SWI-TEC®

Manual

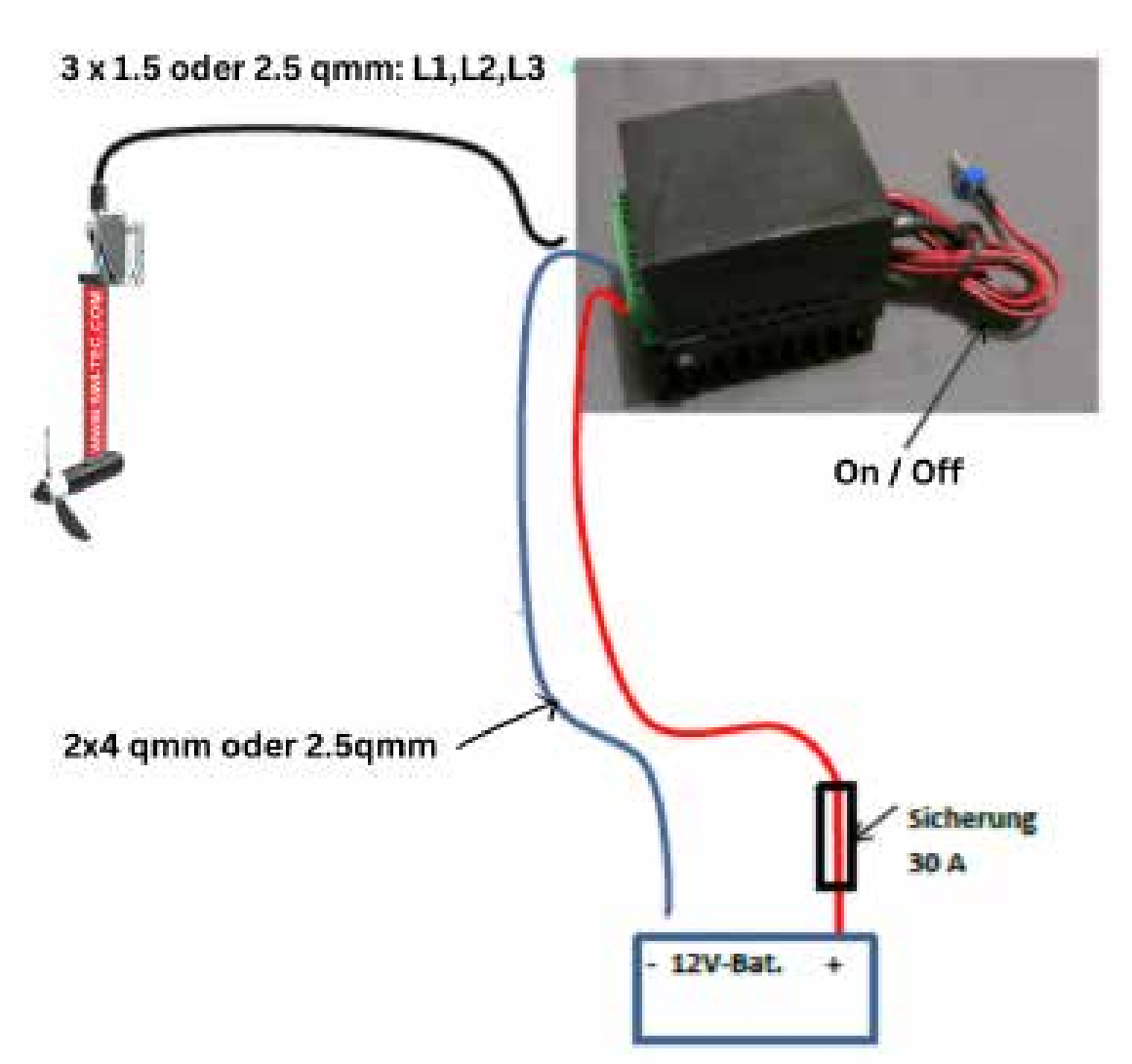
Android Regulator



Content

1. Electric Installation
2. Overview
3. Regulator Installation
4. OLED-Display-Installation (Accessories)
5. Android-App Installation
6. Bluetooth connection
7. Displays and Functions
8. Option „OLED-Display“
9. Display Indicator on Power-On
10. Setup-Menu
11. Display/Piezo Buzzer Messages
12. Technical Specifications
13. Warranty

1. ELECRIC INSTALLATION



Note: The „+BG“ port on the controller box must remain unused! (except in emergency mode, see Troubleshooting section)

The Hydro-Charger consumes no power when switched off via the remote control cable.

