GOSSEN METRAWATT

# POWER PRODUCER

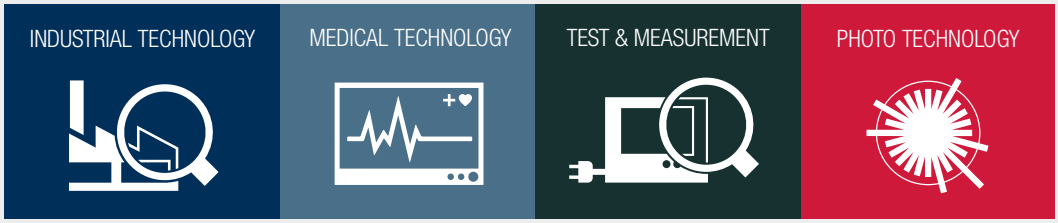
## 2019/20

TEST AND MEASUREMENT
PRODUCT PORTFOLIO

# OVERVIEW



Other catalogs available from the GMC-Instruments Group:



# DIGITAL MULTIMETERS 01

A multimeter is an electronic measuring instrument that combines several measurement functions into a single unit, and is used primarily to measure electrical quantities. To measure means to compare a known quantity with an unknown quantity. The measurement standards of the PTB in Brunswick (German Federal Institute of Physics and Metrology) are used as comparative quantities for our multimeters This is confirmed by means of a DAkkS calibration certificate. Multimeters included in the METRAHIT series are rugged, reliable DMMs with housings made of impact resistant plastic, and are equipped with unique, patented automatic blocking sockets (ABS). They feature an ultramodern design and are equipped with state-of-the-art technology.

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## METRALINE | DM 61

### Multimeter with Clipping Funktion

**The DM 61 was developed for the measurement of voltage and current, AC and DC, resistance, temperature, continuity and diodes. It's equipped with state-of-the-art technology and it assures precision measurement results. The extremely compact and ergonomic design provides for maximized ease of use and safety. Thanks to a broad range of functions, it's universally suitable for demanding measuring tasks in a great variety of applications.**

**FEATURES:**

- Voltage measuring range: DC / AC 100 µV ... 1000 V
- Current measuring range: DC / AC 10 µA ... 660.0 mA
- Clip function 1000:1 for current transformers
- Resistance: 100 mΩ... 60.00 MΩ
- Diode / Continuity
- Temperature TC with K-type: –50 ... 1300 °C
- Hold / Peak / Min-Max / Relative (Zero)
- Auto / Manual ranging
- Dual digital display with analog scale and backlight
- Automatic blocking sockets (ABS)
- UL Certification
- 3-year guarantee

**SCOPE OF DELIVERY:**

- Multimeter
- Rubber holster with carrying strap
- Cable set
- Battery set
- Operating instructions
- Test report

| Type | Article |
|---|---|
| METRAHIT DM61 | M194A |

## METRALINE | DM 62

### Multimeter with TRMS Measurement

**The DM 62 was developed for the measurement of voltage and current, AC and DC, resistance, temperature, frequency, duty cycle, capacitance, continuity and diodes. It's equipped with state-of-the-art technology and it assures precision measurement results. The extremely compact and ergonomic design provides for maximized ease of use and safety. Thanks to TRMS measurement and a broad range of functions, it's universally suitable for demanding measuring tasks in a great variety of applications.**

**FEATURES:**

- Voltage measuring range: DC / AC 100 µV ... 1000 V
- Current measuring range: DC / AC 10 µA ... 10.00 A
- TRMS bandwidth: 2 KHz
- Measuring categories: CAT III 600 V / CAT IV 300 V
- Capacitance: 1 pF ... 40.00 mF
- Frequency: 10.00 Hz ... 10.00 MHz
- Duty cycle (%) measurement
- Digital display and analogue scale with background illumination
- Automatic range selection
- Automatic blocking sockets (ABS)
- Measured value memory
- 3-year guarantee

**SCOPE OF DELIVERY:**

- Multimeter
- Rubber holster with carrying strap
- Cable set
- Battery set
- Operating instructions
- Test report

| Type | Article |
|---|---|
| METRAHIT DM62 | M197A |

## METRAHIT | AM TECH

**4½ Place TRMS Digital Multimeter with a Resolution of 12,000 Digits**


**Multimeter with optimized current ranges, e.g. for measurements at measuring transducers in the process industry.**

### FEATURES:

- Resolution: 12,000 digits, 4½ place, TRMS AC, AC+DC function
- 3 connector jacks with patented automatic blocking sockets (ABS)
- Large, illuminated display with character height of 15 mm and quasi-analog display
- Voltage measurement with a basic accuracy of ±0.05% ($V_{DC}$)
- Measuring category: 1000 V CAT III and 600 V CAT IV, IP 52 protection
- Automatic storage of measured values: DATA / MIN / MAX
- V (AC, DC, AC+DC), A (AC, DC, AC+DC, with clamp), Ohms, °C, continuity, diode, Hz (V, A)
- Clip factor: 1:1 / 10 / 100 / 1000 for current sensors
- Alternating voltage measurement with reduced input impedance (1 MΩ)
- 1 kHz / -3 dB low-pass filter can be activated
- Clip factor adjustable for current sensors (V) and transformers (A)
- Current ranges optimized for 4 to 20 mA measuring transducer output

### SCOPE OF DELIVERY:

- Multimeter
- KS17-2 measurement cable set
- Two 1.5 V AA batteries
- DAkkS calibration certificate

| Type | Article |
|---|---|
| METRAHIT AM TECH | M243A |

## METRAHIT | PM XTRA

**4⅙ Place Digital Multimeter with a Resolution of 60,000 Digits**


### FEATURES:

- Resolution: 60,000 digits, 4⅙ place, basic accuracy of ±0.05% ($V_{DC}$)
- 3 connector jacks with patented automatic blocking sockets (ABS), fuse
- DAkkS calibration certificate included
- Large, illuminated display with 15 mm character height
- TRMS AC, AC+DC function
- Measuring category: 1000 V CAT III and 600 V CAT IV, IP 52 protection
- IR interface for system integration
- Clip factor adjustable for current sensors (V) and transformers (A)
- Current ranges optimized for 4 to 20 mA measuring transducer output
- IR interface and integrated measurement data memory for 61,600 measured values
- Power pack connector socket

### SCOPE OF DELIVERY:

- Multimeter
- KS17-2 measurement cable set
- Two 1.5 V AA batteries
- DAkkS calibration certificate
- Rubber holster
- HC20 hard case

| Type | Article |
|---|---|
| METRAHIT PM XTRA | M250A |

# METRAHIT | PM PRIME

**4⅙ Place Digital Multimeter, System Compatible with IR Interface – Resolution: 60,000 Digits**

## FEATURES:

- Resolution: 60,000 digits, 4⅙ place, basic accuracy of ±0.05% ($V_{DC}$)
- 3 connector jacks with patented automatic blocking sockets (ABS), fuse
- DAkkS calibration certificate included
- Large, illuminated display with 15 mm character height
- TRMS AC, AC+DC function
- Measuring category: 1000 V CAT III and 600 V CAT IV, IP 52 protection
- IR interface for system integration
- Clip factor adjustable for current sensors (V) and transformers (A)
- Current ranges optimized for 4 to 20 mA measuring transducer output
- IR interface and integrated measurement data memory for 61,600 measured values
- Power pack connector socket
- TRMS measurements including, amongst others: VAC TRMS, VAC+DC TRMS, VDC, AAC TRMS, AAC+DC TRMS, ADC dB, Hz(V), Hz(A), V, °C / °F (TC/RTD)
- Resolution of 31,000 digits, triple display, display illumination can be activated under difficult lighting conditions – basic accuracy of 0.02%
- Measurement data memory for up to 300,000 measured values
- Instrument can be remote controlled via Bluetooth® interface (device variant **M248B** only)
- TRMS bandwidth: 100 kHz
- 1 kHz / -3 dB low-pass filter can be activated
- Auto-ranging – automatic adjustment of the measuring range for optimized resolution
- Patented, automatic storage of measured values after settling in
- IR interface – remote controllable without activating the rotary switch
- Optionally with integrated Bluetooth® interface

## FREEWARE

App for smartphones or tablets with Android™ for the Bluetooth® variant

## SCOPE OF DELIVERY:

- Multimeter
- KS17-2 measurement cable set
- Two 1.5 V AA batteries
- DAkkS calibration certificate
- Rubber holster
- HC20 hard case

| Type | Article |
|---|---|
| METRAHIT PM PRIME | M248A |
| METRAHIT PM PRIME BT | M248B |

# METRAHIT I IM

## Multimeter for maintenance, service and diagnostics

Metrahit IM XTRA

reddot award 2018
winner industrial design

IZYTRONIQ Software available

Metrahit IM E-DRIVE

**METRAHIT IM XTRA and METRAHIT IM E-DRIVE multimeters are portable, extremely rugged instruments which are suitable for maintenance, service and diagnostics at electric machines, drive units and systems, for example in automotive, energy and automation applications.**

METRAHIT IM XTRA and METRAHIT IM E-DRIVE multimeters are all-in-one instruments: insulation tester, milliohmmeter, short-circuited coil tester and universal multimeter.

