INSTALLATION- AND OPERATION MANUAL

Batterie-Control-Booster

MT BCB 30-30-20

12V / 30A–30A Nr. MT 03030

MT BCB 40-40-30

12V / 40A–40A Nr. MT 03040

MT BCB 60-40-40

12V / 60A–40A Nr. MT 03060

BÜTTNER ELEKTRONIK
GERMANY
MOBILE MT TECHNOLOGY

Introduction

With the purchase of the Batterie-Control-Booster you have chosen a quality product from BÜTTNER ELEKTRONIK.

The Batterie-Control-Boosters meet the highest requirements of the most modern charging technology for your board battery and offer 3 operating modes:

- Booster mode: Board battery charging while driving from the alternator
- Mains operation: Board battery charging and preservation of charge for the starter battery on 230 V mains supply.
- Pulser operation: Without mains supply the pulser counteracts sulphation of Gel, AGM and lead-acid batteries and thereby increases the battery life.

Please check the contents of the package for completeness immediately after opening. You will find an overview of the scope of delivery on page 2 in chapter “Scope of delivery”.

The battery control booster must be set-up before installation and commissioning. For more information, please read section “Settings” on page 12.

We hope you enjoy your new Mobile Technology Batterie-Control-Booster.

Your BÜTTNER ELEKTRONIK team

About this manual

With the installation guide on the following pages, you can put your Batterie-Control-Booster into operation quickly and easily.

Please read these instructions carefully and attentively. Pay attention to the safety

instructions in particular to ensure proper operation of the device.

Warning!

Danger!

Warns of dangers to persons, damage to the device or other objects. Injuries or damage may result from improper handling. Failure to do so can lead to serious damage, fire and personal injury!

Notice

Tips and Tricks

This icon is used to designate tips, helping to use your equipment even easier and more efficient.

Scope of Delivery

Quantity	Description
1	MT BCB 30/30, MT 40/40 or MT 60/40
1	Temperature-sensor
1	Extension cable (5 m) and adaptor for remote control
1	Installation- and operation manual

Table of Contents

EN

1. General-/Safety information

Please read all the following notes carefully before you start operating your new device.

The MT BCB is exclusively for charging rechargeable battery systems (lead acid, Gel, AGM or LiFePO4 with BMS and approval!) and for supplying connected consumers in permanently installed systems with the specified battery capacities and charging programs.

The battery control booster is suitable for stationary and mobile use but generally not for outdoor use.

The BCB was manufactured on the basis of the applicable safety guidelines.

1. Use may only take place if,
   - a 230 V receptacle with ground is installed in accordance with the respective technical regulations, fused max. 16 A and RCD device (with 30 mA fault current),
   - with the specified cable cross-sections at the BCB inputs and outputs,
   - with the appropriate fuses (close to battery) to protect the wiring between batteries and BCB connections,
   - in perfect technical condition,
   - in well-ventilated non-condensing environment, protected from rain, moisture, dust and aggressive battery gases.
2. For electrical welding work and work on the electrical system, the device must be disconnected from all connections.
3. If the descriptions provided for the non-commercial user do not clearly indicate which characteristic values apply to a device or which regulations are to be observed, the information of a specialist must be obtained.
4. The device does not contain any parts that can be replaced by the user and may contain voltages for a long time (especially in the event of a fault) even after it has been switched off.
5. Compliance with construction and safety regulations of all kinds is subject of the user/buyer.

Warning!

Electrical current

To protect against electric shock, you should disconnect the supply voltage when installing or maintaining the device.

2. Description

The battery control booster MT BCB has 3 functions for fully automated charging, charge maintenance and care of the board batteries. The device is adjustable to all common battery types (lead acid/Gel/AGM/LiFePO4).

The device is to be installed either between starter- and board battery, or also integrated in the leisure vehicle in parallel to the existing charge unit and charges depending the model with additional 30 A respectively 40 A on 230 V mains and 30 A, 40 A, or even 60 A while driving with most recent, temperature compensated IUoU characteristic. The integrated pulsing unit ensures appropriate battery care if none of these charging sources are available. As a result, the device differs in many functions of a charger installed in most Recreational vehicles and is not only used to maintain and for care, but also to keep the board battery always fully charged.

2.1. Mains operation

Allows charging the board battery and supplying the 12 V-consumers from mains power.
The intelligent microprocessor charging control with "IU1oU2oU3" charging characteristic and dynamic charging time calculation automatically ensures fast and gentle full charging as well as subsequent 100% charge retention of the connected board battery from any state of charge and always enables simultaneous supply of 12 V-consumers.
The built-in auxiliary charging output (12 V/4 – 5 A) ensures that the vehicle starter battery is charged and is protected against overcharging.

For silent operation with a dimmed control panel, the device can also be operated in night mode.
Mains operation has priority over booster and pulsing operation i.e. start - and board batteries are charged and kept at full charge.

2.2. Booster operation

Enables the board battery to be fully charged while driving, even with most recent vehicles (Euro 6) with so-called "smart alternators".

The booster not only completely compensates for voltage drops on the incoming charging wiring, but also increases the voltage to the level required – depending on the battery type – to be able to fully charge the board battery as on mains operation using the optimal "IU1oU2oU3"-charging characteristic.

2.3. Pulsing operation

Whenever there is no charging possibilty, the unused lead battery is protected against rapid aging and failure due to sulphation by battery training (e.g. longer breaks, wintering or seasonal operation) – see chapter 4.2.

Note:

- The pulse unit does not replace the charging source! Check and recharge the battery regularly (self-discharge)
- Ensure that only one pulse unit is activated at a time and deactivate if necessary
- With LiFePO4 batteries, the pulse function is automatically deactivated

2.4. General device properties

- "IU1oU2oU3"-charging characteristic for surveillance-free, fully automatic continuous operation (e.g. longer breaks, wintering or seasonal operation)
- Parallel and buffer operation: If the battery is used at the same time, the battery simultaneously will be charged or retained in full condition
- Multiple protection, against overload, overheating, overvoltage, short -circuit, reverse-polarity and incorrect operation (Attention: no reverse polarity protection at the starter battery connection!) Automatic lead-battery regeneration in mains operation at long idle times against harmful acid layers (twice a week)
- Charging cable compensation: voltage drops on the charging cables are automatically corrected
- Charging possibility of deeply discharged batteries (0 V) with initially reduced charging current until battery voltage rises above 9 V
- Integrated on-board network filter for trouble-free parallel operation with solar systems, wind and gasoline generators, etc.
- Temperature-compensated charging: Depending on the temperature, the external temperature sensor influences the charging voltage for lead batteries and the charging current for lithium batteries for monitoring-free and gentle charging
- The enclosed temperature sensor can be used universally for all battery types, regardless of the manufacturer. If a lithium battery from BÜTTNER ELEKTRONIK is used, the temperature sensor built into the battery preferably is to be used. The BCB then establishes contact with the sensor and ensures operation in the optimal charging window.

3. Installation Batterie-Control-Booster MT BCB

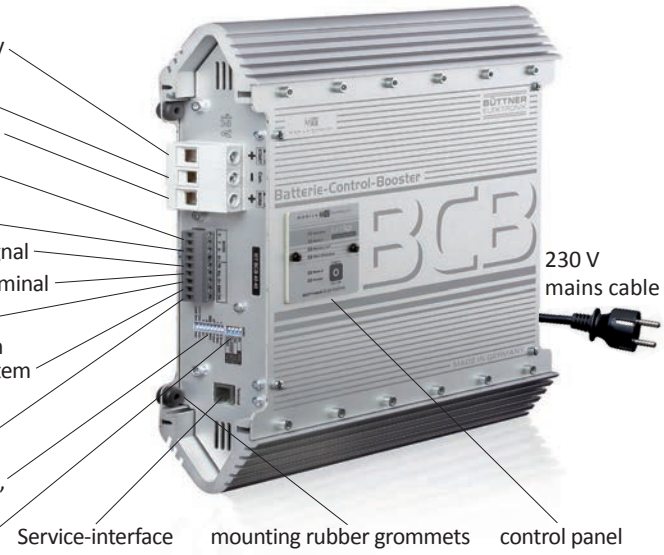
3.1. Mounting

The BCB can be mounted in any position on a clean, flat, hard surface, dust-free and protected from moisture. The installation location should be chosen so that,

- the connection to the board battery remains as short as possible,
- sufficient air exchange for heat dissipation is possible in the proximity of the device and
- the ventilation openings of the housing for full charging capacity should never be covered (minimum 10 cm clearance).
- device is protected from aggressive battery gases,
- the installation is solid and vibration-reduced with rubber grommets
- Cables are placed in such a way that damage is excluded, 12 V and 230 V mains power cables are not mixed together in the same cable conduit and secure fixing is guaranteed.

