

# Charge Regulator SCR Marine

## Manual

Many thanks for purchasing a superwind product.

The **SCR Marine** is a charge regulator of highest quality and will work in conjunction with a wind generator of the model series **SW 350**, **SW 350-II** or **SW 353** (hereinafter jointly referred to as **SW 35X**) to charge your batteries perfectly and reliably for many years.

However, reliable operation not only will depend on product quality but also on accurate assembling and proper wiring. Please read this manual carefully before you start the installation. Please also keep in mind our safety instructions and warning notices. Our main concern is with your safety.

### Labelling

The charge regulator **SCR Marine** is available in two configurations: **SCR 12V Marine** and **SCR 24V Marine**. This manual applies to both configurations.

Manufacturer: superwind GmbH  
Am Rankewerk 2 – 4  
D-50321 Brühl / Germany  
Tel.: +49 / 2232 / 577357  
Fax.: +49 / 2232 / 577368  
e-Mail: power@superwind.com  
Internet: www.superwind.com

You will find the label with the serial number and the nominal voltage on the side of the housing.

### Intended use and range of application

The **SCR Marine** is designed to sense and limit the output voltage of a **SW 35X** wind generator and thus to prevent batteries becoming overcharged.

It is suitable for lead acid batteries, gel batteries, AGM batteries (AGM = Absorbed Glass Mat) and Lithium batteries (LiFePO<sub>4</sub>) and has two battery charging outputs isolated by Schottky blocking diodes. This allows the wind turbine to charge two batteries totally independent of each other.

The **SCR Marine** is not influenced by other power sources connected to the batteries like alternators, gensets, solar arrays and battery chargers. For that reason, it can be used very well in complex systems and hybrid systems.

The regulator is fully potted to protect the electronics against humidity and vibration.

Fields of application for example are sailing yachts, campers, summer cottages, mountain shelters, as well as industrial applications, like navigational aids, traffic management systems, environmental monitoring stations or transmitters.

### General safety recommendations

Always abide by the acknowledged rules of technology and the rules for accident prevention when working on the electrical system.

Take care that works on the electrical system like installation, maintenance and repair is carried out by qualified persons only. These persons must also have studied the instructions before given in this manual.

Batteries store a large amount of energy. In any circumstance avoid to short circuit a battery. For your safety connect a 40A fuse to each of the battery cables.

Charging lead-acid batteries produces inflammable hydrogen gas. Unsealed lead-acid batteries have vent holes releasing hydrogen, which forms detonating gas with the ambient air. A small spark e.g., of an electrical switch can detonate the explosive gas mixture. For explosion prevention therefore always provide sufficient ventilation.

Avoid touching and short-circuiting wires or terminals. Be aware that the voltage on specific terminals or wires can be significantly higher than the nominal battery voltage. Only use isolated tools, stand on dry grounds, and keep your hands dry.

Please also follow the instructions of the wind turbine operation manual and the safety recommendations of the battery manufacturer.

### Exclusion of liability

The manufacturer shall not be liable for damages caused by use other than as intended or mentioned in this manual or if the recommendations of the battery manufacturer were neglected. The manufacturer shall also not be liable if there has been service or repair carried out by any unauthorised person, unusual use, wrong installation, or inappropriate system design. Opening the charge regulator voids warranty.

Technical data	12 V – version	24 V – version
Nominal voltage	12 V	24 V
Max. charging voltage (25°C)	14,4 V	28,8 V
Temperature compensation	-18 mV / °C	-36 mV / °C
Max. current	40 A	40 A
Resistance of dump resistor	0,35 Ohm	1,4 Ohm
Number of charging outputs	2	2
Method of voltage regulation	PWM	PWM
Connectors	M 4	M 4



LED indicating that max. charging voltage has been achieved (batteries fully charged)

Option to connect an external temperature sensor

The default setting for the maximum charging voltage can be adapted to special customer requirements. Since special devices are needed, proper calibration can only be performed by the manufacturer.

