OPERATING INSTRUCTIONS

SOLAR BATTERY CHARGER UNIT
12/24 V 8 A

with:
- for 12/24 V systems
- Dynamic protection against overdischarge
- Gas-formation control (gas control)
- Temperature compensation

Dear Customer,

Thanks you for buying our product. You have bought one of the most powerful, compact and reliable units of its class.

Please read the operating instructions carefully before use.

WARNING!!! Safety Instructions!!!

(Precautions: to maintain good performace.)
- Do not use the unit:
  - In places which are dusty, damp. In a high humidity area (over 80% rel. humidity), Temperatures above 50°C. In areas containing inflammable materials (liquids/solvents, gas). Do not immerse in water.
  - Use only in closed, dry areas.
  - Should the unit fail to operate, or show signs of not operating properly unplug immediately and make sure that the unit is not put into further operation. Do not use the unit when visible signs of damage - due to transport or inadequate storage are noticeable.
  - To prevent the risk of explosion by overcharging, install the battery in a well ventilated place.
  - When recharging sealed lead acid batteries, switch off the gas-control (see pre- installation).
  - Use only solarcells as power source.
  - Follow installation instructions strictly when connection the unit! The unit should be disconnected in reverse order (see installation procedures).
  - To prevent a short-circuit between Solar charger unit and battery, install a fuse on the positive terminal/pole.
  - Equipment which on account of its function may not be switched off by means of load rejection (e.g. navigation lights) must be connected directly to the battery and fused.

FUNCTION-DESCRIPTION OF OPERATION

Solar Battery Charger Unit 12/24 V 8 A with
- 12/24 V switch/changeover
- Dynamic protection against overdischarge
- Protection against overcharge
- Gas formation control (gas control)
- Temperature compensation

The use of lead-batteries is common for the storage of solar energy (photovoltaik solar systems).

Lead-batteries require protection against overcharging and overdischarging. This unit satisfies both requirements. The 12/24 V changeover enables the solar battery charger unit to operate with the installed solar system.

12/24 V Changeover

The unit can be used with both 12 V and 24 V photovoltaik solar systems. The unit can be adapted to both 12 V and 24 V.

Protection against overdischarge

Lead-Batteries need to be protected against being descharged, otherwise damage can occur to the battery cells. The solar battery charger unit protects lead-batteries from undercharging when the required battery power output is not achieved by automatically switching-off. As soon as the batteries are recharged by the solar cells, the load is automatically reconnected.

Protection against overcharge
Exceeding the final charging voltage (13.7 V DC) leads to the formation of gas, which damages the batteries. The amount of gas depends on the temperature. The inbuilt temperature-sensor automatically regulates the final charging voltage in relation to the temperature in area of use/operation. The battery is not fully charged when the final charging voltage is reached. The charging current should not be completely switched off, instead reduced, so that the final charging voltage is not exceeded. This is accomplished by the solar charger unit. The charging process - "IU-charging" recharges the batteries evenly and quickly. The "IU-charging" is achieved by a very quick temporary short-circuiting procedure - also known as the pulse-width modulation (PWM) shuntprocedure!

Gas control
An over extended use of lead-batteries without a controlled gas-formation can lead to the development of damaging battery acids. The solar charger unit controls the gas-formation and therefore removes and prevents the development of battery acids. This process depends upon the temperature and is regulated by the in-built temperature-sensor.

Warning: Recharging and use of sealed lead acid batteries with a solar system on boats/yachts/ships, the gas-control must not be operated. Switch-Off! (See pre-installation)

Temperature compensation
The in-built temperature compensator adjusts and regulates the final charging voltage and gas-formation of the batteries to the temperature in area of use.