They're ideal for safety testing and diagnostics at electric and hybrid vehicles, as well as all types of electric machines.

In combination with the optional COIL TEST ADAPTER, METRAHIT IM XTRA and METRAHIT IM E-DRIVE multimeters permit short-circuited coil measurements within the inductance range.

### FEATURES:

- Multifunctional measuring instrument (V, A, Ω, F, Hz, %, RPM, °C/°F)
- **Insulation resistance measurement** up to 3.1 GΩ
- Direct measurement of current, 10 nA to 1 A
- Capacitance measurement
- **4-wire milliohm measurement**
- 2-wire Rlo measurement per DIN EN 61557-4 / VDE 0413-4
- TRMS AC / AC+DC measurement for current/ voltage up to 10/100 kHz
- Diode measurement (IK = 1 mA, U flow up to 5.1 V) and continuity testing
- Precision temperature measurement – °C, and °F for RTD and TC-K sensors
- **Short-circuited coil test** with 1000 V and optional COIL adapter
- Current measurement with clamp sensors – transformation ratio can be adjusted with CLIP from 1:1 to 1:1000
- Temperature measurement – °C, and °F for RTD and TC-K sensors
- Acoustic signals
- Acquisition of min./max. values, DATA Hold
- Data logger
- Push/print function transfers measured values to application software by simply pressing a key
- Programmable sequences for test routines
- Color graphic display
- Modular power supply: Standard quick-change, rechargeable lithium battery, optional WPC module for inductive charging
- Automatic blocking sockets for the current input
- Test probe with START (ISO) and STORE keys
- Housing with IP 52 protection, dust and splash protected, replaceable rubber holster
- Interfaces: Bluetooth or WIFI integrated, USB with optional mains module
- IZYTRONIQ Windows software for documentation, preparation of test reports and graphic evaluation of measurements

### SCOPE OF DELIVERY:

- Multimeter
- Probe with start/ stop and store/send functions
- KS17-2 cable set, safety measurement cables, red/ black, 4 mm
- **IM XTRA:**
  2 KC4 Kelvin clamps
  **IM E-DRIVE:**
  1 KC4 Kelvin clamp
  1 KC27 Kelvin probe
- Quick change, rechargeable lithium polymer battery with micro USB charging socket
- USB mains power packed with cable, USB – micro USB
- DAkkS calibration certificate
- Rubber holster
- Hard case for multimeters and accessories
- Condensed operating instructions (German/English)
- Card with registration key for IZYTRONIQ software

| Type | Article |
|---|---|
| METRAHIT IM XTRA | M273S |
| METRAHIT IM E-DRIVE | M274S |

## METRAHIT | OUTDOOR

### OUTDOOR Multimeter

**The OUTDOOR multimeter has been specially designed and manufactured to meet the challenges faced by engineers and technicians in adverse environments.**

It's extremely rugged, impact-resistant, water-proof and dust-proof, and it's resistant to extreme temperatures.

Technology and scope of functions are the same as for the **METRAHIT PM XTRA**.

**FEATURES:**

- Special rugged design with shock and impact resistant housing
- Additional rubber holster
- Special "sand" color
- IP 65: dust-proof / water jets
- Patented, sealed blocking sockets

**PLUS ADDITIONAL FUNCTIONS AS INCLUDED WITH THE METRAHIT PM XTRA:**

- Resolution: 60,000 digits, 4⅙ place, basic accuracy of ±0.05% ($V_{DC}$)
- 3 connector jacks with patented automatic blocking sockets (ABS), fuse
- DAkkS calibration certificate included
- Large, illuminated display with 15 mm character height
- TRMS AC, AC+DC function
- Measuring category: 1000 V CAT III and 600 V CAT IV, IP 52 protection
- IR interface for system integration
- Clip factor adjustable for current sensors (V) and transformers (A)
- Current ranges optimized for 4 to 20 mA measuring transducer output
- IR interface and integrated measurement data memory for 61,600 measured values
- Power pack connector socket

**SCOPE OF DELIVERY:**

- Multimeter
- KS17-2 measurement cable set
- Rubber holster
- Two 1.5 V AA batteries
- DAkkS calibration certificate

| Type | Article |
|---|---|
| METRAHIT OUTDOOR | M2400 |

## METRAHIT | EU PRO

### Special Multimeter with Direct Measurement of Current

**Special multimeter for connection to current transformers without fuses, in order to eliminate danger resulting from interruption of the transformer circuits (and thus measuring category 600 V CAT II)**

**FEATURES:**

- With 21 multimeter functions, see standard under PM series
- Direct measurement of current
- Clip factor adjustable for current sensors (V) and transformers (A)
- Alternating voltage measurement with reduced input impedance (low impedance, 1 MΩ)
- 1 kHz / -3 dB low-pass filter can be activated

**SCOPE OF DELIVERY:**

- Multimeter
- KS17-2 measurement cable set
- Two 1.5 V AA batteries
- DAkkS calibration certificate
- Rubber holster
- HC20 hard case

| Type | Article |
|---|---|
| METRAHIT EU PRO | M252A |

# POWER QUALITY

02

Power quality – always on the safe side with clean electrical networks. Industry, commerce, health care services, banks and other service providers are extremely dependent on electrical and electronic systems. These systems influence power quality themselves in many ways, but they react extremely sensitively to disturbances as well.

There's a single convincing response to the numerous challenges faced by users in the area of electrical power supply.

With the help of these innovative class A (2008) products, all relevant measured quantities can be acquired which are decisive for the quality of electrical supply power – the perfect foundation for sustainable optimization.

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# PQVIEW

## Power Quality, Database Management and Analysis Software

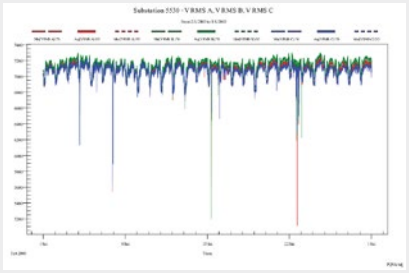


Figure 1: One month trend of minimum, average and maximum.

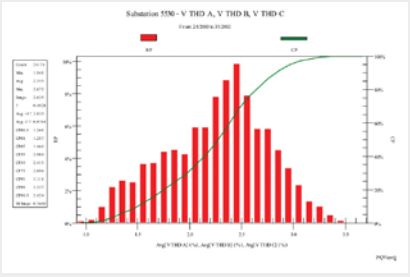


Figure 2: Histogram of voltage THD for three phases The data for trend and histogram charts can be filtered to not include invalid measurements.

**PQView is a multi-component software system developed by Electrotek Concepts® for building and analyzing databases of power quality and energy measurements.**

**Its components build measurement databases, write summary reports, compute power quality indices, view waveforms and rms samples, and trend steady-state quantities via workstations and web browsers.**

Power providers, industrial power consumers, consulting companies, and university researchers throughout the world widely recognize PQView for its capabilities and flexibility.

PQView builds databases with billions of measurements from thousands of monitoring points taken by many different types of meters, including power quality monitors, voltage recorders, in-plant monitors, and digital fault recorders.

It can store and analyze information with the measurements about cause and source of triggered events, as well as evaluate the financial impact of events to both a power provider and a power user.

It can quickly extract meaningful information from a one megabyte or one terabyte database.

PQView combines powerful features in a user-friendly interface.

Measurements can be stored in either Microsoft® Access or Microsoft SQL Server.

