

Charge Regulator SCR Marine

Operating and installation instructions

Status: April 2024

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.

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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 (LiFePO4) 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
Temperature operating range	- 40 °C to + 70 °C	- 40 °C to + 70 °C

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 mm² to 6.0 mm² (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 mm² (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

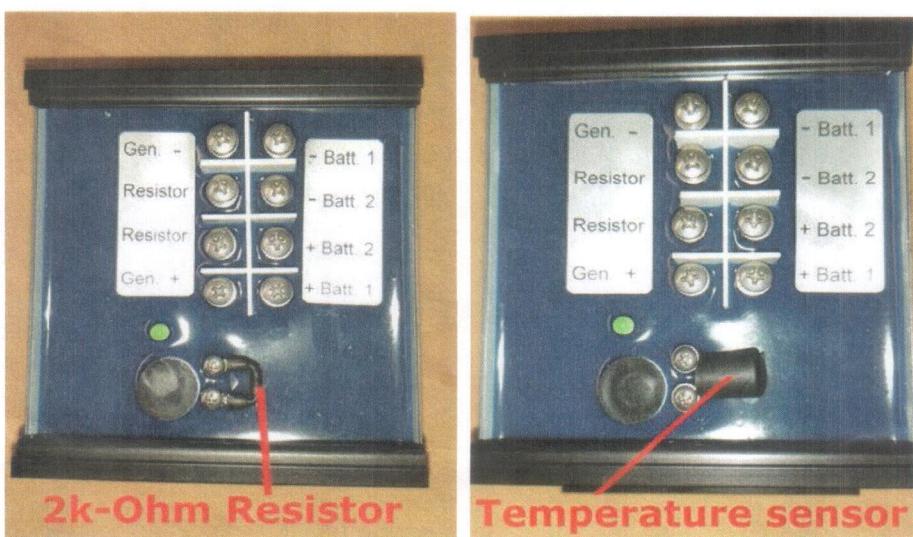
You may connect just one battery or two batteries to the SCR Marine. Use the terminals + Batt. 1 and - Batt. 1 to connect your first battery and use the terminals + Batt. 2 and - Batt. 2 to connect your second battery. If two batteries are connected, they are charged independently and are protected from 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.

