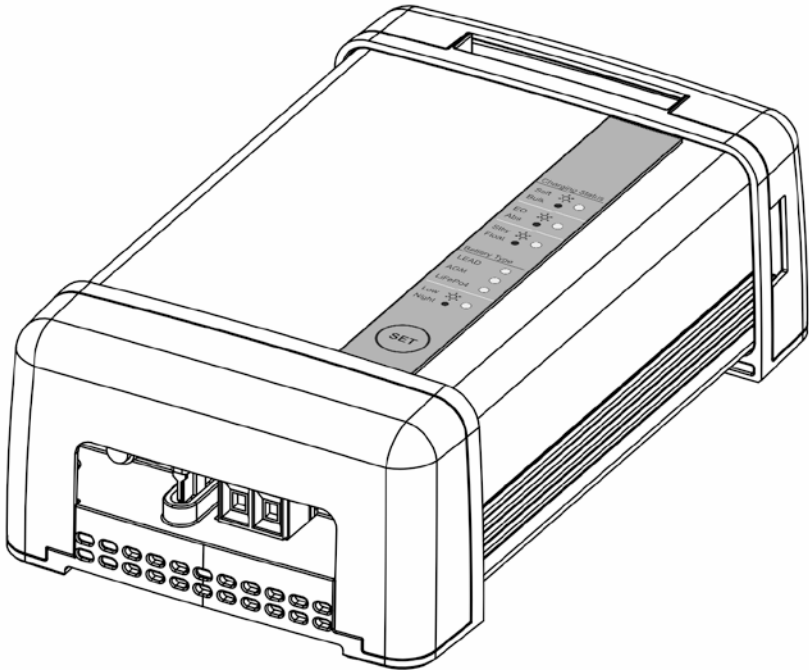


CBC-9120 / 9210

12V 20A / 24V 10A Pro. Charger

Operation manual



Keep this manual in a safe place for quick reference at all times.

This manual contains important safety and operation instructions for correct use of the battery charger.

Read through the manual and pay special attention to the markings and labels of the charger, battery and equipment connected to the battery system.

Pay special attention to **WARNING & PRECAUTIONS** used in this manual.

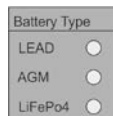
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Quick user guide

1. Check the rating label for correct AC voltage.
2. Connect to AC socket, Bulk LED is on then quickly moves to Abs LED
3. The LEAD LED is the default setting of battery type.
4. Disconnect AC and connect output to battery then reconnect AC.

USING THE SET BUTTON



Note: LEAD ● means LED for LEAD on panel indicator.

- a. Short Presses for battery type and DC source selection.
Short Presses on the SET button will cycle as below:
LEAD ●→AGM ●→LiFePo4 ●→13.5V ●●●→LEAD ● →AGM ● →LiFePo4 ●
→13.5V ●●●
Remark: ●●● 3 battery LED are on for 13.5V DC Source Mode
All 3 battery LED ●●● are on shows output set at 13.5V with 20A Max.
 - b. Just stop at your desired battery type DC Source Mode and charger.
*Will retain the selected setting even it has been disconnected from AC and battery.
 - c. Long Presses (5 sec) for LOW MODE, NIGHT MODE, EQ MODE & EXIT.
When battery type set at AGM or LiFePo4.
Long Press (5 sec)
for LOW→NIGHT→EXIT→LOW→NIGHT→EXIT→LOW→NIGHT→EXIT
When battery type set at LEAD
Long Press (5 sec)
for LOW→NIGHT→EQ→EXIT→LOW→NIGHT→EQ→EXIT→
5. LOW = Low Power Mode: LED flickers
to set charger to Half Power Mode of 15Amp Maximum.
 6. NIGHT = Night Mode: LED solid
8 hour without FAN cool and only 10Amp maximum output.
Charger return to normal max 20Amp at the end of 8 hours.
 7. Exit from Night mode or Low Power Mode by 5 sec long press to unlock and further 5 sec press to exit

Remark:

Auto-Lock Up of charger.

