

# PHOTOVOLTAIC CHARGE CONTROLLER

*RSD50v2*



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### ***DESCRIPTION***

The SOLÉNER RSD50v2 charge controller has been designed and manufactured by SOLUCIONES ENERGÉTICAS, SA to control the battery charge in isolated photovoltaic installations. Its reliability, versatility and ease of use make it an ideal equipment for home systems. It is compact and easily installed. Among its characteristics it stands out:

- Allows you to change the language between Spanish, English, French and Portuguese
- Automatic bi-voltage for the 12/24 V model and fixed for the 48 V model
- Protection against overload and short circuit, with automatic reset by time
- Acoustic alarm, which can be temporarily stopped by pressing a key
- Protection against reverse polarity on panels and battery
- Protection against surge surges in panels, battery and consumption
- Protection against battery disconnection
- Tropicalization of the circuit
- Temperature compensated by external probe
- Low battery consumption disconnection with automatic reset
- Selectable beacon function

### ***INSTALLATION***

Pay attention to the connection polarity. It is important to follow the following connection order:

- Battery connection; some LED should light up, if they do not please check battery polarity
- Connection of photovoltaic panels
- Connection of loads

For disconnection reverse steps order.

Tighten the terminals firmly using a good quality screwdriver with appropriate size, otherwise the current flow will heat excessively the terminals, burning the contacts. After two or three days, tighten them again (the copper deforms slightly over time).

Although the regulator is protected against disconnection of the battery, it is recommended not to disconnect it without having previously disconnected the panels, since the charges can be damaged.

The regulator has a temperature probe hanging from the bottom side. Said probe must be free and must not be connected anywhere.

Sixty-cell modules **ARE NOT SUITABLE** for battery installations. 12-volt systems should use modules with 36 to 40 cells, while 24-volt systems need modules with 72 to 80 cells (or two modules for 12 V in series). Following this criteria, modules for 48-volt systems should have 144 to 160 cells.

## ***FUNCTIONING***

The regulator uses a three-phase charging system (gassing, equalization, and floating); the initial charge phase is the gas phase, which ends when the battery voltage reaches the value specified by the manufacturer, passing to the floating phase. During the float phase an attempt is made to keep the battery voltage within the specified band for float. If the battery voltage falls below that specified for re-gassing, it returns to the gassing phase.

The equalization phase can be activated manually using the menu, but is also activated when the regulator cuts due to low battery. Once started it ends by manual cancellation or when the battery voltage is greater than or equal to the lower equalization for the time specified in parameter P<sub>03</sub>.

In closed batteries there is no equalization phase.

The intelligent diode blocks current flow from the battery to the panel during the night, keeping low power losses in normal operation. Its action is not instantaneous, please do not make assumptions about its operation.

When the alarm is triggered by low battery voltage, the regulator warns the user (using the LED and the buzzer) that the consumption will be disconnected shortly, so the user must decrease or disconnect consumption if he wishes to extend the functioning.

If the battery voltage is excessive the high alarm is triggered, indicating that there is a problem in the installation (battery without electrolyte, bad jumpers, loose connections ...). If it occurs, immediately inform your installer.

There is a function that tries to detect problems in the installation, if you see that the resistance of the circuit is excessive (due to fine cables, rust, lack of tightness or problems in the battery) it will warn on the screen so that it can be corrected.

## ***SETTING***

The regulator has three keys that allow access to the menu. The lower one is similar to the *Enter* key from computers, used for option selection or parameter saving. The other two change functions depending on where they are, working as cursor or escape keys.

The initial menu is accessed pressing the *Enter* key. This menu allows language change, clearing partial counters, starting or canceling an equalization cycle, entering the service menu or executing a maintenance command.

To enter the service menu the initial password is 0000; you can change it once you enter, but don't forget to write it down (you can do it in the box below) if you want to enter again later. In case you lose it, you will have to call us to unlock it.

Password

The service menu allows you to change the password, modify the battery parameters  $B_{xx}$ , the general parameters  $P_{xx}$ , reset the controller or reload the factory values in all the parameters.

The maintenance commands are codes created by the SOLÉNER technical department to be able to modify the behavior of the regulator or check its status without the need to send it to the factory (for example, over time the components derive, forcing

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changes to the calibration parameters, not accessible to the user). DO NOT attempt to enter invented codes or codes from other devices, as they may render the regulator unusable.