### Description of functions

The **SCR Marine** charge regulator has been especially designed for the **SW 35X** wind generator and guarantees optimum charging of the batteries. The secondary function of the **SCR Marine** is to electronically keep the wind generator under load. When the batteries have reached their maximum charging voltage, the **SCR Marine**'s PWM circuit automatically diverts the wind turbine's surplus power to the dump resistor. Thus, with batteries even fully charged, the wind turbine continues operation and provides useable power as soon as electric consumers are switched on. This state of charge is indicated by the LED and the resistor will make a very slight buzzing sound when operating and dissipating power.

### Choosing the position

The charge regulator and the dump resistor are designed for indoor use and shall be mounted at a place well protected from the effects of weather. As the charge regulator has a temperature sensor in order to

adapt the charging voltage to the battery temperature, it should be placed in the same room with the batteries or in a room with the same temperature level. If this is not possible, an external temperature sensor is available (part no.: 0300.15.01.04) which then replaces the standard sensor mounted at the regulator housing.

The distance between the regulator and the battery should be minimum 30 cm but not exceed 100 cm. The distance between the regulator and the power resistor should not exceed 200 cm. The power resistor must be ventilated properly. Never mount it on a flammable surface and take care, that no flammable items will be close to the resistor. Consider that the resistor will dissipate all the wind turbine's power into heat when the batteries are fully charged.

On a yacht a good place for the power resistor is the engine compartment.

### Connecting the charge regulator

Before connecting the charge regulator, prevent your wind generator from unintended starting. Connect the two generator cables together (caution: disconnect the battery before!) or tie one of the rotor blades to the mast (if accessible).

Then start with the installation.

Slide the regulator's black cover sideways and take it off.

Mount the regulator and the power resistor to a dry, plain and non-flammable surface. Use the mounting holes.

For connecting the cables to the charge regulator use the yellow solderless terminals. The solderless terminals provided are suitable for cable cross sections from 2.5 mm<sup>2</sup> to 6.0 mm<sup>2</sup> (AWG 13 to AWG 10).

Use a crimping tool suitable for insulated terminals (see photo) and check that the terminal has been securely crimped to the bared part of the cable.



### Connect the regulator as shown at the wiring diagram below.

**IMPORTANT !** To prevent your system from damages, the cables must be connected in the order as follows:

#### 1. Connecting the power resistor

Connect both of the resistor's cables to the terminals **Resistor** of the charge regulator. In case you need to extend the cables only use cables with a cross section of minimum 4 mm<sup>2</sup> (AWG 12).

#### 2. Connecting the wind generator

Connect the wind generator to the terminals **Gen.+** and **Gen.-** of the charge regulator. Do never interchange the polarity of the cables. Interchanged polarity would destroy the charge regulator and void warranty

In general, you should mark all line ends by POSITIVE (+) and NEGATIVE (-), in order to prevent errors with the connection.

Marking of the connecting cables at the **SW 35X**:

POSITIVE (+) :	RED
NEGATIVE (-) :	BLACK

If you are not sure of the polarity of the cables led down from the wind generator you can identify POSITIVE (+) and NEGATIVE (-) easily by means of a simple multimeter before connecting the cables to the charge regulator.

Select DC (range e.g., 10 VDC) on your multimeter. There is normally a red measuring line connected to the V plug and a black line to the COM plug. Connect the measuring lines to the cables coming from the wind turbine. Ask an assistant to turn the rotor of the wind turbine slowly by hand. The wind turbine already produces low voltage gaugeable by the multimeter. If the voltage is indicated by (+) or without prefix, the red measuring line is connected to the POSITIVE (+) cable. If the voltage is indicated by (-) the red measurement line is connected to the NEGATIVE (-) cable of the wind turbine.

