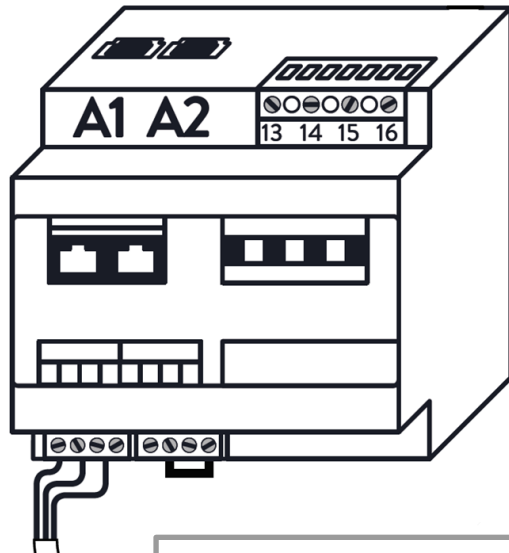


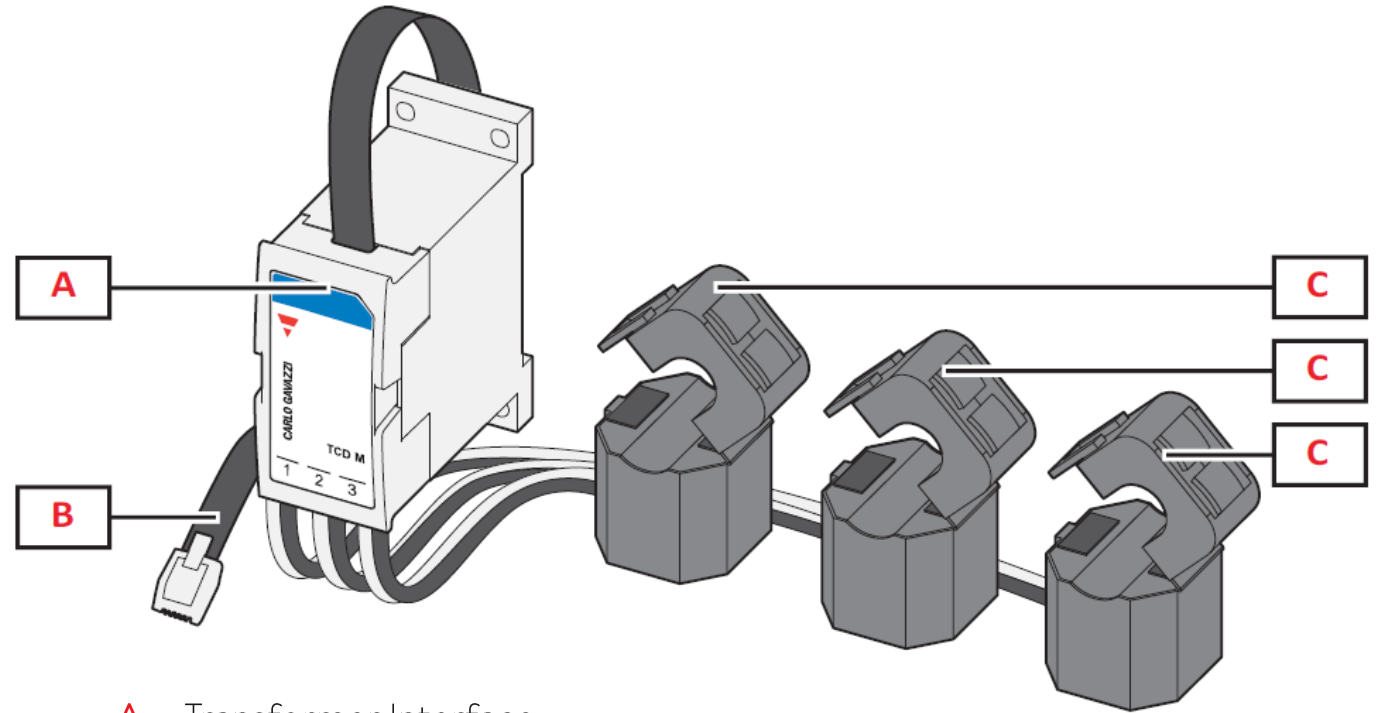
Power Meter and Current Transformer

Overview

Split core Current Transforms (CT) to be used
power analyzer EM271 (Power Meter)



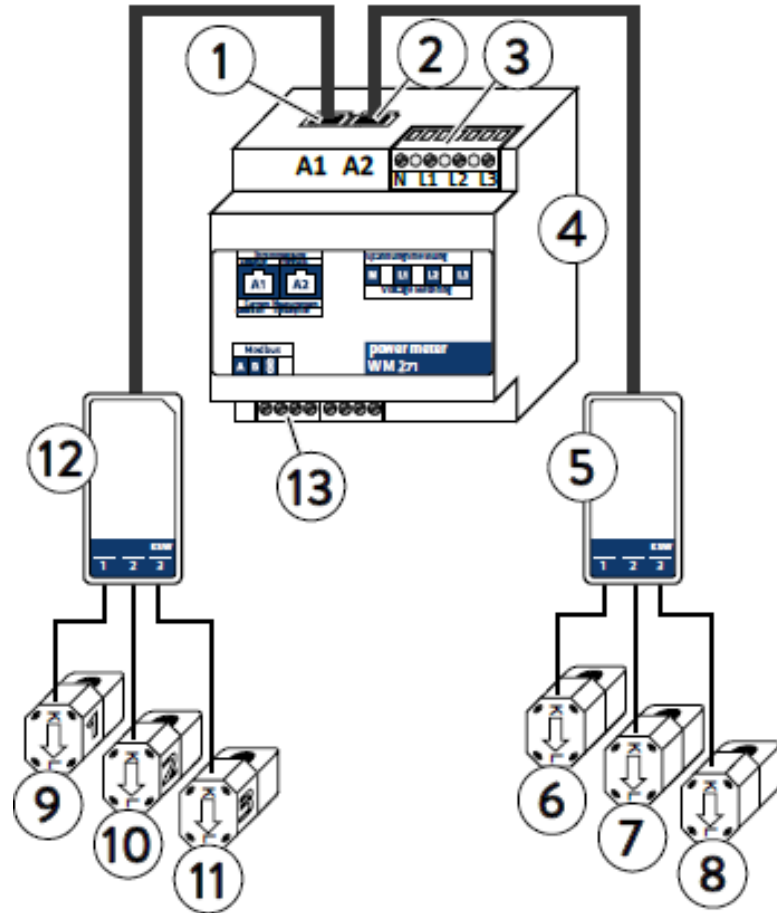
EM271 (Power Meter)



- A Transformer Interface
- B Cable with RJ-11 connectors for connection to the EM271 (Power Meter)
- C Split core Current Transformers