The charger will be locked with the desired selection 3 minutes after no further press on the SET button during operation. If SET button is pressed before Lock Up starts, a new 3 minute count down comes in.

Unlock the charger:

5 second long press on the SET button to unlock and all LEDs will flash to confirm that charger has been unlocked.

WiFi reset: (For WiFi version only)

After unlock the charger, 15 second long press on the SET button to LEDs will flash to reset the WiFi to factory default setting.

Warning / Cautions

WARNING:

Failure to heed this warning may cause injury to persons and damage to Equipment.

CAUTION:

Failure to observe this warning may result in damage to equipment and improper functioning of the Charger.

WARNING:

- *The charger is **not** designed for any life saving application.*
- *The charger is designed for in-door use. Protect the charger from ingress of water.*
- *This charger is made to charge only properly sized lead acid batteries and Lithium Fe PO4 (LFP).*
- *Don't recharging non-rechargeable batteries.*
- *Charging other types of battery or under-sized lead acid batteries may cause fire or explosion.*
- *Install the charger in accordance with all local codes.*
- *Do not use the charger if it has been dropped or damaged.*
- *Do not remove casing of the charger, there is no user -serviceable parts inside.*
- *Do not charge the battery on boats. Remove the battery and charge on shore.*
- *Never attempt to charge a frozen battery.*
- *Never attempt to charge a damaged battery.*
- *Wear protective goggles and turn your face away when connecting or disconnecting the battery.*
- *Never place the charger on top of a battery.*
- *Never smoke, use an open flame, or create sparks near battery or charger during normal charging operation as batteries may give out explosive gas.*
- *Operation as batteries may give out explosive gas.*
- *Do not charge batteries in an enclosure (box- in) due to possible explosion of entrapped explosive gas.*
- *Use of accessory not recommended may cause risk of fire, electric shock.*
- *Disconnect the mains supply before connecting or disconnecting the links to the battery.*
- *If the charger does not work properly or if it has been damaged, unplug all connections.*

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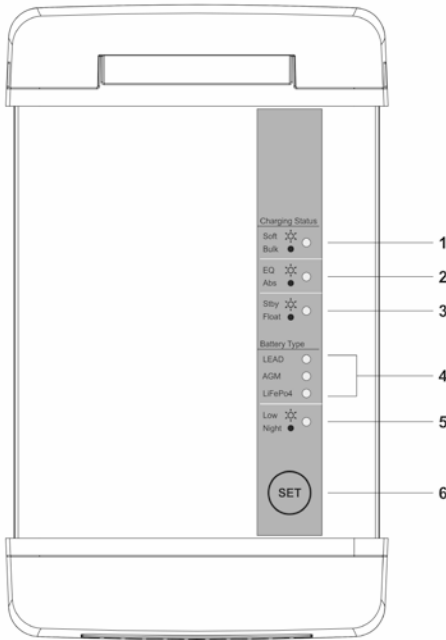
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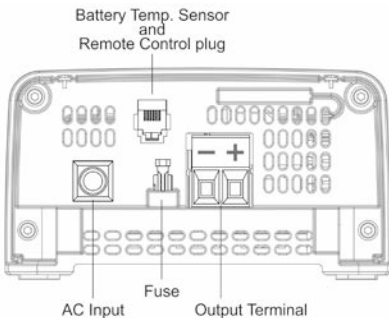
Introduction

This pro charger is designed for applications that demand adaptive charging for Lead Acid based and LiFePO4 (LFP) batteries. Battery with or without load can be connected to the charger all the time and the charger will keep on monitoring the battery. It has temperature compensated charging when connected the supplied battery temperature sensor. The Sleep Mode is to ensure a full silent 8 hour charging without cooling fan.

Control & Indicators



1. Bulk and soft start charger indicator.
2. Absorption and Equalization charge indicator.
3. Float charge and Standby indicator.
4. Battery Type & 13.5V DC Source indicator.
5. Low mode and Night mode indicator
6. Set Button for selection of battery type & operation mode



Using the charger

After checking for the correct ac voltage on the rating label and connection to AC supply, the charger will light up the Bulk LED then quickly to Abs LED.