A complete PQView system consists of three main applications: the Power Quality Data Manager, the Power Quality Data Analyzer, and PQWeb®.

### PQVIEW DATA MANAGER

The primary function of the PQView Power Quality Manager (PQDM) is to build power quality databases automatically from data sources. It also automatically sends e-mail notifications using SMTP servers when data sources have finished importing, rms voltage variations (voltage sags, swells, and interruptions) are imported from data sources, or measurements are not collected from a monitoring instrument for a specified number of days. PQDM also automatically correlates measurements by time stamp and location, and can be combined with add-in modules to provide automatic fault location estimates, voltage sag direction, or capacitor assessment.

### PQVIEW DATA ANALYZER

The PQView Power Quality Data Analyzer (PQDA) creates trends, histograms, and statistical summary tables of more than 125 steady-state characteristics defined within the IEEE PQDIF standard.

It offers scores of charts, event lists, tables, and indices to analyze voltage sags/dips, swells, and interruptions. PQDA interfaces with Microsoft® Word to automatically create summary documents, and allows the user to filter invalid measurements from final analysis.

Trends and Histograms PQDA allows you to create trends, histograms, and statistics for any steady-state voltage, current, power, and energy quantity (Figure 1 and Figure 2).

You can also view trends and histograms for the minimum, average, maximum, standard deviation, count, and any percentile for steady-state data in intervals of minutes, hours, days, weeks, months, and years (Figure 3).

All trends are interactive so you can zoom in with your mouse cursor to an area of interest. Also, each trend can become an event timeline by plotting any associated waveform or rms variation measurements as tick marks along the x-axis. When you click on a tick mark, the waveforms and rms samples recorded with the event will open in a new window. This feature is especially useful when evaluating faults and switching transients.

Each trend and histogram can be copied automatically into Microsoft Word documents or Microsoft Excel spreadsheets or sent to a printer. For example, you could create a report showing the trend and/or histogram of rms voltage or voltage THD for all phases for every meter in your database for a year by specifying only the file name of a Microsoft Word document. Each chart is automatically created and exported to the specified file.

# PQVIEW

## Power Quality, Database Management and Analysis Software

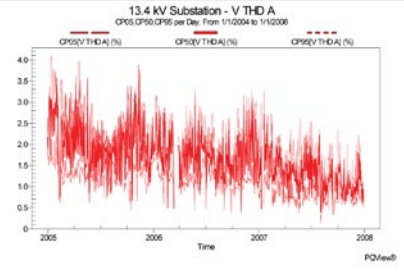



**Figure 3: 5th, 50th, and 95th percentile of daily voltage THD from nearly 25000 samples recorded over a four-year period**

### PQVIEW DATA SOURCES

PQDM automatically builds power quality databases from data sources. It also automatically sends email notifications using SMTP servers or Microsoft Outlook clients when data sources have finished importing, rms voltage variations are imported from data sources, or measurements are not collected from a monitoring instrument for a specified period. PQDM automatically correlates measurements by time stamp and location. It also deletes old measurements, manually adds missed rms voltage, and performs EN 50160 compliance calculations, automatic derivations, and automatic fault location. In addition, it can update measurement databases automatically once per day, manually, or as fast as once every minute. PQDM integrates data from the following data store formats:

- IEEE® Std 1159.3-2003 PQDIF Files
- IEEE® Std C37.111-1991/1999 COMTRADE Files
- MODBUS® Devices (Optional)
- Arbiter® Systems 1133A Power Sentinel (Optional)
- Advantech® Corporation ADAM Analog and Digital

### MODULES (OPTIONAL)

- Cooper Power Systems CYME
- Dranetz® Signature System® and Encore® Series
- Dranetz PASS® Database and PNDS Archive Files
- Dranetz PES Database
- Dranetz Portable Monitors
- Edison Electric Institute® Load File
- Electro Industries® Nexus Communicator Log Files
- Fluke®/Reliable Power Meters (RPM) Omega and Scenario Databases
- GL Industrial Group/Stoner Software® (Optional)
- Gossen Metrawatt MAVOSYS 10
- GridSense PowerView CSV Files
- GroundedPower Monitoring Data Files
- HIOKI® Hi-View Pro Text File ExportLandis+Gyr® MAXsys 2510 Paradox Database and Text Files
- OSIsoft® PI System (Optional)
- PQView® Databases and Text File Formats
- Qualitrol®/LEM Instruments (Optional) Qdevice
- Information System (QIS) Database
- SATEC PAS Site Database
- Schneider Electric® / Power Measurement® PowerLogic
- ION Enterprise® 4.x and 5.x databases, as well as PEGASYS 3.x databases (Optional)
- Siemens® SICARO PQ Manager Text Files
- Siemens® WinPM.Net (Optional)
- SoftSwitching Technologies® I-Grid® Web Site
- Unipower® (Optional) PQ Secure Database
- BTECH Battery Validation Manager Database
- European Network of Transmission System
- Operators for Electricity (ENTSO-E)
- Web Site for Hourly Load Data
- North American ISO/RTO Historical Web Site Data for Hourly Loads for ERCOT, ISO-NE, IESO, NYISO, and PJM
- NOAA Space Weather Prediction Center Web Site for Daily Geomegnetic Data
- General Electric® Communicator Device Log Files
- SilverSpring Networks® Export Document Files

Custom data handlers to bring data from proprietary systems into a PQView database are frequently developed to meet customer needs.PQView Data Sources.

Typically, PQDM automatically updates measurement databases once each day after all of the meters have been polled by their proprietary download software. However, it may be configured to update manually, or as fast as once every minute.

Other functions provided by PQDM include deleting old measurements, manually adding missed rms voltage variations, and creating voltage sag and voltage swell records from voltage minimum/ maximum strip chart data.

PQDM can be combined with add-in modules to provide automatic fault waveform identification and fault location, voltage sag direction, and capacitor analysis.

# PQVIEW

## Power Quality, Database Management and Analysis Software

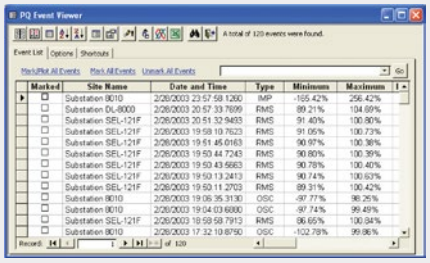


Figure 4: Event lists of voltage sags, swells and inter-ruptions can sorted by time and location.

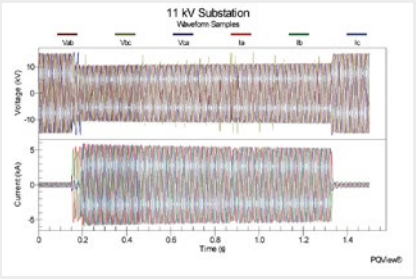



Figure 5: Three-phase voltage and current waveform Samples during a three-phase fault.

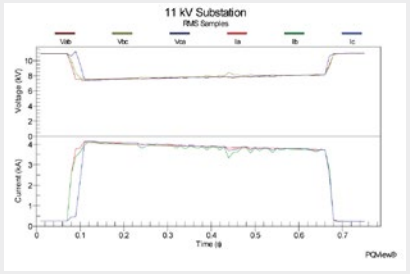



Figure 6: Three-Phase Voltage and Current RMS Samples during a three-phase Fault.

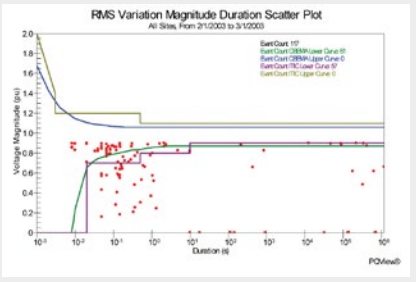



Figure 7: An rms variation magnitude-duration scatter plot overlaid with the sensitivity curves specified by CBEMA in 1987 and by ITIC in 1997

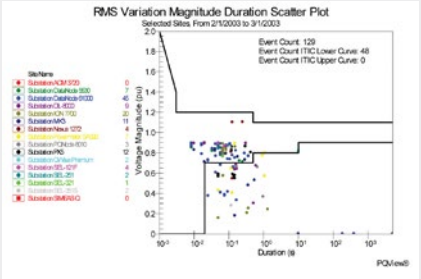



Figure 8: Voltage sag magnitude versus duration scatter plot with ITIC Curves.

