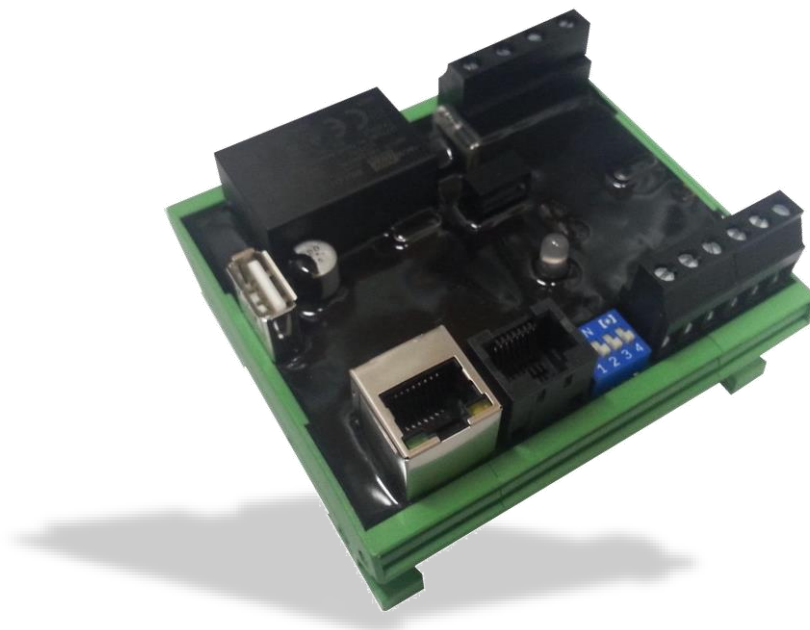# ZERO Export

"Universal ZERO export controller"

Manual

Version 0.1

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Table of Contents

1. Introduction

Dear customer, thank you for purchasing this product. The ZERO export controller is the first controller available on the market which can control up to 10 PV inverters with ZERO export.

The ZERO export controller has the following features

- Full 3 phase power measurements
- MODBUS RTU control
- MODBUS TCP control
- USB for data storage (depending on the version)
- User LED for status information
- Webserver for intuitive configuration and parametrisation

The following versions or modules are available:

- ZERO EXPORT
- MONITORING AND DATALOGGER
- POWER MANAGEMENT
- LOAD MANAGEMENT

This manual covers all versions. Version specific information is marked on version specific chapters.

Specializing in products for renewable energy, Diesel generators and hybrid power solutions, the ZERO export offers the following features standard:

- Wide range power supply input from 85 - 265 V_{AC} (50 - 60 Hz)
- 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

By Phone   :   +49 (0) 2423 9086501

2.   Installation

2.1   Safety instructions

Before installing the product in the end-installation, ensure that the device is not damages 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.

