

# SPC-1000

Advanced HYBRID controller for multi source solar systems with prioritizing



## Manual

Version 1.0

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## 1. Introduction

Dear customer, thank you for purchasing this product. The elgris SPC-1000 controller is a versatile product which can be used either in an elgris system or as a stand-alone product. By using a standard RS-485 MODBUS interface the elgris SPC-1000 controller can be easily integrated into other PLC or similar (larger) systems.

Specializing in products for generators and hybrid power solutions, the SPC-1000 controller offers the following features standard:

- Wide range power supply input from 6.5 - 32 V<sub>DC</sub>
- Small footprint.
- Intuitive software.
- Wide temperature range of -40° – +85°.
- Industrial PUR protection coating for extra rugged environment.
- IP-68 on request.

If you have any questions or if something is unclear, you can contact us in several ways:

Per E-Mail : [support@elgrispower.com](mailto:support@elgrispower.com)

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### 1.1 Version overview

The elgris SPC-1000 controller is available in more and also customized versions.

## 2. Installation

### 2.1 Safety instructions

Before installing the product in the end-installation, ensure that the device is not damaged during transport and everything looks in a normal way.

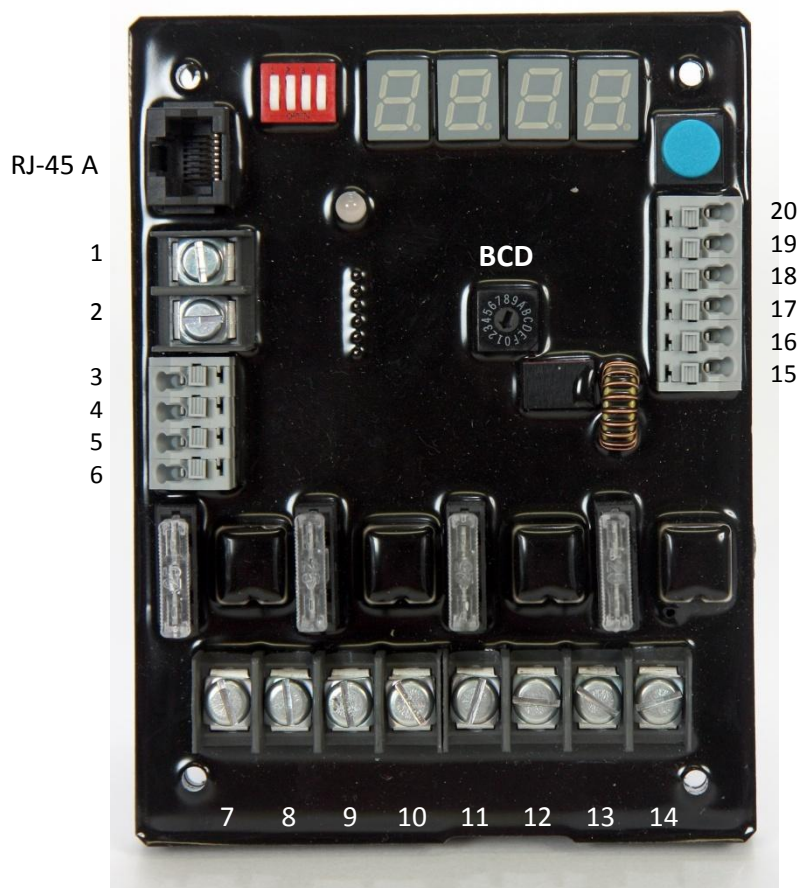
All the connecting cables must not be bent or squeezed. This can result in malfunctions, short circuits and defects in the device and/or sensor connected.

Make sure that cables are not damaged when drilling or bolting in place.

The module may only be commissioned after it has been installed contact-free in a casing. This product generates high frequency. Never operate it in the vicinity of medical devices (e.g. pacemakers) and/or medical equipment (e.g. in hospitals). Look for a suitable installation site.

### 2.1 Connection

Before wiring the device, be sure that the voltage is switched off.