Meter Installation & Configuration

Power Meter Overview



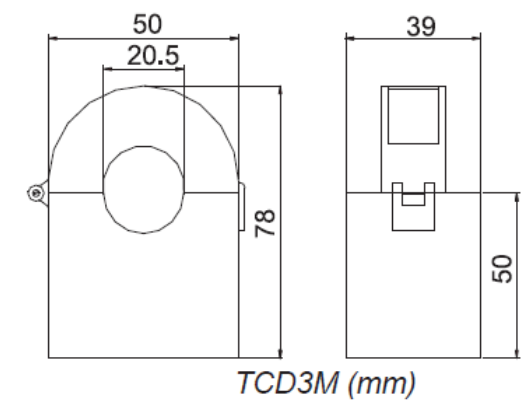
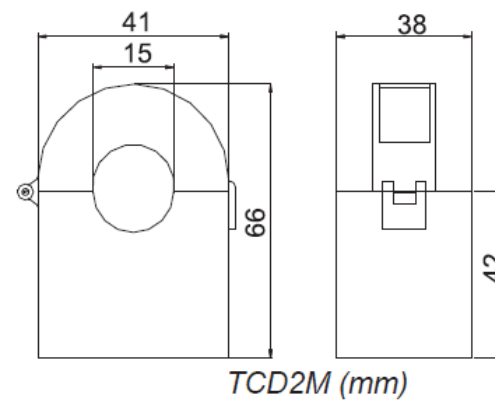
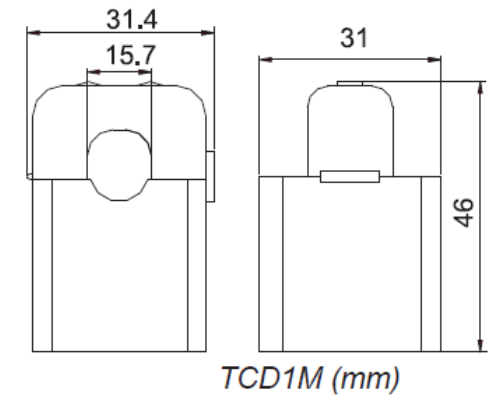
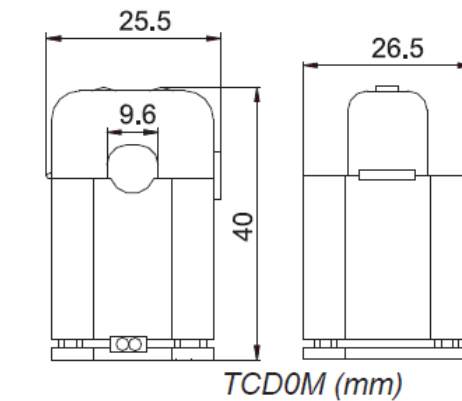
- 1 A1 – input for generation
- 2 A2 – input for consumption
- 3 Voltage measurement terminal strip
- 4 Power meter
- 5 Transformer interface for consumption
- 6, 7, 8 Clamp-on current transformer for consumption – L1, L2, L3
- 9, 10, 11 Clamp-on current transformer for generation – L1, L2, L3
- 12 Transformer interface for generation
- 13 Modbus terminal strip

Meter Installation & Configuration

CT Options

- The CTs included in the scope of delivery are 60A.
- 100A, 200A and 400A CT sets can be purchased from sonnen as accessories.

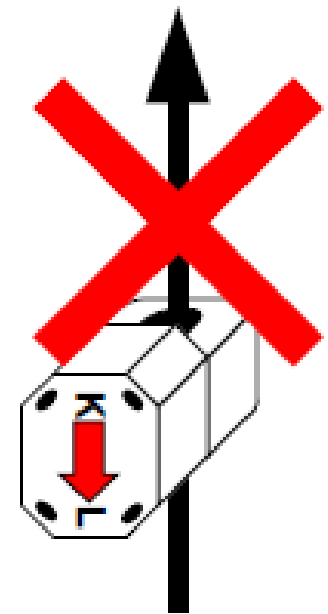
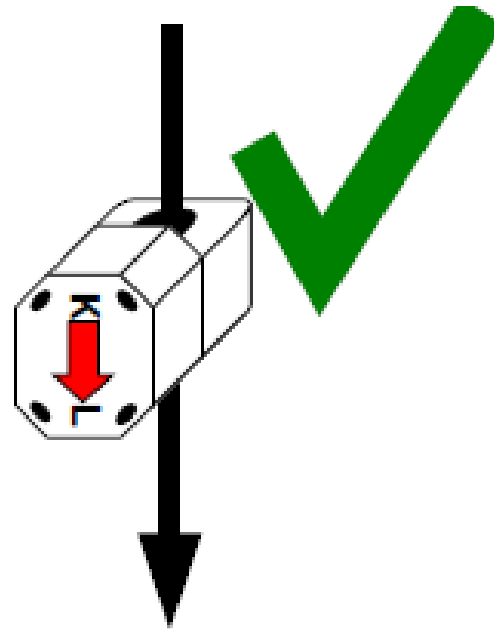
CT types:	
60A: TCD0M	100A: TCD1M
200A: TCD2M	400A: TCD3M



Meter Installation & Configuration

Correct CT Placement- Power Flow

- The split core CTs are clamped across the cables being measured.
- The energy flow direction of the CT must be observed for accurate monitoring.
- The energy flow in the line must run from **K** to **L**.

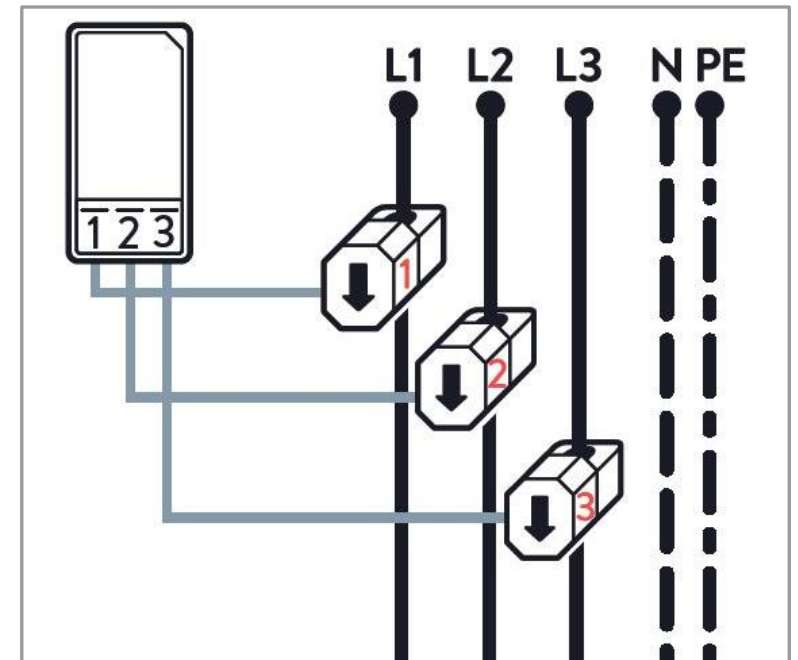
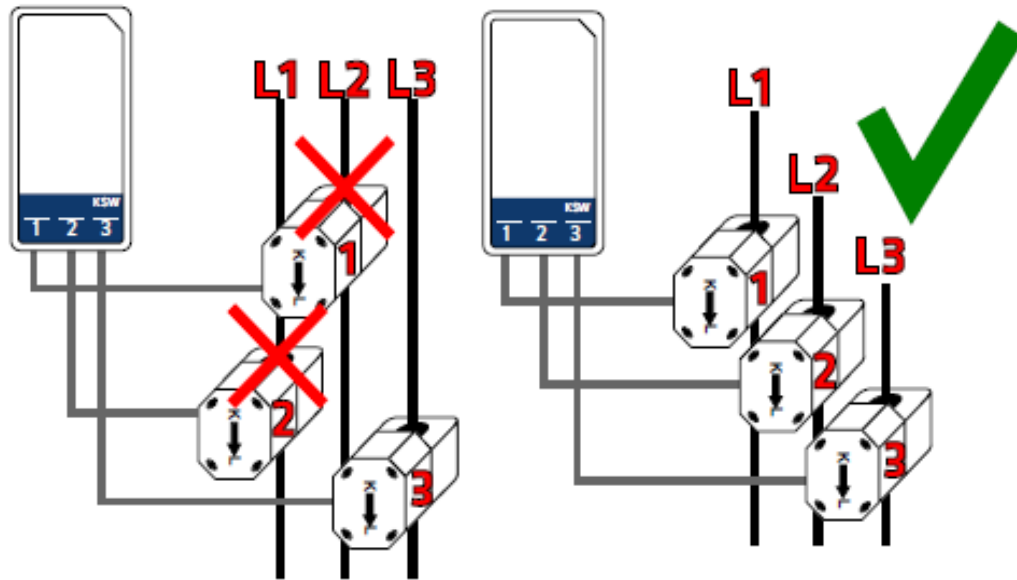