### 3. Connecting the batteries

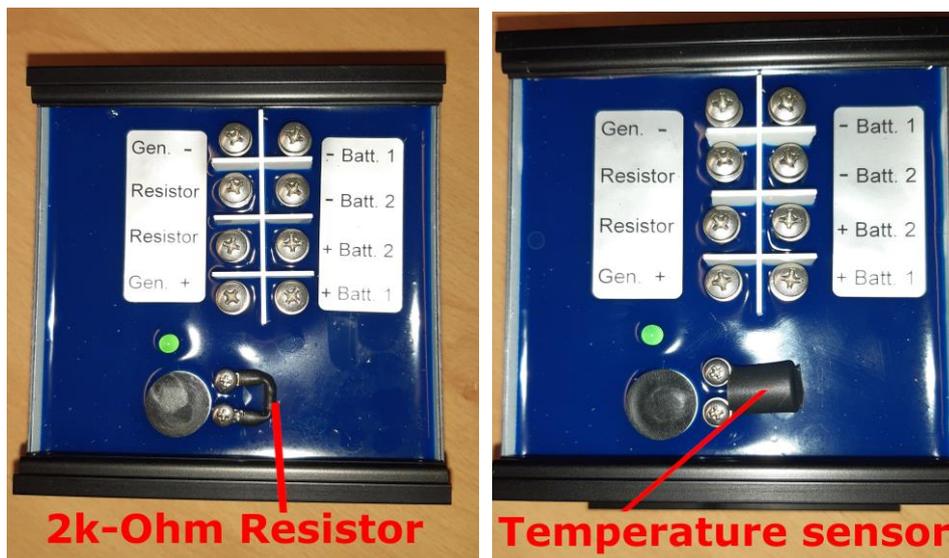
You may connect just one battery or two batteries to the SCR Marine. Use the terminals **+ Batt. 1** and **- Batt. 1** to connect your first battery and use the terminals **+ Batt. 2** and **- Batt. 2** to connect your second battery. If two batteries are connected, they are charged independently and are protected from discharging each other by the regulator's internal Schottky blocking diodes.

**NOTE:** In order to avoid accidentally short-circuiting, first connect the cables to the charge regulator and then to the battery.

#### 3.1 Connecting Lithium batteries (LiFePo4)

Standard SCR-Marine regulators are equipped with a temperature sensor, necessary for the temperature compensation of the end of charge voltage for lead acid batteries.

**As Lithium batteries do NOT allow any variation of the end of charge voltage the temperature sensor must be replaced by a small 2k-Ohm resistor.**



- Remove the temperature sensor
- Install the 2k-Ohm resistor instead. Use the same M3 screws and washers.

