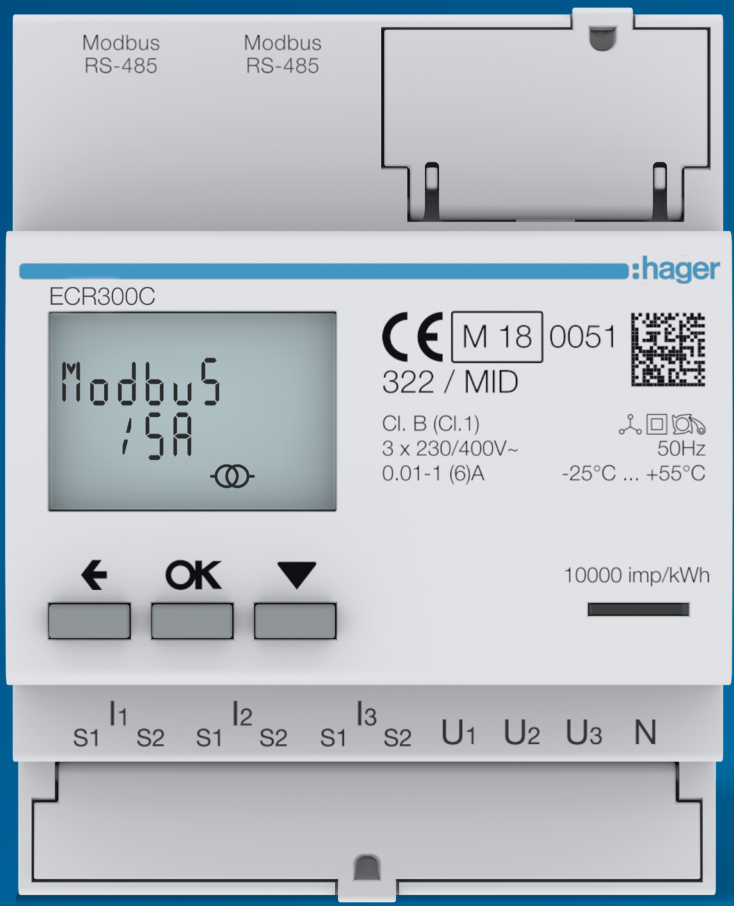
Residential and Commercial Metering solutions

# Frequently Asked Questions

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# Simple and advanced metering Understanding the difference

A number of important parameters must be taken into consideration when looking at meters.
These are crucial factors to understand when choosing the right level of performance for your system and the desired level of control.

## Simple metering

Simple metering consists of recording energy consumption, expressed in KWh.
Also referred to as apparent energy, this is the consumption that is indicated on energy bills from electricity suppliers. The voltage (V), current (I) and also the active power (W), which are the components of apparent energy, can also be associated with this consumption.

## Advanced metering

Advanced metering consists of recording and displaying parameters relating to the quality of the energy (the network efficiency) in addition to the simple metering data. It includes parameters such as reactive power, apparent power or Cos Phi. Energy meters are used for this application.

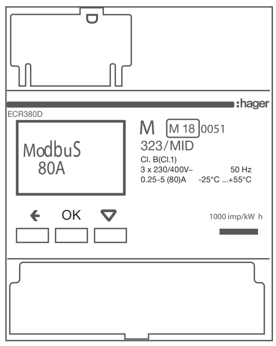
## Complete metering solutions to take measurements across all levels of your electrical installation.

### Direct metering

Metering solution dedicated to measuring modular sub-feeds, single phase or three phase, up to 125 A.


### Indirect metering

Metering solutions enabling remote measurement on bus bars via current transformers.
A solution adapted to procedures on installations requiring continuity of service and reduced maintenance times.