The Hydro-Charger electronically limits the charging current to a value set in the setup (default is 12 A) and is internally protected by a 25 A automotive mini fuse.

The external 30 A fuse located near the battery protects against a potential short circuit or wiring fault between the battery and the controller.

Important: The controller should always be switched on before the hydro generator is in the water.

Never disconnect the charging line while the generator is running! If, for example, you need to switch to a different battery bank during charging, the hydro generator must be removed from the water during the switchover.

The controller is not waterproof. Therefore, install it in a dry location.

The positive and negative battery leads must have a sufficient cross-section (at least 2.5 mm²) and should be kept as short as possible.

A poor connection to the battery can cause various error messages and should be avoided.

When the final charging voltage is reached, the Hydro-Charger automatically regulates itself and only supplies as much current as the connected on-board instruments require.

3. REGULATOR INSTALLATION

Mounting is done using the included brackets.

The heatsink should be well-ventilated. Ideally, it should be mounted so that the cooling fins are vertical, allowing the resulting airflow to provide better cooling.

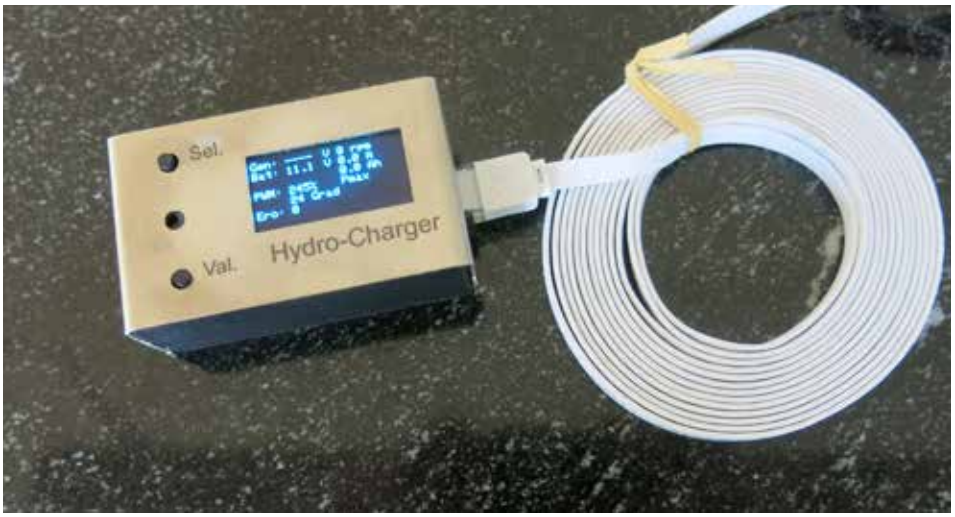


4. OLED-DISPLAY-INSTALLATION (Accessorie)

An external OLED display can be optionally connected to the Hydro Charger via a flat network cable.

The standard cable length is 3 m.

Longer cables up to 7 m are available (special order).



An external OLED display can be optionally attached to the Hydro Charger. The OLED display has double-sided adhesive tape on the back for mounting.

When attaching/pressing the display, do not apply any pressure to the OLED window, as the display glass is very thin and easily breakable.

5. ANDROID APP INSTALLATION

Download the Android app file Hydro-Charger.apk to an Android smartphone and start the installation by tapping the file.

The app icon will appear on your smartphone after successful installation.



6. BLUETOOTH CONNECTION

Important: Before the app can connect to the controller, Bluetooth pairing must be performed on your smartphone. Use your smartphone‘s Bluetooth function for this. After successful Bluetooth pairing, the Hydro Charger app can establish a connection for data exchange.

To do this, tap the „Connect“ button and select the Bluetooth device from the list of paired devices. Upon successful connection, the button will change from red to green and the text „Connected“ will appear.

The Hydro Charger will appear with the name SC_xy (xy = controller serial number):



7. DISPLAYS AND FUNCTIONS

After a successful connection, the app displays the system‘s online data.