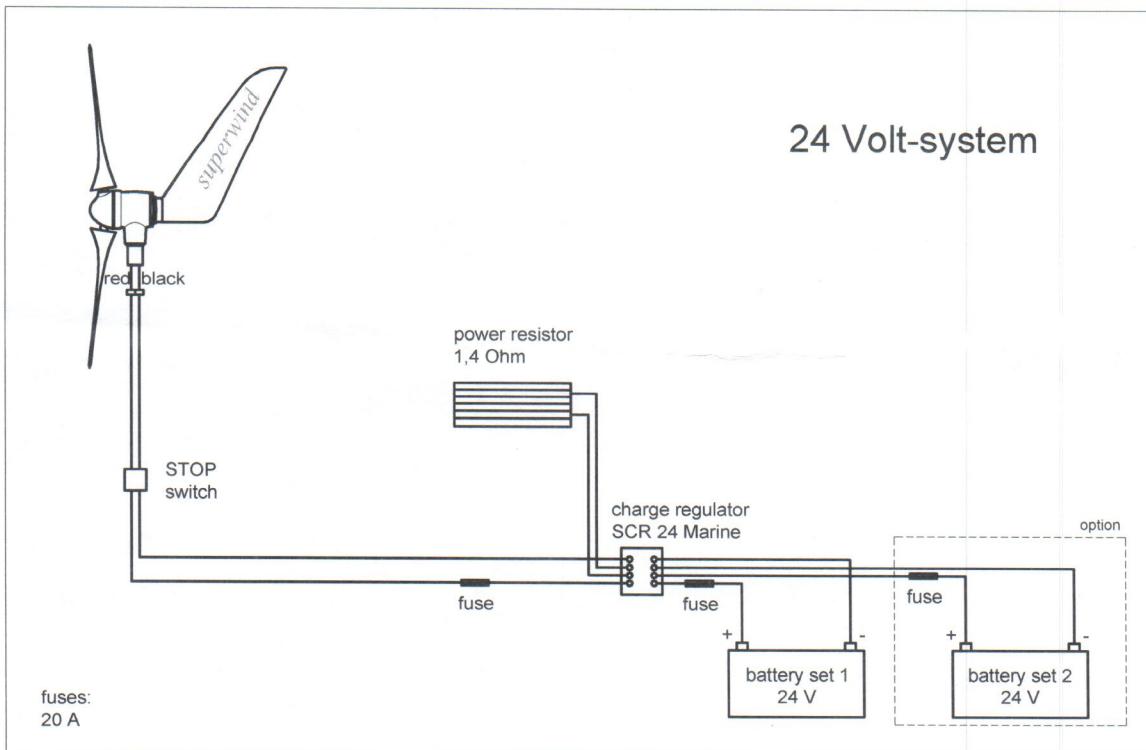
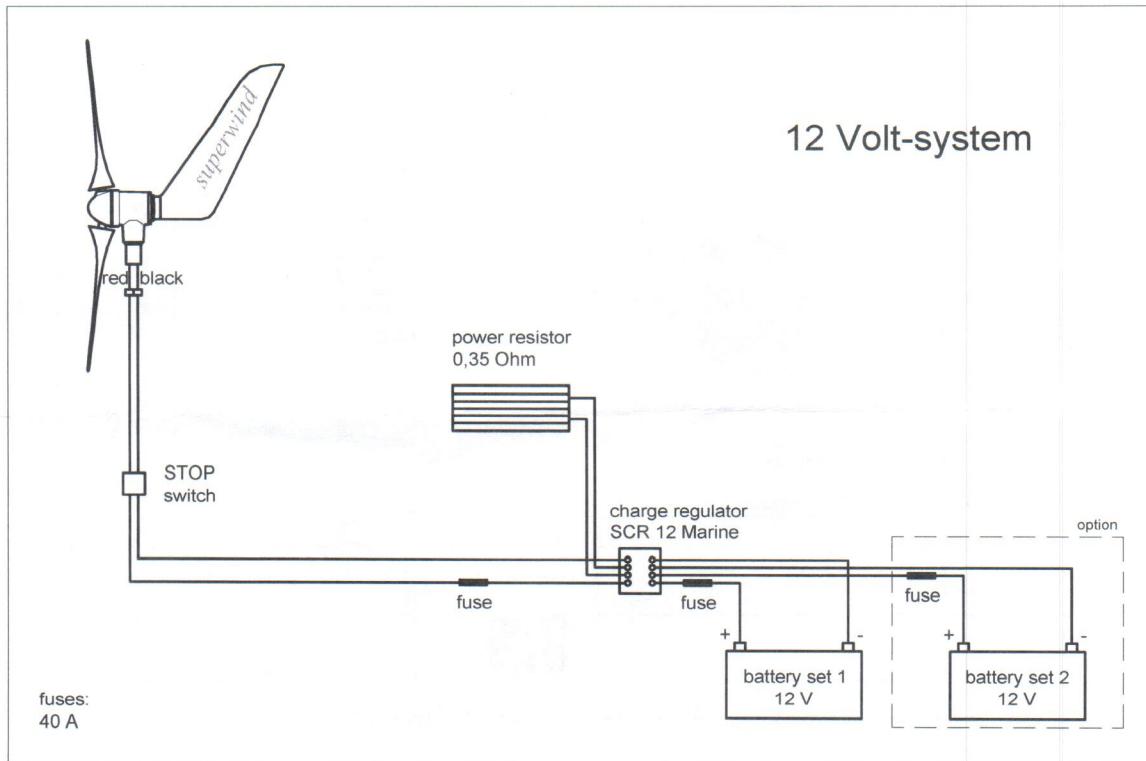
NOTE: Do not run the SCR-Marine regulator without temperature-sensor nor 2k-Ohm resistor connected.

