Measurement and electric control

M.8

Portable power analyzer

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Portable power analyzers

M.8 - Portable power analyzer

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Portable power analyzers

CIRCUTOR offers a wide range of portable analyzers designed to measure, display and/or record the most important parameters of an electrical network. With the analysis of the electrical parameters, the user can find out the power consumption of the installation or detect problems within it

M.8

Definition

Portable power analyzers are units designed for easy transportation, and temporary and simple installation; they are also capable of measuring electrical parameters whether or not the data is recorded in the memory.

The majority of **CIRCUTOR** power analyzers have internal memory available where measured and calculated parameters are recorded.
Because they are units that must perform measurements in a number of installations with very different features, they have setup menus for the most common installations (single-phase, two-phase, 3-wire or 4-wire three-phase).

The current measurement is performed by clamps for easy installation, as there is a wide variety of models and ways of measuring them.

Advantages

There are many diverse advantages of a portable analyzer for the user. The most important is information.

With a portable analyzer, information can be obtained from our installation simply by installing it (if you have screen) or with a single entry (analyzing data using PLUS PowerVision; for more information see M9).

With the information from a single entry, we can find out:

- Habits of use to ensure that the contracted tariffs are the most suitable.

- Response of an installation's load to see how it affects the rest of the installation, startup, shutdown or normal operation of the various charges.

- Angles of each of the loads for the analysis of reactive power, therefore avoiding penalties.

- Analysis of defects in the supply or quality events (if the analyzer permits) to determine the causes of unwanted tripping of protection, restarting electronic equipment, or PLCs

- Measuring leakage currents that trigger unwanted tripping of the differential current protection relays.

- Measurement of the harmonics of the installation that cause conductor warming, high neutral currents, and resonances with reactive compensation equipment.

- Getting to know the demand for our installation to determine if the power

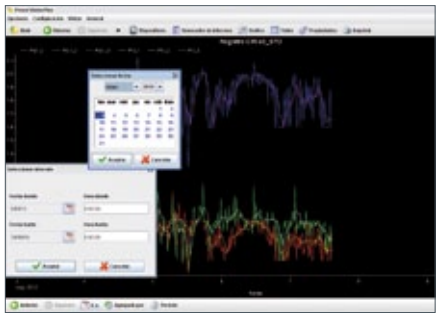
- that the user has contracted is suitable.
- Determine the consumption of each of the charges and detect deviations from lack of maintenance or deterioration of components (bearings, etc.)
- Locate the installation points where connections and deviations appear for uncontrolled loads (rigging)

To sum up, the use of portable analyzers allows us to:

- Save on electrical energy costs
- Control the installation
- Prevent shut-downs of the installation
- Schedule stops for maintenance of the installation

CIR-e3 and CIR-eQ

The **CIR-e** family are the lower-range **CIRCUTOR** analyzers, but offer as many benefits. They make up a family of counters which allow the technician to obtain the electrical parameters necessary to perform energy audits and power quality. They don't have a display screen. The measured parameters are recorded in 2 quadrants. They are accompanied by an executable configuration program and the records are stored on an SD card.



The records generated by these portable analyzers can be analyzed using the web tool found at http://cir-e3.circutor.com and/or with the Power Vision or Power Vision Plus software.

AR5L

The **AR5L** portable analyzer increases the benefits of the CIR-e family as it has a display screen and records the measured parameters in 2 or 4 quadrants. It has an internal memory that stores the electrical parameters for subsequent downloading onto a computer via the communications cable.

It allows for the selection of variables to be recorded, as well as the recording period and the starting conditions for recording the measured parameters.

It has several operating programs running in order to perform harmonic studies, quality reports, flicker measurements, checking leakage currents and earth leakage relays, among others.

The unit's recorded data is compatible with the programs **Power Vision** and **Power Vision Plus**.

AR6

This analyzer is the most complete of the latest generation of portable analyzers. It has a colour graphic display screen with high resolution that allows you to see graphics in detail.
The **AR6** analyzer has 5 inputs for measuring voltage and 5 inputs for measuring currents for each phase and neutral. The other input allows for measurement of the leakage current simultaneously.

The power analyzer allows the user to measure and record power quality parameters (overvoltage, cuts and gaps) that are configured in a particular menu, in addition to recording wave shapes, flicker, energy and all measured parameters therein.

It has quadrant display per phase that lets you know how it is working in each measured line, detects imbalances, and sees lags between voltages and currents. All of this with its powerful graphics processor, along with its high resolution screen, makes this analyzer a very visual tool.

The **AR6** analyzer simultaneously records all network parameters and includes powerful analysis tools, combined with **PowerVision PLUS**, making it the perfect interface between installations in need of optimisation and their energy audits.

AR6

Three-phase power and quality analyzers

Electrical Safety 600 V **CAT IV**

Electrical Safety 1000 V **CAT III**

Description

- Portable power analyzer for three-phase and single-phase electrical networks with simultaneous measurement of leakage current, power quality and recording of transients.
- AR6 is the best tool for visualizing and analyzing the network's problems regardless of whether it is a single-phase or three-phase network.
- It allows recordings of the most common electrical parameters and also those specifically related to supply quality such as overvoltages, swell, sags and transients.
- Thanks to the graphical display of harmonics, phasors and waveforms, the user can detect anomalies in the installation simply by connecting the device.
- Measurement of the main electrical parameters.
- True root mean square measure (TRMS).
- 5.7" colour graphic screen.
- Includes meter for energy consumed and generated.
- Has 5 voltage measurement inputs and 5 current channels.
- Configurable trigger menu via level and time trigger.
- Multiple languages (Spanish, English, French, German, Portuguese, Italian, Chinese, Russian).
- Recording of voltage-quality events (class B) via configurable menu.
- 600 CAT IV, 1000V CAT III (EN 61010).
- CE marking.
- Analysis of records via Power Vision plus PC software.
- Simple and intuitive menu for device configuration.

Features

AR6	
Class 0.5 in the measurement	
Class B according to UNE-EN 61000-4-30	
Measurement and recording according to EN 50160	
AR6 power supply	
Voltage (external power supply)	100…240 Vac.
Current (external power supply)	3.33 A
Frequency	50 to 60 Hz
Maximum power	40 W
AR6	
Nominal voltage	12 Vdc
Current	2 A
Maximum power	24 W
Consumption	30 VA
Operating temperature	0 to 50ºC
Altitude	2000 m
Humidity without condensation	5…95 %
Contamination level	2
Current input features	
Current inputs	I1 , I2 , I3 , IN , Lleakage
Input voltage	0…2 V
Measurement margin	1 to 120 of *In*%
Maximum current	3*In* A
Input impedance	10 kΩ
Voltage input features	
Voltage inputs	U1, U2, U3, UN, Earthing
Input voltage	10 to 800 Vrms neutral phase
Maximum voltage admissible	2,500 V
Bandwidth	3.2 kHz
Other features	
Voltage measurement range	10 to 800 Vf-n
Current measurement range	0.01 to 1000 A (depending on clamp)
Transformation ratios	Programmable
Internal memory	1 Gb
Internal memory features	FAT 32

AR6

Three-phase power and quality analyzer

- List of detected disturbances in tables.
- Display of wave shapes of transients recorded.
- Manual or programmed PHOTO captures (wave shapes of 9 channels along with instantaneous values).
- Compatible with AR5-L pins.
- Automatic detection of clamps.
- Memory download via USB connection.
- Graphic display of phasors, harmonics and wave shapes.

Waveform

- With the waveform visualization, it is possible to detect any waveform defect.

- It is also possible to pause the image and zoom-in on the oscilloscope image any time in order to get a better definition of the image.

Photo

- The device captures the waveform of 9 channels measured together with the instantaneous values of the most important electric variables so that each photo allows a detailed analysis of the installation.

- The photo capture can be programmed with trigger (electrical parameters comparison) or can be taken manually.

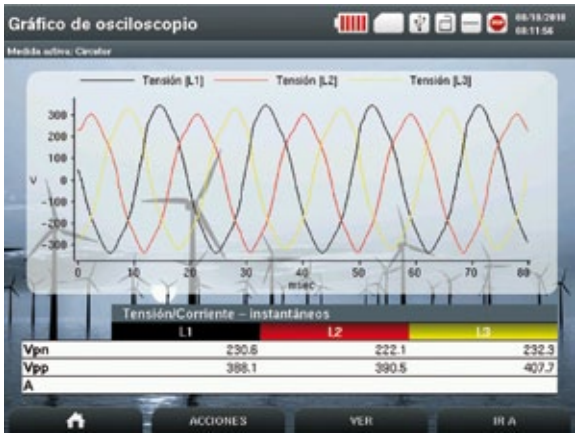
Current clamps

- The current clamps of the AR6 are built with amplifier included. This feature facilitates the transportation and specially the installation of the clamps to make measurements since they do not need extra supply or extra wiring

Features

Accuracy class	
Voltage	0.5% ±2 digits
Current	0.5% ±2 digits
Active power	0.5% ±2 digits
Reactive power	1% ±2 digits
Build features	
Enclosure	Double insulation
Keyboard	Movement and function keys
Screen	5.7“ colour VGA
Dimensions	283 x 168 x 80 mm
Weight	1.640 kg
Communications	USB

Safety	Category III - 600 V, in accordance with 61010
	1000 V CAT III/600 V CAT IV for altitudes lower than 2000 m
	1000 V CAT III/600 V CAT III/300 V CAT IV above 2000 m
Standards	
EN 61000-6-4 (2002), Industrial emissions. **EN 55011 (1994), Driven (EN 52022 – Class B)** **EN 55011 (1994), Radiated (EN 55022 – Class A)**	
EN 61000-6-2 (2022), Industrial immunity **EN 61000-4-2 (1995), Electrostatic discharge** **EN 61000-4-8 (1995), Rapid transient bursts**	
EN 61000-6-1 (2002), Domestic immunity **EN 61000-4-11 (1994), Power supply outages**	
(*) Accuracy is given by the following measurement conditions: Exclusion of errors produced by the clamps and external voltage transformers, with a temperature range of 5 to 45ºC and power factor 0 to 1	



CIRCUTOR

AR6

Three-phase power and quality analyzer

Display

- 5,7” high resolution VGA colour screen allows graphical and numerical representation values showing the information in a clearer way.

Measurement channels

- The analyzer has 5 voltages inputs that corresponds to the 3 phases, neutral and ground, [U1, U2, U3, UN, UEARTH]]

- Has 5 current inputs that corresponds to the (3 phases, neutral and leak current simultaneously [I1, I2, I3, IN, IK].

Visualization

- Information on screen easy to understand and to read considering that the numerical information is represented in tables grouped under the measured variables and their corresponding phases. Moreover, each phase is shown with the colour selected by the user.

- The graphical screens provide the information on the graph on X / Y axes and autoscale for full representation of the measured variable.

Display

Panel size	5.7” (diagonal)
Active area of the LCD	Width 116.16 mm x Height 87.12 mm
No. of Pixels	Horizontal (640x3) x Vertical 480
Resolution type	VGA
Pixel size	Horiz. 0.1815 mm x Vert. 0.1815 mm
Pixel colour	RGB vertical lines
Display colour	White
No. of colours	262K
Back-lighting	LED

Measurement channels

5 voltages inputs that corresponds to the 3 phases, neutral and ground, (U1, U2, U3, UN, UEARTH)	
Inputs for voltage measurement	U1 U2 U3 UN Earth
Input margin	Un= 10 to 800 Vrms phase-neutral
Number of inputs	5
Peak voltage	2,500 V
Crest factor	1.0…1,875
Bandwidth	3.2 kHz
Input impedance	10 MΩ
Permanent overvoltage	1.000 Vrms
Transient overvoltage <1s	2,500 V
Absolute maximum voltage	6 kV
Consumption	≤0.04 VA
Maximum voltage in the voltage measurement circuit	1000 V CAT III/600 V CAT IV for altitudes lower than 2000 m
	1000 V CAT II/600 V CAT III/300 V CAT IV for above 2000 m
Measurement margins	10.00 to 800.00 Vrms
Resolution	0.01 Vrms
Accuracy	± 0.5 % of Vnom
Has 5 current inputs that correspond to the (3 phases, neutral and leak current simultaneously (I1, I2, I3, IN, IK)	
Inputs for current measurement	I1 I2 I3 IN ILeak
Input voltage	0…2 V
Measurement margin	from 1 to 120% of *In*
Primary current measurement In	Depends on clamp
Allowable overload	3 *In*
Consumption	≤ 0.0004 VA
Special features	Leakage current measurement via low-pass filter option activated/deactivated
Input impedance	10 kΩ

