

Q.1

Multi-functional electric energy meters



Multi-functional electric energy meters

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Multi-functional electric energy meters

CIRWATT is a family of combined multi-functional meters that can meet any requirement of an energy metering system, including important aspects, such as quality, accuracy, safety and reliability.

The new metering technologies have allowed **CIRCUTOR** to develop new state-of-the-art equipment, including additional functions for the control and management of metering systems, for example, astronomical clocks, control of the maximum demand, control of programmable power, multi-supply meter (water and gas), meters with photovoltaic applications (two-directional), communications with PLC systems, etc.

The **CIRWATT** family offers a full range of electrical energy meters that are adapted to the type of application. It has the following sub-families:



Definition

In general, electrical consumption meters are devices that meter the consumption of electrical energy in a circuit or electricity service. The market offers electromechanical and electronic meters. Electromechanical meters use parasitic current

and voltage in a disc, influenced by the magnetic fields produced by the turning movement of the needles on a face. Electronic meters use a digital metering mechanism.



Advantage of **CIRWATT** meters:

- Remote management through different channels, for example, through the RS-232 port, RS-485, PLC, etc.
- Readings can be taken with local (Optical Reader), centralised or remote systems.



- There are no mobile parts, so there is no wear.
- There is an internal memory (load curve + billing + events).
- Programmable outputs:
 - Energy impulses
 - Taximeter pulse
 - Active rate
 - Maximum demand alarm
 - Configurable alarms (V, A, W, etc.).
- Lower error diversion throughout the meter's working life.
- Remote loading of the meter's *firmware*. Updates.
- Cost optimisation.
- Greater reading accuracy.
- Optimisation of the space inside meter cabinets (meter + analyzer + clock + taximeter) in a single device.
- Metering of electrical parameters (Voltage, Current, Power Factor, Reactive Energy in 4 quadrants, ...).
- Detection of fraud or manipulation.
- Remote interruption and reinstatement.
- Centralisation of the impulses of other meters (water, gas, ...).
- Variable regulation of the weight of the impulse.
- Integration in home energy management systems. Configurable contracts, rates and seasons.
- Storage in the event log memory:
 - Voltage interruptions
 - Incorrect phase connection
 - Manipulation
- Simple display on the screen:
 - Simple and interesting interface with the parameters metered by the meter.
 - The user can check the partial consumption. The user can check and control his own consumption.
 - Text messages can be sent to the users with notifications or alarms through the alarm outputs integrated in the meter and external GSM/GPRS modem.
 - Billing simulation with the software, using the meter's internal memory.

This section includes the billing meters, but it does not show the sub-metering meters. Submetering meters are shown in section **M3**.

Applications

Applicable to billing

CIRWATT meters are energy meters designed to meter the transfer of energy between frontier points. They are used by utilities companies and other customers. The use of all types of communications means that the information can be recorded by the meters locally or remotely.

Ports

CIRWATT's meters can be used as sub-metering units in wharfs. One of the typical applications of the said units uses PLC communications, since remote communications can be used to centralise the readings in the port's control centre.

The consumption of water can be metered with the impulses emitted by the water meter, connected to the digital inputs of the energy meter, depending on the type of meter. Therefore, automatic

water and energy readings will be taken through the PLC communications.

Photovoltaic installations

There are two possible **CIRWATT**.

The first application involves the placement of the single-phase meter connected to the inverter's output of the solar panel and a totalizer, usually three-phase, located at the frontier point. The second application involves the installation of a three-phase meter in the connection point of the electricity company.

One of the key positions for both applications is the communications with meters. In the first one, the optical system uses PLC communications and in the second one, when there are different installations with various totalizers, the communications can be Ethernet, RS-485 or Modem, thus gathering the data in centralised form.

Submetering installations

Another application used is submetering, not for official billing purposes, but for the metering of energy in the different plots, bungalows, rented apartments, etc.

In these cases, metering can be single or three-phase, with **CIRWATT** meters and PLC communications, centralising all readings in a single **PLC-800** concentrator. This is the way to achieve a more efficient installation in energy terms.

Single-phase meters with circuit breakers can be used for the remote management of the consumption, so that the relay is opened and closed to record / cancel the supply and limit the current, programming the internal relay and controlling the demand.

Product selection table

	Equipment	Active / Reactive Energy Class	Direct / Indirect metering	Voltage	Current	COM1 Communications	COM2 Communications	Load curve 1	Load curve 2	Events	Closing	Inputs / Outputs ****	Page
CIRWATT A		1 / -	Single Direct	230 V 127 V	10(120) A 10(60) A	PLC	-	1 month (60 min) **	-	-	1	•	7
CIRWATT B II		B / 2	Single Direct	230 V	10(60) A	PLC	-	3 months (60 min)	-	512	1	•	9
CIRWATT B III			Three-Phase Direct / Indirect		5(10) A 10(100) A	PLC		3 months (60 min)	-	512	1	•	11
CIRWATT C		1 / 2	Three-Phase Direct / Indirect	3x57/100 V ... 3x230/400 V	5(10) A 10(100) A	PLC RS-232 RS-232 RS-485	- RS-485 Ethernet RS-485	213 days (60 min)	53 days (15 min)	512	64	•	15
CIRWATT D		0,23 / 0,5 0,55 / 1	Three-Phase Indirect	3x57/100 V ... 3x63.5/110 V*	1(2) A 5(10) A	RS-232	RS-485 Ethernet	213 days (60 min)	53 days (15 min)	512	64	•	18
PLC-800		-	-	3x230/400 V ... 3x127/220 V	-	PLC	Ethernet GSMGPRS	•	-	•	•	-	21

(*) For other voltages, please ask
 (**) Only models with PLC
 (***) See specific catalogue

SELECTION TABLE - Single-phase Energy Meters

TYPE METER	TB	TA	
2 wires, asymmetrical connection	•	•	2
Class 1 Active		•	10
Class B Active / Class 2.0 Reactive	•		12
1 x 127 V c.a.	•		B
1 x 230 V c.a.	•		E
5 (60)			S2
10 (120)			S3
10 (60)	•		S4
50 Hz	•		A
60 Hz	•		B
Without communication		•	0
RS-485		•	2
R1 / R2 (PLC)	PLC A		4
R1 / R2 (PLC)	PLC B		5
Without card			0
2 relays 5A 250V (tarif indicator)	•		3
impulse meter input	•		A
type B	•		B
type A		•	A
Import only (2 Quadrants)	•		0
Bidirectional (4 Quadrants)	•		1
Unidirectional (4 Quadrants)			2
Cut off relay (phase)	•	•	2

CIRWATT - - x -

SELECTION TABLE - Three-phase Energy Meters

					CIRWATT				
					□	□	□	□	□
					-	□	□	□	□
					-	□	□	x	□
					-	□	□	□	□
TYPE METER	TB III	TC	TD						
4 wires	•	•	•	4	Connection mode				
0.2S active class / 0.5 Reactive class			•	02	Accuracy				
0.5S active class/ 1.0 Reactive class		•		05					
C Active class / 1.0 Reactive class				05	Measured voltage				
B Active class / 2.0 Reactive class	•			10					
3 x 57 / 100 V a.c. (4w)			•	L					
3 x 63.5 / 110 V a.c. (4w)	•		•	M					
3 x 127 / 220 V a.c.	•		•	N					
3 x 220 / 380 V a.c.			•	O					
3 x 230 / 400 V a.c. (4w)	•		•	Q	Current measure				
3 x 127 / 220 V a.c....3x230/400 Va.c.	•	•		U					
5 (10) A Transformer	•	•	•	T5					
10 (100) A Direct	•	•		D1	Frequency				
50 Hz	•		•	A					
60 Hz	•		•	B					
Automatic (50 / 60 Hz)		•		C	Communications				
Without communications	•			0					
R1 / R2 (PLC)		RS232 / -	RS232 / RS232	1					
R1 / R2 (PLC)		RS485 / -	RS232 / RS485	2					
R1 / R2 (PLC)		Ethernet / -	RS232 / Ether.	3					
R1 / R2 (PLC)	RS232 / - (PLC A)	PLC A		4					
R1 / R2 (PLC)	RS232 / - (PLC B)	PLC B		5					
R1 / R2 (PLC)	RS232 / RS232	RS232 / RS232		7					
R1 / R2 (PLC)	RS485 / RS485	RS485 / RS485		8					
R1 / R2 (PLC)	RS232 / RS485	RS232 / RS485		9					
R1 / R2 (PLC)	RS232 / Ether.	RS232 / Ether.		A					
R1 / R2 (PLC)	RS232/ USB			C					
R1 / R2 (PLC)	RS485 / Ether.			D					
Without card	•			0		Expansion modules			
Inputs / outputs (optomos)	•	•	•	4					
inputs / outputs (relay)	•	•	•	5					
Inputs (water and gas)	•			A					
Earth leakage measure	•			B	Type				
type B meter	•			B					
type C meter		•		C					
type D meter			•	D	Registration mode				
Import only (2 Quadrants)	•	•		0					
Bidirectional (4 Quadrants)	•	•	•	1					
Unidirectional (4 Quadrants)	•			2	More features				
Without more features	•	•	•	0					
Cutoff relay	•			2					

CIRWATT A

Single-phase active energy meter, Class 1

Description

CIRWATT A is a single-phase, digital multi-function meter, Class 1, for the metering of active energy.

CIRWATT A complies with the existing regulations applicable to electronic meters and it has an autonomous data retention system that avoids them from being lost when there is an interruption in the power supply. Likewise, it can be read through the screen (even when there is no power supply) and through the optical port (protocol IEC-61107).

Application

It has been specially designed for installations where electromechanical meters do not satisfy the current needs, particularly those that require a single-phase meter with a billing system.

Features



Power supply	
Nominal voltage	127 V or 230 V (depending on the type)
Tolerance	80 %... 120 % U_n
Consumption	< 0,4 W
Frequency	50 / 60 Hz
Operating range	- 20 ... + 60 °C
Measured voltage	
Connection	Asymmetrical
Reference voltages	127 V or 230 V (depending on the type)
Frequency	50 / 60 Hz
Measured current	
Currents (In)	5 (60) A, 10 (60) A, 10 (120) A
Accuracy	
Active energy	Class 1.0 (IEC 62053-21)
Calculation and processing	
Microprocessor	Based on DSP
Converter	16 bits
Memory	
Data	RAM type, stored by Lithium battery
Setup and events	Non-volatile memory of the FLASH type

Battery	
Type	Lithium
Working life	> 10 years
Clock	
Type	Grid frequency quartz oscillator
Drift	< 0.5 s/day at 25 °C
Relay outputs	
Type	Mechanical relay ; 230 V - 10 A
LED outputs	
Maximum rate	1000 pulses / kW-h
Security	Category III (110 V) in accordance with EN-61010
Build features	
Enclosure	In compliance with DIN 43859
Dimensions	In compliance with DIN 43857
Degree of protection	IP 51
Optical reader	IEC-61107 for local access
Events	
Inverse consumption detection	
Total inverse energy	
Operating hours	
Terminal cover opening detection	

CIRWATT A

Single-phase active energy meter, Class 1

Standards

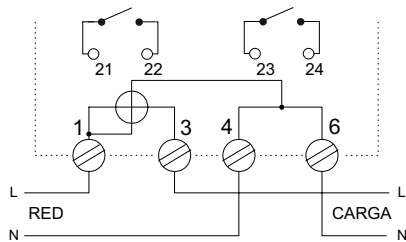
EN 62053-21 (EN 610369)	Standards for static, active energy meters for alternating current, Class 1
EN 50081-1	Residential emissions
EN 50082-1	Residential immunity
EN 55022	Driven emissions: Class B, Radiated emissions: Class B
EN 62052-11	Electricity measurement equipment (AC) - Part 11 Measuring equipment
EN 61000-4-6	Immunity to disturbances, induction by radio-frequency fields (common mode): 10 V/m
EN 61000-4-8	Immunity to electro-magnetic power fields: 30 A/m

References

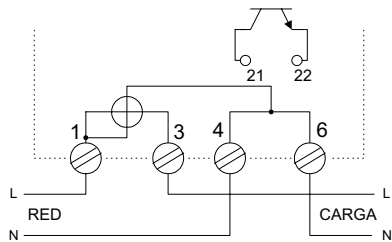
Measuring voltage 230 V ac	Current metering range (A)	Tariffs	Quadrants	Relay outputs	Type
•	10 (120)	3	2	1	CIRWATT A - 210-ED3-03A-00
•	10 (120)	3	2	2	CIRWATT A - 210-ED3-02A-00
•	5 (60)	3	2	1	CIRWATT A - 210-ED4-03A-00
•	5 (60)	3	2	2	CIRWATT A - 210-ED4-02A-00
•	10 (60)	3	2	1	CIRWATT A - 210-ED2-03A-00
•	10 (60)	3	2	2	CIRWATT A - 210-ED2-02A-00

Connections

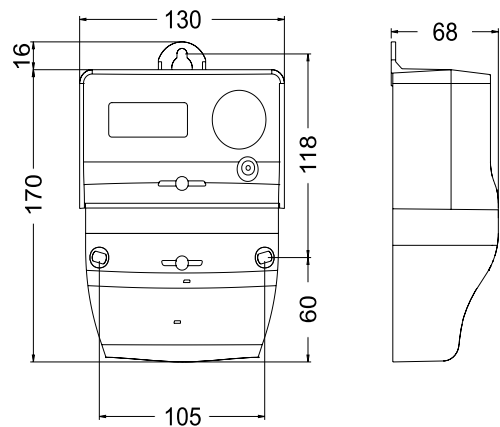
With one or two outputs with mechanical relay



With one digital output of energy pulses



Dimensions



CIRWATT B 100

Single-phase energy meter



Description

CIRWATT B 100 is a digital single phase meter class B (Class 1) in active energy, in compliance with European Directive MID and IEC standards.

