Power and industrial test equipment.

More than 20 new products

Safer working
protect yourself with CAT IV 5kV and 10kV testers

At last
a complete transformer test system

Forms based
software that works the way you do

Any time, any place, anywhere
to your specification –
The new van based
cable fault location system

Turn that noise down
New earth ground testers
with switchable frequencies
New products

CFL40A
Van mountable cable fault locator
The TDR and all the control functions have been installed in a newly designed remote panel, connected to the HV unit by a flexible umbilical cable for installation in to a suitable vehicle by the customer, or Megger.

Delta3000
10 kV automated insulation dissipation factor test set
Fully automatic 10 kV insulation dissipation factor test set for condition assessment of electrical insulation in high voltage apparatus with PowerDB OnBoard for automatically generating test reports.

TTR300 series
Three-phase transformer turns ratio test set
Offering stand-alone or remote-control operation to accurately measure ratio, phase deviation and excitation current. TTR330 has PowerDB OnBoard for automatically generating test reports.

MTO
Transformer ohmmeter
MTO series is a line-operated, field-portable instrument designed specifically to measure the d.c. resistance of all types of magnetic windings, mainly in all types of transformer windings.

MCT1600
Current transformer test set
By performing a range of test automatically, including ratio, saturation knee point, burden, polarity and phase deviation, MCT1600 offers huge productivity gains over conventional CT testers reducing the cost of commissioning transformers.

DET4T2 series
Earth ground resistance testers
DET4T2 series of earth testers now offers user selectable frequency and extended measurement ranges. To make even more attractive it is available in a number of different kits.

PA9 Wireless
Power quality analyser
Simultaneously recording power quality and power flow information PA9 Wireless incorporates a wireless modem to allow a remote user to configure the unit, to view and download data.

S1/2, MIT5/2 and MIT10/2 series
5 kV and 10 kV insulation testers
Megger has up-rated the safety of its 5 kV and 10 kV insulation resistance testers to CATIV 600V and changed the test leads it supplies in the kit.

Advanced manufacturing technology
Megger believes that the best way to secure good quality products and intellectual property is through excellence in engineering and its production facilities. Key processes and expertise are kept in-house, and engineering teams are located on-site at all the company’s factories. Advanced manufacturing technology including automated wave-solder machinery and robotic surface mount component technology help keep costs down and quality up.

Contents

Taking the lead for safety!
As an essential aid to safer testing, Megger has introduced a new and comprehensive family of test leads for use with its insulation resistance testers. Three metres long, and made from ultra-flexible silicone-insulated cable to ensure long life, the new leads cover virtually all requirements related to insulation resistance testing at up to 10 kV.

For use in applications where the space for making test connections is not restricted, the test leads are fitted with large insulated clips. They have a maximum jaw capacity of 54 mm, and an insulation rating of 10 kV.

For applications where space is more restricted, but a useful level of protection from the output of the insulation tester is nevertheless required, the range includes leads that incorporate medium-sized insulated clips. With an insulation rating of 6 kV, these leads have a maximum capacity of 18 mm.

In some instances, such as motor terminal boxes, space for connecting the test leads is so restricted that insulated clips cannot be used. For these applications, Megger offers test leads with uninsulated clips that have a maximum capacity of 18 mm.

Leads with large, medium and uninsulated clips are supplied in colour-coded sets of three – positive, negative and guard.

Also included in Megger’s new test lead family are leads designed to allow insulation resistance testing to be carried out more safely on low voltage control circuits in the vicinity of high voltage equipment. With insulation rated at 1 kV, these leads are supplied in sets of two, and incorporate probe-type tips with push-on crocodile-clip adaptors.

A history of firsts
1903: Megger trademark registered. It is jealously guarded by the company.
1965: First low-voltage insulation power factor set, weighing less than 6.5 kg
1980: First semi-automatic 2.5 kV and 10 kV insulation power factor test set
1990: First fully automatic 10 kV insulation power factor test set
2007: First portable cable fault locator with up to 2000 Joules in four ranges
2007: Megger merges with Programma AB, a major test and measurement products manufacturer.
Regular insulation resistance testing is one of the most cost effective methods of identifying aging in electrical equipment, and with over 60% of equipment failures being ascribed to insulation breakdown, it is a key area to monitor for high levels of customer satisfaction.

**MIT520/2**

5 kV diagnostic insulation resistance tester

MIT520/2, now with CATIV safety, offers the ability to test insulation to 5 kV. It allows automatic IR, PI, DAR, SV and DD tests. Measuring up to 15 TΩ means the MIT520G can detect insulation deterioration earlier than other testers. Results storage and download give you full diagnostic information for later analysis. MIT520G can be powered using either mains or its on-board rechargeable battery, now with improved battery-life management.

**S1-552/2**

High current 5 kV insulation resistance tester

With a high output current 5 mA for fast charging of capacitive loads the S1-552/2 offers variable test voltages from 50 to 5000 V. Measuring up to 15 TΩ, it allows automatic IR, PI, DAR, SV and DD tests. The S1-552/2 is safety rated at CATIV and can be powered using both mains and its on-board re-chargable battery, now with improved battery-life management.

**S1-554/2**

5 kV insulation resistance tester with high noise rejection

Offering 4 mA noise rejection and software filtering the S1-554/2 leads its class. It also offers variable test voltages from 50 to 5000 V. Measuring up to 15 TΩ it allows automatic IR, PI, DAR, SV and DD tests. The S1-554/2 is safety rated at CATIV and can be powered using both mains and its on-board re-chargable battery, now with improved battery-life management.

**S1-1052/2**

High current 10 kV insulation resistance testers

With a high 5 mA output current for fast charging of capacitive loads, the S1-1052/2 offers variable test voltages from 50 V to 10,000 V. Measuring up to 35 TΩ, it allows automatic IR, PI, DAR, SV and DD tests. It can be powered using both mains and its on-board rechargeable battery with improved battery-life management. S1-1052/2 has a CATIV safety rating.

**S1-1054/2**

10 kV insulation resistance testers with high noise rejection

With a high 5 mA output current S1-1054/2 offer variable test voltages from 50 V to 10,000 V. Safety rated at CATIV and measuring up to 35 TΩ, it allows automatic IR, PI, DAR, SV and DD tests. It can be powered using both mains and on-board rechargeable battery with improved battery-life management. S1-1054/2 offers 4 mA noise rejection and software noise filtering, and class leading performance.