Connection and Operating-elements

1. 12/24 V Switch/changeover
2. +/- Terminal/Pole solarmodul
3. +/- Terminal/Pole lead-battery
4. +/- Terminal/Pole load
5. Temperature sensor
6. LED green: Charging control lamp
   illuminates when charging
   the signal lamp flashes slower the more that is charged
7. LED red: Protection against overdischarge
   In case of overdischarge the loads are disconnected. As soon as the battery is recharged, is the connection switched-on and the signal-lamp does not illuminate.
8. Fuse 10A
   Prevention against wrong connection of battery terminals/poles, load terminals/pols and overloading.
   Warning: Should the terminals/poles be wrongly connected to the load output, can units <10A (fused) be completely damaged. Each individual component must be fused.
Pre-installation
Upon delivery is the solar charger unit installed as follows:
- Gas control active (see functions)
The above functions can be turned off at any time.
**Warning:** When recharging sealed lead acid batteries make sure that the gas control is switched off.
Make sure that the 12/24 V switch/changeover is in the correct position.
De-activate as follows:
**Gas control de-activate**
1. Unscrew the 2 screws on the left side (see diagramm) on the solar charger unit and carefully remove the casing/lid.
2. Disconnect the jumper JP1 situated to the electronic-base. The gas control is now de-activated.

**Installation - Warning: Take care that the Terminals/Pols correspond!!!**
The solar charger unit should be placed proximity to the battery and be sufficiently protected against the weather. Take care to place the battery in a well ventilated place. To enable the unit to function properly, the electrical connections should face downwards. To guarantee that the unit functions properly it must be connected to the solar generator, the lead-battery and the load.
Each part of the system-solar generator, lead battery, load and solar charger unit should have the corresponding power supply. Please check each component before installation, when in doubt contact a Specialist! Take careful attention of the following installation instructions:
1. Connect the battery to the corresponding terminals on the solar charger unit. To prevent the wiring from overheating and power supply reduction the use of cable/wire 2,5-4 mm² flexible is recommended. Only when a "short-circuit-protection" connection is installed, can the battery be operated without a fuse. Otherwise must a fuse be connected to the battery +terminal/pole in order to prevent the connection to the solar charger unit from "short-circuiting". Both components must be installed close together in the same room.
2. Connect the solar modul to the corresponding terminals on the solar charger.
3. Connect the load to the solar charger unit.
The connection-terminals pictured on the solar charger unit or see diagramm (Connection/Operating-elements).

**The Solar System fails to Function - possible reasons.**
Battery terminals/poles are wrongly connected: The fuse has blown, replace with the same type.
Module terminals/poles are wrongly connected: Avoid at all costs!!!
Load terminals/poles are wrongly connected: The apparatus can be seriously damaged before the fuse blows. Batteries contain considerable amounts of electrical energy. A short-circuit can result in a large build-up of heat leading to FIRE!!

**Specifications**

<table>
<thead>
<tr>
<th></th>
<th>12/24 V</th>
<th>8 A</th>
<th>8 A</th>
<th>3 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charging current (solar cells)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>max. Load</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>max. Power use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature sensor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final charging voltage</td>
<td>13,7 V / 27,4 V</td>
<td>14,1 V / 28,2 V</td>
<td>4 mA/K/cell</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overdischarge disconnection</td>
<td>11,1 V / 22,2 V</td>
<td>12,6 V / 25,2 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>constant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>reset voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas regulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gassing activation voltage</td>
<td>12,4 V / 24,8 V</td>
<td>14,5 V / 29 V</td>
<td>3 mA/K/cell</td>
<td></td>
</tr>
<tr>
<td>final gassing voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>temp. compensation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuse</td>
<td>10 A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>-25°C - +50°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurements (LxBxH)</td>
<td>95 x 95 x 35 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight approx.</td>
<td>240 g</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Delivered:** Solar Battery Charger Unit with Operating Instruction

Subject to Technical Alternation.No responsibility will be taken for Printing mistakes.
IVT Innovative Versorgungs-Technik GmbH, Dienhof 14, D-92242 Hirschau
Phone: (49) 96 22 - 7 12 21 or 7 12 22, Fax: (49) 96 22 - 7 12 20
Internet: www.IVT-Hirschau.de eMail: Info@IVT-Hirschau.de