3.2. Device overview

START – input +12 V starter-battery
COM – input board battery minus / chassis
BORD – input +12 V Board-battery
T T – 2 input temperatursensor
S- / S+ – 2 inputs for Sense wiring from board-battery
TR – output 12 V – relay control signal
CI – Caravan Industry (CI) – Bus terminal
D+ input D+ / ignition key – signal
BMS – input for control signal from external Battery-Management System for Lithium batteries
Netz – output 12 V-signal (on mains max. 100 mA)
8 DIP-switches for operation mode, power set-up, BMS- signaltype, pulsing
4 DIP-switches for battery-type



3.3. Control panel

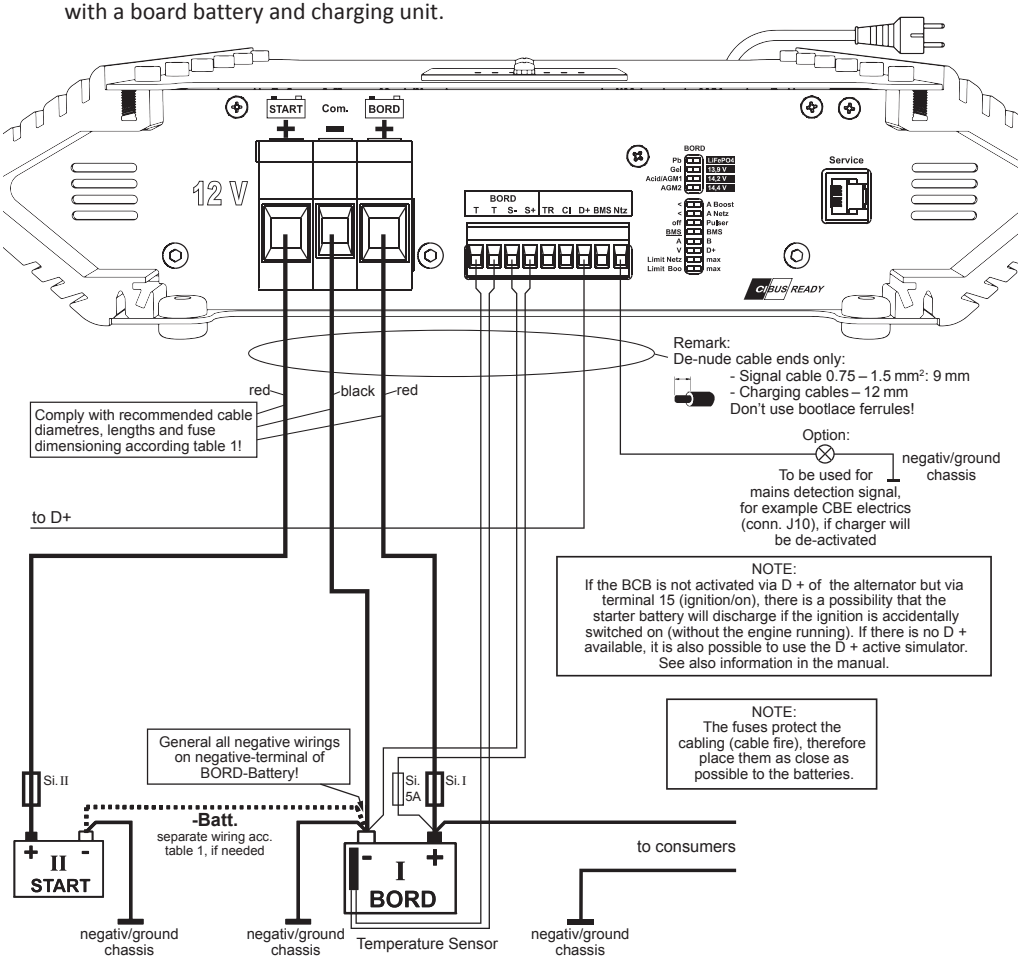
Depending the mounting position of the BCB, the display panel can,

- for optimized readability and operability be mounted rotated in 90° steps after loosening 2 fastening screws, or be used as
- remote display, when the BCB is installed in a place that is difficult to access. To do this, remove the two fastening screws, reconnect the display panel to the BCB using the 5 m plug-in extension cable and mount it at the desired location

3.4. Types of Installation

Installation type 1 – DIY (Do-it-yourself) builders

Perfect for vehicles that need to be equipped with a board battery and charging unit.

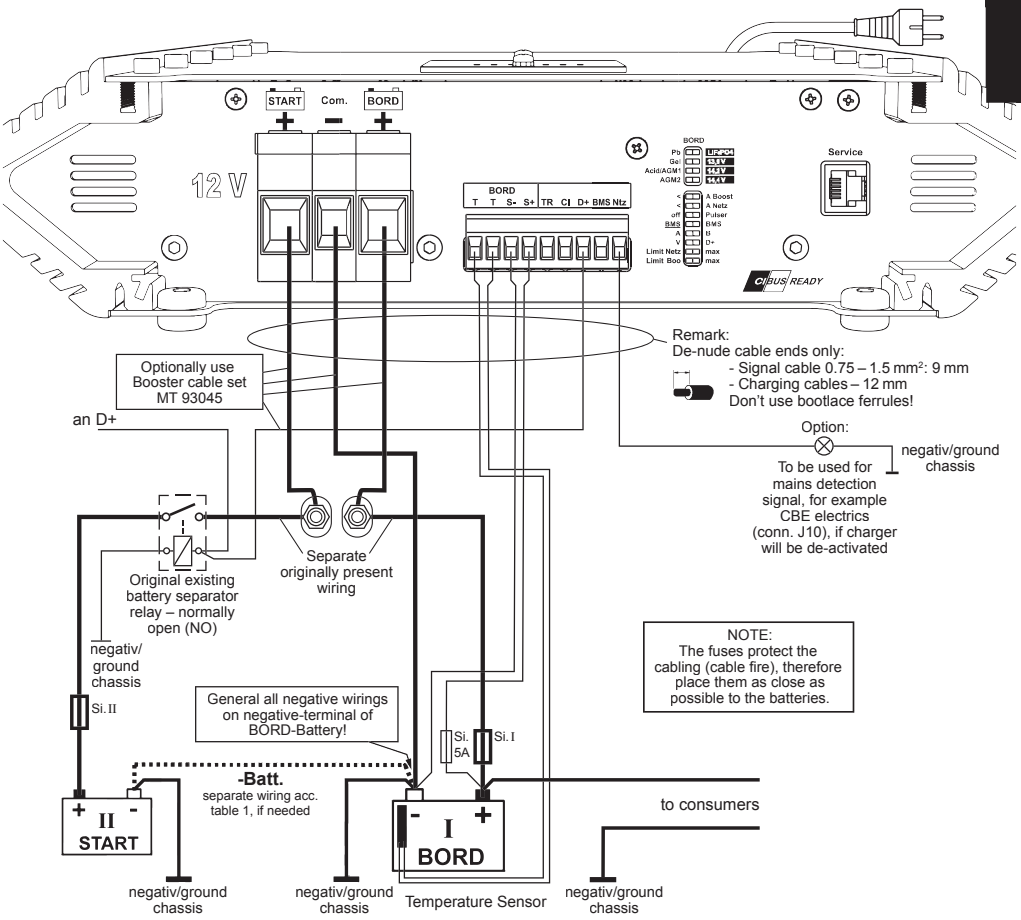


Remarks:

- The BCB takes care of charging the on-board battery while driving and is galvanically isolating the starter battery when the vehicle is stationary. *(no battery separator relay required!)*
- The maximum charging current while driving can be 30 A, 40 A or 60 A depending on the BCB model. For higher currents caused by consumers - see installation type 2.
- When connected to the mains, the board battery will be charged as well as the starter battery be maintained in charge with 4 A, 5 A or 10 A, depending on the BCB model.
- Cable cross-sections and corresponding fuses need to be dimensioned adequately according to table 1.

Installation type 2 – Battery separator relay already present

The BCB is installed in parallel to an already installed battery.

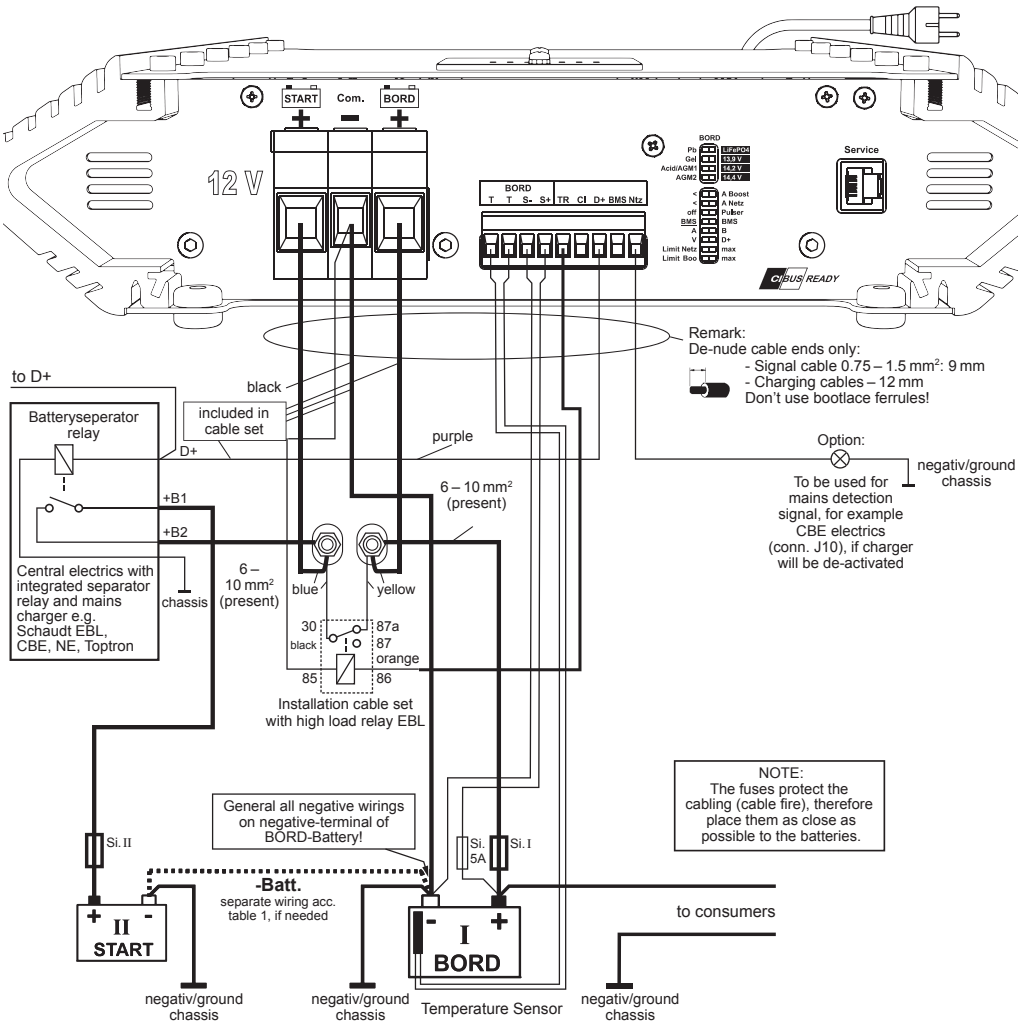


Remarks:

- Installation in a strategically favorable place behind the originally existing battery separator relay. Use booster cable set MT 93045 optionally!
- Controlling of the originally existing battery separator relay and the BCB takes place simultaneously with the D + signal and the BCB takes over the charging management of the board battery. When connected to the mains, only the board battery will being charged! The starter battery cannot be maintained when the battery separator relay is open.
- Please check whether the originally present cable cross-sections and fuses are adequately dimensioned (according table 1). If this is not the case and when using the BCB 40/40 and BCB 60/40, the maximum power consumption must be limited with the "Limit Boo" switch (position to the left). This ensures that originally present cabling, fuses and the battery separator relay – depending on the version – are not overloaded when driving

Installation type 3a – Recreational vehicles with central electric station (Schaudt, CBE, NE, Toptron)

With the installation cable set, the BCB 30/30 and BCB 40/40 can be simply inserted between the originally present cabling between board battery and central electric station. The high-load relay ensures that the consumers can be supplied by the battery again at closed contacts. While driving, the relay is open and the BCB is charging the battery.



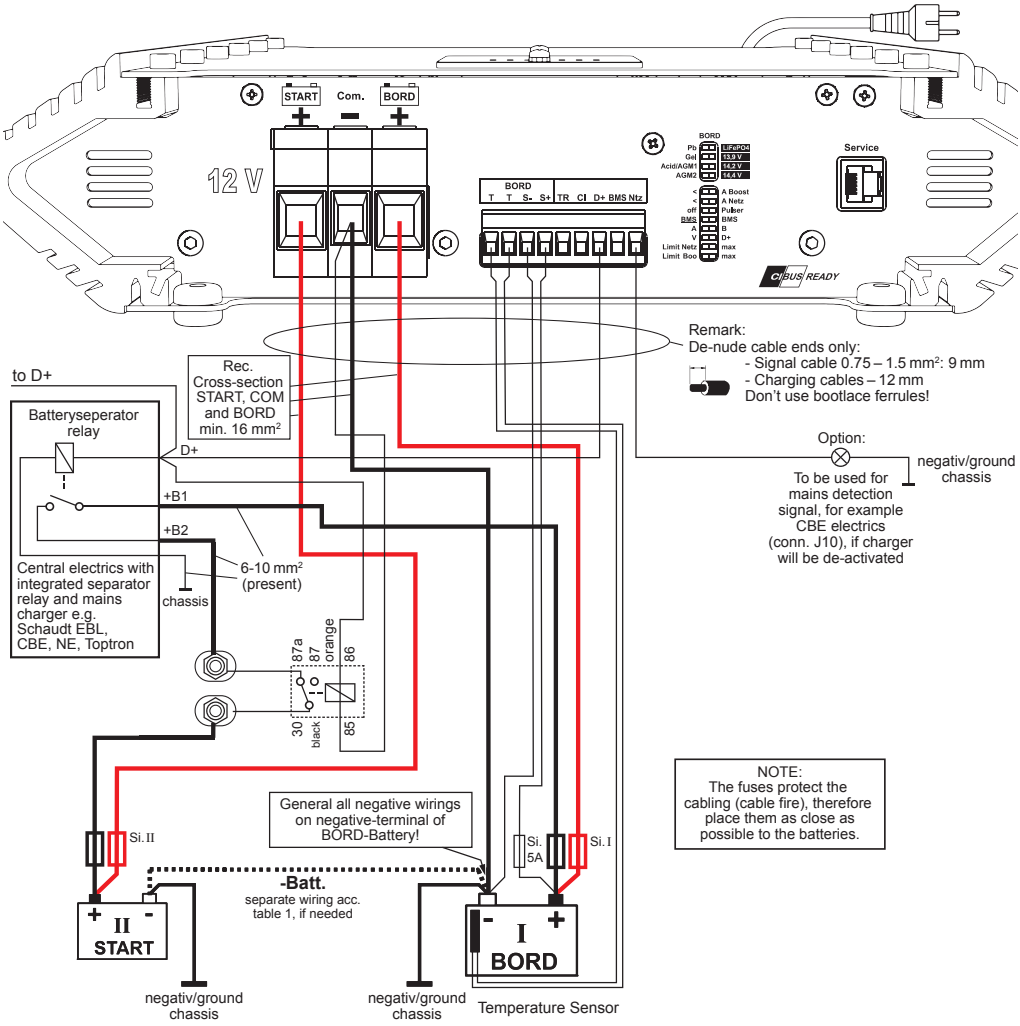
Remarks:

- **Recommendation for installation:**
  Quick and easy installation type when using the optional cable set (item no. MT 93080) for MT BCB 30-30-20 and MT BCB 40-40-30. For this purpose, the charging cable needs to be separated at a suitable point and both cable ends to be connected at each side of the terminal block. The pre-wired cabling needs to be connected to the BCB and the board battery.
- The high load relay (86) can be controlled either via the TR output from the BCB or with the D + / ignition key (terminal 15) signal.
- **Special case:**
  With some manufacturers of motorhome electronics (Nordelectronica NE148/185) the internal battery separator relay is only activated a few seconds after the D + signal! In order to avoid interruption of the on-board supply, the high-load relay EBL may also only open with a time delay after the battery separator relay has closed. For this reason, the high-load relay EBL (86 orange cable) is activated with the TR signal 10 s delayed from the D+ signal.
- DIP switch setting for operating mode on V
- With LiFePO4 board batteries, temperature-related, controlled charging is always ensured, even at extreme temperatures (<0°C and >50°C).
- When connected to the mains, the board battery will be charged and the starter battery be maintained in charge with 4 A, 5 A or 10 A, depending on the BCB model.
- In mains operation, the BCB supports the existing charger and the charging currents are adding up. The temperature-controlled charging can only work correctly if the originally present charger also has temperature compensation. If this is not the case, we recommend deactivating the existing charger in order to achieve the optimal service life of your high-quality battery. In particular, when using LiFePO4 board batteries, the originally present charging devices must be deactivated, especially since they also do not have lithium battery charging characteristics.
- With the EBL (Schaudt), the charger can be deactivated by removing the fuse “charger”. If the power cable remains plugged in, the power detection signal continues to be available in the control unit. In the case of CBE equipment, one cable from the charger output to the CBE distribution can be interrupted in order to disable the charging function, but to receive the “mains present”-signal on the board control panel. If necessary, when disabling/removing the CBE charger, connect the BCB output “Ntz” to “J10” in the CBE distribution box.

Installation type 3b – Special case: BCB 60/40 for recreational vehicles with central electric station (Schaudt, CBE, NE, Toptron)

The BCB 60/40/40 with its power of 60A is too strong for charging while driving for the installation according to installation type 3a and typically present wiring in 10 mm² and maximum load capacity of the integrated isolating relay of the EBL.

It therefore needs to be installed parallel to the central electrical station with appropriately sized cable cross-sections (min. 16 mm²). When driving, however, the starter battery must not be connected to the board battery via the isolating relay. This would short-circuit the START input and the BORD output on the BCB and thus no charging power would be available !



Depending type of EBL, either the starter battery connection cable can be removed or disconnected from the EBL with the additional NC relay (high-load relay EBL – 80 A) only while driving.

The closed relay ensures that the starter battery voltage is displayed on the control panel when the vehicle is stationary.

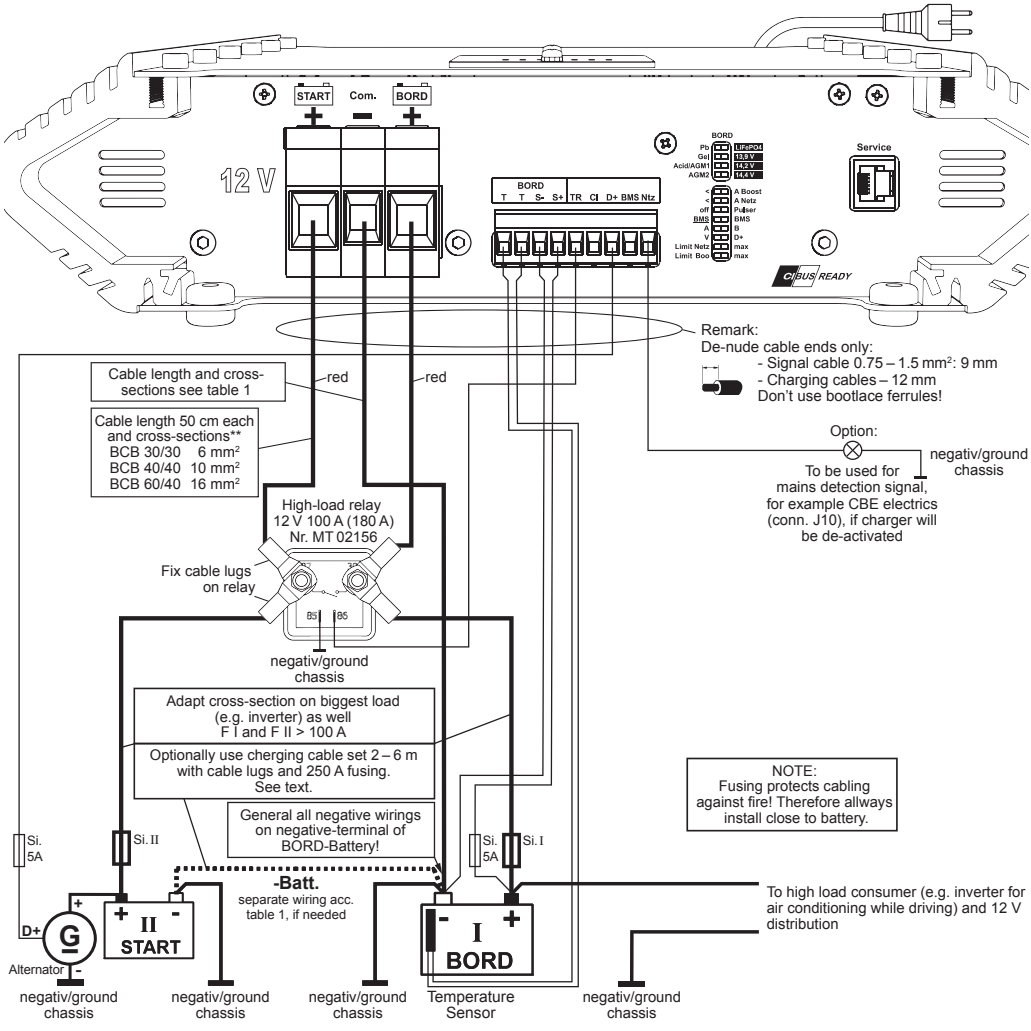
Special case: Alternatively, with the CBE distribution box (DS470), the control of the internal battery separator relay can be disabled by removing the resistor “R47”. As a result, the starter battery connection on the distribution box and thus its voltage display on the control panel is retained. (Please contact our customer service for detailed information)