**S1-5010**

5 kV graphical insulation resistance tester

The S1-5010 is a heavy-duty mains/battery powered instrument. Offering 5 mA high power testing, auto test, graphical display and results storage, it is a stand-alone instrument for maximum diagnostic information and predictive maintenance.

**MIT510/2**

5 kV insulation resistance tester

With CATIV safety, MIT5102 is an easy to operate insulation resistance tester that is very tough. Measuring up to 15 TΩ, it allows automatic IR, PI, DAR, SV and DD tests. The built-in timer and high test ranges allow simple and quick evaluation of the condition of the insulation under test. The MIT510/2 is mains or battery powered, now with improved battery-life management.

**Why CATIV?**

A small fault becomes a big problem on Category IV high energy unfused supplies.

A distant lightning strike can produce a transient of several kV on the supply. The transient may only last for a few tens of microseconds and is likely to do little damage.

The problem is that it may initiate an arc and this arc then presents a low impedance path for current from the mains supply. Often, that supply can deliver 1000 A or more until the breaker or other protective device operates. In that time, the amount of energy liberated is easily enough to start a fire or even cause an explosion. If the arc is within a test instrument there is a high probability that you will be injured or worse!

The solution is simple – design the instruments with protection and internal clearances that are large enough to prevent transients from establishing an arc and along with appropriate protection devices. Guidance to this is given in IEC61010 in order to comply with category ratings defined in IEC60664.

In practice, transients are damped quite quickly as they pass through a typical distribution system. As you can see from the diagram CATIV is recommended for use outside and to the consumer unit. Specify Megger CATIV testers to make sure you are safe and secure. Not only could they save your life, but they are economical too.

Using an instrument with a higher installation category rating does not alone create a safer working environment. You should always follow correct work practices to keep you and others safe.
BM15

5 kV basic insulation resistance tester

With four test voltages and an analogue display the BM15 is a tough, easy-to-use “go / no go” tester. With a test current of 1 mA and a maximum reading of 20 GΩ it can operate on dry cells or rechargeable batteries.

MIT200 series

Light-weight insulation and continuity testers for telecommunications

The MIT200 series are CATIV 600 V tested offering 250, 500 and 1000 V test voltages. They will find applications in electrical contracting, both on domestic and industrial systems, as well as site maintenance and service departments. Their small size and lightness make them ideal for those engineers that need to carry them for extended periods.

MIT400 series

Insulation resistance and continuity testers for industrial maintenance

MIT400 series testers offer CATIV 600 V safety in a convenient easy to hold format. MIT400 series are true diagnostic instruments measuring insulation resistance up to 200 GΩ. They measure insulation deterioration long before most testers even offer a reading.

MIT480 series

Insulation resistance and continuity testers and capacitance measuring

MIT480 series testers offer 50 and 100 V test voltages, ideal for telecommunications and Electrician’s insulation and continuity testers. The MIT480 series also offers frequency, capacitance and distance measuring functions and a 75 V live circuit inhibit feature to match the special needs of telecoms engineers.

MIT300 series

Insulation resistance and continuity testers for special applications

Based on the class leading MIT480 the MIT40X allows the user to set the test voltage anywhere between 10 V and 100 V, depending on the application. It still offers CATIV 600 V safety and tests insulation resistance up to 20 GΩ.

MIT300A

Mobile insulation tester

The MIT300A is a moving coil analogue tester offering 250, 500 and 1000 V test voltages.

MIT40X

Insulation resistance and continuity testers for special applications

MIT40X series testers offer 50 and 100 V test voltages, ideal for telecommunications and Electrician’s insulation and continuity testers. The MIT40X series also offers frequency, capacitance and distance measuring functions and a 75 V live circuit inhibit feature to match the special needs of telecoms engineers.

MIT30X

Insulation resistance and continuity testers for electrical maintenance

MIT300 series testers offer CATIV 300 V safety with flexibility. The MIT300 series comes in four versions from a basic two-test voltages digital tester to a downloading three-test voltages tester. All the digital testers include an analogue arc display.
High voltage test equipment

681100 series
50/100 kV a.c. dielectric test sets

681100 series a.c. dielectric test sets are a.c. high-voltage sources for testing electrical insulation. The standard system includes a control/instrument cabinet, a high-voltage transformer assembly and all necessary cables including ground and input power.

220000 series
70 kV, 120 kV and 160 kV d.c. dielectric test set

220000 series provides a dependable, safe, lightweight and portable d.c. voltage source for testing the quality and integrity of electrical power cables, cable installations, motors, switchgear, insulators, transformers and capacitors.

DELTA2000 offers automatic measurement of dissipation factor, capacitance, watts loss and leakage current. It is ideal for testing electrical insulation in high voltage apparatus such as transformers, bushings, circuit breakers, cables, lightning arresters and rotating machinery.

The ultimate instrument for dissipation factor testing, DELTA3000 is ideal for tan δ testing on transformers.

670000 series
2.5 and 12 kV semi-automatic capacitance and tan δ test bridge

These instruments feature automatic balancing of dissipation factor and manual balancing of capacitance and interference suppression, allowing use in energized HV substations. There is direct readout of tan delta, capacitance and watts dissipated.

CB100
Low voltage capacitance and tan δ test bridge

Lightweight and low-cost the CB100 is ideal for workshop use. Manually balanced it offers direct readout of tan delta and capacitance, overcoming interference by using a test frequency of 80 Hz or 100 Hz.

Capacitance dissipation factor and tan δ

Delta 3000
10 kV automated insulation dissipation factor test set

A fully automatic 10 kV insulation dissipation factor test set designed for condition assessment of electrical insulation in high voltage apparatus such as transformers, bushings, circuit breakers, cables, lightning arresters and rotating machinery.

In addition to performing insulation power factor tests, it can be used for measuring the excitation current of transformer windings.

