



QUALITY & METERING

Solutions for
energy sub-metering.



INTRODUCTION

Managing energy consumption for all types of installations

Sub-metering is used to determine where, how and how much energy is consumed, providing the information needed to undertake corrective actions to improve energy efficiency and avoid inefficient consumption by the loads connected to an installation. They are the ideal solution for multi-user installations where costs have to be charged individually, where the end user or tenant has to pay the cost of their energy consumption.

There are a wide variety of installations where an energy meter is required, and so we present the CEM family of meters, which offer both direct and indirect measurement models for single-phase and three-phase installations. These meters are MID certified, ensuring the accuracy and safety of the energy measurement, for those installations that are used to invoice users based on their energy consumption.

Solutions for energy sub-metering



How is each user billed for the electricity used?

The **CEM** series meters are intended for DIN-rail installation and are designed to read electrical energy, reporting consumption in order to manage industrial or commercial installations, production lines and service rentals.

In order to monetize the energy consumed by each user, invoicing meters have to be installed that can report the exact amount of energy consumed, either by checking the consumption information shown on the display or via RS-485 communications that can send the information to management and billing software using the Modbus protocol.

Types of Certification

Invoicing meters have to comply with **IEC 62053-21** (Class 1 for active energy) internationally or, in Europe, with the MID certification by means of the **EN 50470** (Class B for active energy) standard. The **MID** certification includes the **IEC 62052-11**, **IEC 62053-21** and **IEC 62053-23** standards, making it the most suitable option for any type of installation.



The **MID** certification is essential for those meters used to invoice energy use, as they ensure the reliability of the consumption logs used to bill the end user.



DIRECT MEASURE

INDIRECT MEASURE

SINGLE-PHASE

THREE-PHASE



Save costs by avoiding having to install external current transformers.



Adaptable to any power by means of current transformers.



CEM-C5

Single-phase electricity meter



CEM-C12c

Single-phase electricity meter



CEM-C21

Three-phase electricity meter



CEM-C31

Three-phase electricity meter



CEM-C5

Single-phase, direct measurement meter

Characteristics

- › Direct measurement up to 50 A
- › Class 1 in active energy - IEC 62053-21
- › Self-powered measurement
- › Direct replacement of mechanical meters



2 quadrants



1 module
DIN rail



Sealable



Impulse
output



CEM-C12c

Single-phase, direct measurement meter

Characteristics

- › Direct measurement up to 100 A
- › Class B/1 in active energy - EN 50470/IEC 62053-21
- › Class 2 in reactive energy - IEC 62053-23
- › Built-in network analyzer



4 quadrants



1 module
DIN rail



Sealable



RS-485



The most reliable measurement

The entire range of CEM meters features an anti-fraud system, using sealable covers, to prevent tampering with the wiring in any meter.

References

Reference number	Model	Certification	Voltage measurement	Current measurement	RS-485 (Modbus RTU)	Pulse output
Q25112.	CEM-C5	IEC	1x230V	50A	-	1
Q27211.	CEM-C12c	IEC	1x230V	5 (100) A	✓	-
Q27212.	CEM-C12c-MID	MID	1x230V	0.25 ... 5 (100) A	✓	-



CEM-C21

Three-phase, direct measurement meter

Characteristics

- › Direct measurement up to 65 A
- › 3 x 127/220... 3 x 230/400 V
- › Class B/1 in active energy - EN 50470/IEC 62053-21
- › Class 2 in reactive energy - IEC 62053-23
- › Built-in network analyzer
- › Energy cost measurement, CO₂ emissions
- › Record of operating hours for preventive maintenance.



4 modules
DIN rail



Sealable



RS-485



CEM-C31

Three-phase, direct measurement meter

Characteristics

- › Direct measurement .../5 A
- › 3 x 127/220... 3 x 230/400 V
- › Class B/1 in active energy - EN 50470/IEC 62053-21
- › Class 2 in reactive energy - IEC 62053-23
- › Built-in network analyzer
- › Energy cost measurement, CO₂ emissions
- › Record of operating hours for preventive maintenance.



