

energy **Meters**



 **CIRCUTOR**
Technology for energy efficiency

CIRCUTOR Profile

Since 1973, **CIRCUTOR** has specialised in the design, manufacture and marketing of energy efficiency equipment: measurement and control equipment for electricity, supply quality, industrial electrical protection, power factor correction and harmonic filtering.



Measurement



Protection



Quality & Metering



Power factor correction and harmonic filtering



Electric vehicle recharging systems

The production capacity of **CIRCUTOR** is based on six production centres throughout Spain and the Czech Republic.

CIRCUTOR has committed itself to following the latest technological advances in order to add them to its products. It has its own test technology and laboratories that enable it to guarantee the quality of all its products.

The company is present in over 100 countries, with offices in Argentina, Mexico, Germany, France, Shanghai, Singapore, Dubai, etc.

- Head office of **CIRCUTOR, SA** in Viladecavalls



- Two of the production centres of **CIRCUTOR**





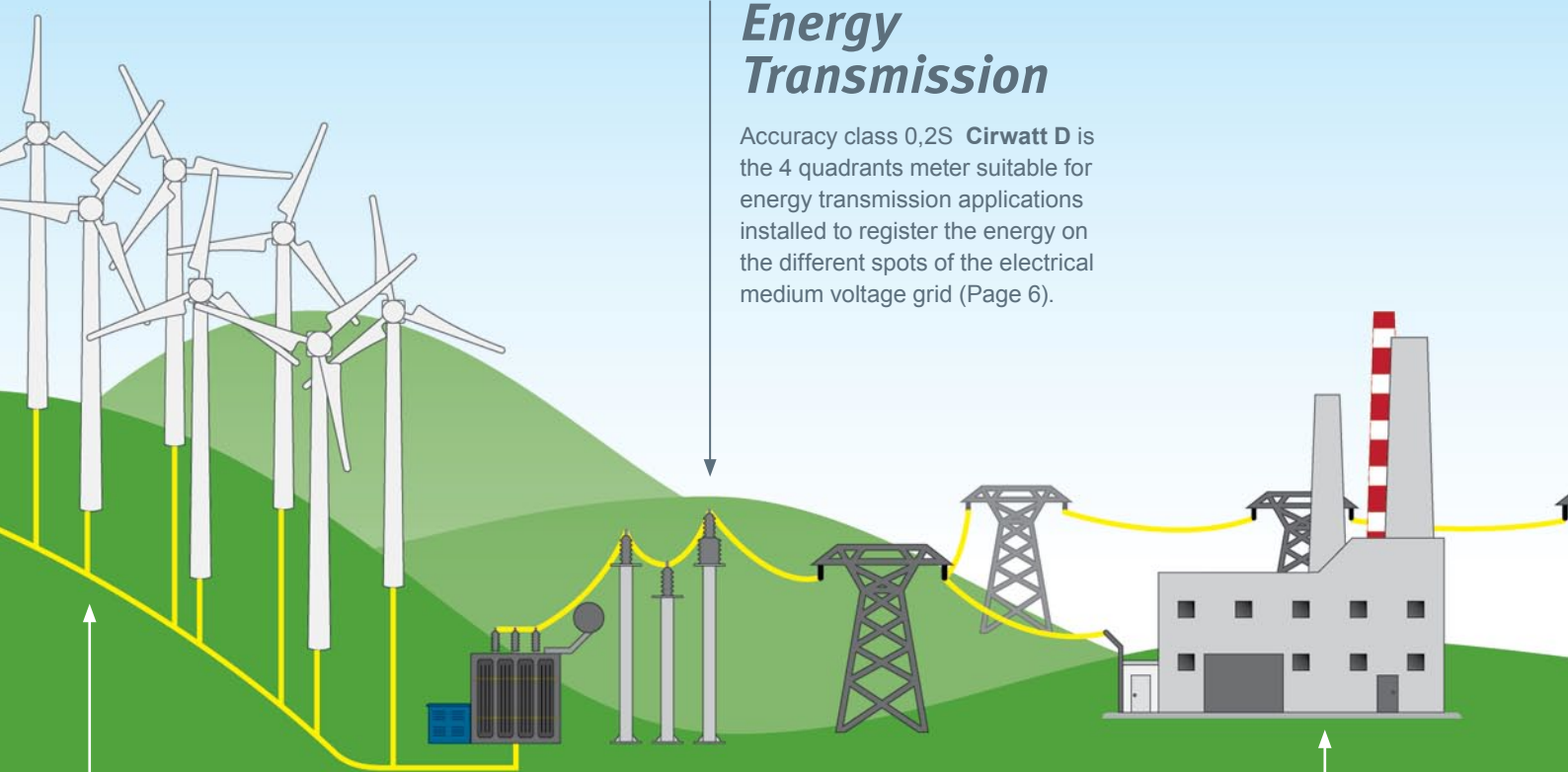
“Integral solutions for electric energy measurement”

To satisfy the needs of the electricity market, CIRCUTOR has a large team of engineers and factories equipped with the latest technologies.