DELTA 3000 allows for direct data feed into PowerDB for automatically generating test reports. All data can be saved in an XML file with all historical data. If a user also has a full license of PowerDB, test sheets can be modified and downloaded to the instrument. The unit’s intuitive, easy-to-use interface allows the user to configure test sheets and pop-up test procedures. A QWERTY keyboard makes it simple for entering all nameplate and location information. The unit has two USB ports. Measurements are performed automatically, and results are displayed on a full VGA colour display. Measured quantities include voltage, current, power (loss), dissipation factor and capacitance. The operator has the option of correcting the current and loss readings to 2.5 kV or 10 kV equivalents. Information can be downloaded directly to a PC or printer. An optional 10 nF TTR capacitor in addition to two HV reference capacitors are also available.

Tan delta

Delta 2000
10 kV fully automated capacitance and tan δ test bridge

The ultimate instrument for dissipation factor testing, DELTA2000 offers automatic measurement of dissipation factor, capacitance, watts loss and leakage current. It is ideal for the assessment of insulation in high voltage apparatus such as transformers, bushings, circuit breakers, cables, surge arresters and rotating machinery.

Delta 2000 is ideal for tan delta testing on transformers.
Power quality

Versatility is vital for measuring power quality. There is a danger that by specifying an instrument that only performs a limited number of tests, you will need to purchase extra equipment later. It is safer to specify a power quality instrument that can make measurement of frequency, flicker, dp/swell, interruption, unbalance, and harmonics for these applications:

- Lamp flicker measurements and recordings
- Energy audits and forecasting
- Capacitor bank sizing
- Load balancing
- Power factor surveys
- Before/after studies
- Load profiling
- Substation monitoring
- Comprehensive power quality investigations
- Billing verification
- Motor, generator and transformer inrush current studies
- Harmonic surveys, analysis, and filter design

MetReport

Power quality analysis software

MetReport is an extremely powerful, fully functional, and stand-alone report generation tool for the Megger PA-9Plus power quality analysers. Its primary purpose is to dramatically improve and extend reporting capabilities.

In today’s economy, time is money. Power and quality professionals sometimes spend countless hours every year creating customized reports supporting their analysis studies. MetReport automates this tedious task while improving the accuracy and reliability of the entire reporting process.

MetReport utilizes data files obtained from the PA-9 and PA-9Plus to rapidly produce completely customizable reports targeted to your specific applications and requirements. Some examples include:

- Power quality studies, harmonics analysis, power factor and energy consultation, tolerance curve studies (CEBMAA/TC, SEMI F47, User Defined), auto data analysis pass/fail reports, ENS5160 compliance, and IEEE/IEC Flicker. The key to quickly learning and using MetReport is the integrated wizard function. This wizard effortlessly takes you through the entire report creation, customization, and generation process. Several sample report templates are included for review, and may be modified to meet your specific needs.

All reports are output as standard Microsoft Word documents.

SL8M (not CE marked)

8 channel recording volt-ammeter

The SL8M is a low cost, 8 channel paperless recording volt-ammeter used for measuring and recording the true RMS values of up to four voltage channels and four current channels. It is the ideal investigative tool for utility trouble-shooters, service investigation groups, meter shop technicians and facility managers to identify and document the presence of three-phase and single-phase voltage problems using associated load current information to locate the source.

MDP series

Distribution profiler

With virtually unlimited data recording capacity, easy installation and lightweight durable construction, MDP gives power utilities a convenient and accurate way of acquiring information needed to monitor power flow on feeders and overhead lines. MDP1 records actual current RMS magnitude up to 1000 A, with an additional 200 A over-range. MDP2 adds recording of relative voltage RMS magnitude together with power and power factor. The MDP3 provides facilities for waveform capture as well as the recording harmonics and THD.

PMM-1

3 phase power measurement meter

Measures a.c., d.c. voltage, a.c. primary and secondary current, power, power factor, reactive power, phase angle and frequency of single and three phase electrical systems with extreme accuracy. Integral solid state timer for continuity and voltage sensing and harmonic measurement up to 49th harmonic. For detailed waveform analysis a high-speed capture function allow 20 measurements per second. An RJ45 data port allows bi-directional communication.

Power multimeter multi-function measuring instrument with intelligent measurement and display of all three-phase system parameters.

PA9 Wireless

Power Quality Analyser

The new Megger PA9 Wireless is the latest innovation of the successful PA-9 Power Quality Analyser platform. It simultaneously records power quality and power flow information.

PA9 Wireless incorporates newly enhanced key features including a wireless modem for remote communication, a full 12 MB of nonvolatile internal memory and standard auxiliary power input capabilities as well as an optional external flash card for added memory. The unique wireless modem allows the user to configure the unit remotely, view real-time data via the remote screen, and preview all recorded data without downloading the data. The wireless modem allows for remote analysis of data, remote data retrieval capabilities and remote unit configuration. The unit intelligently downloads, previews and retrieves only the information of interest. It trends voltage, current, imbalance,

PA9plus

Power quality analyser

The PA9plus has enhanced standard key features including a fast digital signal processor to support future evolving features and capabilities, a full 12 MB of internal, non-volatile memory and incorporated auxiliary power input capabilities.

The product offers testing to the relevant standards (EN50160, IEC61000 series, IEEE1159, IEEE119).

Data can be downloaded from PA9 without interrupting the instrument recording events. The optional removable memory allows internally recorded data to be copied to an external compact flash card using the same technology you see with most digital cameras. Without a computer on site, data can be copied, manually or unattended, from the instrument to external memory cards, increasing the effective instrument memory storage to the size of the memory card used. You can program new configuration setups in the same, simple manner.

PA9 Wireless Starter Kit, shown here, includes 4 voltage cables and 3 raintight CTs.
The MPRT is already recognized around the world as a premier protective relay test instrument. It is currently in use at hundreds of electric utilities, generating facilities, industrial plants, OEMs and testing service companies in over 60 different countries worldwide.

**MPRT**

Protection relay test system

**Performance Proven**

MPRT is recognized for its versatility, its impressive power capability and an extra rugged design. Its testing performance is proven every day in some of the most remote areas of the world. Plus, it keeps getting better with the addition of significant new features and capabilities. These include:

- **Click-on-Fault** - gives you the ability to define the type of operating characteristic, then “click on” the characteristic to test the relay.
- **Binary Search** - used with Click-on-Fault, you can easily define maximum values and type of fault or characteristics such as constant current, constant voltage or source impedance.
- **RIO File Import** - allows you to import an existing RIO file into the click-on-fault diagram and then proceed with the test.