4 modules
DIN rail



Sealable

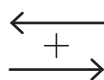


RS-485



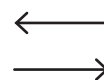
2 quadrants

Only the energy consumed by the installation is recorded.



Absolute Measure (ABS)

They record the absolute value of the energy, adding the total energy consumed and energy generated and showing it as a single value.



4 quadrants

Records both the energy consumed and generated in two independent logs.

References

Reference number	Model	Certification	Voltage measurement	Direct measurement	Indirect measurement	RS-485 (Modbus RTU)	Digital Input	Pulse output
Q22411.	CEM-C21-T1	IEC	3 x 127/220...3 x 230/400 V	65 A	-	-	-	1
Q22421.	CEM-C21-485-T1					✓	-	1
Q22431.	CEM-C21-485-DS					✓	1	-
Q22412.	CEM-C21-T1-MID					-	-	1
Q22422.	CEM-C21-485-T1-MID	MID				✓	-	1
Q22432.	CEM-C21-485-DS-MID					✓	1	-
Q23511.	CEM-C31-T1					-	-	1
Q23521.	CEM-C31-485-T1	IEC	3 x 57/100...3 x 230/400 V	-	.../5(10) A	✓	-	1
Q23531.	CEM-C31-485-DS					✓	1	-
Q23512.	CEM-C31-T1-MID					-	-	1
Q23522.	CEM-C31-485-T1-MID					✓	-	1
Q23532.	CEM-C31-485-DS-MID	MID				✓	1	-

Energy metering and invoicing



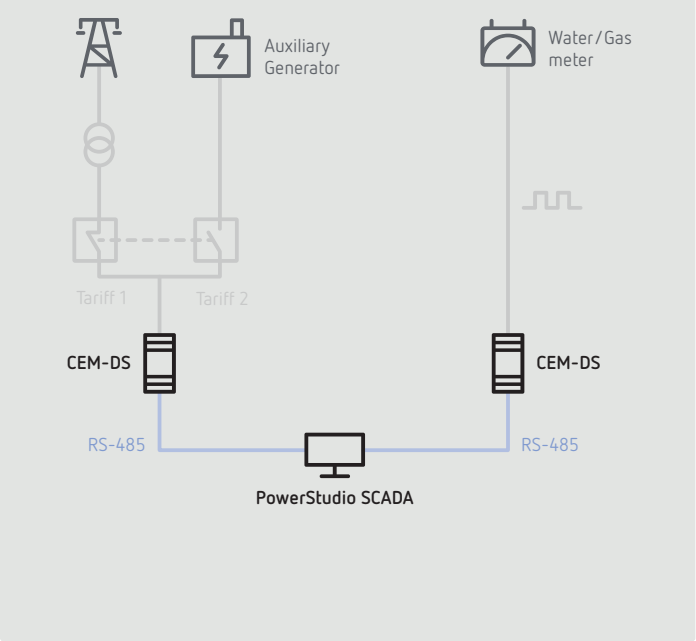
Select the model that best suits your needs

The CEM three-phase meters have two versions, depending on the type of application. The option is provided to add RS-485 communications (Modbus RTU) to record energy readings and electrical variables with the **PowerStudio** or **PowerStudio SCADA** energy management software.

DS version

DS modules have a digital input for tariff changes. This option is used for dual-supply systems, when the installation can consume energy from the grid or from a different secondary source (back-up generator or UPS).