Remarks:

- The high-load relay (NC) is controlled via the D +/ignition key (Term. 15) – signal of the vehicle and “opens” simultaneously when the battery separator relay is closed, thus separating the starter battery from the EBL and the BCB delivers full charging power. Use installation cable set (Überbrückungs-Relais-Einbaukabelsatz MT 93050) if necessary.
- When connected to the mains, the board battery will be charged and the starter battery be maintained in charge with max. 10 A.
- In mains operation, the BCB supports the existing charger and the charging currents are adding up. The temperature-controlled charging can only work correctly if the originally present charger also applies temperature compensation. If this is not the case, we recommend deactivating the existing charger in order to achieve the optimal service life of your high-quality battery. In particular, when using LiFePO4 board batteries, the originally present charging devices must be deactivated, especially since they also do not have lithium battery charging characteristics.
- With the EBL (Schaudt), the charger can be deactivated by removing the fuse “charger”. If the power cable remains plugged in, the power detection signal continues to be available in the control unit. In the case of CBE equipment, one cable from the charger output to the CBE distribution can be interrupted in order to disable the charging function, but to receive the “mains present”-signal on the board control panel. If necessary, when disabling/removing the CBE charger, connect the BCB output “Ntz” to “J10” in the CBE distribution box.
- Please pay attention to the recommended cable cross-sections and proper cabling!

Installation type 4 – Special case: power consumption while driving more important than charging capacity of the BCB

For operating conditions when sometimes higher currents are drawn than the BCB can supply will need to flow to the board battery.



Remarks:

- If consumers with high power consumption need to be operated while driving, which exceed the device output of the BCB, installation type 4 can be used. For this purpose, the high-load normally open relay (12 V/100 A – NO) is controlled via the TR output and the high consumer current can usually flow directly via board battery to an inverter to which, for example an air conditioning system is connected. In this case, the board battery is no longer charged but only the consumer is supplied via the high-load relay.
- When using LiFePO4 batteries, this function is blocked below 0°C!
- The switchover can only work if the BCB is connected directly to the high-load NO relay with 50 cm cables each with the specified cross-sections. The cabling between both batteries with a cross-section of at least 25 mm^2 is also to be carried out directly on the high-load relay.
- Please check accordingly the alternator output power. This should be at least twice as much as the consumer consumption!
- When connected to mains, the board battery will be charged and the starter battery be maintained in charge with 4 A, 5 A or 10 A, depending the BCB model.
- Please pay attention to the recommended cable cross-sections.
- Set the DIP switch for the operating mode to **D+**.

Optionally:

- For the additional cabling of starter- and board batteries, charging cable sets are available in lengths of 2 m, 3 m, 4 m, 5 m and 6 m (MT 22002 – MT 22006) with a cross- section of 25mm^2 with heavy-duty fuse holder and 250 A fuse, as well as a high-load normally open relay 12V / 100A (180 A) (MT 02156) are available (see also manual – inverter for air conditioning 1700 SI-K – charging cable sets)

IMPORTANT:

- When cabling according to “installation type 4” in order to realize very high currents, sufficiently dimensioned cables must be used. If this is not ensured, there is potential risk of fire!
- This schematic is unsuitable for a LiFePO4 board batteries: The LiFePO4 battery always draws as much current as alternator and wiring allows and is consequently always higher than the power of the BCB!

  Better: Use a charge booster (Ladebooster) for the corresponding power requirement.

3.5. General installation instructions

- Connect the BCB according installation type!
- Comply with cable cross-sections and lengths acc. table 1
- Pay attention to polarity
- Fuse installation close to the battery
- First connect BCB, at last the batteries!
- Adapt the mains plug from the BCB to the mains installation in the motorhome (socket).

3.6. Connection of – Com, + BORD, + START

The large power terminals are used to connect ground and charging cabling. Only strip the ends of the battery cables on the BCB – do not use bootlace ferrules (cage clamps)!

Stripping length: approx. 12 mm

Terminal **COM**

- Connect the negative pole of the BOARD battery or to the chassis ground.

Note: If a battery computer is available, connect it to the central earth point of the measuring shunt according to the instructions!

- Connection: max. 16 mm²

Note

An additional ground link "-Batt.", between both minus poles of starter- and board battery as shown, is only required for:

- Isolated motorhome constructions
- To avoid galvanic equalizing currents in lightweight vehicle chassis

Terminals **+ BORD, + START**

- Connect the +12 V cable of the board battery to the +BORD terminal with the correct polarity.
- It is essential to connect the +12V cable of the starter battery to the +START terminal with the correct polarity! Attention: Reverse polarity on the starter battery can lead to serious damage of the BCB!
- Terminal spec.: max. 25 mm²

Table 1: Recommended cable cross-sections for different lengths as well as protections for the assignment of the 3 large power connection terminals – Com, + BORD, + START for full charging power while driving

MT BCB 30/30						
Cable cross-section	Cable length **+ START**	at isolated constructions: Cable length -Batt.	**Si. II** Cable protection	Cable length **– Com.** to board battery	Cable length **+ BORD**	**Si. I** Cable protection
4 mm²	–	–	–	0.5 – 1.5 m	0.5 – 1.5 m	40 A
6 mm²	to 5 m	to 5 m	50 A	1.0 – 2.5 m	1.0 – 2.5 m	40 A
10 mm²	to 8 m	to 8 m	50 A	2.0 – 4.0 m	2.0 – 4.0 m	40 A
16 mm²	to 12 m	to 12 m	50 A	3.0 – 6.0 m	3.0 – 6.0 m	40 A

MT BCB 40/40						
Cable cross-section	Cable length **+ START**	at isolated construc-tions: Cable length -Batt.	**Si. II** Cable protection	Cable length **– Com.** to board battery	Cable length **+ BORD**	**Si. I** Cable protection
6 mm²	–	–	–	0,5 – 1.5 m	0.5 – 1.5 m	60 A
10 mm²	to 5 m	to 5 m	80 A	1.0 – 2.5 m	1.0 – 2.5 m	60 A
16 mm²	to 9 m	to 9 m	80 A	2.0 – 4.0 m	2.0 – 4.0 m	60 A

MT BCB 60/40						
Cable cross-section	Cable length **+ START**	at isolated construc-tions: Cable length -Batt.	**Si. II** Cable protection	Cable length **– Com.** to board battery	Cable length **+ BORD**	**Si. I** Cable protection
6 mm²	–	–	–	–	–	–
10 mm²	–	–	–	0.5 – 2.0 m	0.5 – 2.0 m	80 A
16 mm²	to 7 m	to 7 m	100 A	1.5 – 3.0 m	1.5 – 3.0 m	80 A

3.7. Connections on 9-pin plug-in connector

The plug-in connector is used to connect control and measurement inputs, switching outputs and the CI bus adaptation and can be removed for pre-wiring (see also 3.2. Device overview and 5. Technical data).

Protection: All inputs and outputs on this connector are protected against overvoltage, reverse polarity and overload. The maximum load of all outputs is up to 1 A and protected by a self-resetting thermal fuse.

Terminal spec.: 0.75 mm² – max. 1.5 mm²
Stripping length: approx. 6 mm.

T T: Measurement input for the temperature of the BORD supply battery

Connect the strands of the battery temperature sensor to any of the terminals “TT”.

Preferably connect the temperature sensor to the negative battery terminal.

Note

BÜTTNER ELEKTRONIK LiFePO4 batteries offer internal temperature sensors which can be used for a more precise measurement! A twin wire (2 x 0.75 mm²) between the BCB and the temp.sensor connector of the battery is sufficient for this (see also BÜTTNER ELEKTRONIK LiFePO4 battery instructions).

S – / S +: Inputs for measuring / sense wiring for measuring the battery voltage. With the sense wires, the device can measure and regulate the precise charging voltage on the battery, regardless of the voltage losses on the charging cables!

Note

The use of the sense wiring is the more important the higher the charging power of the BCB and the longer the cables need to be ! Connection must be made directly to the poles of the board battery ! If the battery banks are connected in parallel, connect crosswise!

Without sense wiring, cable breaks or fuse defects, it will be switched normal operation with charging cable compensation, i. e. calculated compensation of the voltage losses on the charging cables within the values of table 1.

