

Keeping up with the standards

*Power
Quality
Monitor*



Complete electrical network analysis at the tips of your fingers!

- All measurements for complete analysis: powers, harmonics, flicker, symmetry, remote control signals, etc.
- Self-explanatory use
- Touch screen user interface
- Data processing and report publishing software
- Monitoring as per EN 50160 standard
- Network connection



►► Presentation

- ✓ Internal memory data storage:
6 months recording capacity
- ✓ Navigable, easy-to-use file structure
- ✓ Monitoring and network connection capacity
- ✓ Protocol write-ups and test report publishing
- ✓ Simultaneous function display
- ✓ Instrument use simplified with
touch screen and Windows™
operating system



►► Parameters

Analysis parameters according to EN 50160 standard in effect

- Network frequency
- Supply voltage
- Fast and slow voltage variations
- Short and long interruptions in supply
- Voltage dips and asymmetries
- Harmonic and interharmonic voltages
- Temporary voltage swells at 50 Hz

Flicker analysis

- Flicker analysis as per EN 61000-3 and EN 61000-4-15: short-term (Pst) and long-term (Plt) flicker

Voltage and current analysis

- TRMS and average values
- Peak value and crest factor

Power analysis

- Generated and consumed active power
- Inductive and capacitive reactive power
- Apparent power, power factor, $\cos \varphi$
- Calculation of energies on each phase

Harmonics break-down up to 50th order

- Harmonics: current, voltage, active and reactive power in relation to the fundamental and in absolute
- Phase shift for each harmonic
- THD: overall and order by order
- Direction recognition for each harmonic order
- Interharmonics spectral analysis

Unbalance and system symmetry analysis

- System symmetry measurement: positive, negative and zero sequence components
- Phase shifting
- Absolute value of voltage and current for the complete spectrum
- Fresnel diagram representation in 3U and 3I
- Overall unbalance of three-phase network

HV network analysis (high voltage)

- Records "short-circuit" events (faultograph function)
- Remote control signal analysis: definition and verification of the frame

▶▶ Specifications

INPUT SPECIFICATIONS

Voltage inputs:
Current inputs:

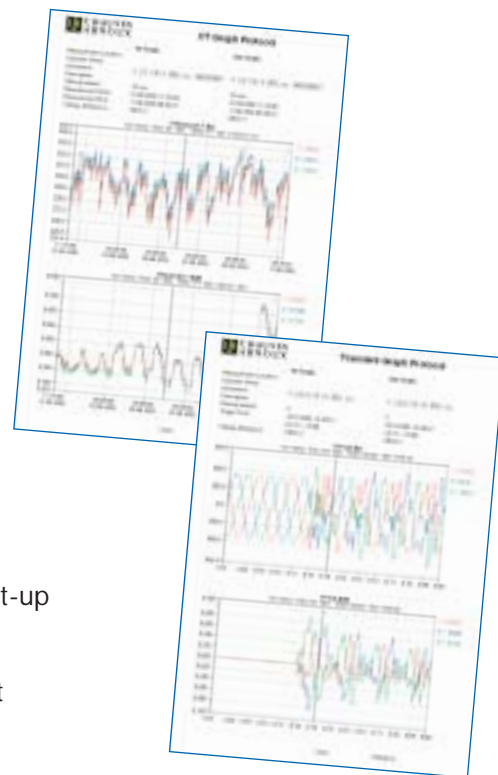
4 channels up to 2 kVpp
4 channels,
range depends on sensors used:
MN 95: 0.2 to 6 A
C145 clamp: 2 to 1200 A
AmpFLEX A195: 25 to 3000 A
Accuracy: < 1%

Analogue inputs:

Up to 16 channels, max.1 Hz (optional)
For recording environmental conditions,
depending on the application

Binary input:
With transient option:

1 external 24 VDC channel for recording start-up
1 binary output, dry contact, 100 V max
(for "transient triggering" status)
1 external 24 VDC binary input (for "transient
triggering" mode start-up)



MAIN SYSTEM

Main processor:
Working memory:
Display:
User interface:
Equipment interface:

256 Mbyte RAM for recording start-up
10 Gbytes
10" LCD color screen
touch screen
1 USB port for keyboard, 2 x RS232 ports:
data logger (optional), printer, binary I/O

Sampling rate:

9.6 kHz/channel maximum (38.4 kHz in transient mode, be it 25 µs)

Making reports

*A4 report print out of analyzed
data for selected time windows*

GENERAL SPECIFICATIONS

Analysis standards met:

EN 50160
EN 61000-2, -3, -4
EN 61000-4-15
EN 61000-4-30

Electrical safety:

IEC 61010-1, 500 V, category III
pollution degree 2

ENVIRONMENTAL CONDITIONS

Operating temperature:

-10°C to +50°C

Storage temperature:

-20°C to +70°C

Relative humidity:

10% to 90% (with no condensation)

Dimensions:

360 x 300 x 150 mm

Weight:

4 kg

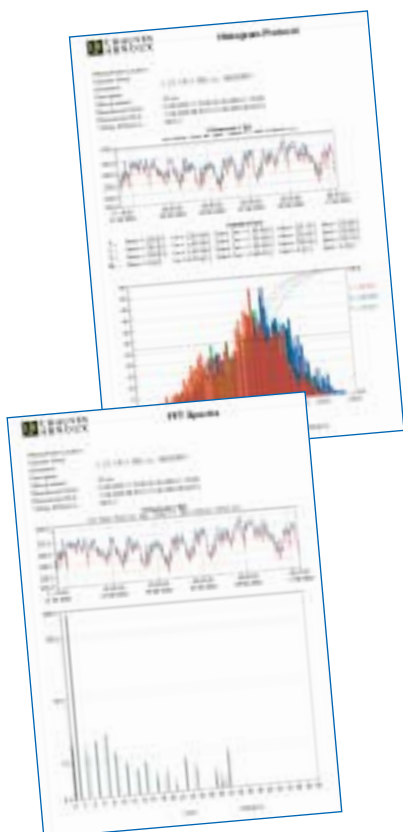
Supply voltage:

85 to 135 VAc and 180 to 265 VAc

COMMUNICATION

Via modem as per publication: CCITT V90 56 kbds

Via Ethernet



Functions

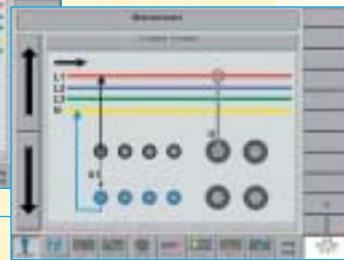
General set-up

- ▶ User I.D. information
- ▶ Saving the set-up used for each set of measurements
- ▶ Configuring the "data recording" mode



Input configuration and connection

- ▶ Single and three-phase network (3 or 4-wire)
- ▶ Current sensor configuration (AmpFLEXTM, C and MN clamps)
- ▶ Direct input possible up to 5 A

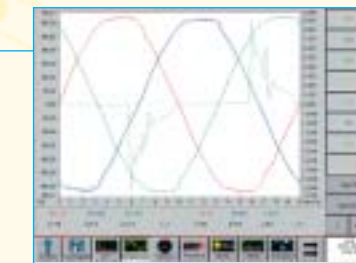


Harmonics analysis

- ▶ Graphic representation of harmonics and interharmonics: current, voltage and power
- ▶ Harmonic current direction recognition (IN or OUT)



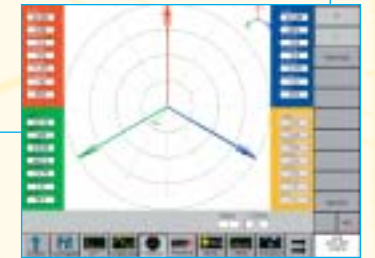
Oscilloscope mode



- ▶ 4 voltages and 4 currents
- ▶ Graphic waveform representation

Vector scope

- ▶ Voltages, currents and harmonics
- ▶ Phase connection and rotation verification
- ▶ Rundown of different measurements on each phase



Monitoring power and energy

- ▶ Tabulated voltage, current, power, and energy
- ▶ Min, max, and average value monitoring
- ▶ Power profile display



Flicker meter

- ▶ Graphic representation over time
- ▶ Short-term flicker
- ▶ Long-term flicker



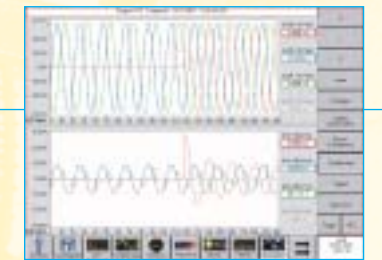
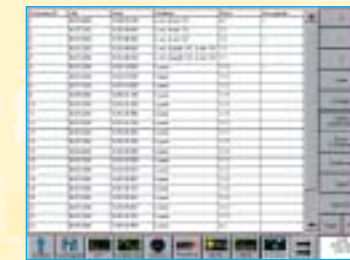
Monitoring voltage

- ▶ Voltage fluctuation representation with value/standard report
- ▶ Monitoring as per EN 50160 standard
- ▶ Changing threshold values
- ▶ DISDIP representations



Recording transients

- ▶ Monitoring
- ▶ Waveform recording for 10 seconds
- ▶ Event summary table
- ▶ Event time-stamping and duration
- ▶ 1 binary input for triggering the recording externally



Data logger

- ▶ Data logger module
- ▶ 8 configurable analogue inputs: 4-20 mA current or 0-10 V voltage
- ▶ 8 configurable thermocouple inputs: J, K, T...
- ▶ Frequency: 1 Hz



Checking remote control signals

- ▶ Remote control signal tracking and recording
- ▶ Measurement on the 3 phases
- ▶ Graphic display of the frame: starting date
- ▶ Max and Average U and I of received signal



Symmetry analysis

- ▶ Measurement on three-phase network
- ▶ Zero, positive, and negative sequence and RMS current and voltage
- ▶ Unbalance factor in U and I



RMS hp mode

- ▶ Recording of Min, Max values in U and I calculated on a 1/2 period (10 ms) during an integration period
- ▶ ITIC, CBEMA table



Remote communication

- For data display and recovery:
 - ▶ Using an external modem
 - ▶ Communication via Ethernet network



PC software

- ▶ Data processing
- ▶ Report publishing
- ▶ Printing out graphs and tables
- ▶ Exporting data to spreadsheets (Excel™, ...)