AR6

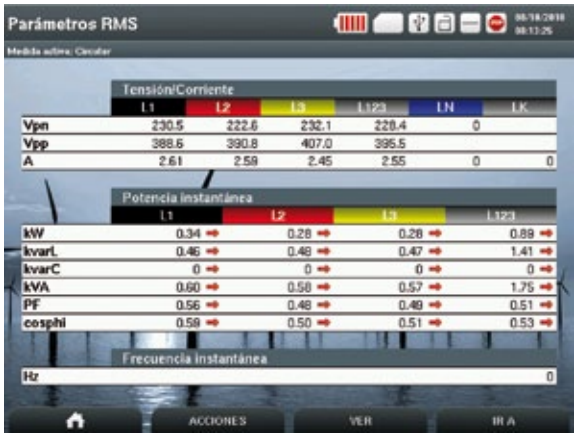
Three-phase power and quality analyzer

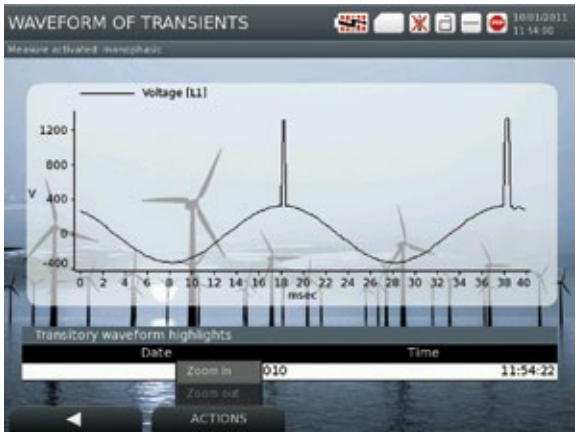
Easy configuration menu

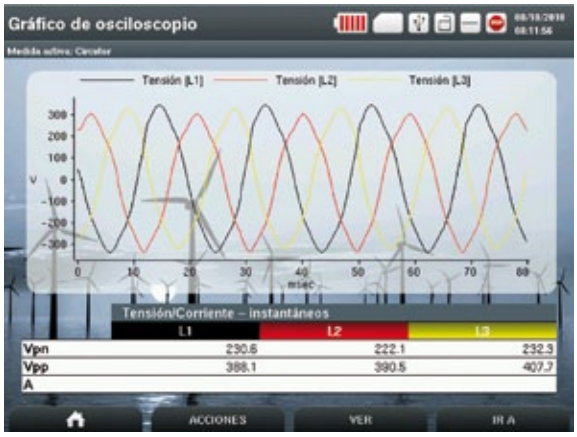
- AR6 has an intuitive main menu and large icons that makes the equipment very easy to navigate and configure.

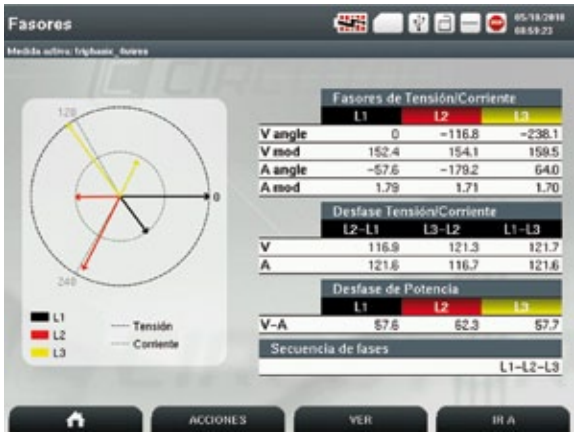
Quality

- It is possible to activate and configure the detection and registration of quality events such as over-voltages, swells, dips and transients. The events are shown in a table with the most important parameters of the event. The user can select any event and visualize the waveform and values of the event.









AR6

Three-phase power and quality analyzer

Autonomy

It is the only portable analyzer that ensures 8 hours of battery life.

Battery	NiMH (Nickel Metal Hydride)
Voltage	6 V
Capacity	4,200 mAh
Charge time	2 …2,5 h
Battery life while in use	4hrs with LCD on
	8hrs with LCD off

Memory

- It has an internal memory that can be extended if the user needs it, but the analyzer is capable of recording for years.

SD	Standard specification 1.10 Capability up to 32 GB
SDHC	Specification 2.0 Class 4 Minimum transfer speed 4MB/s Capability up to 32 GB

Low-pass filter

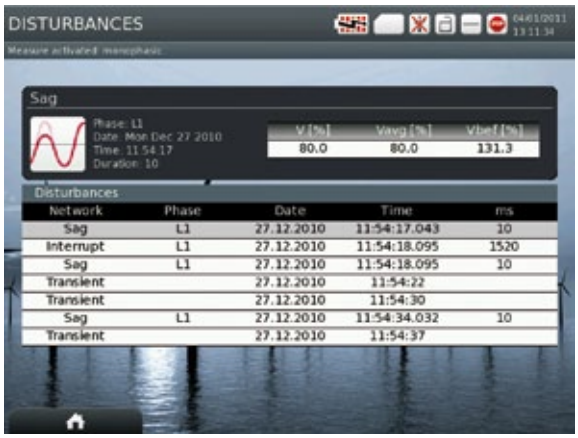
- It includes the possibility of activating a low-pass filter to verify the difference in response and measurement between the immunized earth leakage relays and those that are not..

Photo capture

- There is the possibility of activating the automatic photo capture. The photo records the waveforms of 9 channels and the instantaneous values of the main parameters.

- To capture the photo, it's necessary to create trigger conditions comparing electrical values from one phase or all of them. It's possible to combine different conditions with "AND" and/or "OR" conditions to capture the photo.

- After the configuration, the user can activate the conditions they require for every registration.



AR6

Three-phase power and quality analyzer

Customizable and configurable

- The device allows the configuration of the number of decimals and units desired by the user for each variable.

- The user can select the background colour and colours for each phase according to regulations.

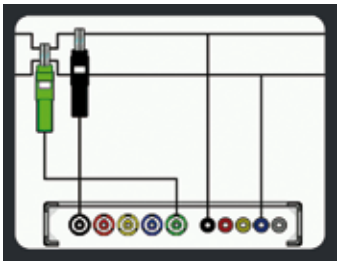
Multi circuit

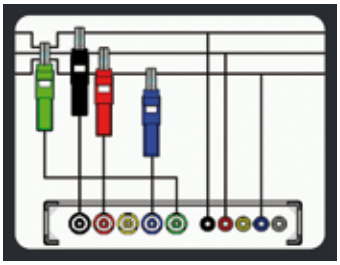
- Allows the configuration for a number of networks. Also shows every way of installing the current sensors according to the network selected. The options are single-phase, two-phase, aron, three-phase and three-phase with neutral.

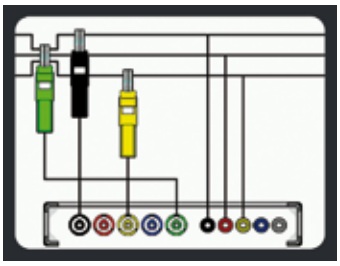
Harmonic graphs

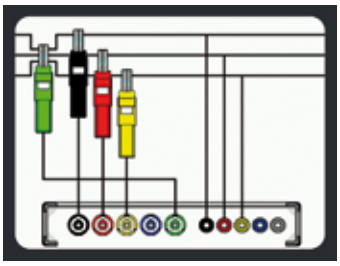
- The harmonics screen displays the amplitude value information of each harmonic.

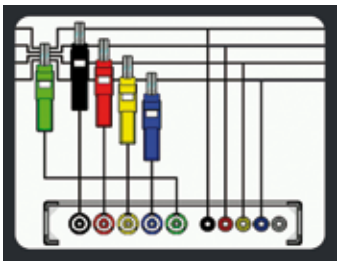
- The user can scroll to select the desired harmonic to display in the below table the most important values of this harmonic.











Application

With the **AR6** you can perform a full study of the electrical installation. It is possible to perform an analysis of consumption, load curves, voltage disturbances in the installation and to display waveshapes, study harmonics or measure flicker, as well as other options.

AR6

Three-phase power and quality analyzer

References

Analyzer	Type	Code
AR6	**AR6, Portable single and three-phase power analyzer**	**M82511**
	AR6 kits	
Analyzer	**Type**	**Code**
AR6, case kit	**AR6 (M82511) + Troley transport case Kit**	**M82512**
AR6 case kit CP Clamps	**AR6 case Kit (M82512) + 3 CP-5 + 3 CP-2000/200 clamps**	**M82541**
AR6 Kit 3 clamps CPRG-500	**AR6 case Kit (M82512) + 3 CPRG-500 clamps**	**M8252V**
AR6 Kit 4 clamps CPRG-500	**AR6 case Kit (M82512) +4 CPRG-500 clamps**	**M8252T**
AR6 Kit 3 clamps CPRG-1000	**AR6 case Kit (M82512) + 3 CPRG-1000 clamps**	**M8252R**
AR6 Kit 4 clamps CPRG-1000	**AR6 case Kit (M82512) + 4 CPRG-1000 clamps**	**M8252P**
AR6 kit **3 AM54-flex**	**AR6 case Kit (M82512) + 3 AM54-flex flexible clamps with built-in power supply**	**M82522**
AR6 kit **4 AM54-flex**	**AR6 case Kit (M82512) + kit with 4 AM54-flex flexible clamps with built-in power supply**	**M82523**

AR6 Clamps		
kit 3 AM54-FLEX	**Kit with 3 AM54-FLEX flexible 100-1000-10000 A clamps**	**M82532**
kit 4 AM54-FLEX	**Kit with 4 AM54-FLEX flexible 100-1000-10000 A clamps**	**M82533**
Kit 3 CPG-5	**Kit with 3 CPG-5 clamps**	**M810C1**
kit 3 CPG-100	**Kit with 3 CPG-100 clamps**	**M810C2**
kit 3 CPRG-500	**Kit with 3 CPRG-500 clamps**	**M810C3**
kit 3 CPRG-1000	**Kit with 3 CPRG-1000 clamps**	**M810C4**
kit 3 CPG-2000/200	**Kit with 3 CPG-2000/200 clamps**	**M810C5**
AR6	**CFG-5 5 A leakage clamp**	**M810BD**
AR6	**CFG-10 10 A leakage clamp**	**M810BE**

Accessories
See page M.8-38

Parameters measured

Parameter	L1	L2	L3	LN	LIII	LK	Max./ Min.
Phase-Neutral Voltage	Yes	Yes	Yes	Yes	Yes	-	Yes
Phase-Phase Voltage	Yes	Yes	Yes	-	Yes	-	Yes
Current	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Consumed Active Power	Yes	Yes	Yes	-	Yes	-	Yes
Consumed Inductive Power	Yes	Yes	Yes	-	Yes	-	Yes
Consumed Capacitive Power	Yes	Yes	Yes	-	Yes	-	Yes
Consumed Apparent Power	Yes	Yes	Yes	-	Yes	-	Yes
Consumed Power Factor	Yes	Yes	Yes	-	Yes	-	Yes
Cosine φ Consumed	Y	Yes	Yes	-	Yes	-	Yes
Generated Active Power	Yes	Yes	Yes	-	Yes	-	Yes
Generated Inductive Power	Yes	Yes	Yes	-	Yes	-	Yes
Generated Capacitive Power	Yes	Yes	Yes	-	Yes	-	Yes
Generated Apparent Power	Yes	Yes	Yes	-	Yes	-	Yes
Generated Power Factor	Yes	Yes	Yes	-	Yes	-	Yes
Cosine φ Generated	Yes	Yes	Yes	-	Yes	-	Yes
Crest factor	Yes	Yes	Yes	-	-	-	Yes
K - Factor	Yes	Yes	Yes	-	-	-	Yes
THD Voltage	Yes	Yes	Yes	Yes	-	-	Yes
THD Voltage even	Yes	Yes	Yes	Yes	-	-	Yes
THD Voltage odd	Yes	Yes	Yes	Yes	-	-	Yes
THD Current	Yes	Yes	Yes	Yes	-	-	Yes
THD Current even	Yes	Yes	Yes	Yes	-	-	Yes
THD Current odd	Yes	Yes	Yes	Yes	-	-	Yes
Flicker Inst. (WA)	Yes	Yes	Yes	Yes	-	-	-
PST Flicker	Yes	Yes	Yes	Yes	-	-	-
Frequency	Yes	-	-	-	-	-	Yes
Voltage Imbalance	-	-	-	-	Yes	-	Yes
Voltage Asymmetry	-	-	-	-	Yes	-	Yes
Current Imbalance	-	-	-	-	Yes	-	Yes
Current Asymmetry	-	-	-	-	Yes	-	Yes
Voltage Harmonics (1-50)	Yes	Yes	Yes	Yes	-	-	-
Current Harmonics (1-50)	Yes	Yes	Yes	Yes	-	-	-
Active Power Maximum Demand	-	-	-	-	Yes	-	-
Apparent Power Maximum Demand	-	-	-	-	Yes	-	-
Average current maximum demand	-	-	-	-	Yes	-	-
Maximum current demand L1, L2, L3	Yes	Yes	Yes	-	-	-	-
Active energy consumed	-	-	-	-	Yes	-	-
Consumed Inductive Energy	-	-	-	-	Yes	-	-
Consumed Capacitive Energy	-	-	-	-	Yes	-	-
Consumed Apparent Energy	-	-	-	-	Yes	-	-
Active energy generated	-	-	-	-	Yes	-	-
Generated Inductive Energy	-	-	-	-	Yes	-	-
Generated Capacitive Energy	-	-	-	-	Yes	-	-
Generated Apparent Energy	-	-	-	-	Yes	-	-
Wave shapes	Yes	Yes	Yes	Yes	Yes	Yes	-
Phasor representation	Yes	Yes	Yes	Yes	Yes	Yes	-

