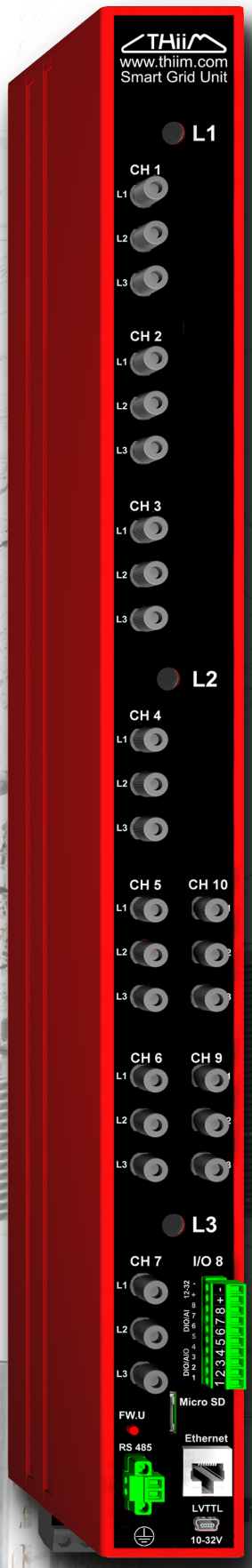


SGU

with

Optical CT Interface for Low and Medium Voltages

Smart Grid Unit

Now with Optional Digital and Analog I/O

SGU

In a Smart Grid Network you need to know if the network is OK, the amount of power and where the power is flowing. The SGU unit is designed to provide this information in an easy way on a real time basis.

The SGU can be configured with up to 10 I/O cards that can each either monitor 3 phases or be Analog/Digital I/O cards with each 8 I/O's. The shown version will measure Voltage, Current, Active and Reactive Power and the Direction of power in each of the up to 30 cables. Additionally frequency and the temperature in the central unit is monitored. The optional I/O cards can be configured as a mix of up to 8 DI/O, 4 AI/O or 8 AO.

For safety reasons, in order to avoid electrical hazards, the communication between the sensors and the main unit are carried out using optic fibres that can easily be cut to desired length. This optical real time communication is patented, and as the communication is digital and with automatic gain control, the optical link is uncritical and calibration proceduces are not nessesary.

The measured and calculated values are transmitted to a central computer for further evaluation in the Smart Grid Network. Protocols can be Modbus or IEC 60870-5-104 and communication modes RS 485 and Ethernet. Other types of communication can be implemented on request.

Advantages of the SGU

- **Class 1,0 measurement of RMS Voltage, RMS Current, Frequency and Temperature.**
- **Calculates Active-, Reactive-, Apparent power, cosΦ and the direction of power in each of the up to 10 x 3 cables.**
- **Forced data read-out intervals to build-in SD card can be set in intervals of X x 10sec. (10-20-30.....)**
- **Fast and easy installation without the need of special tools, even on "live" systems.**
- **No need for regular calibration.**
- **Reliable communication via RS485 or optional Ethernet.**
- **Analog and digital I/O cards each with 8 I/O's can substitute the 3 phase input cards.**
- **Setup is done through a simple web page interface.**

Measurement Principle

Sensors

The sensors are powered by the current in the cables they are attached to. No external power supply is needed. The sensor coil deliver a small energy, enough to activate the low power electronics in the sensor. At current rates 0,8- 2,5A, the sensor will send lightpulses with a slow rate, just to report that the fuse, wire, optical connection etc. are ok- no fuses blown. From 2,5A and up to 340A (680A) or 500A (1000A), the sensors will send light pulses with a frequency range up to 800 kHz, ensuring a "real-time" measurement for accurate RMS and power calculations.