TR: Signal output for switching a

- relay – normally open (NO) while driving in booster operation after installation type 4 (DIP 6 – setting D +) or a
- high-load relay (NC) of EBL installation kit (MT 93080) Installation type 3a for motorhomes with originally equipped central electric (DIP 6 – setting V)

CI Bus (option): Adaptation for the caravan industrial bus system to display all relevant data on a board control panel.

Depending on the configuration of the CI-BUS on-board system, the functions “AC Power Limit” (mains operation) and / or “Limit II” (charging booster operation) can be managed.

The BCB must be integrated into the CI-BUS on-board system of the recreational vehicle manufacturer, installation partner or a system integrator!

D+: Control input from the alternator for booster operation on/off

Connect terminal D+ directly with the control signal of the vehicle. Preferably the vehicle D+ signal generated from the active alternator should be used. In the case of E6 engines, the D+ signal will not be present in the vehicle and the “Ignition ON” signal (terminal 15) can be used to control the device.

Caution: If the ignition key is switched on but the engine not running, there is a potential risk to discharge the starter battery!

Tip

Use D+ Aktiv Simulator (MT 02159)!

BMS: Optional control input from the battery management system of a LiFePO4 battery with 2 different functions depending on slide switch A/B:

Position A:

The control input can be connected to a charging stop/warning/error switching output of a LiFePO4 battery. The battery is thus able to prevent continued charging and to reactivate it at any time. Depending on the type of battery, the input can be set to a battery signal “active 12 V” (high signal) or “active 0 V” (low signal) and only active when a LiFePO4 battery type is set-up. A more detailed description of the function can be found in “4.2. Configurations and functions – DIP 8”

Position B:

A signal from an external control system or from a switch activates the storage mode charge function for LiFePO4 batteries on the BCB.

Leave the terminal free when not in use or with lead-acid / Gel / AGM batteries

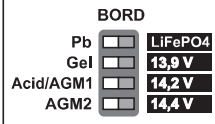
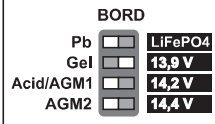
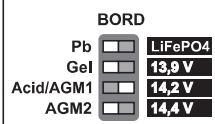
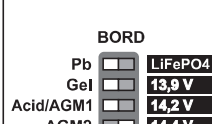
Ntz: (Mains): Signal output if mains voltage (shore power) is present (option): A 12 V signal is supplied to this terminal as soon as the BCB is connected to the mains. It can be used for control and display purposes.

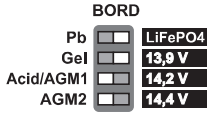
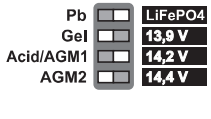
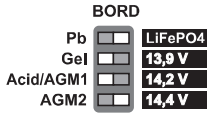
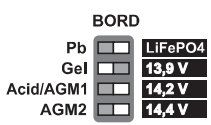
4. Commissioning and function

Setup

1. 4 DIP- slide switches for 8 different, board battery type depending charging programs see 4.1. (DIP 1 – 4)
2. 8 DIP- slide switches for more configurations and functions see 4.2. (DIP 5 – 12):
   - Pulsing unit for re-conditioning of lead batteries - Pulser (DIP 7)
   - Control signal of a LiFePO4 battery - BMS/BMS (DIP 8)
   - Function selection for control signal of a LiFePO4 battery - A/B (DIP 9)
   - Function selection for output TR – V/D+ (DIP 10)
   - AC input current limitation - Limit Netz (DIP 11)
   - DC current limitation from starter circuit - Limit Boo (DIP 12)

4.1. Charging programs for various types of board-batteries (DIP 1 – 4):

DIP-slide switch position (white)	Charging programs for board-batteries in **mains-** and **booster-operation** *(Unless otherwise specified by the battery manufacturer, the appropriate charging program for the battery type can be determined based on the following description and the technical data, U1 and U2 voltages and U1 charging times)*
	**Lead Acid 14.4 V:** Universal charging program for lead acid batteries U1 Absorption voltage: 14.40 V (@20°C 0,5 – 5 h) U2 Float voltage: 13.50 V (@20°C 24 h) U3 Storage voltage: 13.20 V (2x/week regeneration: 14,40 V @20°C/1 h)
	**Gel 14.4 V:** Charging program for **Gel-batteries** (Dryfit, SLA, VRLA): U1 Absorption voltage: 13.8 V (@20°C 4 – 12 h) U2 Float voltage: 13.60 V (@20°C/48 h) U3 Storage voltage: 13.50 V (@20°C cont. regeneration, 2x/week 14,40 V @20°C/1 h)
	**AGM 1 14.4 V:** Charging program for **AGM-batteries** (Absorbed Glass Mat, VRLA): U1 Absorption voltage: 14.40 V (@20°C 0,5 – 4 h) U2 Float voltage: 13.50 V (@20°C 24 h) U3 Storage voltage: 13.20 V (@20°C cont. regeneration 2x/week: 14.40 V @20°C 1 h)
	**AGM 2 14.7 V:** Charging program AGM-batteries (Absorbent Glass Mat, VRLA, spiral cell techn.) with indicated charge voltage 14,7V and 14,8 V U1 Absorption voltage: 14.70 V (@20°C 0,5 – 3 h) U2 Float voltage: 13.60 V (@20°C 24 h) U3 Storage voltage: 13.20V (@20°C cont. regeneration 2x/week: 14.40 V @20°C 1 h)

	**LiFePO4 13.9 V:** Charging program for Dometic eStore - **LiFePO4-batteries** with integrated BMS *(Check other LiFePO4 batteries for suitability of 13.9 V charging voltage and only operate completely with their own BMS and the required protective circuit !)* U1 Absorption voltage: 13.90 V (0,5 – 1h) U2 Float voltage: 13.90 V (24 h) U3 Storage voltage: 13.50 V cont.
	**LiFePO4 14.2 V:** Charging program for Victron / Transwatt TH12/xxx - **LiFePO4-batteries** with integrated BMS *(Check other LiFePO4 batteries for suitability of 14.2 V charging voltage and only operate completely with their own BMS and the required protective circuit!)* U1 Absorption voltage: 14.20 V (0,5 h) U2 Float voltage: 13.60 V (24 h) U3 Storage voltage: 13.40 V cont.
	**LiFePO4 14.4 V:** Charging program **BÜTTNER ELEKTRONIK LiFePO4-Professional batteries**, SuperB SB12VxxE, GNB/Exide SL12xxxHC with integrated BMS. *(Check other LiFePO4 batteries for suitability of 14.4 V charging voltage and only operate completely with their own BMS and the required protective circuit!)* U1 Absorption voltage: 14.40 V (0,3 h – 1h) U2 Float voltage: 13.60 V (24 h) U3 Storage voltage: 13.50 V cont.
	**LiFePO4 14.6 V:** Charging program RELION Lithium Ion Battery with integrated BMS. *(Check other LiFePO4 batteries for suitability of 14.6 V charging voltage and only operate completely with their own BMS and the required protective circuit!)* U1 Absorption voltage: 14.6 0V (0.3 h) U2 Float voltage: 13.80 V (24h) U3 Storage voltage: 13.50 V cont.

Note when using a LiFePO4 battery

- Only operate the battery completely with its own BMS (Battery Management System) and prescribed protective circuit!
- It is essential to observe the battery manufacturer's charging instructions!
- Operation of the device on a LiFePO4 battery without a BMS and without cell balancing and protective circuitry is not permitted!
- To protect the battery, the battery temperature sensor must be connected to the battery terminal (minus pole) and to the device, otherwise the device has no function (see also section 4.7. Troubleshooting)
- If possible, install the battery preferably, that temperatures can be kept above 0°C.

4.2. Configurations and functions (DIP 5 – 12)

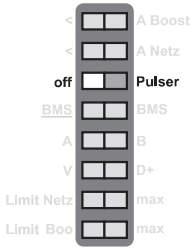
A Boost (DIP 5) and **A Netz** (DIP 6): charge current adjustment to capacity of board battery – Table 2:

DIP-slide switch position (white)	MT BCB 30/30			MT BCB 40/40			MT BCB 60/40		
	Rec. capacity board battery Batterie	Charg. current		Rec. capacity board battery Batterie	Charg. current		Rec. capacity board battery Batterie	Charg. current	
		Mains-mode	Boost-mode		Mains-mode	Boost-mode		Mains-mode	Boost-mode
	60 – 150 Ah	20 A	20 A	80 – 220 Ah	30 A	3	**100 – 220 Ah**	30 A	45 A
	75 – 180 Ah	20 A	30 A	100 – 280 Ah	30 A	40 A	**150 – 420 Ah**	30 A	60 A
	90 – 220 Ah	30 A	20 A	120 – 300 Ah	40 A	30 A	**100 – 300 Ah**	40 A	45 A
	90 – 300 Ah	30 A	30 A	120 – 400 Ah	40 A	40 A	**150 – 560 Ah**	40 A	50 A

Note

If two or more batteries are connected in parallel at the charging output "+ BORD", the total capacity (in Ah) must be set. According to the battery manufacturers, permanent parallel operation is permissible with two or more batteries of the same type, capacity and age (previous history) in a diagonal connection. The above capacities are to be considered as guidelines in regard of battery load and charging time.

Pulsing Unit
(DIP 7) Training function for lead battery systems

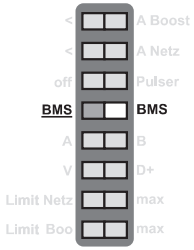


DIP switch position – right: **Pulser** activated
DIP switch position – left: **Off**

In DIP switch position Pulser, the pulsing mode starts automatically if neither mains- nor booster- charging takes place.
Trains the board batteries (only lead acid, gel, AGM) with very short but powerful current pulses and counteracts creeping sulphation.
The average power consumption remains low. Automatic shutdown when voltage at the BOARD terminal: < 12.00 V.

