

Compact Power Analyser CPA100



The CPA100 from Electron Plus has been developed to be the easiest-to-use, quickest-to-setup power analyser ever. Powerful yet simple-to-use PC software, robust compact metal body and standard IEC C19/C20 connections make the CPA100 the compact power analyser of choice.

Key specifications

- 0.2% accuracy (basic V/I)
- 300 V_{RMS} voltage input
- 16 A_{RMS} current input

Key features

- Internal current shunt
- Dual current ranges
- Simple connections to DUT (device-under-test) using IEC C19/C20 connectors
- Straightforward PC interface using our free software (EPIC)
- USB communication and power
- Robust metal enclosure (with stainless steel front and back panels)

Key applications

- Product development
- Production line testing
- PSU development
- Consumer appliance tester
- Server benchmarking
- Single-phase energy efficiency
- Research and development laboratories
- Education

EPIC (Electron Plus Instrument Control) software



EPIC software from Electron Plus is free-to-use software that connects all our instruments, the CPA100 module within EPIC is designed to present all key measurement data to the user as cleanly as possible, simple to understand menus and intuitive features on the single page layout reduce the learning curve associated with a new instrument and reduces errors in measurement setup.

Measurements

The CPA100 measures AC and DC voltage at the outlet while simultaneously measuring the AC and DC current flowing through the internal current shunt (between inlet and outlet). Low

temperature co-efficient resistors reduce thermal effects on measurements – and an internal temperature sensor further reduces drift due to temperature changes.

Simultaneous sampling (at 4KHz) of the voltage and current waveforms, the use of a highly integrated AFE (analog front end) IC and a DSP to pre-process data reduces the overhead of the host PC running EPIC software.

Calibration

Calibration constants and associated data are stored within the CPA100 and are uploaded to EPIC upon connection. The CPA100 is calibrated prior to leaving the factory and may be calibrated and adjusted without opening the enclosure. EPIC contains a calibration menu and instructions on how to adjust the CPA100 (if you have access to a suitable AC voltage and current calibrator).

Accuracy

Accuracy quoted at 23°C +/- 5°C and from 1% to 100% of a selected range.

- Voltage accuracy:
0.2% (0.1% of reading + 0.1% of range)
- Current accuracy:
0.2% (0.1% of reading + 0.1% of range)

Current has two ranges: 4 Arms and 20 Arms

- Power accuracy:
0.25% (to 20th harmonic at 50/60Hz fundamental)
- Frequency accuracy:
0.2% (45-65Hz)

Contact customer support if you require higher or lower calibration temperature windows. We are very happy to discuss your requirements.

Connections

Connections to a mains supply and the DUT (device-under-test) on the CPA100 use commonly available IEC C19 and C20 connectors - these feature first-to-connect and last-to-disconnect earth pins. Also helping to reducing the risk of an unearthed setup there is a 4BA (4.65mm) earthing stud on the rear panel (2M earthing cable supplied with each CPA100). Connection to the host PC is via a USB 2.0 type B.



Measurement types

Raw sampling data for both V and I sampling systems are sent to the host computer, along with pre-computed voltage, current, frequency and power measurements. This flexible structure allows for new measurement types to be implemented in the future. All data is displayed via EPIC.

Name	Measurement	Units
Urms	True RMS Voltage (AC+DC)*	V _{RMS}
Irms	True RMS Current (AC+DC)*	A _{RMS}
P1	Active Power	W
S1	Apparent Power	VA
Q1	Reactive Power	VAR
PF	Power Factor	-
Freq	Frequency	Hz

Ph	Harmonic Active Power	W
Pf	Fundamental Active Power	W
Qf	Fundamental Reactive Power	VA _r
Ip _k	Peak Current <i>(held until reset)</i>	A
VCF	Voltage Crest Factor	-
ACF	Current Crest Factor	-
ET	Elapsed Time	hhh:mm:ss
W-hr	Active Energy <i>(over Elapsed Time)</i>	Wh
VA-hr	Apparent Energy <i>(over Elapsed Time)</i>	VAh
Var-hr	Reactive Energy <i>(over Elapsed Time)</i>	VA _r h
+V _{pk}	Positive Peak Voltage <i>(held until reset)</i>	V
-V _{pk}	Negative Peak Voltage <i>(held until reset)</i>	V
+I _{pk}	Positive Peak Current <i>(held until reset)</i>	A
-I _{pk}	Negative Peak Current <i>(held until reset)</i>	A
+V _{pk}	Positive Peak Voltage <i>(updated each 1s**)</i>	V
-V _{pk}	Negative Peak Voltage <i>(updated each 1s**)</i>	V
+I _{pk}	Positive Peak Current <i>(updated each 1s**)</i>	V
-I _{pk}	Negative Peak Current <i>(updated each 1s**)</i>	V

* High-pass filter can be enabled (AC only), default is high-pass filter off (AC+DC)

** Adjustable from 100ms, 200ms, 500ms, 1s (default) and 2s - calibration valid only for default setting.

Multi-measurement display

EPIC CPA100 screen can be configured to show 4, 8, 12 or 18 measurements simultaneously (as well as the oscilloscope).