## 2.2 Connection detail

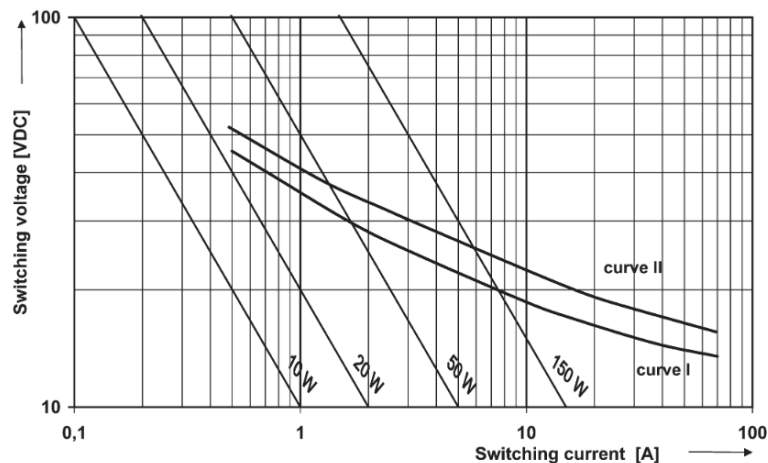
	Pin	Description	Minimum	Maximum
PV	1	Positive input from PV panel	0 V <sub>DC</sub>	100 V <sub>DC</sub>
	2	Output to charge controller	0 A <sub>DC</sub>	10 A <sub>DC</sub>
PT-100	3	PT-100 +	- 20 °C	120 °C
	4	PT-100 -	- 20 °C	120 °C
	5	PT-100 +	- 20 °C	120 °C
	6	PT-100 -	- 20 °C	120 °C
POWER IN - OUTPUTS	7	GND of the busbar	0 V <sub>DC</sub>	10 / 20 / 30 A <sub>DC</sub> – 24 / 48 V <sub>DC</sub> <sup>1</sup>
	8	Positive input 1 busbar	0 V <sub>DC</sub>	10 / 20 / 30 A <sub>DC</sub> – 24 / 48 V <sub>DC</sub> <sup>1</sup>
	9	GND of the busbar	0 V <sub>DC</sub>	10 / 20 / 30 A <sub>DC</sub> – 24 / 48 V <sub>DC</sub> <sup>1</sup>
	10	Positive input 2 busbar	0 V <sub>DC</sub>	10 / 20 / 30 A <sub>DC</sub> – 24 / 48 V <sub>DC</sub> <sup>1</sup>
	11	GND of the busbar	0 V <sub>DC</sub>	10 / 20 / 30 A <sub>DC</sub> – 24 / 48 V <sub>DC</sub> <sup>1</sup>
	12	Positive input 3 busbar	0 V <sub>DC</sub>	10 / 20 / 30 A <sub>DC</sub> – 24 / 48 V <sub>DC</sub> <sup>1</sup>
	13	GND of the busbar	0 V <sub>DC</sub>	10 / 20 / 30 A <sub>DC</sub> – 24 / 48 V <sub>DC</sub> <sup>1</sup>
	14	Positive input 4 busbar	0 V <sub>DC</sub>	10 / 20 / 30 A <sub>DC</sub> – 24 / 48 V <sub>DC</sub> <sup>1</sup>
User I/O	15	Load voltage input	0 V <sub>DC</sub>	100 V <sub>DC</sub>
	16	Opendrain output 1		50 mA
	17	+ Supply output	Busbar voltage maximum 100 mA	
	18	Opendrain output 2		50 mA
	19	PT-100 +	- 20 °C	120 °C
	20	PT-100 -	- 20 °C	120 °C

<sup>1</sup> Depending on the type of controller

## 2.3 Electrical ratings

The maximum load one single contact can carry is shown in the graphic below. Please note that high currents reduce the durability.

Max. DC load breaking capacity



Load limit curve I: safe shutdown, arc extinguishes during transit time.

Load limit curve II: safe shutdown, no stationary arc.

Load limit curves measured with low inductive resistors verified for 1000 switching events.

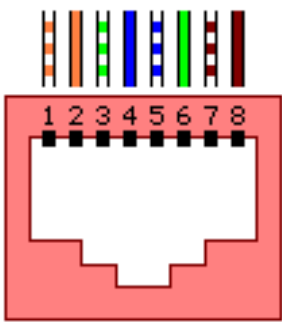
### 3.0 RS-485 connection

The SPC-1000 controller has a standard RS-485 or RS-232 serial interface. The settings are following:

- Address can be set with the dipswitch in decimal.
- 9600 Baud
- 8 bits
- No parity
- One stop bit
- MODBUS RTU mode protocol

The led will lid orange to indicate that there is transmission.

