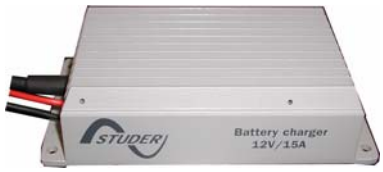
MBC Battery chargers, switch-mode, 3-STEP, IP65

Type	MBC 12-06/1	MBC 12-15/1	MBC 24-03/1	MBC 24-08/1
Battery voltage (Vdc)	**12**	**12**	**24**	**24**
Input voltage (Vac)	100-260	100-260	100-260	100-260
Charge voltage (boost)	14.4	14.4	28.8	28.8
Charge voltage (float)	13.8	13.8	27.6	27.6
Output (Amp.)	**6**	**15**	**3**	**8**
Cooling	Heat sink	Heat sink	Heat sink	Heat sink
Outputs	1	1	1	1
Frequency	40-60 Hz	40-60 Hz	40-60 Hz	40-60 Hz
Efficiency	> 85 %	> 85 %	> 85 %	> 85 %
Ambient temp. range	-25 to 50°C	-25 to 50°C	-25 to 50°C	-25 to 50°C
Dimensions lxwxh (mm)	155x80x36	195x100x47	155x80x36	195x100x46
Weight (kg)	0.9	1.8	0.9	1.8
Recommanded battery capacity	18-60 Ah	45-150 Ah	9-30 Ah	24-80 Ah
Switch over current (A)	0.17-0.23	0.68-0.92	0.17-0.23	0.34-0.46
Secondary fuse (A)	7.5	20	7.5	15
Input wired (Vac)	✔	✔	✔	✔
Output wired (Vdc)	✔	✔	✔	✔
Warranty	2 years			



MBC 12-15/1

MBC Battery chargers, switch-mode, 3-STEP

Type	MBC 12-08/2	MBC 12-12/2	MBC 12-25/3	MBC 12-30/3	MBC 12-40/3	MBC 12-60/3
Battery voltage (Vdc)	**12**	**12**	**12**	**12**	**12**	**12**
Input voltage (Vac)	115-230	115-230	115-230	83-280	83-280	83-280
Charge absorption volt. (Vdc)	14.1 (14.4*)	14.1 (14.4*)	14.1 (14.4*)	14.1 (14.4*)	14.1 (14.4*)	14.1 (14.4*)
Charge float voltage (Vdc)	13.5 (13.8*)	13.5 (13.8*)	13.5 (13.8*)	13.5 (13.8*)	13.5 (13.8*)	13.5 (13.8*)
Output (Amp.)	**8**	**12**	**25**	**30**	**40**	**60**
Cooling	Natural	Fan	Fan	Fan	Fan	Fan
Outputs	2	2	3	3	3	3
Frequency	45-66 Hz	45-66 Hz	45-66 Hz	45-66 Hz	45-66 Hz	45-66 Hz
PFC				✔	✔	✔
Ambient temp. range	-20 to +70°C	-20 to +70°C	-20 to +70°C	-20 to +70°C	-20 to +70°C	-20 to +70°C
Dimensions lxwxh (mm)	155x205x75	155x205x75	155x268x75	272x334x127	272x334x127	272x412x127
Weight (kg)	1.3	1.4	2.3	4.2	4.2	5.4
EMC class	EN 55022/B					
Warranty	2 years					

* GEL batteries

MBC 12-25/3

Type	MBC 12-80/3	MBC 24-12/2	MBC 24-30/3	MBC 24-60/3	MBC 24-80/3
Battery voltage (Vdc)	**12**	**24**	**24**	**24**	**24**
Input voltage (Vac)	83-280	115-230	83-280	150-280	150-280
Charge voltage (boost) (Vdc) *	14.1 (14.4*)	28.2 (28.8*)	28.2 (28.8*)	28.2 (28.8*)	28.2 (28.8*)
Charge voltage (float) (Vdc) *	13.5 (13.8*)	27.0 (27.6*)	27.0 (27.6*)	27.0 (27.6*)	27.0 (27.6*)
Output (Amp.)	**80**	**12**	**30**	**60**	**80**
Cooling	Fan	Fan	Fan	Fan	Fan
Outputs	3	2	3	3	3
Frequency	45-66 Hz	45-66 Hz	45-66 Hz	45-66 Hz	45-66 Hz
PFC	✔		✔	✔	✔
Ambient temp. range	-20 to +70°C	-20 to +70°C	-20 to +70°C	-20 to +70°C	-20 to +70°C
Dimensions lxwxh (mm)	272x495x127	155x268x75	272x412x127	272x495x127	272x495x127
Weight (kg)	7.1	2.3	5.4	7.1	7.1
EMC class	EN 55022/B				
Warranty	2 years				

* GEL batteries

MBC 12-60/3

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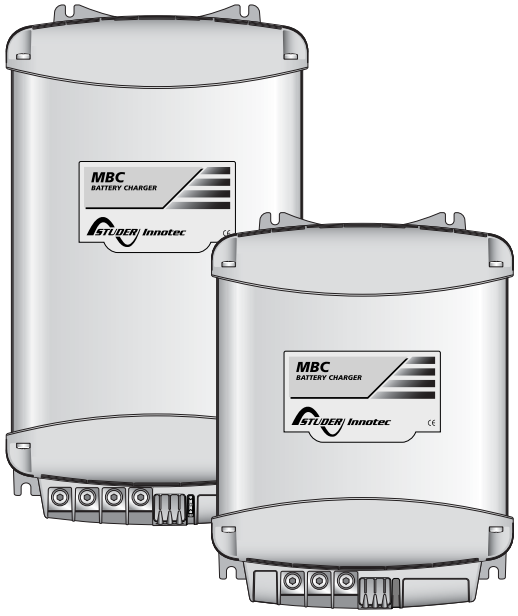
MBC BATTERY CHARGER

MBC 12-08/2
MBC 12-12/2
MBC 12-25/3
MBC 24-12/2



GB User's Manual **MBC BATTERY CHARGER**

GB INDEX

GB CHARACTERISTICS AND INSTALLATION

MBC BATTERY CHARGER SERIES BATTERY CHARGER

The long experience we have in the nautical field has given us the ability to evolve the range of MBC battery chargers, now called MBC BATTERY CHARGER, with superior performance to those currently on the market. The high level of performance of the MBC BATTERY CHARGER gives a charge to the batteries which is both fast and safe.

Other important advantages which the MBC BATTERY CHARGER battery chargers offer, are:

- Three stage IUoU battery charging.
- Multiple outputs in order to charge more groups of batteries (internal battery isolator diodes).
- Charge selector for liquid/gel electrolyte batteries.
- Low residual fluctuation on output (ripple lower than 30 mV RMS).
- Compatible with every kind of generator.
- Short circuit, overloading, output overvoltage and overheating protection.
- Can work in a wide range of ambient temperatures.

INSTALLATION

BEFORE USING THE BATTERY CHARGER CAREFULLY READ THIS USER'S MANUAL. IN CASE OF DOUBT CONTACT THE "STUDER INNOTEC" SUPPLIER OR AFTER SALES SERVICE DEPARTMENT.

THE BATTERY CHARGERS HAS BEEN DESIGNED FOR FIXED INSTALLATIONS (FOR INDOOR USE ONLY).

"Studer Innotec" battery chargers have been designed and made for the reasons described in this user's manual. The "Studer Innotec" Company does not accept any responsibility for direct or indirect damage caused by improper use of the equipment, bad installation or by possible errors occurring in this manual.

THE OPENING OF THE BATTERY CHARGER BY UNAUTHORISED PERSONNEL MAKES THE WARRANTY VOID.

THE PACKAGE CONTAINS: battery charger - warranty card - user's manual - cable terminals (to be used for connection to the output terminals).

EQUIPMENT REQUIRED FOR INSTALLATION

On the basis of the type of model, use the batteries and cables on the output terminals as specified in the following table:

MODEL	MBC 12-08/2	MBC 12-12/2	MBC 12-25/3	MBC 24-12/2
Battery voltage	12 V			24 V
Battery capacity	35 ÷ 80 Ah	55 ÷ 120 Ah	110 ÷ 250 Ah	55 ÷ 120 Ah
Minimum output cable size	4 mm^2	6 mm^2	10 mm^2	6 mm^2

The cables connected to the output terminals have a maximum length of 4 metres.

WARNING: the battery charger must be used only with a re-chargeable lead/liquid electrolytic batteries or lead/gel (sealed or non-sealed).

INSTALLATION SITE

Install the battery charger in a dry and ventilated place and as near to the batteries as possible. The battery charger, although having high efficiency, develops a certain amount of heat during functioning, therefore, it is imperative that the installation area has sufficient ventilation, enough to allow use of the equipment at maximum power.

The battery charger can be installed in a horizontal or vertical position with cables coming out in the downward position. The vertical position is recommended because the natural convection of heat helps to cool the equipment. The perimeter of the battery charger (except the base) must be kept at a distance from walls or objects by a minimum of 5 cm.

WARNING: the outer surface of the battery charger is used as a heat sink, therefore it may reach very high temperatures (risk of burns). Leave the equipment to cool down before handling it.