***Quality & Metering
Division***



Applications for the installation of energy meters



Energy Transmission

Accuracy class 0,2S **Cirwatt D** is the 4 quadrants meter suitable for energy transmission applications installed to register the energy on the different spots of the electrical medium voltage grid (Page 6).

Energy generation

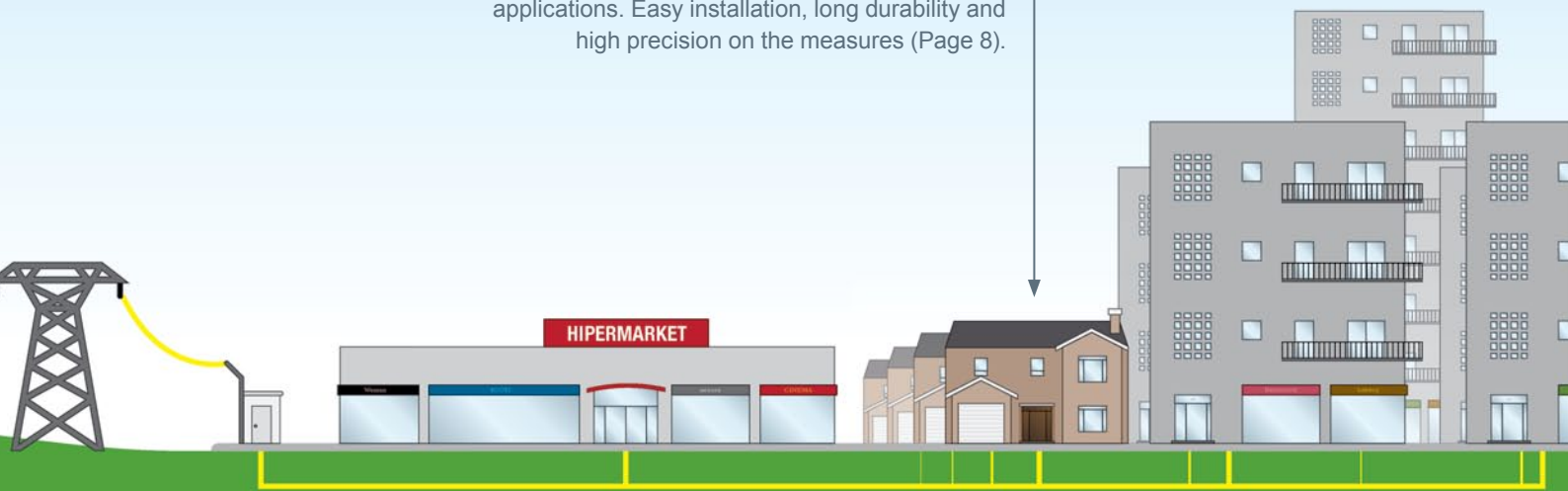
Accuracy class 0,2S **Cirwatt D** is the 4 quadrants meter suitable to be installed for energy generation applications designed to measure big amounts of energy (Page 6).

Heavy industry

Accuracy class 0,2S or 0,5S **Cirwatt D** is the 4 quadrants meter suitable for heavy industry applications, offering a high degree of security and precise resolution on the measured energy readings (Page 6).

High consumption households

Cirwatt B three-phase direct connection is the accuracy **class 1** meter (**class B** based on **MID** directive) suitable for three phase household applications. Easy installation, long durability and high precision on the measures (Page 8).



Shopping Malls

Cirwatt B three-phase indirect connection is the 0,5S or 1 accuracy class meter (**class C** or **B** based on **MID** directive) suitable for medium consumptions. With different kinds of communications and expansion modules which allows the end user and utilities to have the total consumption control (Page 7).

Domestic uses and retail

Cirwatt B type 101 is a single phase meter for light consumptions. Easy reading system and installation. The reduced size makes this product the most suitable to be installed in domestic applications (Page 9).