The default battery type LEAD LED is on showing charger is in good working condition.

Battery Type and DC source Selection Procedure

You can select your desired battery by short presses on the SET button, to move
LEAD→AGM→LiFePo4→13.5V DC (3 battery type LEDS ON)→
LEAD→AGM→LiFePo4→13.5V DC (3 battery type LEDS ON)....

Just stop at your desired battery type or 13.5V DC Source and the charger remembers it even AC & Battery are disconnected.

Low / Night / EQ Selection Procedure

Long Presses for LOW MODE, NIGHT MODE, EQ MODE & EXIT.

When battery type set at AGM or LiFePo4.

Long Press (4 second) for

LOW→NIGHT→EXIT→LOW→NIGHT→EXIT→LOW→NIGHT→EXIT

When battery type set at LEAD

Long Press for LOW→NIGHT→EQ→EXIT→LOW→NIGHT→**EQ**→EXIT→

Low Mode & Night Mode

Flickering LED is Low Mode @

Solid LED is Night Mode @



Both mode have only 10 Amp maximum output and the cooling fan does not rotate at all charging stages so that the charger is virtually noiseless.

The Night Mode has an 8 hour timer and will automatically reset back to normal mode with maximum 20 Amp charging current.

Low mode is more adaptive for battery with less than 70Ah and further extend the lower range of battery capacity to 40Ah.

Both modes are ideal for use in caravan or campers where as the Night mode is good for situation with high day time load and low load at silent night.

Equalization Mode (Recondition Mode)

This charging profile is only applicable to Lead Acid based battery especially wet type .It reconditions the deeply discharged battery and reduces stratification ,counter sulfation found in deeply discharged and infrequent used battery. It also gives battery cells a well balanced charge. Once set, the charging algorithm is automatic. The charger will go through Soft Bulk (for deeply discharged battery) -> Bulk -> Absorption -> **Equalization** -> Float charge stages.

WiFi default setting (WiFi version only)

The default WiFi setting for charger is set to direct connection mode (Ad-hoc). The default SSID started with *m_link* and NO password is needed.

To reset WiFi to default setting, first make sure the charger is unlocked. Then long press for around 15s until ALL LEDs flash to reset WiFi setting.

* Recommend to set password after first connected to prevent unauthorized access.

Precautions

Always check with battery manufacturer for the conditions & suitability for Equalization Charge.

Disconnect any load connected to the battery.

Only apply Equalization charge occasionally to Flat plate, Cylindrical cell of lead acid based Sealed type VRLA battery.

Gassing in Wet type battery is common and make sure electrolyte adequate.

Disconnect any load connected to the battery.

Never leave the charger unattended during Equalization Charge.

Procedure for Equalization Charge

1. Disconnect any load to the battery.
2. Fill up the electrolyte of the battery if necessary.
3. Set Battery Type to LEAD.
4. Give Set Button 3 Long Presses (5 second each)
LOW→NIGHT→EQ→EXIT→LOW→NIGHT→**EQ**→EXIT→LOW
The EQ LED will flicker to indicate charger has been set for EQ Charge.
5. The charger will go through Soft Bulk (for deeply discharged battery)
->Bulk -> Absorption -> **Equalization**.
EQ charge finishes automatically either when battery rises to 16.2V or after one hour -> Float charge stage.
6. Exit any time by long press on the SET button to unlock and a further long press until the flashing EQ LED goes off follow by Float LED On.

Recommended Battery Capacity

	Charging Mode	Battery Capacity
20A	NORMAL	70Ah to 200Ah
10A	LOW or NIGHT MODE	30Ah to 100Ah

Battery Charger installation and Connection

Observe the warnings & safety precautions before rushing to install and operate the charger. Check battery condition, fill up cells for wet battery, clean battery poles. Secure the battery charger in a well ventilated place, make sure the mounting surface is flat and without soft covering material or loose paper sheet. The air intake is at the bottom and air outlet at the Front Exhaust Hood. It is recommended to install the charger in a vertical position for optimum cooling and splash proof.

Before connecting or disconnecting the charging cable, unplug AC cord from the mains.