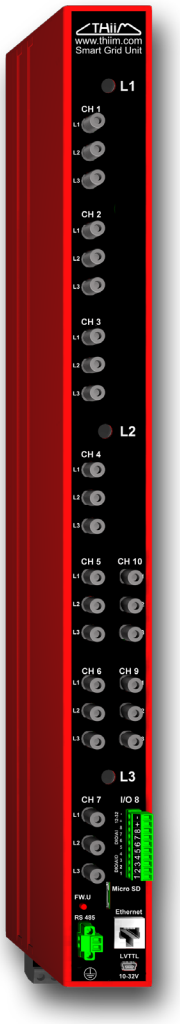
Central unit

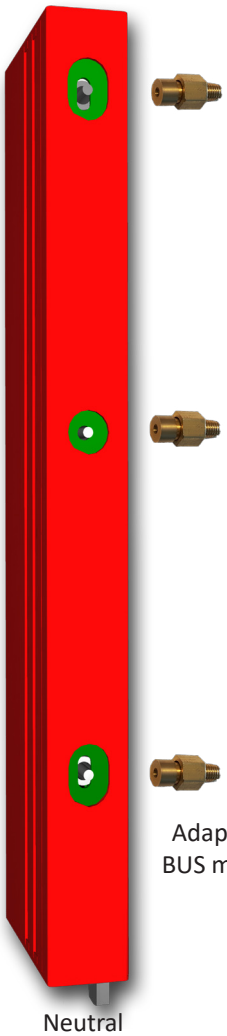
A set of processors in the central unit are converting the pulses from the sensors to actual current values that are sampled at a frequency of 5KHz. The measured and calculated data can, in the IEC 60870-5-104 mode, communicate direct with SCADA systems. In the Modbus mode, be requested down to 10 Sec. intervals or pushed at predefined intervals down to 2 sec. via RS485 or Ethernet to a central computer for further evaluation in the Smart Grid Network.

Optional individual alarm levels can be defined for each input enabling the system to send a message if a certain level is exceeded.

The function and the set points in the various processors in the central unit, can all be modified by sending a message with the relevant information, the firmware can at any time be upgraded by use of a simple USB to LVTTL converter.

Images



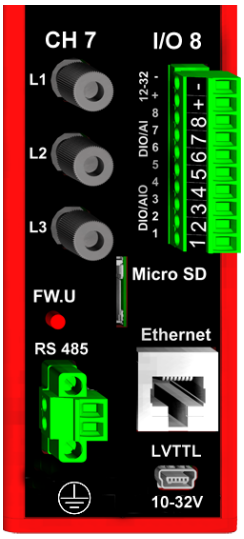


Neutral

Adapters for BUS mounting

24mm Optical sensor

36mm Optical sensor



I/O Connections

Top bracket

Bottom bracket

Bottom Terminals

Installation

Central unit

The central unit is mounted directly on the current rails in a distribution panel or with brackets direct on a flat surface or a wall. The fixation on Bus bars is done from the front by 3 embedded isolated HEX screws screwed into the bus bar interface bolts. By fastening the screws, the power for the unit is enabled automatically. Only an ordinary 5 mm HEX key is needed for this installation as the embedded screws are isolated from the bus.

Sensors

The sensor is simply clicked on the cable.

Connection between the sensor and the central unit is established with an optical fibre, cut to appropriate length, and easily inserted in both sensor and central unit.

Specifications

Sensor:	Cable Size	Max. Ø24 - 300A Max. Ø36 - 450A
	Cable Voltage	Limited only by the insulation of the optical fibre
	Current (measured)	0,8- 2,5A: Sensor/Cable alive 2,5A - 300/450A: RMS Value (Measuring range up to 600/900A)
	Power Consumption	25µW - 2,5W
	Body dimension	75x46x35mm (LED 45mm) (HxDxW) 91x57x41mm (LED51mm) (HxDxW)
Central Unit:	Channels (I/O cards)	1 - 10. (max 10 x 3 phase input cards or 10 x A/D I/O cards)
	Supply Voltage	3 x 230 or 3 x 400V and optional back-up 10-32Vdc
	Voltage (measured)	Supply voltage RMS. Resolution 0,1V
	Current (measured)	Resolution 0,1A RMS
	Frequency (measured)	Resolution: 0,001Hz
	CosΦ	-1 to +1
	Power (calculated)	0 - 999,9 Active-, Reactive-, Apparent power & CosΦ
	Power Quality	Optional under development
	Power Consumption	6W
	Temperature	-25°C - +70°C
	Dimension	520 x 49 x 130mm (HxWxD)
	IP Class	30
	Safety standard	IEC61010-1/61010-2-030,600V Cat III,300V Cat IV. EMC: IEC 61000-6-5
Communication	IEC 60870-5-104, Modbus via RS485 or optional Modbus TCP via Ethernet. Planned support for IEC60850 Update time, Modbus RS485/Ethernet 10 sec. Other communication forms from 2 sec.	

We reserve the right to make changes for product improvement

Thiim A/S
Transformervej 31
DK 2860 Soborg
Denmark

+45 4485 8000
www.thiim.com