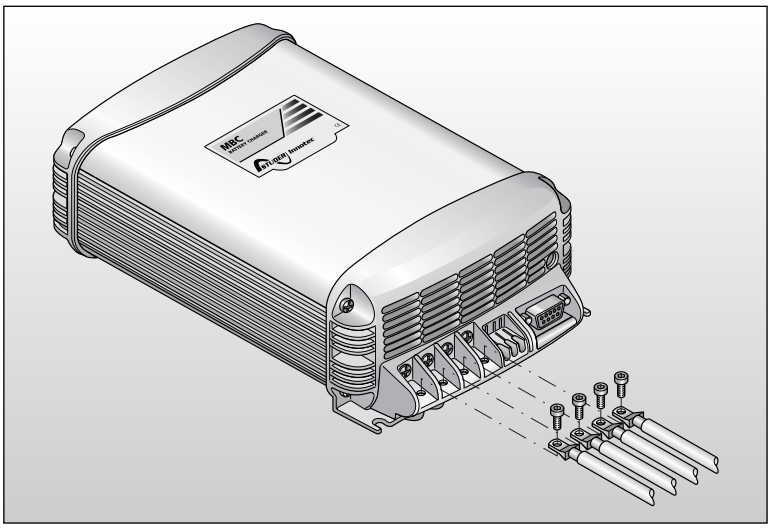


FIG.1

INSTALLATION

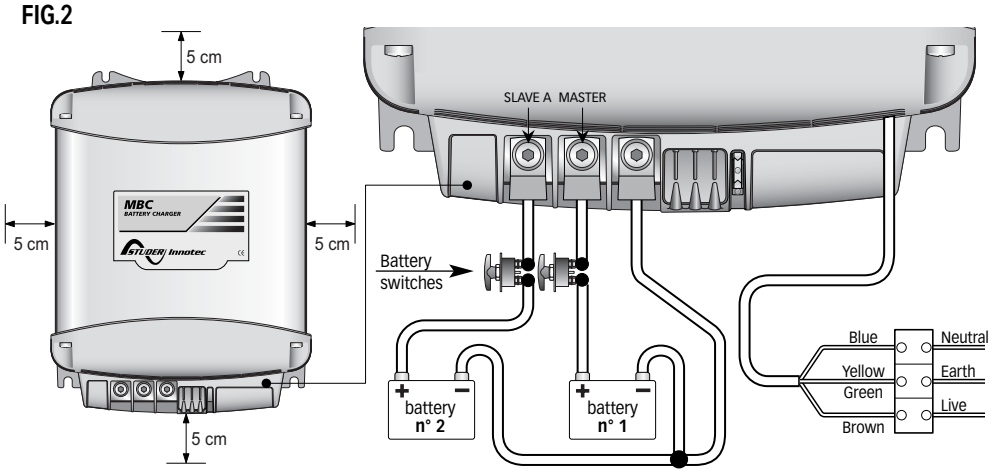
EQUIPMENT SUPPLY

The equipment already includes a power cable for AC supply. For connections to an AC supply see fig.2. Before powering up the battery charger check that the power supply voltage, described on the rating label, corresponds to that supplied by the AC supply source.
In the electrical circuit a two-pole switch must be installed for the sole use of switching the equipment ON & OFF.
The insulation between the contact points of the connections of the AC supply must be at least 3 mm.
The connections to the AC supply must be carried out according to local electrical codes.

WARNING: before connecting or disconnecting the cables from the electrical terminals of the battery charger, make sure that the equipment is disconnected from the AC mains and the batteries.

WARNING: in cases where the power cable could be damaged, have this changed by a "Studer Innotec" service centre. In order to avoid accidents, the equipment must only be opened by authorised personnel.

FIG.2



BATTERY

WARNING: during charge, batteries can generate explosive gases, therefore avoid sparks or naked flames. Provide adequate ventilation to the battery area whilst charging.

WARNING: before connecting the batteries check the terminals of the cables from the battery. Reversing the terminals could seriously damage the battery charger even if protected by fuses.

The positive terminal of the battery or of the group of batteries must be connected to one of the positive terminals of the battery charger. The negative terminal of the battery or of the group of batteries must be connected to the negative terminal of the battery charger. To make the connections use the cable terminals supplied with the equipment.

If the installation has only one or two groups of batteries, always connect the output marked "MASTER". This is the main outlet of the battery charger.
If the "MASTER" is not connected, the battery charger may supply an output voltage lower than rated.
It is advisable to connect the group of batteries which are used more often (typically the service group) to the MASTER output terminal.

The positive output terminals which are not used must be kept free (do not bridge the terminals).

WARNING: the use of inadequate size cables and incorrect connection of the terminals or electrical joints may result in dangerous overheating of the connecting terminals or cables.

SELECTION OF THE CHARGING MODE

The battery charger can be set to optimize the charge according to the type of battery used, either liquid or gel electrolytic. The selection of the type of charge is made via the switch placed in the terminal board area, as indicated in Fig.3a.
When charging liquid electrolytic, re-arrange the switch to position EL, for batteries with gel electrolytic to the position GEL.

WARNING: check the charge mode. Incorrect selection could cause shorter battery life or lengthen the charging time.

FIG.3 a

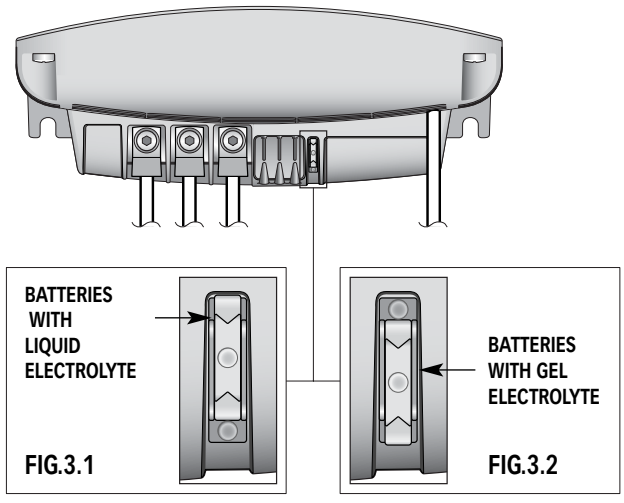
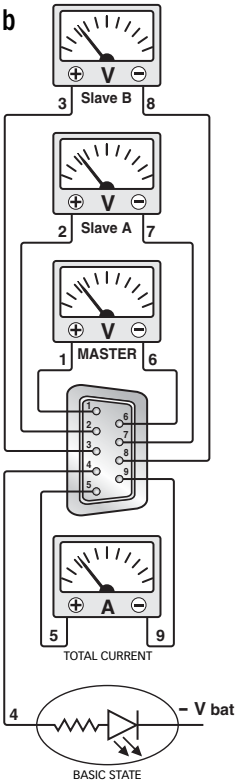


FIG.3 b

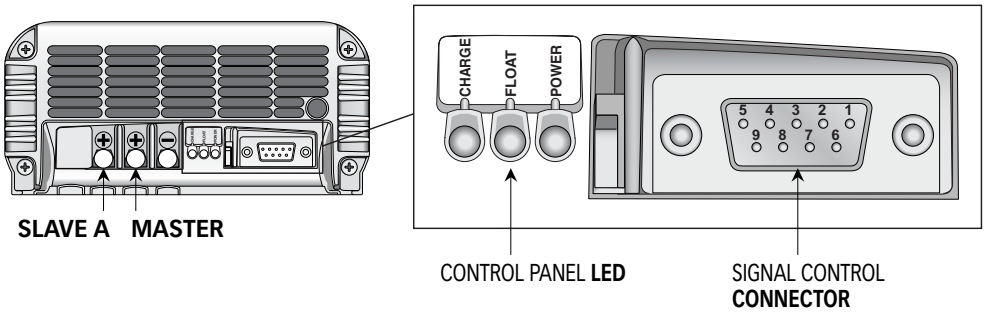


CONTROL SIGNALS (ONLY MBC 12-25/3)

The battery charger has a 9-pin female connector (connector DB9, see fig..4) on which the analog signals can be seen and used to monitor and control the equipment.

The position and description of the signals on the connector are listed below:

FIG. 4



The position and description of the signals on the connector are listed below.

Number	Description
1	Positive MASTER output (650mA max). By drawing 100mA the error is less than 0.7%.
2	Positive SLAVE A output (650mA max). By drawing 100mA the error is less than 0.7%.
3	Not connected or if it present, positive SLAVE B output (650mA max). By drawing 100mA the error is less than 0.7%.
4	Basic state of battery charger (20 mA max).
5	Battery charger total current positive shunt (10 mA max). The transduction ratio is 100mV/100A.
6	GND signal 1 (V master).
7	GND signal 2 (V slave A).
8	GND signal 3 (V slave B, if it present).
9	Battery charger total current negative shunt.

BASIC STATE OF BATTERY CHARGER

Connection PIN 4	State
HIGH IMPEDENCE	OFF or PROBLEMS
+ V CHARGE	ON WITHOUT PROBLEMS

For a wiring example of control signals look at figure 3b.

OPERATION

When the battery charger is switched on, it automatically selects the optimum charge mode to best suit the batteries or load connected. The battery charger has a loading characteristic of the IUoU type.

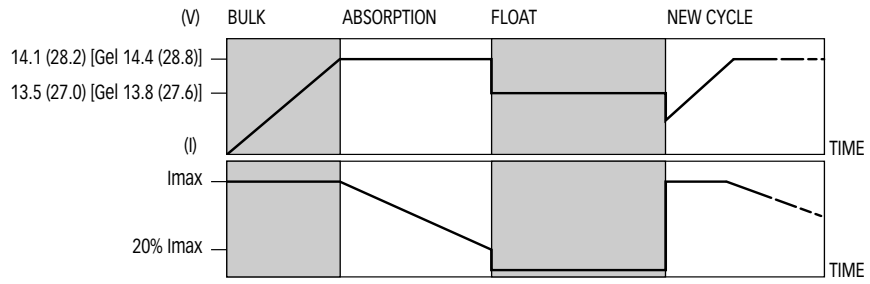
CHARGING CHARACTERISTICS

Charging occurs in 3 phases:

BULK phase (constant current) - The batteries need more current than the battery charger can supply. Current is limited to the maximum rated output. The battery charger can enter this phase during start-up, when the batteries are low or when a high load is connected.

ABSORPTION phase (constant voltage) - The battery charger charges the batteries at a constant ABSORPTION voltage and at the current they need.
The current needed by the batteries will tend to diminish over time. When the required current is less than 20% of the maximum output value, the charger will change to the FLOAT phase.

FLOAT phase (maintenance) - The battery charger charges the batteries at the constant FLOAT voltage. In this phase, as the batteries reach maximum capacity, they will tend to absorb current close to zero Ampere. This FLOAT phase will allow the batteries to be on charge without the risk of overloading. The next step to the ABSORPTION phase occurs when the demand for current goes over 20% of the maximum output value.



GB OPERATING - MAINTENANCE

CONTROL PANEL

The control panel is made-up of three LEDS:
POWER LED, FLOAT LED and **CHARGE LED** (BULK, ABSORPTION, see fig.4)

The information supplied by the LEDS are listed below:

POWER LED

LED Color	Description
Off	No mains power or overheating. In case of overheating check if the installation of the battery charger is correct. Switch off and allow the equipment to cool down for at least 10 minutes.
Green	Power ON

FLOAT LED

LED Color	LED Status	Description
Off	**Off**	No indication
Green	**Fixed**	**FLOAT phase -** FLOAT charge
Green	**Flashing**	Short circuit or overload in output. Check output cables, the group of batteries and the points of use connected to the battery charger.

CHARGE LED (BULK, ABSORPTION)

LED Color	LED Status	Description
Off	**Off**	No indication
Yellow	**Fixed**	**ABSORPTION phase or BULK phase**
Yellow	**Flashing**	Short circuit or overload in output. Check output cables, the group of batteries and the points of use connected to the battery charger.

MAINTENANCE

The battery charger does not need any maintenance. To ensure optimum performance from the equipment, once a year check the cables and the electrical connections.