Meter Installation & Configuration

Correct CT Placement- Three-Phase Installation

With a **three-phase** mains, the clamp-on CT for L1 (marked with number 1) must be connected to phase L1.

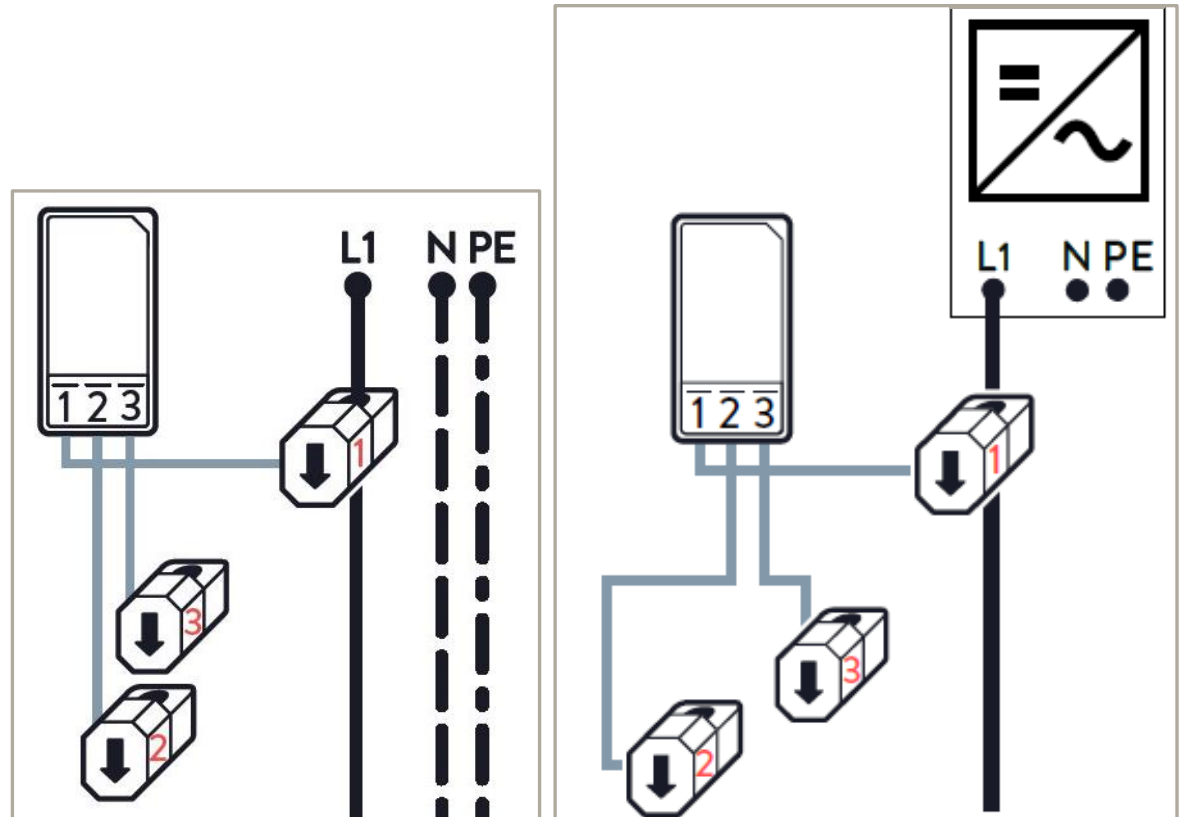
CT#2 must be connected to phase L2 and CT#3 must be connected to phase L3.



Meter Installation & Configuration

Correct CT Placement- Single-Phase Installation

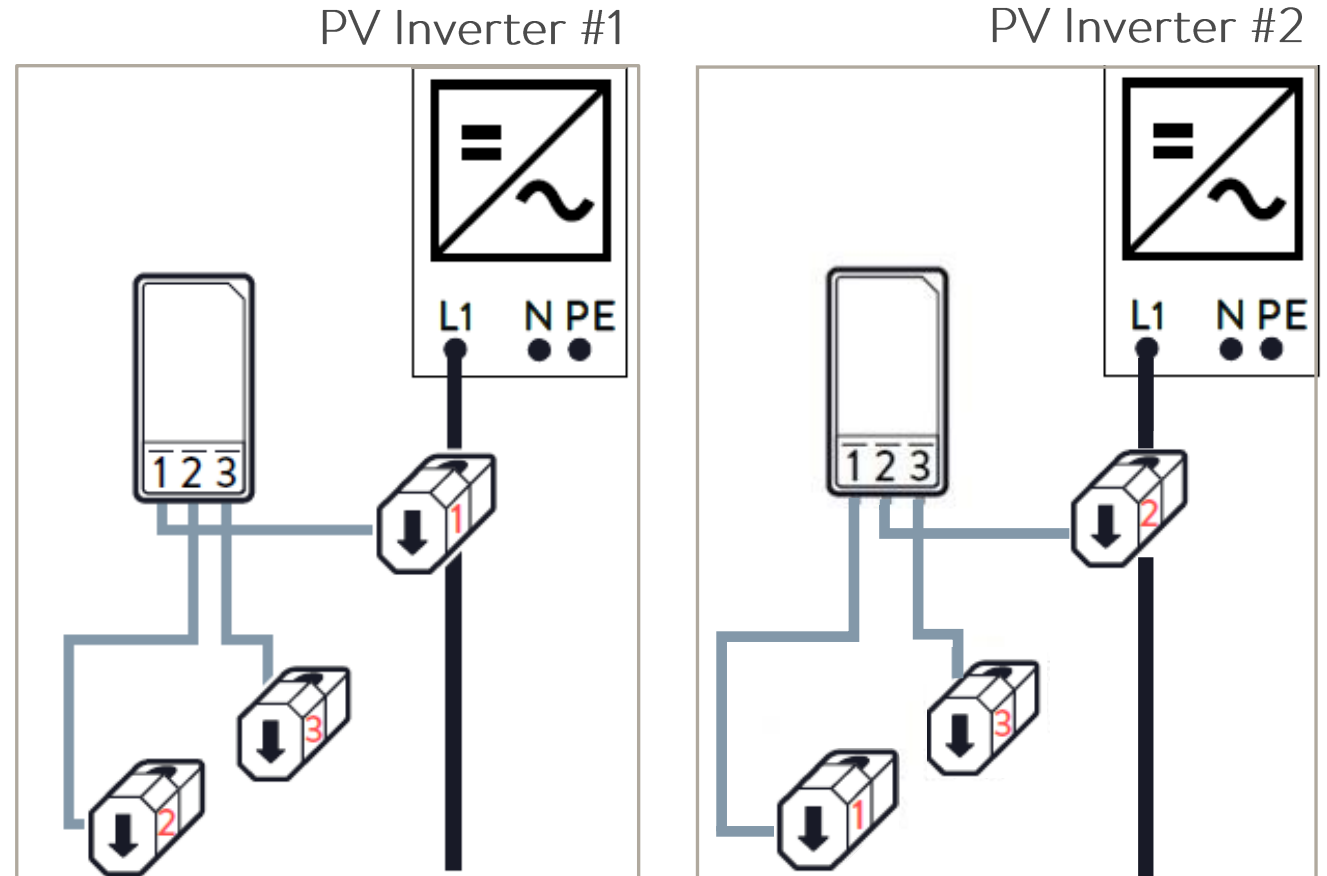
- With a **single-phase** setup, either one of the three CTs can be used to measure the current because all CTs use the same voltage reference point.
- The other two clamp-on CTs must not be connected.
- **Do not cut off unused CTs.**