The meter **CIRWATT B 100** meets existing regulations applicable to electronic meters and it has an autonomous system of data retention that prevents against loss of information. It also allows reading through the optical port protocol (**IEC-62056-21**).

CIRWATT B 100 is specially designed to be installed where the electromechanical meters do not satisfy with the current needs, particularly in those places where a single phase meter with one tariff is required. **CIRWATT B 100** has a small size that allows an easy installation, possibility of reverse energy storage and easy reading system through the display and optical port.

Features

Power Supply

Nominal voltage	127 V or 230 V
Tolerance	80%...115% U_n
Consumption	<2 W; 10 V·A
Frequency	50 Hz or 60 Hz

Voltage measurement

Connection	Asymmetrical or Symmetrical
Reference voltage	127 V or 230 V
Frequency	50 Hz or 60 Hz

Current measurement

Nominal reference current (I_{ref})	5 A
Maximum current (I_{max})	65 A
Minimal current (I_{min})	250 mA
Starting current (I_{st})	25 mA

Accuracy class

Active energy	Clase 1 - IEC 62053-21 / Clase B - EN 50470
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Application

CIRWATT B100 measures active energy with accuracy class 1 (according standard **IEC-62053-21**) or class B (according european directive **MID-EN50470**). This meter is certified according international standards, so it can be used to bill customers energy consumption. Moreover, its reduced dimensions and its accuracy are very suitable to measure small loads or machines (i.e. fridges, ovens or air conditionings). **CIRWATT B** registers energy in both directions, so it doesn't matter if the meter has been installed wrongly (generation instead of consumption) because the meter will register energy correctly.

Battery

Type	Lithium
Duration	> 20 years @ 30 °C

Environmental influence

Operating temperature range	40 °C ... +70 °C
Storage temperature	-40 °C ... +85 °C
Relative humidity	95% max.

Isolation

Insulation voltage	4 kV a 50 Hz for one minute
Impulse voltage 1.2 / 50 us - IEC 62052-11	6 kV
Protection degree (IEC 62052-11)	II

Display

Type	LCD
Number of digits	Up to 8

CIRWATT B100

Single-phase energy meter



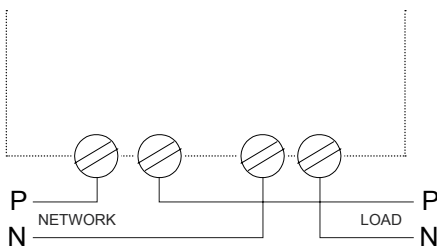
Features

Optical port	
Type	Serial, bi-directional
Protocol	IEC 62056-21 Mode C
Construction features	
IP degree (IEC 60529)	IP 54
External dimensions	DIN 43857
Enclosing features	DIN 43859
Front / Base fixation	Sealed with ultra-sounds

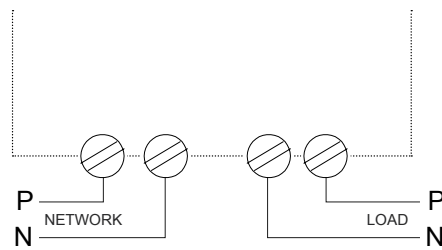
Data configuration	
Memory type	FIFO
Tariffs	Single tariff

Connection

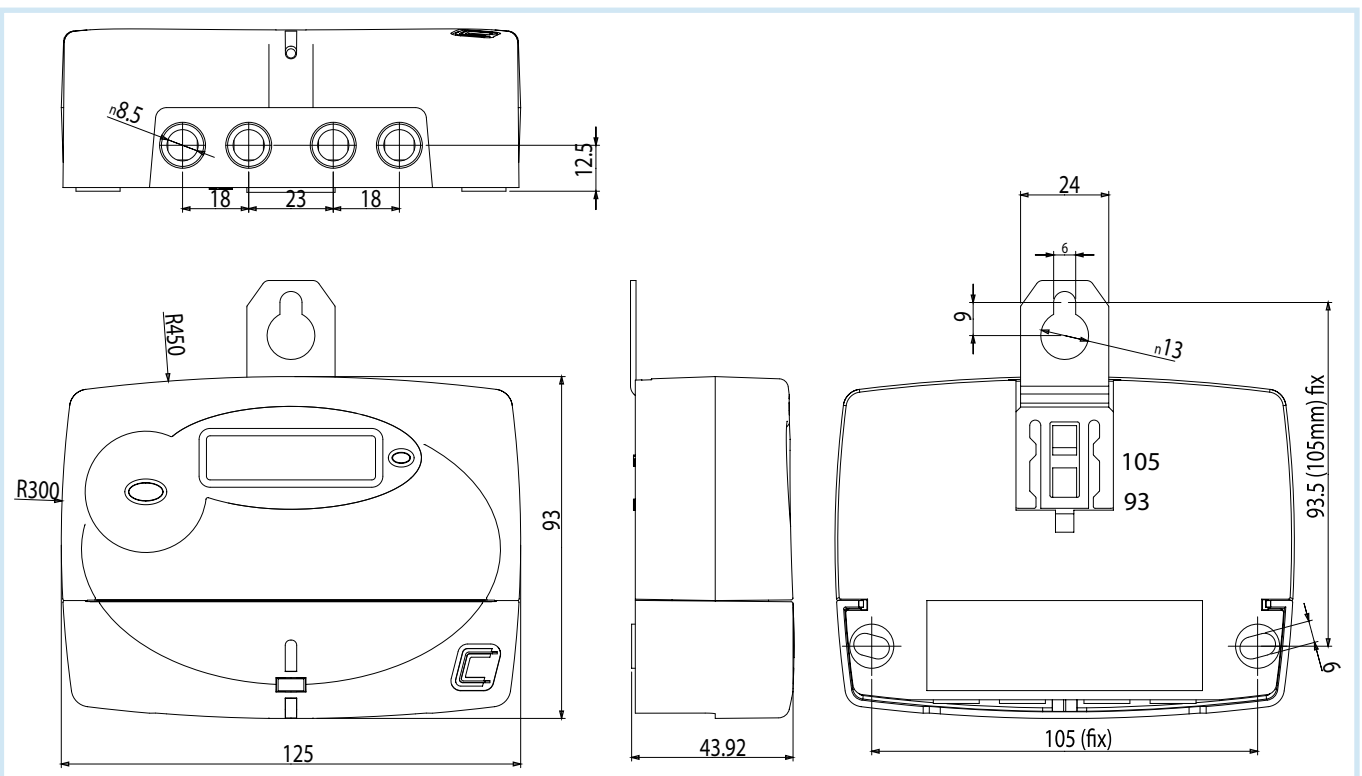
DIN Connection (Asymmetrical)



BS Connection (Symmetrical)



Dimensions



CIRWATT B 101

CIRWATT B 102

Single-phase energy meter

Description

CIRWATT B 101-102 are single phase residential meters with class B (class 1) in active energy and class 2 in reactive energy. It has 4 tariffs and a flexible configuration. An advanced design offers high features and versatility to fulfill requirements in domestic applications.

These meters have memory to record load profile for 400 days, 12 billing closures and moreover tamper registers and power quality information.

As an option it has a backlight display to help in reading energy consumptions or any other information showed if there is no enough light.



Application

Using an RS-485 communication port it is possible to connect up to 32 meters in the same bus and download data remotely using a GSM/GPRS modem.

These meters have many options to detect tampering or any unauthorized access to the meter such as: magnetic field detection, reverse current detection, terminal cover removed, neutral current measurement.

Using **CIRWATT B 101-102** pulse output, user can add a **CIRCUTOR** impulse concentrator **LM**, which allows to centralize energy consumptions and send all data remotely to an energy management software **Power Studio**.

Features

Power supply	
Nominal voltage	127 V or 230 V
Tolerance	80%...115% U_n
Consumption	<2 W; 10 V-A
Frequency	50 Hz or 60 Hz
Voltage measurement	
Connection	Asymmetrical or Symmetrical
Reference voltage	127 V or 230 V
Frequency	50 Hz or 60 Hz
Current measurement	
Nominal reference current (I_{ref})	5 A
Maximum current (I_{max})	65 A
Minimal current (I_{min})	250 mA
Starting current (I_{st})	20 mA
Accuracy class	
Active energy	Class 1 - IEC 62053-21 / Class B - EN 50470
Reactive energy	Class 2 - IEC 62053-21

Battery	
Type	Lithium
Duration	> 20 years @ 30 °C
Environmental influence	
Operating temperature range	40 °C ... +70 °C
Storage temperature	-40 °C ... +85 °C
Humidity	95% max.
Isolation	
Insulation voltage	4 kV a 50 Hz durante un minuto
Impulse voltage 1.2/50 us - IEC 62052-11	6 kV
Protection degree (IEC 62052-11)	II
Display	
Type	LCD
Number of data digits	Up to 7
Read without supply	Yes
Backlight	Yes (optional)

Features

Optical port	
Type	Serial, bi-direccional
Protocol	IEC 62056-21 Mode C
Communication port RS-485 (in model 102)	
Type	Serial, bi-direccional
Protocol	IEC 62056-21 Mode C / MODBUS
Construction features	
IP Degree (IEC 60529)	IP 53
External dimmensions	DIN 43857
Enclosing features	DIN 43859