- If the LiFePO4 battery type is set, the pulsing unit is always deactivated
- If the vehicle is to be parked for a longer period of time, charging mode at the mains socket is always to prefer, since not only the board battery is kept charged, but also the starter battery.

BMS
(DIP 8) Control signal for LiFePO4-batteries

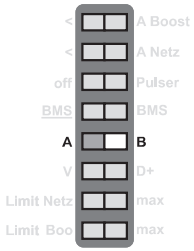


BMS: for 12 V – control signal of a LiFePO4-battery (high active)
BMS: for 0 V - control signal of a LiFePO4-battery (low active)

If the BMS (battery management system) of a LiFePO4 battery is equipped with a "charging stop/warning/error" output, this can be connected to the BCB switching input "BMS" on the 9-pin terminal plug.
Depending on the switch setting of DIP 9, the BMS can either

- stop the charging process (DIP 8 - A), or
- switch the BCB in lithium-maintenance-idle mode (DIP 8 - B).

A / B
(DIP 9) Function selector for LiFePO4-batteries with BMS-signal output

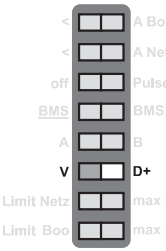


A: Signal at the BCB input plug **BMS**
(together with DIP 8) charger
switches to security supply voltage 12.8 V (charging stopped).
Consumers will continue to be supplied with power at 12.8 V
and the battery is supported to prevent discharge

B: A signal at the BCB input terminal **BMS**
(together with DIP 8) activates 13.2 V
storage voltage for wintering
or storage of a LiFePO4 battery

V / D+

(DIP 10) Function selector for TR-control signal output



Installation type 3a:

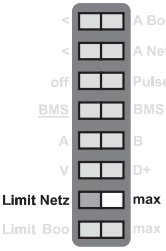
V: The TR output is switched to the D+ signal with a 10 s delay and switched off immediately when D+ drops below 6 V. Required for installation with central electrics and together with an additional NC relay (inst. type 3a). This ensures that (especially at CBE and Nordelettronica) the D + signal required for control purposes can at least be generated from the vehicle signal “D-”.

Installation type 4:

D+: In this position, the TR output is switched depending on the load if the power consumption is higher than the BCB's charging capacity while driving. Enables control of a high-current bypass relay for parallel connection of starter and board battery, e.g. for air conditioning operation via an inverter. If the Li battery type is set, the TR output is activated depending on the temperature in order to exclude uncontrolled charging of the Li battery.

Limit Netz / max

(DIP 11) AC input current limitation during charging on mains

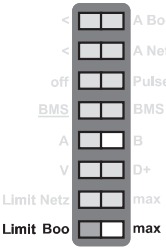


LimitNetz: All with A Boost/ A Netz according “Table 2” selected charging currents are reduced in mains operation by 25 % as following:
20 A will be reduced to 15 A
30 A will be reduced to 22.5 A
40 A will be reduced to 30 A

max: The charging current corresponds settings of A Boost / A Netz according table 2

Limit Boo / max

(DIP 12) Possibility to limit the power consumption from the starter circuit in booster mode

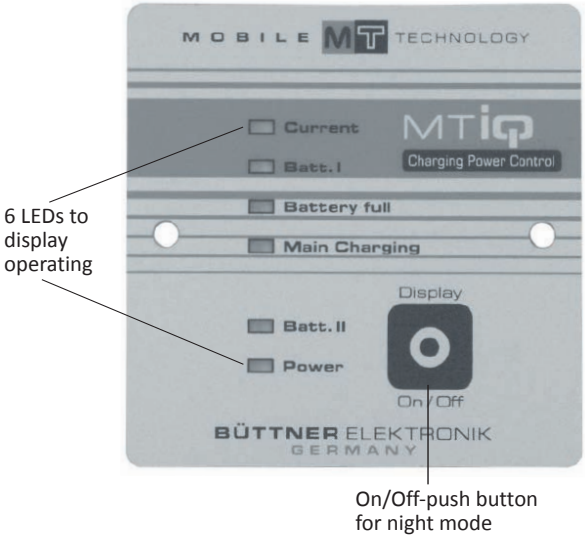


The current consumption of the booster from the starter circuit while driving can be considerably higher than the charging current for the board battery, depending on the charging state. The behavior of the voltage is different and is usually lower for the starter battery than the charging voltage of the booster for the board battery (product of voltage and current at the input is the same as at output of booster)

LimitBoo: This can significantly reduce the power consumption from the starter circuit (approx. 25 %, see technical data).
- to relieve an underpowered alternator,
- Insufficiently dimensioned cabling on the vehicle side between the starter battery and central electrics.

max: The booster can operate at full power

4.3. Control panel and display



4.4. Functions of the push-button

1. Night mode

The BCB can be operated in night mode for noiseless operation. Briefly press the button (1 s) to switch the cooling fan to the lowest speed. Only the "Current" LED lights up weakly as operating indicator. Reset and normal operation take place either automatically after 10 hours have elapsed or when the button is pressed again.

2. AC Power Limit – Funktion

Enables operation of the device with reduced power on weak local power grids, e.g. weak fused camp site, mains power supply, or generator operation. Activation takes place by pressing the push-button (4 s). Display: "Power" LED is switching off briefly every 2 seconds.

Remarks

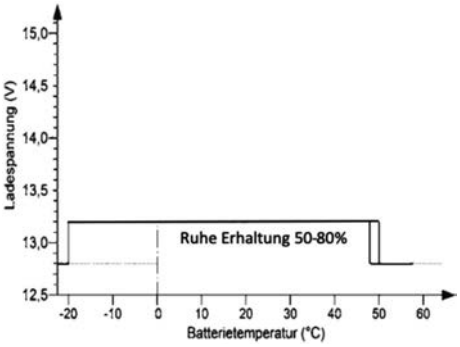
- Activation possible at any time, even without a mains connection!
- The power consumption of the device from the mains is kept below 2 A, the charging current for the batteries and 12 V-consumers can still be more than 25 A.
- Night mode is activated at the same time!

Return to normal operation with full charging power:

- Manually possible any time by pressing the button again (approx. 4 s), or
- Automatically while driving and booster mode

3. LiFePO4 lithium-maintenance-idle mode

Enables long-term charging for LiFePO4 batteries on mains at 50 – 80 % of the capacity, with a permanent charging voltage of 13.20 V.



Activation takes place by pressing the push- button (approx. 8 s)

Display: **Battery full** and **Main Charging** LEDs are flashing alternately. Return to normal operation (charging characteristic previously set using the DIP switches) by pressing the button again (approx. 8 s)

4.5. Charging on mains

The BCB starts the charging operation fully automatically when the device is connected to 230 V mains.

Signal output “Ntz” supplies a control signal 12 V/0.1 A e.g. to generate a mains identification signal.

Depending the installation type and device version, charge retention of the starter battery begins with 4 A, 5 A or 10 A.

Note

The devices also have a very large AC voltage input range and even at 110 V charging is still possible at correspondingly reduced power (see 5. Technical specifications)!

4.6. Charging while driving

When the engine is running, the booster draws power from the starter battery circuit in order to charge the board battery.

This withdrawal is recognized by the vehicle charging management as consumption and thus the alternator is signaled to continuously deliver power.

This function ensures that vehicles with a Euro 6 alternator do not interrupt the charging process.

Depending on the operating mode, with control signal D+ or ignition key signal (terminal 15), charging of the board battery and the increase in the charging capacity of the booster only begins when the starter battery is sufficiently fully charged (see 5. Technical data).

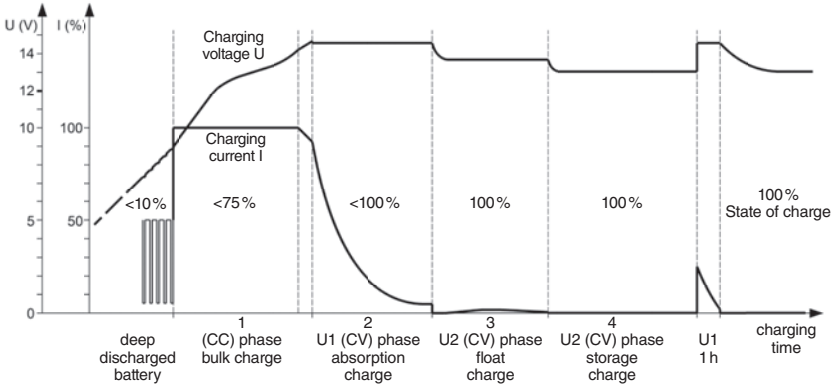
If the starter circuit is heavily loaded by many large consumers and the starter battery voltage drops, e.g. when the engine is idling, the charging power for the board battery is gradually reduced in order to relieve the starter circuit.

If the terminal 15 signal (control via ignition key) is used, there is a possibility that the starter battery will discharge if the ignition is switched on by mistake (without the engine running).