Meter Installation & Configuration

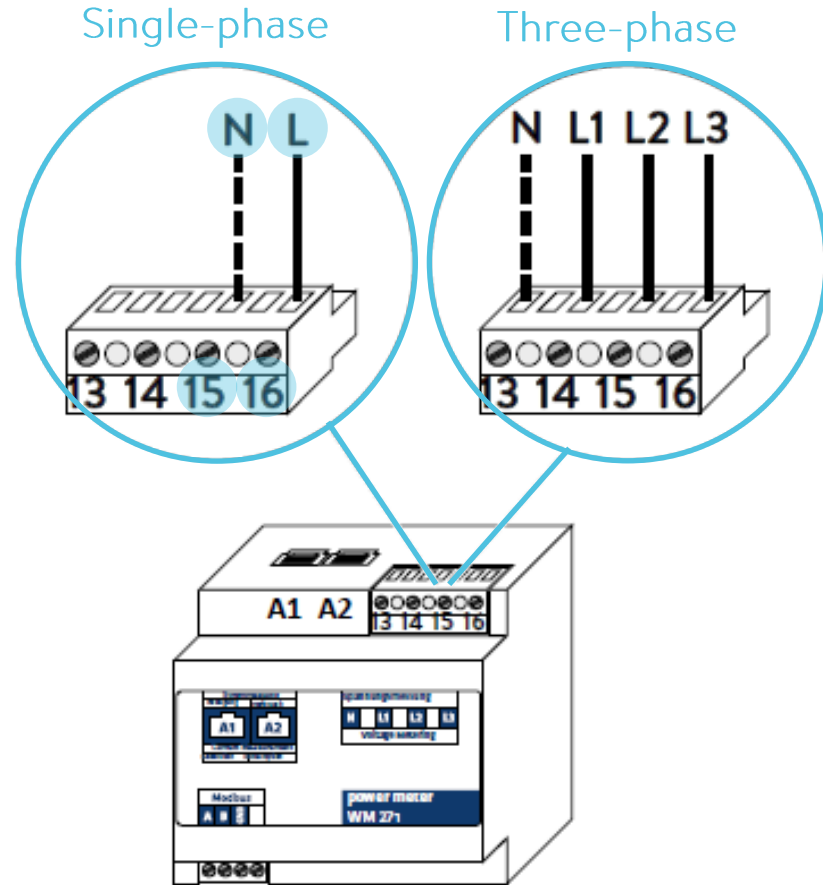
Correct CT Placement- Single-Phase Installation

- In a **single-phase** setup, the other CTs can also be used to measure additional generators or loads respectively.
- **Example:** If two PV inverters are connected in a single-phase setup, CT#1 can be used for PV inverter #1 and CT#2 can be used for PV inverter #2.
 - Or clamp on one CT around the combined PV generation from both PV inverters.



Meter Installation & Configuration

Voltage Reference Connections



The AC connection to the voltage terminal strip depends on the number of phases.

- For a three-phase system, the terminal strip must be wired using ports 13, 14, 15 and 16, as shown in the illustration.
- For a **single-phase** system, the terminal strip must be wired using **ports 15 and 16**.