Data configuration

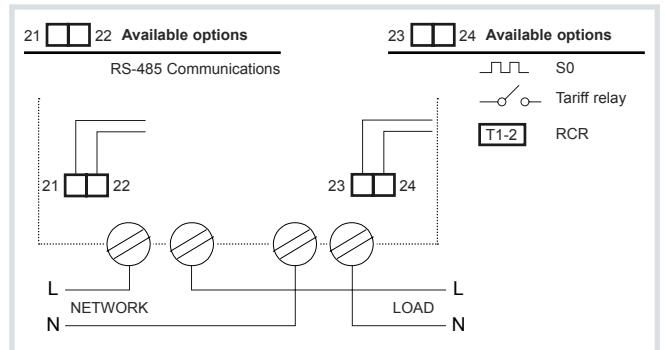
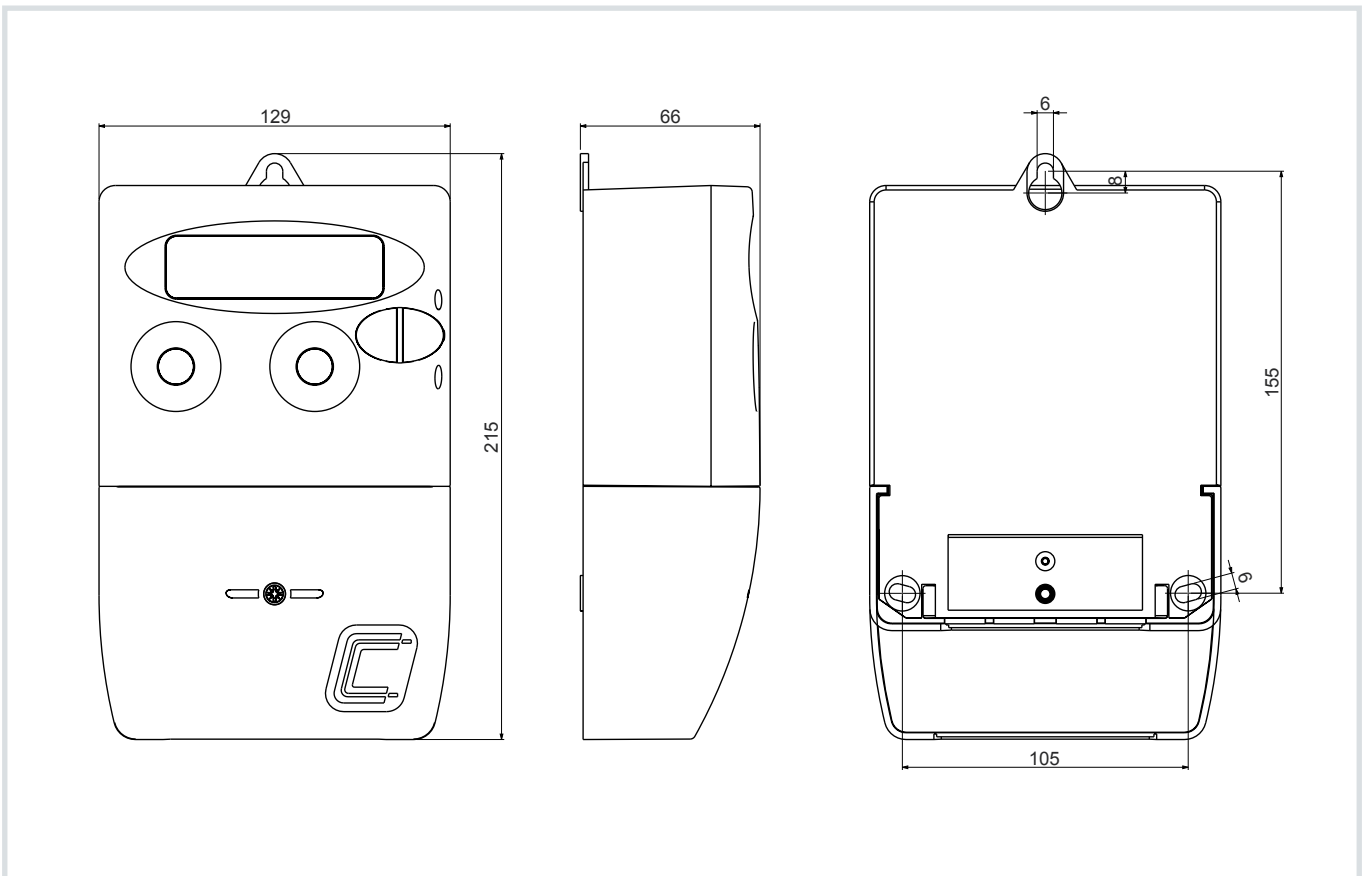
Memory type	FIFO
Tariffs	Up to 4
Billing clousures	15
Load profile	Yes (optional)
Registers for load profile	9600

Anti-tampering features

Terminal cover detection	Yes (micro-switch)
Reverse wiring detection	Yes
Current measurement	Yes (optional)
Manipulation register	Yes, up to 200 registers

Features

	CIRWATT B 101	CIRWATT B 102
Communication port RS-485		•
Pulse output (IEC 62053-31)	•	•
Input for tariff control (Ripple control)	•	•
Relay output for tariff indication	•	•
Electromagnetic field detection	•	•

Connections

Dimensions


ELECTRICITY DISPENSER B II

Single phase energy meter with dispenser function and circuit breaker.

Description

The **ELECTRICITY DISPENSER B II** is a single-phase meter with an electric energy dispensing function to control the demand.

The energy dispenser function is based on the patented concept of the daily energy allowance, allowing the user a smart management of the available electricity in grids with limited or pulsating generation, such as those fed with renewable energy sources.

It includes a main switch that works as a maximum power and maximum demand control as well as an auxiliary switch that can be used for connection or disconnection of non-essential consumptions.

The energy meter complies with the European regulations (MID) EN 50470-1 and EN50470-3, being class B for active energy measuring and class 2 for reactive energy measuring.

It has a standard optical port and a communications port for network connection used for the writing/reading of parameters and for data logging.

It incorporates a wireless RFID card reader where the configuration parameters, according to the grid where it will be connected, are included, and also used as a contract and billing control.

The LCD screen and LEDs enable the user to check the energy availability.

Application

- Rural Micro-grids with renewable energies such as solar, wind, hydro and others...
- Micro-grids with diesel generators where it is needed to limit the available energy.
- Control of the daily energy allowance in stand-alone installations
- Electric energy meter with flat tariff or prepaid RFID card for difficult access consumptions and / or low consumptions



Features

Power supply	
Nominal voltage	230 V or 120 V
Tolerance	80 % ... 115 % U_n
Consumption	<2 W; 10 V·A
Frequency	50 or 60 Hz
Voltage measurement	
Connection	Asymmetrical
Reference voltage	230 V
Frequency	50 or 60 Hz
Voltage consumption of the circuit	< 2 W
Current measurement	
Iref Nominal reference current	10 A
Maximum current I _{max}	40 A
Start-up current I _{st}	< 0.04 x I _{tr}
Minimum current I _{min}	< 0.5 x I _{tr}
Current consumption of the circuit	0.024 V·A at 10 A
Accuracy class	
Accuracy measured in active energy	EN 50470 - Class B
Accuracy measured in reactive energy	UNE-EN 62053-21 - Class 2
Memory	
Data	Non-volatile memory
Setup and events	Serial flash

ELECTRICITY DISPENSER B II

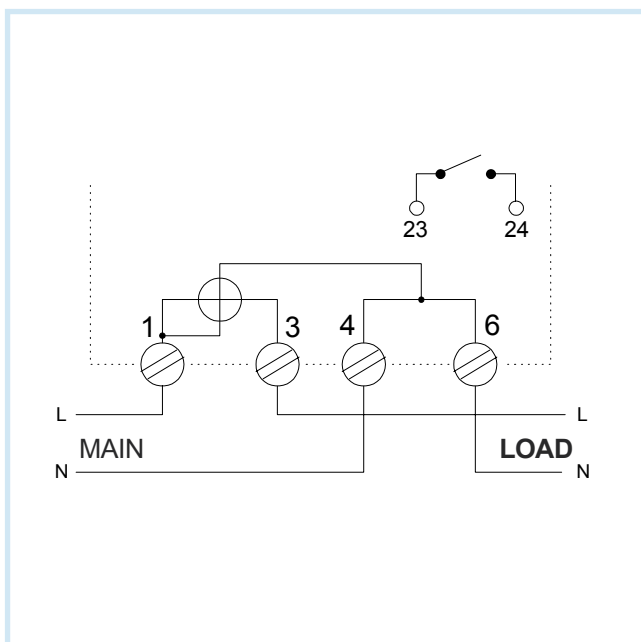
Single phase energy meter with dispenser function and circuit breaker.

Features

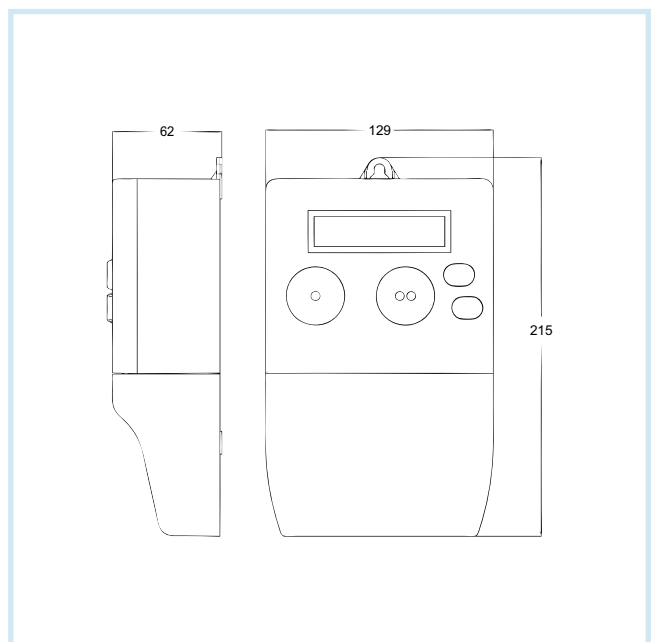
Battery	
Type	Lithium
Working Life	>10 years at 30°C
Clock	
Type	Gregorian calendar
Source	Temperature compensated oscillator
Accuracy (EN61038)	< 0.5 s/day
Environmental influence	
Operating temperature range	-25°C to +70°C
Storage temperature range	-40°C to +85°C
Temperature coefficient	< 15 ppm/K
Humidity	95 % max.
Insulation	
Insulating voltage	4 kV to 50 Hz during 1 min
Impulse voltage 1.2/50 μ s - IEC 62052-11	8 kV
Protection degree (IEC 62052-11)	II
Display	
Type	LCD
Number of data digits	UP to 6
Size of data digits	9 mm
Display data reading when there is no voltage	Yes
Optical communications interface	
Type	Full duplex
Hardware	IEC 62056-21
Protocol	Modbus

RS-485 communication channel	
Type	Half duplex
Configuration	9600, 8, n, 1
Protocol	Modbus
RFID	
Technology	Mifare MF1 ICS 50
Relay	
Nominal current	40 A
Maximum current	120 A / 5 minutes
Auxiliary relay	
Nominal current	5 A at 230Vca
Tampering detection	
Detection	Opening the terminal cover
Type	Micro-switch
Function	Detects intruders when there is no voltage
Construction features	
Connection	Asymmetrical
External dimensions	DIN 43857
Enclosing features	DIN 43859
IP Degree (IEC 60529)	IP 51

Connections



Dimensions



CIRWATT B 200

Single-phase active energy meter, Class B* and reactive, Class 2

Description

CIRWATT B is a multi-function digital single-phase meter, Class B in active energy and Class 2 in reactive energy. The meter complies with European legislation related to energy meters (MID) **EN 50470-1** and **EN 50470-3**, which approves the installation of these meters in any country of the European Union.

It includes PLC (Power Line Carrier) Communications through power cable and an optical communications port. Both use **IEC-61870-5-102** protocol. In addition, it can display information in case of power loss just pressing the button, it can store up to 6 channels of energy registers with 3 months of hourly load profile and it can limit maximum power consumed by end-user, through an internal disconnection relay which can be remotely managed using PLC communications.

Application

The main application of the **CIRWATT B** meter is the metering of active and reactive energy for billing purposes, whenever a meter with high performance features is required at an optimised cost. **PLC** communications can be used for the remote download of all data recorded by the meter through a **PLC-800** concentrator.

The circuit breaker integrated in the meter can be used to manage the supply remotely, opening/closing the circuit breaker and programming the hired power above a value that will activate the circuit breaker, opening it and reclosing it to guarantee the safety for the final user.

Features

Power supply	
Nominal voltage	230 V
Tolerance	80 % ... 115 % U_n
Consumption	<2 W; 10 V·A
Frequency	50 Hz
Voltage measurement	
Connection	Asymmetrical
Reference voltage	230 V
Frequency	50 or 60 Hz
Voltage circuit consumption	< 2 W; 10 V·A
Current measurement	
Nominal reference current, I_{ref}	10A
Maximum current I_{max}	60A
Start-up current I_{st}	< 0.04 x I_{tr}
Minimum current I_{min}	< 0.5 x I_{tr}
Current circuit consumption	0.024 V·A at 10 A
Accuracy class	
Accuracy measured in active energy	EN 50470 - Class B*
Accuracy measured in reactive energy	UNE-EN 62053-21 - Class 2
Memory	
Data	Non-volatile memory
Setup and events	Serial flash



Battery	
Type	Lithium
Working Life	>20 years @ 30°C
Clock	
Type	Gregorian calendar
Source	Temperature compensated oscillator
Accuracy (EN61038)	< 0.5 s/day
Environmental influence	
Operating temperature range	-25°C to +70°C
Storage temperature range	-40°C to +85°C
Temperature coefficient	< 15 ppm/K
Humidity	95 % max.
Insulation	
Insulating voltage	4 kV to 50 Hz during 1 min
Impulse voltage 1.2/50 μ s - IEC 62052-11	6 kV
Protection degree (IEC 62052-11)	II
Display	
Type	LCD
Number of data digits	UP to 6
Size of data digits	9 mm
Display data reading when there is no voltage	Yes

