

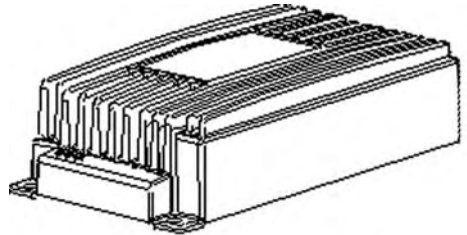
## General

SHF 250-300 are regulated battery chargers. SHF exists in different versions either for charging vented or valve regulated lead/acid batteries. They can also be equipped with a charging curve for Ni-Cd batteries or similar.

**The battery charger is supplied with a pre-set charging curve adapted to the type of battery specified during ordering.**


Information about the charging curve that is set can be read on the data label on the charger. There are different versions of SHF for charging batteries with a battery voltage of 12 V or 24 V and a charging current from 3 A to 17 A. Current and voltage are controlled during the charging process. The charging process is displayed with LEDs on the panel of the battery charger. Charging time and temperature in the battery charger are monitored and charging is limited in the event of cell defects or during insufficient cooling etc. During the entire charging process, the battery charger gathers in data and carries out calculations in order to fully recharge the battery with respect to amount of discharge, temperature, age and more.

**Read through these instructions for use carefully before you begin using the battery charger. Store the operating instructions so that they are always available for the person using the battery charger.**



## SAFETY PRECAUTIONS

Follow the instructions for handling batteries provided by the battery manufacturer. Only use spare parts recommended by the supplier.

	<ul style="list-style-type: none"> <li>The battery charger may only be used for the types of batteries specified.</li> </ul>		<ul style="list-style-type: none"> <li>immediately and send for service personnel.</li> </ul>
	<ul style="list-style-type: none"> <li>The battery charger is supplied with a pre-set charging curve adapted to the type of battery specified during ordering. When changing the type of battery, you should contact the supplier for possible reprogramming of the battery charger.</li> <li>The battery will be damaged if the setting of the battery charger is incorrect.</li> </ul>		<ul style="list-style-type: none"> <li>The battery charger has a voltage that can cause personal injury. Thus, the metal casing may only be opened by authorised service personnel.</li> </ul>
	<ul style="list-style-type: none"> <li>Hydrogen gas is generated when charging batteries, which can cause an explosion.</li> </ul>		<ul style="list-style-type: none"> <li>Disconnect the battery and power supply before carrying out maintenance or cleaning the battery charger.</li> </ul>
	<ul style="list-style-type: none"> <li>During charging, batteries may not be placed in the vicinity of an open fire or sparks.</li> </ul>		<ul style="list-style-type: none"> <li>The battery charger must only be connected to an earthed wall socket. However, chargers marked with the symbol  may be connected to an ungrounded wall socket.</li> </ul>
	<ul style="list-style-type: none"> <li>Do not use the battery charger if it is damaged. Do not touch damaged components. Turn off the mains voltage</li> </ul>		<ul style="list-style-type: none"> <li>The main cable must not be replaced. If the main cable is damaged, the battery charger should be scrapped.</li> </ul>
			<ul style="list-style-type: none"> <li>Batteries should only be charged in well-ventilated premises.</li> </ul>


## Installation

**Only an authorised installation engineer may carry out the installation.**

The battery charger is small and can consequently often be installed in the machine in question. Locate the battery charger so that there is free circulation of air to the battery charger's cooling flanges. In order to achieve the shortest possible charge time in premises with an increase in temperature, the battery charger can be mounted on a metal plate with an area of at least 10 dm<sup>2</sup>, which provides a better cooling effect. Mount the battery charger on the wall using four screws as per illustration.

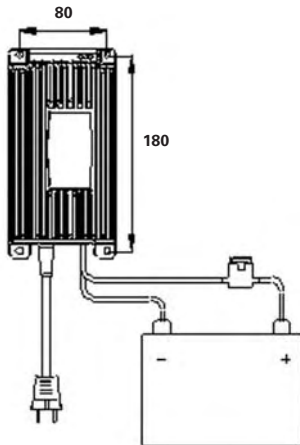
The battery charger is produced in different mains voltage variations. Check that the power supply at the site of the installation complies with the rate voltage according to the information on the battery charger's rating plate.

The recommended mains fuse is specified on the battery charger's rating plate. Use delay action fuses.

