

# Charge Regulator SCR 48 V

## Manual

Many thanks for purchasing a superwind product.

The **SCR 48 V** is a charge regulator of highest quality and will perfectly and reliably charge your batteries for many years.

However, reliable operation not only will depend on the 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

This manual refers to the charge regulator **SCR 48 V**

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 48 V is designed to sense and limit the output voltage of a Superwind 350 / 48 V wind generator and thus to prevent batteries becoming overcharged. For voltage regulation the SCR 48 V uses the method of Pulse Width Regulation (PWM) by diverting excess power from the wind turbine to a power resistor.

The SCR 48 V is suitable for **Lead Acid Batteries, Gel Batteries, AGM Batteries** (AGM = Absorbed Glass Mat) as well as for modern **LiFePO<sub>4</sub> / LiFeMgPO<sub>4</sub> Lithium Batteries** with integrated Battery Management System (BMS).

The SCR 48 V has two battery charging outputs isolated by Schottky blocking diodes. This allows to charge two battery sets of the same type totally independent of each other.

Different to many other wind turbine charge regulators, the SCR 48 V receives the power for its internal electronics from the wind turbine and not from the battery. This means that in calm periods, the SCR 48 V does not draw any current from the battery.

The SCR 48 V 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 electronics are protected against humidity by a protective lacquer.

Fields of application are a wide range of industrial systems like navigational aids, traffic management systems, environmental monitoring stations or radio transmitters. It is also used for marine applications on buoys and ships, vehicles or mountain shelters.

## 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 10 A 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 persons, unusual use, wrong installation or inappropriate system design. Opening the charge regulator voids warranty.

## Technical data

Nominal voltage	48 V
Max. charging voltage ( 25°C)	57.6 V
Temperature compensation	-72 mV / °C
Max. current	10 A
Resistance of dump resistor	5.6 Ohm
Number of charging outputs	2
Method of voltage regulation	PWM
Connecting terminals	4 mm <sup>2</sup> /AWG 11

The GREEN LED “Charging” is indicating that charging current is sent to the battery.

The ORANGE LED “Diversion” is indicating that the PWM is limiting the charging voltage by sending excess power to the resistor.

Important: the external temperature sensor must be connected to terminals 1 and 3. If for any reason no temperature compensation is required, a bridge must be connected between terminals 1 and 2.



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 or a superwind authorized service partner.

## Description of functions

The **SCR 48 V** charge regulator has been especially designed for the Superwind 350 / 48 V wind generator and guarantees optimum charging of the batteries. As long as the actual charging voltage is below the maximum charging voltage, the current from the wind turbine is directly led to the batteries. Charging current flowing to the batteries is indicated by the GREEN LED "Charging".

As soon as the batteries have reached their maximum charging voltage, the PWM circuit variably diverts the wind turbine's surplus power to the dumpload power resistor in order to keep the voltage constant. This state of charge is indicated by the ORANGE LED "Diversion".

Thus, with the batteries even fully charged, the wind turbine continues operating, electrically loaded by the dumpload power resistor and is prepared to provide useable power as soon as electric consumers are switched on.

## Choosing the place of installation

The charge regulator is designed for indoor use and shall be mounted at a place well protected from the effects of weather. The charge regulator's temperature sensor has a cable length of 400 cm and should be mounted close to the batteries.

The distance between the charge regulator and the battery should be minimum 30 cm but not exceed 400 cm. The distance between the charge regulator and the power resistor should not exceed 200 cm.

The power resistor has protection class IP 54 and can be mounted outdoors (e.g. outside a switch cabinet) and must be ventilated properly. It should be mounted vertically with the cable outlet at the bottom. 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 ship, 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. If you have a stop switch, turn to STOP. If not, connect the two generator cables from the wind turbine together (caution: disconnect the battery before!) or tie one of the rotor blades to the mast (if accessible).

Mount the regulator and the power resistors to a dry, plain and non flammable surface. The resistor may also be mounted outdoors in a vertical position with the cable outlets at the bottom. Use the mounting holes.

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

For all cables connected to the charge regulator terminals, use appropriate cable end sleeves.

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

### 1. Connecting the temperature sensor

Connect the two cables of the temperature sensor to the terminals 1 and 3 **Temp.-Sensor**. If for any reason the temperature compensation function shall not be used, a small cable bridge must be connected between terminal 1 and 2. With neither temperature sensor nor bridge connected, the SCR 48 does not work correctly.

### 2. Connecting the power resistor

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

### 3. Connecting the wind generator

Connect the wind generator to the terminals - **Gen.** and **+Gen.** of the charge regulator. Do never interchange the polarity of these 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 **Superwind 350** :

