

Introduction

Dear Customer,

with the purchase of the E-Bike charging system you have chosen a quality product from HYMER in cooperation with BÜTTNER ELEKTRONIK.

This E-Bike charging system meets the highest standards of quality and functionality for a simultaneous charging option of up to 2 bike batteries, even without an external mains connection, in fully automatic charging mode via alternator

while driving or in manual charging mode, but also as usual with 230 V mains supply with always optimal monitoring of your leisure- / bord battery.

Before the first start-up, the E-bike Charger control must be set-up. Please read about this section "Basic Settings" on **page 31**.

We hope you enjoy your new E-bike charger charging system.

Your HYMER / BÜTTNER ELEKTRONIK Team

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!

Note



Tips and tricks

This icon is used to designate tips, which help you to utilize your equipment even easier and more efficient.

Table of contents

Introduction.....	24
Table of contents.....	25
Scope of delivery	25
1 General informations and safety instructions.....	26
2 Functional description E-Bike Charger control	27
Overall diagram.....	28
3 Commissioning	30
3.1. Quick overview – E-Bike Charger control	30
3.2. Basic settings.....	31
4 Operating the E-Bike Charger	33
4.1. Automated charging while driving	33
4.2. Manual charging mode.....	34
5 General operation	35
6 Expert set-up E-Bike charge control	36
7 Troubleshooting	38
8 Technical Data.....	41
9 Warranty	44

Scope of delivery

Quantity	Description
1	E-Bike Charger Control (MT 5005iQ) with display, 200 A shunt with minus cable adaptor and wiring cable set (10 m control cable, main minus-cable, power supply cable with fuse and D+ control cable)
1	PowerLine Sinus inverter 600 W (MT PL 601) with battery cabling (supply and fusing, remote control and grounding) and 230 V output with Wago Winsta coupling system
1	Mains supply transfer switch unit (MT NU 2301) with mains- and inverter input and 230 V output with Wago Winsta coupling system
1	RCDI device 10 A – AC fusing with Wago Winsta coupling system
1	Operation manual

1 General Information

Please read all the following instructions carefully before starting commissioning your new device.

Safety instructions

The manufacturer does not accept any liability for damages caused by im-proper handling and non-compliance with safety precautions or improper installation. Changes to the device may result in a loss of operating license or violation of other legal requirements (e.g. Equipment and Product Safety Law, Electronic Compatibility Law). Upon resale of the conversion, the person responsible for the conversion becomes the manufacturer and is liable accordingly. Furthermore, the manufacturer's warranty is no longer applicable and a loss of warranty rights may result.

The E-Bike Charger system is suitable for stationary and for mobile use. The devices as well as the individual components are to be protected from moisture and generally not suitable for outdoor use.



For an efficient function of this automated charging system for e-bike batteries we recommend,

- urgently the review of the existing board battery capacity, as well
- the installation of a charging booster with appropriate cable cross-sections for efficient charging option while driving, as well
- retrofitting a solar system for charging when stationary

2 Function description of the E-Bike Charger Control

With the help of the measuring shunt in the main minus cable on the board battery system, the control system constantly detects whether the board battery is being charged or discharged and uses this to determine the remaining capacity which is actually available. This is the basic requirement for automated charging of the E-bike batteries, which is only possible in defined capacity ranges of the board batter, both in driving and stationary mode.

When driving, in addition to checking the capacity range of the board battery, the

inverter is only switched on after the dynamo + signal of the alternator has been detected, so that the connected chargers can charge the E-bike batteries.



A charging booster is required for efficient charging, especially for E6 vehicles!

For a E-Bike charger with 180 W power consumption, the inverter consumes about 18 A DC current. With a 30 A charging booster, the bike battery and the board battery can be charged at the same time.

A charging booster with at least 50 A should be available for 2 connected E-bike batteries.

At the camp site with a power connection, the mains transfer switch unit ensures that the sockets for the e-bike power packs are also automatically supplied.

Without mains supply, recharging can also be started manually, as long as there is sufficient board-battery capacity available until the system switches off automatically.