AR6

Three-phase power and quality analyzer

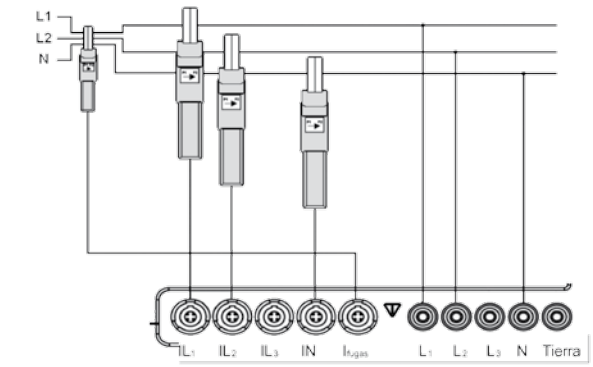
Clamps	CF-5	CF-10	CP-5	CP-100	CPR-500	CPR-1000	CP-2000/200
							
Measurement range	1...1000 A ac	0.2 mA...10 A ac	0.05..0.5 A ac	1...100 A ac	1...500 A ac	1...1000 A ac	1...200 A ac 10...2000 A ac
Nominal frequency	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz
Output voltage	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac
Dielectric rigidity	5200 V, 50 Hz,1 min	5200 V, 50 Hz,1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min
Scale base error	1 % (up to 0.1 A) 0.5 % (Up to 5 A)	-0,35 %	1 %	0,5 %	0,7 %	0,7 %	Scale 200: 0.5 % (+70 mA) Scale 2000: 0.5% (+100 mA)
Maximum conductor diameter	20 mm	100 mm	20 mm	20 mm	52 mm	52 mm	64 mm
Maximum busbar	1 - 50 x 5 mm or 4 - 30 x 5 mm	5 - 80 x 5 mm or 3 - 80 x 10 mm	20 x 5 mm	20 x 5 mm	1 - 50 x 5 mm or 4 - 30 x 5 mm	1 - 50 x 5 mm or 4 - 30 x 5 mm	5 - 125 x 5 mm or 3 - 100 x 10 mm
Description / Code	**CFG-5 Code M810BD**	**CFG-10 Code M810BE**	**3 CPG-5 Kit Code M810D1**	**4 CPG-100 Kit Code M810D2**	**4 CPRG-500 Kit Code M810D3**	**4 CPRG-1000 Kit Code M810D4**	**4 CPG-2000/200 Kit Code M810D5**

AR6

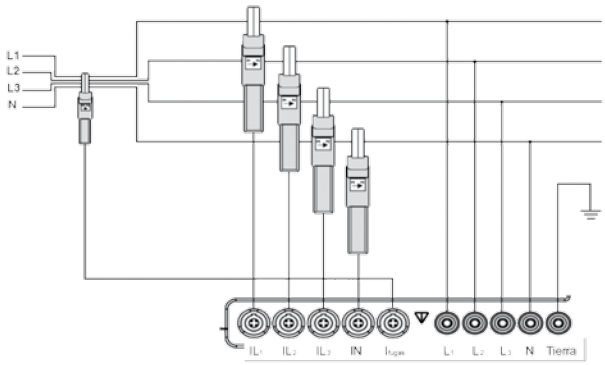
Three-phase power and quality analyzer

Connections

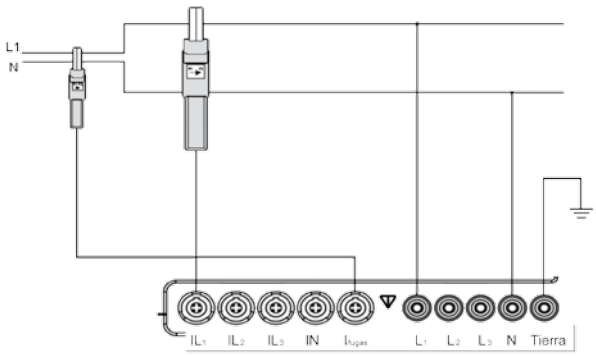
Two-phase system



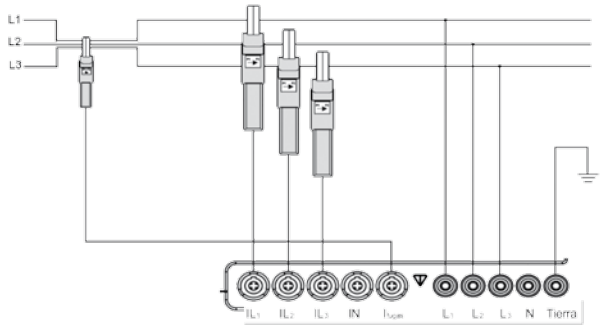
Three-phase system with neutral



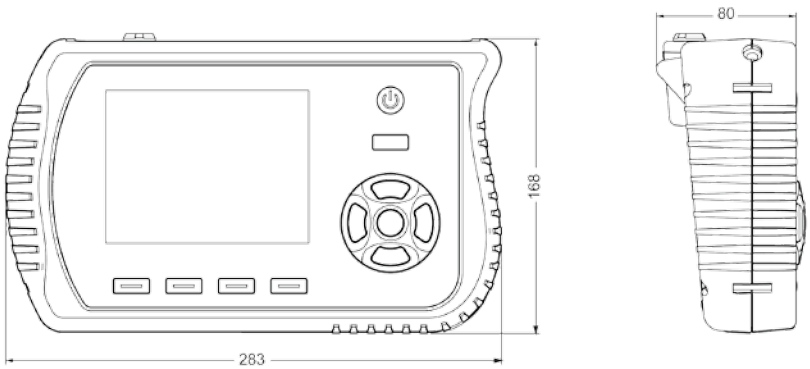
Single-phase system



Three-phase system without neutral



Dimensions



AR5-L

Portable single and three-phase power analyzer

Description

- Measures all of the main electrical parameters of an electricity network
- Measurement in true root mean square
- Built-in energy meter
- With 4 voltage channels and 4 current channels (**AR5-L**)
- Configurable auto-trigger, depending on the parameters required
- Languages: Spanish and English
- Large backlit LCD display
- CAT III 600 V (**EN 61010**). **UL** Certificate
- Display of up to 30 electrical parameters on the screen
- Small size and reduced weight, only 800 g
- Independent files for each measurement
- Including the powerful analysis software: **POWER VISION PLUS**
- Configurable with menus
- Optional operation with no external power supply, with an autonomy of up to 8 hours
- RS-232 Communications with PC
- Clamp auto-detection
- Auto-selection of parameters stored
- Calculation of the time remaining until the memory is full
- Linear or rotating memory (depending on the configuration)

Features

	AR5-L	
Power supply circuit		
Through an external power supply unit	100...240 V ac / 12 V dc	
Frequency	50...60 Hz	
Consumption	15 V·A	
Operating temperature	0...+40 ºC	
Altitude	≤ 2 000 m	
Humidity of operation	80 % for temperatures under 31 ºC, with a linear decrease down to 50 % at 40 ºC	
Measurement circuit	Three-phase (3 wires)	Three-phase (3 / 4 wires)
Contamination level	2	
Voltage circuit		
Measurement range	In accordance with the clamp, 0.01 A...20 kA	
Voltage and current transformation ratios	Programmable	
Measurement units	Automatic change of scale	
Internal memory	1 Mb	
Accuracy class (*)		
Voltage	0.5 % ± 2 digits	
Current	0.5 % ± 2 digits	
Active power	1 % ± 2 digits	
Power factor	1 % ± 2 digits	
Build features		
Housing	Reinforced insulation	
Keyboard / Display	On the front panel	
Display	LCD 160 x 160 pixels (backlit)	
Current clamp connector	3	3 / 4
Dimensions	220 x 60 x 130 mm	
Weight	800 g	
RS-232 Outputs	Series output	

AR5-L

Portable single and three-phase power analyzer

Application

- Complete study of the installation where the analyzer is capable of gathering different types of records: harmonics, disturbances, meter verification, transients, flicker, etc.

Features

	AR5-L
Safety	Category III - 600 V, in accordance with 61010
Standards	
EN 61000-3-2 (1995), Harmonics	
EN 61000-3-3 (1995), Voltage fluctuations	
EN 61000-6-4 (2002), Industrial emissions **EN 55011 (1994), Driven (EN 52022 – Class B)** **EN 55011 (1994), Radiated (EN 55022 – Class A)**	
EN 61000-6-2 (2022), Industrial immunity **EN 61000-4-2 (1995), Electrostatic discharge** **ENV 50140 (1993), Radiated electromagnetic field** **EN 61000-4-8 (1995), Rapid transient bursts** **ENV 50141 (1993), RF in common mode** **EN 61000-4-8 (1995), Magnetic field at 50 Hz**	
EN 61000-6-1 (2002), Domestic immunity **EN 61000-4-5 (1995), Shockwave** **EN 61000-4-11 (1994), Power supply interruptions**	
(*) Accuracy is given by the following measurement conditions: Exclusion of errors produced by the clamps and external voltage transformers, with a range of temperature of 5 ... 45 ºC and power factor of 0 ... 1	

References

Analyzer	Clamps	Program	Transport	Type	Code
			Units		
AR5-L	-	Energy / Harmonics	Carrying Bag	**AR5-L- Power analyzer with 4 current inputs**	**M80111**
			AR5-L Kits		
AR5-L	3 x CPR-1000 1 x CPR-500	Energy / Harmonics	Carrying Bag	**3 L AR5-L**	**M80811**
AR5-L	3 x CPR-2000/200 1 x CPR-1000	Energy / Harmonics	Carrying Bag	**4 L AR5-L**	**M80821**
AR5-L	3 x CPR-2000/200 1 x CPR-10003 x CP-5	Energy / Harmonics and Disturbances	Carrying Bag	**5 L AR5-L**	**M80832**
AR5-L	3 x C-FLEX–45 cm 1 x CF-5	Energy / Harmonics and Disturbances	Carrying Bag	**11 L AR5-L-RBT**	**M80843**
AR5-L	3 x C-FLEX-80 cm 1 x CF-5	Energy / Harmonics and Disturbances	Carrying Bag	**12 L AR5-L-RBT**	**M80853**
AR5-L	3 x C-FLEX-45 cm 1 x CF-5	Energy / Harmonics and Disturbances	Case	**11 LM AR5-L-RBT**	**M80643**
AR5-L	3 x C-FLEX-80 cm 1 x CF-5	Energy / Harmonics and Disturbances	Case	**12 LM AR5-L-RBT**	**M80653**
The two analyzers include: 3 voltage cables + power supply					
All kits include: 3 voltage cables + power supply + PowerVision software + energy / harmonics program + 3 clamps					

Accessories
See page M.8-40

AR5-L

Portable single and three-phase power analyzer

Parameters measured

Three-phase system, 4 wires

Parameter	Symbol (unit)	L1	L2	L3	Three-phase value
phase-neutral voltage	V	Yes	Yes	Yes	-
Current	A	Yes	Yes	Yes	Yes
Neutral current (only AR5-L)	I_N	Yes			
Frequency	Hz	Yes	-	-	-
Active power	kW	Yes	Yes	Yes	Yes
Power factor L	kvarL	Yes	Yes	Yes	Yes
Power factor C	kvarC	Yes	Yes	Yes	Yes
Apparent power	kVA	-	-	-	Yes
Power factor	PF	Yes	Yes	Yes	Yes
Active energy	kW·h	Yes	Yes	Yes	Yes
Power factor L	kvar·h L	Yes	Yes	Yes	Yes
Power factor C	kvar·h C	Yes	Yes	Yes	Yes
Voltage harmonics		Yes	Yes	Yes	-
Current harmonics		Yes	Yes	Yes	-
Current harmonics on neutral		Yes			