**Dynamic Control** - provides a precise maximum values and type of fault or characteristics such as constant current, constant voltage or source impedance. In addition it gives you a simple means to create complex waveforms for special test applications, using a new feature called Wave Index. Wave Index can change the waveform “on-the-fly” by incrementing individual harmonic values in real time.

**Recorder Capability** - Used with Dynamic Control, capture all analog input waveforms, binary inputs and outputs, and more.

**Modbus Communications** - automates communication with various relays via Modbus protocol.

**SSI File Reader** - quick, easy import of state-sequence files from ASPEN® and CAPE® Simulation programs.

**Test Results Import** - allows you to read other test set result files and import them into the AVTS database.

**MGTR**

MGTR is a small, lightweight, field portable, GPS satellite receiver system specifically designed to perform end-to-end tests of line protection schemes, with Megger MPRT relay test systems. MGTR provides a precise Portable Output Pulse (POP), with 100 nanoseconds of resolution. This output pulse provides a trigger synchronization of two or more MPRT test systems to less than ±1 μs of the Universal Time Coordinated (UTC).

**New**

**MPRT LCA**

LCA Low Current Adapter is a lightweight, field portable unit designed to provide multiple precise very low current sources with the Megger MPRT relay test system. The combination of MPRT and LCA provides a very powerful test capability. A single LCA unit can provide a maximum of three currents 10 to 200 milliams each phase. LCA is especially designed for testing very sensitive extremely low current relays with high accuracy amplitude and phase angle.

With MPRT and LCA, you can test relays which require three phase voltage and three phase currents, with currents as low as 1.75 mA up to 0.20 A.

**What makes MPRT a World Class test instrument?**

There are three distinctive components of the Megger MPRT Relay Test System that set it apart from any other. These are:

- **The Power Box**
- **A hand-held controller we call the TVI (Touch/View Interface)**
- **AVTS Basic Software (Advanced Visual Test Software)**

**The Power Box**

It’s lightweight (yet extremely rugged), with unmatched versatility. Constant Power Output is sustained through the entire “power curve” of a test. With a CPO of 200 VA current and 150 VA voltage, the MPRT will test any protective relay.

A unique modular VI-Gen Design combines the voltage and current generator (VI-Gen) components into one amplifier package. By using multiple VI-Gen, the system can deliver up to four voltages and four currents or with convertible voltage and current channels eight currents.

The modular configuration also allows you to order the system to fit your precise testing requirements and budget, with an easy, flexible upgrade path.

**AVTS**

Advanced visual test software

A version of AVTS can be supplied to meet individual customers’ requirements. AVTS Basic is supplied with all MPRT systems and can be upgraded to AVTS Advanced or the full AVTS Professional packages. AVTS Basic allows full automatic operation of the test set with pre-prepared test files, whilst the Advanced and Professional options give increased functionality for the preparation of automatic test files and relay performance evaluation.

Automated relay testing enables the test engineer to save a great deal of time and money by rapidly executing the test process and minimising any protected power system equipment downtime.

AVTS packages have a powerful graphical interface that is developed and continuously upgraded by Megger to simplify both manual and semi-automatic relay testing.

**K500**

Protective relay tool kit

A comprehensive range of relay tools containing over 40 manual and semi-automatic relay testing features and capabilities. The K500 relay test set is touch screen based and is used for testing full-featured protection relays and using any of the advanced features and options.
Primary injection test

Circuit Breakers are one of the critical “safety valves” of electrical systems, and basic maintenance procedures are essential to maintain maximum reliability. As the leading producer of circuit breaker test sets, Megger sets the standards for quality and reliability.

**PCITS2000/2**
Primary current injection test set

PCITS2000P enables you to test relay protection systems and their current transformers together. It has a built-in timer to record protection relay operation.

**DDA1600, DDA3000 and DDA6000**
High current injection test sets

DDAs are a range of high current units capable of generating a test current of up to 50,000 A through a circuit breaker. The instrumentation and control system enable the operator to vary the pulse time and firing angle of the injected signal. They can be used for testing protection relays and low voltage circuit breakers at the commissioning stage.

**CB832 and CB845**
Current injection sets

Capable of generating up to 1800 A and 5000 A respectively for an instantaneous trip test, these units are ideal for testing protection relay operation. For an instantaneous trip test, these units are ideal for testing protection relays and low voltage circuit breakers at the commissioning stage.

Secondary injection test

**SCITS100**
Current and voltage injection sets

Tough test sets suitable for general purpose relay testing. A wide range of relays can be tested due to their operating system flexibility. Current and voltage on the output terminals are measured and displayed. An accurate timer measures the relay operating time.

**MS-2**
Circuit breaker and overload relay test set

MS-2 is perfect for utilities, industrials and electrical service organisations. It verifies the proper operation of thermal, magnetic and solid-state overload relays; moulded-case circuit breakers; and ground-fault trip devices.

**SR98**
Voltage and current injection sets

SR98 is a lightweight, field portable test set capable of testing a wide range of electro-mechanical, solid-state and microprocessor-based protective relay. Offering high current and power output and 0 to 360° phase shift capability, SR98 has a large display, RS-232 and parallel printer ports.

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**Automatic protection testing**

<table>
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<th>SITS120</th>
<th>SR98</th>
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<td>Frequency</td>
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<td>Over-voltage</td>
<td>59A</td>
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<td>Ground directional ground fault</td>
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<td>Over-current (67N): Directional over-current</td>
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<td>Over-current (67N): Over-voltage</td>
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<td>Over-current (67N): Ground directional ground fault</td>
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<td>Over-current (67N): Over-current</td>
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<td>Over-current (67N): Auto synchronising</td>
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<td>Over-current (67N): Frequency</td>
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<td>Over-current (67N): Reclosing</td>
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<tr>
<td>Over-current (67N): Frequency</td>
<td>48A</td>
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</tbody>
</table>
Cable fault location

The fundamental objective of any cable fault location system is to provide quick, effective, accurate and safe fault location, resulting in reduced system outages and “Customer Minutes Lost”. Megger’s new PFL systems achieves all this, and more. The standard system comes as a mobile, compact system to meet your local requirements. All systems offer the facility to undertake cable testing.