TECHNICAL DATA

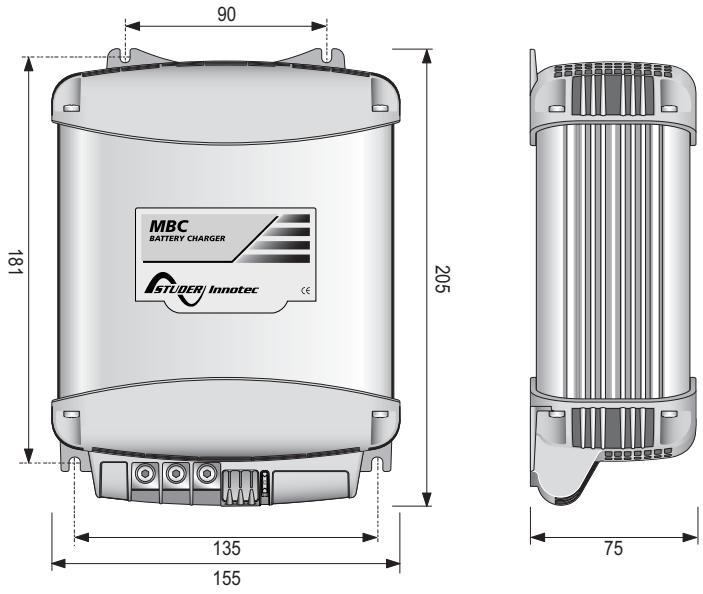
MODEL	MBC12-08/2 MBC12-08/2 DR	MBC12-12/2 MBC12-12/2 DR	MBC12-25/3 MBC12-25/3 DR	MBC24-12/2 MBC24-12/2 DR
OUTPUT CHARACTERISTICS				
Maximum output current [1]	8 A	12 A	25 A	12 A
Charge absorption voltage	14,1 Vdc (14,4 Vdc GEL)			28,2 Vdc (28,8 Vdc GEL)
Charge float voltage	13,5 Vdc (13,8 Vdc GEL)			27,0 Vdc (27,6 Vdc GEL)
Residual ripple [2]	30mV RMS max			
Charging characteristics	Automatic in three stages IUoU			
Number of outputs [3]	2		3	2
INPUT CHARACTERISTICS				
Supply voltage [4]	207÷260 Vac (207÷260 Vac or 103÷130 Vac [5] (*))			
Frequency	45÷66 Hz			
Maximum absorption (230 Vac) [6]	1,2 A	1,8 A	3,2 A	3,0 A
Maximum absorption (115 Vac) [6] (*)	2,4 A	3,6 A	6,4 A	6,0 A
PROTECTION				
Reverse polarity [7]	Yes, through fuse			
Overload	Yes			
Output short circuit	Yes			
Overheating	Yes			
AMBIENT CHARACTERISTICS				
Operating temperature	-20 to +70 °C, with power reduction over +50 °C			
Cooling	Natural	Forced, with controlled fan (2 speed)		
Humidity	Max. 95% RV without condensation			
CASE				
Material	Aluminium - Cycoloy ®			
Colour	Anodized - OR5066			
Dimensions (WxHxD)	155 x 205 x 75 mm		155 x 268 x 75 mm	
Weight	1,3 Kg	1,4 Kg	2,3 Kg	
GENERAL				
Connector for remote panel	No		Yes	No
Safety classification	EN 60335-2-29			
EMC class	EN 55022/B			

(*) available early 2005

(1) Maximum value at normal use or in short circuit.
(2) At maximum output current on resistive load.
(3) Each output can supply the maximum value of nominal current. The sum of the currents supplied from each output can not exceed the maximum nominal value of the equipment.
(4) Without power derating.
(5) The battery charger measure the input AC voltage and choose the correct working input range.
(6) With supply voltage specified as and output current equal to the maximum nominal value.
(7) The protection could be inefficient in some operative conditions.
Cycoloy ® is a registered trade mark of GE Plastics.

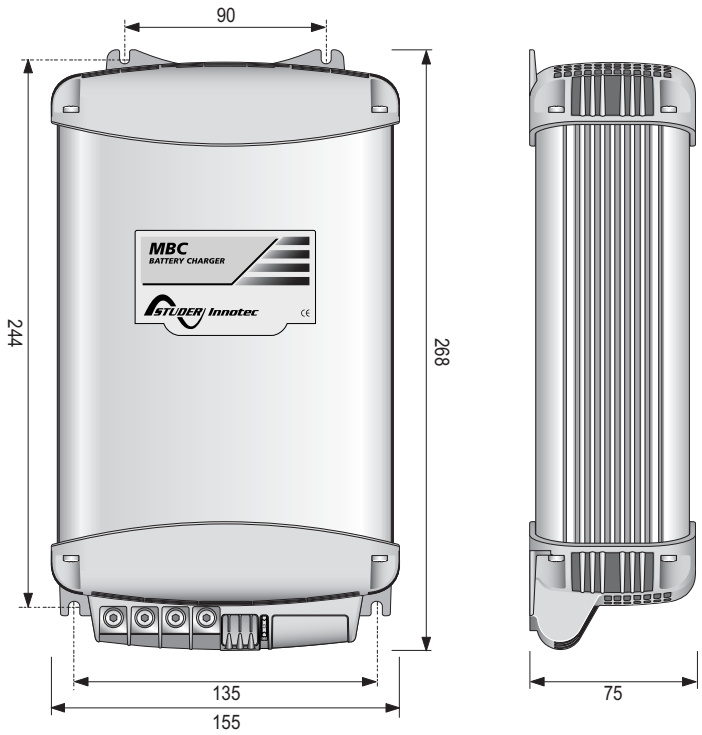
MBC BATTERY CHARGER - DIMENSIONS (mm)

12-08/2
12-12/2



MBC BATTERY CHARGER - DIMENSIONS (mm)

12-25/3
24-12/2



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STUDER Innotec

MBC BATTERY CHARGER

MBC 12-30/3
MBC 12-40/3
MBC 12-60/3
MBC 24-30/3

GB User's Manual MBC BATTERY CHARGER

GB INDEX

MBC BATTERY CHARGER SERIES BATTERY CHARGER

The long experience we have in the nautical field has given us the ability to evolve the range of MBC battery chargers, now called MBC BATTERY CHARGER, with superior performance to those currently on the market. The high level of performance of the MBC BATTERY CHARGER gives a charge to the batteries which is both fast and safe.

Other important advantages which the MBC BATTERY CHARGER battery chargers offer, are:

- Three stage IUoU battery charging.
- Multiple outputs in order to charge more groups of batteries (internal battery isolator diodes).
- Differentiated charging for liquid electrolite or gel batteries.
- Integrated fuses inside the battery chargers (one for each output).
- Thermal battery protection (with optional sensors).
- Ability of providing full output power with low supply voltage.
- The possibility of using the battery charger as a power supply without batteries.
- Low residual fluctuation on output (ripple lower than 30 mV RMS).
- Universal AC supply input (280 ÷ 83 Vac, 45 ÷ 66 Hz).
- Power factor (cos φ) equal to 1.
- Compatible with every kind of generator.
- Short circuit, overloading, output overvoltage and overheating protection.
- Can work in a wide range of ambient temperatures.
- Variable speed for the cooling fan.
- High-technology control panel.
- Automatic and manual half power mode.
- CAN BUS interface for data transfer.
- Case constructed in stainless steel, Cycoloy®.

INSTALLATION

BEFORE USING THE BATTERY CHARGER CAREFULLY READ THIS USER'S MANUAL. IN CASE OF DOUBT CONTACT THE "STUDER INNOTEC" SUPPLIER OR AFTER SALES SERVICE DEPARTMENT.

THE BATTERY CHARGERS HAS BEEN DESIGNED FOR FIXED INSTALLATIONS (FOR INDOOR USE ONLY).

"Studer Innotec" battery chargers have been designed and made for the reasons described in this user's manual. The "Studer Innotec" Company does not accept any responsibility for direct or indirect damage caused by improper use of the equipment, bad installation or by possible errors occurring in this manual.

THE OPENING OF THE BATTERY CHARGER BY UNAUTHORISED PERSONNEL MAKES THE WARRANTY VOID.

THE PACKAGE CONTAINS: battery charger - warranty card - user's manual - cable terminals (to be used for connection to the output terminals).

EQUIPMENT NECESSARY FOR INSTALLATION

On the basis of the type of model, use the batteries and cables on the output terminals as specified in the following table:

MODEL	MBC 12-30/3	MBC 12-40/3	MBC 12-60/3	MBC 24-30/3
Battery voltage	12 V			24 V
Battery capacity	140 ÷ 300 Ah	180 ÷ 400 Ah	270 ÷ 600 Ah	140 ÷ 300 Ah
Minimum output cable size	10 mm^2	16 mm^2	25 mm^2	10 mm^2

The cables connected to the output terminals have a maximum length of 4 metres.

WARNING: the battery charger must be used only with a re-chargeable lead/liquid electrolytic batteries or lead/gel (sealed or non-sealed).

INSTALLATION SITE

Install the battery charger in a dry and ventilated place and as near to the batteries as possible. The battery charger, although having high efficiency, develops a certain amount of heat during functioning, therefore, it is imperative that the installation area has sufficient ventilation, enough to allow use of the equipment at maximum power.
The battery charger can be installed in a horizontal or vertical position with cables coming out in the downward position. The vertical position is recommended because the natural convection of heat helps to cool the equipment. The perimeter of the battery charger (except the base) must be kept at a distance from walls or objects by a minimum of 5 cm.