Important: All buttons only respond to a long press and vibrate, with the exception of the Connect and Disconnect buttons.

A long press of the „Help“ button in the upper right corner, next to „Disconnect,“ provides help for all operating functions. Pressing it again disables the help text.

The help text appears at the bottom of the window.



8. OPTION „OLED-DISPLAY“



9. DISPLAY INDICATOR ON POWER-ON

The controller software version appears on the display at startup.

The controller fan briefly activates during power-up for a function check.

A short beep on the display indicates a sound test.

The Sel button toggles the display between battery values and system values (expert mode).

BATTERIE LEVEL DISPLAY



System values (expert mode)
Generator voltage (only if higher than the battery voltage, otherwise „----“)
Battery voltage and charging current of the hydrogenerator, amount of Ah fed into the system
Turbine speed
PWM value of the controller
Controller status: U_L: Voltage limit to UBat-Max
I_L: Charging current limit to IGen_Max
Controller temperature: Fan starts at 42 °C
Ero: Error display of the last error

The Ah counter (total amount of Ah fed into the system) can be reset using the Val. button.
A long press is required to reset until „done“ appears as confirmation.
The counter starts at zero after each display restart.

Notes:

Generator voltage U_Gen: Voltage after the bridge rectifier at the input of the step-down converter.

Note: If the voltage is lower than the battery voltage, „----“ appears.

Charging current: During generator operation, the charging current is subject to constant fluctuations due to sea state and sailing conditions. Therefore, the charging current is displayed filtered with a low-pass filter.

PWM duty cycle: This defines the operating point of the hydro generator. The value in % is the duty cycle of the step-down converter‘s internal pulse-width modulation. It corresponds to the percentage of time the hydro generator is switched on. The smaller the value, the faster the turbine rotates. At a very low duty cycle, the charging current is reduced to zero, and the turbine idles. The maximum charging current is typically slightly below 245%.

Display	**Meaning**
Pmax	The turbine operates at the set maximum power point.
U_L	Voltage Limiting Controller Mode: The duty cycle is reduced once UBat-Max is reached. The hydro generator then only supplies as much energy as the onboard systems require.

Display	Meaning
I_L	Charging current limitation mode: The duty cycle is reduced to avoid exceeding IBat_Max or IGen_Max.
Gout	The warning buzzer sounds and the message “take out Gen” indicates that the hydrogenerator must be removed from the water because the battery is fully charged.
UGen_L	If the voltage exceeds 50 V, the controller switches off the charging current and goes into idle mode. At 100 V, a message indicates that the turbine must be removed from the water. Should this occur, the propeller pitch should be increased. Contact SWI-TEC!

10. SETUP-MENU

1. Pressing the Select and Value buttons simultaneously opens the setup menu.
2. Use the Select button to choose adjustable parameters.
3. Use the Value button to change the selected parameter within the allowed limits.
4. Exit the setup menu by selecting „Quit and Save“ and pressing the Value button. The configured values will then be saved permanently.

The following parameters can be changed.

Display	Value	Meaning
“UBat_Max”	13.8 – 15.0 V(default 13.8 V)	Charging cut-off voltage in V, above which the duty cycle is reduced by the controller.
“IBat_Max”	5 … 20 A (default 12 A)	Maximum charging current in A, above which the duty cycle is reduced. The controller should not operate at its maximum value continuously! If this occurs, the propeller pitch must be increased.
“PWM_Max”	(default 245)	Maximum duty cycle in %, this allows the MaximumPowerPoint of the charging operation to be set; the typical value is slightly below 245%.
„Rbat“	0 - 10 (default 2) 0: Funktion ausgeschaltet	The UBat. voltage measured at the controller output is corrected depending on the charging current IBat to compensate for the voltage drop in the charging line to the battery. The correction value in volts is calculated using the formula: -IBat*Rbat/32 (e.g., IBat = 10 A and Rbat = 2 results in 10*2/32 = -0.625V as the correction value for the UBat voltage) If the UBat voltage measured at the controller deviates from the actual battery voltage at higher charging currents, this can be corrected using this parameter.
„Set Default Values“		Resets the controller to its default values.