* Class B is equivalent to a Class 1

CIRWATT B

Single-phase active energy meter, Class B and reactive, Class 2

Features

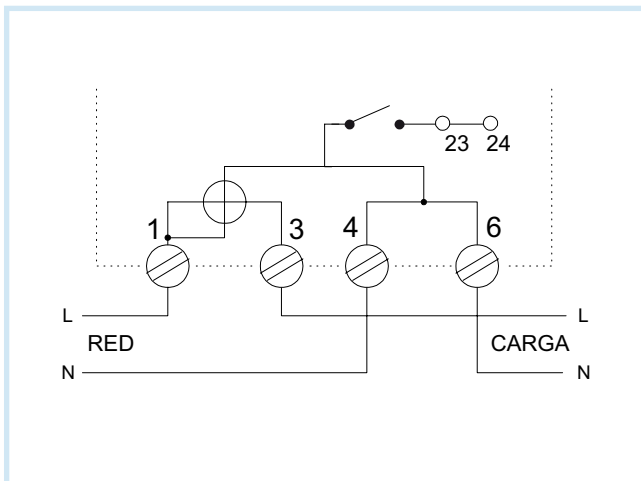
Optical communications interface	
Type	Serial, two-directional
Hardware	IEC 62056-21
Protocol	REE, based on IEC 870-5-102
Tampering detector	
Detection	Opening the terminal cover
Type	Micro-switch
Function	Detects intruders when there is no voltage.
Construction features	
Connection	Asymmetrical
External dimensions	DIN 43857
Enclosing features	DIN 43859
IP Degree (IEC 60529)	IP 51
PLC	
Modulation system	DSCK with repeater system
Hardware	CENELEC A or CENELEC B
Protocol	CirPLC and PEP (PLC Encapsulated Protocol)

Rate programming	
Number of days	4
Types of days	4
Contracts	1
Number of Tariffs	6
Discrimination	1 hour
Holidays/festivities	15
Special days	None
Load curve	
Number of load curves	1
Integration time	Programmable: 1 ... 253
Recording depth	2200
Events	
Number of events	200
Billing closures	
Number of locks	12, per contract
Type	Disabled / Programmable date and hour

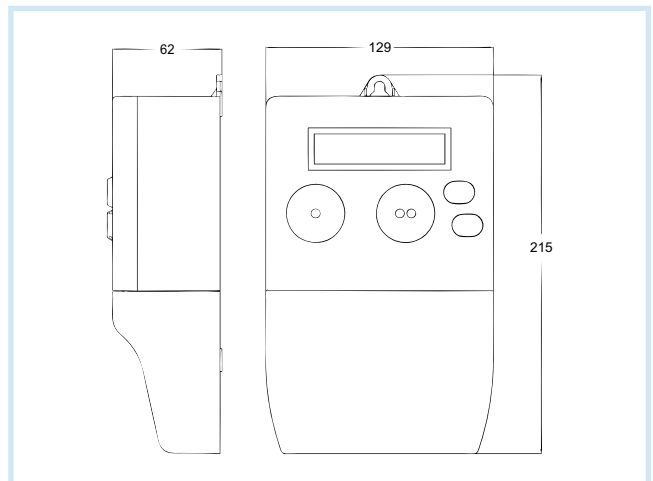
References

Metering voltage 230 Vac	Current metering range (A)	Hourly discrimination	Quadrants	Relay outputs	Impulse outputs	Impulse inputs	Communication	Internal Circuit breaker	Type
•	10 (60)	DH 1	4	2			PLC A	•	CIRWATT B - 212-ES4-43B-12
•	10 (60)	DH 0	4	2			PLC A	•	CIRWATT B - 212-ED4-43B-12

Connections



Dimensions



CIRWATT B 410D

Standard three-phase meter with direct connection



Description

CIRCUTOR's CIRWATT B 410D is a standard three phase direct connection meter, as a result of all the technological developments which is experiencing the current market. These changes have created new needs and requirements both in terms of more flexible rates, new communications systems and a price optimization.

Application

CIRWATT B 410D is suitable for LV applications (with currents from 100 to 120 A), adapted to new market challenges, having different communication systems and expansion modules. Providing to the market a robust and competitive meter fully complying with the new European Directive MID (EN 50470) and all the relevant IEC's.

Features

Power supply	
Nominal voltage	3 x 230 (400) V - 3 x 127 (230) V
Tolerance	80% ... 115% U_n
Consumption	< 2 W; < 10 V·A
Frequency	50 or 60 Hz
Voltage measurement	
Connection	Asymmetrical
Reference voltage	3 x 230 (400) V - 3 x 127 (230) V *
Frequency	50 or 60 Hz
Voltage consumption of the circuit	< 2 W; 10 V·A
Current measurement	
Nominal reference current I_{ref} (I_{max})	5 (100) A or 10 (100) A or 10 (120) A or 15 (120) A *
Start-up current I_{st}	< 0,04 x I_{tr}
Minimum current I_{min}	< 0,5 x I_{tr}
Current consumption of the circuit	< 0,1 V·A
Accuracy class	
Accuracy measured in active energy	EN 50470 (Class B) - IEC 62053-21 (Class 1)
Accuracy measured in reactive energy	IEC 62053-23 (Class 2)
Memory	
Data	Non-volatile memory
Setup and events	Serial flash
Battery	
Type	Lithium
Working Life	> 20 years @ 30 °C
Clock	
Type	Gregorian calendar
Source	Temperature compensated oscillator
Accuracy (EN 61038)	< 0.5 s / day at 23 °C
Environmental influence	
Operating temperature range	-40 ... +70 °C
Storage temperature range	-40 ... +85 °C
Temperature coefficient	< 15 ppm/K
Humidity	95 % máx.
Insulation	
Insulating voltage	4 kV a 50 Hz during 1 min
Impulse voltage 1.2/50 μ s - IEC 62052-11	8 kV
Protection degree (IEC 62052-11)	II
Display	
Type	LCD
Number of data digits	up to 8
Size of data digits	8 mm
Display data reading when there is no voltage.	Yes

* Request for other configurations

CIRWATT B 410D

Standard three-phase meter with direct connection



Features

Optical communications interface	
Type	Serial, two-directional
Hardware	IEC 62056-21
Protocol	REE, based on IEC 870-5-102
Tampering detector	
Detection	Opening the terminal cover
Type	Micro-switch
Function	Detects intruders when there is no voltage.
Construction features	
Connection	Asymmetrical
External dimensions	DIN 43857
Enclosing features	DIN 43859
IP Degree (IEC 60529)	IP 51
PLC	
Modulation system	DSCK with repeater system
Hardware	CENELEC A or CENELEC B
Protocol	CirPLC and PEP (PLC Encapsulated Protocol)

Rate programming	
Number of days	12
Types of days	10
Contracts	3
Number of Tariffs	9
Discrimination	1 hour
Holidays/festivities	30
Special days	12
Load curve	
Number of load curves	2
Integration time	Programmable: 1 ... 253 min
Recording depth	4000
Events	
Number of events	200
Billing closures	
Number of locks	12, per contract
Type	Disabled / Programmable date and hour

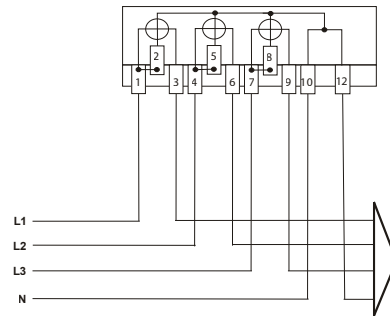
Other features

Communications *	Expansion cards *
RS-232 / PLC	Without inputs / outputs
RS-485 / PLC	4 relay outputs (Tariff indicator)
RS-232 / RS-232	2 relay outputs / 4 impulse inputs
RS-485 / RS-485	4 pulse inputs
RS-232 / RS-485	Earth leakage measurement
RS-232 / Ethernet	2 relay outputs / 2 impulse outputs / 2 impulse inputs
R-485 / Ethernet	

* Request for other configurations

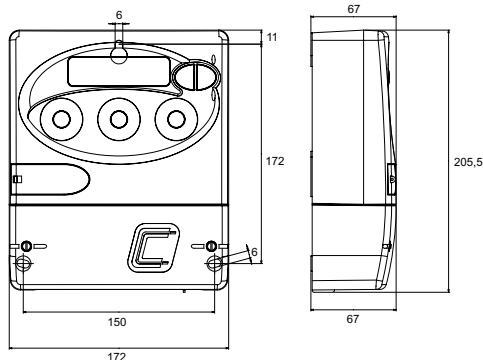
Connections

CIRWATT B 410D three-phase direct connection

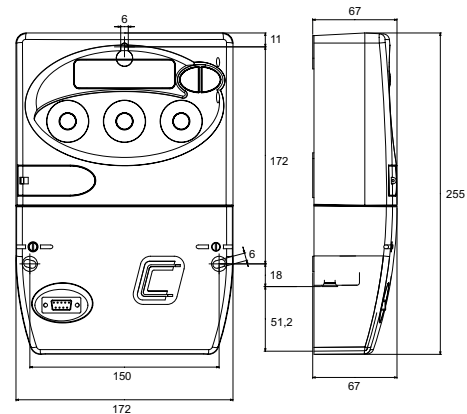


Dimensions

Terminal cover option



Wire cover option



CIRWATT B 410D

Standard three-phase meter with direct connection



References

Class (Active/ Reactive)	Quadrants	Frequency (Hz)	Measuring range V	Measuring range A	Communication COM1	Communication COM2	Type	Code
B / 2	4	50 or 60 Hz	3x230/400 V	10 (100)A	RS-232	RS232	CIRWATT B 410-QD1A-70B10	QB4A0
B / 2	4	50 or 60 Hz	3x230/400 V	10 (100)A	RS-485	RS485	CIRWATT B 410-QD1A-80B10	QB4E0
B / 2	4	50 or 60 Hz	3x230/400 V	10 (100)A	RS-232	RS485	CIRWATT B 410-QD1A-90B10	QB4B0
B / 2	4	50 or 60 Hz	3x230/400 V	10 (100)A	RS-232	ETHERNET	CIRWATT B 410-QD1A-A0B10	QB4C0
B / 2	4	50 or 60 Hz	3x230/400 V	10 (100)A	RS-485	ETHERNET	CIRWATT B 410-QD1A-D0B10	QB4D0
B / 2	4	50 or 60 Hz	3x127/220 V	10 (100)A	RS-232	RS232	CIRWATT B 410-ND1A-70B10	QB740
B / 2	4	50 or 60 Hz	3x127/220 V	10 (100)A	RS-485	RS485	CIRWATT B 410-ND1A-80B10	QB7E0
B / 2	4	50 or 60 Hz	3x127/220 V	10 (100)A	RS-232	RS485	CIRWATT B 410-ND1A-90B10	QB7B0
B / 2	4	50 or 60 Hz	3x127/220 V	10 (100)A	RS-232	ETHERNET	CIRWATT B 410-ND1A-A0B10	QB7C0
B / 2	4	50 or 60 Hz	3x127/220 V	10 (100)A	RS-485	ETHERNET	CIRWATT B 410-ND1A-D0B10	QB7D0

CIRWATT B 410T

Standard three-phase meter with indirect connection



Description

CIRCUTOR's CIRWATT B 410T is a standard three phase indirect connection meter, as a result of all the technological developments which is experiencing the current market. These changes have created new needs and requirements both in terms of more flexible rates, new communications systems and a price optimization.

Application

CIRWATT B 410T is suitable to be installed in LV and MV networks being the best solution or installations with high and medium consumptions like shopping malls, industries and high consumption households. Providing to the market a robust and competitive meter fully complying with the new European Directive MID (EN 50470) and all the relevant IEC's.