Three-phase system, 3 wires

Parameter	Symbol (unit)	L1-L2	L2-L3	L3-L1	Three-phase value
phase-phase voltage	V	Yes	Yes	Yes	-
Current	A	Yes	Yes	Yes	Yes
Frequency	Hz	Yes	-	-	-
Active power	kW	Yes	Yes	Yes	Yes
Power factor L	kvarL	Yes	Yes	Yes	Yes
Power factor C	kvarC	Yes	Yes	Yes	Yes
Apparent power	kVA	-	-	-	Yes
Power factor	PF	Yes	Yes	Yes	Yes
Active energy	kW·h	-	-	-	Yes
Power factor L	kvar·h L	-	-	-	Yes
Power factor C	kvar·h C	-	-	-	Yes
Voltage harmonics		Yes	Yes	Yes	-
Current harmonics		Yes	Yes	Yes	-

Two-phase System

Parameter	Symbol (unit)	L1-N	L2-N	Two-phase value L1-L2
phase-phase voltage	V	Yes	Yes	Yes
Current	A	Yes	Yes	Yes
Neutral current (only AR5-L)	I_N	-		
Frequency	Hz	Yes	-	-
Active power	kW	Yes	Yes	Yes
Power factor L	kvarL	Yes	Yes	Yes
Power factor C	kvarC	Yes	Yes	Yes
Apparent power	kVA	-	-	Yes
Power factor	PF	Yes	Yes	Yes
Active energy	kW·h	-	-	Yes
Power factor L	kvar·h L	-	-	Yes
Power factor C	kvar·h C	-	-	Yes
Voltage harmonics		Yes	Yes	-
Current harmonics		Yes	Yes	-
Current harmonics on neutral		Yes		

Single-phase system

Parameter	Symbol (unit)	L1-N
phase-phase voltage	V	Yes
Current	A	Yes
Frequency	Hz	Yes
Active power	kW	Yes
Power factor L	kvarL	Yes
Power factor C	kvarL / (-C)	Yes
Apparent power	kVA	Yes
Power factor	PF	Yes
Active energy	kW·h	Yes
Power factor L	kvar·h L	Yes
Power factor C	kvar·h C	Yes
Voltage harmonics		Yes
Current harmonics		Yes

Programs

AR5-L

Portable single and three-phase power analyzer

Programs

Description	Equipment	Type	Code
Updating harmonics	AR5-L	**Updating ARI**	**M80221**
Flicker (PST and PLT assessment)	AR5-L	**FL Program**	**M80223**
Detection of network disturbances	AR5-L	**PERTURB Program**	**M80224**
CHECK METER, meter verification system	AR5-L	**CM Program**	**M80225**
Optic fibre sensor, shunts and CHECK METER program included	AR5-L	**Optical check meter kit**	**M806B3**
FAST CHECK, motor start-up	AR5-L	**Fast Program**	**M80226**
LEAK METER, detection and analysis of leakages	AR5-L	**Leak Program**	**M80229**
FILE VISION, display of files in AR5-L	AR5-L	**Fil Vision Program**	**M8022A**

Memory capacity example: In the Energy program, if you record 30 network parameters, with a registration period of 15 minutes, you obtain an autonomy of 80 days of memory.

Harmonics

The harmonics program can be used for the following:

- Analysis of all electrical parameters: voltage, current, power, energy, etc.
- Analysis of overheating in transformers, capacitors, etc.
- Detection of neutral current
- Wave shapes shown on the display in real time
- Zoom on a wave shape
- Harmonic decomposition display (30 or 50 harmonics)
- Calculation of the THD % in voltage and current

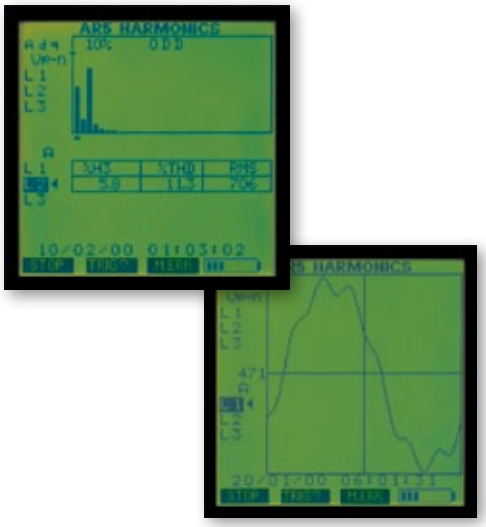
Applications:

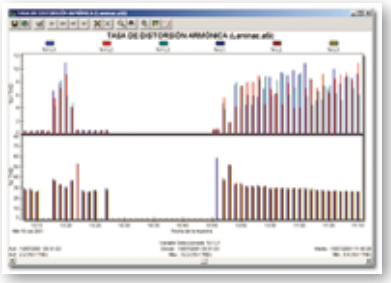
- Calculation of the diameter of cable required to support losses produced by harmonics
- Study of harmonic filtering applications
- Comparison of measurements taken, in accordance with the IEC standard
- Energy and billing study
- Study of installation consumption
- Analysis of the power factor compensation

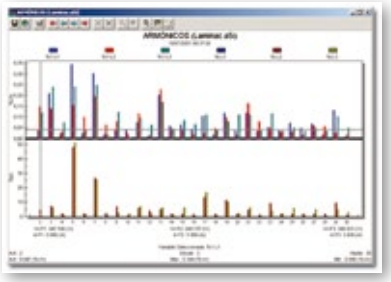
Graphical representation of:

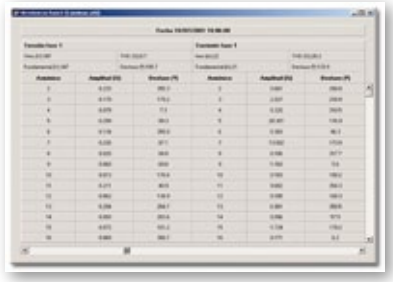
- Wave shapes and harmonic distortion
- Total harmonic distortion THD %
- Harmonic decomposition (up to order 50)
- True root mean square values for voltage and current
- It can be used to prepare tables and lists
- The direction of harmonics can be seen with software

Type	Code
Updating ARI	**M80221**









Programs

AR5-L

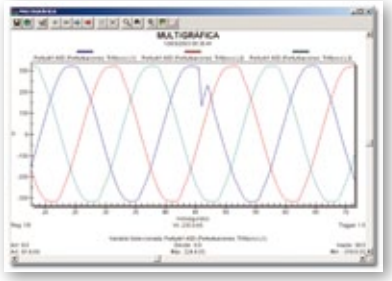
Portable single and three-phase power analyzer

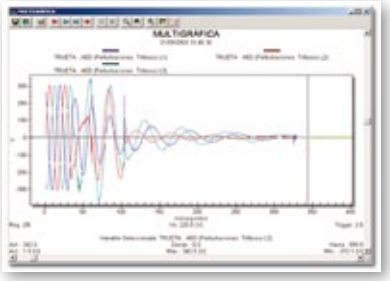
Network quality - Disturbances

Program applications:

- Detection of interruptions, gaps, micro-cuts, peaks, etc.
- Adjustment of the sensitivity for the capture of different types of disturbances
- Information about the number of disturbances detected
- Applications
- Check the effect of switching a load over various points of the installation
- Take "x-rays" of any installation with an **AR5-L** unit and a PC, in order to know everything about a supply network:
  - Evolution of the wave shape
  - Display of an alterationChecking the three phases during the alteration

Type	Code
PERTURB Program	M80224



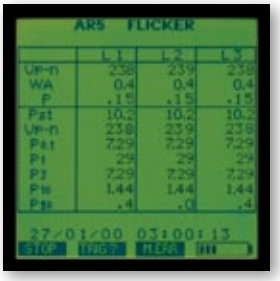


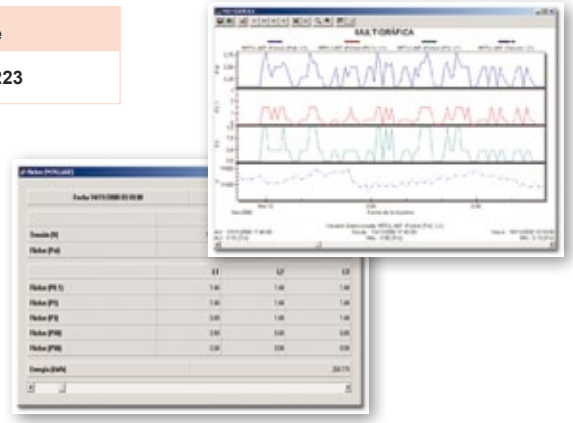
Flicker

The flicker program can be used to:

- Study the flicker present in the installation, whether it is instantaneous, PST or PLT (the latter via software)
- Carry out the same operations executed by the energy program
- Configuration of the times for the calculation of the flicker and energy
- Flicker parameters on a single screen
- Applications
- Determine the level of visual disturbance that can lead to a decrease in the performance of workers
- Study voltage fluctuations

Type	Code
FL Program	M80223



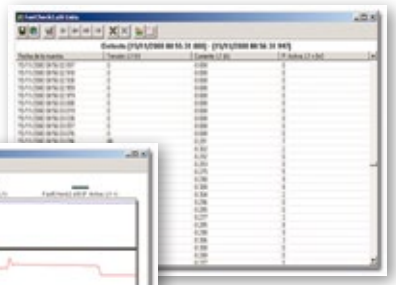


Motor start-up *(Fast check)*

This program can be used to:

- Perform studies on single or three-phase networks to capture the voltage, current, power and power factor during cycle periods
- Capture short voltages (for ex.: motor start-up, welding machines, etc.)
- Potential recording with a *trigger*
- Fixed or rotating memory

Type	Code
Fast Program	M80226



Programs

AR5-L

Portable single and three-phase power analyzer

Check-Meter

The program can be used to:

- Check the measurements of electronic and mechanical meters
- Carry out the tests with no energy cuts
- Carry out 30-second long tests
- Determine the error in active energy or power factor meters
- Programmed setup and percentage error on a single screen
- Up to 4000 records can be created
- Numerical table
- Export to .bmp format or to the clamp-board.

ApplicationsMeter verification studies, creation of detailed reports in each measurement point

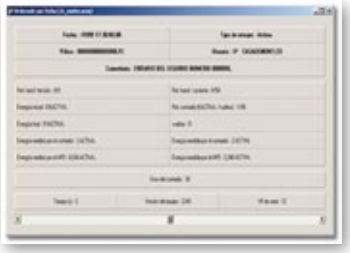
- Detection of errors that exceed 1 % (with the **AR5-L**-shunts calibrated set) in electricity meters
- Detect potential fraud situations

Type	Code
CM Program	**M80225**

Optical reader kit

- For electronic meters or meters with verification LED
- Optic fibre cable used to check meters
- Communications and power supply cable connected to **AR5-L**
- Measures impulses with a longitude that exceeds 1 us
- Shock-proof plastic
- Reduced dimensions: 64x41x26 mm

Type	Code
CM optical kit (includes sensor, shunts, program and software)	**M806C3**



Leak

- Measurement of leakage current, up to 10 A, with a transformer
- Measurement with current sensing clamp
- Measurement with earth leakage transformers
- Measurement scales with 2 mA ... 1 A clamp and 20 mA ... 10 A clamp
- Filtering of high frequencies to avoid the effect of switching systems
- Measurement of the true root mean square value during each period (20 ms)
- Continuous measurement with a record of each period of the programmed time
- Programmable record time 1 s ... 100 s
- Detection of the trip moment due to a voltage drop
- Detection of the trip moment, depending on the programmed leakage level

ApplicationsDetection of the trip level of protection relays

- Checking leakages with no need for manual analysis on the site

Type	Code
Leak Meter Program	**M80229**

Programs

AR5-L

Portable single and three-phase power analyzer

File Vision

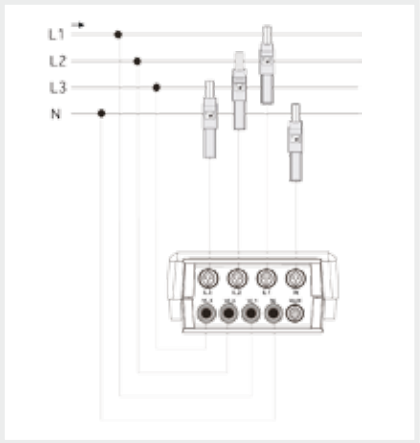
- On-site verification of records
- Display of records, with no need for a PC
- The screen has a cursor that indicates the position of the value of the variable selected, in terms of record time and parameter
- Auto-scalable axis of the parameter (adapted to the maximum and minimum values of all records
- Permanent display of 32 records on the screen
- Display of the maximum and minimum value of the records
- You can browse through records easily and quickly
- Variables represented by the different programs:

- Harmonics: Vpp, Vpn, A, W, var L, var C, PF, Hz, V·A, I_N, kW·h
- Check-Phase: Vpp, Vpn, A, W, var L, var C, PF, Hz, V·A, I_N, kW·h
- Flicker: Vpp, Vpn, A, W, var L, var C, PF, Hz, V·A, I_N, kW·h, Pst
- Fast-Check: Vpp, Vpn, A, W, var L, var C, PF, Hz, V·A, I_N

