

# Using instructions

## Charge regulator



These instructions relate **ONLY** to this product and contain important information for using the product for the first time. Please keep these instructions for later reference and should always accompany the product in the event of transference to a new user.

### 1. Introduction

Dear Customer, thank you for purchasing the solar pump kit. With this solar pump kit you purchased a product manufactured according to the current state of technology.

**CE** This product fulfils all requirements of the valid European and national regulations. The conformity was proved. The relevant declarations and documentation are deposited with the manufacturer.

To maintain this state and guarantee a safe operation, you as the user will have to follow this operating manual!

### 2. Safety Instructions



- In case of damages caused by not following this operating manual, the warranty rights will expire! We exclude liability for any consequential damages!
- We exclude liability for property or personal damages caused by inappropriate handling or not following the safety instructions.
- In these cases any guarantee rights will expire.

Due to safety and admission reasons (CE) it is not allowed to arbitrarily reconstruct and/or change the product. Therefore, please keep to the operating manual.

### Special Features

- Intelligent microprocessor control and professional software.
- Incl. intelligent deep discharge protection by means of different switch-off thresholds.
- Automatic protection against overcharging, deep discharge, short circuit and voltage reversal.
- Extended service life due to PWM circuit.
- LED display battery charge level indicator
- Different operating modes adjustable for the output.

### 3. Intended Use

The solar controller was designed for solar island systems for the use in private respectively domestic environments. The controller is operated via an integrated microprocessor. All settings are made via one button.

The controller has many protective functions such as e.g. short circuit, overcharging, incorrect connection, overcharging, deep discharge as well as an automatic shutdown and automatic restart, etc. with a precise indication of the battery status, the charge and a malfunction by means of signal LEDs.

The charge controller uses the PWM battery charge mode in order to ensure that the battery is always in its best condition and that its service life is extended.

There are many operating modes and discharge options in order to meet the requirements of a multitude of possible applications.

In case you should feel overchallenged with the installation this solar system, please ask an authorized specialist (e.g. electrician) for help.

### 4. Assembly and Putting into Operation

#### 4.1 General Information:

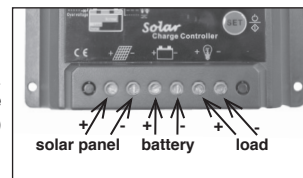
- When connecting the charge controller please always use copper cables with an adequate cross-section and keep the cable lengths as short as possible.
- It is possible to connect cables with a maximum cross-section of 4 mm<sup>2</sup> on the terminals.
- Install the charge controller indoors on a solid on a non-flammable surface!

#### 4.2 Charging Modes:

1. If the connected battery is exhaustively discharged, then the charging voltage is increased for approx. 10 minutes. After that, the battery is charged in normal mode. The trickle charging follows after the full charge.
2. The charging voltage will not be increased if no deep discharge is existent. This function makes sure that the battery is charged as effectively and carefully as possible.

#### 4.3 Connection:

1. The **battery cable** is connected at first. First connect the battery cable with the connection of the controller (battery symbol) and then with the battery's poles.



**Note:** Pay attention to the correct polarity when connecting the battery!

**CAUTION:** Danger of burning in case of a short circuit on the battery.

2. If the polarity is correct then the LED „BAT“ lights up; in order to perform a check, press the button „SET“. In case it should not light up, check the cable connection and the connection for the correct polarity.
  3. Now connect the **solar module cable** to the charge controller (solar module symbol). In doing so, please also pay attention to the correct polarity! Now connect the cable with the connection on the solar module.
- Note:** Pay attention to the correct polarity when connecting the solar module!
4. The LED „SUN“ will be illuminated when the sun is shining. In case it should not be illuminated, check the cable connection and the polarity.
  5. Now connect the devices to be operated with the **load output** of the charge controller (lamp symbol). In doing so, please also pay attention to the correct polarity.

**Note:** Pay attention to the correct polarity when connecting the consumers! The connected devices may be destroyed in case of an incorrect polarity!

### 5. LED Displays

#### - LED Display „Sun“

**Green:** If the charge controller was connected correctly and the sun is shining onto the photovoltaics module, then the green LED „SUN“ is illuminated and indicates that a charging current is flowing.

**Flashing green:** If the LED „SUN“ is flashing quickly, then there is an overvoltage. Please pay attention to the technical data in item 8.

#### - LED Display „BATT“

**Green:** The LED lights up green if the battery voltage is in a normal range.

**Flashing green:** The LED „BATT“ flashes slowly if the battery is fully charged.

**Orange:** The LED display „BATT“ lights up orange in case of an undervoltage.

**Red:** In case of a deep discharge, the LED „BATT“ will light up red. Then the controller will automatically switch off the load and the battery has to be charged by solar radiation.

The LED „BATT“ will again be illuminated green and the output will be reactivated as soon as the battery's voltage has recovered.

#### - LED Display „LOAD“

**Green:** The LED „LOAD“ lights up green if the load output is activated.

**Slowly flashing red:** The LED „LAST/LOAD“ flashes slowly in red if the load current is 1.25 higher than the nominal current of the controller for 60 seconds or of the load current is 1.5 times higher than the nominal current of the controller for 5 seconds.

**Quickly flashing red:** The controller switches of the power output in case of any overload. The controller immediately switches of the power output in case of any short circuit and the LED „LOAD“ flashes quickly.

In order to check the load connection, disconnect the part affected by the short circuit and press the button „SET“ once. The charge controller will recommence its operation after 30 seconds or work normally the following day.