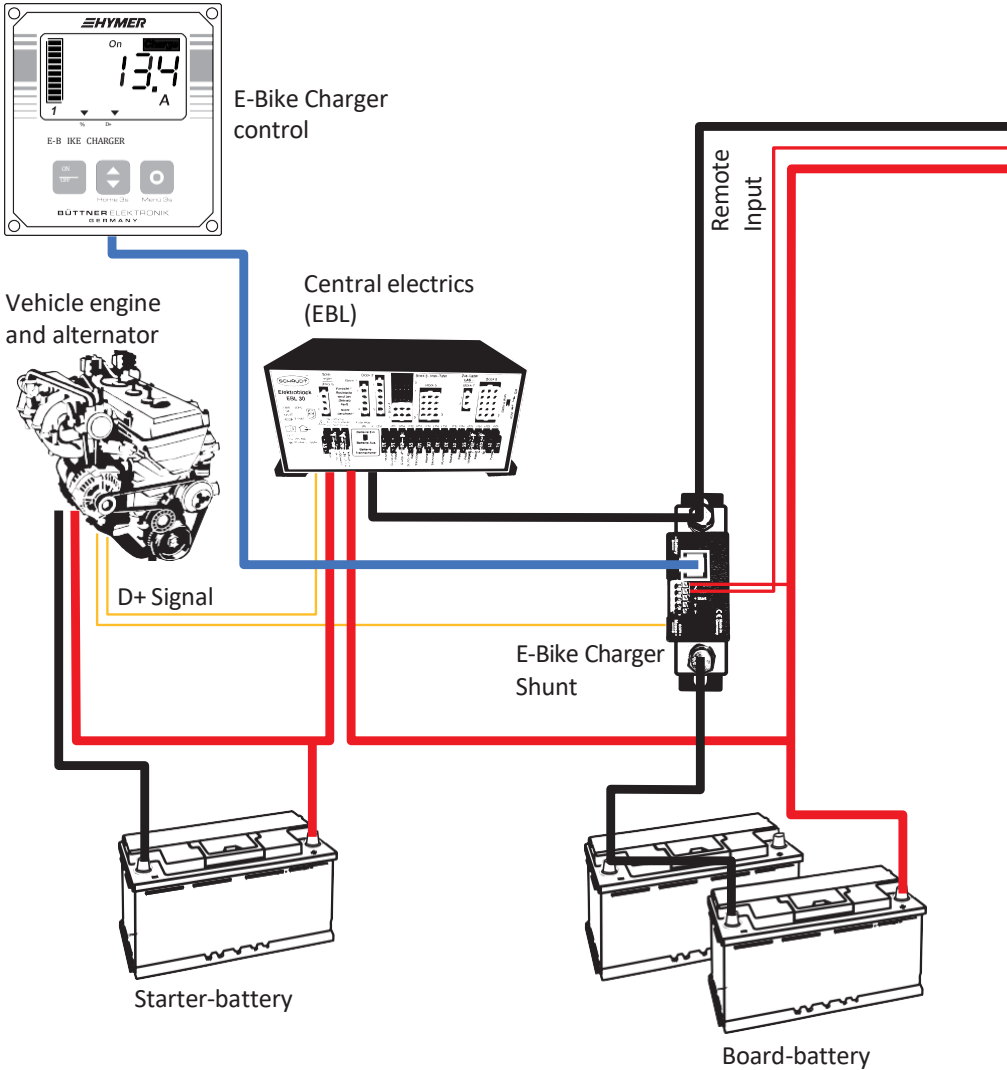
For efficient charging while stationary, the board-battery capacity must be available and a solar system is recommended!

Up to 500 Wh from the board battery system can be required to recharge just one e-bike battery. This already corresponds to the maximum amount of energy that can be drawn from a 100 Ah lead type battery! This means that the board battery system should have at least twice the capacity, and it should be possible to compensate the consumption for charging with a solar system.

With a 125 Wp module, 500 Wh can be harvested on a sunny day.