First connect the Red cable to Positive + terminal of charger and the battery Positive + Pole.

Then connect the Black cable to the Negative – terminal and the Negative – Pole of the battery. Make sure all the connections are secured and well tighten up, double check on the correct polarity.

After AC is on, check for the correct battery type, if not you can always change to desire battery type by quick short presses without disconnection of the AC mains or battery.

The 6 Stage Charging Algorithms for Lead Acid Battery

There are two separate charging algorithms:
one for lead acid based and one for Lithium FePo4.
Lead acid based batteries ; wet , sealed , AGM

6 Stages: *Soft Start--> Bulk --> Absorption ---> Float --> Standby ---> Refresh Cycle*

This 6-Stage charger will give a fast and safe charging according to the state of your battery, saves energy, and automatically refresh your battery.

Soft Start:

When battery voltage is less than 12V, charger will lower the initial charging current to 10 Amp to avoid heating up and stress on the battery until battery voltage rises to 12.4V then switches to normal Bulk Charge.

Bulk Charge:

This stage will give about 80% of the total charge to the battery. Charger is held in giving out a constant charging current of 20Amp to the battery. Voltage increases as the charging goes on bulk charge mode giving a steady 20Amp current to the battery and the temperature of the battery increases as well.

Absorption Charge:

This will give the remaining 20% charge to the battery. When the battery voltage rises to the voltage level of the selected battery type, the charging switches to Constant voltage charging. The absorption time is adaptive to the time spent on bulk charge and the battery type.
The absorption time is also is bounded by a set of upper and lower time limits.

Float Charge:

A low constant voltage charge to top up the battery for slight self discharge or light occasional loading in order to keep the battery in a fully charged condition all the time.

Standby Charge:

The charger will enter into an energy conversation (Standby) stage with lower Float Voltage after long period of inactivity of 8 hours or more has been detected. This Standby stage also helps to reduce grid corrosion. This will decrease the gassing and corrosion to the positive terminal.

Refresh Charge

Charger will automatically give a refreshing cycle charge (fast bulk & absorption, float) at 7 days interval of inactivity. This is to keep the electrolyte and the cells of the lead acid battery in good working condition.

Equalization Charge:

It is only applicable to Lead Acid based battery especially wet type. It reconditions the deeply discharged battery and reduces stratification, counter sulfation found in deeply discharged and infrequent used battery. It also gives battery cells a well balanced charge.

Once set, the charging algorithm is automatic. The charger will go through Soft Bulk (for deeply discharged battery) -> Bulk -> Absorption -> **Equalization** -> Float charge stages.

You can exit from Equalization charge to Float anytime by long press at the SET button.

Sleep Mode & Half Power Mode

Both charge mode have only 10Amp maximum charging current in stead of 20Amp.

The cooling fan will be off all the time to ensure total silence of a quiet charging operation.

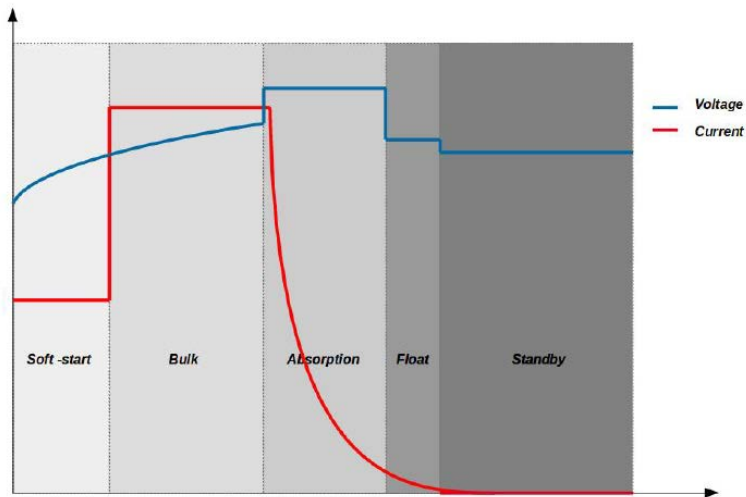
Half Power mode is more suitable for batteries with less than 70Ah capacity.