2.2   Device overview

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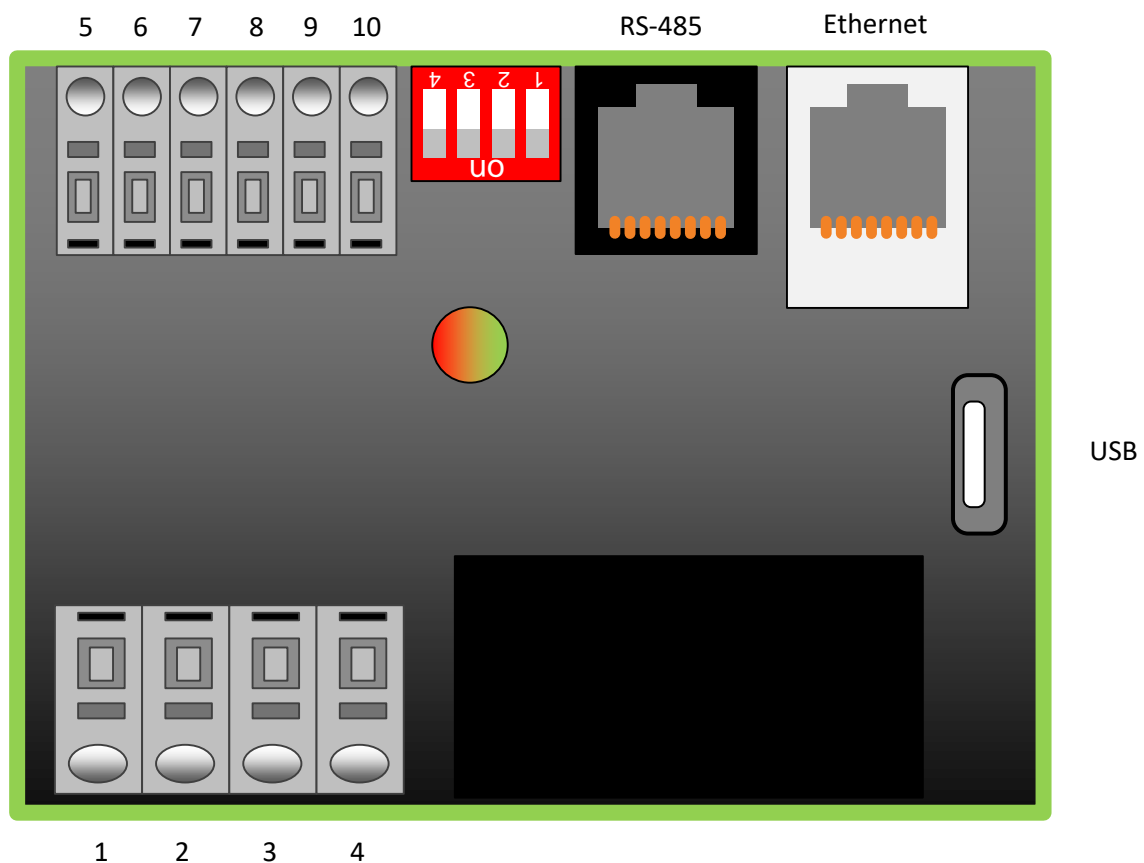
2.3   Pin description

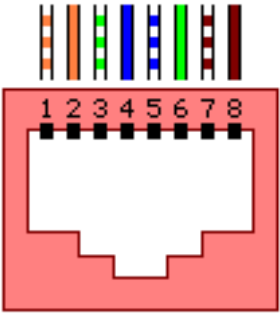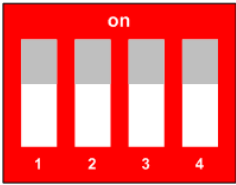|	Pin	Description	Minimum	Maximum
Voltage input	1	Phase 1 voltage input	85 Vac	250 Vac
	2	Phase 2 voltage input	85 Vac	250 Vac
	3	Phase 3 voltage input	85 Vac	250 Vac
	4	Neutral input of voltage		0 Vac
Power input	5	K input current transformer L1	0 Aac	5 Aac
	6	L input current transformer L1	0 Aac	5 Aac
	7	K input current transformer L2	0 Aac	5 Aac
	8	L input current transformer L2	0 Aac	5 Aac
	9	K input current transformer L3	0 Aac	5 Aac
	10	L input current transformer L3	0 Aac	5 Aac
Dipswitch	1	IP address selection	OFF = DHCP	ON = static
	2	System frequency	OFF = 50 Hz	ON = 60 Hz
	3	Single or Three phase	OFF = Three phase	ON = Single phase
	4	Internal use only	OFF = Default	

