Power Quality recording with Class A precision

The MEDCAL ST II three-phase network analyzer is the optimal solution for large-scale, distributed voltage quality recording solutions. Two versions are available, P and S.

The P versions supports the most fundamental power quality magnitudes: voltage dips and swells including voltage profiles, voltage and current harmonic distortion (UTHD and ITHD) and voltage flicker.

The more advanced S version covers all the requirements of EN 50160, it records the most common disturbances: voltage dips and swells including voltage profiles, total demand distortion (TDD), voltage and current harmonics and inter harmonics plus voltage flicker.

Additionally, both versions also support all the common electric magnitudes: Voltage, Current, Frequency, Unbalance, Active, Reactive and Apparent Power as well as Active, Reactive and Apparent Energy. Cos(Φ) is also recorded when possible. If Cos(Φ) cannot be calculated the Power Factor is used instead.

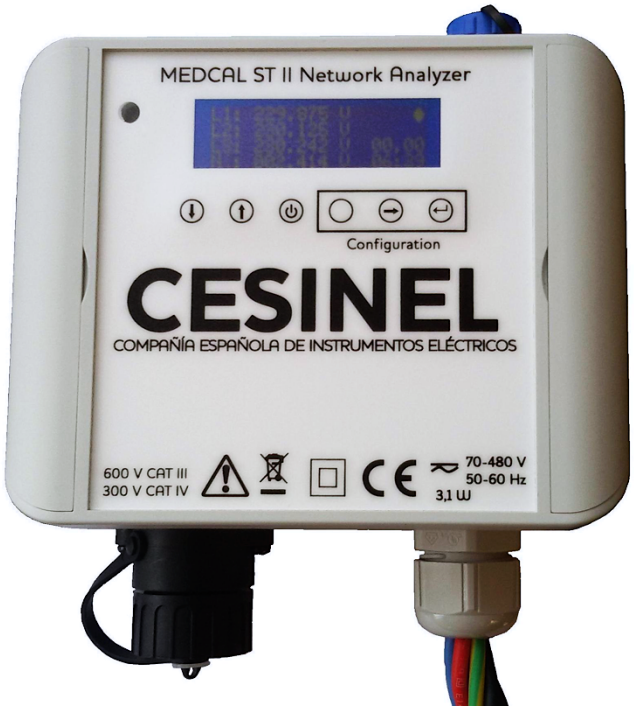
Summary of main capabilities

Recorded phenomena	P	S
Voltage and current RMS max, average and minimum values	●	●
Voltage interruptions, dips and swells: time and duration of event	●	●
Voltage and current harmonic distortion (UTHD and ITHD)	●	●
Total Demand Distortion (TDD)	○	●
Voltage and current harmonics and inter-harmonics up to 50th order	○	●
Network frequency max, average and minimum values	●	●
Active, reactive and apparent power and energy. Cos(Φ) and Power Factor	●	●
Voltage flicker: Plt and Pst values	●	●
Voltage and current unbalance	○	●
Residual or fault current calculation	○	●

MEDCAL STII is capable of storing more than six months of recorded data under normal conditions using the recommended default 10 minutes averaging period.

The instrument is equipped with an advanced dual power supply: one is powered via two independent high voltage safety leads and can accept AC voltage between 70 and 480V_{RMS} as well as DC voltage between 100 and 600VDC, and the other obtains power from its USB host (PC) with reinforced isolation It is possible to measure and download data without feeding the equipment with mains voltage by just using the USB cable.