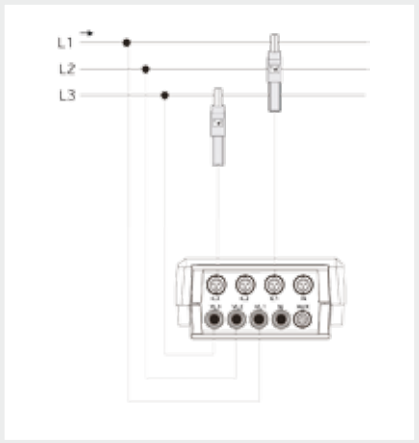
Type	Code
File Vision	M8022A

Connections

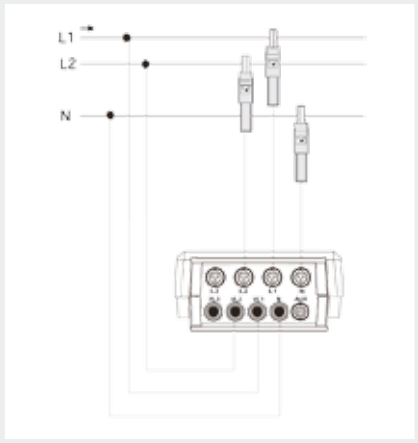
Three-phase system, 4 wires



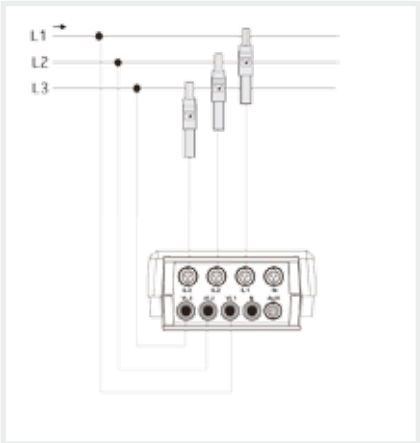
Three-phase system, 3 wires, ARON



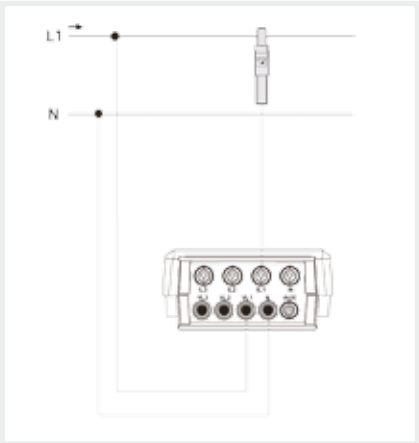
Two-phase System



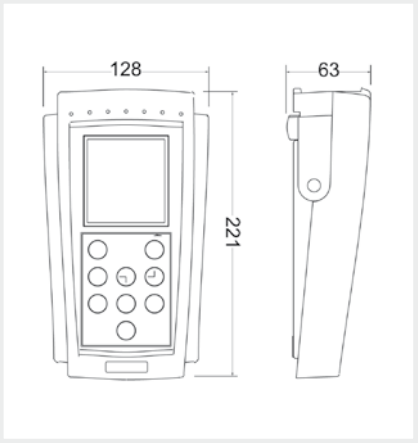
Three-phase system, 3 wires



Single-phase system



Dimensions



CIRCUTOR

Clamps

AR5-L

Portable single and three-phase power analyzer

Clamps	CF-5	CF-10	CP-5	CP-100	CPR-500	CPR-1000	CP-2000/200
							
Measurement range	1...1000 A ac	0.2 mA...10 A ac	0.05..0.5 A ac	1...100 A ac	1...500 A ac	1...1000 A ac	1...200 A ac 10...2000 A ac
Nominal frequency	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz
Output voltage	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac
Dielectric rigidity	5200 V, 50 Hz,1 min	5200 V, 50 Hz,1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min
Scale base error	1 % (up to 0.1 A) 0.5 % (Up to 5 A)	-0,35 %	1 %	0,5 %	0,7 %	0,7 %	Scale 200: 0.5 % (+70 mA) Scale 2000: 0.5% (+100 mA)
Maximum conductor diameter	20 mm	100 mm	20 mm	20 mm	52 mm	52 mm	64 mm
Maximum busbar	1 - 50 x 5 mm or 4 - 30 x 5 mm	5 - 80 x 5 mm or 3 - 80 x 10 mm	20 x 5 mm	20 x 5 mm	1 - 50 x 5 mm or 4 - 30 x 5 mm	1 - 50 x 5 mm or 4 - 30 x 5 mm	5 - 125 x 5 mm or 3 - 100 x 10 mm
Description / Code	**CF-5** **Code M81331**	**CF-10** **Code M81334**	**3 CP-5 Kit** **Code M81041**	**3 CP-100 Kit Code M81042** **1 CP-100Neutral clamp (blue) Code M81036**	**3 CPR500 Kit Code M81043** **1 CPR-500Neutral clamp (blue) Code M81037**	**3 CPR-1000 Kit Code M81044** **1 CPR-1000 - Neutral clamp (blue)Code M81038**	**3 CP-2000/200 Kit Code M81045**

Clamps

AR5-L

Portable single and three-phase power analyzer

Clamps C-FLEX 20 000 / 2 000 / 200 A-45

Longitude sensor	45 cm
Scales	200 A / 2000A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / A Scale 20k or 10k: 0,1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation **IEC 1010** - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10 ... +55 °C
Humidity	90 % HR (a 50 °C)

Scales	Type kit	Code
20 kA / 2000 A / 200 A	**Kit 3 C-FLEX 20000/2000/200 A-45**	**M81141**

Clamps C-FLEX 20 000 / 2 000 / 200 A-80

Longitude sensor	80 cm
Scales	200 A / 2000 A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / A Scale 20k or 10k: 0,1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation **IEC 1010** - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10 ... +55 °C
Humidity	90 % HR (a 50 °C)

Scales	Type kit	Code
20 kA / 2000 A / 200 A	**Kit 3 C-FLEX 20000/2000/200 A-80**	**M81142**

Clamps C-FLEX 20 000 / 2 000 / 200 A-120

Longitude sensor	120 cm
Scales	200 A / 2000 A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / A Scale 20k or 10k: 0,1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation **IEC 1010** - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10 ... +55 °C
Humidity	90 % HR (a 50 °C)

Scales	Type kit	Code
20 kA / 2000 A / 200 A	**Kit 3 C-FLEX 20000/2000/200 A-120**	**M81143**

C-80

Portable single and three-phase power analyzer

Description

- Measurement of the main electrical parameters of a single-phase network, balanced three-phase network and unbalanced three-phase network with neutral
- Measurement of energy
- Measurement of the THD in A and V
- Detects leakage currents and the turning direction of phases
- Internal memory to record parameters automatically
- Display of the maximum and minimum values of electrical parameters
- Reduced size and weight (300g) very robust and easy to use
- Auto-detection of clamp

Application

- Calculation of the capacity in kvar to compensate the installation
- Display of energies compensated with a determined capacitor bank
- Creation of harmonic distortion alarms to detect resonances

Features

Power supply circuit	
Voltage	2 x 1,5 V dc (LR6 AA-type batteries)
Measurement circuit	
Nominal voltage	50 ... 500 Vac
Frequency	45 ... 65 Hz
Nominal current	2 V (automatic, depending on the clamp)
Voltage overload	10% (550 V ac)
Current overload	10%
Class/Accuracy	
Voltage	0.5% ± 2 digits
Current	0.5% ± 2 digits
Power rating	1% ± 2 digits
Build features	
Operating autonomy	200 hours
Keyboard	1 on/off + 7 function keys
Display	7 segments, 3 lines x 4 digits, indication icons
Voltage terminals	L1, L2, L3 / N
Current clamp connector	4 wires (ID signal -> automatic detection)
Record	Circular file (between 1 and 90 min)
Dimensions	172 x 100 x 50 mm
Weight	300 g
Accepted clamps	**CP 2000/200, CP 1000, CP 500, CP 100, CP 5, CF-5, C-FLEX 200 / 2000 / 20000**
Safety	
IEC 61010-6-1	
Standards	
IEC 61000-6-3: 1996, Emissions in residential and commercial environments and light industry CISPR 11:1997 MOD, Radiated (CISPR 22: 1997 MOD-Class A)	
IEC 61000-6-4: 1997, Emissions in industrial environments. CISPR 11: 1997 MOD, Radiated (CISPR 22: 1997 MOD-Class A)	
IEC 61000-6-2:1999, Immunity in industrial environments IEC 61000-4-2:1995, Electrostatic discharge IEC 61000-4-3:2002, Radiated electromagnetic field IEC 61000-4-4:1995, Rapid transient bursts IEC 61000-4-5:1995, Shockwaves IEC 61000-4-6:1996, RF in common mode IEC 61000-4-8:1993, Magnetic field at 50 Hz	
IEC 61000-6-1:1997, Immunity in residential and commercial environments and light industry IEC 61000-4-5:1995, Shockwaves	
IEC 61010-6-1:2001, Electrical security	

C-80

Portable single and three-phase power analyzer

References

Analyzer	Clamps	Type	Code
C-80	-	**C-80, Power analyzer**	**M80120**
	Kits		
C-80	CPR-1000	**C-80 / 1000**	**M80121**
C-80	CP-2000/200	**C-80 / 2000**	**M80122**
C-80	C-FLEX 20k / 2k / 200 A, 45 cm	**C-80 / C-FLEX 45**	**M80123**
C-80	C-FLEX 20k / 2k / 200 A, 80 cm	**C-80 / C-FLEX 80**	**M80124**
C-80	C-FLEX 20k / 2k / 200 A, 45 cm + CF-5A	**C-80 / C-FLEX 45**	**M80125**

All kits include 3 voltage cables + case

Parameters measured

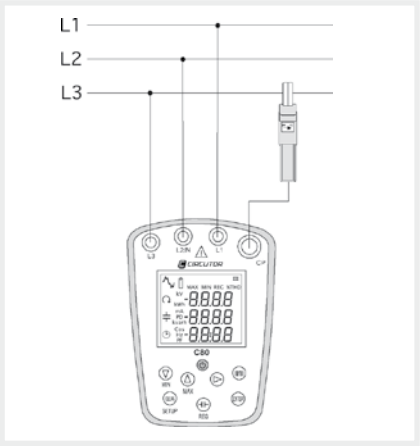
Parameter	Symbol (unit)	Balanced Three-phase / Single-phase system		
		Instantaneous	Maximum	Minimum
Voltage	V	•	•	•
Current	A	•	•	-
Frequency	Hz	•	•	•
Active power	W	•	•	-
Reactive power (L and C)	var	•	•	-
Apparent power	V · A	•	•	-
Power factor	PF	•	•	-
Cos φ	cos φ	•	•	-
Active energy	W · h	•	-	-
Power factor (L)	var · h L	•	-	-
Power factor (C)	var · h C	•	-	-
THD (%) U, I	% THD	•	•	-
MD (Max demand)	PD	•	•	-

Accessories

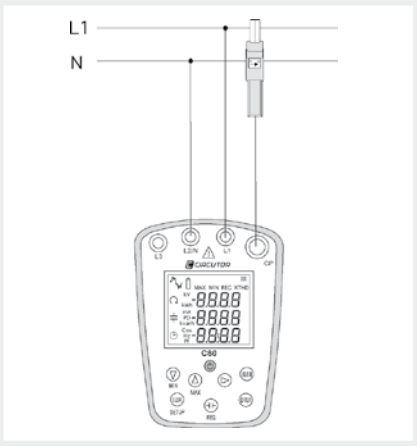
See page M.8-44

Connections

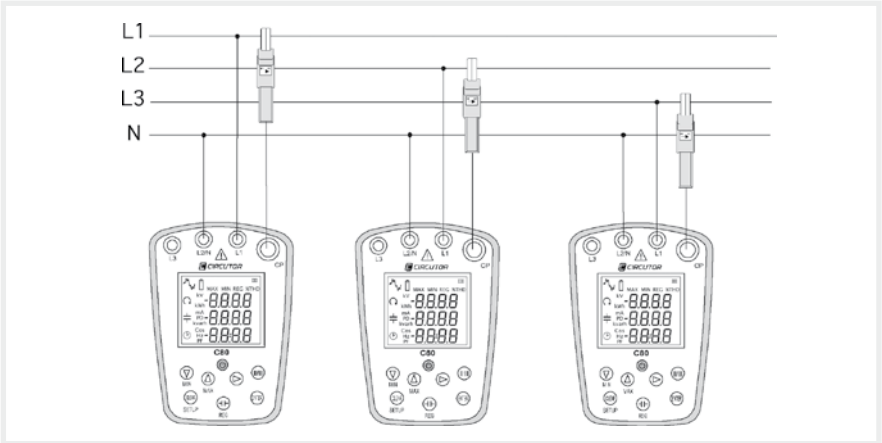
Balanced Three-phase System



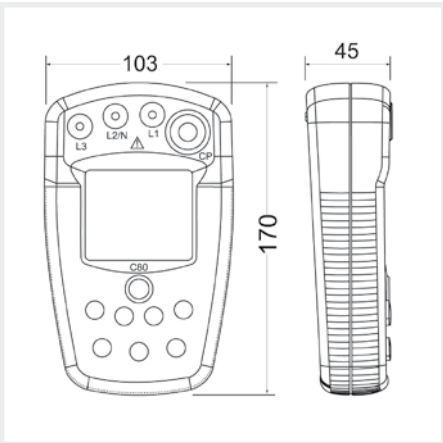
Balanced single-phase system



Umbalanced Three-phase System with neutral



Dimensions



CIRCUTOR

Clamps

C-80

Portable single and three-phase power analyzer

Clamps CP-100

Measurement range	1...100 A ac
Nominal frequency	48...65 Hz
Output voltage	2 V ac
Dielectric rigidity	5200 V, 50 Hz, 1 min
Scale base error	0,5 %
Maximum conductor diameter	20 mm
Maximum busbar	20 x 5 mm

