

EBC1205M/EBC2405M/EBC1210M *(SMPS Technology)*

ENKO Electronic Control Systems - IZMIR / TURKIYE

www.enkoelektronik.com

Lead-Acid Battery charger (with Boost Charge and Alarm functions)

EBC Series Battery Chargers are designed and optimized for charging all types of Lead Acid batteries (including gel type sealed Lead Acid batteries), protecting the battery and extending its useful life time.



Charging Lead-Acid batteries in three controlled stages for best performance...

ENKO EBC Series Battery Chargers can deliver continuous charging current of 5A and 10A into 12V battery system with EBC 1205M and EBC 1210M (voltage is set to 13.8Vdc, with an option of up to 14.7Vdc), and 5A into 24V battery system with EBC2405M (voltage is set to 27.6Vdc with an option of up to 29.4Vdc). These battery chargers are designed with performance in mind and special care is taken for protecting and extending the life-time of the battery.

ENKO EBC Series Battery Chargers are designed with "Switched Mode" technology, where the switching transistor has only two states, ON or OFF, which increases the overall efficiency, hence reduces the excess heat dissipation and in return, increasing the device life-time and reliability.

The control system is also designed in such a way that; battery is charged in three stages:

- Constant current mode (protecting battery cells)
- Constant voltage mode (reducing the charge current)
- Float charge (compensation of internal self-discharge)

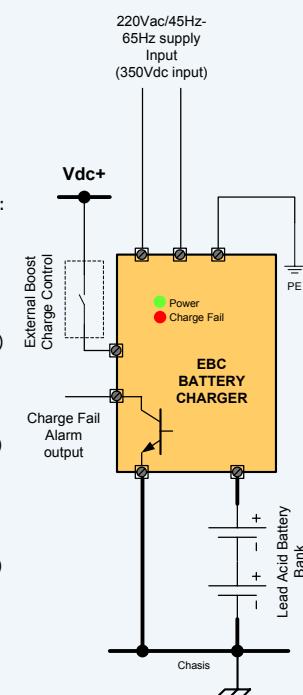
Constant current mode makes sure that; when the battery is drained down below its rated capacity, the high charge current flow into the battery is limited in order to protect the cells and reduce damage to the plates.

As the battery capacity is recovered, each cell voltage reaches up to 2.30Vdc to 2.45Vdc level, which means that the required charging current starts to reduce.

When the required battery terminal voltage is fully reached, the charger keeps supplying just enough current in order to compensate

Technical specifications:

Input supply voltage range:	198Vac to 264Vac / 45Hz to 440Hz (250VDC to 380VDC)
Operating temperature range:	-40°C to +60°C (Storage: -45°C to 80°C)
Relative humidity:	20%RH to 90%RH, non condensing
Efficiency:	>82% under full load conditions
Nominal output voltage:	EBC 1205M&1210M: 13.8Vdc (factory set, adjustable up to 14.7Vdc) EBC 2405M: 27.6Vdc (factory set, adjustable up to 29.4Vdc)
Rated output current:	EBC 1205M&2405M: 5.0A DC (Typical: 5.3A, Short circuit current: <6.0A) EBC 1210M: 10.0A DC (Typical: 10.6A, Short circuit current: <11.4A)
Output voltage ripple:	10Hz to 100KHz — 50mV(EBC 1205M), 75mV(EBC 2405M), 100mV(EBC 1210M) pk to pk (noise: <1V pk to pk)
Load regulation:	<200mV (no load to full load)
Line regulation:	<100mV (198Vac to 264Vac at full load)
Charge fail output:	Solid state output, sinking 50mA under normal operating cond.
Boost charge mode:	EBC 1205M&1210M: Nominal output voltage +0.8Vdc on activation (optional) EBC 2405: Nominal output voltage +1.6Vdc on activation (optional)
Input/output isolation voltage:	4KV DC
Output/Earth isolation voltage:	500Vac