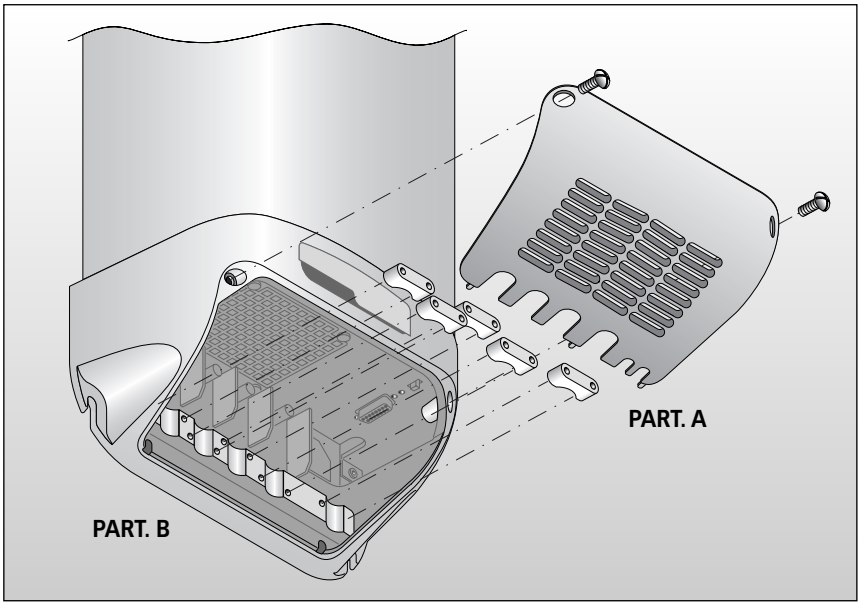


FIG.1

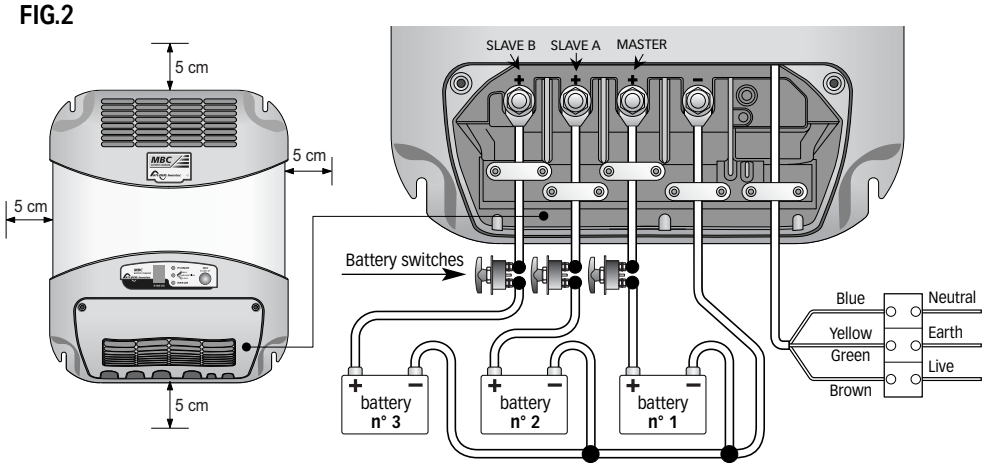
EQUIPMENT SUPPLY

The equipment already includes a power cable for AC supply. For connections to an AC supply see fig.2. Before powering up the battery charger check that the power supply voltage, described on the rating label, corresponds to that supplied by the AC supply source.
In the electrical circuit a two-pole switch must be installed for the sole use of switching the equipment ON & OFF. The insulation between the contact points of the connections of the AC supply must be at least 3 mm. The connections to the AC supply must be carried out according to local electrical codes.

WARNING: before connecting or disconnecting the cables from the electrical terminals of the battery charger, make sure that the equipment is disconnected from the AC mains and the batteries.

WARNING: in cases where the power supply cable could be damaged, have this changed by a "Studer Innotec" service centre. In order to avoid accidents, the equipment must only be opened by authorised personnel.

FIG.2



BATTERIES

To access the output terminals it is necessary to remove the cover by loosening the two screws which hold it on top (see fig. 1 Part A). Before making the connections to the cables from the battery, loosen or remove the cable clamps by loosening the screws which fix it to the base (Fig.1 Part B).

WARNING: during charge, batteries can generate explosive gases, therefore avoid sparks or naked flames. Provide adequate ventilation to the battery area whilst charging.

WARNING: before connecting the batteries check the terminals of the cables from the battery. Reversing the terminals, could seriously damage the battery charger even if protected by fuses.

The positive terminal of the battery or of the group of batteries must be connected to one of the positive terminals of the battery charger. The negative terminal of the battery or of the group of batteries must be connected to the negative terminal of the battery charger. To make the connections use the cable terminals supplied with the equipment.

If the installation has only one or two groups of batteries, always connect the output marked "MASTER". This is the main outlet of the battery charger.
If the "MASTER" is not connected, the battery charger may supply an output lower voltage than rated and therefore less power.
It is advisable to connect the group of batteries which are used more often (typically the service group) to the MASTER output terminal.

The positive output terminals that are not used must be kept free (do not bridge the terminals).

WARNING: the use of inadequate size cables and the incorrect connection of terminals or electrical joints may result in dangerous overheating of the connecting terminals or cables.

FIG.3 a

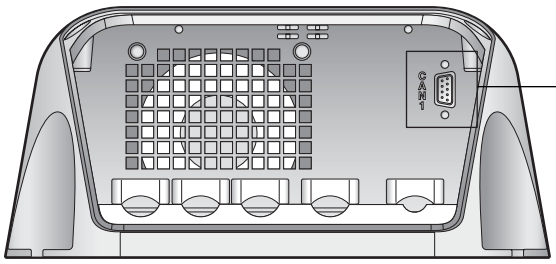
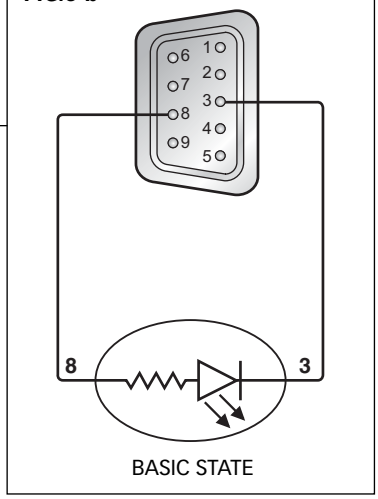


FIG.3 b



CONTROL SIGNALS

The battery charger is provided with a 9-pin female D-shell connector (DB9 connector, see Fig. 3a) which indicates the signals which can be used for monitoring and controlling the equipment.

The position and description of the signals on the connector are listed below:

FEMALE CONNECTOR (DB 9)

PIN	Description
1	CAN BUS terminator (124 ohm)
2	CANL signal - CAN BUS interface
3	Battery charger negative
4	Not used
5	Earth
6	Not used
7	CANH signal - CAN BUS interface
8	Basic state of the battery charger (+V output, 20mA max)
9	+5Vdc (10 mA max)

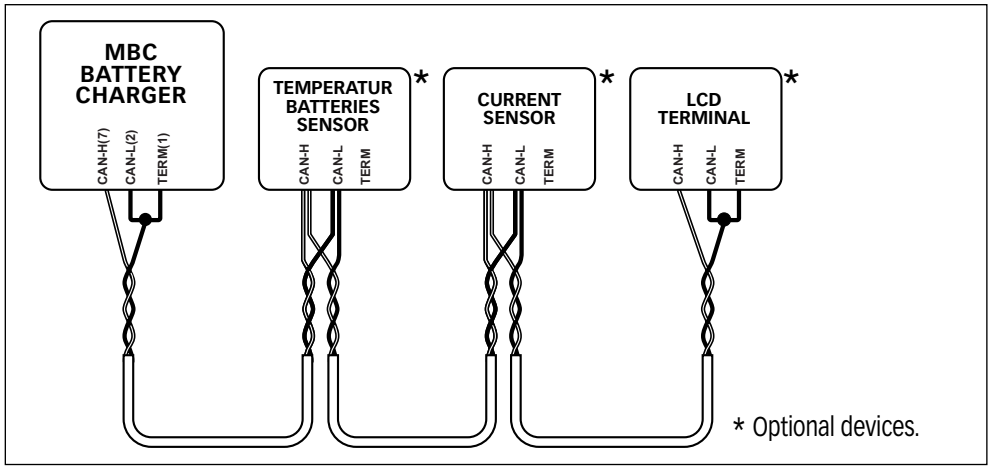
BASIC STATE OF BATTERY CHARGER

PIN 8 connection	State
HIGH IMPEDENCE	OFF OR PROBLEMS PRESENT
+V OUTPUT	ON OR NO PROBLEMS PRESENT

For a wiring example of control signals look at figure 3b.

CAN BUS NETWORK CONNECTION

When making the data interface connection (CANH and CANL signals) use an unscreened cable with a twisted pair (cross-section 0.25/ 0.35 mm^2 AWG 22/24, impedance 100/150 ohm).
The maximum total length of the data signal cable should be no more than 100 m.
Activate the terminator at the first and last device connected to the network.
If there is only one device, the terminator does not need to be activated.
An example of a network connection is given below:



OPERATION

When the battery charger is switched on for a short period, all the LEDS on the front panel will light up. After that the battery charger will place itself in the optimum charging mode to best suit the batteries or load connected. The battery charger has a loading characteristic of the IUoU type.
The MBC battery chargers can also be used as a power supply, that is, with batteries disconnected.
We suggest you use the battery charger in this mode only occasionally and not for ordinary use. However, avoid connecting high inductive loads (e.g. high powered motors) with the batteries disconnected as it you could cause damage to the equipment, even if rare to happen.

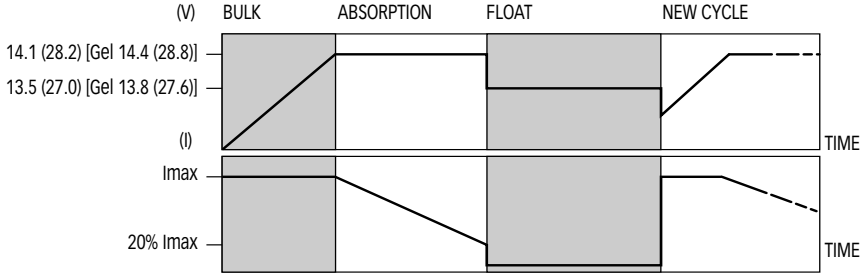
CHARGING CHARACTERISTICS

Charging occurs in 3 phases:

BULK phase (constant current) - The batteries need more current than the battery charger can supply. Current is limited to the maximum rated output. The battery charger can enter this phase during start-up, when the batteries are low or when a high load is connected.

ABSORPTION phase (constant voltage) - The battery charger charges the batteries at a constant ABSORPTION voltage and at the current they need.
The current needed by the batteries will tend to diminish over time. When the required current is less than 20% of the maximum output value, the charger will change to the FLOAT phase.

FLOAT phase (maintenance) - The battery charger charges the batteries at the constant FLOAT voltage. In this phase, as the batteries reach maximum capacity, they will tend to absorb current close to zero Ampere. This FLOAT phase will allow the batteries to be on charge without the risk of overloading. The next step to the ABSORPTION phase occurs when the demand for current goes over 20% of the maximum output value.



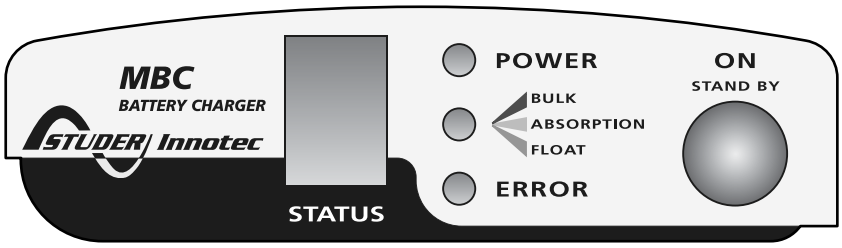
HALF-POWER MODE

If the supply voltage of the equipment drops under 97 Vac the battery charger will activate the "half power" mode. In this mode the battery charger can supply, a maximum value half of the maximum nominal output current. In this way you can reduce the current absorption from the AC supply. This feature is useful when the battery charger is supplied via a generator or from a dock outlet with limited power output.
The half power mode can be activated manually by using the remote LCD terminal (optional).