PFL20-1500 Power cable fault locator system

The PFL20-1500 emphasizes portability, featuring all of the basic fault locating tools within one compact package. It is a flexible stand-alone unit with a MTDR mounted in the hinged lid. All important tools of cable fault locating are consolidated into one package: dc/tester burner, surge generator, and radar coupling. When utilized with the MTDR Cable Analysis System, the combined instruments provide the following fault location techniques:

- Time Domain Reflectometry
- Digital Arc Reflection
- Surge Pulse
- Reflection
- Differential Arc Reflection

The variable output voltage can also be used to test sheaths requiring 5 or 10 kV test voltages. The operator selectable over-current trip levels provide protection to the system under test in the event of the cable breaking down.

Fault pre-location

Each system provides a variety of methods you can use to pre-locate the fault position.

- TDR mode – use a real time trace and a stored trace for viewing simultaneously on the colour display, allowing comparison and difference measurements to be determined. Further, the TDR features auto-ranging, auto distance to fault and operator assist functions that guide the operator through the fault locating process.
- A.R.M. (Arc Reflection Method) mode – the system stabilizes a fault by creating a temporary “bridge” to earth. During this condition a standard pulse echo measurement is taken into what is basically a short circuit fault.
- ICE (Impulse Current) and Voltage Decay methods – these are also available and are transient analysis methods or pre-location which utilize either a linear coupler or voltage divider.

Fault conditioning

Also use the system to stabilize flashing, unstable or high resistance faults, by employing A.R.M. and Proof/Burn technology.

Proof/Burn

Following a breakdown of the cable under test, you can employ the 40 kV dc output to apply a high current, thus stabilizing the fault condition. This allows easier and quicker pre-location and pinpointing of the unstable faults.
Time domain reflectometry

Time domain reflectometry – or TDR for short – is based on the simple notion of reflecting an electrical signal from the fault back to your instrument, and measuring the time. Megger has taken the concept, and added easy to use diagnostic tools that help even inexperienced staff make expert assessments.

TDR1000/2P
Single channel cable fault locator

A state of the art TDR capable of identifying and locating faults on metallic cables. The TDR1000 is suitable for use on both dead or live cables without a blocking filter, up to CATIV 300 V phase-to-earth.

How TDRs work

A TDR measures the time it takes a pulse to travel down a cable, encounter an impedance change, and reflect back. By knowing the velocity of the pulse the TDR converts this time to distance. You can then pinpoint the exact location of the problem. Using a Time Domain Reflectometer (TDR) such as TDR1000/2 you can find the distance from the tester to the end of the wire (up to 3,000 metres), along with the distance to each anomaly within the circuit. The problem could be in a terminal block, a wire bundle, or a poor connection.

Problems with the dead zone

The width of the transmitted pulse affects the TDR’s ability to identify reflections. The width of the pulse is sometimes referred to as the dead zone. As the pulse increases in width, it becomes more difficult to identify reflections, because the dead zone may mask closely spaced reflections. The TDR measures the time it takes a pulse to travel down a cable, encounter an impedance change, and reflect back. By knowing the velocity of the pulse the TDR converts this time to distance.

Velocity of Propagation

Pulses travel at different velocities on different cables. The type of insulation and cross sectional area of a cable will affect the velocity of a pulse. The velocity of a cable can easily be determined by connecting onto a sample of known length. Place the TDR’s cursor at the reflection representing the end of the cable. Adjust the velocity setting until the unit reports the correct length. This setting will be the velocity of propagation for the cable. When the problem has been identified, it can be corrected easily, certainly faster, and more efficiently than rewiring the system.

TDR2000/2P
Dual channel cable fault locator

A state of the art mono or colour display display two-channel TDR, capable of identifying and locating faults on metallic cables. The TDR2000P/P is suitable for use on dead or live cables without a blocking filter, up to CATIV 300 V phase-to-earth with a range of up to 20 km. The TDR has an internal memory and the TraceMaster software supplied allows storage and analysis of waveforms on a PC.

MTDR1
Single-phase time domain reflectometer

Primarily used for the pre-location of cable faults using arc reflection, differential arc reflection and impulse current methods, the MTDR1 offers exceptional flexibility yet is intuitive to use with facilities such as operator assist, auto-ranging and auto distance to fault. With a full built-in keyboard and Windows® XP operating software the MTDR1 has a range of up to 30 km.

Cable trace and voltage detectors

L1050, L1070, L1071 Accutrace, and Cable Route Tracer

Portable cable locators

These instruments are used to locate the exact route and depth of metallic cables. The instruments’ capabilities are enhanced by offering both passive and active modes. For ease of use, and improved efficiency, the instruments can be either inductive or conductively coupled.

- Multiple output frequencies*
- Variable tx output power level*
- Peak and null detection*
- Push button depth measurement*  
  * dependent on model

Voltage detectors and phasing testers

The Detex range of testers is ideal for determining the presence of voltage be it phase to earth or phase to phase. A verification unit is available to ensure safe operation.

Voltage detectors are suitable for voltages from 2.3 kV to 550 kV. Models are available with electronic LED and audible indication or neon indication.

Phasing testers are available from 2.4 kV to 69 kV with a choice of analogue or neon voltage indication.

DETEX®

DETEX® portable cable fault pinpointer

DETEX® Series of testers are used to pinpoint faults in shielded, direct buried cables by detecting both the electromagnetic and acoustic pulses emitted from an arcing fault when it is surged.

Cable Fault Pinpointer

DETEX® Series is available as an electromagnetic-only detector with acoustic detector, or with single or dual detector configurations.

As a single detector, the set provides detection of acoustic emission, measurement of time delay between the acoustic and electromagnetic signals, and distance to the fault. If a second detector is added, the set will also display the direction to the fault.

The MPP1000 series of locators can be used with any surge generator.

Capable of locating long or short ranges, inductive or conductive, active or passive, the L1070 delivers quick and accurate results with a user-friendly interface.

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Transformer testing

It’s tough work testing transformers when it’s cold and wet. Or even if it’s hot and the sun’s baking on your back. Don’t worry, Megger’s new hand-held transformer test equipment is tough and lightweight, with all the functionality you need for rapid testing.

PowerDB OnBoard - consistent and repeatable
PowerDB OnBoard comprises the powerful PowerDB asset management software embedded within the instrument, running on a Windows operating system. Without the need for an external computer, PowerDB OnBoard brings field based users consistent, repeatable tests across instruments, unprecedented data analysis (including historical trend charting) and asset management tools, all from on-screen ‘forms based’ views.