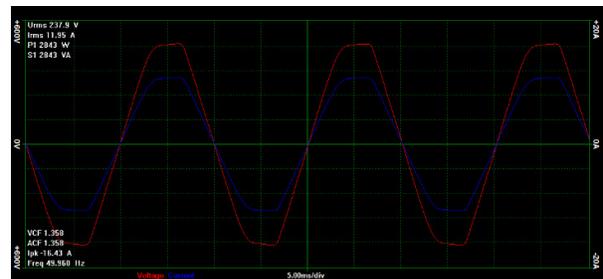
If a measurement is not being displayed, it is still being calculated and can be recorded.

Any box on the display can be configured to display any measurement.

Measurements that are integrated over time (e.g. W-hr) and peak held measurements (e.g. I_{pk}) have a reset function above the measurement units.

Rolling average (from off to 1s to 32s) with adjustable 'break-out-on-deviation' makes for easy to read values on display.

Oscilloscope display



Simultaneously shows voltage and current waveforms, auto-ranging or fixed ranges for both voltage and current, superimpose up to 8 measurements on screen.

Zero-crossing triggering on voltage waveform.

Scope timebase can be adjusted to show approximately 1,2,3 or 6 complete cycles.

Graticule and crosshairs can be disabled and number of graticule divisions on screen can be altered.

Freeze and capture buttons

Freeze button ("FREEZE") will freeze the screen without interrupting measuring or logging tasks. Capture button ("SAVE IMAGE") will record the oscilloscope trace (.BMP) to file (with a unique timestamp).

Datalogging (with EPIC19.004 onwards)

All measurement logging occurs at a minimum interval determined by the sample update rate (typically 1s) up to 3600s (1 hour).

Record length is determined by PC storage and file handling system limitations.

All measurements are recorded with a time-stamp in .CSV file, the format of which is straightforward to understand.

General specifications

Voltage input:	300 V _{RMS} (CF=3) 150 V _{RMS} (CF=6)
Voltage peak:	1000 V (< 60s)
Current input:	16 A _{RMS} (CF=3) 8 A _{RMS} (CF=6)
Current peak:	100 A (< 0.05s every 1s)
Input impedance: (between L & N)	3 MΩ
Current shunt: (between L & L)	2.5 mΩ
Indicator:	Multicolour LED on front panel
Operating: (<85% relative humidity, non-condensing)	-0°C to 40°C
Maximum Altitude: (above sea level)	2000 M
Storage Temperature: (<75% relative humidity, non-condensing)	-20°C to 60°C
Dimensions:	172 x 102 x 58mm 6.8" x 4.0" x 2.3"
Weight:	0.6kg 1.3lbs
Conformity:	CE EN 61010-1:2010

Warranty

All warranties are return-to-base, we will endeavour to turn around any repair claims within 7 days.

- 2 year warranty on CPA100
- 1 year warranty on calibration
- 1 year warranty on accessories

Package contents

1x CPA100 Compact Power Analyser
1x C19 (inlet) connector
1x C20 (outlet) connector
1x Earthing lead (2M, 6ft) with ring terminal
1x USB cable (2M, 6ft)

Accessories available

The CPA100 is designed to be used with commonly available C19/C20 (IEC 60320) connectors. We supply a range of these also:

C19 mains input leads (2M to 2.5M length)
UK (230V) BS1363 - **#C19UKL**
USA (120V) NEMA 5-15P - **#C19USL**
EURO (230V) Schuko 16A - **#C19EUL**
Australia (230V) 15A - **#C19AUL**

C20 mains output leads (1M length)
C20 to C13* (common) – **#C20C13L**
C20 to C15* (120°C) - **#C20C15L**
C20 to C5 (cloverleaf) - **#C20C05L**

Spare C19 and C20 connectors
C19 (Schurter 4795.0000) 16A - **#CONN217**
C20 (Schurter 4796.0000) 16A - **#CONN212**

Spare earthing lead
2M length 4mm² tri-rated green/yellow cable with 5mm crimped ring-terminal - **#CE2L**

**C13/C15 connectors look very similar and many people refer to them generically as 'kettle leads'. Only the high-temperature C15 connector is suitable for kettles, rice-cookers, fryers, etc..*