CONTROL PANEL

The control panel is made-up of three LED, a 7 segment display and a button:
POWER LED, **CHARGE PHASE LED** (BULK, ABSORPTION, FLOAT) **ERROR LED**, **STATUS** display and **ON/STAND-BY** button (see fig.4).

FIG.4



ON/STAND-BY BUTTON:

Use this button to put the battery charger in stand-by mode. To activate this mode simply press the button quickly (press and release in less than one second). To take the battery charger out of stand-by mode, press the button quickly again or disconnect the battery charger from the AC power supply and then connect it up again.

The information supplied by the LEDS are listed as below:

POWER LED

LED colour	Description
OFF	No mains power
Green	Power ON
Flashing	Battery charger in stand-by mode

CHARGE PHASE LED (BULK, ABSORPTION, FLOAT)

LED Colour	Description
OFF	No output power
Red	**BULK phase** - charge at constant current
Orange	**ABSORPTION phase -** charge at constant voltage
Green	**FLOAT phase** - float charge

ERROR LED

LED Colour	Description
OFF	No problem with manual reset
Red	Problem with manual reset (see error codes)

NOTIFICATION SIGNS

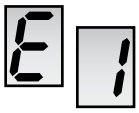
	The half-power mode has been activated by the manual control.
	[*Flashing symbol*]. Monitor mode is activeted.

PROBLEMS WITH AUTOMATIC RESET

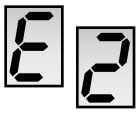
	The AC mains voltage is too low. The battery charger goes into half-power mode. The message disappears when the mains voltage falls within the nominal range again. (This indication appears when the battery charger is turned off even under normal voltage supply conditions).
	The battery charger is reducing power because of a high ambient temperature. The message disappears as soon as the condition which caused the problem is no longer present. If this message appears frequently check whether the battery charger has been installed properly.
	The temperature measured by the battery sensors (optional) is outside the range determined for the charge (-20/+55°C). The output voltage of the battery charger becomes 12.8V (25.6V in the 24V models) so that the batteries are not damaged. This message disappears when the battery temperature falls back within the correct range.
	CAN BUS communication problem. The system has found a rate of communication errors which is higher than normal. If this message appears frequently, check whether the CAN network wiring has been carried out properly.

GB NOTIFICATION SIGNS

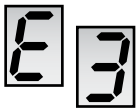
PROBLEMS WITH MANUAL RESET



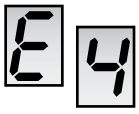
The letter "E" and the number appear flashing on the display alternately.
Short circuit or output overload. Check the output wiring, the group of batteries and the load connected to the battery charger.



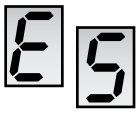
The letter "E" and the number appear flashing on the display alternately.
Output fuse blown (probable reverse polarity).



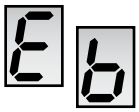
The letter "E" and the number appear flashing on the display alternately.
Output overvoltage. Due to internal malfunctioning, the battery charger supplied a voltage more than 12% of the nominal value for a very brief time.



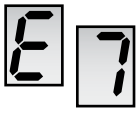
The letter "E" and the number appear flashing on the display alternately. The battery charger overheats excessively. The operating temperature of the battery charger has exceeded the maximum allowable threshold for proper operation. Check whether the battery charger has been installed properly. Turn off the equipment and leave it to cool down for at least 10 minutes.



The letter "E" and the number appear flashing on the display alternately.
Prolonged overload. The battery charger has delivered maximum current at a voltage lower than half the nominal output value for too long.
Check the output wiring, the group of batteries and the load connected to the battery charger.



Error indication reserved for future expansions.



The letter "E" and the number appear flashing on the display alternating.
Serious CAN BUS communication problem. Check the CAN network wiring and make sure the terminals have been installed properly.

THE E2/E3 PROBLEMS NEED TO BE CHECKED BY A "STUDER INNOTEC" SERVICE CENTRE.

In order to eliminate the problems with manual reset you must remove the cause of the problem, therefore, switch off the battery charger for at least 10 seconds and then switch it back on again.

PROGRAMMING THE BATTERY CHARGER

The battery charger has the following programmable functions:

- Selecting the battery charge mode - liquid or gel electrolite.
- Selecting the network group.
- Selecting the priority within the network group.
- Activating/inactivating the monitor mode.

Activating programming

Press the button provided on the control panel for 6 seconds in order to activate the programming procedure. Once this time has elapsed, the letter "P" will appear steady on the display. At this point, release the button. The battery charger will pass from one programming function to another in the order given below:

EL/GEL SELECTION

This function enables the charge provided by the battery charger to be optimized according to the type of batteries used - liquid electrolite or gel.

WARNING: check which battery charging mode has been selected. If the wrong selection is made, this could reduce the service life of the batteries or mean the charging time takes longer.

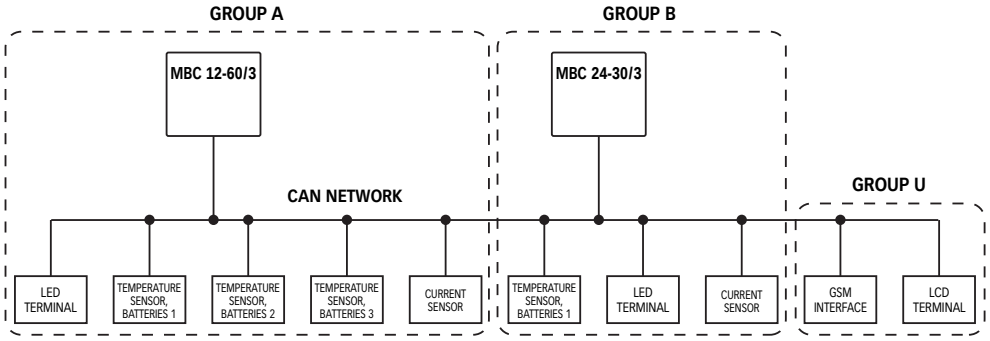
The letter "E" (liquid Electrolyte) or "L" (gel) will appear flashing on the display according to the current setting.

To change the setting press the key quickly (press and release the button in less than 1 second).

To make the setting operative press the key for at least 2 seconds. The display will confirm the setting by showing the letter selected for one second (steady).

SELECTING THE NETWORK GROUP

This function enables the user to determine which network group the battery charger belongs to (group "A", "b" o "C"). Only one battery charger of the MBC BATTERY CHARGER series can belong to each group. The other devices making up the group can be terminals, sensors or interfaces. A diagram is given below showing an example of a possible network:



BATTERY CHARGER PROGRAMMING

The devices belonging to one group "A", "b" or "C" can only dialog between themselves. Group "U" (Universal) is an exception as this can dialog with any other device.

The distinction between different groups is very important in order to connect all the devices to the same CAN network even if they belong to different electrical systems.

The letter "A", "b" or "C", will appear flashing on the display according to the current setting.

To change the setting, press the key quickly (press and release the key in less than 1 second).

To make the setting operative press the key for at least 2 seconds. The display will confirm the setting by showing the letter selected for one second (steady).

SELECTING GROUP ORDER OF PRIORITY

This function is used to determine the priority level of the battery charger within the network group. At the moment this function is not used by the battery charger (it is reserved for future expansions).
The number "1", "2" or "3" will appear flashing on the display according to the current setting.

To change the setting press the key quickly (press and release the key in less than 1 second).

To make the setting operative press the key for at least 2 seconds. The display will confirm the setting by showing the number selected for one second (steady).

ACTIVATING/INACTIVATING THE MONITOR MODE

This function enables the user to activate or inactivate the battery charger's "monitor" mode.
If it is activated, the "monitor" mode enables the battery charger to transmit and receive data on the CAN network even if no AC power is being delivered. To do this, the battery charger is supplied with power from the group of batteries using the master output. The current absorption, with "monitor" mode active, is less than 75mA (120mA for 24V models).
The battery charger exits "monitor" mode (is turned off) if the voltage of the master group of batteries is less than 7Vdc (14Vdc for the 24V models).

This mode should be activated when the remote terminals are connected to the CAN network.

The letter "O" (monitor mode Off) or "S" (monitor mode On [Stand-by]), will appear flashing on the display according to the current setting.

To change the setting press the key quickly (press and release in less than 1 second).

To make the setting operative press the key for at least 2 seconds. The display will confirm the setting by showing the letter selected for one second (steady).

Once the programming procedure has been completed, the following symbol will be shown for 1 second: "-".

MAINTENANCE

The battery charger does not need any maintenance. To ensure optimum performance from the equipment, once a year check the cables and the electrical connections.

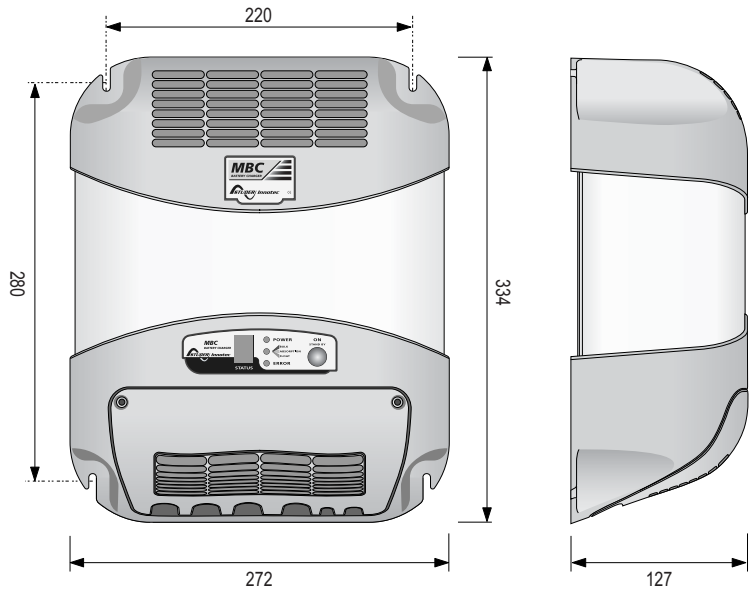
TECHNICAL DATA

MODEL	MBC12-30/3	MBC12-40/3	MBC12-60/3	MBC24-30/3
OUTPUT CHARACTERISTICS				
Maximum output current [1]	30 A	40 A	60 A	30 A
Charge absorption voltage	14,1 Vdc (14,4 Vdc GEL)			28,2 Vdc (28,8 Vdc GEL)
Charge float voltage	13,5 Vdc (13,8 Vdc GEL)			27,0 Vdc (27,6 Vdc GEL)
Residual ripple [2]	30mV RMS max			
Charging characteristics	Automatic in three stages IUoU			
Number of outputs [3]	3			
INPUT CHARACTERISTICS				
Supply voltage	83÷280 Vac, with power reduction under 97 Vac			
Frequency	45÷66 Hz			
Maximum absorption (230 Vac) [4]	2,5 A	3,3 A	4,8 A	4,5 A
Maximum absorption (115 Vac) [4]	5,1 A	6,8 A	9,8 A	9,5 A
Power factor (cos φ)	1			
PROTECTION				
Reverse polarity [5]	Yes, through fuse			
Overload	Yes			
Output short circuit	Yes			
Overvoltage in output [6]	Yes			
Overheating	Yes			
Battery overtemperature	Yes, optional			
AMBIENT CHARACTERISTICS				
Operating temperature	-20 to +70 °C, with power reduction over +50 °C			
Cooling	Automatic , by variable speed cooling fan			
Humidity	Max. 95% RV without condensation			
CASE				
Material	Stainless steel - Cycoloy ®			
Colour	Polished steel - OR5066			
Dimensions (WxHxD)	272 x 334 x 127 mm		272 x 412 x 127 mm	
Weight	4,2 Kg		5,4 kg	
GENERAL				
Connector for remote panel	Yes			
Safety classification	EN 60335-2-29			
EMC class	EN 55022/B			