TTR25 Hand-held TTR
TTR25 is an automatic hand-held transformer ratio test set used to measure the turns ratio, excitation current, and polarity of windings distribution and power transformers, potential and current transformers, and tapped transformers.

TTR300 Basic TTR test set
TTR300 is designed to be completely remote controlled via a PC running PowerDB LITE (included) or PowerDB (full version) PC software. TTR300 is field upgradable to TTR310, TTR320 or TTR330 without compromise to calibration. It has built-in capability for storing test results into internal memory in an open XML data format via PowerDB LITE. You can quickly download test results via RS-232 serial port.

TTR310 TTR with PowerDB lite
TTR310 has an easy-to-read, high-contrast LCD that can be seen in bright sunlight and provides the user interface for instrument set-up and test operation. It comes complete with PowerDB LITE software. TTR310 can store test results, upload results to a PC (via RS232 serial port), and/or print them in the field via optional thermal paper printer, without the use of an external computer. TTR310 has full automatic operation (either stand-alone or remote-control), is field upgradeable to TTR330 without compromise to calibration and built-in capability for storing test results into internal memory in an open XML data format for direct input into Excel® or XML format via PowerDB LITE.

TTR320 TTR with PowerDB lite and colour display
TTR320 has a high contrast bright 5.7” full VGA colour display can be seen in direct sunlight. It has a full keyboard for entering nameplate information. Communications ports include RS-232, USB and Ethernet ports for easy on-board printing, storage, and downloading of test results. PowerDB LITE software is included, so you can perform data analysis and trending of results. TTR320 has full automatic operation (stand-alone or remote-control), is field upgradeable to TTR330 without compromise to calibration and has a graphical user interface with easy-to-read ICON based screens and automated setup and control. You can store test results in an open XML format, to either internal memory or to an external USB storage device.

TTR330 Advanced TTR test set with PowerDB onboard
TTR330 has a new user interface that lets you interact with the PowerDB ONBOARD software system through keyboard and navigation keypads as displayed on an 8.4” VGA bright-colour screen. PowerDB ONBOARD displays the actual test form directly on the screen. TTR330 also lets you customise test forms via optional full-version PowerDB. TTR330 has three communications ports (two USB, one Ethernet). The USB host ports can be used for connecting directly to an optional printer (to print full-size A4 or letter completed test forms) and for data storage to a USB memory device (for later printing, analysis, archiving, and/or trending). The Ethernet port allows TTR330 to interface bi-directionally to a PC. TTR330 has full automatic operation (stand-alone or remote-control) with user interface via on-screen customizable test forms and built-in capability for storing test results, in an open XML format, to either internal memory or to an external USB storage device.

See page 37 for more information on PowerDB.
Transformer testing

Transformer ohmmeter
Transformer winding resistance and tap-change test set
Field portable low resistance measuring instrument designed to test transformer windings, motors, generators and tap changers. The two independent measuring channels greatly reduce the test duration of large inductive loads like transmission transformers, where it is possible to measure secondary and primary windings simultaneously.

MCTT-10
Current transformer tester
MCTT10 is a portable unit for performing saturation and ratio tests on current transformers using the voltage-comparison method. It provides a variable voltage output and precision instrument for testing single and multi-ratio CTs. Saturation and ratio tests can be performed without changing any leads.

TTR550005
Single-phase transformer turns ratio test set
The single-phase TTR measures power and distribution transformers using the manual balancing method. Deviations in turns ratio readings indicate problems in one or both windings or the magnetic core circuit. A hand crank provides power for the TTR550005.

Transformer testing

MCT1600
Current transformer tester
A robust, portable unit to automatically or manually perform saturation, ratio, polarity, demagnetising tests, CT burden and insulation tests on current transformers using the voltage comparison method. It has an integrated 1 kV insulation test system. The colour display is viewable in daylight and shows multiple instantaneous saturation curves with knee points. Data is saved to a USB stick.

MTO320
Transformer ohmmeter with graphical interface
MTO320 provides a fully automatic six-winding resistance measurement capability, even on 3-phase transformers with tap changers. During tap changes, the unit also continuously monitors for any break-before-make conditions.

Communications is via RS-232, USB and Ethernet ports for easy on-board printing and storage, and downloading of test results.

Once testing is complete, the unit will automatically demagnetize the transformer.

Supplied with PowerDB LITE PC software application, the user can perform data analysis and trending of results.

MTO measures dc resistance of all types of transformer windings within the defined ranges of current and resistance.

<table>
<thead>
<tr>
<th>Model</th>
<th>MTO210</th>
<th>MTO330</th>
<th>MCT1600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument type</td>
<td>Transformer Ohmmeter</td>
<td>Current Transformer test set</td>
<td>Current Transformer test set</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.2% ±0.25% of FL</td>
<td>±0.2% ±0.25% of FL</td>
<td>±0.2% ±0.25% of FL</td>
</tr>
<tr>
<td>Test voltage</td>
<td>60V</td>
<td>60V</td>
<td>60V</td>
</tr>
<tr>
<td>Pre-test polarisation check</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Damage after test</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Head lengths</td>
<td>20 metres (66 feet)</td>
<td>20 metres (66 feet)</td>
<td>20 metres (66 feet)</td>
</tr>
<tr>
<td>Printer paper width</td>
<td>15cm (6 inches)</td>
<td>15cm (6 inches)</td>
<td>15cm (6 inches)</td>
</tr>
<tr>
<td>Output range</td>
<td>Variable 5 mA - 10 A (dc)</td>
<td>Variable 5 mA - 10 A (dc)</td>
<td>Variable 5 mA - 10 A (dc)</td>
</tr>
<tr>
<td>Rating: Continuous use on all ranges</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Display</td>
<td>8.4 in (210 mm) full colour VGA</td>
<td>8.4 in (210 mm) full colour VGA</td>
<td>8.4 in (210 mm) full colour VGA</td>
</tr>
</tbody>
</table>

The single-phase TTR transformer turns ratio test set measures the turns ratio and exciting current of windings in power, potential and current transformers.