2.4   Wiring diagram
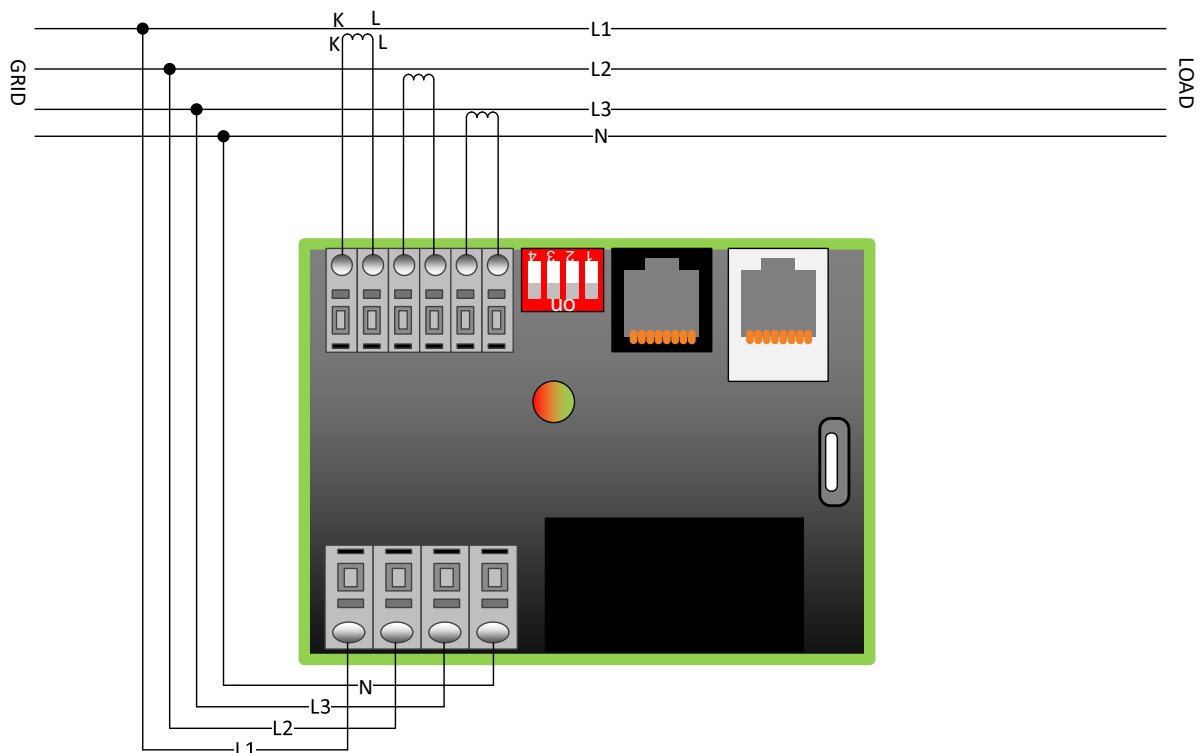
Please read the manual of the used inverter to check wiring scheme.

Note: Some inverters may need additional hardware

2.5   RS 485 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

2.6   Dipswitches

Dipswitch	Description	
	OFF	ON
1	DHCP	Static IP
2	50 Hz	60 Hz
3	Three phase	Single phase
4	Not used must be OFF	

2.7 LED status

The LED on board informs the user about the internal status.

LED colour	Meaning	Action
Off	No power or internal error	Contact support
	Internal Error	Contact support
	Date and time not set, no USB data logging possible	Update date and time or check internet connection for SNTP
	Standby, no inverter online	Check inverter settings
	Controller is throttling the PV	Normal operation
	Power management active	Normal operation
	Controller is not throttling PV	Normal operation

3   Commissioning

Before starting with the commissioning of the ZERO export 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 a running generator or connected grid and short the output of the generator (when available) before working on the power system.

Only a few settings are needed to commission the ZERO export controller.

Most important is the settings of the current transformer and the minimum setpoint of the generator.