CIRWATT D

Multi-function three-phase high accuracy energy meter

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 D is a high accuracy meter, with four quadrants measurements and different communications and expansion cards.

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

CIRWATT D	
Voltage measurement	3x57/100 V 3x63,5/110 V 3x127/220 V 3x230/400 V
Current measurement	.../ 5(10)A .../ 1(2)A (Using current transformers)
Accuracy	0,2 S or 0,5 S in Active Energy (IEC 62053-22) 0,5 or 1 in Reactive Energy (According to IEC 62053-23)
Frequency	50 Hz 60 Hz
Quadrants	4
Communications (2 ports)	RS-232/RS-232 RS-232/RS-485 RS-232/Ethernet
Expansion modules	3 inputs / 4 relay outputs 3 inputs / 4 Optomos outputs



High
features

CIRWATT B indirect connection

Three-phase meter with indirect connection for medium consumptions

CIRCUTOR's CIRWATT B indirect connection 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 indirect connection is suitable to be installed in LV and MV networks being the best solution for installations with high and medium consumptions like shopping malls, industries and high consumption households. Providing to the market a robust and competitive meter with different accuracies and fully complying with the new **European Directive MID (IEC 50470)**.

CIRWATT B indirect connection	
Voltage measurement	3x63,5/110 V 3x127/230 V 3x230/400 V
Current measurement	.../ 5(10) A .../ 1(2) A .../ 1(6) A (Using current transformers)
Accuracy	Class C (EN-50470) MID Class 0,5S (IEC-62053-22)
Active energy	or Class B (EN-50470) MID Class 1 (IEC-62053-21)
Accuracy	Class 1 (acc. to IEC-62053-23)
Reactive energy	or Class 2 (IEC-62053-23)
Frequency	50 Hz 60 Hz
Quadrants	2 4
Communications (2 ports)	Without communications RS-232/RS-232 RS-232/RS-485 RS-485/RS-485 RS-232/Ethernet RS-232/PLC RS-485/Ethernet
Expansion modules	4 relay outputs 4 inputs to read pulses 4 inputs to read impulses /2 relay outputs

MID
approval



CIRWATT B direct connection

Three-phase meter with direct connection for medium consumptions

CIRCUTOR's CIRWATT B indirect connection 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 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 (IEC 50470)**.



CIRWATT B direct connection	
Voltage measurement	3x127/230 V 3x230/400 V
Current measurement	10 (100) A 15 (120) A
Accuracy	Class B (EN 50470) MID
Active energy	Class 1 (IEC 62053-21)
Accuracy	Class 2 (IEC 62053-23)
Reactive energy	
Frequency	50 Hz 60 Hz
Quadrants	2 4
Communications (2 ports)	Without communications RS-232/RS-232 RS-232/RS-485 RS-485/RS-485 RS-232/Ethernet RS-232/PLC RS-485/Ethernet
Expansion modules	4 relay outputs 4 inputs to read impulses 4 inputs to read impulses /2 relay outputs





CIRWATT B

Single-phase energy meter*

CIRWATT B type 101 is a digital single phase meter **class B** (**Class 1**) or **Class A** (**Class 2**) in active power measurement, in compliance with **European Directive MID**. The meter **CIRWATT B** meets existing regulations applicable to electronic meters and has an autonomous system of data retention that will prevent its loss against the lack supply. It also allows reading through the optical port protocol (**IEC-62056-21**).

CIRWATT B type 101 is specially designed to be installed where the electromechanical meters do not satisfy with the current needs, particularly in those where a single phase meter with one tariff is required. **CIRWATT B type 101** has a small size that allows an easy installation, possibility of reverse energy storage and easy reading system through the display and optical port.



CIRWATT B type 101	
Voltage measurement	127 V 230 V
Current measurement	5 (60) A 10 (60) A
Accuracy	Clase B (EN-50470) MID Clase 1 (IEC-62053-21)
Active energy	or Clase A (EN-50470) MID Clase 2 (IEC-62053-21)
Frequency	50 Hz 60 Hz
Quadrants	2 Unidirectional
Communications	1 optical port (IEC-62056-21 for local access).

TRMC

Current transformers for energy meters

Current transformers used in Low Voltage installations, in applications with official measurements and used to bill energy, since they comply with the specifications of the Spanish electricity companies. Resin is used as an exterior insulation element to provide a set of characteristics that increase the quality of the transformer when compared to other conventional insulation systems. The most important properties of this type of insulation are:

- » High mechanical resistance
- » Great dielectric strength
- » Self-extinguishing (VO Degree)
- » Tropicalized
- » Impossibility of tampering with the transformer, preventing any form of access to the internal elements.