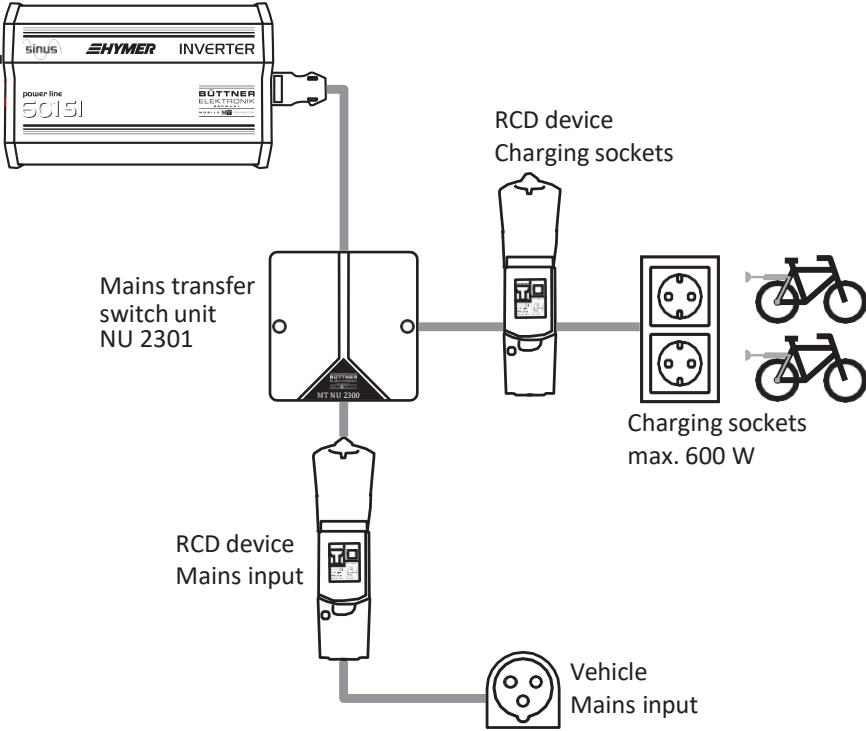
2 Function description of the E-Bike Charger Control

Overall diagram



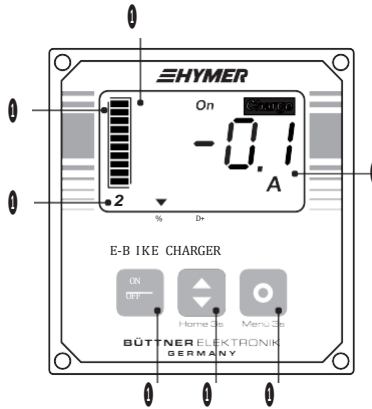
2 Function description of the E-Bike Charger Control


Pure sine inverter
PowerLine PL 601




3 Commissioning


3.1 Quick overview – E-Bike Charger control:



- 1 Operation mode – selection button** 

Automated charging while driving: short push on button → Operation mode displaying **1**: „1“

Manual charging mode: 3 s – push on button → Operation mode displaying **2**: „2“
- 2 Display screen – selection button** 

For displaying power consumption (negative sign) or charge in A, available capacity in Ah and %, remaining time display in h, as well as voltage display of the board battery in the main display **1**
- 3 Menu – button** 

Switching display On/Off: → short push on button

Set-up: 3 s – long push on button → Set-up nominal capacity in Ah, battery type and display brightness

Expert Mode: 10 s – long push on button → Set-up of switch-on / switch-off thresholds in % (see 6. Expert set-up)
- 4 Displaying operation mode:**

 - 1:** Automated charging while driving
 - 2:** Manual charging mode

5 Displaying operational readiness %:
An arrow in the display above the % symbol indicates that the board battery provides sufficient remaining capacity for charging the E-bike batteries.

6 Displaying operational D+:
An arrow in the display above the D+ - symbol indicates that the charging current is provided while vehicle engine is running
- 7 Graphical displaying of available battery-capacity**
- 8 Function control „On“ and Charge**

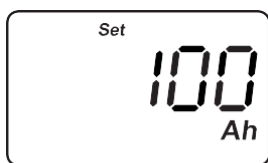
will only be displayed when E-Bike battery charging takes place and the board battery provides sufficient capacity
- 9 Main screen**

3 Commissioning

3.2 Basic settings

Set-up of the E-Bike charger control:

Push Menu-button  for 3s



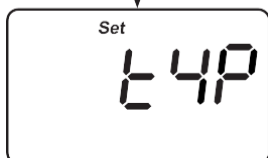
Set-up the total nominal capacity of the battery-system
(Factory default 100 Ah)