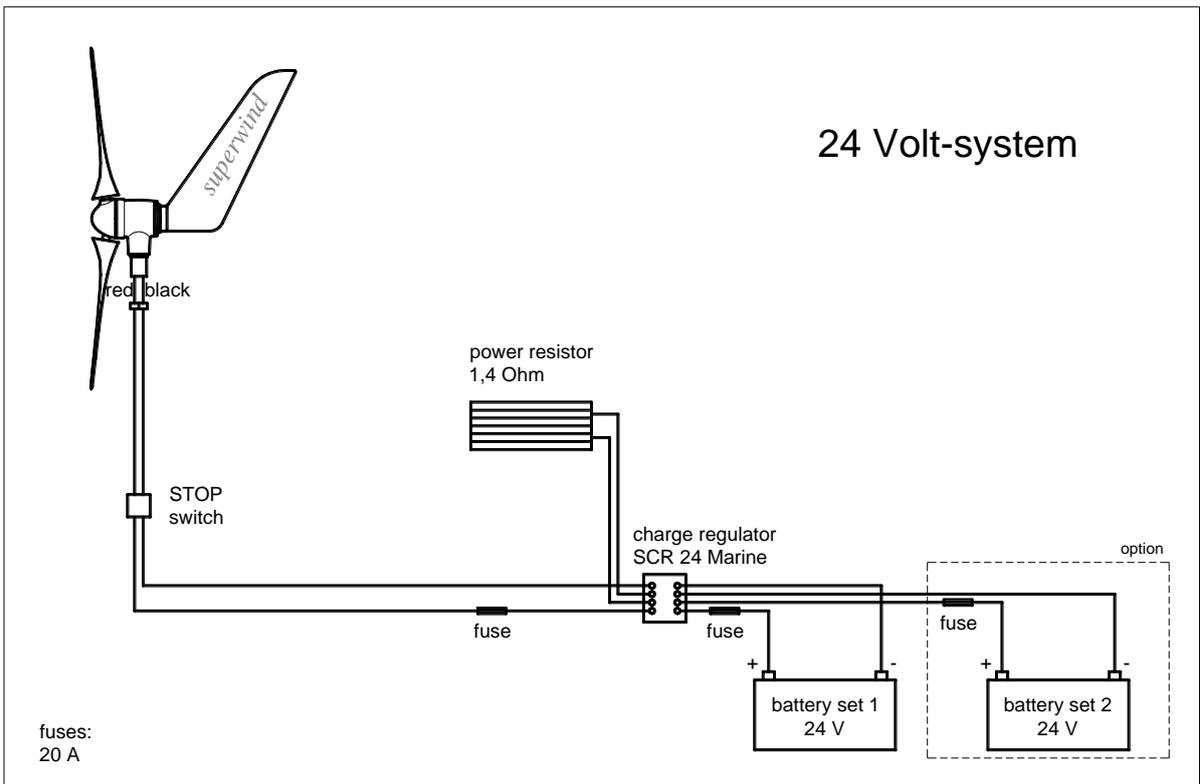
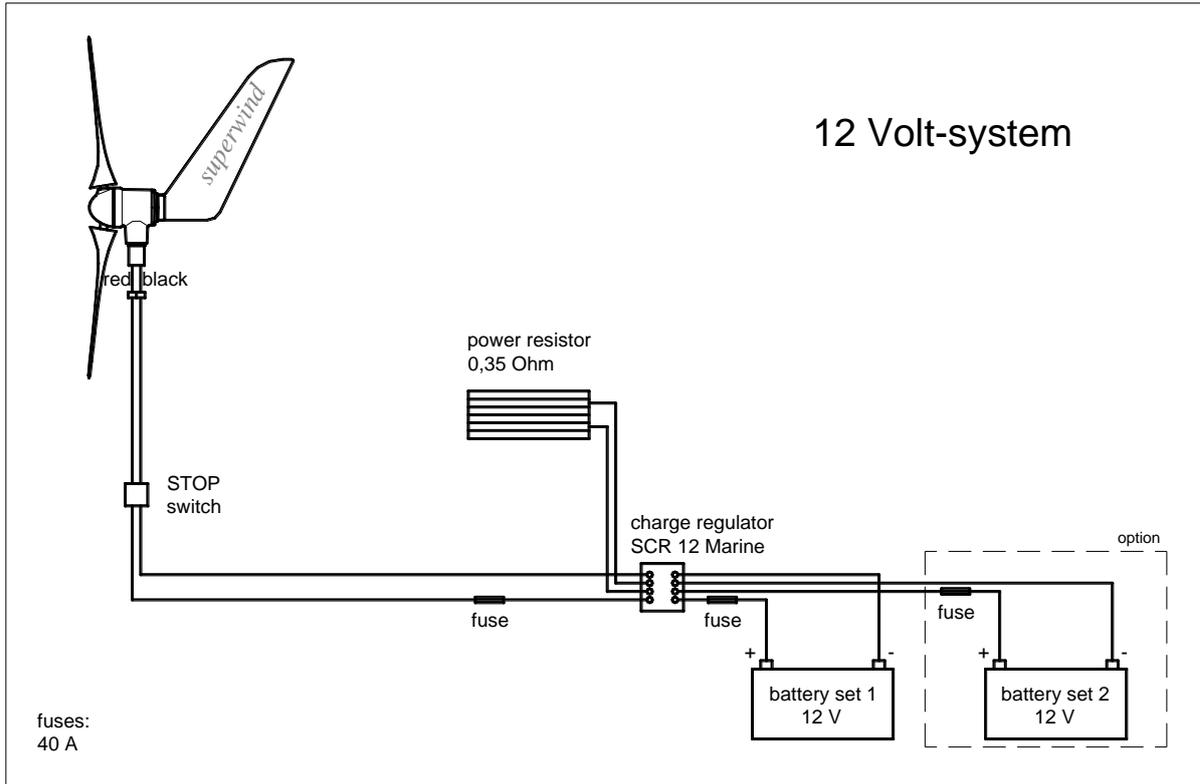
**NOTE:** Do not run the SCR-Marine regulator without temperature-sensor nor 2k-Ohm resistor connected.