Features

Power supply	
Nominal voltage	3 x 230 (400) V - 3 x 127 (230) V - 3 x 63,5 (110) V
Tolerance	80% ... 115% U_n
Consumption	< 2 W; < 10 V·A
Frequency	50 or 60 Hz
Voltage measurement	
Connection	Asymmetrical
Reference voltage	3 x 230 (400) V - 3 x 127 (230) V - 3 x 63,5 (110) V *
Frequency	50 or 60 Hz
Voltage consumption of the circuit	< 2 W; 10 V·A
Current measurement	
Nominal reference current I_{ref} (I_{max})	1 (2) A or 1 (6) A or 2,5 (10) A or 5 (10) A *
Start-up current I_{st}	< 0,04 x I_{tr}
Minimum current I_{min}	< 0,2 x I_{tr}
Current consumption of the circuit	< 0,1 V·A
Accuracy class	
Accuracy measured in active energy	EN 50470 (Class B) - IEC 62053-21 (Class 1)
Accuracy measured in reactive energy	IEC 62053-23 (Class 2)
Memory	
Data	Non-volatile memory
Setup and events	Serial flash
Battery	
Type	Lithium
Working Life	> 20 years @ 30 °C
Clock	
Type	Gregorian calendar
Source	Temperature compensated oscillator
Accuracy (EN 61038)	< 0.5 s / day at 23 °C
Environmental influence	
Operating temperature range	-40 ... +70 °C
Storage temperature range	-40 ... +85 °C
Temperature coefficient	< 15 ppm/K
Humidity	95 % máx.
Insulation	
Insulating voltage	4 kV a 50 Hz during 1 min
Impulse voltage 1.2/50 μ s - IEC 62052-11	8 kV
Protection degree (IEC 62052-11)	II
Display	
Type	LCD
Number of data digits	up to 8
Size of data digits	8 mm
Display data reading when there is no voltage.	Yes

* Request for other configurations

CIRWATT B 410T

Standard three-phase meter with indirect connection



Features

Optical communications interface	
Type	Serial, two-directional
Hardware	IEC 62056-21
Protocol	REE, based on IEC 870-5-102
Tampering detector	
Detection	Opening the terminal cover
Type	Micro-switch
Function	Detects intruders when there is no voltage.
Construction features	
Connection	Asymmetrical
External dimensions	DIN 43857
Enclosing features	DIN 43859
IP Degree (IEC 60529)	IP 51
PLC	
Modulation system	DSCK with repeater system
Hardware	CENELEC A or CENELEC B
Protocol	CirPLC and PEP (PLC Encapsulated Protocol)

Rate programming	
Number of days	12
Types of days	10
Contracts	3
Number of Tariffs	9
Discrimination	1 hour
Holidays/festivities	30
Special days	12
Load curve	
Number of load curves	2
Integration time	Programmable: 1 ... 253 min
Recording depth	4000
Events	
Number of events	200
Billing closures	
Number of locks	12, per contract
Type	Disabled / Programmable date and hour

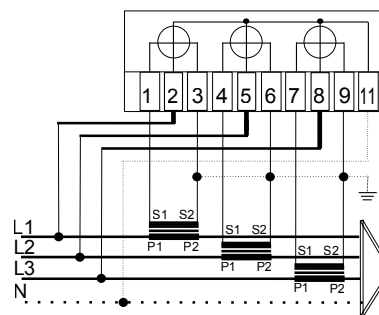
Other features

Communications *	Expansion cards *
RS-232 / PLC	Without inputs / outputs
RS-485 / PLC	4 relay outputs (Tariff indicator)
RS-232 / RS-232	2 relay outputs / 4 impulse inputs
RS-485 / RS-485	4 pulse inputs
RS-232 / RS-485	Earth leakage measurement
RS-232 / Ethernet	2 relay outputs / 2 impulse outputs / 2 impulse inputs
R-485 / Ethernet	

* Request for other configurations

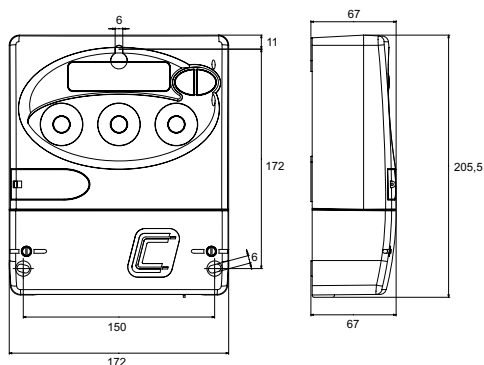
Connections

CIRWATT B 410T indirect connection

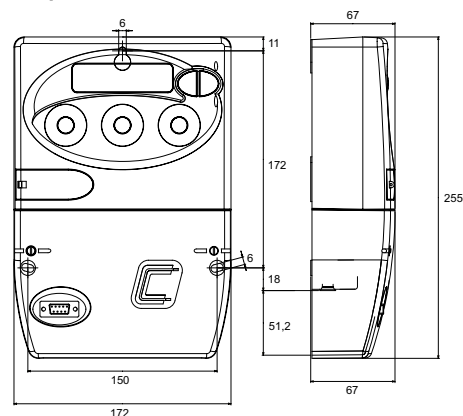


Dimensions

Terminal cover option



Wire cover option



CIRWATT B 410T

Standard three-phase meter with indirect connection



References

Class (Active/ Reactive)	Quadrants	Frequency (Hz)	Measuring range V	Measuring range A	Communication COM1	Communication COM2	Type	Code
B / 2	2	50 or 60 Hz	3x230/400 V	.../5A	RS232	RS232	CIRWATT B 410-QT5A-70B00	QB660
B / 2	2	50 or 60 Hz	3x230/400 V	.../5A	RS485	RS485	CIRWATT B 410-QT5A-80B00	QB6A0
B / 2	2	50 or 60 Hz	3x230/400 V	.../5A	RS232	RS485	CIRWATT B 410-QT5A-90B00	QB670
B / 2	2	50 or 60 Hz	3x230/400 V	.../5A	RS232	ETHERNET	CIRWATT B 410-QT5A-A0B00	QB680
B / 2	2	50 or 60 Hz	3x230/400 V	.../5A	RS485	ETHERNET	CIRWATT B 410-QT5A-D0B00	QB690
B / 2	2	50 or 60 Hz	3x127/220 V	.../5A	RS232	RS232	CIRWATT B 410-NT5A-70B00	QBF60
B / 2	2	50 or 60 Hz	3x127/220 V	.../5A	RS485	RS485	CIRWATT B 410-NT5A-80B00	QBFA0
B / 2	2	50 or 60 Hz	3x127/220 V	.../5A	RS232	RS485	CIRWATT B 410-NT5A-90B00	QBF70
B / 2	2	50 or 60 Hz	3x127/220 V	.../5A	RS232	ETHERNET	CIRWATT B 410-NT5A-A0B00	QBF80
B / 2	2	50 or 60 Hz	3x127/220 V	.../5A	RS485	ETHERNET	CIRWATT B 410-NT5A-D0B00	QBF90

CIRWATT B 505

Multi-function three-phase meter with indirect connection



Description

CIRCUTOR's CIRWATT B 505 is a standard three phase indirect connection meter, as a result of all the technological developments which is experiencing the current market. These changes have created new needs and requirements both in terms of more flexible rates, new communications systems and a price optimization.

Application

CIRWATT B 505 is a 4 quadrants meter suitable for heavy or medium industry applications, offering a high degree of security and precise resolution on the measured energy readings. Providing to the market a robust and competitive meter with different communication ports and expansion cards, fully complying with the new European Directive MID (EN 50470) and IEC 62053-22 for Active Energy (Class 0,5S) and IEC 62053-23 for Reactive Energy (Class 1 or Class 2).

Features

Power supply	
Nominal voltage	3 x 230 (400) V - 3 x 127 (230) V - 3 x 63,5 (110) V
Tolerance	80% ... 115% U_n
Consumption	< 2 W; < 10 V·A
Frequency	50 or 60 Hz
Voltage measurement	
Connection	Asymmetrical
Reference voltage	3 x 230 (400) V - 3 x 127 (230) V - 3 x 63,5 (110) V *
Frequency	50 or 60 Hz
Voltage consumption of the circuit	< 2 W; 10 V·A
Current measurement	
Nominal reference current $I_{ref} (I_{max})$	1 (2) A or 1 (6) A or 2,5 (10) A or 5 (10) A or 1 (10) A *
Start-up current I_{st}	< 0,02 x I_{tr}
Minimum current I_{min}	< 0,2 x I_{tr}
Current consumption of the circuit	< 0,1 V·A
Accuracy class	
Accuracy measured in active energy	EN 50470 (Class C) - IEC 62053-22 (Class 0,5S)
Accuracy measured in reactive energy	IEC 62053-23 (Class 1 or 2)
Memory	
Data	Non-volatile memory
Setup and events	Serial flash
Battery	
Type	Lithium
Working Life	> 20 years @ 30 °C
Clock	
Type	Gregorian calendar
Source	Temperature compensated oscillator
Accuracy (EN 61038)	< 0.5 s / day at 23 °C
Environmental influence	
Operating temperature range	-40... +70 °C
Storage temperature range	-40 ... +85 °C
Temperature coefficient	< 15 ppm/K
Humidity	95 % máx.
Insulation	
Insulating voltage	4 kV a 50 Hz during 1 min
Impulse voltage 1.2/50 μ s - IEC 62052-11	6 kV
Protection degree (IEC 62052-11)	II
Display	
Type	LCD
Number of data digits	up to 8
Size of data digits	8 mm
Display data reading when there is no voltage.	Yes

* Request for other configurations



CIRWATT B 505

Multi-function three-phase meter with indirect connection

Features

Optical communications interface	
Type	Serial, two-directional
Hardware	IEC 62056-21
Protocol	REE, based on IEC 870-5-102
Tampering detector	
Detection	Opening the terminal cover
Type	Micro-switch
Function	Detects intruders when there is no voltage.
Construction features	
Connection	Asymmetrical
External dimensions	DIN 43857
Enclosing features	DIN 43859
IP Degree (IEC 60529)	IP 51

Rate programming	
Number of days	12
Types of days	10
Contracts	3
Number of Tariffs	9
Discrimination	1 hour
Holidays/festivities	30
Special days	12
Load curve	
Number of load curves	2
Integration time	Programmable: 1 ... 253 min
Recording depth	4000
Events	
Number of events	200
Billing closures	
Number of locks	12, per contract
Type	Disabled / Programmable date and hour

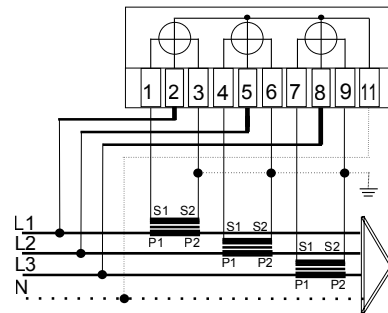
Other features

Communications *	Expansion cards *
RS-232 / RS-232	Without inputs / outputs
RS-485 / RS-485	4 relay outputs (Tariff indicator)
RS-232 / RS-485	2 relay outputs / 4 impulse inputs
RS-232 / Ethernet	4 pulse inputs
R-485 / Ethernet	Earth leakage measurement
	2 relay outputs / 2 impulse outputs / 2 impulse inputs

* Request for other configurations

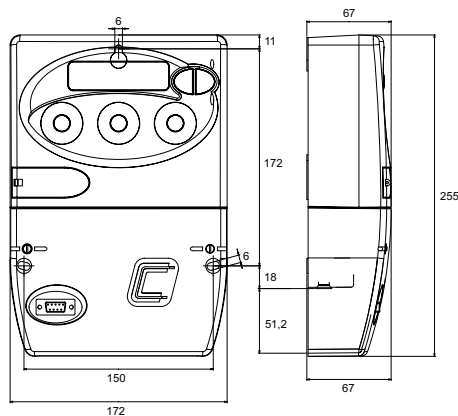
Connections

CIRWATT B 505 three-phase indirect connection



Dimensions

Wire cover option



CIRWATT B 502

Multi-function three-phase meter with indirect connection



Description

There are installations in which due to high energy consumption or generation, the accuracy of the meter to be installed is a key factor to consider. **CIRCUTOR** offers the best option to measure large amounts of energy. **CIRWATT B 402** is a high accuracy meter, with four quadrants measurements and different communications and expansion cards.

Application

It is specially designed for HV installations which requires a strict billing system, different load profiles and communications. Fully adapts to the customer's requirements.

