

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 $Cos(\Phi)$ cannot be calculated the Power Factor is used instead.

Summary of main capabilities Recorded phenomena

Recorded phenomena Voltage and current RMS max, average and minimum values	Р •	S •
Voltage interruptions, dips and swells: time and duration of event	•	٠
Voltage and current harmonic distortion (UTHD and ITHD)	•	•
Total Demand Distortion (TDD)	0	٠
Voltage and current harmonics and inter-harmonics up to 50th order	0	٠
Network frequency max, average and minimum values	•	٠
Active, reactive and apparent power and energy. $Cos(\Phi)$ and Power Factor	•	٠
Voltage flicker: Plt and Pst values	•	٠
Voltage and current unbalance	0	٠
Residual or fault current calculation	0	٠

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 $480V_{\text{RMS}}$ 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

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Statistics and compliance checking

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 Vpms 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 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, User-selectable voltage transformer primary 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; ${\rm I_L}$ 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) Current measuring range 50 A / 180 A / 600 A / 2000 A 2 x ln: 100 A / 360 A / 1200 A / 4000A

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

Nominal current (In) Maximum current measuring range 5 A, 10 A, 20 A, 50 A, 200 A 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 frequency6.400 / 12.800 Hz.Sampling resolution16 bits with adjustable amplification stageAutomatic 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 sessionsUp to 8 recording with pre-programmed start and stop timeAveraging intervals1 s, 2 s, 5 s, 10 s, 30 s, 1 m, 2 m, 5 m, 10 m, 15 m, 30 m, 60 mNumber of records and eventsOver 10.000.000 records. Duration depends on selected topology and number of
disturbancesP 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
S promeasurements with 10 minutes averaging interval
S promeasurements with 10 minutes averaging interval
S promeasurements with 10 minutes averaging intervalType of memory
RTC precisionInternal Flash-type memory
5 ppm (error below 0.5 seconds per day)

RTC precision

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

Power supply frequency Power consumption Isolation

USB Power supply

Power supply level Power consumption USB cable length Isolation

Electrical safety

Installation category Pollution degree Clearance Isolation level Safety standard

Environmental conditions

Operating temperature Relative humidity Operating altitude without degradation

Dimensions and weight

External dimensions Weight Voltage cables length 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 DC or AC 50-60 Hz 3.1 W max. 3310 V_{RMS} / 5.5 mm creepage distance

5 V_{DC} (USB standard voltage) 2.8 W max. 1.5 meters max. 5000 V_{RMS} / 8 mm creepage distance

600 V CAT III / 300 V CAT IV 2 5.5 mm Double isolation IEC/EN 61010-1

-10 °C to +50°C 95 % non-condensing Up to 1.200 m

140 mm x 110 mm x 60 mm 900 g 140 cm