Increase capacity +1



Decrease capacity -1



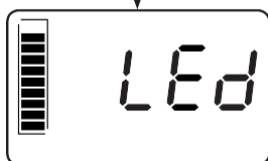
Set-up battery type acc. table 1
(Factory default 34):



Increase value +1



Decrease value -1



Set-up display brightness



brighter



darker

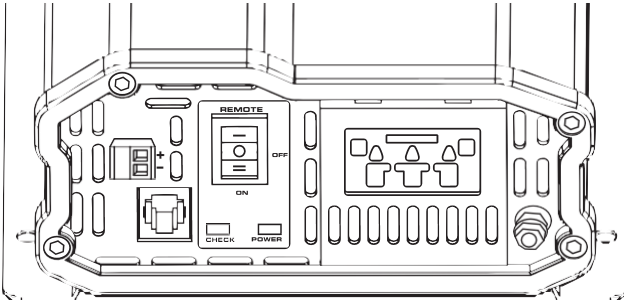
save set-up

Battery type	Battery charging voltage	Set-up value
Blei-Säure/Nass	14.4	24
Gel	14.4	53
AGM 14.4	14.4	34
AGM 14.4 – 14.8	14.7 – 14.8	47
LiFePO4 13.9 V	13.9	89
LiFePO4 14.2 V	14.2	82
LiFePO4 14.4 V	14.4	84
LiFePO4 14.6 V	14.6	86
LiFePO4 14.8 V	14.8	88

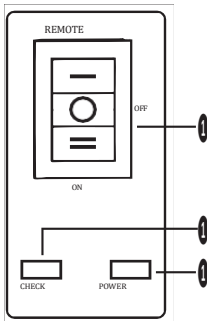
3 Commissioning

Commissioning pure-sine inverter

EN



3-step switch
Must be in position I
= Remote !




The PowerLine inverter has an **ON / OFF / REMOTE** device switch ❶. In this way, the functionality of the inverter can be determined.

When the switch is in the **OFF** position, the inverter is switched off.

In the **ON** switch position, the inverter is permanently switched on regardless of the remote control input

Warning!
**No intelligent and monitored
E-bike charging possible!**



The switch position **REMOTE** enables the inverter to be operated via the remote control input.

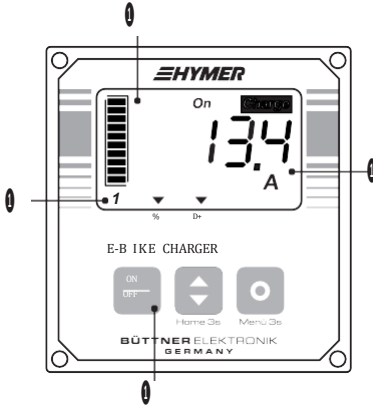
The operating status of the inverter is indicated by 2 LEDs on the front of the device.

The green **“POWER”** ❶ lights up when the inverter is switched on and 230 V AC voltage is generated at the output.

The red **“CHECK”** ❶ indicates when operation is restricted or has been canceled.

4 Operating the E-Bike Charger

4.1 Automated charging while driving (Operation mode 1)



To proceed automated charging of the E-bike batteries the basic settings must be carried out first!

Preparations:

1. Connect the E-Bike battery to the power supply unit
2. Connect the power supply unit or up to 2 units to the referenced E-bike charging socket(s) up to max. 600 W (usually in the rear garage)
3. By briefly pressing the button ① the automated charging mode is activated while driving – operation mode 1!



For control, the number “1” must be shown in the lower left corner of the display ②!

Start of charging:

When the vehicle engine is started and the board battery has sufficient capacity, a small arrow appears in the display ① above the % - and **D+** symbol.

This activates the switching output of the measuring shunt and switches the inverter on. As a control, in the display ① “**On**”

and **Charge** will be shown.



If no arrow is displayed above the % symbol, the board battery will be charged first while driving until sufficient capacity is ensured and then recharging of the E-bike battery starts automatically.

The display ② then shows “blinking” “**On**”

and no **Charge** symbol.