Display	Value	Meaning
“Quit and save”		Exit the setup menu **using the Value. key.**
„Error-History“		Displays the error history (frequency and order of the last 6 errors) when the Val. key is pressed. **These cannot be deleted.**

11. OPTION OLED DISPLAY

Error messages are signaled audibly with 5 warning tones from the piezo buzzer. The corresponding information appears on the display. The messages appear cyclically until the error no longer occurs. Each message is logged and counted in the EEPROM. This allows for retrospective tracking of how often each message occurred.

Important: If the warning buzzer sounds repeatedly, the hydrogenerator should be brought up to speed! There is a risk of damage to the hydrogenerator or the battery!

“Overtemp TPWM”“Take out Gen!!!”	The controller electronics have reached their upper temperature limit.
“Overvoltage Gen”“Take out Gen!!!”	The generator voltage has reached the upper limit (e.g., when the regulator switches off and the turbine is idling).
“Overvoltage UBat”“Take out Gen!!!”	The battery voltage is too high
“Bad Bat.-Connect “ “Take out Gen!!!”	The charging connection to the battery is faulty and the charging power cannot be delivered. This could also be due to an internal fault in the electronics.
“Bat nearly full” “Take out Gen!!!”	The controller has reduced the output to the lower PWM limit. The hydro generator is barely delivering any charging power and is idling unnecessarily.
“Overload I_Gen”	The upper charging current limit has been significantly exceeded. The hydrogenerator must be throttled back or removed from the water entirely.

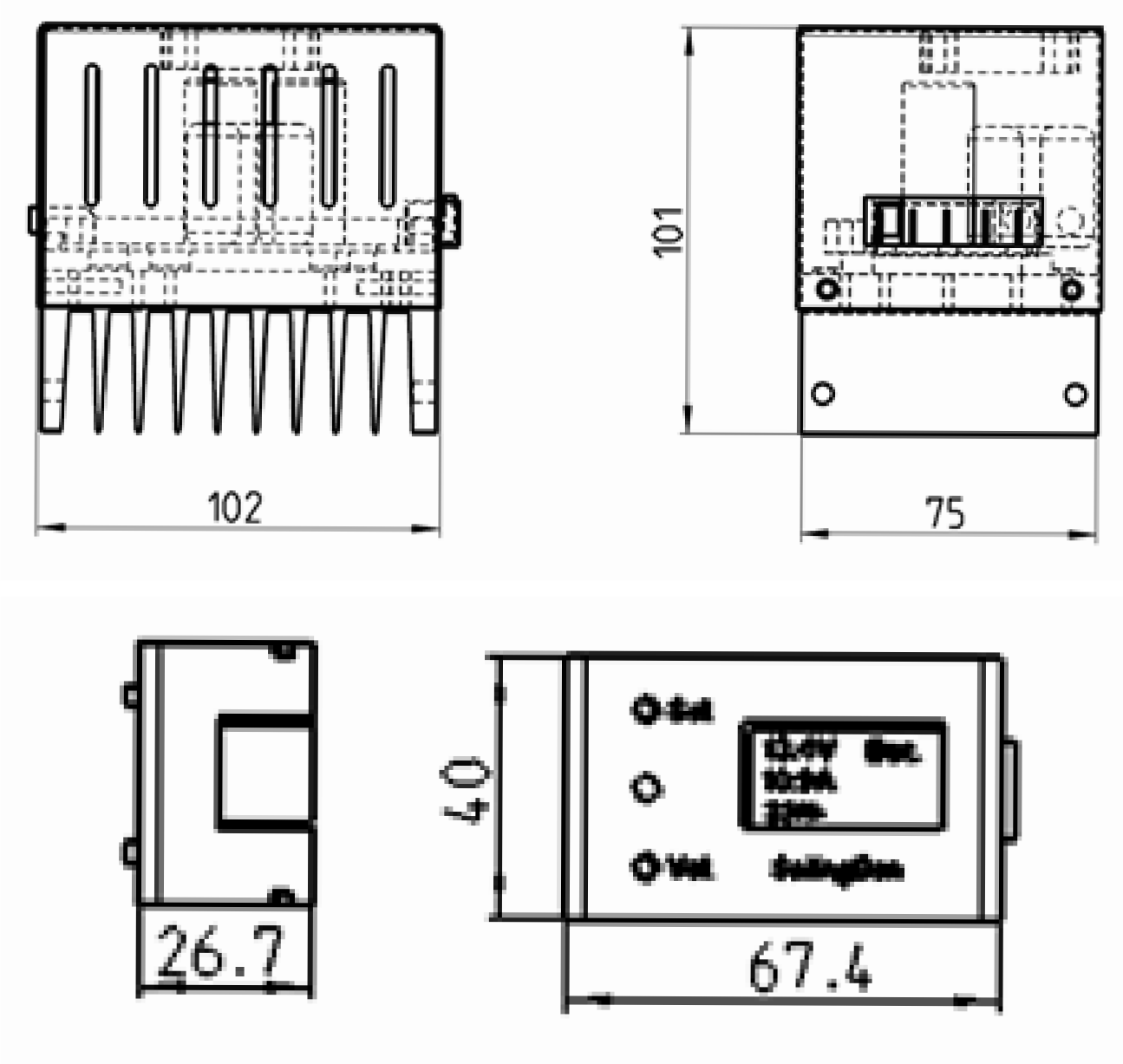
Emergency operation:

Should the Hydro-Charger fail en route, the Hydro-Generator can also be operated without its regulator function, provided the bridge rectifier is still intact. To do this, simply disconnect the „+Bat“ terminal on the Hydro-Charger and connect it to the „+BG“ terminal (the output of the bridge rectifier).

The Hydro-Generator is then directly connected to the battery after its internal rectification stage. You will need to monitor the battery voltage yourself. The rectifier function is also available when the controller is switched off!

12. TECNICAL SPECIFICATION

Dimensions (all dimensions in mm)



Cable length between power module and OLED display: 3 m standard,
Special order up to a maximum of 7 m

Electrical Specification:

Electricity demand	30 - 40 mA depending on display brightness; 0 mA when switched off (remote control switch in OFF position)
Maximum charging current	20A (electronically limited)
Battery charging voltage	12 V or 24 V
Charging voltage	Programmable in 0.1 V increments between 13.8 V and 15 V

13. WARRANTY

SWI-TEC warrants that this product, when used normally and properly maintained, will conform to the applicable specifications for a period of two years from the date of purchase by the end user. Any component that proves to be defective during this two-year period under normal use will be repaired or replaced by SWI-TEC at its discretion.

CONDITIONS AND LIMITATIONS
SWI-TEC‘s liability is limited to the repair or replacement of parts of the product that exhibit defects in materials or workmanship.

SWI-TEC shall not be liable in any way for product failure or any resulting loss or damage caused by:
a) improper or inadequate installation of the product
b) any modification or alteration of the product
c) conditions that exceed the product‘s performance specifications or permissible working loads.

Products for which a warranty claim is made must be returned to SWI-TEC unless SWI-TEC has agreed otherwise in writing.

This warranty does not cover incidental costs incurred for the inspection, removal, shipping, transport, or installation of the product.

Service performed by anyone other than SWI-TEC will void this warranty.

EXCLUSIONS
The warranty is limited to a period of one year from the date of purchase by the end user for the following product parts: electrical components, electronic controls, weatherproof seals, and products used in racing applications.

LIABILITY
SWI-TEC‘s liability under this warranty is to the exclusion of all other warranties or liabilities (to the extent permitted by law). In particular, but not limited to:

a) SWI-TEC is not liable for:
any loss of anticipated sales or profits, or for indirect, consequential, or economic damages;
damages, costs, or expenses payable to third parties;
damage to yachts or equipment;
death or personal injury (unless caused by SWI-TEC‘s negligence).

Some states or countries do not allow the exclusion or limitation of incidental or consequential damages. Therefore, the above limitation or exclusion may not apply to you.

b) SWI-TEC makes no further warranties regarding the suitability for a particular purpose, usability, nature, or satisfactory quality of the product.

SEVERABILITY CLAUSE
If any provision of this warranty is held to be invalid or unenforceable, in whole or in part, by a court or other competent authority, the validity of the remaining provisions and the remaining part of the provision in question shall remain unaffected.

DISPUTES
All disputes arising from this warranty shall be submitted to the court in Porto Cristo.