Features

Power supply	
Nominal voltage	3 x 230 (400) V - 3 x 127 (230) V - 3 x 63,5 (110) V
Tolerance	80% ... 115% U_n
Consumption	< 2 W; < 10 V·A
Frequency	50 or 60 Hz
Voltage measurement	
Connection	Asymmetrical
Reference voltage	3 x 230 (400) V - 3 x 127 (230) V - 3 x 63,5 (110) V **
Frequency	50 or 60 Hz
Voltage consumption of the circuit	< 2 W; 10 V·A
Current measurement	
Nominal reference current $I_{ref} (I_{max})$	1 (2) A or 1 (6) A or 2,5 (10) A or 5 (10) A *
Start-up current I_{st}	< 0,001 x I_{ref}
Minimum current I_{min}	< 0,01 x I_{ref}
Current consumption of the circuit	< 0,1 V·A
Accuracy class	
Accuracy measured in active energy	EN 50470 (Class C) - IEC 62053-22 (Class 0,2S)
Accuracy measured in reactive energy	IEC 62053-23 (Class 0,5 or 1 or 2)
Memory	
Data	Non-volatile memory
Setup and events	Serial flash
Battery	
Type	Lithium
Working Life	> 20 years @ 30 °C
Clock	
Type	Gregorian calendar
Source	Temperature compensated oscillator
Accuracy (EN 61038)	< 0.5 s / day at 23 °C
Environmental influence	
Operating temperature range	-40 ... +70 °C
Storage temperature range	-40 ... +85 °C
Temperature coefficient	< 15 ppm/K
Humidity	95 % máx.
Insulation	
Insulating voltage	4 kV a 50 Hz during 1 min
Impulse voltage 1.2/50 μ s - IEC 62052-11	6 kV
Protection degree (IEC 62052-11)	II
Display	
Type	LCD
Number of data digits	up to 8
Size of data digits	8 mm
Display data reading when there is no voltage.	Yes

* Request for other configurations

** Voltage not available in 1 (10) A model



CIRWATT B 502

Multi-function three-phase meter with indirect connection

Features

Optical communications interface	
Type	Serial, two-directional
Hardware	IEC 62056-21
Protocol	REE, based on IEC 870-5-102
Tampering detector	
Detection	Opening the terminal cover
Type	Micro-switch
Function	Detects intruders when there is no voltage.
Construction features	
Connection	Asymmetrical
External dimensions	DIN 43857
Enclosing features	DIN 43859
IP Degree (IEC 60529)	IP 51

Rate programming	
Number of days	12
Types of days	10
Contracts	3
Number of Tariffs	9
Discrimination	1 hour
Holidays/festivities	30
Special days	12
Load curve	
Number of load curves	2
Integration time	Programmable: 1 ... 253 min
Recording depth	4000
Events	
Number of events	200
Billing closures	
Number of locks	12, per contract
Type	Disabled / Programmable date and hour

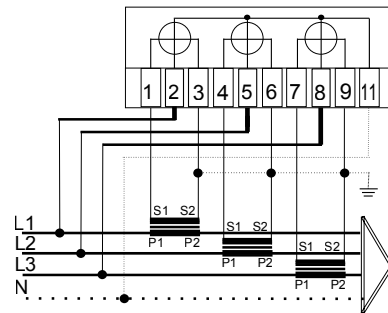
Other features

Communications *	Expansion cards *
RS-232 / RS-232	Without inputs / outputs
RS-485 / RS-485	4 relay outputs (Tariff indicator)
RS-232 / RS-485	2 relay outputs / 4 impulse inputs
RS-232 / Ethernet	4 pulse inputs
R-485 / Ethernet	Earth leakage measurement
	2 relay outputs / 2 impulse outputs / 2 impulse inputs

* Request for other configurations

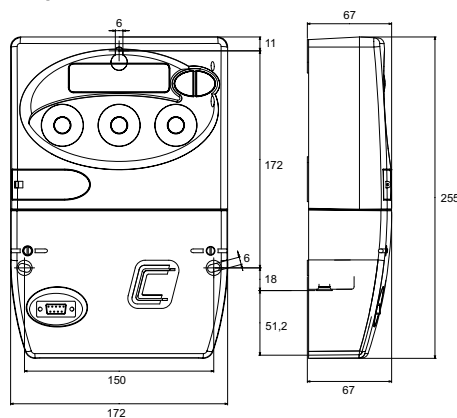
Connections

CIRWATT B 502 three-phase indirect connection



Dimensions

Wire cover option



CIRWATT B 410 RC

Three-phase energy meter with built in relay



Description

CIRWATT B 410 RC direct connection with built in relay is a standard three-phase meter, as a result of all the technological developments which is experiencing the current market. These changes have created new needs and requirements both in terms of more flexible rates, new communications systems and a price optimization.

CIRWATT B 410 RC direct connection is suitable for LV applications, adapted to new market challenges, having different communication systems and expansion modules. Providing to the market a robust and competitive meter fully complying with the new European Directive MID (EN 50470- IEC 62053-22). Its built in relay can be opened and closed remotely and also the maximum contracted currents can be programmed

Application

CIRWATT B 410 RC is ideal for LV and MV power supplies up to 100A. Different communication channels can be used (depending on the model): Optical, RS-232, RS-485, Ethernet or PLC (Power Line carrier). The built in relay status could be easily modified using **CIRCUTOR**'s software.

Features

Power supply	Direct
Nominal voltage	3 x 230 (400) V - 3 x 127 (230) V
Tolerance	80 % ... 115 % U_n
Consumption	<2 W; 10 V·A
Frequency	50 or 60 Hz
Voltage measurement	
Connection	Asymmetrical
Reference voltage	400 V
Frequency	50 or 60 Hz
Voltage consumption of the circuit	< 2 W; 10 V·A
Current measurement	Class B
Nominal reference current I_{ref}	10 A
Maximum current I_{max}	100 A
Start-up current I_{st}	< 0,04 x I_{tr}
Minimum current I_{min}	< 0,5 x I_{tr}
Current consumption of the circuit	< 0,1 V·A
Accuracy class	
Accuracy measured in active energy	EN 50470 - Class B / IEC 62053-21
Accuracy measured in reactive energy	IEC 62053-23 - Class 2
Memory	
Data	Non-volatile memory
Setup and events	Serial flash
Battery	
Type	Lithium
Working Life	>20 years @ 30 °C
Clock	
Type	Gregorian calendar
Source	Temperature compensated oscillator
Accuracy (EN 61038)	< 0.5 s/day at 23 °C
Environmental influence	
Operating temperature range	-40 ... +70 °C
Storage temperature range	-40 ... +85 °C
Temperature coefficient	< 15 ppm/K
Humidity	95 % máx.
Insulation	
Insulating voltage	4 kV a 50 Hz during 1 min
Impulse voltage 1.2/50 μ s - IEC 62052-11	6 kV
Protection degree (IEC 62052-11)	II
Display	
Type	LCD
Number of data digits	up to 8
Size of data digits	8 mm
Display data reading when there is no voltage.	Yes

CIRWATT B 410 RC

Three-phase energy meter with built in relay



Features

Optical communications interface

Type	Serial, two-directional
Hardware	IEC 62056-21
Protocol	REE, based on IEC 870-5-102

Tampering detector

Detection	Opening the terminal cover
Type	Micro-switch
Function	Detects intruders when there is no voltage.

Construction features

Connection	Asymmetrical
External dimensions	DIN 43857
Enclosing features	DIN 43859
IP Degree (IEC 60529)	IP 51

PLC

Modulation system	DSCK with repeater system
Hardware	CENELEC A or CENELEC B
Protocol	CirPLC and PEP (PLC Encapsulated Protocol)

Rate programming

Number of days	12
Types of days	10
Contracts	3
Number of Tariffs	9
Discrimination	1 hour
Holidays/festivities	30
Special days	12

Load curve

Number of load curves	2
Integration time	Programmable: 1 ... 253 min
Recording depth	4000

Events

Number of events	200
------------------	-----

Billing closures

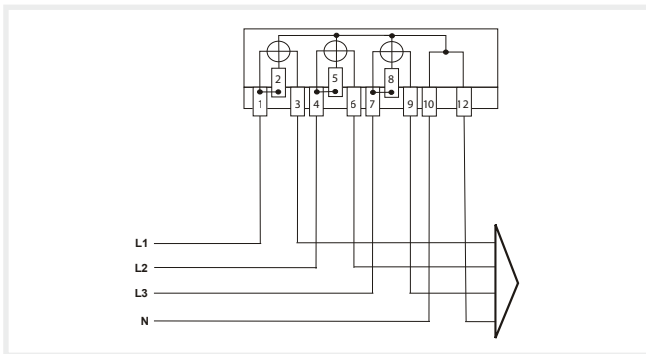
Number of locks	12, per contract
-----------------	------------------

Type	Disabled / Programmable date and hour
------	---------------------------------------

Circuit breaker

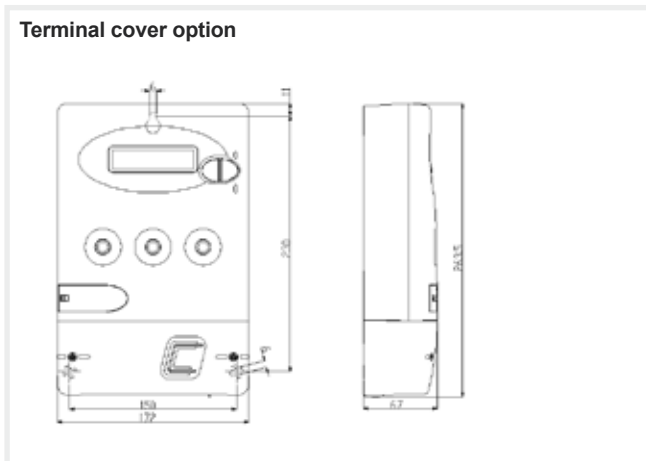
Type	Bistable relay
Maximum switching current	100 A

Connections

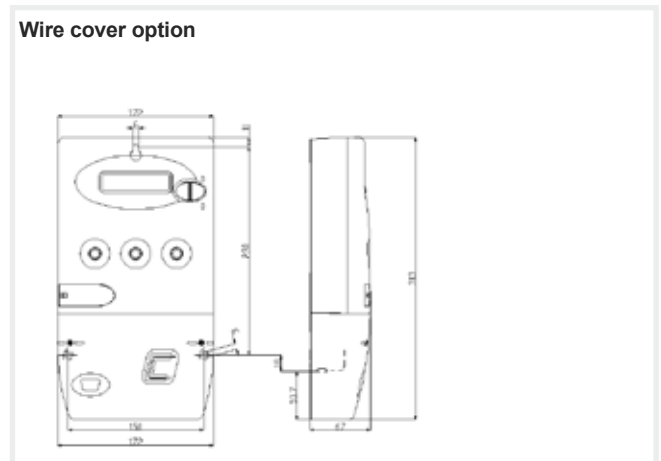


Dimensions

Terminal cover option



Wire cover option



CIRWATT C

Digital multi-function three-phase meter



Description

Digital multi-function three-phase meter, with 2 or 4 quadrants, with type-1 accuracy in active energy and type-2 accuracy in reactive energy, direct or indirect metering, with the possibility of programming up to 3 contracts.

In accordance with the demands and needs of the electricity market, **CIRCUTOR** has included 2 communications ports (on demand), respecting the IEC and MODBUS communications protocols. It is committed to future technologies, adapting a range of Type C meters to the new communications system, PLC.

The main display shows the following visual indicators in standby mode:

- Energy direction
- Reactive capacitive / reactive
- Quadrant being used
- Phases activated and their direction
- Active rate per contract
- The meter also has 3 alarms to indicate the status of the contact or the installation: critical, non-critical and battery.

Application

CIRWATT C is ideal for LV and MV power supplies up to 450 kW.

Special 4Q meter for FV plants, with an endless number of communications options.

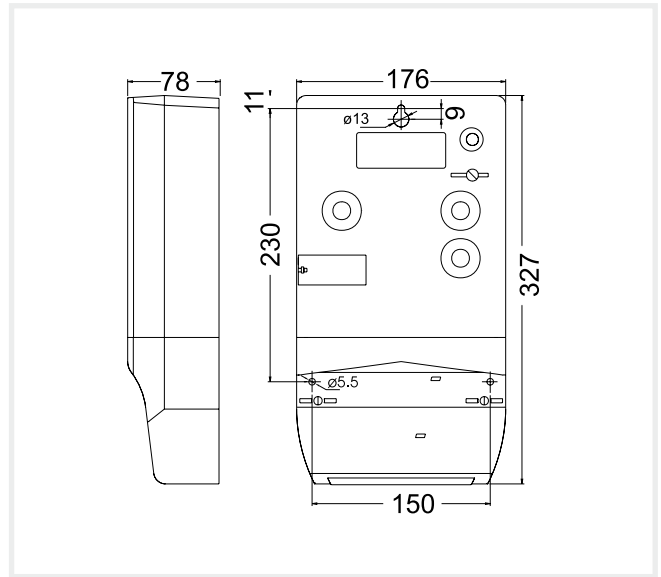
Features

Power supply circuit	Self-powered
Nominal voltage	Multi-range, from 3 x 57.7 / 100 V to 3 x 230 / 400 V _{ac}
Tolerance	± 20 %
Consumption	< 2 W / 10 V·A
Frequency	50 ... 60 Hz
Operating temperature	- 20 ... + 60 °C
Metering circuit	
Connection	3 or 4 wires from the same unit
Reference voltages	Multi-range, from 3x57.7/100 V to 3x230/400 Vac
Frequency	50 ... 60 Hz
Current circuit	
Nominal base currents	.../5 or .../1 A (indirect metering; 10 A (direct metering)
Maximum current	10 or 2 A (2 x I _n) (indirect metering); 100 A (10 x I _n) (direct metering)
Accuracy	
Active Energy	Class 1 (IEC 61036)
Reactive Energy	Class 1 (IEC 61268)
Data memory	FLASH (non-volatile memory)
Capacity	Events: 512 records / Billing closing: 64 / Load curve: 213 days / 2nd programmable load curve: 5,120 records
Clock maintenance battery	Lithium
Working Life	10 years (50% load)
Operation with no battery or voltage	Maximum 24 hours
Clock	
Type	Quartz oscillator / grid synchronism (adjustable by the programmer)
Quartz oscillator drift	< 0.5 s/day at 25 °C
Digital inputs (on demand)	4 inputs (60...300 V _{ac})
Digital outputs (on demand)	3 mechanical relay outputs (up to 400 V _{ac}) optoMOS
Verification LED output	
Rate	20 000 impulses / kW·h or kvar·h, in terms of secondary values (indirect metering); 1 000 impulses / kW·h (direct metering)
Communications	
Optical interface	IEC-61107
COM 1	RS-232 / RS-485 / Ethernet / PLC (depending type)
Protocols	IEC-870-5-102, IEC-61107
Build features	
Enclosure	In compliance with DIN 43859
Weight	1.9 kg