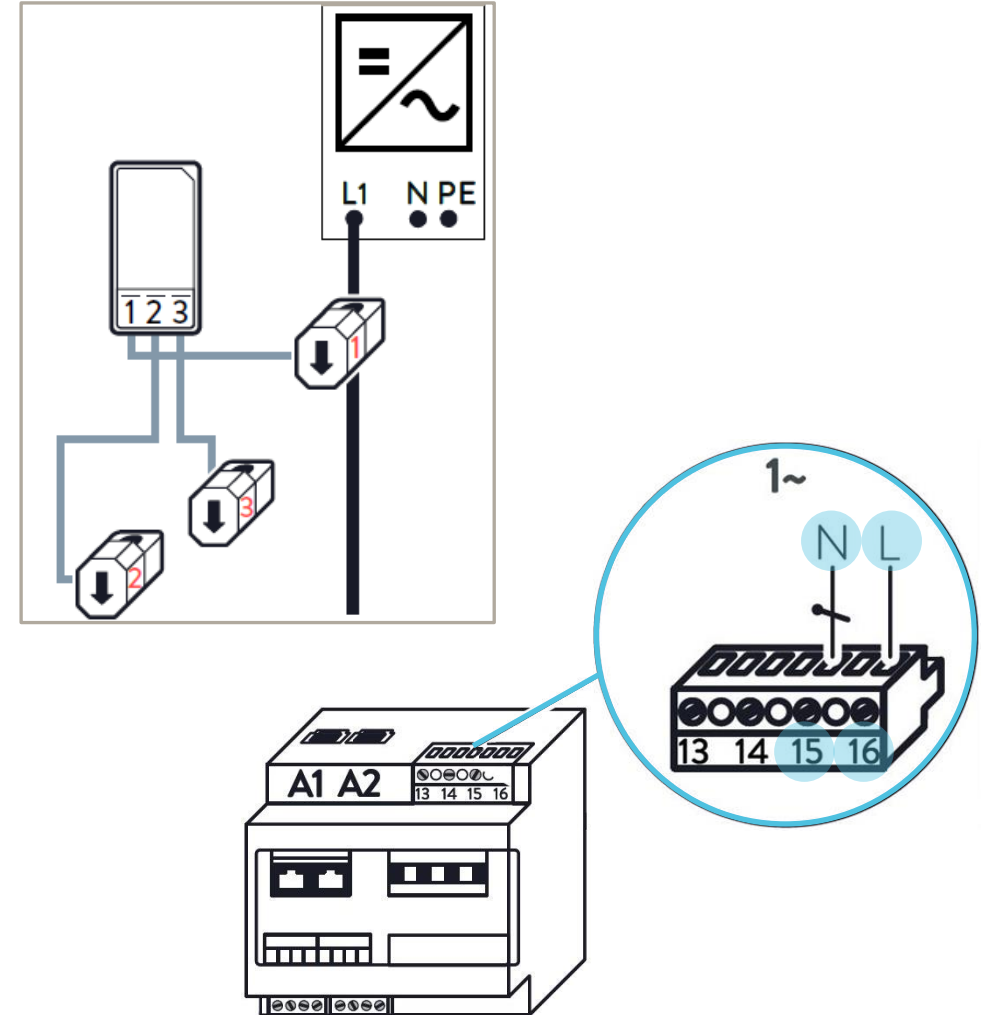
Meter Installation & Configuration

Correct CT Placement

- Do not confuse the phases:

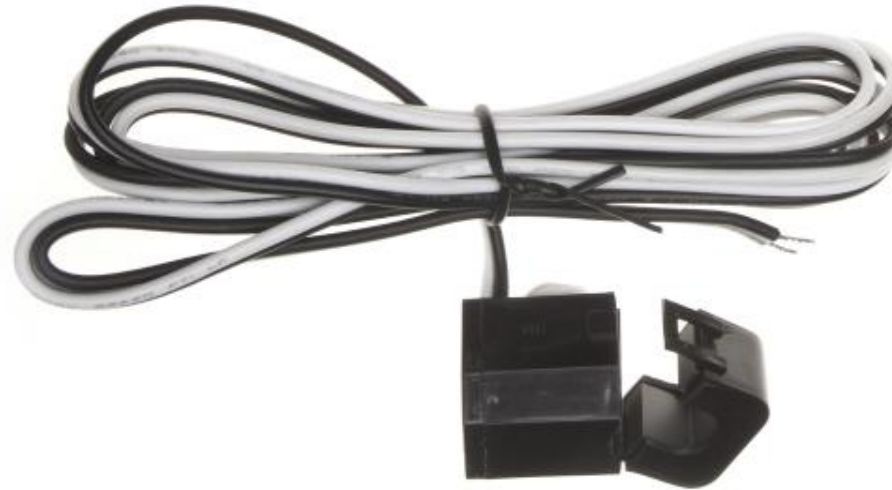
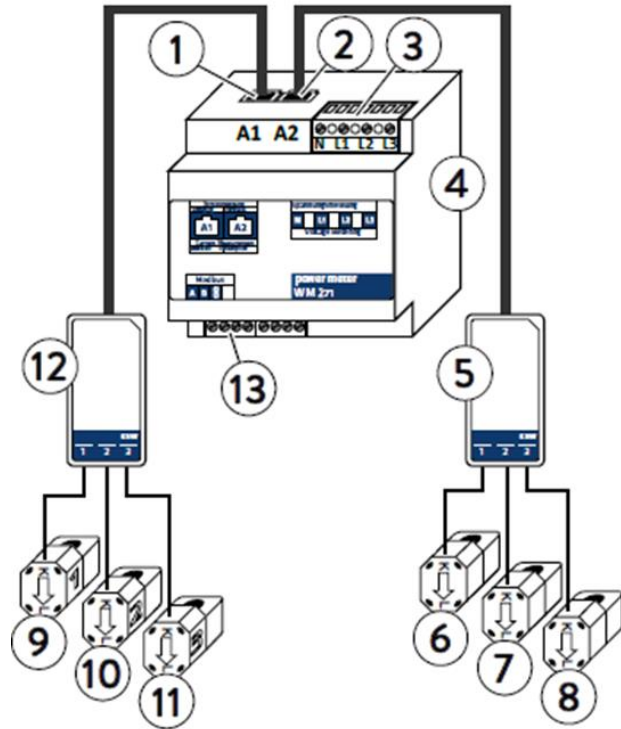
Power measurement only works if the current and voltage of the same phase are measured.

- Example:** The clamp-on CT for L1 (marked with number 1) must be connected to phase L1. This phase L1 must also be connected to terminal L1 of the voltage measurement terminal strip on the Power Meter. Only then the correct power for phase L1 can be determined.



Meter Installation & Configuration

Extending CTs



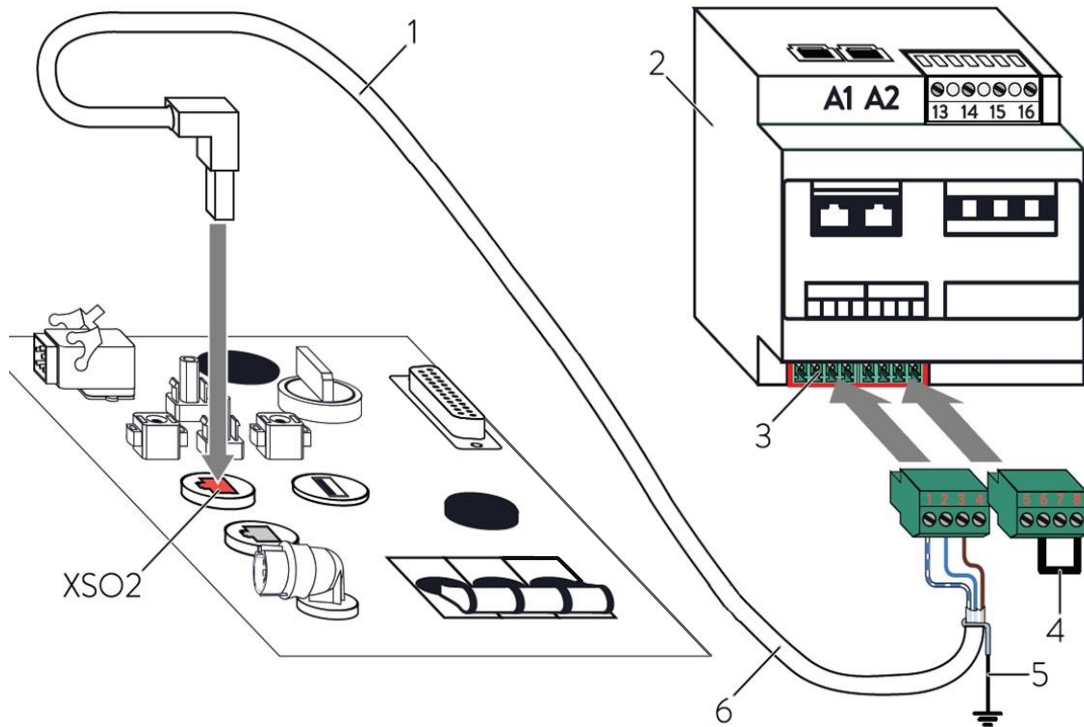
Extension of the route length via the cutting and extending of the CT wires is possible up to a maximum route length of 30 meters.