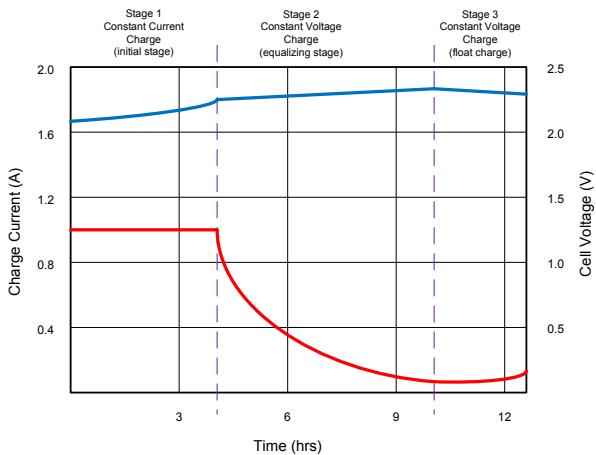
Main features:

- 195Vac to 264Vac input voltage range
- 45Hz to 440Hz input supply frequency range
- Capability to work direct from 240Vdc to 365Vdc supply voltage
- 13.8Vdc factory set DC output terminal voltage (option up to 14.7Vdc) for EBC 1205M and 1210M, 27.6Vdc factory set DC output terminal voltage (output up to 29.4Vdc) for EBC 2405M
- 5Adc continuous output current into load with EBC 1205M and 2405M, 10Adc continuous output current into load with EBC 1210M
- Capability to work continuously into short-circuit
- Parallel connection for higher output current rating and redundant operation
- Series connection capability for higher output voltage requirements
- No cooling fans used for high operational reliability
- Aluminum alloy case for robust handling and easy mounting

Additional features:

OVERALL EFFICIENCY >82%	✓
LINE REGULATION OF 0.1V MAX. OVER THE FULL INPUT VOLTAGE RANGE	✓
LOAD REGULATION IS <0.2V OVER NO LOAD TO FULL LOAD RANGE	✓
WIDE OPERATING TEMP. RANGE (-40°C to +60°C), HIGH HUMIDITY RATING UP TO 90% NON-CONDENSING	✓
INPUT FUSE PROTECTION	✓
REVERSE OUTPUT POLARITY PROTECTION WITH INTERNALLY FITTED DIODE	✓
USER OPERATED BOOST CHARGE FUNCTION TO REPLENISH THE BATTERY CHARGE STORAGE CAPACITY TO HIGH LEVELS (optional function)	✓
NOISE INPUT FILTER FOR EMC REDUCTION	✓

Typical Cell charging characteristics



Typical **Cell charging** characteristics of the charger is shown in the table. The **Cell** is part of the battery, 12V batteries contain 6 cells and 24V batteries contain 12 cells.

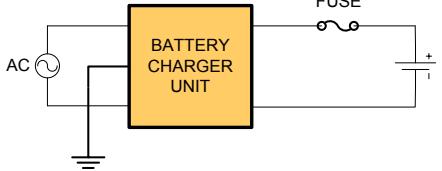
Factory setting of the charger allows each **Cell** to be charged to 2.30Vdc, which corresponds to 13.80Vdc terminal voltage in 12V systems and 27.6Vdc terminal voltage in 24V systems. User can use an option up to 2.45Vdc per **Cell**, which corresponds to 14.70Vdc in 12V systems and 29.4Vdc battery terminal voltage in 24V systems.

Each charging stage can be seen on the table. Initial cell charging is achieved with constant current mode, which limits the current such that it does not damage the cell plates. Normal charging time should be calculated as 10hr to 12hr. This requires typical charging current rating of 10% of the rated battery current capacity.