CIRWATT C

Digital multi-function three-phase meter

Dimensions

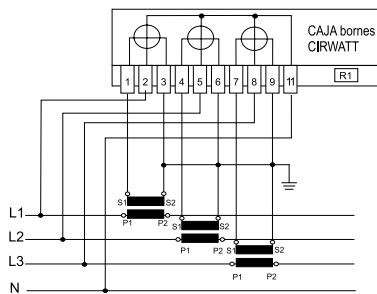


Standards

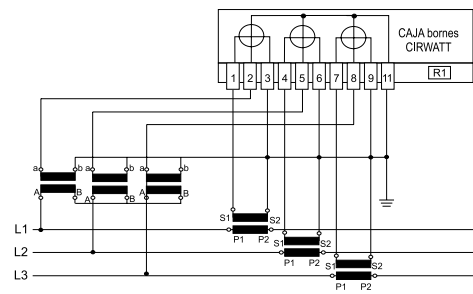
IEC60687	Static active energy meters for ac, Class 0.5S, 0.2S
IEC61036	Static active energy meters for ac, Class 1
IEC61268	Static reactive energy meters for ac, Class 1 and 2
EN -50081-1	Residential emissions
EN -50082-2	Industrial immunity
EN 55022	Driven emissions: Class B / Radiated emissions: Class B
EN 61000-4-6	Immunity to RF fields coupled to cables (common mode): 10 V
EN 61000-4-8	Immunity to magnetic fields and grid frequency: 30 A/m

Connections

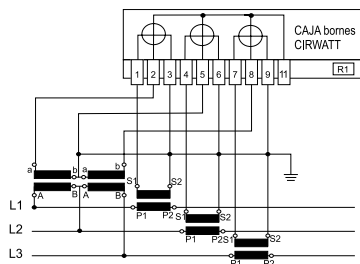
3 / 4 Wire Connection (LV)



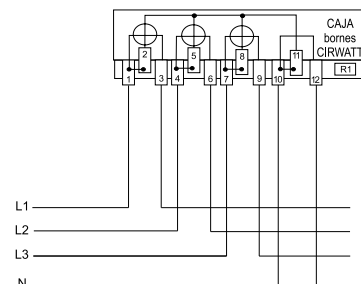
3 Wire Connection (MV)



3 Wire Connection (MV)



Direct metering



CIRWATT C

Digital multi-function three-phase meter



References

Class (active/reactive)	Quadrants	Measuring range V	Measuring range A	Input / Output relays	Input impulses	Communication COM1	Communication COM2	Type	Code
Standard									
1/2	2	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS232	-	CIRWATT C 410-UD1C-10C0	Q1C521
1/2	2	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS485	-	CIRWATT C 410-UD1C-20C0	Q1C525
1/2	2	3x57/110 V a 3x230/400 V	10 (100)A	-	-	ETHERNET	-	CIRWATT C 410-UD1C-30C0	Q1C52D
1/2	2	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS232	RS232	CIRWATT C 410-UD1C-70C0	Q1C52W
1/2	2	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS485	RS485	CIRWATT C 410-UD1C-80C0	Q1C52U
1/2	2	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS232	RS485	CIRWATT C 410-UD1C-90C0	Q1C52T
1/2	2	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS232	ETHERNET	CIRWATT C 410-UD1C-A0C0	Q1C52V
1/2	2	3x57/110 V a 3x230/400 V	.../5A	-	-	RS232	-	CIRWATT C 410-UT5C-10C0	Q1C511
1/2	2	3x57/110 V a 3x230/400 V	.../5A	-	-	RS485	-	CIRWATT C 410-UT5C-20C0	Q1C515
1/2	2	3x57/110 V a 3x230/400 V	.../5A	-	-	ETHERNET	-	CIRWATT C 410-UT5C-30C0	Q1C51D
1/2	2	3x57/110 V a 3x230/400 V	.../5A	-	-	RS232	RS232	CIRWATT C 410-UT5C-70C0	Q1C51W
1/2	2	3x57/110 V a 3x230/400 V	.../5A	-	-	RS485	RS485	CIRWATT C 410-UT5C-80C0	Q1C51U
1/2	2	3x57/110 V a 3x230/400 V	.../5A	-	-	RS232	RS485	CIRWATT C 410-UT5C-90C0	Q1C51T
1/2	2	3x57/110 V a 3x230/400 V	.../5A	-	-	RS232	ETHERNET	CIRWATT C 410-UT5C-A0C0	Q1C51V
4 quadrants - Energy generation									
1/2	4	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS232	-	CIRWATT C 410-UD1C-10C1	Q1C421
1/2	4	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS485	-	CIRWATT C 410-UD1C-20C1	Q1C425
1/2	4	3x57/110 V a 3x230/400 V	10 (100)A	-	-	ETHERNET	-	CIRWATT C 410-UD1C-30C1	Q1C42D
1/2	4	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS232	RS232	CIRWATT C 410-UD1C-70C1	Q1C42W
1/2	4	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS485	RS485	CIRWATT C 410-UD1C-80C1	Q1C42U
1/2	4	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS232	RS485	CIRWATT C 410-UD1C-90C1	Q1C42T
1/2	4	3x57/110 V a 3x230/400 V	10 (100)A	-	-	RS232	ETHERNET	CIRWATT C 410-UD1C-A0C1	Q1C42V
1/2	4	3x57/110 V a 3x230/400 V	.../5A	-	-	RS232	-	CIRWATT C 410-UT5C-10C1	Q1C411
1/2	4	3x57/110 V a 3x230/400 V	.../5A	-	-	RS485	-	CIRWATT C 410-UT5C-20C1	Q1C415
1/2	4	3x57/110 V a 3x230/400 V	.../5A	-	-	ETHERNET	-	CIRWATT C 410-UT5C-30C1	Q1C41D
1/2	4	3x57/110 V a 3x230/400 V	.../5A	-	-	RS232	RS232	CIRWATT C 410-UT5C-70C1	Q1C41W
1/2	4	3x57/110 V a 3x230/400 V	.../5A	-	-	RS485	RS485	CIRWATT C 410-UT5C-80C1	Q1C41U
1/2	4	3x57/110 V a 3x230/400 V	.../5A	-	-	RS232	RS485	CIRWATT C 410-UT5C-90C1	Q1C41T
1/2	4	3x57/110 V a 3x230/400 V	.../5A	-	-	RS232	ETHERNET	CIRWATT C 410-UT5C-A0C1	Q1C41V
Inputs / outputs									
1/2	2	3x57/110 V a 3x230/400 V	10 (100)A	4 / 3	Opto	RS232	-	CIRWATT C 410-UD1C-14C0	Q1C522
1/2	2	3x57/110 V a 3x230/400 V	10 (100)A	4 / 3	Rele	RS232	-	CIRWATT C 410-UD1C-15C0	Q1C523
1/2	2	3x57/110 V a 3x230/400 V	10 (100)A	4 / 3	Opto	RS485	-	CIRWATT C 410-UD1C-24C0	Q1C526
1/2	2	3x57/110 V a 3x230/400 V	10 (100)A	4 / 3	Rele	RS485	-	CIRWATT C 410-UD1C-25C0	Q1C527
1/2	2	3x57/110 V a 3x230/400 V	.../5A	4 / 3	Opto	RS232	-	CIRWATT C 410-UT5C-14C0	Q1C512
1/2	2	3x57/110 V a 3x230/400 V	.../5A	4 / 3	Rele	RS232	-	CIRWATT C 410-UT5C-15C0	Q1C513
1/2	2	3x57/110 V a 3x230/400 V	.../5A	4 / 3	Opto	RS485	-	CIRWATT C 410-UT5C-24C0	Q1C516
1/2	2	3x57/110 V a 3x230/400 V	.../5A	4 / 3	Rele	RS485	-	CIRWATT C 410-UT5C-25C0	Q1C517

CIRWATT D

Multi-function three-phase high accuracy energy meter

Description

High-accuracy meter, metering in 4 quadrants and offering the maximum programming and communications flexibility, in order to be suitable any type of requirement. The best option for large-scale consumers. The meter has an LCD display with 3 lines, where all parameters are displayed on 2 buttons. The main display shows the following visual indicators in standby mode:

- Energy direction
- Reactive capacitive / reactive
- Quadrant being used
- Phases activated and their direction
- Active rate per contract

The meter also has 3 alarms to indicate the status of the contact or the installation: critical, non-critical and battery.

Application

It has been specially designed for installations that require: billing by contract, dual load profile or various remote metering systems operating in parallel. It adapts to the needs of each client, thanks to the many different communications ports and protocols. (RS-232 - RS-232, RS-232 - RS-485, RS 232 – Ethernet).

Features

Power supply circuit	Self-powered
Nominal voltage	Depending on the type
Consumption	< 2 W / 10 V·A
Frequency	50 or 60 Hz (depending on the type)
Operating temperature	- 20 °C ... + 60 °C
Measuring circuit	
Connection	3 or 4 wires from the same unit
Reference voltajes	3x63.5/110 V, 3x110/190 V, 3x127/220 V, 3x230/400 V (depending on the type)
Frequency	50 or 60 Hz
Current circuit	
Nominal base currents	.../5 or .../1 A (indirect reading)
Maximum current	10 or 2 A (2 x In) (indirect reading)
Accuracy	
Active Energy	Class 0.2S or 0.5S
Reactive Energy	Class 0,5 or 1
Data memory	
Capacity	Events: 512 records / Billing closing: 64 / Load curve: 213 days / 2nd programmable load curve: 5.120 records

Clock maintenance battery	Lithium
Working Life	10 years (50% load)
Operation with no battery or voltage	Maximum 24 hours
Clock	
Type	System frequency / quartz oscillator
Quartz oscillator drift	< 0.5 s/day at 25 °C
Digital inputs (on demand)	3 inputs (60...300 Vac)
Digital outputs (on demand)	3 mechanical relay outputs (up to 400 Vac) optoMOS (depending on the type)
Verification LED output	
Rate	20 000 pulses / kW·h or kvar·h, in terms of secondary values
Communications	
Optical interface	IEC-61107 - Reading / Programming
COM 1	RS-232 - Reading / Programming
COM 2	RS-232 / RS-485 - Reading
Protocols	IEC-870-5-102, Modbus-RTU, IEC-61107
Build features	
Enclosure	In compliance with DIN 43859
Weight	2.2 kg



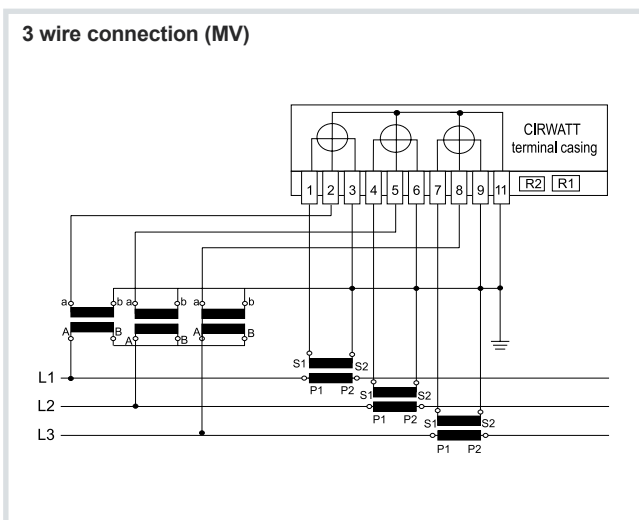
Standards

IEC 62052-11 and IEC 62053-22	Static active energy meters for AC, Class 0.2S and 0.5S
IEC 62052-11 and IEC 62053-23	Static reactive energy meters for AC, Class 2 and 3
EN-50081-1	Residential emissions
EN-50082-2	Industrial immunity
EN 55022	Driven emissions: Class B / Radiated emissions: Class B
EN 61000-4-6	Immunity to RF fields coupled to cables (common mode): 10 V
EN 61000-4-8	Immunity to magnetic fields and grid frequency: 30 A/m