This display also applies if the engine has not yet been started or switched off.

Charging progress:

When driving will be interrupted or the motor is switched off in start / stop mode, the inverter remains switched – on for a limited time. Will be within 5min. no engine running (D+ signal) be detected, the inverter is switched – off, but charging is automatically resumed within 5 hours if

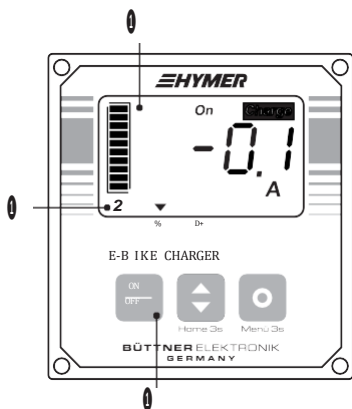
the engine will be retarded again. The program is then terminated and may have to be restarted again. A short press on the **On / Off** button deactivates the active mode manually at any time.



For control, no number will be shown in the left corner of the display ①!

4 Operating the E-Bike Charger

4.2 Manual charging mode (Operation mode 2)



Preparations:

1. Connect the E-Bike battery to the power supply unit.
2. Connect the power supply unit or up to 2 units to the referenced E-bike charging socket(s) up to max. 600 W (usually in the rear garage).

Start of charging:

If the capacity of the board battery is sufficient for operating mode 2, a small arrow will appear in the display ❶ above the % - symbol.

This activates the switching output of the measuring shunt and switches the inverter on. As a control, in the display ❶ "On"

and **Charge** will be shown.

❶ To proceed automated charging of the E-bike batteries the basic settings must be carried out first!

3. By pressing the button ❶ for 3 s the manual charging mode is activated while driving – operation mode 2.

❶ For control, the number "2" must be shown in the lower left corner of the display ❶!

❶ If no arrow is displayed above the % - symbol, the board battery must be recharged first until sufficient remaining capacity is ensured again.

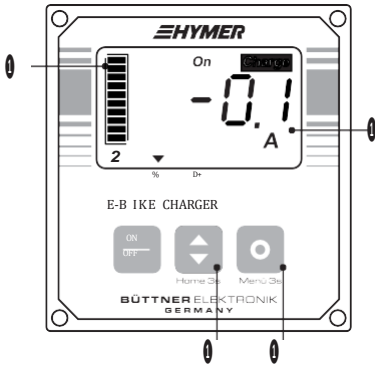
The display ❶ then shows the "blinking" "On" and no **Charge** symbol.


5 hours after activating operation mode 2, this charging mode is automatically deactivated.

❶ For control, no number will be shown in the left corner of the display ❶!

5 General operation

Switching display On/Off




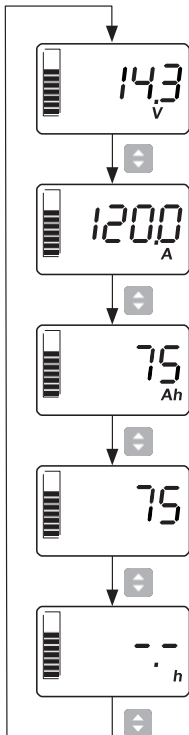
By a short push on button ❶  the display can be switched off and on.



The control will not be affected! The display can be switched off if the controller is not used for a longer period of time.

Displaying of various board battery-informations

By briefly pressing the button ❶  various board- or leisure battery screens can be selected in the main display ❶.



Battery voltage screen in Volt

Current screen in Ampère

Actual measured current value. Positive charging current (unsigned) that flows into the on-board battery, or consumer current (negative sign), if e.g. E-bike charging takes place in mode 2.

Capacity screen in Ampère-hours and percentage

The charging and discharging of the battery is recorded and balanced by a microprocessor. Programmed characteristic curves and correspondingly set battery types enable an automatic evaluation of the battery load and calculation of the remaining charge. Self-discharge of the battery during long idle times is taken into account, the full charge status is automatically recognized and corrected if necessary. The graphic display of the remaining battery capacity ❶ corresponds to the % - screen in 10% steps.

Remaining time in battery in hours

The remaining time is calculated from the remaining capacity (up to the set switch-off threshold) and the actual current. If there is no power consumption, no remaining time can be calculated and the placeholder “.-.” is displayed accordingly.