A lightweight, field portable unit that safely and accurately measures the DC winding resistance of all types of transformers and rotating machines.
Transformer testing

Insulating oil

Oil is an efficient coolant with a high flash point and high dielectric strength when used as an insulator in transformers. The insulation properties can change due to oxidation, acids, sludge, gas and water absorption. These changes can be monitored using a dielectric Megger OTS test set.

**OTS100AF/2**

100 kV automatic oil test set

A laboratory instrument that measures the dielectric strength automatically with a test voltage up to 100 kV. While the custom facility allows the operator to vary the test parameters, the international test specifications are pre-programmed, making it easy to use.

**OTS80AF/2**

80 kV automatic oil test set

For laboratory use, this instrument measures the dielectric strength automatically with a test voltage up to 80 kV. While the custom facility allows the operator to vary the test parameters, the international test specifications are pre-programmed, making it easy to use.

**OTS60AF/2**

60 kV automatic oil test set

For users wanting to test up to 60 kV, this is the ideal laboratory instrument for automatic dielectric strength measurement. While the custom facility allows the operator to vary the test parameters, the international test specifications are pre-programmed, making it easy to use.

Transforming testing

**Karl Fischer**

Karl Fischer testing uses the titration method to measure the amount of water in fluids such as insulating oil. It has become a standard test done on transformer insulating oil.

**KF875**

Portable moisture in insulating oil test set

Easy to use, portable one button test set with integral printer. Can be powered from mains, internal rechargeable battery or car battery. Ideal for on site use.

**KF-LAB**

Variable specific gravity moisture in oil test set

Easy to use test set that titrates for specific gravities between 0.60 and 1.40. Designed specifically for laboratory use, the KF-LAB is mains powered only.

KF-LAB MKII analyzes materials with a specific gravity between 0.6 and 1.4, plus insulating oils

Whether you test insulating oil on-site or in the laboratory, one of the Megger oil test sets will meet your requirements.

**VCM100**

Calibration meter

A useful device for verifying the calibration of the AF series of oil test sets.

<table>
<thead>
<tr>
<th>Model</th>
<th>OTS60AF</th>
<th>OTS80AF</th>
<th>OTS100AF</th>
<th>OTS60PB</th>
<th>OTS80PB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test voltage</td>
<td>60 kV</td>
<td>60 kV</td>
<td>100 kV</td>
<td>60 kV</td>
<td>60 kV</td>
</tr>
<tr>
<td>Power supply</td>
<td>Automatic</td>
<td>Automatic</td>
<td>Automatic</td>
<td>Automatic</td>
<td>Automatic</td>
</tr>
<tr>
<td>Weight</td>
<td>12 kg</td>
<td>30 kg</td>
<td>42 kg</td>
<td>18 kg</td>
<td>17.5 kg</td>
</tr>
</tbody>
</table>

Moisture in insulating oil not only reduces the efficiency of the oil as an insulator but may also be used to detect signs of degradation in the solid insulation in transformers and switchgear since water is a by-product of the breakdown of this type insulation. However oil degrades in the light and over time, and water content should be measured at or near the normal operating temperature of the oil.

It is now recognised that inaccuracies can occur when oil is sent to a central laboratory or workshop for breakdown and water content analysis. Local testing allows decisions to be made immediately reducing the danger of putting the equipment back into service with inadequate oil whilst waiting for results to come through from a central laboratory.

**Polarity**

**Polarity tester**

Transformer polarity verifier

This simple device can help avoid an expensive mistake. Its small size and reliable construction make it a useful addition to any tool box.

**Phase sequence and continuity indicator**

Providing positive indication of phase sequence on energized lines and which phase, if any, is faulty.

Motor and phase rotation tester

A compact, rugged and portable instrument suitable for phase sequence and motor ratio testing. Suitable for determining the rotation direction of 1, 2 or 3-phase motors, rotation or sequence of energized power circuits. Can also be used to determine the polarity of instruments and power transformers, and phase/polarity of unmarked motor windings.

Motor and phase rotation tester provides complete phase-sequence and motor-rotation testing in one instrument
Low resistance testing

Failing to spot gaps and cracks in aircraft wings or broken rails on railways can cause disastrous failure causing devastation to the lives of passengers. Routine maintenance using a low resistance tester (DLRO) sometimes known as a “Ducter” test can highlight problems before they become catastrophic.

DLRO600
600 A low resistance ohmmeter

Provides the operator with high resolution, 0.1 µΩ, lightweight and portable method of performing on-site low resistance measurements. The unit can be used to test circuit breaker contact resistance to IEC 62271-100, switch contacts, busbars, joints, splices and fuses. The test current is variable from 10 A to 600 A, in 1 A steps, enabling the user to perform all the required test with a single instrument.

DLRO200
200 A low resistance ohmmeter

Provides the operator with high resolution, 0.1 µΩ, lightweight and portable method of performing on-site low resistance measurements. The test current is variable from 10 A to 200 A, in 1 A steps, enabling the user to perform all the required test with a single instrument. The unit can be used to test small circuit breaker contact resistance to IEC 62271-100, switch contacts, busbars, joints, splices and fuses.

Table:

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement ranges</th>
<th>DLRO600</th>
<th>DLRO200</th>
<th>DLRO10X</th>
<th>DLRO10</th>
<th>BT51</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.1 µΩ to 999.9 µΩ</td>
<td>0.1 µΩ to 999.9 µΩ</td>
<td>0.1 µΩ to 999.9 µΩ</td>
<td>0.1 µΩ to 999.9 µΩ</td>
<td>0.1 µΩ to 999.9 µΩ</td>
<td>0.1 µΩ to 999.9 µΩ</td>
</tr>
<tr>
<td>Current test range</td>
<td>10 A - 600 A</td>
<td>10 A - 200 A</td>
<td>0.1 A - 10 A</td>
<td>0.1 A - 200 A</td>
<td>2.0 A</td>
<td></td>
</tr>
<tr>
<td>Battery storage</td>
<td>Rechargeable batteries</td>
<td>Rechargeable batteries</td>
<td>Rechargeable batteries</td>
<td>Rechargeable batteries</td>
<td>Rechargeable batteries</td>
<td></td>
</tr>
<tr>
<td>Weight including leads</td>
<td>14.5 kg</td>
<td>14.5 kg</td>
<td>2.6 kg</td>
<td>2.6 kg</td>
<td>4.5 kg</td>
<td></td>
</tr>
</tbody>
</table>
Battery testing

With the increasing dependency of back up systems on battery strings, and the escalating cost of replacing failing cells; instrumentation and software systems that can measure trend and manage the life-cycle of cells is a cost effective option.