Type	Code
CPR-100	**M81032**

Clamps CPR-1000

Measurement range	1...1000 A ac
Nominal frequency	48...65 Hz
Output voltage	2 V ac
Dielectric rigidity	5200 V, 50 Hz, 1 min
Scale base error	0,7 %
Maximum conductor diameter	52 mm
Maximum busbar	1 - 50 x 5 mm or 4 - 30 x 5 mm

Type	Code
CPR-1000	**M81034**

Clamps CPR-500

Measurement range	1...500 A ac
Nominal frequency	48...65 Hz
Output voltage	2 V ac
Dielectric rigidity	5200 V, 50 Hz, 1 min
Scale base error	0,7 %
Maximum conductor diameter	52 mm
Maximum busbar	1 - 50 x 5 mm or 4 - 30 x 5 mm

Type	Code
CPR-500	**M81033**

Clamps CP-2000/200

Measurement range	1...200 A ac 10...2000 A ac
Nominal frequency	48...65 Hz
Output voltage	2 V ac
Dielectric rigidity	5200 V, 50 Hz, 1 min
Scale base error	Scale 200: 0.5 % (+70 mA) Scale 2000: 0.5% (+100 mA)
Maximum conductor diameter	64 mm
Maximum busbar	5 - 125 x 5 mm or 3 - 100 x 10 mm

Type	Code
CP-2000 / 200	**M81035**

Clamps CP-5

Measurement range	0,05...5 A ac
Nominal frequency	48...65 Hz
Output voltage	2 V ac
Dielectric rigidity	5200 V, 50 Hz, 1 min
Scale base error	1 %
Maximum conductor diameter	20 mm
Maximum busbar	20 x 5 mm

Type	Code
CP-5	**M81031**

Clamps

C-80

Portable single and three-phase power analyzer

C-FLEX Clamps 20 000 / 2000 / 200 A-120

Longitude sensor	120 cm
Scales	200 A / 2000 A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / AScale 20k or 10k: 0.1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation IEC 1010 - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10...+55 ºC
Humidity	90 % HR (at 50 ºC)

Scales	Type	Code
20 kA / 2000 A / 200 A	**C-FLEX 20000/2000/200 A-120**	**M81153**
10 kA / 1000 A / 100 A	**C-FLEX 10000/1000/100 A-120**	**M81653**

*** Codes for 1 clamp**

C-FLEX Clamps 20 000 / 2000 / 200 A-80

Longitude sensor	80 cm
Scales	200 A / 2000 A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / AScale 20k or 10k: 0.1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation IEC 1010 - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10...+55 ºC
Humidity	90 % HR (at 50 ºC)

Scales	Type	Code
20 kA / 2000 A / 200 A	**C-FLEX 20000/2000/200 A-80**	**M81152**
10 kA / 1000 A / 100 A	**C-FLEX 10000/1000/100 A-80**	**M81652**

*** Codes for 1 clamp**

C-FLEX Clamps 20 000 / 2000 / 200 A-45

Longitude sensor	45 cm
Scales	200 A / 2000 A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / AScale 20k or 10k: 0.1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation IEC 1010 - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10...+55 ºC
Humidity	90 % HR (at 50 ºC)

Scales	Type	Code
20 kA / 2000 A / 200 A	**C-FLEX 20000/2000/200 A-45**	**M81151**
10 kA / 1000 A / 100 A	**C-FLEX 10000/1000/100 A-45**	**M81651**

*** Codes for 1 clamp**

CIR-e³

Portable power analyzer

Description

- Measure in 2 quadrants the main parameters for single-phase and three-phase electrical networks with 3 and 4 wires.
- True root mean square measure
- Built-in energy meter.
- 4 voltage channels and 3 current channels.
- Configurable via PC application.
- Recording of parameters on SD card (up to 2 Gb).
- Compatible with Power Vision software.
- Possibility of custom-made independent power supply allowing power supply ranges of 100 to 400 Vac and 70 to 315 Vdc.
- Reduced size which allows installation in boxes with standard double insulation.
- Light
- Automatic detection of pins.
- Indication of poor connection of voltages and current pins.
- Compatible with CIR-e WEB application for processing data via a web site.
- Magnetic attachment to facilitate fastening to an electric panel or metal supports.

Application

- Equipment for performing energy audits

Features

Power circuit			
Voltage		100 to 400 Vac, 70 to 315 Vdc	
Frequency		50 to 60 Hz	
Consumption		9 VA	
Measurement circuit			
Voltage (f-N)		10 to 400 Vac (f-N) ± 10%	
Voltage f-f		17 to 690 Vac (f-f) ± 10%	
Current (.../2 V)		2.5 to 100% F.E. of clamp (within class)	
Frequency		45 to 65 Hz	
Minimum/maximum current, in accordance with the clamp and scale			
Clamp		Scale	Range
E-FLEX 20/54 cm	L1/sc1	200 A	5 to 200 A
	L2/sc2	2 000 A	50 to 2000 A
	L3/sc3	20 000 A	500 to 20,000 A
CP-5		5 A	0.05 to 5 A
CP-100		100 A	1 to 100 A
Accuracy			
Voltage		0,5 % F.E.	
Current		1 % F.E.	
Power		2 % F.E.	
Energy		2 % F.E.	
Build features			
Operating temperature		10 to 50ºC	
Altitude		2 000 m	
Humidity		95% RH without condensation	
Storage temperature		-10 to 65ºC	
Protection degree		IP 53	
Weight (only CIRe3)		0.677 kg	
Weight (with packaging)		0.733 kg	
Standards			
ELECTRICAL SAFETY STANDARD: IEC 60664-1, IEC 61010-1, IEC 62053-21, UL 94, VDE 110 **ELECTROMAGNETIC EMISSIONS**: IEC 61000-3-2, IEC 61000-3-3, IEC 61000-6-4, EN 55011, EN 55022 **ELECTROMAGNETIC IMMUNITY**: IEC 61000-6-2, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-8, IEC 61000-6-1, IEC 61000-4-11, ENV 50141			

CIR-e³

Portable power analyzer

Parameters measured

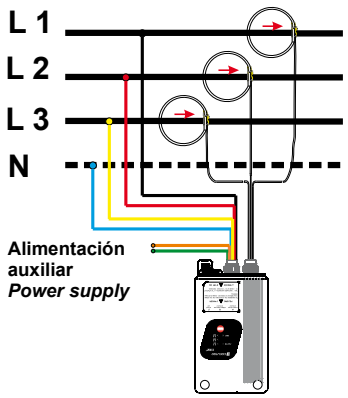
Parameter	Symbol (unit)	L1	L2	L3	III	Max./ Min.
Voltage	V	•	•	•	-	•
Current	A	•	•	•	-	•
Frequency	Hz	•	-	-	-	•
Active power	W	•	•	•	•	•
Reactive power factor (L and C)	varL, varC	•	•	•	•	•
Apparent power	V·A	•	•	•	•	•
Power factor	PF	•	•	•	•	•
Active energy	W · h	-	-	-	•	-
Reactive energy (L and C)	var·hL,var·hC	-	-	-	•	-
Apparent energy	VAh	-	-	-	•	-
Harmonic decomposition *U*, *I* (50)		•	•	•	-	-
THD (%) *U*, *I*	% THD	•	•	•	-	-
MD (Max demand) - Active power	W (MD)	-	-	-	•	•
MD (Max demand) - Apparent power	VA (MD)	-	-	-	•	•
Fundamental *U*, *I*		•	•	•	-	-
WA flicker	WA	•	•	•	-	-
PST flicker	Pst	•	•	•	•	•

References

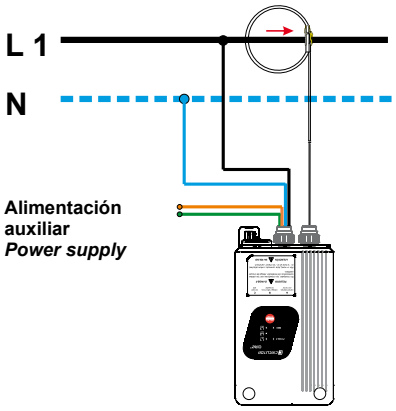
Analyzer	Pins	Type	Code
CIR-e³	-	**CIR-e³**	**M85020**
CIR-e³	3 x 3 x CP-100	**CIR-e³ / 3 CP-100**	**M85030**
CIR-e³	E-FLEX 54	**CIR-e³ E-FLEX 54**	**M85000**
Accessories			
See page M.8-45			

Connections

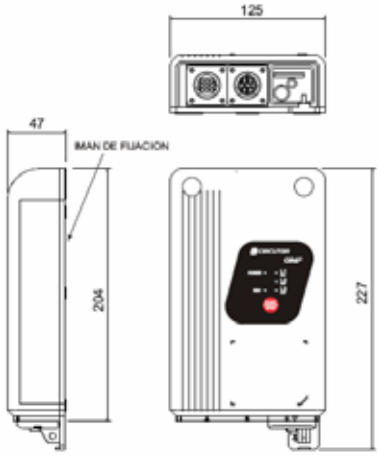
Three-phase system balanced with neutral



Single-phase system



Dimensions



CIRCUTOR

CIR-e^{Q}

Portable power quality analyzer

Description

- Standard measurement of voltage parameters.
- Parameters for live power quality.
- Configurable via PC application.
- Recording of electrical parameters and quality events in SD (up to 2 Gb).
- Light.
- Reduced size which allows installation in boxes with standard double insulation.
- Possibility of custom-made independent power supply allowing power supply ranges of 100 to 400 Vac and 70 to 315 Vdc.
- Compatible with CIR-e WEB application for processing data via a web site (STD files).
- Has a magnet to facilitate fastening on electric panel or metal supports.

Application

- Device which has been designed to incorporate the most recent technologies offering the most advanced services on the market for measuring and recording quality events in electrical networks.