6 Expert set-up E-Bike charge control

The switch-on thresholds for the start of charging and the switch-off threshold for aborting the E-bike battery charge depend on the respective operating mode, automated charging while driving (mode 1)

or manual charging (mode 2), the battery type (LiFePO4 or Pb types) and the battery capacity of the board battery and are pre-set but can be changed if necessary.

Switch-on / switch-off threshold values for charging operation mode 1 (driving mode):

Switch-on threshold = 95% - LiFePO4 & all Pb types

Switch-off threshold = 90% - LiFePO4 & all Pb types

Switch-on / switch-off threshold values for charging operation mode 2 (manual operation):

Switch-on threshold = 70% - LiFePO4

Switch-off threshold = 50% - LiFePO4

Switch-on threshold = 95% - all Pb types


Switch-off threshold = 75% - all Pb types

Warning!

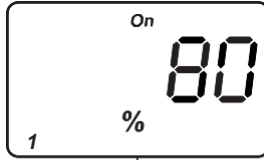


These Switch-on / switch-off threshold values are preset to maintain the greatest possible autonomy while at the same time ensuring the longest service life of your board battery and should only be changed by qualified personnel.


6 Expert set-up E-Bike charge control


To change these on / off threshold values, press the menu key  for 10 seconds.

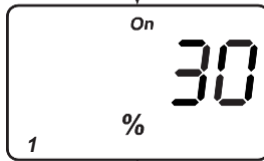
Mode 1
Automated charging
while driving




Switched output ON - switching
threshold capacity


 Increase capacity +1

 Decrease capacity -1

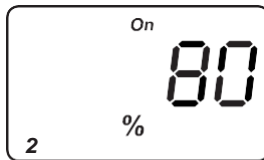


Switched output OFF - switching
threshold capacity


 Increase capacity +1


 Decrease capacity -1

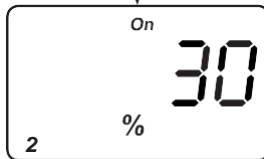
Mode 2
Manual charging
operation




Switched output ON - switching
threshold capacity


 Increase capacity +1

 Decrease capacity -1






Switched output OFF - switching
threshold capacity

 Increase capacity +1

 Decrease capacity -1

7 Troubleshooting

Please note the table below for initial remedial measures in the event of charging problems with your E-bike batteries.

Fault	Cause	Solution
Display of E-Bike Charger control without screen		Switch-on display by short push on the right button 
No charging of the E-bike batteries on mains supply at the camp site	Check mains input RCD device	The switch position must be at the top. If this device can no longer be switched on / releases again, switch off / unplug all 230 V consumers or contact an electrician!
	Check RCD device for charging sockets	If this device can no longer be switched on, the plugged in E-Bike power supply unit possibly is defective ! Unplug and switch-on the RCD again, respectively contact an electrician!
No charging of the E-bike batteries while driving / running engine	Charging operation mode 1 must be activated	Verification according to 4.1
	Check whether the display shows "On" and  !	If "On" only flashes and there are no arrows in the display above the % - and D+ sign, the board battery is below the switch-on threshold, see 6. Expert set-up and needs to be charged first.
	Check inverter	1. 3-step switch must be in position "Remote" , see 2. 2. Check inverter indicators and acoustic signals, see 7.1.
	Check RCD device for charging sockets	If this device can no longer be switched on, the plugged in E-Bike power supply unit possibly is defective! Unplug and switch-on the RCD again, respectively contact an electrician!
No charging of the E-bike batteries in manual charging operation	Charging operation mode 2 must be activated	Verification according to 4.2.
	Check whether the display "On" and  !	If "On" only flashes and there are no arrows in the display above the % - and D+ sign, the board battery is below the switch-on threshold, see 6. Expert set-up and needs to be charged first.
	Check inverter	1. 3-step switch must be in position "Remote" , see 2. 2. Check inverter indicators and acoustic signals, see 7.1.
	Check RCD device for charging sockets	If this device can no longer be switched on, the plugged in E-Bike power supply unit possibly is defective! Unplug and switch-on the RCD again, respectively contact an electrician!