# Simple or advanced meters: functions and utilisation

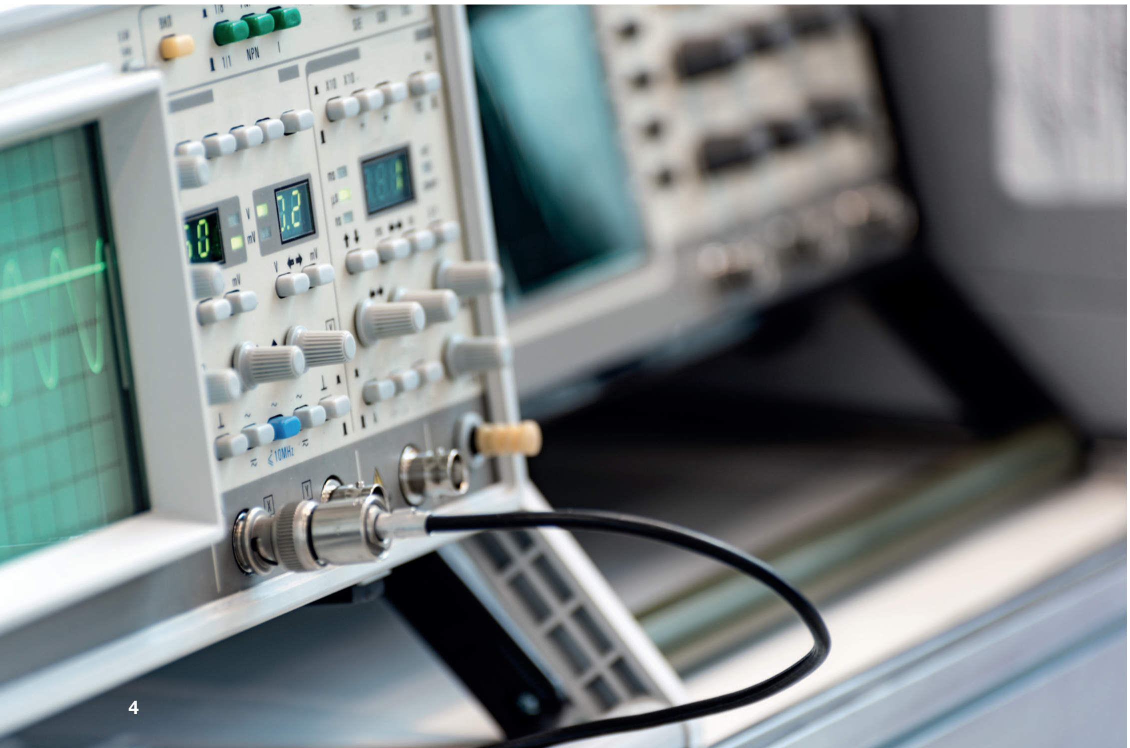
**Reactive power (Q)**
Reactive power (Q), expressed in var, is the power generated by the reactive consumers of a circuit. These are either capacitors (from the capacitive consumers range) or coils (from the inductive consumers range).

Reactive power can impair the performance of an electrical network. This results in calorific energy, synonymous with energy losses. It's worth remembering that, beyond a certain threshold, reactive power is measured and taxed by electrical energy suppliers, because it affects the overall performance of their network. This is why it is crucial to identify and control the reactive power in your electrical network.

Don't forget that the greater the reactive power, the more apparent power you will draw from your electricity supplier, compared to the same demand for active power.

**Energy (E) and power (P)**
Power P, expressed in kilowatts (kW) is the product of the voltage in a circuit multiplied by the current circulating through it at a given time. It differs from energy, expressed in kWh, which in turn represents a quantity of energy accumulated over a period of one hour. It is this energy that is invoiced by the electricity supplier, while the power corresponds to the maximum permitted by the electricity supply contract.

**Active power (P)**
Active power (P), expressed in watts, is the power available at a time T to supply a network consumer.



## Cos Φ

Cos Phi is the coefficient of performance based on the angular phase shift between an alternating circuit's voltage and current. Ideally, it should be around 1, because this indicates that the phase shift angle between voltage and current is low. The power lost in the network is low in this case. This lost power, called reactive power, is generated by inductive or capacitive non-resistive loads in an electrical network. One way of absorbing these derivatives of Cos Φ is to install capacitor banks sized according to the capacitors present in the electrical network.

## Harmonics

In Australia, the current circulates at a fixed oscillation frequency of 50 Hz in every electrical network with an alternating current. In order to maintain the most regular sinusoidal signal possible, this oscillation must remain constant. Yet the network supplies some consumers that are operating with direct current. So, the signal must be transformed via an AC/DC supply. These transformation processes are not without consequence in terms of keep the frequency stable. The resulting frequency distortions are called harmonics. They can occur on the voltage signal, the current, in every phase, between phases or between a phase and neutral. Physically, harmonics translate into disturbances on the line, such as interference, an increase in noise and a reduction in the overall performance, as well as heating. In the end, this can also result in disturbances in operation and the tripping of electrical protection devices in an installation. To limit the harmonics, it is important to identify their origin so that the right remedial devices can be installed, such as active or passive filters.