[1] Maximum value at normal use or in short circuit.
[2] At maximum output current on resistive load.
[3] Each output can supply the maximum value of nominal current. The sum of the currents supplied from each output can not exceed the maximum nominal value of the equipment.
[4] With supply voltage as specified and output current equal to the maximum nominal value
[5] Protection may be inefficient in some operative conditions.
[6] Software/hardware double-check.
Cycoloy ® is a registered trade mark of GE Plastics.

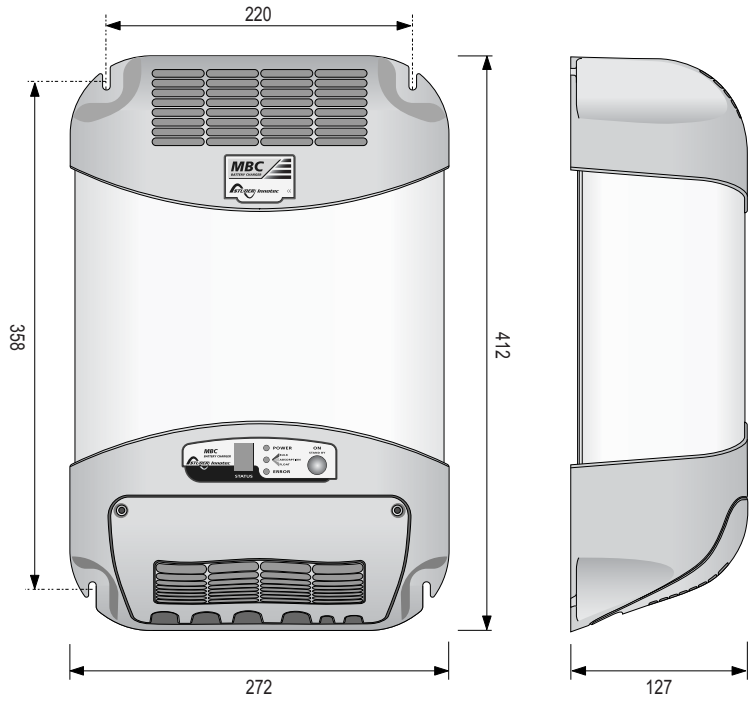
MBC BATTERY CHARGER - DIMENSIONS (mm)

12-30/3 - 12-40/3



MBC BATTERY CHARGER - DIMENSIONS (mm)

12-60/3 - 24-30/3



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STUDER Innotec

MBC BATTERY CHARGER

MBC 12-80/3
MBC 24-60/3
MBC 24-80/3

GB User's Manual MBC BATTERY CHARGER

GB INDEX

MBC BATTERY CHARGER SERIES BATTERY CHARGER

The long experience we have in the nautical field has given us the ability to evolve the range of MBC battery chargers, now called MBC BATTERY CHARGER, with superior performance to those currently on the market. The high level of performance of the MBC BATTERY CHARGER gives a charge to the batteries which is both fast and safe.

Other important advantages which the MBC BATTERY CHARGER battery chargers offer, are:

- Three stage IUoU battery charging.
- Multiple outputs in order to charge more groups of batteries (internal battery isolator diodes).
- Differentiated charging for liquid electrolite or gel batteries.
- Integrated fuses inside the battery chargers (one for each output).
- Thermal battery protection (with optional sensors).
- Ability of providing full output power with low supply voltage.
- The possibility of using the battery charger as a power supply without batteries.
- Low residual fluctuation on output (ripple lower than 30 mV RMS).
- Universal AC supply input (only MBC 12-80/8).
- Power factor (cos φ) equal to 1.
- Compatible with every kind of generator.
- Short circuit, overloading, output overvoltage and overheating protection.
- Can work in a wide range of ambient temperatures.
- Variable speed for the cooling fan.
- High-technology control panel.
- Automatic and manual half power mode.
- CAN BUS interface for data transfer.
- Case constructed in stainless steel, Cycoloy®.

INSTALLATION

BEFORE USING THE BATTERY CHARGER CAREFULLY READ THIS USER'S MANUAL. IN CASE OF DOUBT CONTACT THE "STUDER INNOTEC" SUPPLIER OR AFTER SALES SERVICE DEPARTMENT.

THE BATTERY CHARGERS HAS BEEN DESIGNED FOR FIXED INSTALLATIONS (FOR INDOOR USE ONLY).

"STUDER INNOTEC" battery chargers have been designed and made for the reasons described in this user's manual. The "STUDER INNOTEC" Company does not accept any responsibility for direct or indirect damage caused by improper use of the equipment, bad installation or by possible errors occurring in this manual.

THE OPENING OF THE BATTERY CHARGER BY UNAUTHORISED PERSONNEL MAKES THE WARRANTY VOID.

THE PACKAGE CONTAINS: battery charger - warranty card - user's manual - cable terminals (to be used for connection to the output terminals).

EQUIPMENT NECESSARY FOR INSTALLATION

On the basis of the type of model, use the batteries and cables on the output terminals as specified in the following table:

MODEL	MBC 12-80/3	MBC 24-60/3	MBC 24-80/3
Battery voltage	12 V	24 V	
Battery capacity	360 ÷ 800 Ah	270 ÷ 600 Ah	360 ÷ 800 Ah
Minimum output cable size	35 mm^2	25 mm^2	35 mm^2

The cables connected to the output terminals have a maximum length of 4 metres.

WARNING: the battery charger must be used only with a re-chargeable lead/liquid electrolytic batteries or lead/gel (sealed or non-sealed).

INSTALLATION SITE

Install the battery charger in a dry and ventilated place and as near to the batteries as possible. The battery charger, although having high efficiency, develops a certain amount of heat during functioning, therefore, it is imperative that the installation area has sufficient ventilation, enough to allow use of the equipment at maximum power.
The battery charger can be installed in a horizontal or vertical position with cables coming out in the downward position. The vertical position is recommended because the natural convection of heat helps to cool the equipment. The perimeter of the battery charger (except the base) must be kept at a distance from walls or objects by a minimum of 5 cm.

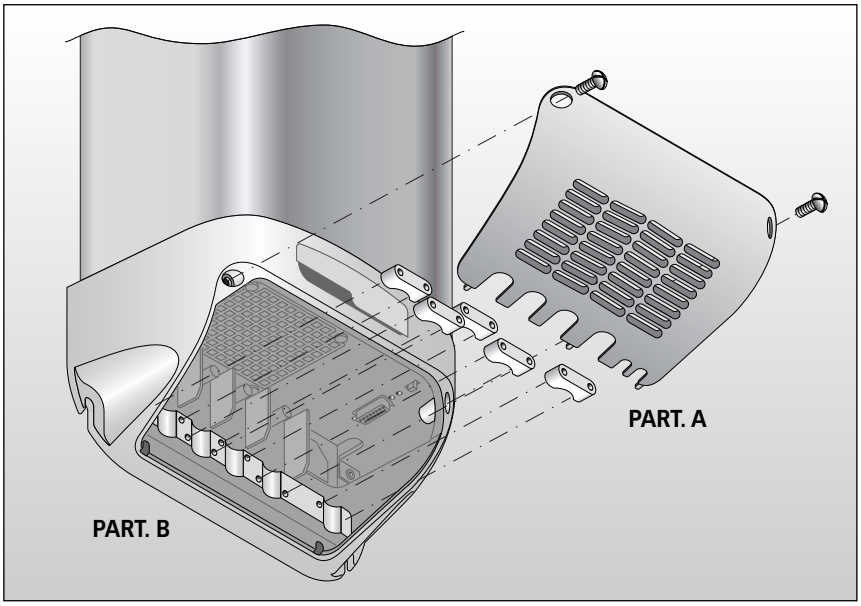


FIG.1

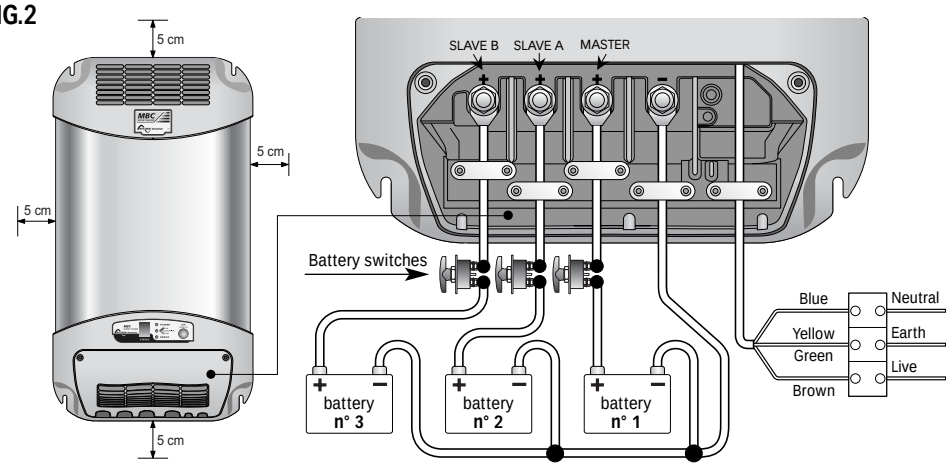
EQUIPMENT SUPPLY

The equipment already includes a power cable for AC supply. For connections to an AC supply see fig.2. Before powering up the battery charger check that the power supply voltage, described on the rating label, corresponds to that supplied by the AC supply source.
In the electrical circuit a two-pole switch must be installed for the sole use of switching the equipment ON & OFF. The insulation between the contact points of the connections of the AC supply must be at least 3 mm. The connections to the AC supply must be carried out according to local electrical codes.