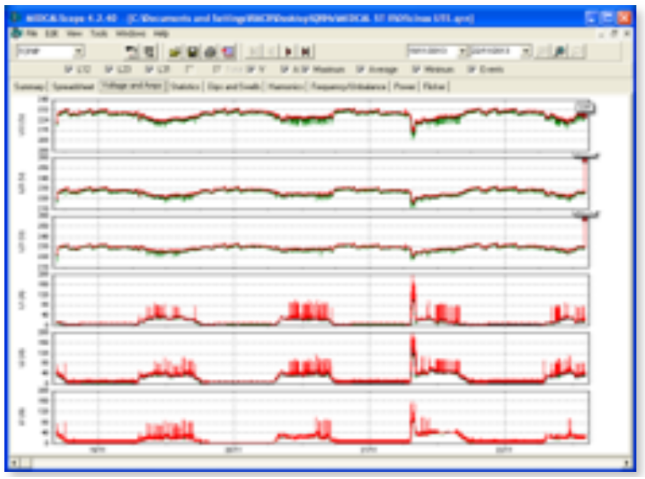
In case of interruption the instrument keeps recording and measuring for 10 seconds, and after this period the recordings are saved into the internal memory. The recording will resume automatically once the power voltage returns.



Complete included software

The included MEDCALScope software allows a complete and exhaustive analysis of recorded data. It is possible to save the recorded data for later use and export the data to other computer applications such as spreadsheets and word processors, as well as check compliance with EN50160, NV, PRODIST and other power quality standards and produce automated reports. MEDCALScope is freely available for download or update at the internet address: http://www.cesinel.com/medcalscope/.

Voltage and current view



Harmonics view

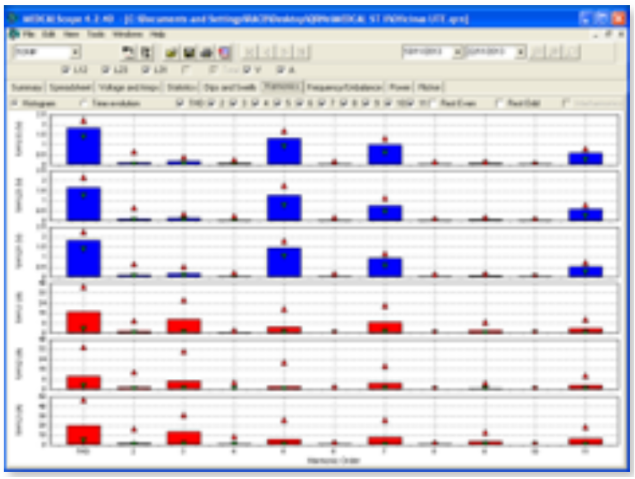
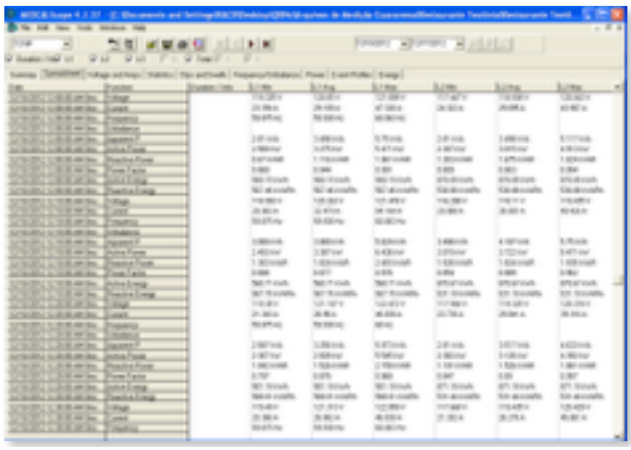
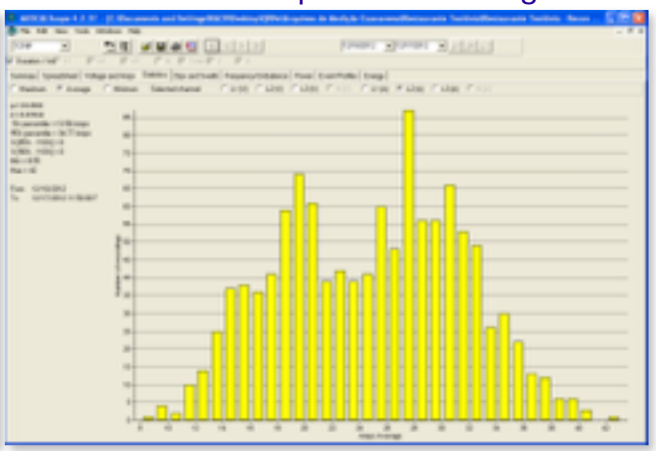