3.1   First time power on

Follow the following steps when the system is first time being powered.
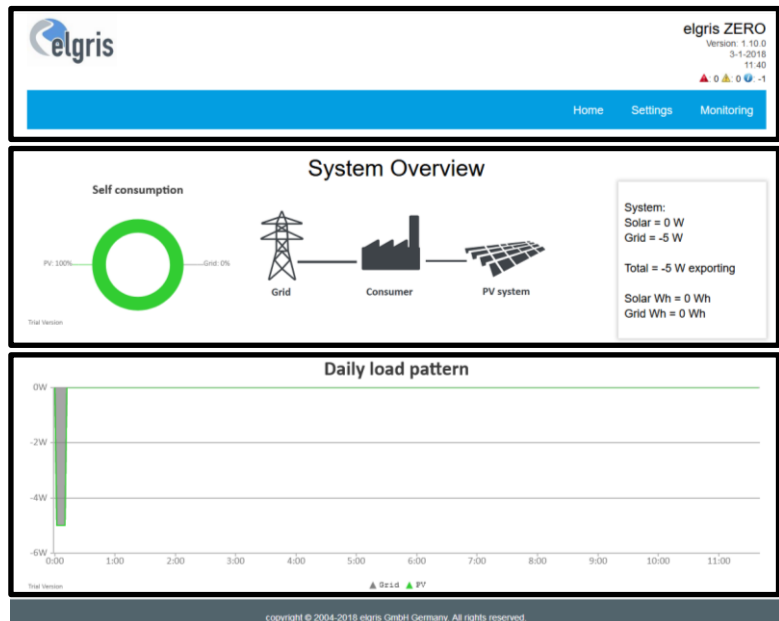
☞ Switch of the PV inverter, disconnect the PV inverter from the system and start the controller by applying power to L1 and N in case you use a single-phase system or L1, L2 and L3 with N for three phase systems. When the ZERO export unit is working properly, the LED is blinking green.

☞ Connect to the embedded webserver by typing the default address 192.168.1.100 in a web browser.

☞ On the Menu select Settings to adjust the CT ratio. The CT ratio is defined as 1: value. For example, when you have a CT 5:200 the value is 40.

☞ When the CT ratio is changed the power readings on the overview page should match the actual power. A positive value is consumption from the grid, a negative value means exporting to the grid. When this is not correct, check the wiring of K and L of the CT.

☞ Switch on the DC side of the PV system to commission the PV inverters. The steps to add an inverter to the system is explained on page 7.

4 Graphical User Interface

The ZERO export controller includes a webserver to adjust the system parameters and see the status of the system.

By default, the webserver can be reached by typing the IP address 192.168.1.100 in a web browser. Supported web browsers are Microsoft Edge, Google Chrome and Mozilla Firefox.
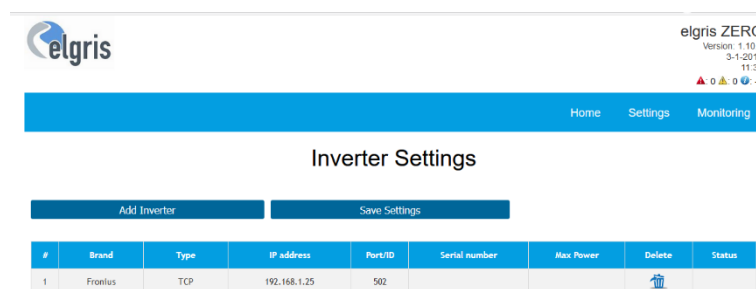
4.1 Overview