Note: Cutting and extending the CT wires is a modification of the supplied components and may in some circumstances invalidate the warranty;

Please contact the service support at [sonnen Australia](http://www.sonnen.com.au) prior to extending the cables to seek written approval.

Meter Installation & Configuration

Modbus connection to sonnenBatterie



Measurement data is transmitted from the Power Meter to the storage system using the Modbus line.

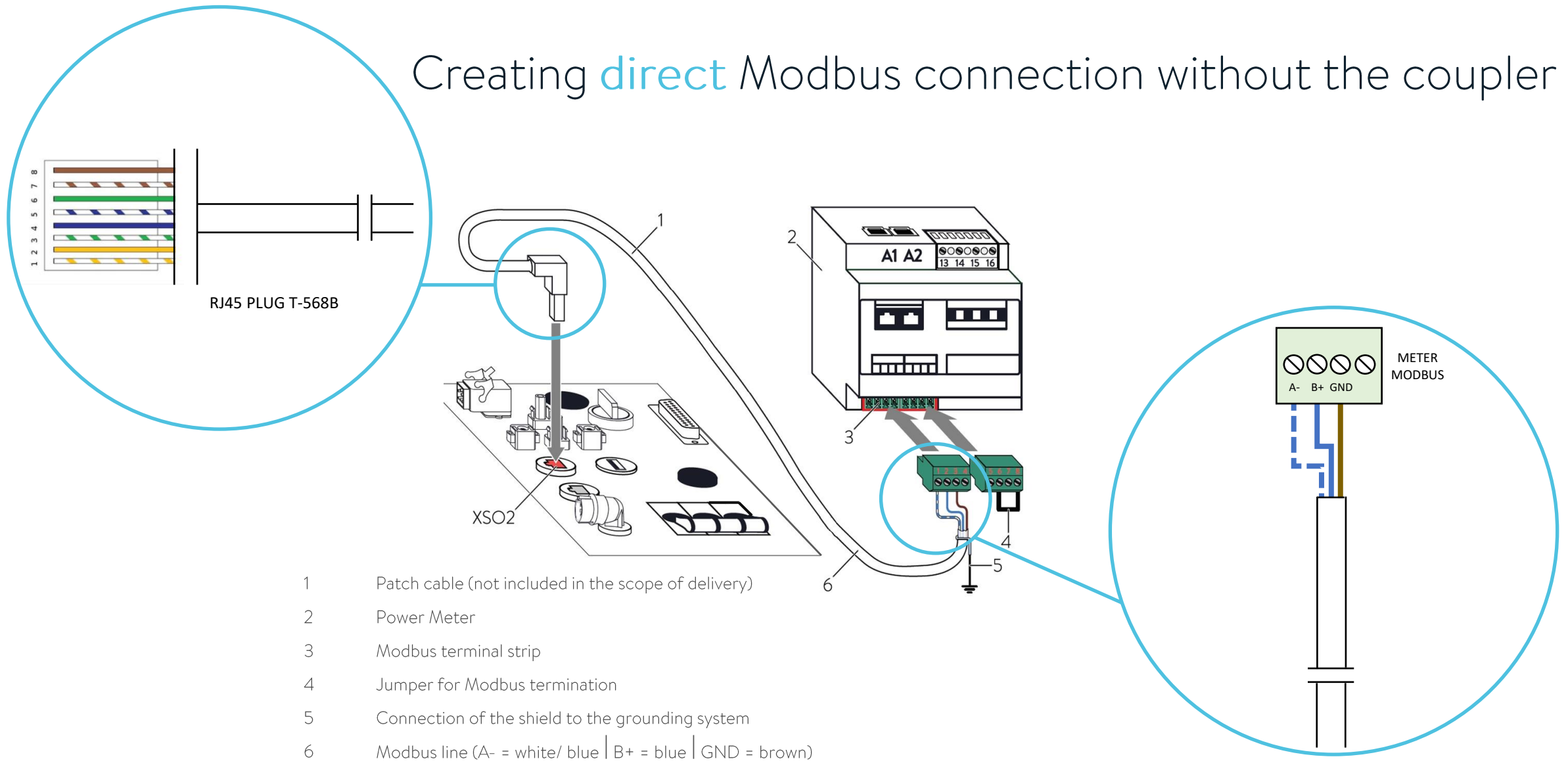
Modbus line requirement:

- Category: Cat 5 e or 6
- Shielded
- Do not exceed 30 meters Modbus route length

Make direct Modbus connection from the Power Meter to sonnenBatterie system without using the coupler.

- | | | | |
|---|---|------|--|
| 1 | Patch cable (not included in the scope of delivery) | 5 | Connection of the shield to the grounding system |
| 2 | Power Meter | 6 | Modbus line (A- = white/ blue B+ = blue GND = brown) |
| 3 | Modbus terminal strip | XSO2 | Modbus port |
| 4 | Jumper for Modbus termination | | |

Creating **direct** Modbus connection without the coupler



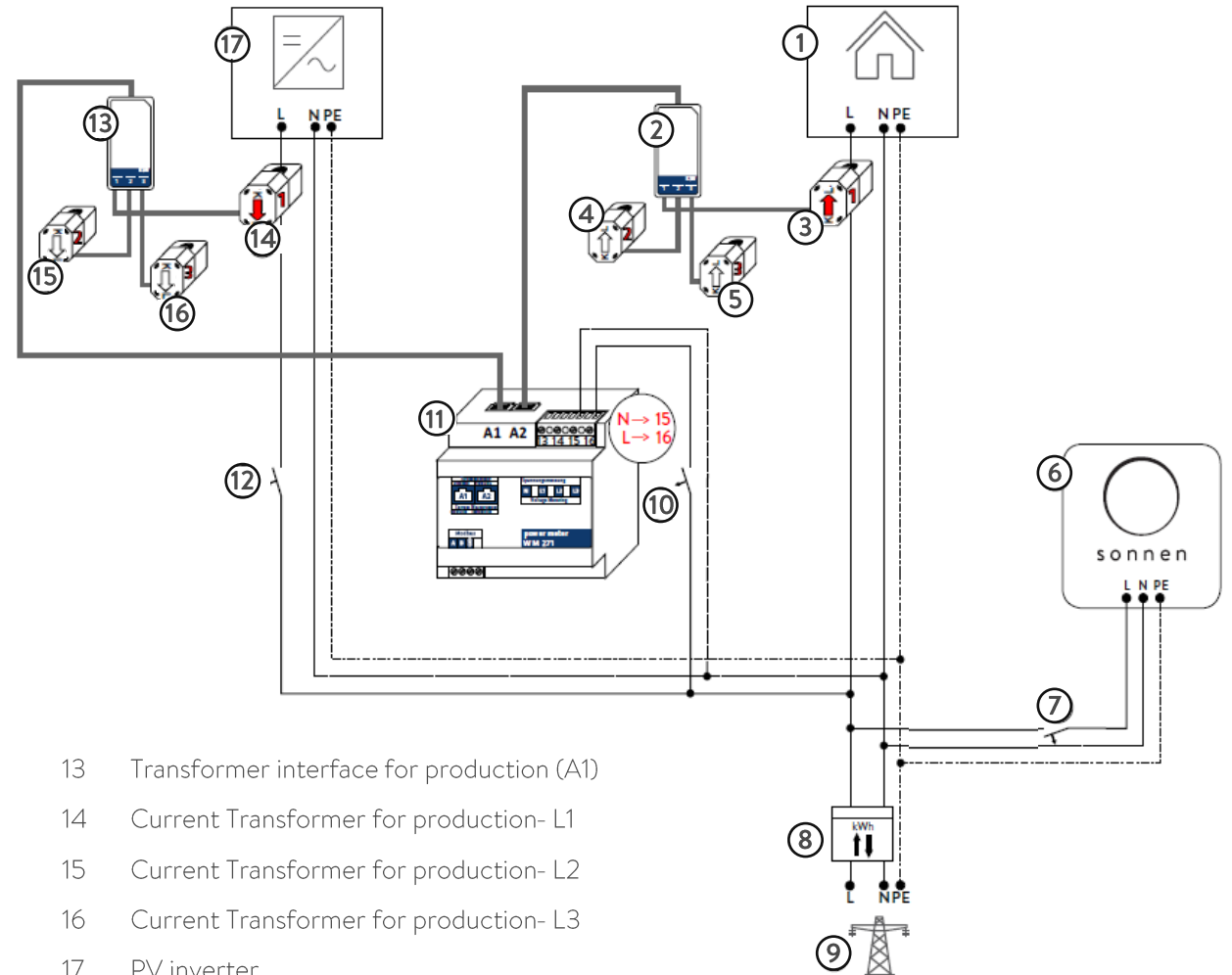
- 1 Patch cable (not included in the scope of delivery)
- 2 Power Meter
- 3 Modbus terminal strip
- 4 Jumper for Modbus termination
- 5 Connection of the shield to the grounding system
- 6 Modbus line (A- = white/ blue | B+ = blue | GND = brown)
- XS02 Modbus port

