when the battery is inserted. Red LED light indicates charging. If the charger/battery is outside temperature limits, charging will not take place and the LED will indicate yellow. Green LED indicates a fully charged battery. The charger is not intended for continuous use, after a charge cycle is completed the battery shall be removed and the power disconnected.

DC power cord

Connection of the DC power is on the ROKA connector on the left side of the charger. The center lead is +. This is also marked on the cord. The -lead is the ribbed cord, +lead is at the smooth cord



Indicators

The MC-3 series charger is equipped with one LED, placed on front, close to the battery compartment. Charger status is indicated by the following LED colors:

Charge status	LED
Battery absent	Green
Temperature charge cutoff	Yellow
Battery inserted with no supply voltage	Yellow
Fast charging	Red
Charge complete	Green




8.3.4 Charger ordering numbers from CMC

Versions

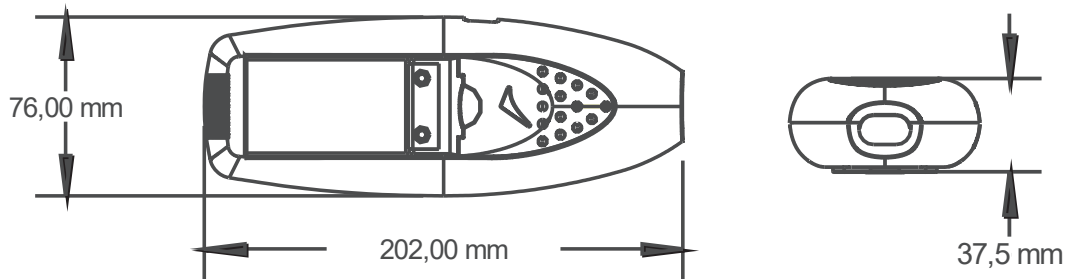
There is only one version of the MC-3 series charger covering virtually all different supply voltages. To apply to different main supply voltage standards there is different mains supply cords. All ordering numbers are listed below.

M5-1080-3600	Charger MC-3 series
M5-1140-3600	Power cord EUR/C7
M5-1140-3603	Power cord US/C7
M5-1140-3601	Power cord UK/C7
M5-1140-3602	Power cord AUSTR/C7
M5-1140-3604	DC power cord with plug
M5-1080-3699	Kit with charger and all 5 power cord.
M5-1051-3600	MC-BAT3
M9-1051-3600	MC-EX-BAT3

8.3.5 Charger general specifications

Input voltage	AC input: 100 - 230V  , max 150mA, 50 - 60 Hz DC input: 12 - 24V 
Operating Temperature Ambient	-20°C - +40°C
Storage Temperature	Charging takes place in the temperatur interval +10°C - +40°C only -25°C - +80°C
Humidity	10-90%
Max height for usage	2000 meters above sea level
Mounting of the PSU	Two key holes on the bottom of the unit support wall mounting in two directions
Galvanic Separation	Yes
Power inlet	AC: IEC conn 2,5A PCB RA DC: DC-connector 1,9mm pin Roka 520 2550  - terminal is the ribbed cord, + terminal is the smooth cord
Output connector	2x gold plated pin

8.3.6 Charger mechanical outline:



8.3.7 Charger cleaning/maintenance

With no battery or power connected to the charger, the charger can be carefully cleaned with a damp cloth.

8.3.8 Charger marking