7 Troubleshooting

7.1 Inverter indicators and acoustic signals

Status	LED Inverter/ Extern	LED Check	Acoustic signal	Output 230V
Inverter Start	ON	ON (1sec)	1 x	ON
Normal operation	ON	OFF	OFF	ON
Low-voltage warning	ON	OFF	2 x / pause	ON
Low-voltage	ON	ON	3 x / pause	ON
High-voltage	ON	ON	4 x / pause	ON
Overtemperature	ON	ON	5 x / pause	ON
Overload warning	ON	OFF	1 x short / pause	ON
Overload	OFF	ON	continuous	OFF
Short-circuit	OFF	ON	continuous	OFF

Input parameter	Voltage range	Description
Normal operation	11.5 V – 14.0V	
Optimal operation	13.0V – 14.0V	
Low-voltage warning	11.2 V – 10.7V	Acoustic signal 2 x / pause
STOP Low-voltage	< 10.7V +/-0.2V	Inverter OFF, Acoustic signal 3 x / pause
RESTART Low-voltage	> 12.0V +/-0.2V	Inverter ON
STOP High-voltage	> 15,0V	Inverter OFF, Acoustic signal 5 x / pause Voltages >16V may cause damage in the device even when not in operation!

7 Troubleshooting

7.2 Switching back on inverter / Reset CHECK Anzeige

If the inverter has stopped operation because of one of the previously described reasons, a manual restart can be done. To do so the inverter has to be switched OFF at the device switch until the red LED is extinguished. After a short waiting time, the inverter can be restarted.

At the reboot the inverter now checks all the input parameters, same as each normal startup. If there is still a parameter over or below the limit values, the start is prevented, and the corresponding status message is shown on LED and acoustic signal.



In case of overtemperature, wait 5 to 10 minutes for cooling down the device before restart. In case of overload, turn off the load and reduce the connected consumers.

7.3 Device protection

The inverter is internally protected against damage in the following events:

- Low-voltage: The inverter switches off when the battery voltage drops below the STOP threshold. And re-starts again when the voltage is above the threshold of RESTART.
- Overvoltage: The inverter switches off when the battery voltage is above the STOP threshold and re-starts again when the voltage is below the threshold.
- Overtemperature: The inverter switches off when the internally permissible maximum temperature is exceeded. Only after cooling down and reset the inverter could be restarted.
- Overload: The inverter stops operation and switches off. After short waiting time the inverter starts up again automatically.
- Output short circuit: The inverter switches off if the absolute limit values for output power are exceeded. The inverter can only be restarted after it has been manually switched on again.

8 Technical Data

E-Bike Charger control – MT 5005iQ

Nominal voltage	12 V
Operating voltage range	8...32 V
Current consumption	4...60 mA, depending display brightness
Battery types	see label "battery type"
Ambient conditions, humidity	max. 95% RF, not condensing

Display unit

Technic	LCD Display with specific segments
Screen dimension	49 x 28 mm
Illumination	white LED
Dimensions (mm)	80 x 85 x 24
Installation dimension electronics (mm)	ca. 66 x 72
Weight	ca. 55 g

Precision-Smart-Shunt: 200 A

Load capacity Smart-Shunt


Nominal current	200 A
Contin. current (ventilated)	240 A
Max. current 15 min	300A
Max. current 7 min	400 A
Max. peak current	900 A
Dimension Smart-Shunt (mm)	135 x 32 x 44
Weight	240 g



Declaration of conformity:

According to the provisions of the directives 2006/95 / EC, 2004/108 / EC, 95/54 / EC, this product complies with the following standards or normative documents: EN55014; EN55022 B; DIN14685; DIN40839-1; EN61000-4-2; EN61000-4-3; EN 61000-4-4

8 Technical Data

Pure sine inverter – MT PL 601 SI	
Nominal voltage	12 V DC
Input voltage range	10,5 – 15 V DC
Output voltage	 230 V / AC / 50 Hz / THD <3%
Nominal power	600 W
Overload / 1s	1000 W
Standby current	0.7 A
Nom. power (max.current)	60 A
Efficiency	87 – 94%
Weight approx.	2100 g
Dimension L x W x H (mm)	250 x 165 x 85
Battery cabling	1.2 m – 10 mm ²
Cable fusing	60 A
Ventilation	Depending temperature- and load
Protections	Overload, overtemperature, short-circuit on output, Overvoltage, Undervoltage
Remote Input	12 V DC / 30 mA