**NOTE:** The standard setting of the SCR-Marine regulator is 14.4 VDC (12V version) or 28.8 VDC (24V version) end of charge voltage, suitable for open lead acid batteries and several types of LiFePO4 batteries.

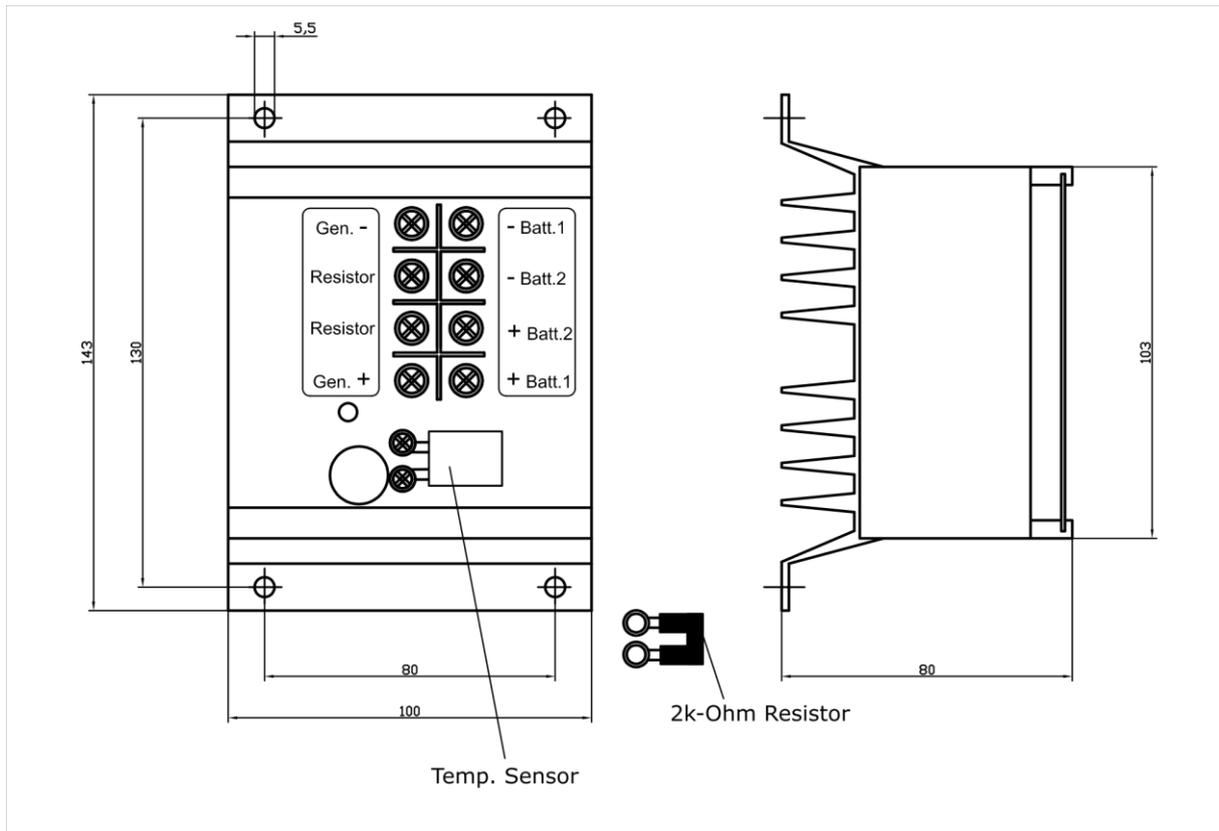
**To ensure that this setting is also applicable for your battery type, please check the data sheet or contact the battery manufacturer.**

In case that the setting of the SCR-Marine must be changed please follow the instructions "How to adjust the voltage of a SCR-Marine 12V/24V".

**NOTE:** In order to avoid accidentally short-circuiting, first connect the cables to the charge regulator and then to the battery.



**Dimensions of the charge regulator:**



**Dimensions of the power resistor:**