System Setup

Consumption Measurement

Concept:

- The power consumed by the loads is measured by the CTs.
- The power imported from the grid or fed into the grid is not measured; it is calculated.



- | | | | |
|---|--|----|---------------------------------------|
| 1 | Consumers in building | 7 | B16 Miniature Circuit Breaker |
| 2 | Transformer interface for consumption (A2) | 8 | Bidirectional meter |
| 3 | Current Transformer for consumption- L1 | 9 | Public electrical mains |
| 4 | Current Transformer for consumption- L2 | 10 | B6 Miniature Circuit Breaker |
| 5 | Current Transformer for consumption- L3 | 11 | WM271 Power Meter |
| 6 | Storage system | 12 | PV inverter Miniature Circuit Breaker |

- | | |
|----|---|
| 13 | Transformer interface for production (A1) |
| 14 | Current Transformer for production- L1 |
| 15 | Current Transformer for production- L2 |
| 16 | Current Transformer for production- L3 |
| 17 | PV inverter |

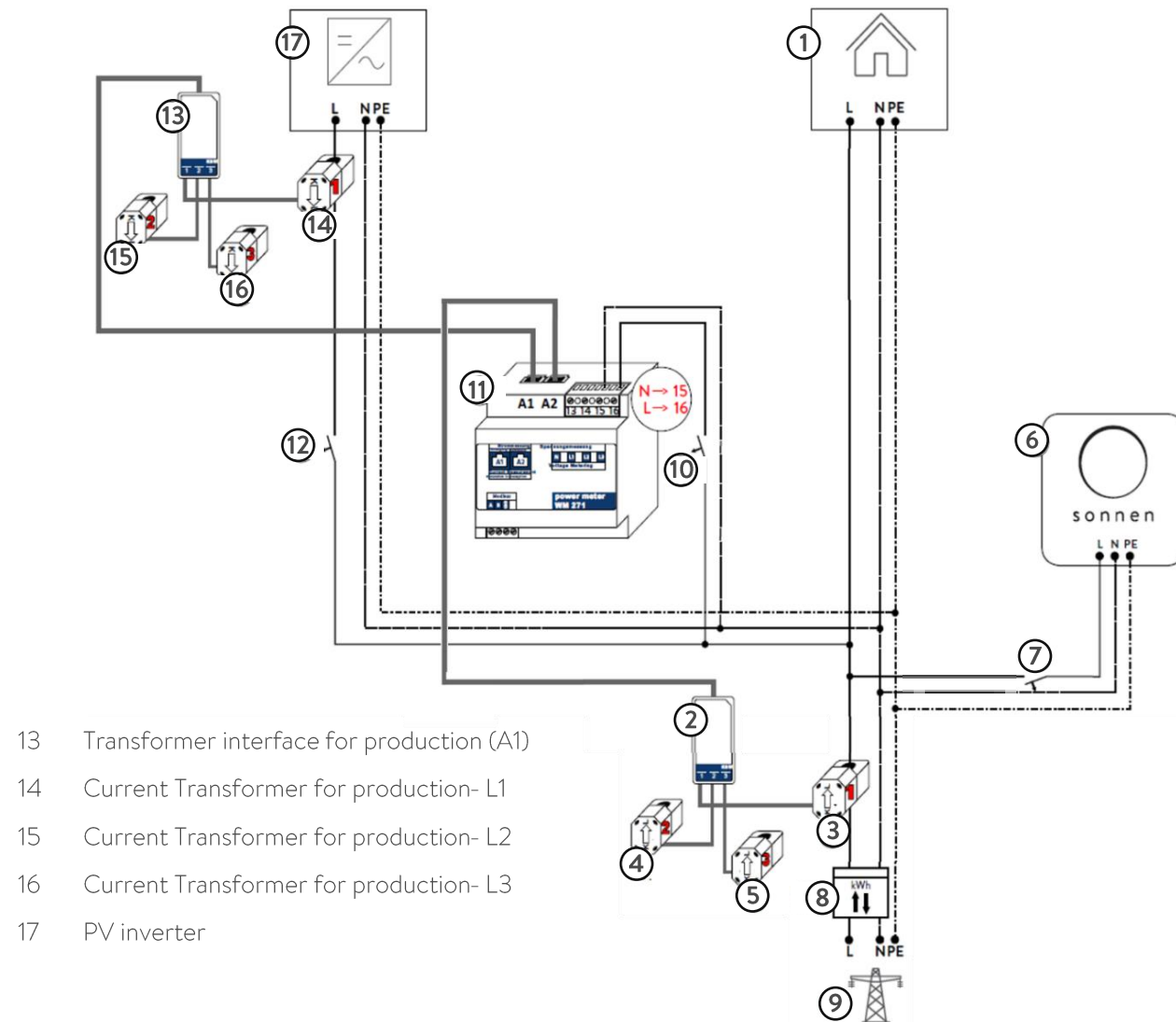
System Setup

Grid Measurement

Concept:

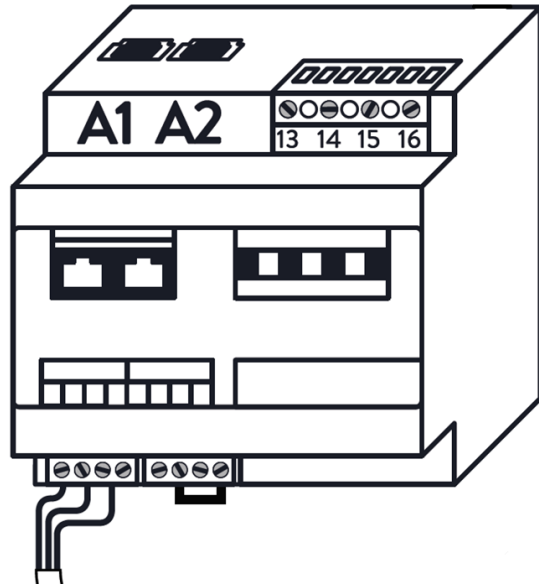
- The power imported from the grid or fed into the grid is measured by the CTs.
- The power consumed by the loads is not measured; it is calculated.