### EVENT LISTS

PQDA can quickly build event lists (Figure 4) from the millions of events recorded in a measurement da-tabase. PQView "measurement events" consist of the waveform and rms samples recorded during voltage sags and swells due to faults and motor starting, and voltage transients due to fuse operations, lightning strikes, load switching, and capacitor and cable energizing.

The event lists can be built based on simple queries that only select certain meters for a specific date range. Or, they can be more sophisticated. For example, you could request a list of all events in which the rms voltage dropped below 0.7 per unit.

Even more sophisticated queries can be run allowing you to search for single-phase sags, three-phase sags, single-phase faults, and three-phase faults. PQView provides methods for viewing waveform samples for events (Figure 5) or recorded rms samples (Figure 6).

PQDA provides numerous methods for deriving quantities from event waveform samples and/or rms samples:

- Reactance-to-Fault
- Radial Fault Location
- Spectrum Charts for 1, 10, 12 and N-Cycle Windows
- Phasors and Harmonic Phasors
- High-Pass Filter and Low-Pass Filter
- First Derivative and Squared Value Time
- Mean Values and RMS Values
- Load Resistance, Load Reactance, Load Impedan-ce, and Load Impedance Angle
- Real Power, Reactive Power, Apparent Power, and Energy
- Delta Real Power, Reactive Power, Apparent
- Power, and Energy
- Characteristic Voltage
- Waveform Transformation
- Missing Voltage and Delta Current from First Cycle or from Ideal Waveform
- Symmetrical Components
- Delta Symmetrical Components
- Three-Phase Diode Rectifier Output
- Line Frequency during Event
- Total Harmonic Distortion (THD)
- DC Component, Fundamental Component, and Harmonic Trends during Event
- Links to Map Viewer and Trend Viewer
- IEEE P1159.2 RMS Characteristics
- IEEE P1159.2 Point-in Wave Characteristics
- IEEE P1159.2 Missing Voltage Characteristics
- Dranetz Event Characteristics
- Digital Status Changes
- Operations SummaryOperations Summary

RMS Voltage Variation AnalysisA key strength of PQDA lies in its analytical capabilities of rms voltage variations (voltage sags, swells, and interruptions). In addition to being able to build lists of events showing the voltage magnitude and duration of each event, you can build ITIC Charts, CBMA Charts, and SEMI F47 Charts.

Custom charts that overlay multiple curves (Figure 7) can be built as well. The measurements from each meter can be plotted optionally in a different color (Figure 8). If you identify the cause code or source code of each event by adding additional infor to your database, then the plots can use a different color for these supplemental codes as well.

Another scatter plot will plot the voltage magnitude of each voltage sag, swell, or interruption versus time (Figure 9). When plotting any of these magnitude-duration or magnitude-time scatter plots, you may click on the point representing each event to see the waveforms and rms samples associated with that event. Because PQDA's rms variation analysis al-gorithm involves temporal aggregation of multiple events occurring in close in time, you see not only the event that resulted in a particular voltage magnitude and duration, but also any other events that occurred around the same time at that location.

# PQVIEW

## Power Quality, Database Management and Analysis Software

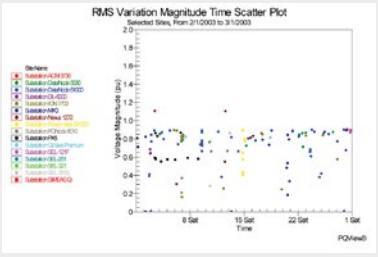



Figure 9: A voltage sag scatter plot of rms voltage magnitude on a One-month time line.

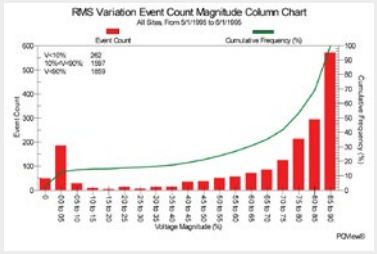



Figure 10: Statistical histogram showing the voltage magnitude distribution for voltage sags measured at 241 power quality meters.

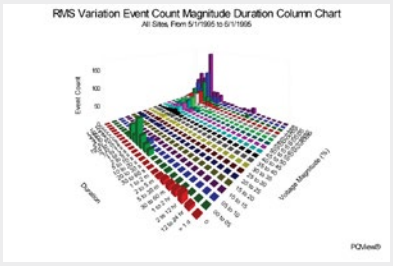



Figure 11: Column chart showing the voltage magnitude and duration for voltage sags measured at 241 power quality meters.

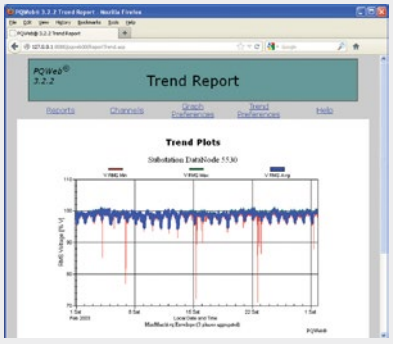



Figure 12: PQWeb provides Read-Only Access to PQView Databases via a web browser.

Figure 13: One-line diagram with aerial map of estimated and actual location.

In Figure 10, PQDA temporally aggregated voltage sag measurements by determining the lowest voltage during a 60-second period of time at each meter. Rates of occurrence were calculated by determining the number of days each meter was available during the 31-day analysis period.

If a meter had unavailable days, then PQView took them into account when computing the occurrence rates. A chart showing a magnitude-duration distribution (Figure 11) and a distribution of SARFI-80 rates recorded at 241 sites (Figure 12).

The height of each column in the SARFI-80 chart is a count of sites that had a similar rate of voltage sags to below 0.80 per unit.

For example, 44 sites had no events resulting in a drop in rms voltage to a level below 0.8 per unit, while 27 sites experienced an event below 0.8 per unit three times during the month.

Only one site experienced 20 events resulting in a voltage sag below 0.8per unit during the 31-day period.

You can automatically create summary reports using Microsoft Word. You need only to specify the sites for the report, specify the desired date range, and which options you want for the report.

The rms variation report writer can include monitoring site lists; event lists; SARFI summaries that compute the count or rate of voltage sags; IEC 61000-2-8 DISDIP tables; CBEMA, ITIC, SEMI F47, and timeline scatter plots; and magnitude, duration, magnitude-duration column charts.

### INTERNET ACCESSIBILITY VIA PQWEB

PQView can provide data and reports via the Internet or company intranet. Through PQWeb® a server runs PQView data analysis tasks and allows you to access and view the results using any web browser (Figure 12). With this software, PQView becomes a multiplatform application, able to work across otherwise incompatible operating systems.

### FAULT LOCATION

PQView features an optional Reactance-to-Fault Add-in Module that can be used to estimate the distance from a substation monitor to a single-phase or multi-phase fault.

When combined with electrical circuit model data from circuits modeling databases, PQView applications can provide maps pinpointing the location of a fault using both desktop and web applications.

In Figure 12, the distance between the fault location estimated by PQView and the actual fault was 200 meters.

