

1 Introduction



► This installation manual contains important information regarding the installation of the eTactica Power Meter (models EM-SC and EM-FC), which must be followed.

- Read the entire manual before beginning the installation in order to avoid making mistakes and to reduce the chances of any danger during the installation process.
- Pay attention to the installation instructions and be prepared to look them up during the installation process.

2 Safety Information

This manual contains information which you must observe for your own personal safety and the prevention of injury or damage. Such information is highlighted by the warning triangle shown below.

2.1 Hazard Classification

DANGER

This warning indicates danger with high risk, which if not avoided, can lead to death or serious injuries.

WARNING

This warning indicates danger with medium risk, which if not avoided, can lead to serious or major injuries.

CAREFUL

This warning indicates a lower risk, which if not avoided, can lead to minor or major injuries.

ATTENTION

This warning indicates that there is important information regarding the product or its parts requiring particular attention.

2.2 Installation Information

WARNING

- **Be sure to observe all hazard statements and warnings and cautions.**
- **Read the section entitled "Safety Information" very carefully.**

2.3 Safety Notes

DANGER

Risk of lethal electric shock.

- Risk of lethal electric shock: Lethal voltages are present in the live components.
- Install the Power Meter only in approved cabinets or housings so that the connectors between the current transformers (CTs) and Power Meter are appropriately covered and protected.
- To restrict access by unauthorized persons, the electrical cabinet should be locked, with only authorized persons having access. Turn the power off before installation or maintenance, and provide protection against unintentional power-up during work.
- Install the Power Meter in a dry environment.
- Protect the Power Meter from humidity and moisture.
- Turn power off before commencing the installation or maintenance work and provide protection against unintentional power-up during work.
- Ensure that no voltage is being supplied to the conductors.

WARNING

- Always install data and power cables so that they are separated (Refer to DIN EN 50174-2).

ATTENTION

- To prevent damage caused by a power surge, the Power Meter should be protected by a surge arrester (SPD Type 1) and surge protector (SPD Type 2).
- Make sure that the power source which supplies the Power Meter with voltage can be switched off easily, for example via a C2 or B6 miniature circuit breaker. This must be marked as the disconnecting device for the power source and be easily accessible.
- No maintenance on the Power Meter is required.

3 Target Group

The activities described in this document may only be carried out by a certified electrician with the following qualifications:

- Training in the installation and commissioning of electrical equipment.
- Safety regulations training in electrical hazards and safety.
- Knowledge of relevant standards and guidelines.

4 Description


The Power Meter with current transformers is intended for measuring mains connections in a cabinet or sub-cabinet, for either single or three-phase installations. The Power Meter continuously measures voltage, current, power factor, cumulative active and reactive energy, and line frequency. The measured data is available by a standard Modbus RTU interface. The Power Meter is offered in two versions: EM-SC for clamp-on CTs (0-80A, 0-200A, 0-500A, all 100mA secondary) and EM-FC using flexible coil CTs (0-1000A, 0-2000A, 0-3000A, all with an integrator with 333mV output). The CTs are placed on the mains conductors and register the current amperage.

5 Intended Use

The Power Meter must only be used when installed in an appropriately protected cabinet, in a dry indoor space. Install the Power Meter according to the instructions in this manual. Other uses or installation methods may lead to personal injury or damage to property. This includes any modifications to the Power Meter, unless specifically authorized by eTactica ehf. Any other use of the product aside from its intended use, as described in this manual, is deemed to be improper. Unauthorized alterations, modifications, repairs, or opening of the product casing will void the warranty and are prohibited. This manual is a part of the product and must be read, followed, and kept accessible at all times.

6 Disposal

The Power Meter and CTs must not be placed in regular waste disposal.

-  ► Dispose of the Power Meter and CTs in accordance with your local regulations on electronic waste.

7 Contact Information

In case of any technical problems with this product, please contact eTactica ehf at:

eTactica ehf
Borgartun 27
105 Reykjavik
Iceland

Tel.: +354 535 3000
Internet: <http://www.etactica.com>
Email: support@etactica.com

8 What is in the box

Designation	Article no.	Quantity
Power Meter by type: EM-SC EM-FC	5060474160575 5060474160483	1
Current Transformer: SC-80 (80A) SC-200 (200A) SC-500 (500A) FC-1000 (1000A) FC-2000 (2000A) FC-3000 (3000A)	5060474160636 5060474160612 5060474160629 5060474160247 5060474160254 5060474160261	3
Device bus connector	822350424318	1
Voltage connector	GMSTB2,5/4-ST 7,62	1
Current transformer connector	BCP-500- 6 GN	1
Installation manual		1

9 Product diagram

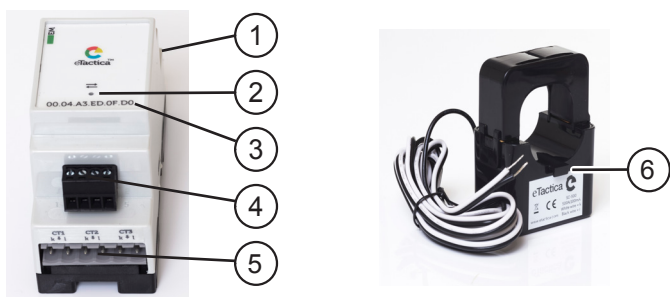


Fig. 1 Power Meter (example EM-SC) and current transformer (SC-500)

1	Voltage connector
2	Status LED
3	Serial number
4	Device bus connector
5	Current transformer connector
6	Tabs for fastenings

10 Technical Data

Electrical Connections	EM-SC	EM-FC					
Operating voltage (L1 to N)	230VAC \pm 10% (for self-powering)						
Device bus Power	5-24 V DC						
Device bus current	Max. 20 mA						
Measurement range L1-N, L2-N, L3-N	230VAC \pm 10% @ 50 and 60Hz						
Measurement category	CAT III 300 V						
Rated working voltage	250 V AC						
Rated working current	80A	200A	500A	1000A	2000A	3000A	
Maximum current	120A	300A	600A	-	-	-	
Rated impulse withstand voltage	4000 V						
Accuracy	Class 1 IEC-61557-12						
Device bus							
RS485-unit loads	1						
Interface protocol	Modbus/RTU- 19200, 8, E, 1 (default settings) (9600-115200 available)						
Modbus address range	01 to F7 hex (1 to 247 decimal), the default one is the last byte of the serial number, see pos. 3 in Fig. 1.						
Modbus cable	2/3 wire half duplex, 0,25 mm ² to 1,5 mm ²						

Housing Protection

Protection rating IP2X

Environmental Conditions

Temperature	
— Storage	-25°C to 70 °C
— Operating	-5 °C to 55 °C
Relative humidity	50 % to 90 %
Altitude	<2000
Pollution degree	2

11 Installation Information

To install the Power Meter you will need the following:

- ▶ An insulated screwdriver.
- ▶ Device cable, premade cables are available from eTactica, otherwise make it on site.
- ▶ Cable ties.

11.1 Installing Current Transformers

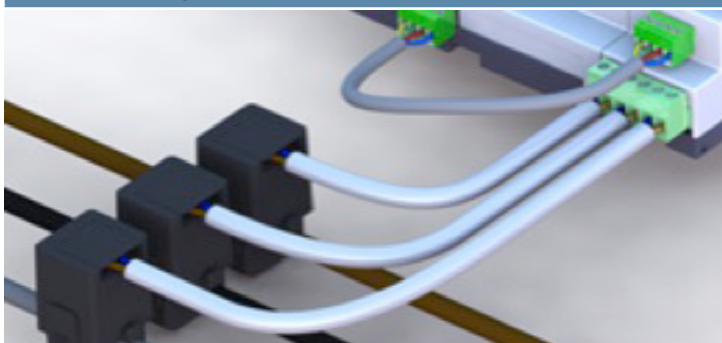


Fig. 2: Installing current transformers

- ▶ Connect the wires from each CT to the Power Meter. Note the polarity, 'k' and 'l' markings on the CT should match the 'k' and 'l' markings on the EM-xxx.
- ▶ Clamp the CT onto the conductor for L1 (phase 1). (Fig. 2). Note the polarity of the CT, the arrow on the CT should point towards the load.
- ▶ Repeat for L2 and L3 in three phase installations only.
- ▶ Fasten the CTs to the conductors with cable ties by using the tabs on the CT (pos 6 in Fig. 1).
- ▶ The phases of the CTs should match the phases of the voltage inputs.
- ▶ For installation of flexible coils, see separate document.

11.2 Voltage connection

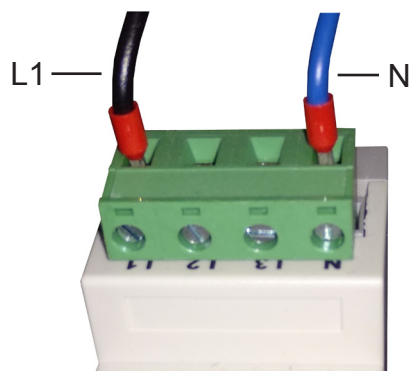


Fig. 3: Wiring the voltage input connection to the Power Meter

- ▶ Connect a wire from L1 (phase 1) and N (Neutral) to the appropriate place on the screw terminal plug (see label on box).
- ▶ Repeat for L2 and L3 in three phase installations only.
- ▶ Plug the terminal plug into the Power Meter (pos. 2 in Fig. 1).

ATTENTION- Make sure the connections are in the correct order

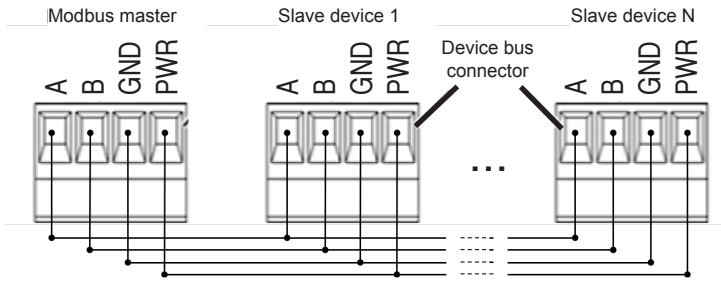


Fig. 4: Wiring the Power Meter to the Modbus Master

- ▶ As a standard RS-485 network, all devices should be daisy chained (no branches, no loops) with the Gateway at one end. Modular premade cables comprising a “head” piece for the Gateway, multiple “Y” pieces for intermediate devices and a “tail” piece with built in 120 Ohm termination are available separately from eTactica which can make this process plug and play.
- ▶ Alternatively, refer to figure 4 for terminal assignments.
- ▶ While connecting devices, record the serial of each device, and the names/purpose of each measured channel. This will enable you to assign a useful cabinet model and share this information with your chosen software platforms.
- ▶ Connect the cable to the Power Meter (pos. 4 in Fig. 1).

12 LED Status Indication

A LED light (pos.2 in Fig. 1) indicates the status according to the following:

LED Pattern	Description
Fast blinking, 7 Hz	Bootloader running, should go to normal operation in about 5 seconds.
Blinking - 1 Hz	The Power Meter is working as expected and is collecting and sending data.
No blinking - always on	The Power Meter is powered, but not receiving modbus requests. Possible causes: 1) RS485 is not wired correctly. 2) The Modbus Master has not sent a request for at least 30 sec.
No light - LED is off	The Power Meter is not powered. Check the wiring.
Fast blinking, 2 Hz	Status error. Possible causes: 1) Phase 1 (L1) is missing or too low, please check if L1 is connected properly. 2) Power factor is below 0.4, please check that the phases of the voltage input match with the phases of the CTs
Periodic fast blinking, 15 Hz	Device identification, when setting up the cabinet model on the gateway, you can see what device you are working on.
Fast blinking, 15 Hz	Firmware update in progress.

Single-phase Installation

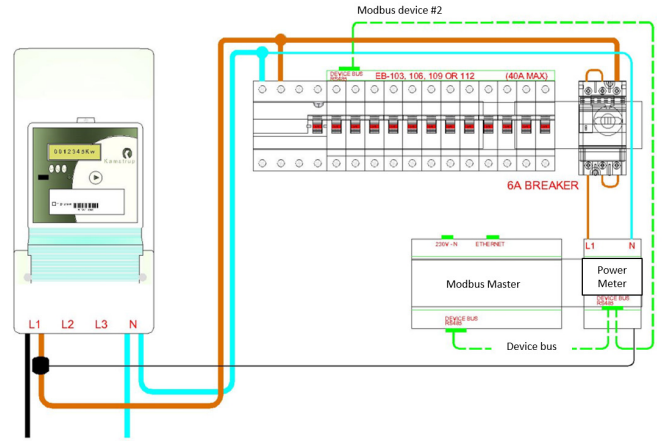


Figure 5: Single-phase installation diagram

Three-phase Installation

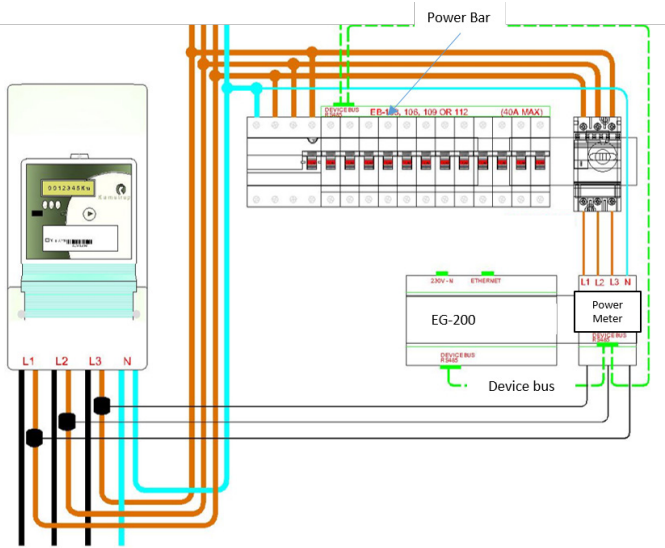


Figure 6: Three-phase installation diagram