CVMk2

✓ *Power and precision within your reach*

Measuring with accuracy class

CIRCUTOR
Technology for energy efficiency

Power and accuracy

▸ 0.2% or 0.5% class in power and active energy measurement

▸ Over 500 electric parameters display

▸ Both voltage and current harmonics spectrum graphics (to the 50th)

▸ Maximum and minimum values capture with timestamp recording

▸ Five voltage inputs and four current inputs (I_N) (*Neutral current*)

Versatile

▸ 96x96 mm, 144x144 mm and 4 inch hole panel assembly and (DIN-rail fixation as well)

▸ Compact or separate assembly by means of communication cable

▸ Three upgrade slots: digital I/O, analogue I/O and Ethernet with SD memory card (512 MB)

▸ Multiple languages (English, Spanish, etc.)

One display can monitor
## up to 32 measuring modules information

Graphic screen

▸ Large size 1/4 VGA display

▸ 1 single display can show up to 32 measurement modules

▸ Expansion modules are detected automatically

Applications

▸ Measuring in low and high voltage upstream distribution switchboards

▸ Sub-metering and energy costs charge

▸ Redundant energy consumption metering

▸ Disturbances and voltage events capture

▸ Both voltage and current (V, A) waveform display
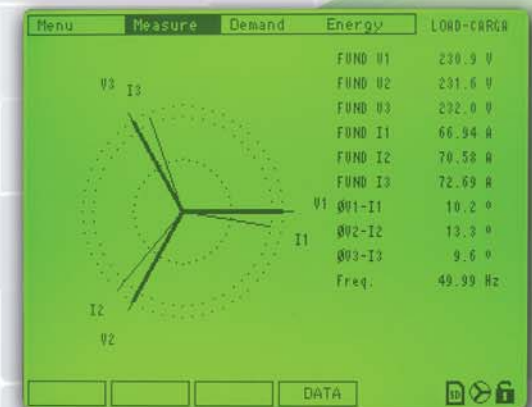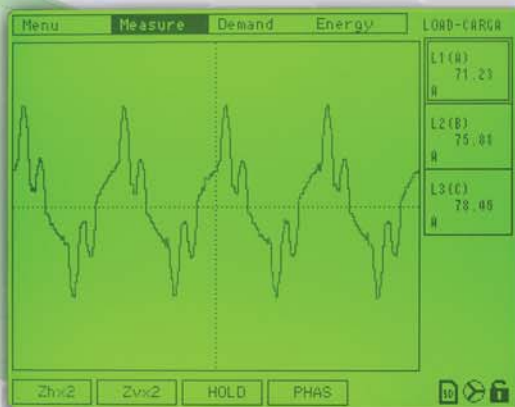
Harmonics

Harmonics are disturbances which introduce losses in the power transformers and wires or bus-bars.

It is essential to asses them accurately. By means of the **CVM*k2*** you will obtain:

▸ Harmonic decomposition in voltage and current up to the 50th

▸ Harmonic distortion in voltage and current (% THD)

▸ Calculation of the *k factor*; it assesses the performance of the power transformer

Unbalance, asymmetry and flicker

▸ Calculation of the k_a and k_d in voltage and current

▸ Phasorial diagram display

▸ Display the cos φ and power factor (by phase and three-phase)

▸ PST and PLT (flicker) calculation

Disturbances

Thanks to the high sampling rate (TRMS), **CVM*k2*** can detect disturbances and events in voltage such as:

▸ Overvoltages

▸ Sags

▸ Interruptions

With **Power Studio** software we can graphically monitor the captured events by means of CBEMA and ITIC curves

Energy

The rationalisation and electrical consumption control is essential in any installation. Therefore, with **CVM*k2*** you will be able to monitor the consumption at the measuring points with maximum accuracy:

▸ Active, apparent, capacitive and inductive reactive energy (imported and exported)

▸ Display of total, monthly or annual energy consumption

Tariffs

The different electric markets have multiple calendars and tariffs; **CVM*k2*** can discriminate up to nine tariffs, with synchronism through:

▸ External contacts (expansion card with digital inputs)

▸ Internal clock (loading the calendar in the equipment's internal memory)

Power demand

The calculation of demand is essential for the correct sizing of the facilities and in order to contract the correct energy. **CVM*k2*** allows you to simultaneously display the following magnitudes:

▸ Active power (kW)
▸ Apparent power (kVA)
▸ Phase current (I_1, I_2, I_3)
▸ Three-phase current (A_{III})

Moreover, we can discriminate these demands and even display the maximum values on screen, with the date and time (timestamp function)

Menu	Measure	Demand	**Energy**	LOAD-CARGA
Energy	Current » Tariff 1		Current »	
kWh		000792	Monthly »	kWh
			Yearly »	
kvarLh		00017704 .698		kvarh
kvarCh		00000003 .238		kvarh
kVAh		00092193 .663		kVAh
kWh –		00000000 .044		kWh
kvarLh –		00000000 .603		kvarh
kvarCh –		00000000 .681		kvarh
kVAh –		00000002 .716		kVAh