Features

Power circuit	
Voltage	100 to 400 Vac, 70 to 315 Vdc
Frequency	50 to 60 Hz
Consumption 100/400 Vac	5.2/22 VA
Consumption 70/315 Vdc	3 W
Measurement circuit	
Voltage (f-N)	10 to 400 Vac (f-N)
Voltage f-f	17 to 520 Vac (f-f)
Frequency	45 to 65 Hz
Accuracy	0.5 % F.E.
Build features	
Operating temperature	10 to 50ºC
Altitude	2 000 m
Humidity	95% RH without condensation
Storage temperature	-10 to 65ºC
Protection degree	IP 53
Weight (only CIR-e^{Q})	0.677 kg
Weight (with packaging)	0.713 kg
Standards	
ELECTRICAL SAFETY STANDARD: IEC 60664-1, IEC 61010-1, UL 94, VDE 110 **ELECTROMAGNETIC EMISSIONS**: IEC 61000-3-2, IEC 61000-3-3, IEC 61000-6-4, EN 55011, EN 55022 **ELECTROMAGNETIC IMMUNITY**: IEC 61000-6-2, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-8, IEC 61000-6-1, IEC 61000-4-11, ENV 50141	

CIR-e^Q

Analizador portátil de calidad de suministro

Parameters measured

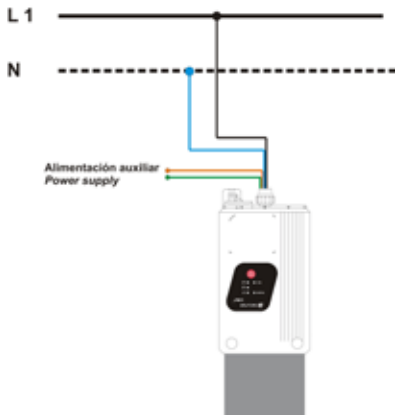
Parameter	Symbol (unit)	L1	L2	L3	III	Max./Min.
Phase-neutral voltage	V	Yes	Yes	Yes		Yes
Phase-phase voltage	V	Yes	Yes	Yes		Yes
Frequency	Hz	Yes				Yes
THD V		Yes	Yes	Yes		Yes
Fundamental V		Yes	Yes	Yes		
Harmonic decomposition V (50º)	Har	Yes	Yes	Yes		
Quality percentage		Yes	Yes	Yes		
Crest factor		Yes	Yes	Yes		
WA flicker	WA	Yes	Yes	Yes		
PST flicker	Pst	Yes	Yes	Yes		Yes
Imbalance	kd V				Yes	Yes
Asymmetry	Ka V				Yes	Yes
Quality						
Overvoltage		Yes	Yes	Yes		
Voltage gaps		Yes	Yes	Yes		
Interruptions		Yes	Yes	Yes		

References

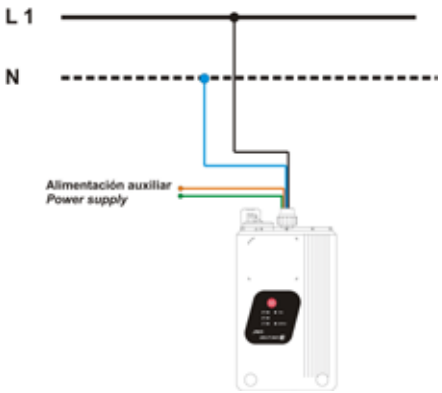
Analyzer		Code
CIR-e^Q		**M85010**
Accessories		
See page M.8-45		

Conexiones

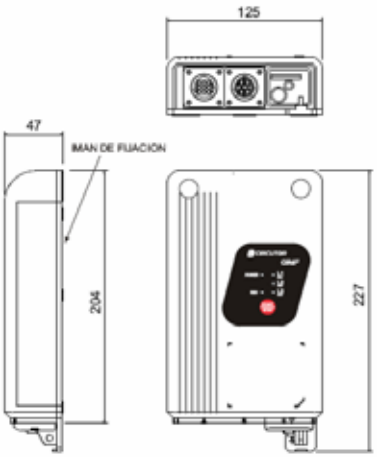
Unbalanced three-phase system with neutral



Balanced single-phase system



Dimensions



CIRCUTOR

Special clamps

High voltage clamps

PI-23

High voltage clamps

Description

- Open clamps can be used to measure current in points where the power supply can not be interrupted

Application

- Check currents circulating through the line
- Assessment of network losses
- Carry out studies to prevent overheating
- **PI-23** Applications: This clamp has been designed to measure the maximum current circulating through the line
- The clamp has a display that shows the maximum value of the current measured
- The measurement is taken while using a safety system that prevents the effects of the clamps on the current when the clamp is placed or taken out of the line.

Features

Maximum voltage	36 kV	
Maximum measurement current	400 A (2 scales)	
Maximum conductor diameter	25 mm	
Voltage circuit		
Battery	9 V, 6F22	
Frequency	50 Hz (60 Hz, on demand)	
Backlit	LCD	
Digits	3	
Accuracy	± 2 %	
Build features		
Degree of protection	IP 50	
Weight (without battery)	290 g	360 g with receiver
Standards		
61010 Electrical safety		

References

*I*max	*U*max	∅ max	Type	Code
400 A	36 kV	25	**PI-23 + case (50 Hz)**	**M80132**
400 A	36 kV	25	**PI-23 + case (60 Hz)**	**M80132001**
6 m Pole (3 sections of 2 m)				**M89941**

Special clamps

Clamps with logger

CPL

Clamps with memory

Description

- Current sensing clamps that measure and integrate the current in true root mean square.
- Internal memory used to store mean values (128 kB)
- Measurement in true root mean square
- Maximum and minimum current values
- Trigger option
- Real-time clock to record events
- PC connection to program and obtain data recorded

Features

Voltage circuit	
Through an external power supply unit	230 Vac (± 15 %)
Self-power supply	I >15 % I_n
Frequency	50 ... 60 Hz
Measurement range	1 at 100% I_n
Accuracy with external power supply	1 % of the reading (± 2 digits)
Memory	128 KB (> 8000 records)
Type of memory	Linear
Safety	Category III 640 V (self-power supply), **EN 61010**
Standards	
EN 60664, VDE 0110, UL 94, EN 60801, EN 6100, EN 61010-1	

References

Measurement margin (external power supply)	Measurement margin (self-power supply)	Type	Code
5...500 A ac	75...500 A ac	**CPL-500**	**M81311**
10...1000 A ac	150...1000 A ac	**CPL-1000**	**M81312**
20...2000 A ac	300...2000 A ac	**CPL-2000**	**M81313**

Includes memory with power supply, RS-232 interface and PowerVision software

T-3V

Earth resistance meter

Description

- Capable of measuring the earth voltage
- The 2 mA measurement current can be used to make resistivity tests of the earth to trigger the earth circuit breakers of the circuit being tested
- Battery operated
- Self-disconnection. The timer is operated automatically after no control has been used for 3~6 minutes. The meter is in operation when the operation push-button and the timer activation button are pressed at the same time
- Reading memory function
- Open circuit indicator. The OFF LED indicates when the connection of the test bits is correct
- Compact and light
- Designed to comply with the **IEC-1010** (**EN61010**) security standard.

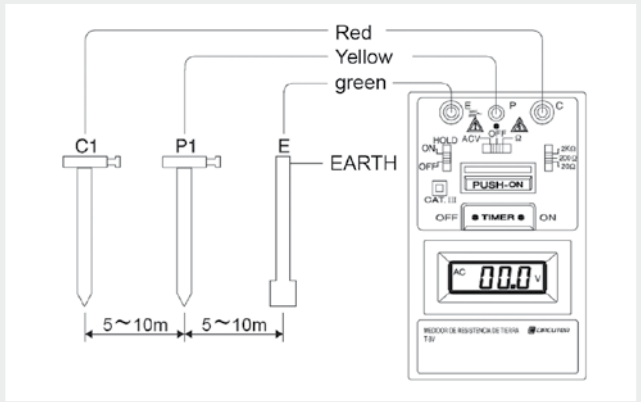
Features

Measurement system	Earthing resistance to earth with a constant current inverter 800 Hz, 2 mA approx.
Earth voltage	0...200 V ac, 40...500 Hz
Earth resistivity	Scale and resolution 0 ~ 20 Ω (0.01Ω) 0 ~ 200 Ω (0.1Ω) 0 ~ 2000 Ω (1Ω)
Earth voltage accuracy	± (1 % read. + 2 dig.)
Earth resistivity accuracy	± 0.1% _ or (when greater); ± (2 % read. + 2 dig.)
Safety standards	**IEC-1010** (**EN 61010**)
Low battery indicator	The "B" symbol will appear on the display
Read memory indicator	The "DH" symbol will appear on the display
Over-margin indication	"1" on the most significant digit (MSD)
Open circuit indicator	The operation indicator (2) will be turned off
Timer (auto-disconnection)	When no control is operated, after 3 ~ 6 minutes
Indicator	3 digit LCD (2000 records)
Power supply	Six 1.5 V batteries (R6C)
Dimensions	W. 163 x H. 100 x D. 50 mm
Weight	Approx. 600 g (including batteries)
Accessories	Testing bits (red – 15 m, yellow – 10 m, green – 5 m), auxiliary earthing rods, carrying case, instruction manual

Coding

Type	Code
T-3V	M80410

Connections



MEG-S

Insulation meter

Description

The **MEG-S** unit has a backlit LCD display and it is used to take insulation (MΩ), continuity (Ω) and AC voltage readings.

- Press a button for instantaneous operation. In addition, in the case of taking continuous readings of MΩ or Ω, the unit has a built-in timer with automatic disconnection after 3 to 5 minutes to save on the consumption of batteries
- LED indicator (red) to check the insulation and continuity
- Use of the high-performance and accuracy DC-DC converter
- Carrying case
- Specially designed to measure the insulating resistance of domestic electrical appliances, distribution of energy lines and installations.
- Cable for the conductor insulation test.
- Cable for the insulation test against the appliance body.

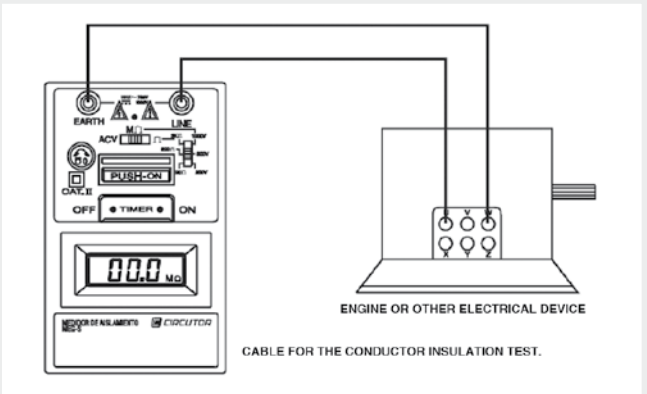
Coding

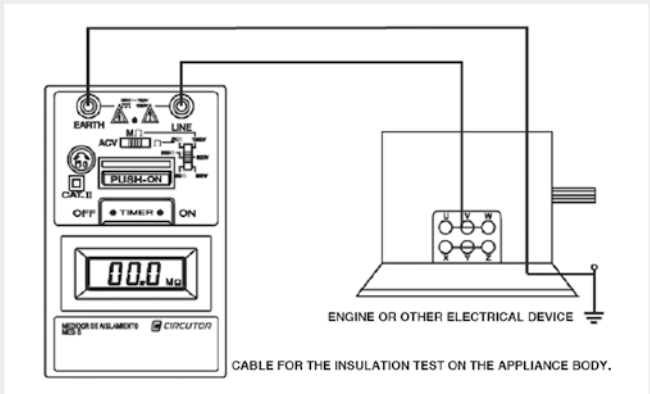
Type	Code
MEG-S	**M80420**

Features

Indicator	3 1/2 digit LCD indicator with maximum reading of 1999
Insulation reading	20 M_ ± 1.5 % read. ± 2 dig. 200 M_ ± 2.5 % read. ± 2 dig. 2000 M_ ± 5.0 % read. ± 3 dig.
Auto-range function	(for Insulation Measurement)
Test voltage	250 V, 500 V, 1000 V DC ±10%
AC voltage measurement	0 – 750 V ±1.5 % read. + 2 dig.
Impedance	10 MΩ
Continuity measurement	0 - 20 Ω ± 2 % read. ± 4 dig. 0 - 200 Ω ± 1.5 % read. ± 2 dig. 0 - 2 kΩ ± 1.5 % read. ± 2 dig. Short-circuit current 3 mA Acoustic continuity indication under: 8 Ω scale of 20 Ω 10 Ω scale of 200 kΩ 40 Ω scale of 2 kΩ
Over-margin indication	"1" on the most significant digit (MSD)
Timer	Automatic disconnection after 3 minutes
Non-disruptive voltage	In compliance with the IEC-1010 security requirements category III
Power supply	Six 1.5 V batteries (R6C)
Dimensions	W. 163 x H. 100 x D. 52 mm
Weight	Approx. 430 g (including batteries)
Accessories	Batteries (6) Testing bits Carrying case Instruction manual

Connections





CPM

Current sensing clamp - multimeter

Description

- The **CPM** current sensing clamp offers the voltage, current, resistance and frequency measurement functions, with an acoustic continuity buzzer and diode test.
- Three push-buttons are used to select the measurement hold (HOLD), maximum value (MAX) and DC current measurement reset (DCA ZERO) functions
- The meter is powered with a 9 V battery. Its design and double insulation make the CPM a safe and robust instrument.