1	Consumers in building	7	B16 Miniature Circuit Breaker
2	Transformer interface for consumption (A2)	8	Bidirectional meter
3	Current Transformer for consumption- L1	9	Public electrical mains
4	Current Transformer for consumption- L2	10	B6 Miniature Circuit Breaker
5	Current Transformer for consumption- L3	11	WM271 Power Meter
6	Storage system	12	PV inverter Miniature Circuit Breaker



Power Meter for Three-Phase

Re-Programming the Power Meter Using the LCD Screen



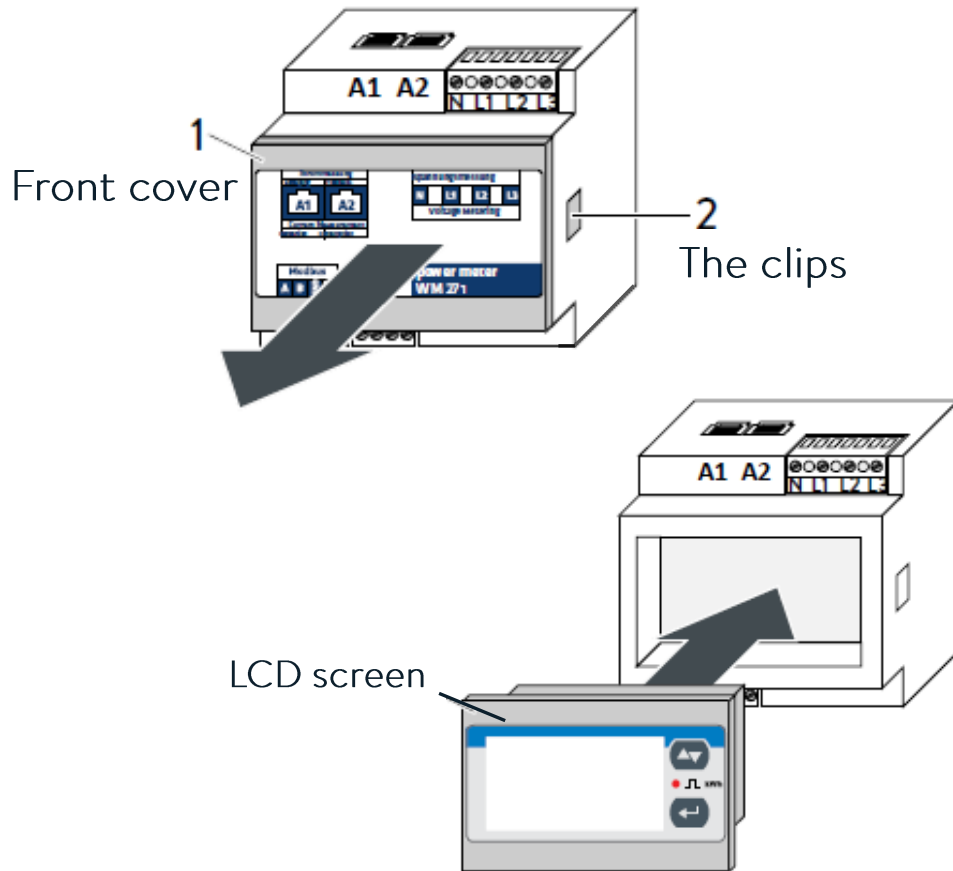
The Power Meter is supplied for single-phase installations as standard. Power Meter can be re-programmed for three-phase or split phase installations using the LCD screen.

The required LCD screen can be purchased from [sonnen Australia](http://www.sonnen.com.au).



Power Meter for Three-Phase

Re-Programming the Power Meter Using the LCD Screen



- Press the clips (2) on both sides of the power meter. You might use a small screwdriver.

- Remove the front cover (1).

- Insert the touch display into the power meter.

- Supply the power meter with energy.

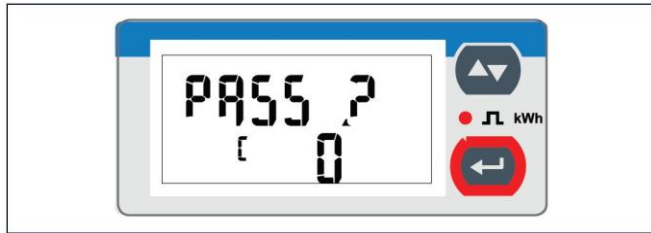
Power Meter for Three-Phase

Re-Programming the Power Meter Using the LCD Screen



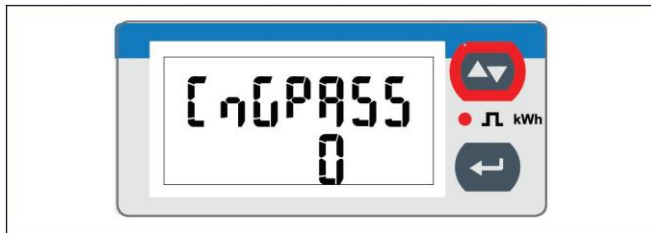
➤ Press  for 3 seconds.

➤ The PASS ? screen appears.



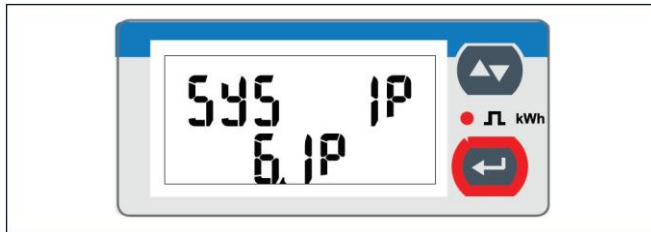
➤ Press  for 3 seconds.

➤ The CnGPASS screen appears. The power meter is now in programming mode.



➤ Press  once.

➤ The SYS screen appears.








➤ Press  once.

Now it is possible to change the measuring point.

Power Meter for Three-Phase

Re-Programming the Power Meter Using the LCD Screen



- Press  twice until the setting 3P | 2.3P appears.
- Press  for a longer period of time until the sign (1) disappears.
- Press  ten times.
- The end screen appears.
- Press  once.  The three-phase measuring mode is activated.
 - Remove the touch screen.
 - Insert the front cover into the power meter.