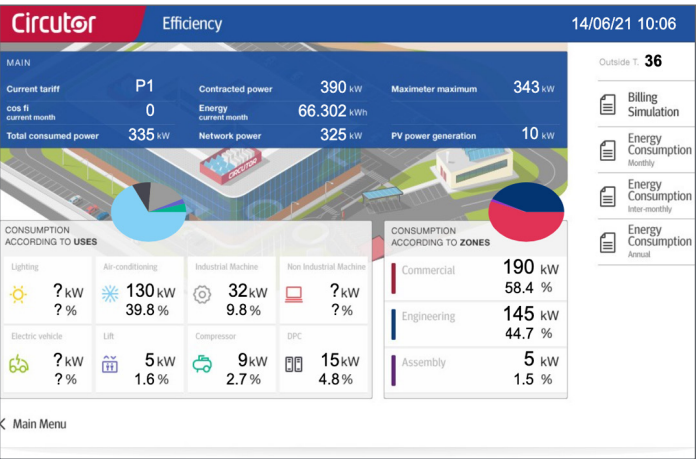
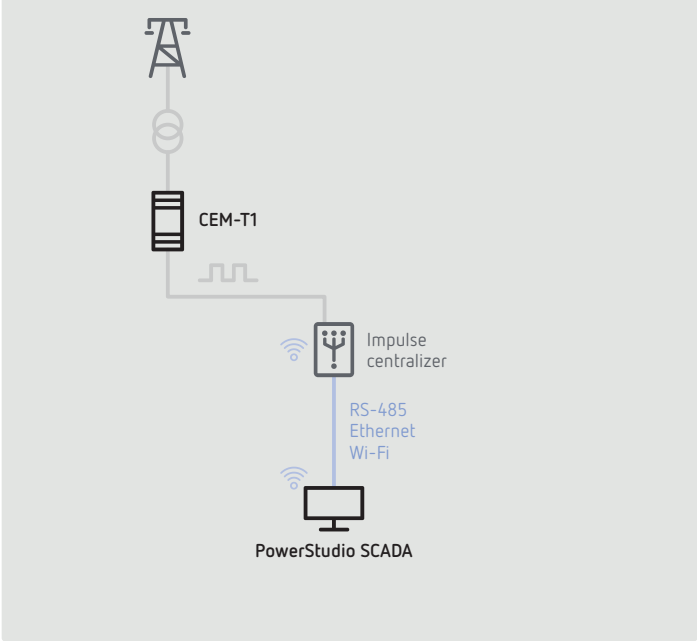
The digital input can also be used to receive pulses from other meters (water, gas, etc.).



Version T1

The **T1** models have a programmable digital output to emit pulses proportional to the energy consumed by the meter.

The digital output is designed to connect with pulse centralizers or programmable automations, to send the consumption data to the management software.



Meters with power analyzers

CEM devices can also be used as network analyzers. They not only manage active and reactive energy, they also measure voltage, current, power, power factor and other electrical variables to check the correct operation of any installation.



Creates automatic invoices in a simple way



Connect **CEM** meters via RS-485 communications (Modbus RTU) to the PowerStudio SCADA energy management software; to automatically generate and send simulations of electric bills, to distribute energy costs among different users, or to determine the consumption of each line or load in an installation.

Using **PowerStudio SCADA**, you can monitor your installation in real time, make graphs and tables to analyze consumption trends for each customer, create SCADA screens to manage each meter or contract, export the data or receive invoice simulations in your email to simplify the billing process.

Current transformers for any type of installation

CIRCUTOR offers a wide range of transformers for indirect current measurement **CEM-C31**. **TD** closed-core transformers are the best option for new construction installations or for those in which the service can be cut off. **TQ** transformers are ideal for existing installations where the power can't be cut in order to install them.



Download our catalogue of current transformers

TD closed-core transformers

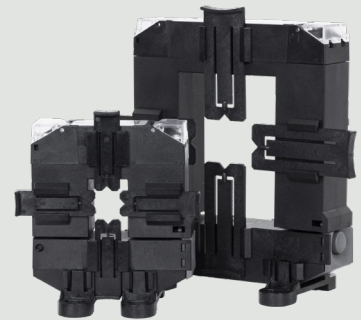
- ✓ .../ 5 A
- ✓ .../ 1 A
- ✓ .../ 250 mA



From 40 A to 4000 A

TQ open-core transformers

- ✓ .../ 5 A
- ✓ .../ 1 A
- ✓ .../ 250 mA



From 100 A to 1000 A

Applications





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