WARNING: before connecting or disconnecting the cables from the electrical terminals of the battery charger, make sure that the equipment is disconnected from the AC mains and the batteries.

WARNING: in cases where the power supply cable could be damaged, have this changed by a "STUDER INNOTEC" service centre. In order to avoid accidents, the equipment must only be opened by authorised personnel.

FIG.2



BATTERIES

To access the output terminals it is necessary to remove the cover by loosening the two screws which hold it on top (see fig. 1 Part A). Before making the connections to the cables from the battery, loosen or remove the cable clamps by loosening the screws which fix it to the base (Fig.1 Part B).

WARNING: during charge, batteries can generate explosive gases, therefore avoid sparks or naked flames. Provide adequate ventilation to the battery area whilst charging.

WARNING: before connecting the batteries check the terminals of the cables from the battery. Reversing the terminals, could seriously damage the battery charger even if protected by fuses.

The positive terminal of the battery or of the group of batteries must be connected to one of the positive terminals of the battery charger. The negative terminal of the battery or of the group of batteries must be connected to the negative terminal of the battery charger. To make the connections use the cable terminals supplied with the equipment.

If the installation has only one or two groups of batteries, always connect the output marked "MASTER". This is the main outlet of the battery charger.
If the "MASTER" is not connected, the battery charger may supply an output lower voltage than rated and therefore less power.
It is advisable to connect the group of batteries which are used more often (typically the service group) to the MASTER output terminal.

The positive output terminals that are not used must be kept free (do not bridge the terminals).

WARNING: the use of inadequate size cables and the incorrect connection of terminals or electrical joints may result in dangerous overheating of the connecting terminals or cables.

FIG.3 a

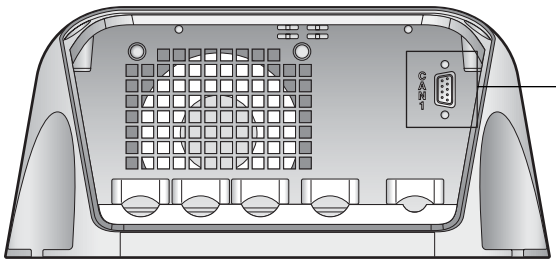
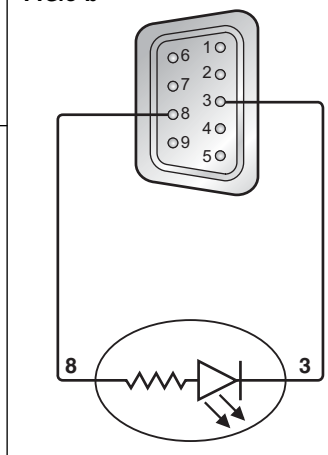


FIG.3 b



CONTROL SIGNALS

The battery charger is provided with a 9-pin female D-shell connector (DB9 connector, see Fig. 3a) which indicates the signals which can be used for monitoring and controlling the equipment.

The position and description of the signals on the connector are listed below:

FEMALE CONNECTOR (DB 9)

PIN	Description
1	CAN BUS terminator (124 ohm)
2	CANL signal - CAN BUS interface
3	Battery charger negative
4	Not used
5	Earth
6	Not used
7	CANH signal - CAN BUS interface
8	Basic state of the battery charger (+V output, 20mA max)
9	+5Vdc (5mA max)

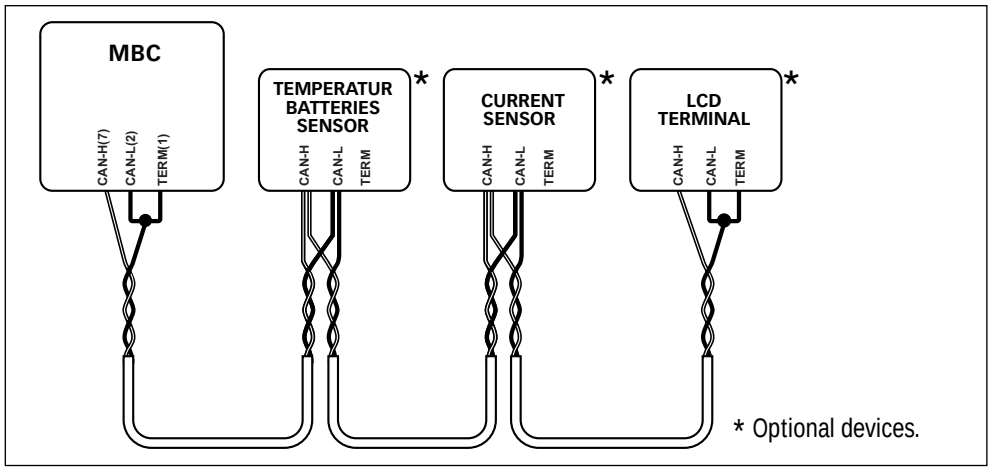
BASIC STATE OF BATTERY CHARGER

PIN 8 connection	State
HIGH IMPEDENCE	OFF OR PROBLEMS PRESENT
+V OUTPUT	ON OR NO PROBLEMS PRESENT

For a wiring example of control signals look at figure 3b.

CAN BUS NETWORK CONNECTION

When making the data interface connection (CANH and CANL signals) use an unscreened cable with a twisted pair (cross-section 0.25/ 0.35 mm^2 AWG 22/24, impedance 100/150 ohm).
The maximum total length of the data signal cable should be no more than 100 m.
Activate the terminator at the first and last device connected to the network.
If there is only one device, the terminator does not need to be activated.
An example of a network connection is given below:



OPERATION

When the battery charger is switched on for a short period, all the LEDS on the front panel will light up. After that the battery charger will place itself in the optimum charging mode to best suit the batteries or load connected. The battery charger has a loading characteristic of the IUoU type.
The MBC battery chargers can also be used as a power supply, that is, with batteries disconnected.
We suggest you use the battery charger in this mode only occasionally and not for ordinary use. However, avoid connecting high inductive loads (e.g. high powered motors) with the batteries disconnected as it you could cause damage to the equipment, even if rare to happen.

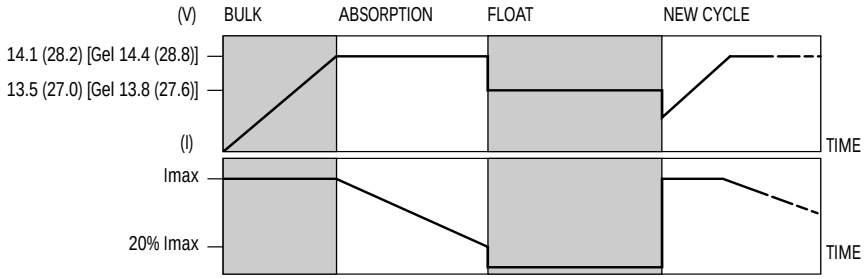
CHARGING CHARACTERISTICS

Charging occurs in 3 phases:

BULK phase (constant current) - The batteries need more current than the battery charger can supply. Current is limited to the maximum rated output. The battery charger can enter this phase during start-up, when the batteries are low or when a high load is connected.

ABSORPTION phase (constant voltage) - The battery charger charges the batteries at a constant ABSORPTION voltage and at the current they need.
The current needed by the batteries will tend to diminish over time. When the required current is less than 20% of the maximum output value, the charger will change to the FLOAT phase.

FLOAT phase (maintenance) - The battery charger charges the batteries at the constant FLOAT voltage. In this phase, as the batteries reach maximum capacity, they will tend to absorb current close to zero Ampere. This FLOAT phase will allow the batteries to be on charge without the risk of overloading. The next step to the ABSORPTION phase occurs when the demand for current goes over 20% of the maximum output value.



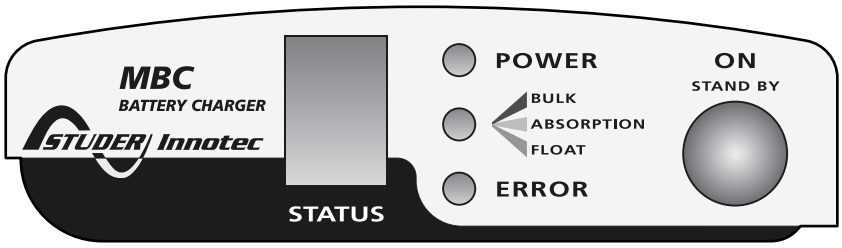
HALF-POWER MODE

If the supply voltage of the equipment drops under 97 Vac the battery charger will activate the “half power” mode. In this mode the battery charger can supply, a maximum value half of the maximum nominal output current. In this way you can reduce the current absorption from the AC supply. This feature is useful when the battery charger is supplied via a generator or from a dock outlet with limited power output.
The half power mode can be activated manually by using the remote LCD terminal (optional).

CONTROL PANEL

The control panel is made-up of three LED, a 7 segment display and a button:
POWER LED, **CHARGE PHASE LED** (BULK, ABSORPTION, FLOAT) **ERROR LED**, **STATUS** display and **ON/STAND-BY** button (see fig.4).

FIG.4



ON/STAND-BY BUTTON:

Use this button to put the battery charger in stand-by mode. To activate this mode simply press the button quickly (press and release in less than one second). To take the battery charger out of stand-by mode, press the button quickly again or disconnect the battery charger from the AC power supply and then connect it up again.

The information supplied by the LEDS are listed as below:

POWER LED

LED colour	Description
OFF	No mains power
Green	Power ON
Flashing	Battery charger in stand-by mode

CHARGE PHASE LED (BULK, ABSORPTION, FLOAT)

LED Colour	Description
OFF	No output power
Red	**BULK phase** - charge at constant current
Orange	**ABSORPTION phase** - charge at constant voltage
Green	**FLOAT phase** - float charge

ERROR LED

LED Colour	Description
OFF	No problem with manual reset
Red	Problem with manual reset (see error codes)

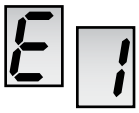
NOTIFICATION SIGNS

	The half-power mode has been activated by the manual control.
	[*Flashing symbol*]. Monitor mode is activeted.

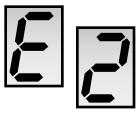
PROBLEMS WITH AUTOMATIC RESET

	The AC mains voltage is too low. The battery charger goes into half-power mode. The message disappears when the mains voltage falls within the nominal range again. (This indication appears when the battery charger is turned off even under normal voltage supply conditions).
	The battery charger is reducing power because of a high ambient temperature. The message disappears as soon as the condition which caused the problem is no longer present. If this message appears frequently check whether the battery charger has been installed properly.
	The temperature measured by the battery sensors (optional) is outside the range determined for the charge (-20/+55°C). The output voltage of the battery charger becomes 12.8V (25.6V in the 24V models) so that the batteries are not damaged. This message disappears when the battery temperature falls back within the correct range.
	CAN BUS communication problem. The system has found a rate of communication errors which is higher than normal. If this message appears frequently, check whether the CAN network wiring has been carried out properly.