4.7. Charge progress on the board battery

A new, complete main charge cycle for the BOARD battery begins,

- after the alternator has stopped (or the control signal “D+” has disappeared), or a mains power failure
- after the reset voltage drops below 12.75 V (lead battery) or 13.10 V (LiFePO4) for 30 s



1. The main charge takes place with maximum **constant current (CC) in phase** I (Bulk) from the medium voltage range up to close to the U1 (CV) phase. Deep discharged batteries are gently pre-charged starting from 0 V with initially reduced current and charging current interruptions for regeneration up to approx. 9 V. The **Main Charging** LED lights up, approx. 75 % of the capacity (approx. 90 % for LiFePO4) is recharged. The duration of the CC-phase depends on the battery conditions, the load from consumers and the state of charge. For safety reasons, the I (CC)-phase is ended after a maximum of 15 h (in the event of battery cell defects or similar).
2. When the voltage rises, the charging current is somewhat reduced to protect the battery and subsequent switched to the **constant voltage (CV) phase** U1 (Absorption). During the U1 (CV)-phase (full charge, cell compensation charge, the battery voltage is kept constant at a high level, the green LED **Battery Full** flashes (only briefly, with increasing charge, flashing interval increases). The duration of the constant voltage phase depends on the battery type and the depth of discharge. The LED **Main Charging** will be extincted at the end of the U1 (CV) phase.
3. The U2 (CV)-phase (Float) then takes place at reduced voltage and variable current in parallel operation with consumers. The LED **Battery Full** is illuminated continuously. Depending on the battery type, the U2 (CV)-phase is limited to 24 to 48 hours.
4. The subsequent U3 (CV)-phase at reduced charging voltage **(Storage charge)** is used in long- term operation on mains power without further discharging (e.g. long breaks in use or hibernation) to minimize battery gassing and harmful battery cell plate corrosion effects.
5. For battery regeneration (avoidance of electrolyte stratification and sulphation), the charger carries out a **constant voltage (CV) phase** U1 twice a week for a short time (max. 1 h). This is followed by a direct return to the U3 (CV)-storage charge.

Note:
In all charging phases U1-U3 (CV) (battery full), almost the entire possible charger current is available for additional supply of consumers without discharging the battery!

4.8. Function of temperature sensor

The temperature sensor measures the battery temperature and depending on the set battery type, either influences the charging voltage for lead batteries or the charging current for LiFePO4 batteries.

4.8.1. Lead acid-, Gel-, AGM-batteries:

At low temperatures, the charging voltage is increased to compensate for the inertia of the battery and to achieve full state of charge. However, to protect connected voltage-sensitive consumers, the voltage is also limited at extreme cold conditions.

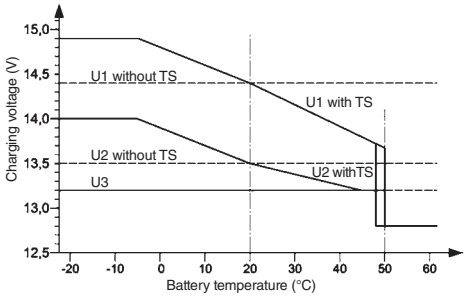
At summer temperatures, the charging voltage is reduced, thereby reducing the risk of gassing and loss of liquid, in particular of gas-tight batteries (SLA, VRLA, etc.) and significantly increasing the service life.

Battery protection: If the battery temperature is too high (more than +50°C), the charging voltage is strongly decreased to safety charging voltage of approximately 12.80 V and the maximum charging current reduced to 50 % for protection (LED “Batt. I” flashes). Battery charging will then no longer take place, but any connected consumers will continue to be supplied by the charger until the battery is within the permissible temperature range and charging automatically can be continued.

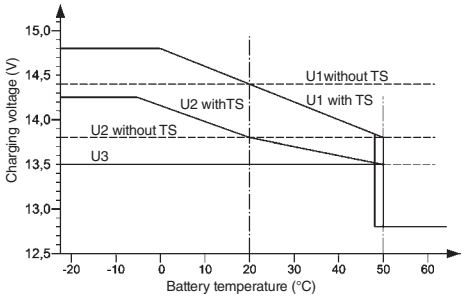
A missing sensor is recognized by the BCB and the charging voltages recommended by the battery manufacturers then will be set for conditions at 20°C.

IU1oU2oU3-presentation of the temperature-compensated charging programs for lead acid batteries

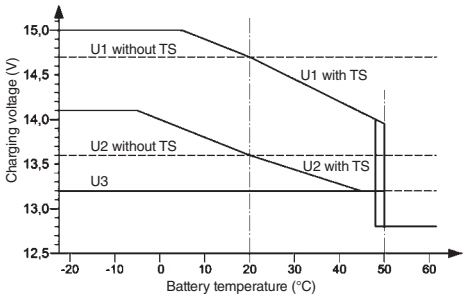
Charge program “Lead Acid/AGM 1”



Charge program “Gel”



Charge program “AGM 2”



4.8.2. LiFePO4-batteries:

For LiFePO4-batteries, the charging voltage is not continuously adjusted to the temperature. Only at extreme battery tem-peratures e.g. < -20°C, > 50°C the charging voltage is reduced to approx. 12.80 V to protect the battery (LED Batt. I flashes)

Battery charging will then no longer take place, but any connected consumers will continue to be supplied by the charger until the battery is within the permissible temperature range and charging automatically can be continued.

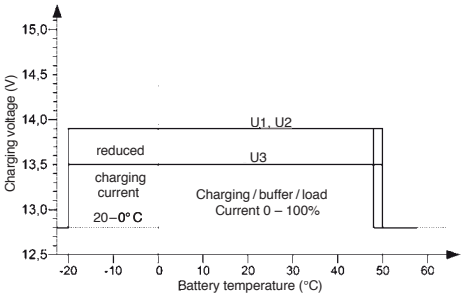
Below 0°C the charging current is significantly reduced to protect the battery and longer charging times can be expected. (LED Batt. I is extincted briefly every 2 s)

Note:

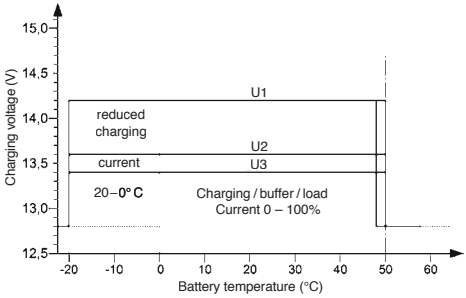
Without temperature sensor no device function, LED Main Charging flashes!

IU1oU2oU3-presentation of the temperature-compensated charging program for LiFePO4-batteries

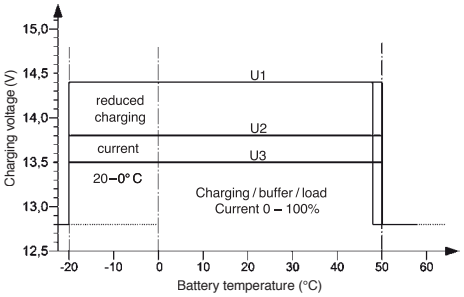
Charge program LiFePO4 13.9 V



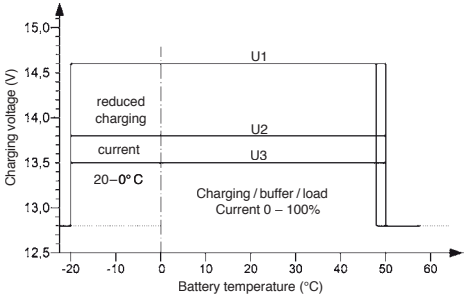
Charge program LiFePO4 14.2 V



Charge program LiFePO4 14.4 V



Charge program LiFePO4 14.6 V



4.9. Operating mode displaying and troubleshooting

Current (red):
- illum: Brightness lighter or darker depending on the charging current provided
- off: Actual charging current is less than approx. 0.2 A

Batt. I (Board batt., yellow):
- illum: Board battery is monitored and being charged
- flashing:
  1. Battery protection: excessive battery temperature > 50°C, switching to lower safety charge voltage, automatically return when cooling down slightly to 48°C, with $LiFePO_4$ batteries also at low battery temperatures < –20 °C
  2. Control input "BMS" was activated from the $LiFePO_4$ Battery, i.e. charging stopped
- short extinct (every 2s) $LiFePO_4$ only: Battery-temperature < 0 °C, to protect the battery, the charging current can be reduced for all types of charging, which means longer charging times for discharged batteries.
- off: No charging (safety switch is switched off).

Battery full (Board batt., green):
- illum: State of charge 100 %, Maintenance charge U_2, U_3 (CV), ready.
- flashing: Main charging process still in phase U_1 (CV), state of charge approx. 75 % (Pb)/90 % ($LiFePO_4$) (short flashing) gradually increases to 100 % (long flashing)
- off: Main charging process still in phase I (CC).

Main Charging (Board batt., yellow):
- illum: Main charging process in phase I (CC) or U_1 (CV).
- flashing:
  1. Temperature-sensor not detected for $LiFePO_4$ battery charge program
  2. External over-voltage at board battery, > 15.50 V after 20 s, automatic return < 13.2 V (depend. type) after 30 s.
- off: Maintenance charge in phase U_2, U_3 (CV).

Batt. II (Start-batt., yellow):
- illum: Booster operation (charge while driving), start batt. charging board batt.
- flashing: Operating voltage at terminal "START" is too low, the power control of the booster therefore has reduced the output power by more than 30 %.
- off: Booster not activ.

Power (green):

- illum: BCB powered on mains or in 12 V booster operation.
- flashing:
  1. Safety timer shutdown, I (CC)-phase too long (15 h), to high consumer loads or battery defect (cell short-circ.). Restart only by removing of signal on "D+/Kl.15" (Motor, ignition off) and mains plug.
  2. Internal device error (overheating), automatic restart after cooling down.
- short extinct. (every 2 s): „AC Power Limit" is active, the grid charging power is limited, Silent Run (night mode).
- short flash (every 20 s): Pulse unit in BCB active, board batterie is being trained.
- off: No mains power and booster not active, stand-by.