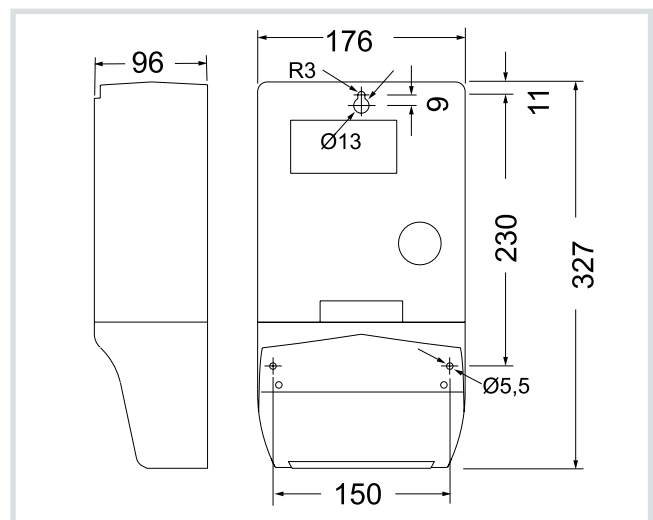
References

Consumer type	Class	Quadrants	Metering range V	Metering range A	OptoMOS Input / Output	Relay Input / Output	COM1	COM2	TYPE
STANDARD									
2	0.5S	4	3x63.5/110 V	... / 5 A	-	-	RS232	RS232	CIRWATT D 405-MT5A-10D
2	0.5S	4	3x63.5/110 V	... / 5 A	-	-	RS232	RS485	CIRWATT D 405-MT5A-20D
2	0.5S	4	3x63.5/110 V	... / 5 A	-	3/4	RS232	RS232	CIRWATT D 405-MT5A-15D
2	0.5S	4	3x63.5/110 V	... / 5 A	3/4	-	RS232	RS232	CIRWATT D 405-MT5A-14D
2	0.5S	4	3x63.5/110 V	... / 5 A	-	3/4	RS232	RS485	CIRWATT D 405-MT5A-25D
2	0.5S	4	3x63.5/110 V	... / 5 A	3/4	-	RS232	RS485	CIRWATT D 405-MT5A-24D
1	0.2S	4	3x63.5/110 V	... / 5 A	-	-	RS232	RS232	CIRWATT D 402-MT5A-10D
1	0.2S	4	3x63.5/110 V	... / 5 A	-	-	RS232	RS485	CIRWATT D 402-MT5A-20D
1	0.2S	4	3x63.5/110 V	... / 5 A	-	3/4	RS232	RS232	CIRWATT D 402-MT5A-15D
1	0.2S	4	3x63.5/110 V	... / 5 A	3/4	-	RS232	RS232	CIRWATT D 402-MT5A-14D
1	0.2S	4	3x63.5/110 V	... / 5 A	-	3/4	RS232	RS485	CIRWATT D 402-MT5A-25D
1	0.2S	4	3x63.5/110 V	... / 5 A	3/4	-	RS232	RS485	CIRWATT D 402-MT5A-24D
Indicate: Distribution, area, hourly discrimination and current transformer ratio, if applicable.									
Three-phase meters with additional features									
ETHERNET COMMUNICATIONS									
2	0.5S	4	3x63.5/110 V	... / 5 A	-	-	RS232	Ether.	CIRWATT D 405-MT5A-30D
1	0.2S	4	3x63.5/110 V	... / 5 A	-	-	RS232	Ether.	CIRWATT D 402-MT5A-30D
FOR OTHER CONFIGURATIONS (inputs, outputs and other communications), PLEASE ASK									

Connections



Dimensions



CIRWATT D

High-performance, multi-function static meter



References

Consumer type	Class	Quadrants	Metering range V	Metering range A	OptoMOS Input / Output	Relay Input / Output	COM1	COM2	TYPE	code
STANDARD										
2	0.5S	4	3x63.5/110 V	... / 5 A	-	-	RS232	RS232	CIRWATT D 405-MT5A-10D	Q1D251
2	0.5S	4	3x63.5/110 V	... / 5 A	-	-	RS232	RS485	CIRWATT D 405-MT5A-20D	Q1D255
2	0.5S	4	3x63.5/110 V	... / 5 A	-	3/4	RS232	RS232	CIRWATT D 405-MT5A-15D	Q1D253
2	0.5S	4	3x63.5/110 V	... / 5 A	3/4	-	RS232	RS232	CIRWATT D 405-MT5A-14D	Q1D252
2	0.5S	4	3x63.5/110 V	... / 5 A	-	3/4	RS232	RS485	CIRWATT D 405-MT5A-25D	Q1D257
2	0.5S	4	3x63.5/110 V	... / 5 A	3/4	-	RS232	RS485	CIRWATT D 405-MT5A-24D	Q1D256
1	0.2S	4	3x63.5/110 V	... / 5 A	-	-	RS232	RS232	CIRWATT D 402-MT5A-10D	Q1D051
1	0.2S	4	3x63.5/110 V	... / 5 A	-	-	RS232	RS485	CIRWATT D 402-MT5A-20D	Q1D055
1	0.2S	4	3x63.5/110 V	... / 5 A	-	3/4	RS232	RS232	CIRWATT D 402-MT5A-15D	Q1D053
1	0.2S	4	3x63.5/110 V	... / 5 A	3/4	-	RS232	RS232	CIRWATT D 402-MT5A-14D	Q1D052
1	0.2S	4	3x63.5/110 V	... / 5 A	-	3/4	RS232	RS485	CIRWATT D 402-MT5A-25D	Q1D057
1	0.2S	4	3x63.5/110 V	... / 5 A	3/4	-	RS232	RS485	CIRWATT D 402-MT5A-24D	Q1D056
Indicate: Distribution, area, hourly discrimination and current transformer ratio, if applicable.										
Three-phase meters with additional features										
ETHERNET COMMUNICATIONS										
2	0.5S	4	3x63.5/110 V	... / 5 A	-	-	RS232	Ether.	CIRWATT D 405-MT5A-30D	Q1D25E
1	0.2S	4	3x63.5/110 V	... / 5 A			RS232	Ether.	CIRWATT D 402-MT5A-30D	Q1D05E

FOR OTHER CONFIGURATIONS (inputs, outputs and other communications), PLEASE ASK

PLC-800

Concentrator for PLC systems

Description

The **PLC800** is the main element of **CIRCUTOR**'s Smart Metering systems. The main function of the **PLC800** concentrator is to manage the electrical distribution network with the use of **CIRWATT** electrical energy meters. The information is gathered using the electrical cable of the distribution network using the so-called 'PLC Communications' (Power Line Carrier).

The **PLC800** concentrator is installed in transformer substations and it uses different communications systems, such as Ethernet, GSM and GPRS, which offer various positions to access the information and interact with the system.

Application

The system offers *Plug&Play* functionalities, so that the **CIRWATT** electrical energy meters are detected automatically by the **PLC800** concentrator, downloading all information to the memory, such as the energy load curves, events and billing closures. The **PLC800** concentrator also offers the possibility of automatically sending this information to an ftp server.

In addition, it offers various specific functions to manage the electrical energy demand, loss control and fraud detection. All of these actions can be used for the preventive maintenance and detailed monitoring of the behaviour of the electrical distribution network.



Features

Power supply	
Working voltage	127 V to 230 V
Power consumption	~7 W and ~12 V·A
Environmental influences	
Operating temperature range	-20 °C to +60 °C
Storage temperature range	-40 °C to +85 °C
Humidity	95% max.
Processor	
Microprocessor	Samsung S3C2440-300
Display	
Type / Size	TFT LCD / 3,5"
Backlight	LED
PLC – Power line communications	
Type	DCSK with repetitive system
Hardware	CENELEC A or CENELEC B
Connection	3 or 4 wires (with dual connection option)
Protection class	II
* For other configurations, please ask	

Data memory	
Type	FLASH (SD card)
Capacity	528 MB
Battery	
Type	Lithium
Position	Internal
Working Life	>20 years @ 25 °C
Modem	
Type	GSM and GPRS
Band	Quadriband
Card	SIM
Ethernet Port	
Type	IEEE 802.3
Connector	RJ-45
Speed	10/100 Mbit
USB Ports	
Version	USB 1.1
Type	Female, type A

PLC-800

Concentrator for PLC systems

Standards

IEC 61000-4-2	Electrostatic discharges : 8 kV
IEC 61000-4-3	Electromagnetic fields (80 Mhz to 2 Ghz): 10V/m 30V/m
IEC 61000-4-4	Fast transient burst test : 4 kV
IEC 61000-4-5	Surge test in current and voltage circuits : 6 kV
IEC 62052-11	Impulse voltage 1,2/50 µs: 8 kV
IEC/CISPR 22	Radio interference suppression: Class B
UNE-EN 50470	Current and voltage circuits under load: 4 kV

References

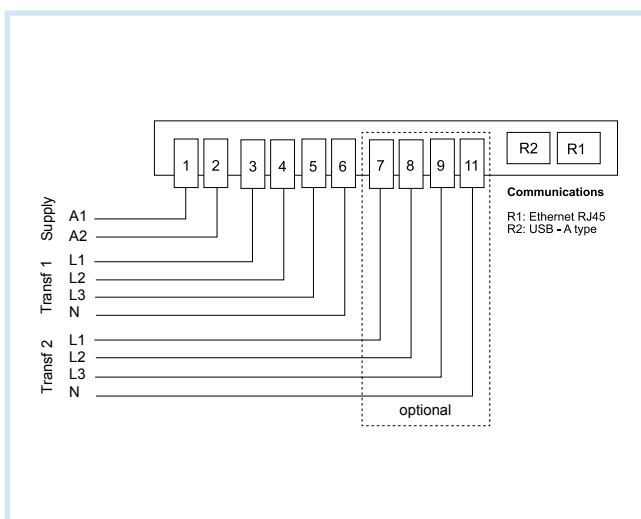
Power supply voltage 127 ... 230 Vac	PLC Communications band	Metering voltage 3x230/400 V	Number of PLC Communications inputs	GSM/GPRS Modem	USB Ports	Ethernet Port	Type	Code
●	A	●	1	●	2	1	PLC800-U-1-2M00-12-0	Q45210
●	B	●	1	●	2	1	PLC800-U-1-4M00-12-0	Q45310
●	A	●	2	●	2	1	PLC800-U-1-2M2M-12-0	Q45211

Screens

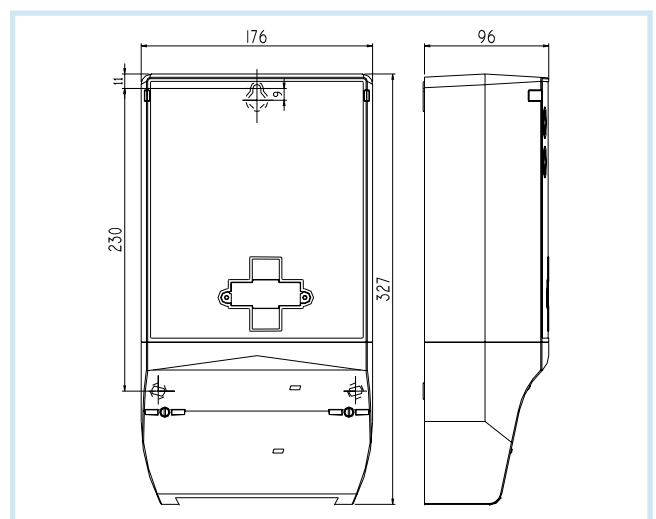


- Connected meter list
- Modification of contracted currents
- Open/close the internal relay
- Electrical parameters readings











Connections



Dimensions



Relation between products and accessories

		Converters	TRMC	Modem	LOC	LM4-PLC	Software
							
		Communications converters	Current transformers	GSM, RTC, protector	Optical reader	Impulse concentrator	Management and control Software
		See M.5	See Q.3	See Q.3	See Q.3	See Q.3	See Q.3
CIRWATT A		-	-	-	•	•	•
CIRWATT B		-	-	-	•	•	•
CIRWATT C		•	•	•	•	•	•
CIRWATT D		•	•	•	•	•	•
PLC-800		-	-	-	-	•	•