Header with status information and menu

Main area with system information

Daily chart with load and PV output

4.2 Inverter settings
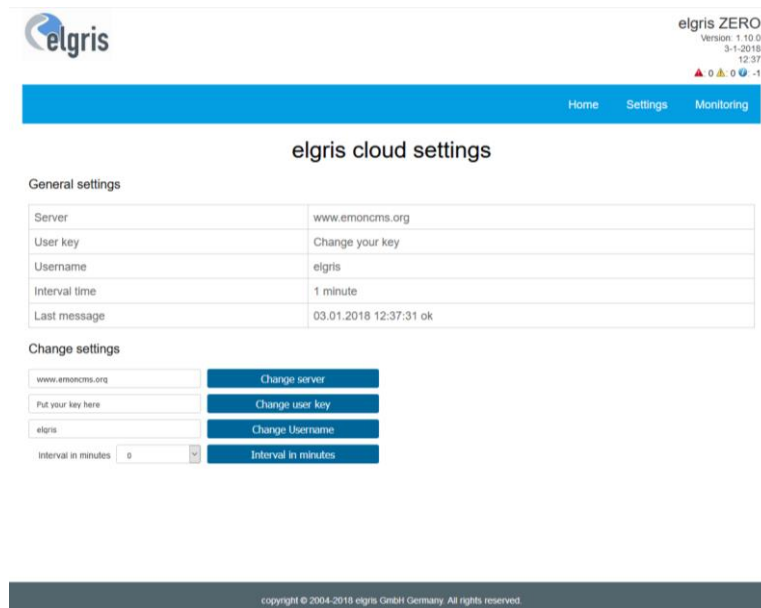
After selecting the brand of the inverter which needs to be controlled, the type of communication needs to be selected. Not all communication options are available for all inverters. Please refer to the inverter support list on the website www.elgrispower.com

When selecting TCP as communication, the IP address and MODBUS TCP port (Default 502) must be adjusted. When selecting RS 485 for communication, the MODBUS slave ID must be set and the serial port settings must match the inverter settings.

When all settings are correct they can be send to the inverter by pressing "Save settings". Up to ten inverters can be programmed by pressing "Add Inverter".

4.3 elgris cloud

With the elgris cloud you can store data on the open source platform emonCMS. This enables the user to have a cloud solution where all data can be visualised and transferred on other mediums.
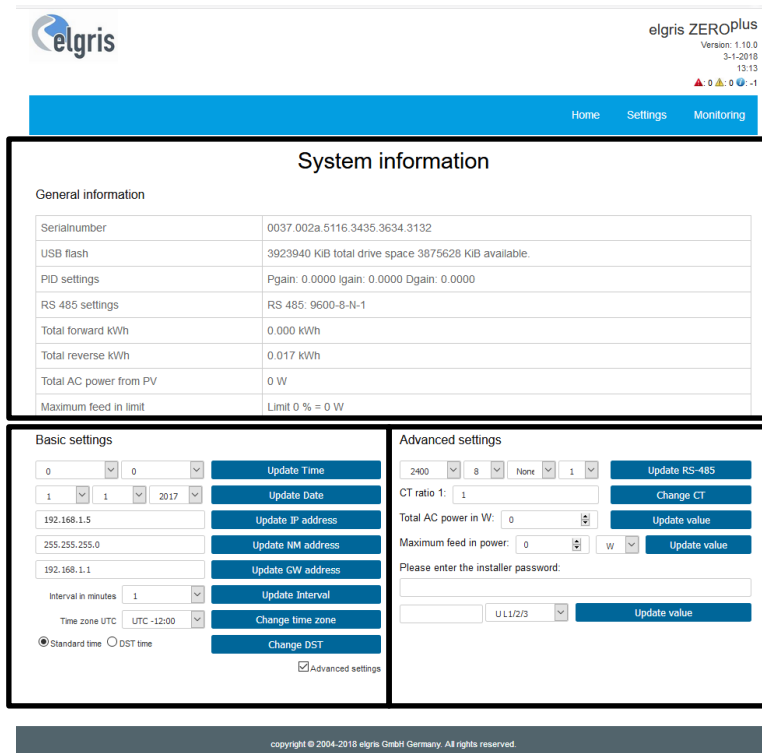
The emonCMS software can run on the open source server, a self-hosted server or local server like Raspberry PI.

To start logging, you must fill out the server address with its hostname, the user key for security and optional a user name when you want to log more data under the same account.
With the interval time you can set the time between each update interval. By setting the time to zero, the data logging to the remote sever stops.

The response of the communication is displayed as last messages. When everything is working fine, the message "Ok" will be displayed here.

4.4   System settings

On the settings page the main settings and parameters can be changed. To enable the advanced settings, the checkbox must be selected