If 15 seconds pass without pressing keys while in the menu or editing a parameter, the action is canceled, going to the top-level menu or losing the entered value.

A quick method to restart the controller without having to go to the menu is to press all three keys simultaneously.

The menu tree is as follows:

**Language**  
**Spanish**  
**English**  
**French**  
**Portuguese**  
**Reset counters**  
**Equalization**  
**Service**  
**Change Password**  
**Battery**  
**Parameters**  
**Restart**  
**Factory values**  
**Maintenance**

## **DISPLAY AND LED**

The controller's liquid crystal display (LCD) offers the user abundant information on the status of the photovoltaic system. Normally the information changes automatically every few seconds (depending on the value of parameter P<sub>00</sub>), but if you press the advance button you can change it at will, keeping the information for a longer time.

To reduce power consumption, the screen brightness automatically lowers when time passes without pressing keys; this time can be changed using parameter P<sub>01</sub>.

The status of the system is also indicated by the color of a LED and its status (steady or flashing).

Colour	Permanent	Flashing
RED	Low battery cutout output	Low voltage alarm
YELLOW	Equalization phase	Gassing phase
GREEN	High voltage alarm	Float phase
BLUE	Short circuit	Overload
WHITE	Reserved	Self diagnosis error

## **BEACON FUNCTION**

The beacon function activates the output stage only at night, so you cannot make normal use of the consumption output. It is intended for street lights, beacons in repeaters or similar applications. To avoid confusion, after activating the beacon function (using P<sub>09</sub>) the screen reminds that this function is active.

## **USB CONNECTION**

Allows the controller to be connected to a host to extract information or configure it; the controller will appear as a virtual serial port. This is achieved using text commands, the protocol is in [https://www.solener.com/rsd50v2\\_protocolo.pdf](https://www.solener.com/rsd50v2_protocolo.pdf). The driver for Windows 7 and later is in <https://www.solener.com/rsd50v2.inf>; For Linux with kernel  $\geq 3.0.0$  no driver is required, and it usually appears as ttyACM0.

## **PARAMETERS**

Parameter	Description	Minimum	Factory	Maximum	Units	Notes
P <sub>00</sub>	Time between screens	2.0	4.0	19.9	s	
P <sub>01</sub>	Screen saver	10	60	3600	s	
P <sub>02</sub>	Deactivation of the acoustic alarm		No			No, Yes
P <sub>03</sub>	Equalization time	10	300	3600	s	
P <sub>04</sub>	Potential-free contact function	0	0	23		See next table
P <sub>05</sub>	Lower voltage setpoint	1,800	2,000	P <sub>06</sub>	V/elem	See next table
P <sub>06</sub>	Higher voltage setpoint	P <sub>05</sub>	2,100	3,000	V/elem	See next table
P <sub>07</sub>	Lower current setpoint	0	15.0	P <sub>08</sub>	A	See next table
P <sub>08</sub>	Upper current setpoint	P <sub>07</sub>	35.0	99.9	A	See next table
P <sub>09</sub>	Beacon function		No			No, Yes

*Parameters*

Value	Contact function
0	It closes when the group must be running
2	It closes at night (beacon)
4	It closes when the low alarm is triggered
6	It closes when the high alarm is triggered
8	It closes when the battery is charged (the float phase is reached)
10	It closes when the battery voltage exceeds P <sub>06</sub> and opens when it drops below P <sub>05</sub>
12	It closes when the battery voltage is between P <sub>05</sub> and P <sub>06</sub>
14	It closes when the load current exceeds P <sub>08</sub> and opens when it drops from P <sub>07</sub>
16	It closes when the charging current is between P <sub>07</sub> and P <sub>08</sub>
18	It closes when the consumption current exceeds P <sub>08</sub> and opens when it drops from P <sub>07</sub>
20	It closes when the consumption current is between P <sub>07</sub> and P <sub>08</sub>
22	It closes when the group must be on and it is night

*To achieve the opposite effect, add 1 to Value; thus, if Value = 3 the contact is closed at daylight*