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

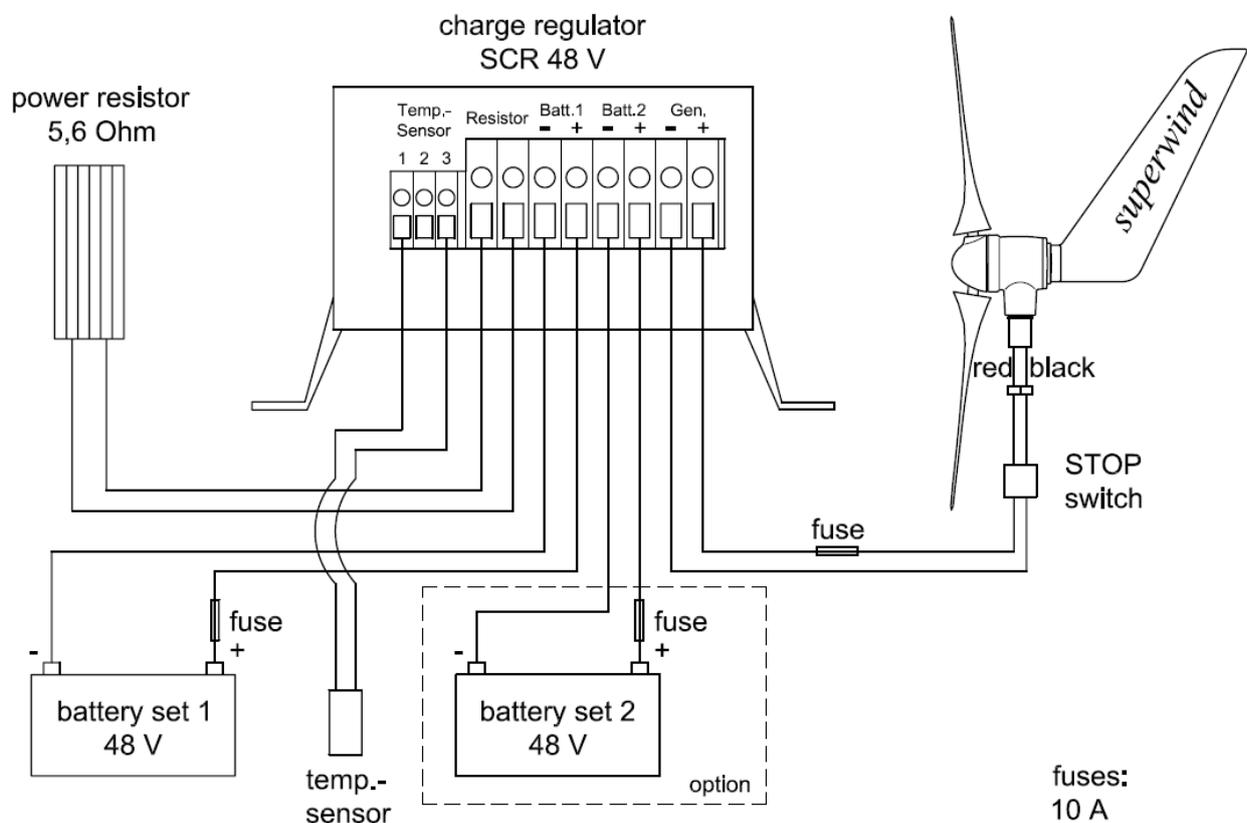
If you are not sure about the polarity of the cables from the wind generator, you can identify POSITIVE (+) and NEGATIVE (-) easily using a simple multimeter.

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.

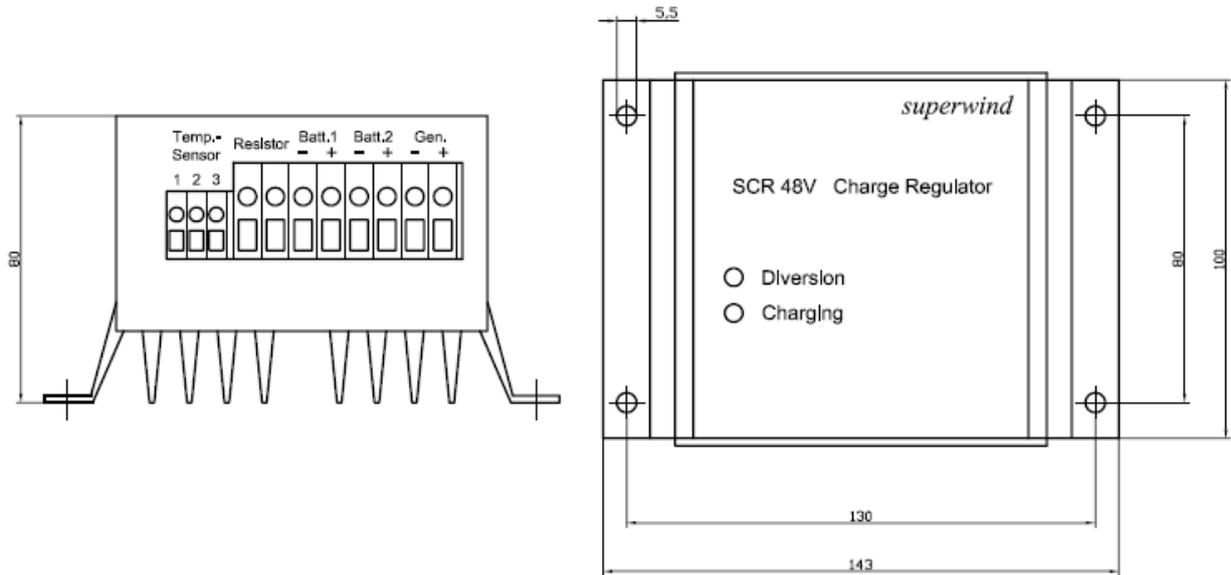
### 4. Connecting the batteries

You may connect just one battery set or two battery sets to the SCR 48. 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 battery sets 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.



**Dimensions of the charge regulator:**



**Dimensions of the power resistor:**