4.9.1. Mains operation - LED **Power** is illuminated:

- Full charging current is not achieved:
  1. Board battery is already charged: Load with heavy consumers.
  2. Check wiring – Com, + BORD and fuse I, check cross-sections and lengths according to Table 1, check S + and S- sense wiring as well as stripped cable ends, measure voltages directly at the terminals/their screws.
  3. Check setting of slide switch "A Netz" according to table 2.
  4. Deactivate the "AC Power Limit" function by pressing the push-button.
- All LEDs are flashing (Current, Batt. I, Battery full, Main Charging, Batt. II and Power) at the same time:
  The upper 4 DIP switches for selecting the board battery type are in an invalid position and the device has switched off to safety mode. Set the desired battery type (see 4.1 type, technology)
- In mains operation (without batteries or with a defective fuse) the active charging outputs provide the required charging voltage, the LEDs "Batt. I", "Batt. II" and "Battery full" continue to light up.

4.9.2. Booster operation

- Device does not start, LED “Batt. II” does not light up:
  Check voltage at activation input terminal “D+”, > 8 V.

- Full charging current is not reached, LED “Batt. II” flashes:
  - Check voltage at terminal + START> 11 V, increase motor speed so that the booster can increase.
  - Check points 1 to 4 of mains operation. If mains operation is working properly:
    - Check wiring + START, fuse II, cross-sections and lengths (also chassis “minus” connection, if necessary “-Batt.” cable from the starter to the board battery) according to table 1. Find hidden battery separator relay from previous wiring.
    - If necessary, briefly deactivate the “Limit Boo”-function for test purposes. Operation with EBL, EVS etc.
- Booster constantly switches between active and idle:
  “D+” must be delivered directly from the vehicle, not from EBL.

5. Technical Data

	BCB 30/30	BCB 40/40	BCB 60/40
Charging output "BORD" battery:			
Lead-acid-, Gel-, AGM-battery – nominal voltage:	12 V	12 V	12 V
Battery capacity (adjustable) recommended:	75 – 300 Ah	100 – 400 Ah	150 – 560 Ah
Pre-set charging programs for Pb-batteries:	4	4	4
Pre-charge current (battery deep discharged < 8 V) max.:	15 A	20 A	20 A – 30 A
Minimum battery voltage to start charging:	0 V	0 V	0 V
Protection-charge voltage at battery over-temperature:	12,80 V	12,80 V	12,80 V
LiFePO4-battery – nominal voltage:	12.0 – 13.3 V	12.0 – 13.3 V	12.0 – 13.3 V
Battery capacity (adjustable) recommended:	60 – 300 Ah	80 – 400 Ah	100 – 560 Ah
Pre-set charging programs for LiFePO4-batteries:	4	4	4
Protection charge voltage at battery under-/ over-temperature:	12.80 V	12.80 V	12.80 V
"BMS"- control input from BMS, high/low selectable, Ri=30 kOhm:	yes	yes	yes
Charging input/-output starter battery "START":			
Starter battery nominal voltage:	12 V	12 V	12 V
Battery capacity minimum recommendation:	60 Ah	80 Ah	100 Ah
Mains operation:			
Nominal operating voltage (AC):	230 V / 45 – 65 Hz		
Voltage range (AC):	190 V – 265 V (full charge power), short time (5 s) 300 V		
Operating voltage range (AC):	90 V – 265 V / 45 – 65 Hz		
Charging power 110 V (AC) approx.:	90 %	70 %	70 %
Sinusoidal current consumption, power factor correction (CosPhi = 1):	yes	yes	yes
Max. power consumption (AC):	520 W	700 W	700 W
Max. current consumption 207 V AC:	2.5 A	3.4 A	3.4 A
current consumption "AC Power Limit" 207 V AC:	2.0 A	2.0 A	2.0 A
"BORD Charge-/buffer-/load current, regulated" IU1oU2oU3, Pb, LiFePO4:	0 A – 30 A	0 A – 40 A	0 A – 40 A
Retention charge current for "START", regulated:	0 A – 4 A	0 A – 5 A	0 A – 10 A
Automatic lead acid battery-regeneration Twice a week 1 h:	yes	yes	yes
Fan noise reduction, night mode:	yes	yes	yes
Signal output "Ntz", indication light / max.:	12 V / 1 A	12 V / 1 A	12 V / 1 A
Power supply function "BORD" (e.g. to supply at battery replacement):	yes	yes	yes

Technical Data	BCB 30/30	BCB 40/40	BCB 60/40
Booster operation:			
Input voltage range “START” (EURO 6 +), D+ controlled:	10.5 – 16.0 V	10.5 – 16.0 V	10.5 – 16.0 V
Input over-voltage cut-off “START” (EURO 6 +), max.:	16.5 V	16.5 V	16.5 V
Power consumption on “START”, max.:	470 W	630 W	930 W
Current consumption active on “START”, DIP switch position “max.”:	0.1 A – 42 A	0.1 A – 57 A	0.1 A – 82 A
Current consumption active on “START”, DIP switch position “Limit Boo”:	0.1 A – 32 A	0.1 A – 43 A	0.1 A – 65 A
“BORD” Charge-/buffer-/load current, regulated, IU1oU2oU3, Pb, LiFePO4:	0 A – 30 A	0.1 A – 40 A	0.1 A – 60 A
Activation-control input “D+”, for D+, Terminal 15, ignition:	8 – 16 V	8 – 16 V	8 – 16 V
Signal output “TR”, high load relay/max.:	12 V / 1 A	12 V / 1 A	12 V / 1 A
Pulse operation, training for lead-acid, Gel, -AGM-battery “BORD” while not charging:			
Anti-sulphation-peak current pulses, short-time:	up to 100 A	up to 100 A	up to 100 A
Repetition rate:	every 20 s	every 20 s	every 20 s
Under-voltage cut-off:	< 12.0 V	< 12.0 V	< 12.0 V
“T T” input for battery-temperature-sensor “BORD”:	yes	yes	yes
„Sense“-voltage-sense wiring “S-” and “S+” for battery “BORD”:	yes / yes	yes / yes	yes / yes
Reverse current from battery, stand-by, no mains:	16 mA	16 mA	16 mA
Security-timer per charging phase I-, U1-, U2:	yes	yes	yes
Ripple voltage:	< 30 mV rms	< 30 mV rms	< 30 mV rms
Charging voltage-Limit “BORD” (protection for consumers):	15.00 V	15.00 V	15.00 V
External over-voltage cut-off “BORD” (20 s):	15.20 V	15.20 V	15.20 V
Short-circuit-/reverse charge- security protection:	yes	yes	yes
Device installation orientation:	any	any	any
Temperature range:	–20/+45° C	–20/+45° C	–20/+45° C
Speed and temperature controlled fans:	yes	yes	yes
Cont. reducing charge power at over-temperature:	yes	yes	yes
Security cut-off at over-temperature:	yes	yes	yes
CI-Bus interface (OEM only)	yes	yes	yes
Service interface (restricted service access)	yes	yes	yes
Protection class / type:	I / IP21	I / IP21	I / IP21
Dimensions, incl. mounting flanges (w/h/d, mm):	270 x 300 x 70	270 x 300 x 70	270 x 300 x 70
Weight:	3650 g	3800 g	3950 g
Ambient conditions, air humidity:	max. 95 % RF, no condensation		
Safety regulations:	EN 60335-2-29		

6. Warranty

The company BÜTTNER ELEKTRONIK GmbH assumes a 24-month warranty in the event of a proven warranty claim (proof of purchase with date).

All functional faults that occur within the warranty period and that can be proven despite proper use will be remedied free of charge, without assumption of transport costs.

The provision of warranty services does not extend the warranty period granted from the date of purchase..

The following is excluded from warranty:

- Damage that can be attributed to non-compliance with the instructions in the operating manual.
- Damage caused by reverse polarity, overcurrent, overvoltage or lightning.
- Devices opened by the customer.

The manufacturer assumes no liability for damage caused by improper handling and non-compliance with the safety precautions. Changes to the device can lead to the loss of the operating license or the violation of other legal requirements (e.g. device and product safety law, law on the electronic compatibility of devices).

When reselling in the event of a conversion, the person responsible for the conversion becomes the manufacturer and is liable accordingly. Loss of the manufacturer's guarantee and warranty rights are not excluded.

The manufacturer's warranty does not limit the statutory warranty obligation. In the event of a defect, please contact our hotline or your dealer.

Available accessory:

- High load relay EBL with installation kit for installation type 3a — Part no. MT 93080
- Bypass-relay installation kit for for installation type 3b — Part no. MT 93050
- High load relay 12 V/100 A (180 A) for installation type 4 — Part no. MT 02156
- Charging cable sets in various lengths 2 m / 3 m / 4 m / 5 m / 6 m incl. fuse (250 A) — on demand
- D+ Aktiv Simulator — Part no. MT 02159

Diese Bedienungsanleitung ist auch zum Download verfügbar auf unserer Homepage unter Service-Downloads

This manual is also available for download in English language on our homepage in Service-Downloads.

Declaration of conformity:
In accordance with the provisions of directives 2014/35/EU, 2014/30/EU, 2009/19/EG this product complies with the following standards or normative documents: EN55014-1; EN55022 B; EN 61000-3-2; EN 61000-3-3; EN61000-6-1; EN61000-4-2; EN61000-4-3; EN61000-4-4; EN61000-4-5; EN 61000-4-6; EN 61000-4-11; EN60335; EN50498.

This product may not disposed with household waste.

Qualitäts-Management
produziert nach
DIN EN ISO 9001

The product is RoHS-conform
It therefore corresponds to the directive on the restriction of hazardous substances in electrical and electronic devices.

MOBILE TECHNOLOGY WITHOUT COMPROMISES

Solar modules + complete sets | Monitoring displays | Bord electronics/Bord batteries + accessory | Charging boosters + Charging Technology / Inverters

BÜTTNER ELEKTRONIK
GERMANY
MOBILE MT TECHNOLOGY

BÜTTNER ELEKTRONIK GMBH · Tel.: 0 59 73/9 00 37-0 · Fax: 0 59 73/9 00 37-18
E-Mail: info@buettner-elektronik.de · Web: www.buettner-elektronik.de