## **BATTERIES**

	OPzS	OPzV	Traction	SOPzS	Gel	LiFePO4
HIGH VOLTAGE ALARM	2,625	2,583	2,625	2,650	2,542	2,450
EQUALIZATION BAND	2,450/2,500	2,433/2,467	2,450/2,500	2,330/2,400	2,450/2,500	2,440/2,445
GASSING	2,450	2,400	2,400	2,600	2,450	2,433
FLOATING BAND	2,300/2,400	2,283/2,317	2,300/2,400	2,250/2,300	2,300/2,400	2,417/2,433
GASSING START	2,103	2,083	2,103	2,103	2,103	2,400
LOW VOLTAGE ALARM	1,853	1,833	1,875	1,875	1,853	1,700
OUTPUT DISCONNECT	1,833	1,792	1,853	1,850	1,833	1,667
OUTPUT RECONNECT	2,167	2,167	2,167	2,167	2,167	2,133
TEMPERATURE COEF.	3.0	3.0	2.0	1.9	2.0	1.5
TECHNOLOGY	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED

*Preset voltages in volts per element at 25 °C. The temperature coefficient is in mV/(V · °C)*

If your battery is not in this table consult the manufacturer's data, enter the values in the parameters shown below and then select the battery *Custom* at B<sub>00</sub>. The factory settings for these parameters are the same of the OPzS battery.

Parameter	Description	Minimum	Factory	Maximum	Units	Notes
B <sub>00</sub>	Selected battery		OPzS			See previous table
B <sub>01</sub>	High voltage alarm	B <sub>02</sub>	2,625	3,000	V/element	At 25 °C
B <sub>02</sub>	Upper limit of equalization	B <sub>03</sub>	2,500	B <sub>01</sub>	V/element	At 25 °C
B <sub>03</sub>	Lower limit of equalization	B <sub>04</sub>	2,450	B <sub>02</sub>	V/element	At 25 °C
B <sub>04</sub>	Gassing voltage	B <sub>05</sub>	2,450	B <sub>03</sub>	V/element	At 25 °C
B <sub>05</sub>	Upper float limit	B <sub>06</sub>	2,400	B <sub>04</sub>	V/element	At 25 °C
B <sub>06</sub>	Lower float limit	B <sub>07</sub>	2,300	B <sub>05</sub>	V/element	At 25 °C
B <sub>07</sub>	Regasing voltage	1,900	2,103	B <sub>06</sub>	V/element	At 25 °C
B <sub>08</sub>	Output reconnect voltage	2,000	2,167	2,400	V/element	At 25 °C
B <sub>09</sub>	Low voltage alarm	B <sub>10</sub>	1,853	2,000	V/element	At 25 °C
B <sub>10</sub>	Output disconnect voltage	1,667	1,833	B <sub>09</sub>	V/element	At 25 °C
B <sub>11</sub>	Temperature coefficient	0.0	3.0	9.9	mV/(V · °C)	
B <sub>12</sub>	Battery technology		Open			Open / Closed

*Battery selection and configurable battery parameters*

## **FEATURES**

	Value
<b>LENGTH × WIDTH × HEIGHT</b>	160 × 193 × 35mm
<b>WEIGHT</b>	1.07 kg (including packaging and accessories)
<b>BOX</b>	Galvanized steel, baked epoxy painted
<b>TIGHTNESS</b>	IP32
<b>OPERATING TEMPERATURE RANGE</b>	-10 to +50 °C
<b>INTENSITY IN AND OUT</b>	50 A nominal, +5% maximum
<b>NOMINAL VOLTAGE</b>	12/24 V (with automatic selection) or 48 V, depending on model
<b>MAXIMUM PANEL VOLTAGE</b>	50, 60 or 105 V depending on how you work at 12, 24 or 48 V
<b>SELF-CONSUMPTION</b>	200 mW
<b>INTELLIGENT DIODE</b>	Yes
<b>USB CONNECTION</b>	Virtual serial port, miniUSB connector
<b>TELESIGNAGE</b>	Maximum 250 V and 120 mA (AC and DC), protected against overcurrent

All these data are correct at the time of writing except errors or omissions, they are not binding and are subject to change without notice. The latest version of this manual can be downloaded from [https://www.solener.com/rsd50v2\\_e.pdf](https://www.solener.com/rsd50v2_e.pdf).

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