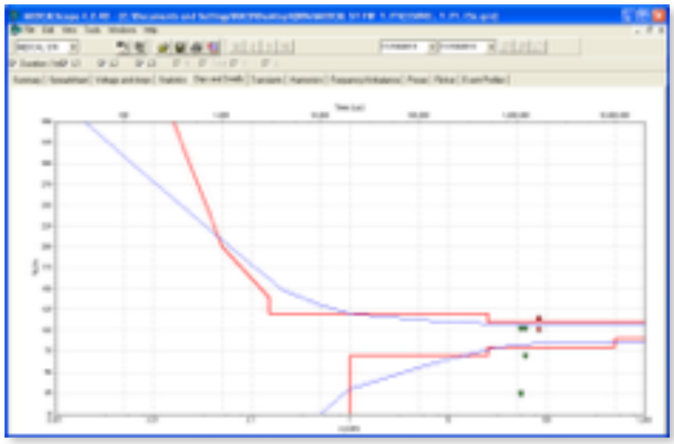
Table view



Statistics and compliance checking



ITIC / CBEMA events curves



Instrument setup

Detailed Technical specifications

User interface characteristics

Display type	Graphical LCD Display with backlight. Auto-power off function for longer life
User interface	6 flat buttons for display and local configuration of the instrument. It is possible to operate the instrument with electric safety gloves
Enclosure IP rating	IP65 according to IEC 60529

Voltage measurement

Input Voltage (Phase-Neutral) (Un)	Max. 480 V_{RMS}
Input Voltage (Phase-Phase) (Un)	Max. 830 V_{RMS}
User-selectable nominal voltages	50/100 V, 64/110 V, 65/115 V, 69/120 V, 72/125 V, 73/127 V, 100/173 V, 110/190 V, 120/208 V, 125/217 V, 127/220 V, 133/230 V, 139/240 V, 220/380 V, 230/400 V, 250/415 V, 277/480 V, 347/600 V, 400/690 V, 480/831 V
User-selectable electric topology	Wye three-phase 4 wires: L1-N, L2-N, L3-N voltages and L1, L2, L3, N currents Delta three-phase 3 wires: L1-L2, L2-L3 and L3-L1 voltages and L1, L2, L3 currents Split-Phase: L1-N and L2-N Single-Phase: L1-N
User-selectable voltage transformer primary	1 kV, 2.4 kV, 3.3 kV, 6.9 kV, 10.0 kV, 11.0 kV, 13.8 kV, 15.0 kV, 23.0 kV, 25.0 kV, 30.0 kV, 33.0 kV, 34.5 kV, 45.0 kV, 69.0 kV, 88.0 kV, 138.0 kV, 230.0 kV, 345.0 kV, 440.0 kV, 500.0 kV, 750.0 kV
User-selectable voltage transformer secondary	100 V, 110 V, 115 V, 220 V, 230 V, 400 V, 1000V
Input Impedance	600 kΩ per channel, 1.2 MΩ Phase-Neutral
Maximum error for RMS voltage	0.1% of range

Voltage quality parameters

RMS voltage	Maximum, Average and Minimum for every interval according to IEC 60050-101.14.16
Dips and Swells	Duration and depth measured according to EN 61000-4-30 Ed 2. Possibility of recording the RMS voltage profile of the recorded events
RMS voltage profiles	Triggered by Dips and Swells. Cycle-by-cycle recording, maximum duration: 4 seconds
Voltage harmonics (S version only)	Up to order 50th according to EN 61000-4-7 and EN 50160:2001
Voltage interharmonics (S version only)	Up to order 50th according to EN 61000-4-7 and EN 50160:2001
VTHD	Measured according to EN61000-4-7 and EN 50160:2001
Flicker	Measured according to EN61000-4-15 and EN 50160:2001
Frequency	Measured according to EN61000-4-30 Ed 2 and EN 50160:2001
Unbalance	Measured according to EN61000-4-30 Ed 2 and EN 50160:2001

Current measurement common specifications

Input connector	IP-68 waterproof
RMS current	Maximum, Average and Minimum for every interval
Intrinsic error for RMS current	0.1% of range
Current harmonics (S version only)	Up to order 50th according to EN 61000-4-7 and EN 50160:2001
ITHD	Measured as VTHD for consistency.
TDD (Total Demand Distortion)	Measured according to IEE 519 Standard; I_L can be manually established or automatically calculated.
Residual current (S version only)	Calculated as difference of 3 channels.

Flexible current sensors. 4 sensors: L1, L2, L3, N

Nominal current (In)	50 A / 180 A / 600 A / 2000 A
Current measuring range	2 x In: 100 A / 360 A / 1200 A / 4000A

Inductive current clamps. 4 sensors: L1, L2, L3, N

Nominal current (In)	5 A, 10 A, 20 A, 50 A, 200 A
Maximum current measuring range	15 A, 30 A, 60 A, 150 A, 300 A

Power and Energy measurement

Active, Apparent and Reactive/Non-Active Power. Maximum, Average and Minimum for every interval.
Cos(Φ), In delta mode only the total power factor is available.
Active, Apparent and Reactive/Non-Active Energy with daily load curve.

Sampling, recording, memory and storage

Sampling frequency	6.400 / 12.800 Hz.
Sampling resolution	16 bits with adjustable amplification stage

Automatic storage of recordings after 10 seconds of losing supply power.
Automatic power on and resuming of recording after return of supply voltage.

Pre-programming recording sessions	Up to 8 recording with pre-programmed start and stop time
Averaging intervals	1 s, 2 s, 5 s, 10 s, 30 s, 1 m, 2 m, 5 m, 10 m, 15 m, 30 m, 60 m
Number of records and events	Over 10.000.000 records. Duration depends on selected topology and number of disturbances P version: Under normal circumstances the instrument can store over 150 days of measurements with 10 minutes averaging interval S version: Under normal circumstances the instrument can stores over 90 days of measurements with 10 minutes averaging interval
Type of memory	Internal Flash-type memory
RTC precision	5 ppm (error below 0.5 seconds per day)

Communications

USB 2.0 as standard	Certified drivers for Windows XP, 7, 8, 8.1 and 10. Both 32-bit and 64-bit versions
USB effective data transmission speed	1 Mbps
Bluetooth wireless interface for remote communication (class 2)	
Bluetooth effective transmission speed	100 kbps
Bluetooth wireless transceiver frequency	2.4GHz

Mains Power supply

Power supply level	70 to 480 V_{RMS} nominal; 600 V_{RMS} max., 1000 V_{RMS} over-voltage protected 100 to 600 V_{DC} nominal; 850 V_{DC} max., 1500 V_{DC} over-voltage protected
Power supply frequency	DC or AC 50-60 Hz
Power consumption	3.1 W max.
Isolation	3310 V_{RMS} / 5.5 mm creepage distance

USB Power supply

Power supply level	5 V_{DC} (USB standard voltage)
Power consumption	2.8 W max.
USB cable length	1.5 meters max.
Isolation	5000 V_{RMS} / 8 mm creepage distance

Electrical safety

Installation category	600 V CAT III / 300 V CAT IV
Pollution degree	2
Clearance	5.5 mm
Isolation level	Double isolation
Safety standard	IEC/EN 61010-1

Environmental conditions

Operating temperature	-10 ºC to +50ºC
Relative humidity	95 % non-condensing
Operating altitude without degradation	Up to 1.200 m

Dimensions and weight

External dimensions	140 mm x 110 mm x 60 mm
Weight	900 g
Voltage cables length	140 cm