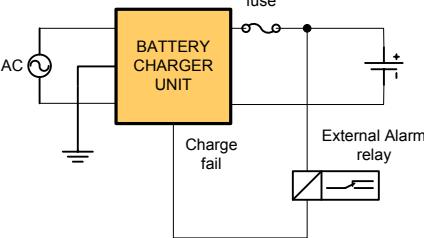
After the initial charging stage is completed, charge current starts to decrease as the cell voltage approaches 2.30Vdc. This takes approximately 60% of the charging period and is necessary to equalize each **Cell** voltage within the battery. During this period, the charger ensures stable constant voltage across the battery terminals.

After the charging is completed, the battery keeps draining current from the charger in order to compensate its internal resistive losses, called *Self Discharging* of the battery. This needs to be compensated in order to keep the battery charge at its highest condition.

Reverse polarity protection



Charge fail alarm connection



If reverse polarity protection is required, user has to fit an external fuse in the charge circuit with the indicated rating in the table.

Charge failure output can be used with a relay, connected to V+ so that other devices can be controlled through the alarm relay. Under normal operating conditions, the relay will be energized.

The alarm output is solid state relay, which can sink up to 50mA DC current.

MODEL	Fuse Rating	
	Current	Capacity
EBC 1205M EBC 1205MR	15A	350A ² s
EBC 1210M EBC 1210MR	15A	350A ² s
EBC 2405M EBC 2405MR	15A	350A ² s

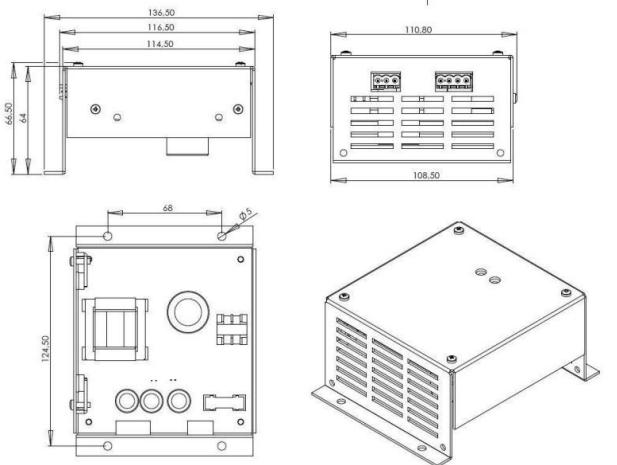
The charger enclosure is made from Aluminum alloy metal sheet and can either be screw fitted directly on the panel or it can be used together with rail mounting kit. **Rail mounting kit is an option** and has to be decided during purchase. Total weight is 330gr in EBC 1205M and 2405M, and 380gr in EBC 1210M.

Care should be taken in order to make sure that the perforations on the metal enclosure is not covered and free air ventilation is maintained within the panel. Otherwise, excess accumulated heat will degrade the overall efficiency of the charger unit.

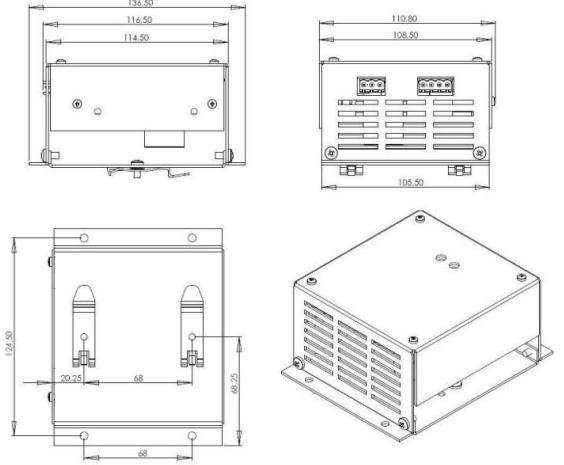
Earth connection has to be made securely as the case is made from metal. Also proper noise filtering can only be active with a good earth connection of the charger unit.

Mechanical dimensions

Panel mounted version EBC 1205M/1210M/2405M



Rail mounted version EBC 1205MR/1210MR/2405MR



Built-in boost charge function allows batteries to be refreshed periodically...

Output current is limited for constant current charging and it is also short circuit protected...



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