The sleep Mode has an 8 hour timer, charger will go back to normal maximum output of 20Amp

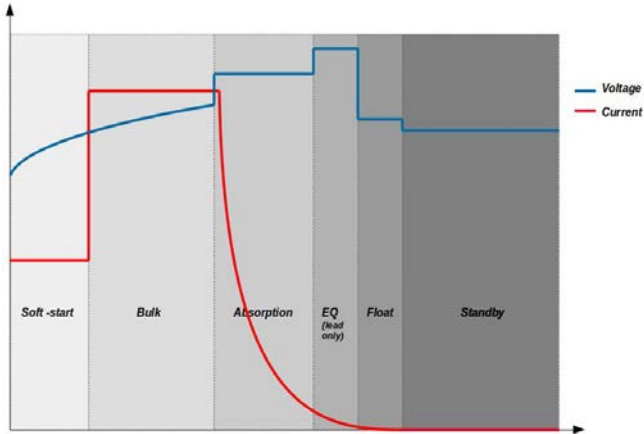
Battery with Loads connected such as in caravan, campers & etc.

The charger can be used as a stand alone automotive charger or connected to battery all the time with and without load as long as the load is not more than 15Amp in normal mode or 7Amp in half power /sleep mode.

Lead Acid based batteries: LEAD / AGM



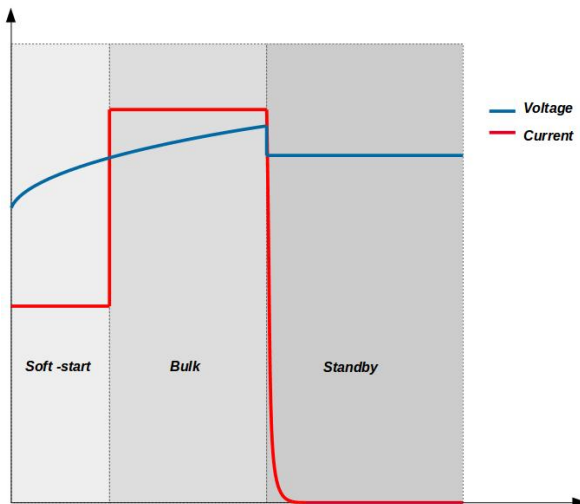
Charging Profile with Equalization charge set for Lead Acid based batteries.



LiFePO4 (LFP) battery

Caution: Never charge LFP battery when its temperature is below 0°C.

There is a special charge algorithm and treatment for Lithium FePO4 (LFP) batteries to ensure safe and optimal charging adaptive to the special chemistry of the battery which is quite different to Lead Acid battery. There are only two active charging stages namely Bulk and Absorption, at the end of Absorption is the inactive (no charging current) Standby Stage. There is no Float and no automatic refreshing cycle charge and no Equalization Charge for LFP.



DC Source 13.5V

All 3 battery type LED are on at the same time in DC source mode. Charger can be used as a constant 13.5V voltage DC source with start upload limited to 2AMP and subsequent maximum continuous 13Amp load without the battery.

Battery with load

A load can be connected to the battery during charging as long as the load is not larger than the rated output of the charger. The maximum continuous load should be less than 13Amp.

Supplied Accessories

Battery temperature sensor (only for lead acid based battery)

When connected to the battery temperature sensor, the charging voltages changes inversely with the battery temperature such that charging voltage decreases with rise of temperature and increases with drop of battery temperature.

Optional Accessory

Remote control Module

It is an extension of the front panel of the charger with full sets of LED indicators & the SET button. You can monitor the charging status and do all sorts of setting on the charger without getting to the charger which is most likely installed at hard to access spot. This optional Remote Control Module comes with a 10 meter connection cable.

Cable size recommendation for 20A

AWG	Maximum Length (m)
12	3m
10	5m
8	8m

Protection

Over Temperature Protection of battery

When this sensor detects the temperature of battery over 60°C, the charger will decrease the charging current to 1Amp. When the battery temperature reduce back to 60 °C.