CE Declaration of conformity:
 The product complies with the requirements of the following directives and standards of the European Union:
 Directive 2014/30 / EU standards: DIN EN 61000-6-3, VDE 0839-6-3: 2011/09, (B1:2012-11); DIN EN 61000-6-4; VDE 0839-6-4:2011-09; DIN EN 55022; VDE 0878-22:2011-12, B1:2016-08: (CISPR 22:2008 mod.); DIN EN 55011; VDE 0875-11:2011-04, A1:2015-11; DIN EN 55014-1 VDE 0875-14-1:2012-05, A1:2016-03
 DIN EN 61000-6-1 VDE 0839-6-1:2016-05; DIN EN 55014-2 VDE 0875-14-2:2016-01
 Low voltage directive 2014/35/EU Standards:
 DIN EN 60335-1:2012/A11: 2014; DIN EN 60730-1:2017-05; VDE 0631-1:2017-05
 ROHS and REACH compliant:
 DIN EN 50581:2013-02; VDE 0042-12:2013-02, VDE 0042-12:2013-02 (EG) Nr. 1907/2006 (REACH)

8 Technical Data

Mains transfer switch unit – MT NU2301

Input voltage	230 V AC, 50 Hz, pure sinewave
Output voltage	230 V AC, 50 Hz
Input current	(max.) 10 A
Output power	(max.) 2300 VA
Switchover time	ca. 0,5 s
Internal fuse	T 10 A / 250 V
Protection class	Overload, Short-circuit, Reverse current
Temperature range	-20° C ... +60° C
Protection class	IP 55
Dimension	113 x 93 x 55 mm
Weight	ca. 195 g



Declaration of conformity:

The product is in line with the requirements of the following European Union directives and standards:

Directive 2014/30/EU Standards: DIN EN 61000-6-3, VDE 0839-6-3: 2011/09, (B1:2012-11); DIN EN 61000-6-4; VDE 0839-6-4: 2011-09; DIN EN 55022; VDE 0878-22:2011-12, B1:2016-08: (CISPR 22:2008 mod.); DIN EN 55011; VDE 0875-11: 2011-04, A1:2015-11; DIN EN 55014-1 VDE 0875-14-1:2012-05, A1:2016-03; DIN EN 61000-6-1 VDE 0839-6-1:2016-05; DIN EN 55014-2 VDE 0875-14-2:2016-01
 Low voltage directive 2014/35/EU standards: DIN EN 60335-1:2012/A11: 2014; DIN EN 60730-1: 2017-05; VDE 0631-1:2017-05
 ROHS und REACH compliant: DIN EN 50581:2013-02; VDE 0042-12:2013-02, VDE 0042-12:2013-02 (EG) Nr. 1907/2006 (REACH)

9 Warranty

Warranty

The company BÜTTNER ELEKTRONIK GmbH assumes a 24-month warranty in the event of a proven warranty claim (purchase receipt with date). All functional errors occurring within the warranty period, which are demonstrably caused despite proper use, will be corrected free of charge up to 24 months after the date of purchase. In order to carry out the warranty work, the defective device must be sent to the factory free of charge for the manufacturer. It remains up to the manufacturer to repair or replace defective parts. The costs for the return shipment are to be paid by the customer. Warranty services do not extend the warranty period granted from the date of purchase.

Excluded from the warranty:

- Damages caused by non-compliance with the instructions in the user manual.
- Damage caused by reverse polarity, overcurrent, overvoltage or lightning strikes.
Devices opened by end-users.
- The manufacturer's warranty does not limit the statutory warranty. In the event of a defect, please contact our hotline or your dealer.
- Printing errors, errors and technical changes reserved.

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Disposal! This product may not be disposed with household waste.



DIN EN ISO DIN EN ISO
9001:2015 14001:2015
ZERTIFIZIERT ZERTIFIZIERT



Declaration: The product is in line with the requirements of the following European Union directives and standards: