

1 Introduction



► This installation manual contains important information regarding the installation of the eTactica Power Meter (models EM-80, EM-200, EM-500, EM-1000, EM-2000, and EM-3000), 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 kilowatt-hours, and line frequency. The measured data is transmitted via an RS485 bus to the Modbus Master. The Modbus Master also provides the device supply voltage of 12V DC to the Power Meter. The Power Meter is offered in six versions which vary depending upon the primary current measurement range (0-80A, 0-200A, 0-500A, 0-1000, 0-2000, 0-3000), with clamp-on CTs, and using flexible coil CTs for currents over 500A. The CTs are placed on the mains conductors and register the current amperage. They provide secondary current outputs in the mA range.

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 ReMake Electric 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 ReMake Electric ehf at:

ReMake Electric ehf	Tel.: +354 535 3000
Hlidasmara 14	Internet: http://www.etactica.com
201 Kopavogur	Email: info@etactica.com
Iceland	

8 Scope of Delivery

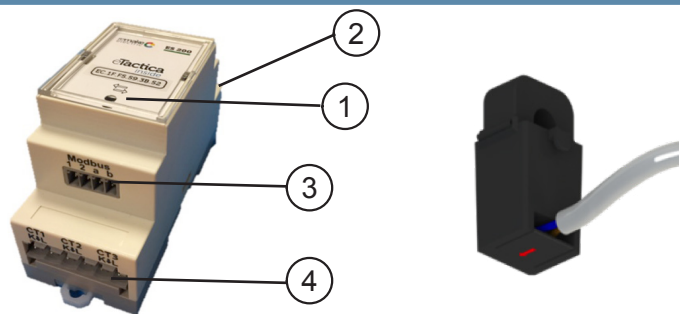


Fig. 1: Scope of delivery of the Power Meter and CTs (example: EM-200).

	Designation	Article nr.	Quantity
1	Power Meter by type: EM-80 (80A) EM-200 (200A, EM-500 (500A) EM-1000 (1000A) EM-2000 (2000A) EM-3000 (3000A)	5060474160278 5060474160285 5060474160292 5060474160308 5060474160315 5060474160322	1
2	Current Transformer: SC-80 (80A) SC-200 (200A) SC-500 (500A) FC-1000 (1000A) FC-2000 (2000A) FC-3000 (3000A)	5060474160216 5060474160223 5060474160230 5060474160247 5060474160254 5060474160261	3
3	Molex connector 39500	822350424318	1
4	On Shore connector OSTTJJ	OSTTJ040150	1
5	On Shore connector OSTTJJ	OSTTJ027150	3
6	Installation Manual		1
7	Warning labels for CTs		3

9 Technical Data

Electrical Connections	EM-80	EM-200	EM-500	EM-1000	EM-2000	EM-3000
Operating voltage (L1 to N)	230VAC ±10% (for self-powering)					
Device bus Power	12 V DC					
Device bus current	Max. 20 mA					
Device bus power	Max. 0,5 W					
Measurement range (L1-N, L2-N, L3-N)	230VAC ±10% @ 50Hz					
Nominal voltage/ insulation	300 V RMS					
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					
Sensor accuracy	±1% of FS @ 25°C					
Operating frequency	50Hz					
Device bus						
RS485-cable length	Max. 60 m					
Interface protocol	Modbus/RTU- 19200, 8, E, 1 (default settings)					

Modbus address range	0x01 to 0xF7 (1-247 decimal)
Modbus cable	4-wire, 2× shielded twisted pair, multi-stranded
Housing Protection	
Protection rating	IP2X
Environmental Conditions	
Temperature	
— Storage	-20 °C to 70 °C
— Operating	-20 °C to 50 °C
Relative humidity	50 % to 85 %

10 Installation Information

To install the Power Meter you will need the following:

- ▶ An insulated screwdriver.
- ▶ Modbus cable.
- ▶ Cable ties
- ▶ Cable for CT.

10.1 Installing Current Transformers

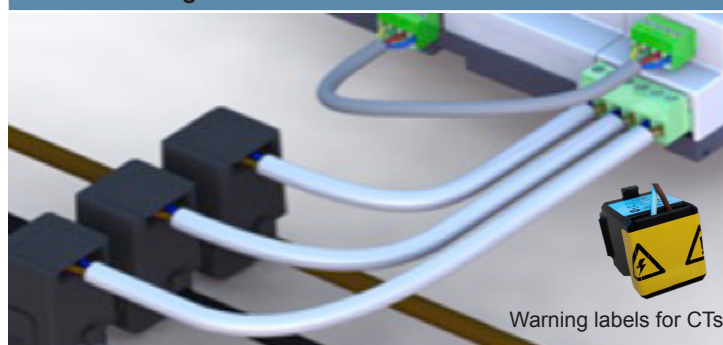


Fig. 2: Installing Current Transformers

- ▶ Connect the wires to the CT output terminals and the connector to the other end. Note the polarity, 'k' and 'l' markings on the CT should match the 'k' and 'l' markings on the EM-xxx.
- ▶ Clamp a 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 (Fig. 2).
- ▶ Plug the cable into connectors on the Power Meter (pos. 4 in Fig. 1). The phases of the CTs should match the phases of the voltage inputs.
- ▶ Put the warning labels on the CTs

10.2 Voltage connection

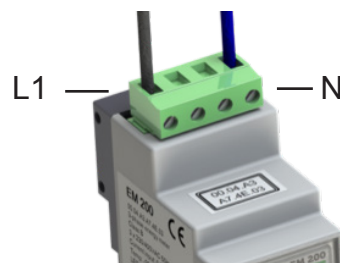


Fig. 3: Wiring the voltage input connection to the Power Meter

- ▶ Connect a wire from L1 (phase 1) and N (Neutral) to the appropriate place on the screw terminal plug (see label on box).
- ▶ Plug the terminal plug into connector on the Power Meter (pos. 2 in Fig. 1). Connect the cable to the Power Meter (pos. 3 in Fig. 1).
- ▶ Repeat for L2 and L3 in three phase installations only.

ATTENTION- Make sure the connections are in the correct order

10.3 Connecting the Power Meter with the Modbus Master

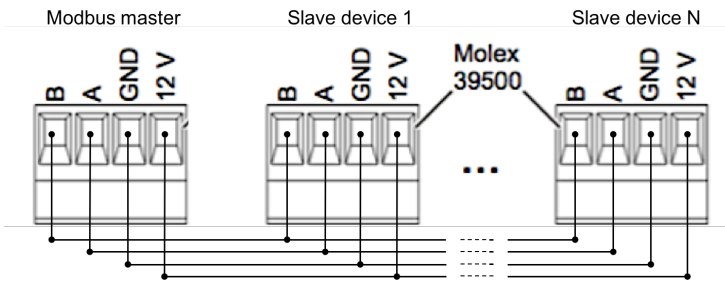


Fig. 4: Wiring the Power Meter to the Modbus Master

- ▶ Prepare the device cable (Fig. 4 shows the pin assignment.)
- ▶ The devices should be daisy chained (no branches, no loops), with the Modbus Master at one end and it is recommended to terminate with a 120 Ohm resistor between the A and B terminals on the last device in the chain.
- ▶ Connect the cable to the Power Meter (pos. 3 in Fig. 1).

10.4 Modbus address

The last two digits of the serial number are the Modbus address (in hexadecimal). Each Power Meter has a Modbus address ranging from 0x01 to 0xF7 (1-247 decimal).

ATTENTION – Eliminate duplicate addresses

Note that all devices connected in series to a Modbus Master must have a unique Modbus address.

10.5 LED Status Indication

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

Led Pattern	Description
Slow blinking – 1 sec interval	The Power Meter is working as expected and is collecting and sending data
Fast blinking – 0.4 sec interval	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
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 seconds.
No light - LED is off	The Power Meter is not powered by the Modbus Master. Check the wiring.

Single-phase Installation

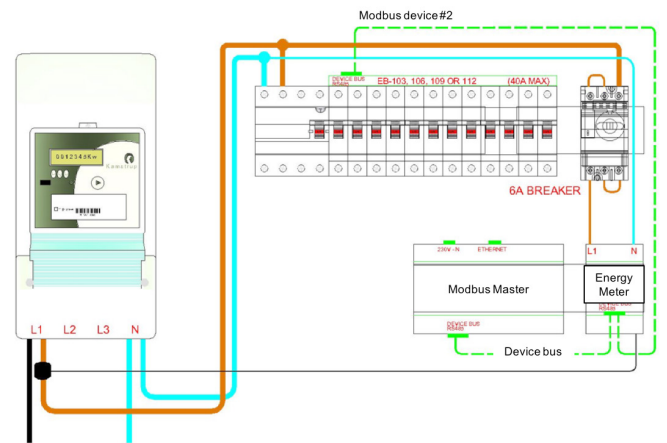


Figure 5: Single-phase Installation diagram

Three-phase Installation

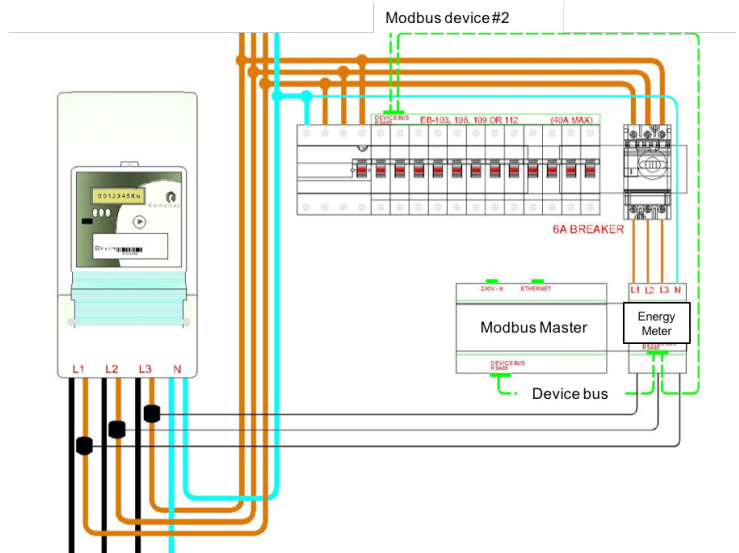


Figure 6: Three-phase Installation diagram