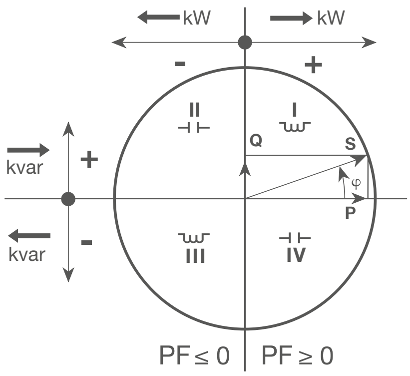
## Energy import/export

In an electrical installation, it is generally accepted that the voltage and current are positive, since the loads present in a circuit consume power while they are working. However, some inductive loads can, in certain situations, see their current and voltage become negative. When the voltage and current are positive, we refer to imported energy. Conversely, if they are negative, we talk about exported energy.

It is possible to have a positive quantity and a negative quantity: in this case, measurement is on all four quadrants.

This reaction is possible if one of the two sinusoidal curves of the voltage or current is out of phase with the other.

Power factor
Convention according to IEC 62053-23




## Apparent power (S)

Apparent power (S), expressed in VA, is the total power that can be supplied by a network or a consumer. In most situations, it is this power that is taken as the reference for all electricity contracts, because it consists of the active power (i.e. the used power) and the reactive power (i.e. the generated power).

# Smart metering
# is it crucial for my installation?

## Do I need to choose smart electricity meters or can I do without them?

The answer is pretty simple. If there are meters in an installation, they are there to provide information on the systems of the installation at the right time and to the right people.
In the case of simple metering, used only for monthly tracking of changes to energy consumption, manual data recording could be an option for reporting information in performance monitoring tools for small installations with few meters.

If the data recording frequency is greater or if there are more meters or they are used to monitor the quality of the energy, it will be more practical and quicker to use smart meters, with a corresponding energy manager.
It is important to note that it makes no sense for some of the meters in the same installation to be installed in smart versions while others are installed in standalone versions, since the smart meters can be operated remotely while the others require manual data recording.

# Choosing your communication technology

Before considering the additional cost represented by a smart meter, you must identify the actual requirement in terms of the quantity of information to be collected, the required level of reliability of the communication and, finally, the environment in which the meter will be installed.

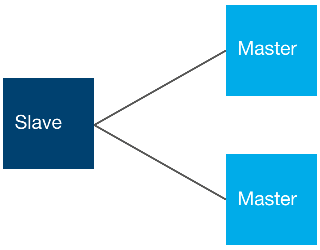
The last question to consider is whether the data requirement will differ between measurement points or whether it will stay the same. If there is a possibility that the requirement may change, it would be advisable to choose a smart meter, in order to enable a change of hardware in the future.

| | Simple metering (kWh) | Quality of simple energy | Quality of complete energy | Reliability of communication | Installation distance |
|---|---|---|---|---|---|
| **Pulse** | x | | | Average | A few metres |
| **Wired connection Modbus RS485 RTU** | | x | x | Good | 1200 metres of cable between the transmitter and the receiver, in Modbus cable |

# The details of the communication networks

## Pulse meters

Parallel wiring, point to point




**Advantages**

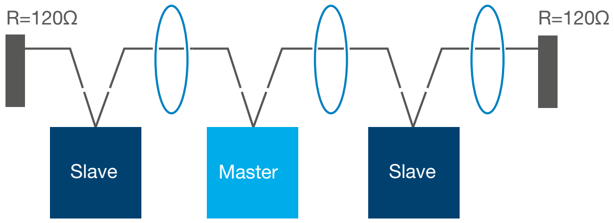
- Easy to install,
- No programming required.

**Disadvantages**

- 1 single piece of information can pass along a Pulse line. For 2 pieces of information, 2 Pulse lines would be required,
- Not possible to check if the data is being transferred properly.


# Modbus RTU RS485 meters

## Wiring in series/parallel (no branches!)




### Advantages

- Confirmation of receipt of the information sent,
- Native function for checking errors in data frames,
- Maximum distance of 1200 metres,
- Maximum flow of 38,400 bauds, depending on the number of participants and the quantity of data in transit.

### Disadvantages

- Requires programming,
- Limited to 31 participants over 1200 metres,
- Sensitive to the quality of the wiring.

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