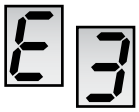
PROBLEMS WITH MANUAL RESET



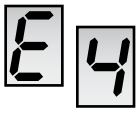
The letter “E” and the number appear flashing on the display alternately.
Short circuit or output overload. Check the output wiring, the group of batteries and the load connected to the battery charger.



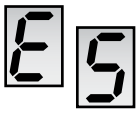
The letter “E” and the number appear flashing on the display alternately.
Output fuse blown (probable reverse polarity).



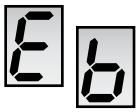
The letter “E” and the number appear flashing on the display alternately.
Output overvoltage. Due to internal malfunctioning, the battery charger supplied a voltage more than 12% of the nominal value for a very brief time.



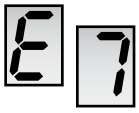
The letter “E” and the number appear flashing on the display alternately. The battery charger overheats excessively. The operating temperature of the battery charger has exceeded the maximum allowable threshold for proper operation. Check whether the battery charger has been installed properly. Turn off the equipment and leave it to cool down for at least 10 minutes.



The letter “E” and the number appear flashing on the display alternately.
Prolonged overload. The battery charger has delivered maximum current at a voltage lower than half the nominal output value for too long.
Check the output wiring, the group of batteries and the load connected to the battery charger.



The letter “E” and the number appear flashing on the display alternately.
Blocked fan.



The letter “E” and the number appear flashing on the display alternating.
Serious CAN BUS communication problem. Check the CAN network wiring and make sure the terminals have been installed properly.

THE E2/E3 PROBLEMS NEED TO BE CHECKED BY A “STUDER INNOTEC” SERVICE CENTRE.

In order to eliminate the problems with manual reset you must remove the cause of the problem, therefore, switch off the battery charger for at least 10 seconds and then switch it back on again.

PROGRAMMING THE BATTERY CHARGER

The battery charger has the following programmable functions:

- Selecting the battery charge mode - liquid or gel electrolite.
- Selecting the network group.
- Selecting the priority within the network group.
- Activating/inactivating the monitor mode.

Activating programming

Press the button provided on the control panel for 6 seconds in order to activate the programming procedure. Once this time has elapsed, the letter "P" will appear steady on the display. At this point, release the button. The battery charger will pass from one programming function to another in the order given below:

EL/GEL SELECTION

This function enables the charge provided by the battery charger to be optimized according to the type of batteries used - liquid electrolite or gel.

WARNING: check which battery charging mode has been selected. If the wrong selection is made, this could reduce the service life of the batteries or mean the charging time takes longer.

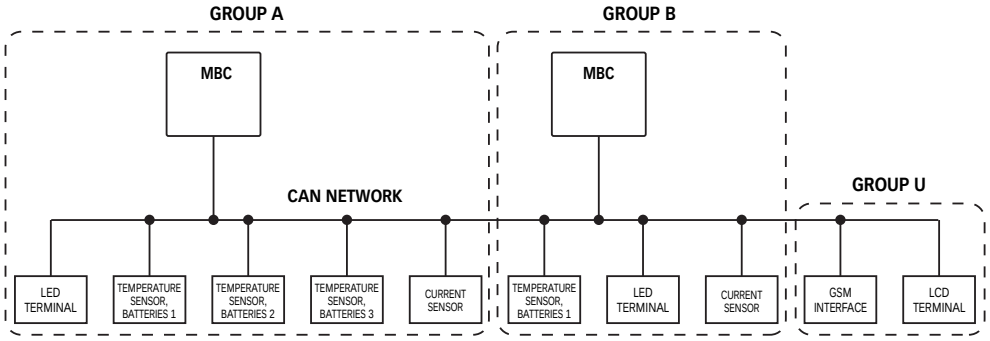
The letter "E" (liquid Electrolyte) or "L" (gel) will appear flashing on the display according to the current setting.

To change the setting press the key quickly (press and release the button in less than 1 second).

To make the setting operative press the key for at least 2 seconds. The display will confirm the setting by showing the letter selected for one second (steady).

SELECTING THE NETWORK GROUP

This function enables the user to determine which network group the battery charger belongs to (group "A", "b" o "C"). Only one battery charger of the MBC BATTERY CHARGER series can belong to each group. The other devices making up the group can be terminals, sensors or interfaces. A diagram is given below showing an example of a possible network:



The devices belonging to one group "A", "b" or "C" can only dialog between themselves. Group "U" (Universal) is an exception as this can dialog with any other device.

The distinction between different groups is very important in order to connect all the devices to the same CAN network even if they belong to different electrical systems.

The letter "A", "b" or "C", will appear flashing on the display according to the current setting.

To change the setting, press the key quickly (press and release the key in less than 1 second).

To make the setting operative press the key for at least 2 seconds. The display will confirm the setting by showing the letter selected for one second (steady).

SELECTING GROUP ORDER OF PRIORITY

This function is used to determine the priority level of the battery charger within the network group. At the moment this function is not used by the battery charger (it is reserved for future expansions).
The number "1", "2" or "3" will appear flashing on the display according to the current setting.

To change the setting press the key quickly (press and release the key in less than 1 second).

To make the setting operative press the key for at least 2 seconds. The display will confirm the setting by showing the number selected for one second (steady).

ACTIVATING/INACTIVATING THE MONITOR MODE

This function enables the user to activate or inactivate the battery charger's "monitor" mode.
If it is activated, the "monitor" mode enables the battery charger to transmit and receive data on the CAN network even if no AC power is being delivered. To do this, the battery charger is supplied with power from the group of batteries using the master output. The current absorption, with "monitor" mode active, is less than 75mA (120mA for 24V models).
The battery charger exits "monitor" mode (is turned off) if the voltage of the master group of batteries is less than 7Vdc (14Vdc for the 24V models).

This mode should be activated when the remote terminals are connected to the CAN network.

The letter "O" (monitor mode Off) or "S" (monitor mode On [Stand-by]), will appear flashing on the display according to the current setting.

To change the setting press the key quickly (press and release in less than 1 second).

To make the setting operative press the key for at least 2 seconds. The display will confirm the setting by showing the letter selected for one second (steady).

Once the programming procedure has been completed, the following symbol will be shown for 1 second: "-".

MAINTENANCE

The battery charger does not need any maintenance. To ensure optimum performance from the equipment, once a year check the cables and the electrical connections.

TECHNICAL DATA

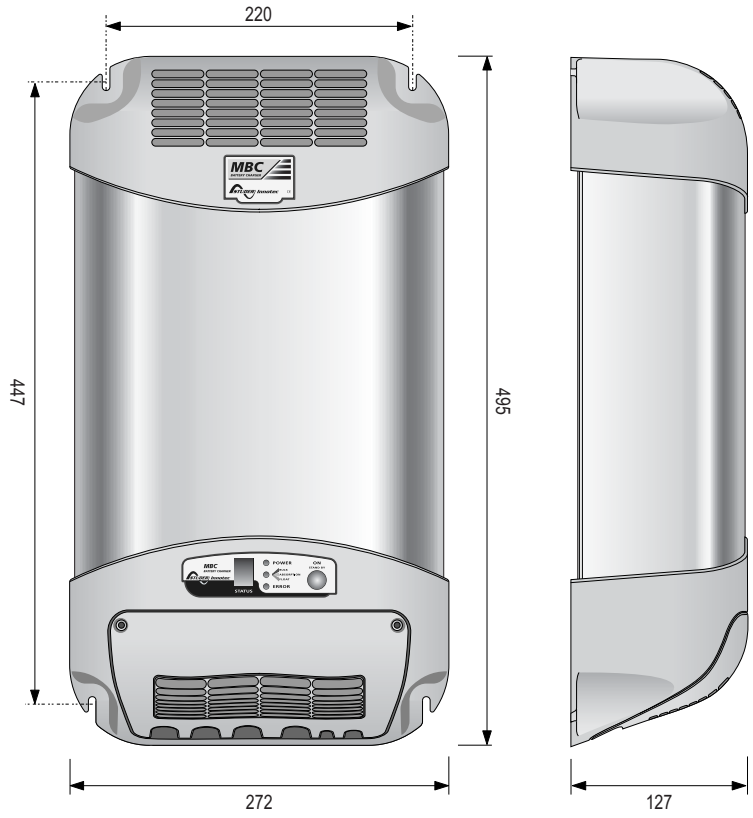
MODEL	MBC12-80/3	MBC24-60/3	MBC24-80/3
OUTPUT CHARACTERISTICS			
Maximum output current [1]	80 A	60 A	80 A
Charge absorption voltage	14,1 Vdc (14,4 Vdc GEL)	28,2 Vdc (28,7 Vdc GEL)	
Charge float voltage	13,5 Vdc (13,8 Vdc GEL)	27,0 Vdc (27,5 Vdc GEL)	
Residual ripple [2]	90mV RMS max		
Charging characteristics	Automatica a tre stadi IUoU		
Number of outputs [3]	3		
INPUT CHARACTERISTICS			
Supply voltage	83÷280 Vac, with power reduction under 97 Vac	150÷280 Vac, with power reduction under 195 Vac	
Frequency	45÷66 Hz		
Maximum absorption [4] (230 Vac)	6,4 A	8,9 A	11,9 A
Maximum absorption [4] (115 Vac)	12,9 A	–	
Power factor (cos φ)	1		
PROTECTION			
Reverse polarity [5]	Yes, through fuse		
Overload	Yes		
Output short circuit	Yes		
Overvoltage in output [6]	Yes		
Overheating	Yes		
Battery overtemperature	Yes, optional		
AMBIENT CHARACTERISTICS			
Operating temperature	-20 to +70 °C, with power reduction over +50 °C		
Cooling	Automatic , by variable speed cooling fan		
Humidity	Max. 95% RV without condensation		
CASE			
Material	Stainless steel - Cycoloy ®		
Colour	Polished steel - OR5066		
Dimensions (WxHxD)	272 x 495 x 127 mm		
Weight	7,1 Kg		
GENERAL			
Connector for remote panel	Yes, digital (CAN BUS)		
Safety classification	EN 60335-2-29		
EMC class	EN 55022/B		

(1) Maximum value at normal use or in short circuit.
(2) At maximum output current on resistive load.
(3) Each output can supply the maximum value of nominal current. The sum of the currents supplied from each output can not exceed the maximum nominal value of the equipment.
(4) With supply voltage as specified and output current equal to the maximum nominal value
(5) Protection may be inefficient in some operative conditions.
(6) Software/hardware double-check.

Cycoloy ® is a registered trade mark of GE Plastics.

MBC BATTERY CHARGER - DIMENSIONS (mm)

12-80/3 / 24-60/3 / 24-80/3



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