### 3.1 RJ-45 Pin out

	Pin	Description
	1	Not connected
	2	RS-232 TX
	3	RS-232 RX
	4	RS-485 B (D-)
	5	RS-485 A (D+)
	6	GND
	7	Not connected
	8	Not connected

### 3.3 Parameter overview

The following parameters are available.

Number	Description	Default	Minimum value	Maximum value	Read/Write
41001	PV voltage in				Read
41002	PV current in				Read
41003	PV power in				Read
41004	PV voltage out				Read
41005	PV current out				Read
41006	PV power out				Read
41007	Input 1 voltage				Read
41008	Input 1 current				Read
41009	Input 1 power				Read
41010	Input 2 voltage				Read
41011	Input 2 current				Read
41012	Input 2 power				Read
41013	Output voltage				Read
41014	Output current				Read
41015	Output power				Read
41016	PT100 1				Read

41017	PT100 2				Read
41018	MCU temperature				Read
41019	PT100 3				Read
41020	Bus voltage (external)				Read

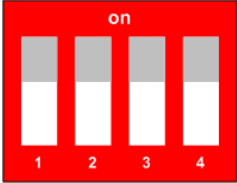
### 3.4 Parameter description

To be come

### 3.5 Dipswitches

There are four dipswitches on the SPC-1000 controller to select different communication channels and boot modes.

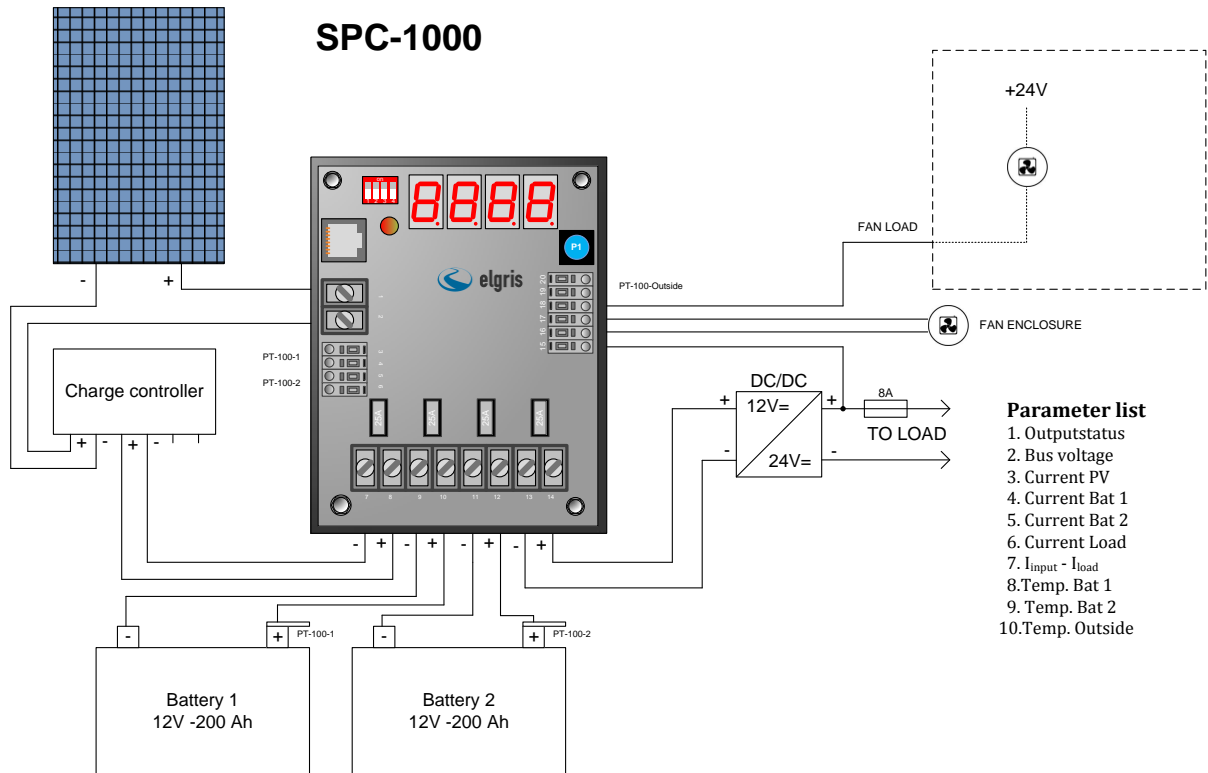
Please refer to the table below for a detailed description:

	Dipswitch	Description	
		ON	OFF
	1	120 Ohm Termination A – B	Open
	2	RS-485	RS-232
	3	RS-485	RS-232
4	Not used		

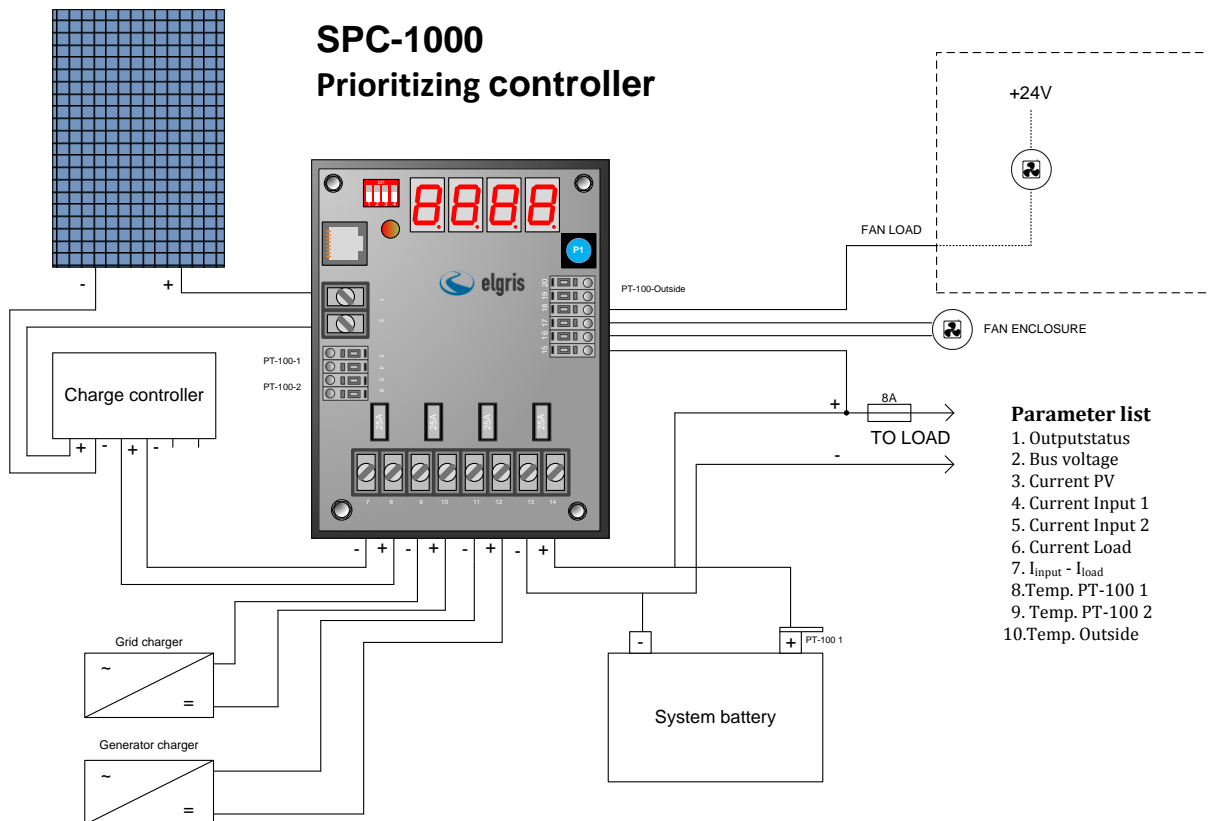
### 4.0 Commissioning

Before starting with the commissioning of the elgris SPC-1000 controller all safety precautions must be taken which apply to the rules in your country and general safety rules. Never work on a system with live power.

#### 4.1 Wiring diagram with 2 batteries



#### 4.2 Wiring diagram with PV, Grid, Generator and Battery





#### 4.2.1 Working principle

The controller measures all power parameters in the system. Depending on a predefined schedule, the controller switches the input source from the PV or the generator or the grid.

It is also possible to have two sources selected at the same time, when the PV for example is not capable of supplying the full load; either the grid or the generator can be used to support the load.

Depending on the settings, the grid and/or generator will be switched of when the PV power is being restored.