### WHY YOU SHOULD USE PQ VIEW:

- Power Quality SCADA management solution
- Interacting with 3rd party SCADA and data management solutions
- Live monitoring of Power Quality Data
- AI (Artificial Intelligence) for fault location in the grid network
- Correlate PQ and Fault Events with SCADA
- Save cost for Maintenance of the grid network
- Different user levels Admin & Viewer
- Real time analyses via PQ View Web on any operating system and device
- PQDMS data management solution
- 3rd Party meters integration no limitation to the brand
- Easy overview over big data via Mapping tool
- ARS – Automatic Reporting System against IEE / IEC & EN Norming
- Sag Directivity Answer Module® to identify the direction of the SAG
- Estimate Load Growth

### WHO SHALL BUY PQ VIEW?

- Power Producers
- Grid Network operators
- Large industries such as:
  - Steel
  - Aluminium
  - Automotive
  - Oil & Gas Producers
  - Mining
- City operators for Smart Cities 4.0
- Maintenance Companies for Power solutions
- Hospitals

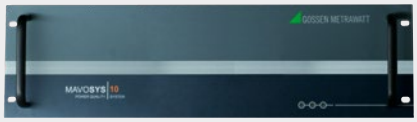
## MAVOLOG I PRO

### Class A Power Disturbance Analyzer per IEC 61000-4-30


- Evaluation of main quality acording EN50160 with automatic report generation
- IEC 61000-4-30: 2008 Class A power quality analyser
- 4 voltage and 4 current channels with automatic range selection, 32 kHz sampling rate
- Measuring of instantaneous values of more then 140 quantities
- Waveform and transient recorder with programmable sampling time (> 600 samples / period), pre-trigger and post-trigger time
- 32 adjustable alarms, anomalies and quality reports which can be saved in the internal memory
- Frequency range from 16 Hz to 400 Hz
- RS232/485, Ethernet and USB 2.0 communication ports
- Modbus and DNP3 communication protocolsl
- GPS, IRIG-B (modulated and digital) and NTP real time synchronization
- Up to 20 inputs and outputs (analogue inputs/ outputs, digital inputs/outputs, alarm/watchdog outputs, pulse input/outputs, tariff inputs)
- Multilingual user interface and user friendly setting- and evaluation software Mavo-View
- MAVO database software (optional)

## MAVOSYS I 10

### Power Disturbance Analyzers



**Monitoring System for Analyzing Power Quality, Power and Energy**

Disturbances and events can be easily pinpointed, documented and analyzed with the **MAVOSYS 10**, even in highly branched-out systems, with reference to applicable standards – the perfect foundation for sustainable optimization. Optimization increases operating reliability, keeps product quality stable and assures high levels of cost effectiveness.

**Features:**

- Combination of up to four virtual analyzers in a single housing
- Input modules for 4 x voltage, 4 x current, 8 x digital signal
- Local operation and visualization with an optional ¼ VGA touchscreen
- Certification in accordance with IEC 61000-4-30, class A
- Time synchronization via NTP server and/or optional GPS receiver
- Internal and external cross-triggering
- Complies with all national and international standards
- Ethernet 10/100 BaseT, RS 232 and RS 485 interfaces included as standard equipment
- TCP/IP, HTTP, XML and Modbus TCP/RTU communication protocols

It's the first mains analyzer to go beyond the conventional upper limit of 8 channels for voltage and current inputs.

Users can now select from amongst various input modules for voltage (4 channels), current (4 channels) and digital signals (8 channels).

Applications which used to require two or more devices can now be implemented by combining up to 4 modules in a single **MAVOSYS 10**.

**Refer to our current price list or our website for preconfigured complete systems and other configuration options.**

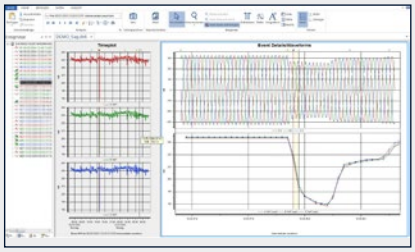
# MAVOWATT I 230 / 240 / 270 / 270-400

## 3-phase energy and power disturbance analyzers

MAVOWATT 230

MAVOWATT 240

MAVOWATT 270-400



DranView 7: Fault Recording with Detail View

DranView 7

### Applications

**The mains analyzers included in the MAVOWATT product range are used to monitor, analyze and record mains quantities.**

All relevant measured quantities can be acquired which are decisive for the quality of electrical supply power. Disturbances and events can be easily pinpointed, documented and analyzed with reference to applicable standards. Power measurements at frequency converter outputs are also easily possible.

Diverse communication options, extremely safe operation and numerous recording and report generating functions distinguish these products.

### Customer Benefits

#### SAFE

- 1000 V CAT III / 600V CAT IV for safe work in public networks, as well as for measurements of up to 1000 $V_{RMS}$ AC/DC in industrial environments.
- Wireless remote access via smartphone, tablet and PC permits hazard-free work and configuration in safety-critical environments.
- Complies with the latest industrial standards and permits legally secure recording of, for example, voltage quality per EN 50160 / IEC 61000

#### INTUITIVE AND PRODUCTIVE

- Convenient operation and analysis thank to the enormous 7" color touch-display
- Automatic detection of electrical system types, as well as nominal values for voltage, current and frequency
- Quick overview during measurement thanks to the PQ and energy dashboard with real-time warnings and red-green display
- Supports troubleshooting and diagnosis of interference sources with the help of AnswerModules®

#### FLEXIBLE

- Power measurements at frequency converter outputs
- 8 differential inputs (4 U / 4 I) permit precise and flexible acquisition of measured values in star and delta systems or simultaneous, direct measurement of AC and DC signals of up to 1000 $V_{RMS}$.
- 1 MHz sampling and 2000 $V_{PEAK}$ for capturing transients
- Various frequency bands for worldwide use in systems with 16⅔, 50 and 60 Hz, or optionally in 400 Hz systems as well
- GPS receiver input for time synchronization
- Ethernet, WiFi, Bluetooth and USB for data transmission and remote access

### Compliance with the Standards

Amongst others, the instruments fulfill all requirements specified in the IEC 61000-4-30 measuring instrument standard for “class A instruments”, as well as IEC 61000-4-7 (measuring procedures for harmonics) and IEC 61000-4-15 (flicker meters).

This permits legally secure recording of the limit values stipulated in EN 50160 (voltage characteristics of electricity supplied by public distribution networks), e.g. for voltage quality.

### MAVOWATT 230

- All functions and measurements: class A (4U / 4I)
- Load profile analyses and energy measurements
- Voltage quality per EN 50160 including report function
- Acquisition of transients: 512 values per period
- Two frequency bands: 16⅔ and 50 / 60 Hz
- Events recording: RMS and waveform
- Pre/post-trigger: max. 100 periods
- Snapshot function
- USB and Ethernet
- Time synchronization via GPS clock (optional)
- AnswerModules® – analysis module for motor status

### MAVOWATT 240

All functions same as MAVOWATT 230 plus:

- AnswerModules® – analysis module for voltage dip direction
- Switching of compensation capacitors, motor status
- Ripple control signal recording
- Expanded detail time window for events with up to 10,000 periods (pre/post-trigger)
- Bluetooth
- WiFi

### MAVOWATT 270

All functions same as MAVOWATT 240 plus:

- 1 MHz sampling for transients up to 2000 $V_{PEAK}$

### MAVOWATT 270-400

All functions same as MAVOWATT 270 plus:

- Expanded frequency band for 400 Hz applications

# MAVOWATT I 230 / 240 / 270 / 270-400

## Overview

| Instrument | | MAVOWATT 230 | MAVOWATT 240 | MAVOWATT 270 |
|---|---|---|---|---|
| **Application / Function** | |  |  |  |
| **Communication** | Ethernet | ■ | ■ | ■ |
| | WiFi | – | ■ | ■ |
| | Bluetooth | OPTIONAL | ■ | ■ |
| | USB | ■ | ■ | ■ |
| | VNC for full remote control of the instrument | ■ | ■ | ■ |
| | Apple and Android app for acquisition and alarm generation | ■ | ■ | ■ |
| | GPS time synch* (see comment) | ■ | ■ | ■ |
| **Inputs** | (4) differential, voltage channels, 0 to 1000 V AC/DC | ■ | ■ | ■ |
| | (4) differential, voltage channels for current sensors, 0.1 to 6000 V (AC/DC) with supply voltage for flexible current sensors | ■ | ■ | ■ |
| **Measurements** | 1000 V CAT III, 600 V CAT IV | ■ | ■ | ■ |
| | IEC 61000-4-30:2008, class A with certificate | ■ | ■ | ■ |
| | Sampling rate: 512 values/period/channel for U & I | ■ | ■ | ■ |
| | U-I dips and swells | ■ | ■ | ■ |
| | Transients as of 32 / 40 µs (60 / 50Hz) | ■ | ■ | ■ |
| | Transients as of 1 µs | – | – | ■ |
| | Power demand and energy consumption | ■ | ■ | ■ |
| | IEEE 1459, advanced energy | – | ■ | ■ |
| | Harmonics and interharmonics U (127), I (63) | ■ | ■ | ■ |
| | EN 50160, edition 3 | ■ | ■ | ■ |
| | 400 Hz monitoring | – | – | (400)* |
| **AnswerModules** | Motor status | ■ | ■ | ■ |
| | Voltage dip direction | – | ■ | ■ |
| | Switching of compensation capacitors | – | ■ | ■ |
| **Setups** | Automatic setups for power quality, power demand and energy consumption | ■ | ■ | ■ |
| | Setup wizard | ■ | ■ | ■ |
| | Monitoring of operating modes | 7 | 9 | 9 |
| | Max. pre/post-trigger periods | 100 | 10.0000 | |
| | Number of transient triggers | 3 | 3 | 4 |

* Comment:
- GPS time synch necessitates an optional GPS receiver and antenna **(Z802H)**.
- (400) with MAVOWATT 270-400 only

# EARTH MEASUREMENT 03

Protective measures in electrical systems are intended to prevent bodily injury due to accidents involving electrical current.