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.

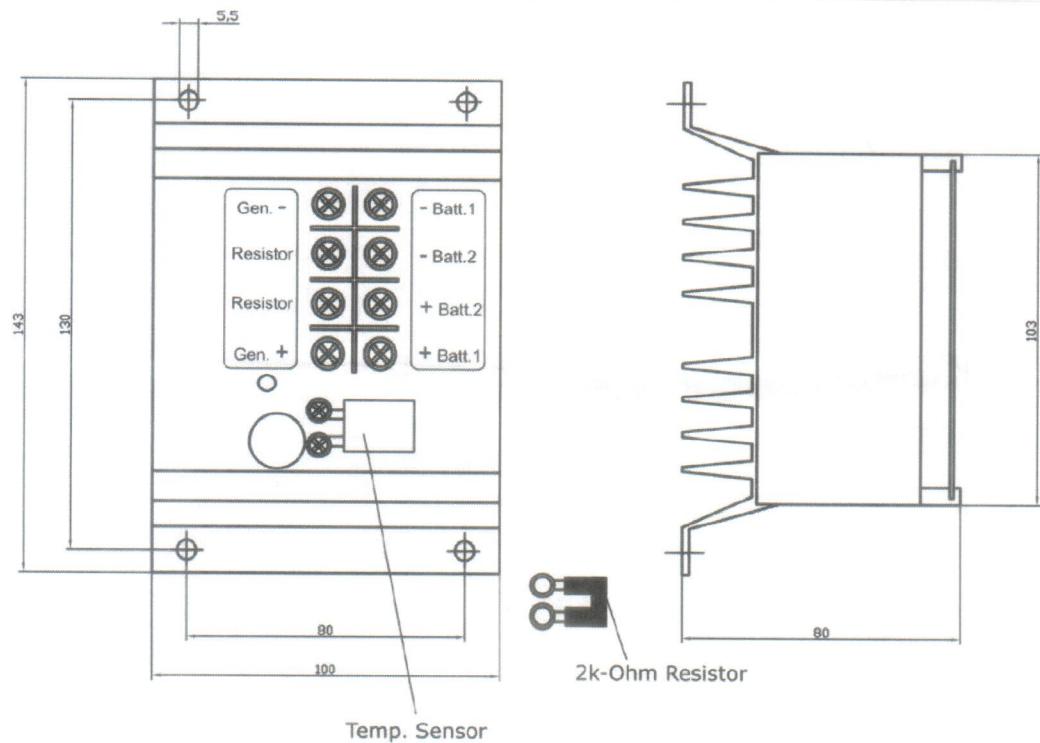
To ensure that this setting is also applicable for your battery type, please check the data sheet or contact the battery manufacturer.

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".