### 6. Operating Modes

The charge controller may work in 17 different operating modes. For the different options, see item 6.

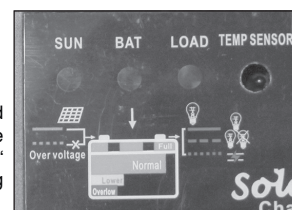
#### 6.1 Setting Procedure:

Press the button „SET“ for 5 seconds to get into the programming mode. In the indication „WORK MODE“, you will find a flashing number. With every other pressing of the button „SET“ another number will appear. Press until the number appears that you need. The setting is finished as soon as the LED number stops flashing. The LED number lights up every time the button is pressed.

#### 6.2 Possible Modes:

##### - WORK MODE 0

At nightfall, the output is activated after approx. 10 minutes. The output is switched off after approx. 10 minutes at the crack of dawn.



### - WORK MODE 1-15

At nightfall, the output is activated after approx. 10 minutes. Depending on the set mode, the output remains activated for a period of 1 hour up to a maximum of 15 hours. This mode is particularly appropriate for illumination purposes (e.g. garden illumination).

### - WORK MODE 16

In this mode, all light controls and timing functions are terminated and the charge controller works like a usual charge controller. The load output may be switched on and off via the button „SET“.

### - WORK MODE 17

The system setting works identical to the WORK MODE 0. Only a 10 minute delay is activated here. The output is immediately activated at nightfall and deactivated at the crack of dawn.

### - Setting Procedure:

Press the button „SET“ for 5 seconds. WORK MODE indicates a flashing LED number. With every other pressing of the button „SET“ another number will appear. Press until the number appears that you need. The setting is finished as soon as the LED number stops flashing. The LED number lights up every time the button is pressed.



Mode	LED Number	Mode	LED Number
Light control ON+ light control OFF	0	Light control ON+ 9 h delay OFF	9
Light control ON+ 1 h delay OFF	1	Light control ON+ 10 h delay OFF	10
Light control ON+ 2 h delay OFF	2	Light control ON+ 11 h delay OFF	11
Light control ON+ 3 h delay OFF	3	Light control ON+ 12 h delay OFF	12
Light control ON+ 4 h delay OFF	4	Light control ON+ 13 h delay OFF	13
Light control ON+ 5 h delay OFF	5	Light control ON+ 14 h delay OFF	14
Light control ON+ 6 h delay OFF	6	Light control ON+ 15 h delay OFF	15
Light control ON+ 7 h delay OFF	7	Mode general use as charge controller	16
Light control ON+ 8 h delay OFF	8	Identical to Work Mode 0 without 10 minutes delay	17

## 7. Malfunctions

Problem	Possible solution
The sun is shining onto the photovoltaics module but the green LED „SUN“ is not illuminated	Check the cable connection of the photovoltaics module! Is there any interruption, bad contact or voltage reversal?
The LED „SUN“ flashes quickly	The system voltage is too high! Open battery circuit. Check whether the battery is connected correctly or not or the charging circuit is destroyed.
The LED „LOAD“ is illuminated but the connected devices do not work!	Check whether the load cable is connected correctly!
The load LED „LOAD“ flashes quickly but the connected devices do not work!	Short circuit in the load output! Check the connections of the connected devices! Disconnect all connected devices or disconnect the defective device. Press the button „SET“; the output will be reactivated after approx. 30 seconds. Now reconnect the individual devices.

Problem	Possible solution
The load LED „LOAD“ flashes slowly but the connected devices do not work!	The charging capacity/load power is higher than the permitted maximum connected load of the charge controller. Reduce the connected devices and press the button „SET“; the controller will be reactivated after approx. 30 seconds.
The LED-„BAT“ is illuminated red but the connected devices do not work !	The battery is exhaustively discharged; the output is reactivated as soon as the battery is recharged by the solar module.

## 8. Technical Data

Nominal charging current:	10 A
Nominal load current:	10 A
System voltage:	12 / 24 V automatic switchover
Overload-, short circuit protection:	If 1.25 times higher than the nominal current: 60 sec., if 1.5 times higher than the nominal current: 5 sec.
--- overload protection; ≥3 higher than the nominal current --- short circuit protection	
No-load consumption:	≤6mA
Voltage drop charging circuit:	≤0.26V
Voltage drop discharging circuit	≤0.15V
Overvoltage protection:	17V at 12 V, 34 V t 24V
Operating temperature:	-35°C-+55°C
Increase charging voltage:	14.6V at 12 V, 29.2 V at 24 V
Direct charging voltage:	14.4V at 12 V, 28.8 V at 24 V (10 min )
Trickle charging:	13.6V at 12 V, 27.2 V at 24 V
Charging voltage recovery:	13.2V at 12 V, 26.4 V at 24 V
Undervoltage:	12.0V at 12 V, 24 V at 24 V
Deep discharge voltage:	11.1V at 12 V, 22.2 V at 24 V
Switch-on voltage after deep discharge:	12.6V at 12 V, 25.2 V at 24 V
Protection class:	IP 63

### Disposal:

Dear customer, please cooperate in avoiding waste. When you intend to dispose of the product in future, please consider that it contains valuable raw materials suited for recycling. Therefore, do not dispose it of with domestic waste but bring it to a collection point for the recycling of waste electrical and electronic equipment. Thank you very much for your cooperation!



### Manufacturer:

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