Of course they also prevent property damage caused by electrical power as well. And thus every electrical system should be checked with our test instruments before initial start-up, and at regular intervals thereafter, in order to assure the effectiveness of installed protective measures.

For the most part, this involves testing in accordance with the following VDE regulations: DIN VDE 0100-600 (IEC 60364-6), DIN VDE 0126 (IEC 62446), DIN VDE 0105-100 (EN 50110-1), VDE 0660-600-1 (DIN EN 61439-1), VDE 0113-1 (DIN EN 60204-1) and VDE 122-1 (DIN EN 61851-1).

The tests themselves are executed by the instruments strictly in accordance with stipulations set forth in particular by VDE 0413 (EN 61557).

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# GEOHM PRO/XTRA

## High-Precision Earth Testers and Low-Resistance Measuring Instruments

GEOHM PRO

GEOHM XTRA

NEXON .IQ CONVERTER MODULE

GMC INSTRUMENTS CLOUD .IQ

**Battery Powered Earth Tester – also for Measurement of Soil Resistivity**

**Features:**

- 3 and 4-wire earth resistance measurement
- 3-wire earth resistance measurement with current clamp
- Loop resistance measurement with 2 current clamps without disconnection (in case the use of auxiliary electrodes isn't possible)
- Soil resistivity (Wenner method)
- Current measurement with the help of clamp meters (e.g. leakage current measurement) and flexible clamp meters
- Low-resistance of the PE conductor with 200 mA (per IEC 60364-6-61, section 6.12.2)

**GEOHM XTRA:**

- Integrated GPS module
- Measured values are saved together with GPS coordinates

**Additional features:**

- RS and RH resistance measurements via auxiliary electrodes
- Measurement of interference voltages
- Measurement of interference frequencies
- Measurement even where interference voltages occur in systems with 16⅔, 50 and 60, as well as 400 Hz (with automatic and manual selection of the right measurement signal frequency)
- Measuring voltage selection (25 or 50 V)
- Entry of distances between the electrodes in meters (m) and feet (ft.) for measurement of soil resistivity
- Memory for 990 measured values (10 banks with 99 units each)
- Clamp meter calibration
- RTC real-time clock
- Data transmission to the PC (USB)
- Symbolic display of battery voltage

**SCOPE OF DELIVERY:**

- Test instrument
- Carrying pouch
- Measurement cable, 1.2 m, red
- Measurement cable, 2.2 m, black
- 2 alligator clips, red and black
- 2 measurement cables, 25 m, red and green
- Measurement cable, 50 m, black
- 4 earth spikes, 30 cm
- USB cable
- Automotive charging cable
- Screw terminal
- Power pack
- Operating Instructions
- Calibration certificate

| Type | Article |
|---|---|
| GEOHM PRO | M592A |
| GEOHM XTRA | M592B |

## GEOHM 5

### Earth Tester for All Known Measuring Methods

This battery powered measuring instrument can also be used to ascertain or measure soil resistivity and ohmic resistance in accordance with the current-voltage measuring method. Easy, concise operation with only 4 keys.

**Features:**

- Measurement of:
  - Earth resistance
  - Selective earth resistance
  - Soil resistivity
- Current (TRMS) via clamp meter (optional)
- Conventional 3 and 4-pole measurement
- Selective single-clamp measurement (optional)
- 2-clamp measurement (optional)
- Battery operation is possible (optional)
- No balancing required
- Continuous monitoring of interference voltage and auxiliary earth electrode resistance with indication when allowable limit values are exceeded
- Data storage for 250 measurements (1000 measured values)
- Data interface for transmission of measured values to a PC

**SCOPE OF DELIVERY:**

- One 4.5 meter black test cable, one 4.5 meter green test cable, one 15 meter red test cable
- Blue test cable, 20 meters
- 4 earth spikes
- 4 batteries per LR14
- Carrying strap
- Stackable system case

| Type | Article |
|---|---|
| GEOHM 5-SET | M591B |

## GEOHM C

### Earth Tester


**Battery Powered Earth Tester – also for Measurement of Soil Resistivity**

**Features:**

- Compact, menu-driven instrument for the measurement of earthing resistance for 3 or 4-wire connection
- Continuous monitoring of interference voltage, as well as auxiliary earth electrode and probe resistance, with indication when allowable limit values are exceeded.
- Complete display of all required values at a large dot matrix display, or warning with 4 LEDs Easy, concise operation with only 4 keys.
- Measurement of earthing resistance in 5 ranges up to 50 kΩ
- Voltage measurement: 10 to 250 V
- Frequency measurement: 45 to 200 Hz
- Battery monitoring and self-test
- Integrated memory with IrDA interface
- Earth tester per **DIN VDE 0413**
- Extremely rugged 2-component housing

**SCOPE OF DELIVERY:**

- Test instrument
- Neck strap
- Set of batteries
- Factory calibration certificate
- Operating instructions

| Type | Article |
|---|---|
| GEOHM C | M590A |

# METRACLIP EARTH

## Earth Clamp Meter

CAT IV

### APPLICATIONS

The earth clamp meter can be used to test the resistance of any conductive system which demonstrates loop characteristics.

The following measurements are possible:

- Earth resistance measurement if grounding is connected in series to the equipotential bonding conductor
- Other earth measurements, for example via overhead ground wires or interconnected transmission towers for power transmission or telecommunications
- Measurements at distributed ground connections with a common ground plane

### Measuring Method

The earth clamp meter simultaneously fulfils requirements for use as a clamp generator and a clamp meter:

- The test current which flows through the generator winding generates an alternating voltage in the enclosed conductor with a constant level E.
- A sensor winding detects current I induced in the conductor in this way, from which the clamp meter calculates loop impedance using the following equation: $Z_{Loop} = E/I$.

In the advanced mode, an additional loop inductance measurement is performed which takes the influence of the respective line frequency into consideration.

### BENEFITS

- Clamp generator and meter in a single device – permits simplified measurement without auxiliary earth electrodes
- Clamp measuring functions:
  - Earth loop resistance: 0.01 ... 1500 Ω
  - Loop inductance: 10 ... 500 µH
  - Leakage current: 0.2mA ... 40 A, AC
  - Touch voltage: 0.1 ... 75 V
- Minimal influence due to interference current
- Large OLED display: up to 3 measured values can be read simultaneously
- Measured value memory for resistance and leakage current, each with date and time
- Compact and user-friendly: one-hand operation thanks to minimal weight
- and easy to open clamp with spring force compensation
- Extremely safe thanks to 600 V CAT IV

### Features

- Measurement of loop impedance in parallel connected grounding networks with a much simpler procedure than possible with conventional processes using two auxiliary earth electrodes
- Impedance measurement is especially accurate for low values, because inductance present in the loop is taken into consideration during resistance measurement.
- Touch voltage is estimated by multiplying loop impedance and leakage current. The voltage value ascertained in this way is the maximum value which can occur between the measuring point and earth, because the measured loop impedance value takes the entire loop into account.

### SCOPE OF DELIVERY:

- 1 earth clamp meter in carrying case
- 4 batteries (LR6 or AA)
- 1 test certificate
- 1 mini CD-ROM with operating instructions in D, GB, F, E and I
- 1 set of condensed operating instructions in D, GB, F, E and I, as well as NL, PL and RO, printed
- 1 safety data sheet in 20 languages
- 1 calibration loop

| Type | Article |
|---|---|
| METRACLIP EARTH | M312N |

# INSULATION TESTERS 04

Protective measures in electrical systems are intended to prevent bodily injury due to accidents involving electrical current.

Of course they also prevent property damage caused by electrical power as well. And thus every electrical system should be checked with our test instruments before initial start-up, and at regular intervals thereafter, in order to assure the effectiveness of installed protective measures.