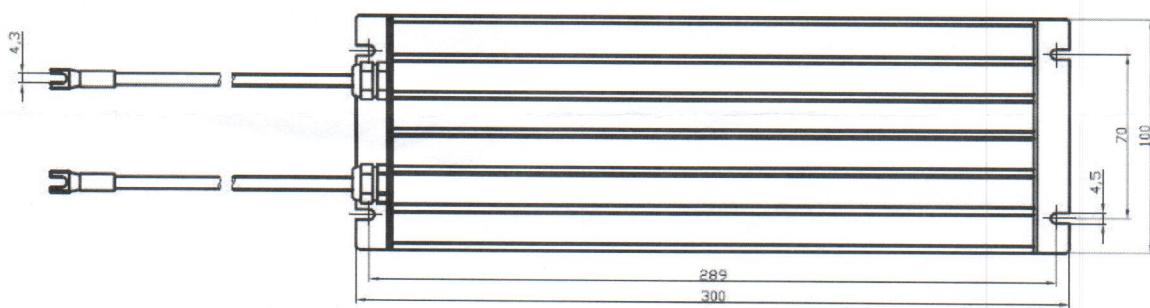
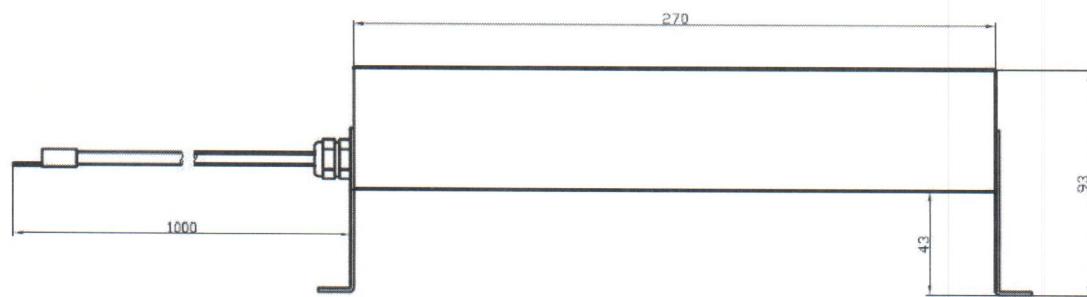
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Dimensions of the charge regulator:



Dimensions of the power resistor:





Warranty Card for Charge Regulator SCR Series

Model name and serial number:	<p>Charge Regulator SCR 12 Marine Nominal Voltage: 12 VDC Factory Setting: 14,4 VDC max. Dump Current: 40 A Serial No.: 3104 1240 superwind GmbH, Brühl Made in Germany</p> 
Dealer and stamp:	
Date of purchase:	
Name and address of customer:	

superwind GmbH warrants this product to be in good working order during the warranty period. In the event that the product is found to be defective within the warranty period repair service will be provided free of charge by superwind GmbH or an authorised service partner.

Free repair service may be obtained only against presentation of the warranty card together with the original invoice issued to the customer by the retailer. The warranty card must state the purchaser's name, the retailer's name and address, the serial number and the date of purchase of the product. superwind GmbH reserves the right to refuse warranty service if this information is not complete or has been removed or changed after the original purchase of the product by the purchaser from the retailer.

Warranty period

The warranty is valid for three years from the date of purchase by the purchaser, as evidenced by the above mentioned documents.

To obtain warranty service

Warranty service is available at superwind GmbH and superwind authorized service partners. Any costs of secure transportation of the product to and from superwind GmbH / superwind authorized service partners will be borne by the customer.

Limitations

superwind GmbH does not warrant the following:

- Periodic check-ups, maintenance and repair or replacement of parts due to normal wear and tear.
- Defects caused by modifications carried out without superwind's approval.
- Defects caused by improper use, handling or operation, in particular defects caused by improper installation and connection or installation at inadequate places.
To obtain warranty service the purchaser has to provide evidence that the product has been installed correctly at an adequate place.
- Accidents or disasters or any cause beyond the control of superwind GmbH, including but not limited to lightning, flooding, fire etc.
- Costs for disassembly and reassembly of the product to enable shipment for warranty reasons.

Others

superwind GmbH reserves the right to decide whether the product or parts of it shall be repaired or replaced instead. In case neither repair nor replacement could be performed by superwind GmbH the purchaser solely will be entitled to cancel the purchase.

This warranty does not affect the purchaser's statutory rights under applicable national legislation in force, nor the purchaser's right against the retailer arising from the sales / purchase contract. In the absence of applicable national legislation this warranty will be the purchaser's sole and exclusive remedy, and superwind GmbH shall not be liable for any incidental or consequential damages for breach of any expressed or implied warranty of this product.

Besides apply the

GENERAL CONDITIONS FOR THE SUPPLY OF PRODUCTS AND SERVICES OF THE ELECTRICAL AND ELECTRONICS INDUSTRY