The battery charger is connected to the mains voltage via a cable with a plug to an earthed wall socket. However, battery chargers marked with the symbol  may be connected to an ungrounded wall socket.

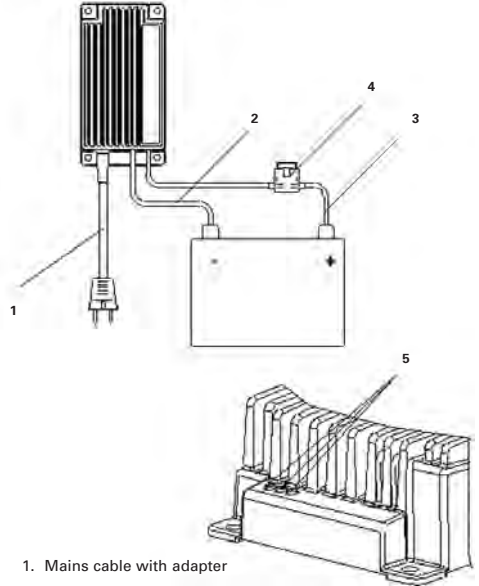
Connect the battery charger as per illustration. The red cable is connected to the battery's positive pole and the black or blue cable is connected to the battery's negative pole. Carefully check the marking on the battery.

The battery can be permanently connected or detachable.



## Operation

### Connection cables and LEDs



1. Mains cable with adapter
2. Black cable to negative pole
3. Red cable to positive pole
4. Fuse
5. LEDs

### Charging



**In the case of danger, disconnect the mains voltage by pulling out the plug from the wall socket.**

#### Connecting a battery

1. Check that the battery charger is turned off. The plug should be pulled out of the wall socket.
2. Check the wiring and adapter to ensure that there is no visible damage.
3. Connect the battery to the battery charger.
4. Start the battery charger. Insert the plug into the wall socket. A yellow LED should light up. Charging time will vary depending on the type of battery and the depth of discharge.
5. A green LED is displayed when the battery is full charged. The battery goes over to maintenance charging.

#### Note!

The green LED will not light immediately if a fully charged battery is connected. This time can vary between 0 and 2 hours.

#### Disconnecting a battery

1. Turn off the battery charger. Pull the plug out of the wall socket.



The battery charger should be turned off when disconnecting the battery. If the battery is disconnected during an ongoing charge, the contacts in the charging glove will be damaged and spark formation can occur causing a hydrogen gas explosion.

2. Disconnect the battery from the battery charger.

## Maintenance

Only an authorised installation engineer may carry out maintenance of the battery charger.

## Troubleshooting



Do not use the battery charger if it is damaged. Do not touch damaged components. Turn off the mains voltage immediately and send for service personnel.

When the battery charger's built-in self-testing function detects a fault, this is indicated via the LEDs. Please make a note of any faults and send for authorised service personnel. The following checks should only be carried out by authorised service personnel.

## SHF 250

Off       On       Flashing

Red	Yellow	Green	Meaning
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Mains supply not connected.
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Charging complete.
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Main charge in progress.
<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Trickle charge in progress.
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Unidentified error.
<input checked="" type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	Battery voltage too high. Charging stopped.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Battery voltage too high. Charging stopped. (option)
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Battery voltage too high. Charging stopped. (option)
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="checkbox"/>	Charger temperature too high. Reduced charging current.
<input checked="" type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	No battery connected.
<input checked="" type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	Battery voltage low. Low-current phase.
<input type="checkbox"/>	<input type="radio"/>	<input checked="" type="radio"/>	Low charger temperature or transmission error.
<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	Maximum Ah exceeded.
<input type="checkbox"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	High battery temperature (option)
<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="checkbox"/>	Low battery temperature or transmission error (option)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Battery voltage very low. Pulse charging.

## SHF 300

Off       On       Flashing

Red	Yellow	Green	Meaning
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Main charging in progress.
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Additional charging in progress.
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Charging complete.
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Too long charging time, charging not complete.

## Checks



Disconnect the battery and power supply before carrying out maintenance or cleaning the battery charger.

1. Check that the battery is free from defects, in good condition and is the correct type for the battery charger.
2. Check that the battery is correctly connected and that the battery fuse, if any, is whole.

3. Check that the mains voltage is correct and that all fuses are whole.
4. Check the wiring and adapter to ensure that there is no visible damage.

## Recycling

It should be possible to recycle the battery charger as metal and electronic scrap.