For the most part, this involves testing in accordance with the following VDE regulations: DIN VDE 0100-600 (IEC 60364-6), DIN VDE 0126 (IEC 62446), DIN VDE 0105-100 (EN 50110-1), VDE 0660-600-1 (DIN EN 61439-1), VDE 0113-1 (DIN EN 60204-1) and VDE 122-1 (DIN EN 61851-1).

The tests themselves are executed by the instruments strictly in accordance with stipulations set forth in particular by VDE 0413 (EN 61557).

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## METRISO PRIME 10

### High-Precision Insulation, Low-Resistance and Voltage Measuring Instrument for Up to10 kV / 40 TΩ

GMC INSTRUMENTS CLOUD

NEXON .IQ CONVERTER MODULE

**The METRISO PRIME 10 insulation tester has been developed for the detection of insulation damage and for protection against electric shock in electrical power supply networks. The measurement results are used to evaluate the safety of electrical installations.**

**Features:**

- Insulation measurement per EN 61557-2/ VDE 0413, part 2
- Test voltage in fixed steps: 50, 100, 250, 500, 1000, 2500, 5000, 10,000 V
- Measurement with incrementally rising voltage
- Measuring range up to 40 TΩ per IEC 61557-2
- Measurement of polarization index and absorption ratio
- Measurement with shielded measurement cable
- Protection against voltage conducting objects
- Variable adjustment of limit values
- Digital filter for stabilizing measured values
- Creation of R/I or R/U diagrams
- Storage of test results
- Low-resistance measurement per EN 61557-4 / VDE 0413, part 4
- Continuity testing of protective conductors and equipotential bonding connections with a test current of > 200 mA

**SCOPE OF DELIVERY:**

- Test instrument
- Set of measurement cables consisting of:
  - 11 kV cable, 3 m (1000 V CAT IV), with banana plug sockets, red
  - 11 kV cable, 3 m, shielded (1000 V CAT IV), with banana plug sockets, black
  - 10 kV “E” cable, 3 m, (1000 V CAT IV), with banana plug sockets, blue
- 3 alligator clips, 5.5 kV, 32 A (1000 V CAT IV), black, red and blue
- 2 test probes, 5.5 kV, 32 A, with banana plug sockets, red and black
- 1 temperature probe (Z555J)
- 1 USB cable
- 1 power cable, 230 V
- 1 accessories pouch
- 1 set of operating instructions
- 1 test report
- 1 set of handling instructions for lithium-ion batteries
- 1 safety data sheet

| Type | Article |
|---|---|
| METRISO PRIME 10 | M555A |
| CASE METRISO PRIME 10* | Z555K |
| Backpack METRISO PRIME 10* | Z556K |

* Further information concerning optional accessories can be found on our website.

## METRISO PRIME

### Analog High-Voltage Insulation Measuring Instrument

**Analog high-voltage insulation measuring instrument with permanently connected measurement cables and test probes**

**METRISO PRIME (crank generator):** The battery powered **METRISO PRIME** is converted into the muscle powered **METRISO PRIME** by replacing the battery module with a crank generator.

**Features:**

- Extensive measuring range: 10 kΩ ... 1 TΩ
- Measuring range: 100 kΩ ... 100 MΩ (1000 V)
- Measuring voltages: 100, 250, 500, 1000, 1500, 2000, 2500 and 5000 V
- Measurements to 1000 V per **DIN VDE 0413**
- Voltage measurement to 2000 V
- Concise logarithmic display
- Guard terminal for the elimination of surface current
- Measuring category: 600 V CAT III, 300 V CAT IV

**SCOPE OF DELIVERY:**

- Test instrument
- With battery module
- 5 kV alligator clips (KY 5000 A)

**METRISO PRIME (crank generator)**

- With crank generator
- 5 kV alligator clips (KY 5000 A)

**METRISO PRIME Set / METRISO PRIME Set K (crank generator)**

- KY 5000 A
- GUARD 5000 A
- F2000 universal carrying pouch

| Type | Article |
|---|---|
| METRISO PRIME | M550T |
| METRISO PRIME (crank generator) | M550U |
| METRISO PRIME Set | M551T |
| METRISO PRIME Set K | M551U |

# MACHINE TESTERS 05

Protective measures in electrical systems are intended to prevent bodily injury due to accidents involving electrical current.

Of course they also prevent property damage caused by electrical power as well. And thus every electrical system should be checked with our test instruments before initial start-up, and at regular intervals thereafter, in order to assure the effectiveness of installed protective measures.

For the most part, this involves testing in accordance with the following VDE regulations: DIN VDE 0100-600 (IEC 60364-6), DIN VDE 0126 (IEC 62446), DIN VDE 0105-100 (EN 50110-1), VDE 0660-600-1 (DIN EN 61439-1), VDE 0113-1 (DIN EN 60204-1) and VDE 122-1 (DIN EN 61851-1).

The tests themselves are executed by the instruments strictly in accordance with stipulations set forth in particular by VDE 0413 (EN 61557).

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# PROFITEST PRIME

## PROFITEST PRIME
## PROFITEST PRIME AC

**All-in-one test instrument in AC and DC networks for electrical installations, machines, switchgear, industrial equipment, wind power turbines, power generators and e-mobility for DIN VDE 0100-600, DIN VDE 0105-100, VDE 0113-1, VDE 0660-600-1, VDE 0126-23 and VDE 0122-1**


PROFITEST PRIME AC

PROFITEST PRIME AC

GMC INSTRUMENTS CLOUD

### Versatile and Future-Proof
- Intuitive operation
- Efficient work
- Standards-compliant testing
- Legally secure documentation

### Saves Time and Money
- As single test instrument for a broad range of applications
- All measurements without any bothersome replug-ging of the measurement cables
- Interchangeable test tips on the measurement cables
- Language genius – can be used all over the world

### Up-to-Date – Even in 10 Years
- Future-proof thanks to firmware updates
- 10-year service guarantee
- DAkkS certificate issued by own calibration laboratory
- User support for questions about testing

### Quick and Easy Report Generation
- Cascadable, future-proof software concept
- Modern data management by means of customer and measurement data administration
- Creation of system structures – from the system all the way down to the measuring points
- Quick and easy generation of a legally secure report per ZVEH

### Safe Measuring and Testing
- Easy operation with rotary switch
- Predefined test sequences for structured testing
- Coded plugs assure error-free testing
- On-site help thanks to help function with wiring diagrams
- Measuring category: 600 V CAT III / 300 V CAT IV

### Technical Characteristics
- Measurement in AC/DC systems up to 1000 V
- Measurement of internal line resistance and fault loop resistance with high test current up to 690 V AC / 800 V DC without tripping RCD types A and B
- Low-resistance measurement for protective and equipotential bonding conductors with 200 mA, automatic polarity reversal and 25 A
- Testing of RCD types A, AC, F, B, B+, EV, MI and G/R, as well as SRCDs and PRCDs
- Combined RCD test with continuously rising ramp, time to trip, tripping current
- Insulation measurement up to 1000 V with rising ramp
- Testing of RCMs and IMDs
- Measurement of leakage and differential current
- Measurement of temperature and humidity with a sensor
- Mains and battery operation (with limited func-tionality)
- Push-print function – transmission of the mea-sured value after measurement
- Bluetooth and USB interfaces

### SCOPE OF DELIVERY:
- Test instrument in measuring case and accessories pouch with measurement cables and alligator clips
- USB cable
- Mains cable
- Condensed operating instructions – complete operating instructions can be downloaded from the Internet
- DAkkS calibration certificate
- Safety data sheet

| Type | Article |
|---|---|
| PROFITEST PRIME | M506A |
| PRIME starter package* | M506D |
| PRIME master package* | M506E |
| PRIME professional package* | M506F |

* Further information concerning the packages can be found on our website.

## PROFITEST PRIME AC – same as PROFITEST PRIME plus:


- High-voltage test (2.5 kV AC, 500 VA) with the PROFITEST PRIME AC (standard sequence, ramp function and pulse control mode)
- Work safety concept for the inspector in accor-dance with DIN EN 50191and EN 61557-14 with indicator lamp, emergency off switch and key switch, as well as with 2-voltage pistols

| Type | Article |
|---|---|
| PROFITEST PRIME AC | M506C |

# PHOTOVOLTAIC TESTERS 06

Protective measures in electrical systems are intended to prevent bodily injury due to accidents involving electrical current.