Over Temperature Protection of charger:

At high operating temperature charger will gradually decreases the output power to protect the electronic components from further thermal stress and at the same time keeps a safe and continuous charging. The charger will decrease output current in 3 levels, while the charger temperature keeps on increasing, it will decrease output current to 13Amp first, then 6Amp and finally 1Amp.

Short circuit protection by constant current method and auto reset when fault is clear.

Reversed polarity protection with 25Amp (CBC-9120)/ 15Amp (CBC-9210) thermal fuse.

Specification

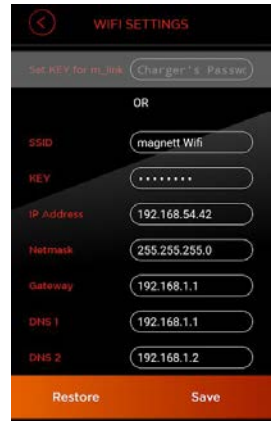
Model	CBC-9120	CBC-9210		
AC Input Voltage	180-264VAC 50Hz~			
AC Full Load	≤2.5A	≤2.5A		
No Load Input Current (Standby)	≤120mA	≤120mA		
Output (Charge) Voltage Selection				
	Absorption	Float	Absorption	Float
Lead	14.4V	13.6V	28.8V	27.2V
AGM	14.7V	13.6V	29.4V	27.2V
LiFePO4	14.4V	N/A	28.8V	N/A
Equalization for Lead	16.1V / 3A		32.2V / 1.5A	
DC Source Mode	13.5V / 14A		27V / 7A	
Standby Voltage for Lead / AGM	13.2V		26.4V	
Minimum Battery Voltage	3V			
Recycle Day	7 days			
Remote Battery Temp. Sensor (supplied accessory)	Yes, -20mV/°C		Yes, -40mV/°C	
Max. Output Charge Current	20A		10A	
Soft Start Bulk Charge Current	10A		5A	
Low Mode Charge Current	10A		5A	
Efficiency	>91%		>91%	
Protections	Short Circuit protections, self recoverable Over temperature protection, 3 steps decrease of output power, self recoverable Battery over temperature protection, with battery remote sensor, self recoverable Reverse Polarity(fused) (Replace by 25A fuse for 9120, 15A fuse for 9210)			
Cooling	Thermostatically Controlled Variable Low speed FAN (0 – full speed)			
Operating Temperature	-10°C to +50°C (Maximum Output up at 40°C)			
Back Drain Current	Less than 1Ah/month			
Remote Control	Optional Accessory			
Wireless Remote Control	WiFi models only Remote Control by PC software / Smart phone APPS			
Approvals	EN55014, EN61000, EN60335, EN62233			
Dimension (LxWxH)	223x135x73mm		223x135x73mm	
Weight	1.8kg		1.8kg	
Recommended Battery Capacity Range	70Ah-200Ah (20A) 35Ah-100Ah (10A)		35Ah-100Ah (10A) 18Ah-50Ah (5A)	

Troubleshooting

Problem	Possible Cause	Fix
All LED on Panel is OFF	Charger damaged	Check outlook of charger. If damaged, do not use it again
	No AC Input	1. Check AC source. 2. Check cable connection is correctly connected.
	Charger failed	Contact supplier for repairing service
No Output and LED on Panel is ON	Output fuse is broken	Check output fuse
	Charger failed	Contact supplier for repairing service
LED Consecutive Rotations	Charger over temperature	1. Check cooling fan is working. 2. Disconnect any load to battery. 3. Disconnect AC source. 4. Let charger cool down 5. Double check on correct size of battery.
	Battery over temperature	1. Switch AC and Disconnect battery from charger and load, let cool down. 2. Make sure load connected to battery is less than 20Amp. 3. Make sure temperature sensor is connected correctly and fix on battery. 4. Check temperature of battery near temperature sensor point. If 55°C - 60°C, the charger will protect. 5. Make sure battery and the sensor wire are away from any heat source.

Smartphone Apps

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This apps support Manson CBC-9xxx series with WiFi version.

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Mounting Hold Diagram