Ensures that all transformers comply with the current specifications and regulations, enclosing the test certifications from certified laboratory.



	TRMC 210	TRMC 400
Class	0,5 / 15 V·A 0,5 S / 10 V	0,5 / 15 V·A 0,5 S / 10 V
Encapsulation	In resin (wound primary)	In resin (bus bar)
Maximum operating voltage	0,72 kV a.c.	0,72 kV a.c.
Primary current	100 ... 600 A	800 ... 1 500 A
Secondary current	5 A	5 A
Insulation voltage	3 kV	3 kV
Safety factor	FS < 5	FS < 5
Frequency	50 / 60 Hz	50 / 60 Hz
Thermal class	B	B
Thermal short-circuit current	$I_{th} = 60 I_n$	$I_{th} = 60 I_n$
Dynamic current	$I_{dyn} = 2,5 I_{th}$	$I_{dyn} = 2,5 I_{th}$
Standards	IEC 60044-1, IEC 60011-1	

GSM/GPRS Modem

GSM/GPRS modem with RS-232 and RS-485 communications

This modem has GSM and GPRS communications, it is used for installations where there is not an analog telephone line. The device is able to be configured locally or remotely. With GPRS communications through a fixed IP address and coverage signal by internal LED's.

The device is connected with the meters by a GSM phone call or via GPRS. With two communication channels: RS-232 and RS-485 that receives calls for downloading and controlling data from the meter.

- » RS-232: Connection with only one meter. The maximum distance allowed between meter and modem is 15m.
- » RS-485: Possibility to communicate up to 32 meters using one modem. The maximum distance is 1200 m.



GSM/GPRS MODEM	
Voltage range	100...230 V ac 50 Hz
Power consumption	10 V·A active mode 6 V·A passive mode
GSM	GSM Rec. 7.02 asynchronous Non-Transparent 9,6 kbit/s Modem type V.32 RLP according to GSM Rec. 4.22 ISDN-type V.110 through SIM with or without PIN GSM quad-band 2 Watt transmit power
Antenna type	Antenna (mounting clip) cable 1.5 m Magnet holder antenna cable 2.5 m FME connector
Meter connection	RS-232 up to 19,2 kBit/s Full duplex (Rx, Tx, GND, DTR) via RJ-45 connector RS-485 up to 32 Transceiver 2-wires 1,200 m cable length fixed Transparent or Mode C Data format : 8N1 or 7E1
Protection type	IP 51

PowerWatt LT SQL

Energy meters reading software

PowerWatt LT SQL is a software package that has been specially designed to interact with the multi-functional **CIRWATT** three phase meters. It has been designed for remote metering applications and the management of energy meters, enabling a permanent control of the meter consumption. This is an easy and friendly tool to use where the interface is oriented to any type of user.

This software is a tool that can be used to interact with meters and its purpose is to guarantee the total control of the information:

- » Real-time monitoring of instant values.
- » Reading the configuration of different parameters.
- » Downloading the files to the units and programming these downloads so that they are carried out automatically.
- » Exporting files in standard format.
- » Display of download parameters in tables and graphs.
- » SQL database.



COMPANY

Laboratory

Official metrological verification laboratory

- » Accredited laboratory according to European Directive 2004/22/CE “**Measuring Instrument Directive**” (MID).
- » Laser marking customization.
- » Laboratory area of 415 m², with three metrological verification automatic meter chain.
- » Meter testing laboratory area of 500 m².



COMPANY

Own technology

Research, development and innovation

CIRCUTOR manufactures and designs its own products, so as to respond to market needs, incorporating the latest technology. Our professional team brings significant added value:

- » More than 10 years experience in Metering
- » Experts in the use of latest technologies
- » Dynamism and flexibility in project implementation
- » High experience in customized products
- » Continuous improvement of our products
- » Training our professional team
- » Working group specially dedicated to design meters



COMPANY

Certifications

CIRCUTOR manufactures its products in compliance with the highest quality standards, respecting the environment and protecting the health of its employees. To this end, it has been certified with the following:



ISO 9001
Quality



ISO 14001
Environment



ISO 18001
Occupational Health and Safety



INTERTEK RSC MS (RoHS)
Management of restricted substances



QC 080000
Management of dangerous substance processes





energy
Meters

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