Of course they also prevent property damage caused by electrical power as well. And thus every electrical system should be checked with our test instruments before initial start-up, and at regular intervals thereafter, in order to assure the effectiveness of installed protective measures.

For the most part, this involves testing in accordance with the following VDE regulations: DIN VDE 0100-600 (IEC 60364-6), DIN VDE 0126 (IEC 62446), DIN VDE 0105-100 (EN 50110-1), VDE 0660-600-1 (DIN EN 61439-1), VDE 0113-1 (DIN EN 60204-1) and VDE 122-1 (DIN EN 61851-1).

The tests themselves are executed by the instruments strictly in accordance with stipulations set forth in particular by VDE 0413 (EN 61557).

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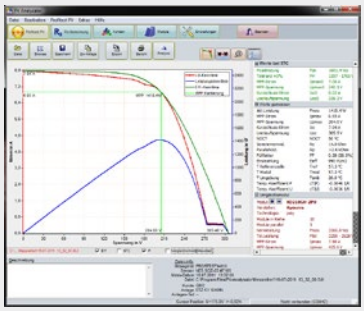
# PROFITEST | PV

## Photovoltaics



PV Analyzer

**Peak power measuring instrument and curve tracer for PV modules and strings**

The **PROFITEST PV** permits measurement of characteristic IU curves, as well as individual photovoltaic modules and strings.

**Features:**

- Generator voltages of up to 1500 $V_{DC}$*, current of up to 20 $A_{DC}$ (*available after QII 2019)
- Measurement of short-circuit current ISC, open circuit voltage UOC, instantaneous peak power of a solar cell Pmax and series resistance RS
- Measurement of internal parallel resistance RP
- Automatic conversion of momentary measured values to STC
- Patented calculation process for evaluating PV generators without knowledge of the manufacturer's specifications
- Patented calculation process for determining the generator's internal series resistance based solely on a single characteristic IU curve
- Separate measurement of temperatures at the irradiation sensor and the back of the module for increased measuring accuracy
- High level of intrinsic safety thanks to included load disconnector (1500 V* / 32 $A_{DC}$) for all-pole disconnection of the measuring instrument from the PV generator (*available after QII 2019)
- Calibrated irradiation sensor in accordance with IEC/EN 60904-2 with integrated Pt1000 temperature sensor
- Integrated customer/module database with bidirectional data exchange
- Software for graphic representation, evaluation and documentation with integrated database / PV analyzer

**SCOPE OF DELIVERY:**

- Test instrument
- Irradiation reference sensor with integrated Pt1000 temperature sensor, 10 m
- External safety disconnector, 1500 V* / 32 A (*available after QII 2019)
- 4-wire measurement cable set, 10 m
- Pt100 PV surface sensor
- External power pack

**PV Analyzer**

The database software offers effective support for testing and documentation. It's been specially developed for use in the field of photovoltaics and permits graphic representation and analysis of measurement results.

PV Analyzer includes the following functions and more:

- Measured characteristic curve values are read in from the **PROFITEST PV**.
- Export of measured values or results (e.g. as XLS file)
- Generation of a test report (e.g. as a PDF file)
- Online measurement – graphic representation of the characteristic curve and measured values (also suitable for continuous measurement)
- Online access to the database / data management in the **PROFITEST PV**
- Representation of measured and calculated values under STC
- Overview of characteristic IU curves for a given test series in the browser window
- Module database (approx. 40,000 modules)
- Analysis function: evaluation of measured values acquired under STCs (error interpretation)

| Type | Article |
|---|---|
| PROFITEST PV | M360A |

# PROFITEST | PV SUN
# PROFITEST | PV SUN MEMO

## Test Instrument

PROFITEST PV SUN

PROFITEST PV SUN MEMO

**Test instrument for testing PV modules and strings per DIN EN 62446 (VDE 0126-23)**

- Voltage measurement: 0 ... 1000 $V_{DC}$
- Current measurement (direct): 0 ... 20 $A_{DC}$
- Insulation resistance measurement
- Measuring range: 0 ... 20 MΩ – test voltages: 250, 500 and 1000 V DC
- Earth fault measurement: 0 ... 1000 $V_{DC}$
- Testing for protective conductor continuity: 0 ... 10 Ω / > 200 mA
- Polarity test
- Backlit LCD panel
- Compact and rugged, for service calls under harsh conditions
- Weight: only 500 g

**PV SUN MEMO –** same as **PV SUN**
but with internal memory (10,000 measured values), bidirectional interface, software and USB interface cable

**INCLUDED WITH THE PROFITEST PV SUN:**

- 1 Test instrument
- 4 batteries, 1.5 V IEC LR6 (AA)
- 3 safety measurement cables, 1.5 m, red, blue and yellow
- 1 solar plug adapter to MC3 and MC4
- 1 plug-on safety test probe with socket
- 1 plug-on safety alligator clip with socket
- 1 carrying case with foam insert + operating instructions

| Type | Article |
|---|---|
| PROFITEST PV SUN | M360C |
| PROFITEST PV SUN MEMO | M360D |

# IZYTRONIQ

## A New Dimension of Test Technology

**IZYTRONIQ is newly developed test software with which the entire testing scenario can be visualized, managed and documented in an audit-proof, instrument-independent fashion. And thus for the first time ever, you can combine and document measurement and test data from various test instruments and multimeters into a single test.**

Intuitive operation and a modern look assure quick access to all functions. Thanks to intelligent selection and the suppression of tools and work areas, users are only offered options for action which are actually relevant for the respective task. Usability is supported by a creative design with meaningful icons and the representation of complex data relationships in tree structures.

New IZYTRONIQ test software makes the entire testing sequence simpler and more flexible. Even complex tasks with numerous measuring points and different test sequences can be processed quickly, professionally and reliably. Sequences which are matched to the applicable standards can be programmed with individual test steps, in order to assure that all required measurements are conducted properly and recorded in the test report in a legally secure manner. As a result, the software supports electricians and test teams during initial and periodic testing of electrical systems, switchgear/controlgear assemblies and machines, as well as during safety and function tests for electrical and technical medical devices.

GMC INSTRUMENTS CLOUD

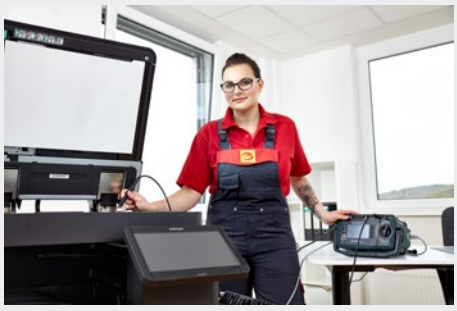
## APPLICATIONS:

### Testing of Equipment and Installations

IZYTRONIQ permits the entry of electrical systems using a tree structure and component-oriented allocation of test results by means of push/print communication via Bluetooth/USB. Even complex tree structures for multiple measurements at various test points can be transferred to the test instrument bidirectionally.

### Testing of Electrical Devices

Regardless of whether testing after repair, initial testing or periodic testing is involved, – IZYTRONIQ places diverse options at your disposal for efficient, time-saving test procedures. Alternatively, individually created sequences can be transferred to the safety tester and executed there.

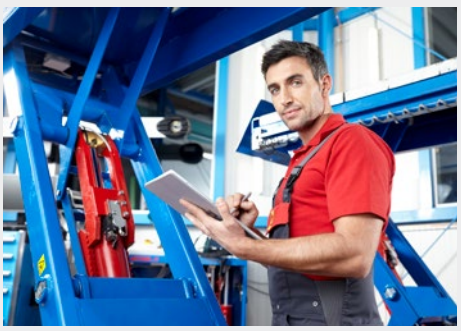


### Testing of Machines

The complex structure of modern production machines necessitates a great variety of test steps, which are included in the overall measuring procedure. IZYTRONIQ does justice to this requirement through the use of individually programmable test sequences.

### Testing of Technical Medical Devices

In order to assure that technical medical devices function safely and to their fullest extent, IZYTRONIQ supports you in fulfilling the relevant legal requirements quickly and simply, and permits especially efficient but nevertheless individual test documentation.



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