INFO

Menu	**Measure**	Comm.	Exp. Card	LOAD-CARGA
Measure	Tariff			

Num.Tariff   4

Synchro   EXTERNAL

Input num.   2001

EDIT

Menu	Measure	**Demand**	Energy	LOAD-CARGA
Demand	Tariff 1	Tariff 1		
		Tariff 2		
P.total		Tariff 3 .24	kW	
		Tariff 4		
S.total		54.03	kVA	
I1		75.43	A	
I2		79.02	A	
I3		77.50	A	
Iavg.		77.32	A	

INFO   MAX

Expansion cards

CVM*k2* is designed with three expansion slots, where we can house different optional cards giving additional functions to measurement:

- ‣ Free voltage digital 8I/8O (opto-coupled transistor outputs)
- ‣ Free voltage digital 8I/4O (relay outputs; 1 switched NO / NC)
- ‣ Analogue 0...20 mA or 4...20 mA 8I/4O (selectable)
- ‣ Ethernet (Modbus / TCP) and SD memory card (512 MB)

Extended applications

- ‣ Instantaneous display of any process or physical variable (analogue)
- ‣ Acquisition and accounting of other magnitudes through pulses (water, gas, steam, etc).
- ‣ Connection and disconnection of loads by demand
- ‣ Electrical magnitude conversion to a 0...20 mA or 4...20 mA signal

Monitoring software

Its main function is to register and communicate with **CIRCUTOR** equipment, in order to carry out the analysis of the captured data and thus reach conclusions.

Power Studio Scada allows you to:

▶ Carry out precise energy supervision of the facility

▶ Carry out preventive maintenance for lines and installations

▶ Impute energy costs by section or measuring point

The main functions are:

▶ Online display of the power analyzer

▶ Remote parametrisation of the equipment

▶ Log record

▶ Analysis of the data by means of tables or graphs

▶ Display of reports and billing simulations

▶ Built-in webserver function (multi-point access software)

▶ Possibility of creating access profiles

▶ Great versatility and use-friendly

▶ For the exchange of data, it has a DDE server and integrated XML

CVM*k2* responds to the standardised Modbus/RTU (RS-485) and Modbus/TCP (Ethernet) protocols, and can be interrogated from any other market application.

http://powerstudio.circutor.com

SOFTWARE

Powerstudio
.circutor.com
S C A D A

Voltage inputs

Measurement range	from 5 to 120% of U_n for U_n = 300 V ac (ph-N) from 5 to 120% of U_n for U_n = 520 V ac (ph-ph)
Frequency	45…65 Hz
Maximum measured voltage	360 V ac
Overvoltage allowance	750 V ac (up to)
Consumption	< 0.5 V·A

Current inputs

Measurement range	from 1 to 120% of I_n for I_n = 5 A
Secondary CT (I_n)	1 or 5 A
Primary current	Programmable < 30000 A
Excess load admitted	6 A permanent ; 100 A t<1 s
Consumption	< 0,45 V·A

Auxiliary supply

Power supply	80 to 265 V ac (50 - 60 Hz) (consumption < 30 V·A) 90 to 300 V dc (consumption < 25 W)

Digital inputs

Operation voltage	of 24 to 60 V dc ± 20 %
Minimum signal width	30 ms
Consumption (per input)	< 0,5 W

Accuracy (type 402)

Currents (I)	± 0,2 % from 10 % ...120 % of I_n
Voltage (V)	± 0,2 % from 20 % ...120 % of U_n/U_n
Active power P	± 0,2 % from 10% ... 120 % of I_n
Reactive power Q	± 0,5 % from 10 % ... 120 % of I_n
Apparent power S	± 0,5 % from 10 % ...120 % of I_n
Frequency F	± 0,01 Hz from 45 to 65 Hz
Active energy	± 0,2 %
Reactive energy	± 0,5 %
Apparent energy	± 0,5 %

Digital pulse outputs

Type	Optocoupler
Operation voltage	24 dc
Maximum power (per output)	0.6 W

Digital relay outputs

Type	Mechanical relay
Operation voltage	250 V ac
Maximum current (resistive load)	3 A

Analogue output

Scale	from 0 …. 20 mA or 4 … 20 mA
Maximum admitted load	500 Ω
Response time	< 2 s
Output range points	4000

Communications

Type	RS-485
Protocol	ModBus / RTU
Speed (configurable)	9600, 19200, 38400, 57600 baud
Parity	odd, even or no parity
Stop bits	1 or 2

Ethernet output

Type	Ethernet - RJ45
Protocol	Modbus / TCP
Speed	10 baseT / 100baseT (x)

ENVIRONMENT

Operation temperature	- 10... + 50 °C
Storage temperature	- 20... + 65 ºC
Relative humidity	95% without condensation
Installation category	CAT III according to IEC 61010
Level of contamination	2 according to IEC 61010
Protection index	IP51 front IP20 rear section

MECHANICS

Connection	Screw terminal block for rigid wires of 2.5 mm (4.5 mm²) or flexible wires

REGULATION REFERENCES

CEM	61000-4-2, 61000-4-3, 61000-4-11, 61000-4-4, 61000-4-5