Coding

Type	Code
CPM	**M80430**

Features

Indicator	3 1/2 digit LCD indicator with maximum reading of 1999
Presentation functions Hold MAX	Measurement retention Retention of the maximum measurement value
Polarity	Automatic, positive by default and negative polarity indicator (-)
Over-margin	(OL) or (-OL) will be shown on the display
Zero	Automatic
Low battery indicator	" [+ −] " will be displayed when the voltage of the battery is under the normal operating levels
Reading rate	2.5 readings per second, nominal
Power supply	9 V Battery, **IEC 6F22**
Autonomy	200 standard hours, with carbon-zinc battery
Ambient conditions Operating temperature Storage temperature	 0 °C to 40 °C (RH 0-70%) 20 °C to 60 °C, (RH 0-80%) with the battery removed
Dimensions	250 (W) x 100 (H) x 46 mm. (D)
Weight	380 g, including battery
Accessories	A pair of test bits. Carrying case
Reference conditions	Environmental conditions: 23 °C ± 5 °C, RH < 75%
DC Voltage Scale Accuracy Input impedance Overload protection	 600 V ± (0.5% read. + 1 digit) 10 MΩ 600 V dc or ac. rms
AC Voltage (50-500 Hz) Scale Accuracy Input impedance Overload protection	 200 V, 600 V ± (1.2% read. + 4 digits) 10 MΩ 600 V dc or ac. rms
Resistance Scales Accuracy Open circuit voltage Overload protection	 2 kΩ, 200 kΩ ± (1.2% read. + 1 digit) 0.3 V dc 600 V dc or ac rms
Frequency (Auto-range) Scales Accuracy Sensitivity Overload protection	 2 kHz, 20 kHz ± 0.1% read. + 3 digits 80 V rms minimum 600 V dc or ac rms
Continuity Acoustic warning Overload protection	 Lower than 30 Ω in the 2 kΩ 600 V dc or ac rms
Diode test Testing current Accuracy Open circuit voltage Acoustic warning Overload protection	 1.0 mA ± 0.6 mA ± (6.0% read. + 3 digits) 3,0 V dc standard < 30 mV 600 V dc or ac rms
DC Current (Place the conductor in the centre of the piece) Scales Resolution Accuracy Overload protection	 200 A, 700 A 100 mA ± (1.5% read. + 5 digits) 700 A dc Max. during one minute
AC Current (40 Hz to 500 Hz) (Place the conductor in the centre of the piece) Scales Resolution Accuracy Overload protection	 200 A, 700 A 100 mA ± (1.5% read. + 5 digits) 50 to 60Hz ±(3.5% read. + 5 digits) 40 to 500 Hz 700 A dc Max. during 1 minute

CDB

Earth leakage verification unit and loop resistance meter

Description

- Designed to take readings in single or three-phase installations
- Measurement of amperage with voltages per phase of 190 to 260 V
- Inspection of all sorts of residual current devices
- Powered with batteries or accumulators
- Measurement of the voltage between the phase and earth UL-PE
- Measurement of the voltage between the phase and neutral UL-N
- Measurement of the voltage between the neutral and earth terminal UN-PE
- Measurement of frequency
- Measurement of the protection loop impedance RS
- Measurement of the protection loop impedance RS, with no disconnection of the RCD
- Measurement of the trigger time tA of the RCD with earth leakage intensity I_N, 5x I_N and pulsed current
- Checking the RCD with gradual incremental voltage, measurement of the operating intensity of the RCD I_ and measurement of the contact voltage UI_ when the RCD is disconnected
- Measurement of the contact voltage UI_N when passing the nominal operation intensity 0.45x I_N through earth with no synchronisation of the RCD, checking that the RCD is not disconnected
- Cabling inspection (results are displayed in the form of symbols)
- Optional backlit LCD display
- The values read are automatically stored and then displayed on the display

Basic operating instructions

- The instrument can be used at a room temperature of - 5° C to 40° C. Instruments stored during a long period of time at temperatures under 0ºC must be acclimatised during 2 hours prior to storage
- The maximum relative humidity in air allowed is 80 % at 23° C
- The instrument must not be exposed to aggressive gases and vapours that could cause oxidation, liquids and dust
- The instrument can only take readings under reference conditions with no additional errors
- The maximum resistance of the housing to heat is a maximum of 80º C
- The instrument can not take readings when the ºC overheating symbol is displayed
- The instrument can also be connected between phases during a maximum interval of 5 minutes
- All units under the RCD (Capacitors, rotating machines, etc.) as well as the residual currents of circuits can have an impact on the readings
- The voltage drops in batteries under the limits allowed is shown by the symbol that appears on the lower left corner of the screen
- The correct battery polarity must be maintained when changing batteries (in accordance with the battery clamp symbols). Used batteries will reduce the clarity of the display, even though this does not have an impact on the operation of the instrument. Batteries can not be changed when the instrument is connected to the mains. The instrument must not be connected to the mains when the battery lid is damaged. The lid must be changed immediately
- The two-wire adaptor can only be connected to the CDB instrument for measuring purposes, i.e., it can not be connected to the power supply
- The CDB plug must be connected to the adaptor's output (when a two-wire adaptor is used) before it is connected to the mains or to the load being measured

Coding

Type	Code
CDB	M80450

LXM

Luxmeter

Coding

Type	Code
LXM	M80450

Features

Measurement ranges	0.00 to 39.99/399.9/3999/39990 lx 0.000 to 3.999/39.99/399.9/3999 fc automatic selection / range manual
Resolution	0.01 lx ~ 10 lx ; 0.001 fc ~ 1 fc
Accuracy	±3% rdg ±5 digits
Temperature features	±0.1% / º C
Response time	0.5 sec.
Light detector: Photodiode	Yes
Operating temp. / humidity	0º C ~ 40º C (32 ºF ~ 104º F) , 0 ~ 80% HR
Storage temp. / humidity	-10º C ~ 50º C (14ºF ~ 122º F) , 0 ~ 70% HR
Range Overload	" ---- " display
Power supply	one 9V battery ,006P or IEC 6F22 or NEDA 1604
Battery working life	Approx. 170 hours (Alkaline battery)
Dimensions	196 (L) x 54 (W) x 33 (H) mm 7.7 (L) x 2.1 (W) x 1.3 (H) inches
Weight	Approx. 180 gr
Accessories	9V Battery, instruction manual

MS-148

Alternating voltage detector

Description

- Measurement of ac, from 70 to 600 V ac, with no need to be in contact with the voltage

Coding

Type	Code
MS-148	M80440

accesorios AR6

Kit with 4 flexible clamps

Description

- Kit with 4 **AM54-Flex** flexible clamps with 5 ties

Code M82533

Kit with 3 flexible clamps

Description

- Kit with 3 **AM54-Flex** flexible clamps with 5 ties

Code M82532

Flexible clamp

Description

- **AM54-Flex** type flexible clamps with coloured clips

Code M82531

Crocodile clamps

Description

- Crocodile clamps for **AR6**

Code M89909

Voltage cables

Description

- Black (**UL**) voltage cables with 12 ties in 6 colours

Code M82501

AR6 case

Description

- Deep red **AR6** work cover

Code M82503

AR6 case

Description

- Transport case (trolley type) for **AR6**

Code M82504

Lexan front panel

Description

- Lexan front panel with phase colours

Code M82506

Power supply

Description

- Power supply for **AR6**

Code M82507

AR6 battery

Description

- Replacement for the internal battery of the **AR6** analyzer

Code M82508

Power Vision Plus

Description

- Software for the remote management and measurement of the information recorded by the **AR5-L** portable analyzers and other units manufactured by **CIRCUTOR**.

- It is a high-performance tool that increases the power of the information recorded by the units.

For more information, see M.9 Catalogue

Code **M90411**

AR5-L accessories

Charging power supply and interface (RS-232)

Description

Includes:
- 80 - 250 V ac Power supply
- Power supply cable
- Cable to connect the power supply and the **AR5-L**
- Series cable (RS-232) to connect the power supply and PC

Code **M89926**

AR5-L battery

Description

Replacement for the internal battery of the **AR5-L** analyzer

Code **M89904**

Case for AR5 / AR5-L

Description

Cover for the **AR5-L** analyzer, so that it can be transported easily and comfortably

Code **M89901**

Carrying bag for AR5 / AR5-L

Description

Includes pockets for the following:
- One **AR5-L** analyzer
- 4 current sensing clamps (**CP5**, **CP100**, **CPR500**, **CPR1000**, **CP2000/200**, **CF-5** or any kit with flexible clamps)
- Power supply and power supply / voltage measurement cables
- Folder with the manuals of PowerVision and other programs
- Accessories of the **AR5-L** analyzer

Code **M89905**

AR5-L accessories

Case for AR5-L clamps

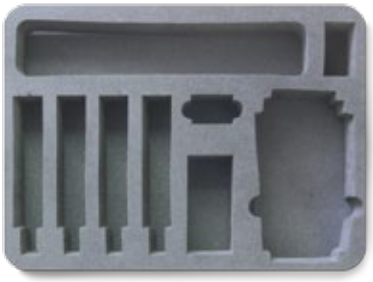
Description

Case for **AR5-L** clamps

Code **M89921**

1000 L Case

(with protective foam, for CPR-1000 clamps of the AR5-L analyzer)



Description

Includes pockets for the following:

- One **AR5-L** analyzer
- 4 **CPR100** current sensing clampsPower supply and power supply / voltage measurement cables

Code **M89923**

2000 L Case

(with protective foam, for CPR-2000/200 clamps of the AR5-L analyzer)

Description

Includes pockets for the following:

- One **AR5-L** analyzer
- 4 **CPR2000** / **200** current sensing clamps
- Power supply and power supply / voltage measurement cables

Code **M89924**

C-FLEX Case

(with protective foam, for C-FLEX clamps of the AR5-L analyzer)

Code **M8992F**

AR5-L accessories

CheckMeter + optical reader

Description

Includes:

- CheckMeter Program for **AR5-L** (last version). The corresponding cartridges are included, such as the CheckMeter program for **AR5-L** and the co-processor.

- **CheckMeter** optical sensor (with the optic fibre cable to monitor meters and the communications and power supply cable that connects it to the **AR5-L**)

- Program User Manual CheckMeter (including the explanation of how the sensor must be used)

Code **M806C3**

Power Vision Plus

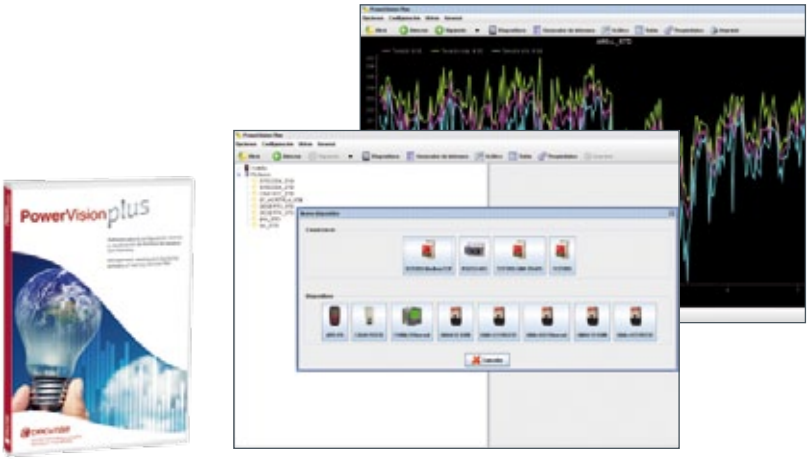
Description

- Software for the remote management and measurement of the information recorded by the **AR5-L** portable analyzers and other units manufactured by **CIRCUTOR**.

- It is a high-performance tool that increases the power of the information recorded by the units.

For more information, see M.9 Catalogue

Code **M90411**



PC Communications cable

Description

- RS-232 Series connection cable, with two DB9 connectors (male and female), with a length of 1.2 m. Used in **AR5** and **AR5-L** analyzers to download the data stored in the PC with the Power Vision Software.

Code **M8991E**

AR5-L accessories

Adaptor cable (3 cables) AR5-L

Description

- Set of three cables, with a 4-way female connector with colour phase on one end and a 3-pin male connector on the other end.

Code **M89917**

Adaptor cable (1 cable) AR5-L

Description

- 4-way female connector on one end and 3-pin male connector on the other end.

Code **M89922**

Adaptor cable (1 cable) AR5

Description

- 3-way female connector on one end and 4-pin male connector on the other end, with phase colour.

Code **M89932**

Cable to connect the AR5-L unit to the power supply

Description

- Cable to connect the power supply input and communications between the analyzer and power supply.

Code **M8992C**

AR5-L accessories

Set of 4 voltage cables

Description

- Set of 4 cables to connect the voltage inputs of the **AR5-L** analyzer to an electric panel or sub-panel.

Code **M89908**

Crocodile clamp (1 unit)

Description

- Clamp that adapts to the voltage cable and can be connected to an electric panel or sub-panel to measure voltage.

Code **M89909**

C-80 accessories

3 voltage cable replacement kit

Description

- Set of 3 cables to connect the voltage inputs of the **C-80** analyzer to an electric panel or sub-panel.

Code **M89907**

C-80 Case

Description

- Case to carry the **C-80** analyzer easily and safely.

Code **M89931**

CIR-e³ / CIR-eᴱ accessories

Kit with 3 E-FLEX clamps

Description

- Kit with 3 **E-FLEX** 54 200/2.00/20.000 A clamps for **CIR-e³**

Code M86010

Kit with 3 CP-5 clamps

Description

- Kit with 3 **CP-5** clamps for **CIR-e³**

Code M86011

Kit with 3 CP-100 clamps

Description

- Kit with 3 **CP-100** clamps for **CIR-e³**

Code M86012

Kit with 6 voltage cables

Description

- Kit with 6 voltage cables for **CIR-e³** or **CIR-eᴱ**

Code M86020

CIR-e³ or CIR-eᴱ case

Description

- Transport case for **CIR-e³** or **CIR-eᴱ**

Code M89931