Are batteries a waste of time and money?

Batteries are indeed, a waste of money. This means to say that if the power grid were 100% reliable, batteries would not be necessary! The many worldwide power outages over the past several years make batteries essential as a backup source. Who actually gives batteries a second thought? We simply expect them to work when called upon. Experience has shown that this expectation is pure fiction.

Batteries are extremely important to provide electricity to support many assets and revenue streams during outages. For example, in a generating station, if the turbine suffers an outage, without the back-up battery the turbine lube oil priming pumps would not continuously keep the bearings lubricated causing major damage and lengthy outages. In hospitals, who wants to be in the middle of an operation when an a.c. outage occurs without proper battery back-up? The applications for batteries are innumerable and frequently unseen. In this world of dependency upon electricity, it is impossible to survive without battery back-up.

It is not enough to only check the voltage and specific gravity. The sum of all of the cells’ voltages equals the charger output. Voltage (and specific gravity) of lead-acid batteries follows the sulphate. If a battery is fully charged, the sulphate will be in the acid and its voltage and specific gravity will be normal (with few exceptions.) If it is in a discharged state, the voltage will be low and as there will still be some sulphate on the plates, the specific gravity will also be low. If the battery has a normal voltage, there is no indication of its condition. When the voltage is abnormal, it may indicate a potential problem.

There are many failure modes for batteries. With care and measurement these can be dramatically reduced, especially if little to no testing is presently being performed. The battery is installed, not to add to the work load, but to support critical electrical equipment or revenue streams. Proper testing and data analysis can help determine when a battery should be replaced. Testing also helps reduce emergency battery replacements and assists in budgetary planning, thus reducing cost. A properly implemented battery testing regime does not necessarily reduce the work load but it will, most likely, increase reliability of the entire d.c. network.

BITE® 3 Battery impedance test equipment

BITE®3 battery impedance test equipment determines the health of lead-acid cells up to 2000 Ah by taking measurements of the most important battery parameters, cell impedance, an internal ohmic test, cell voltage, intercell connection resistance and ripple current.

For the first time in a battery test instrument, BITE®3 measures float current and the harmonic content of the ripple current. There is a built-in spectrum analyser to show the harmonic content of the ripple current. It has firmware that can be upgraded through the Internet and supports English, French, German and Spanish.

Battery testing

BITE2P Impedance tester for up to 7000 Ah cells

A rugged durable instrument whose enhanced capabilities make it easier to determine the true state of health of a battery system, terminal plate to terminal plate. The BITE2P is ideal battery systems up to 7000 Ah, used in substations, generating stations, telephone exchange UPS systems and cabinetized UPS batteries, railway substations, signal and communications installations.

PROACTIV Battery database management software

ProActiv is a powerful yet easy-to-use battery database management software designed to aid the analysis and monitoring of each individual battery in a battery system. Failure of a battery system within environments such as utilities, hospitals or manufacturing plants can result in operational failure of the devices connected to it.

ProActiv assists the user to avoid battery failures, budget for future battery string and cell replacements, and plan battery change-outs in an orderly manner. It utilizes a Microsoft Access database format allowing the user to organize and manage battery data such as voltages, impedance, intercell connection resistance, ripple current, specific gravity, and IR thermographs.

BGFT Battery ground fault tracer

A manually balanced instrument that identifies, tracks and locates ground faults in unearthed d.c. battery systems, on-line. Effective in high electrical noise environments, as the strength of test current can be adjusted. Useful for industries where power supply for operating, measurement, communication and control equipment is critical.

BGL (not CE marked) Battery earth fault tracer

This instrument detects, tracks and locates earth faults on battery or floating systems by injecting a 21 Hz or 25 Hz signal (depending on line frequency) between the system and earth. The resulting current is then traced through the system with a clamp accessory, knowing that the fault current will flow to earth until the fault is located. Designed for operation on live battery systems, hence there is no requirement to isolate the system.
Megger has more than 50 years experience of designing and building earth resistance testers. The latest generation is CATIV rated, and have tough moulded cases.

**DET2/2**

High resolution earth tester

Our top of the range earth tester. High resolution to 1 mΩ. This level is required to measure resistivity to adequate depth on many substations and communication sites. Measurement of the low earth values required on many installations, to meet Ground Potential Rise (GPR) requirements need this resolution to ensure valid results. Superior noise filtering greater than 40 V peak to peak to retain resolution under real test conditions.

**DCM300E**

Earth leakage clamp

Measurement of leakage current. For stable readings down to very low current value with a 10 mΩ resolution. Current measurement up to 300 A.

**Professional earth test kit**

Megger's Professional Earth Test Kit is designed to be as practical as possible. Housed in a tough polyethylene carry case, the kit is stored neatly, well-protected and easy to transport. In use the reels are fitted and retained on the spike handles, simply run out the test lead to the instrument and plug in, plug the other end directly into the spike, and test. When the test is complete, unplug the test leads and wind them in, whilst still on the spike.

- Ideal for use with whole range of Megger earth testers
- 4 wires on easy-wind reels make it quick to get testing and quick to pack away again
- 1 croc clip test wire
- Fibre glass measuring tape to assist accuracy
- Auger style spikes make it easy to deploy and to check depth
- Tough easy store case

All models include these features

- Extra large selector switch
- Extra large, clear display for easier operation in outdoor conditions
- Simple one button operation
- Battery powered with a bar graph that updates battery strength
- Noise reduction up to 40 V peak to peak
- Safety rating of CATIV 100 V
- IP54 rated (water/dust ingress) for extra protection in harsh conditions

**DET3TD offers a complete kit** for customers wishing to conduct earth electrode testing using the two and three pole techniques for the four pole soil resistivity test

**DET4TD2 is a complete earth testing kit** for users needing the flexibility to use either the two and three pole electrode techniques or the four pole soil resistivity test

**DET4TC2** is similar to DET4TD2, with the added advantage of using rechargeable batteries. You can also get an adaptor to charge your tester from your vehicle.

**DET4TC2 is similar to DET4TD2, with the added advantage of using rechargeable batteries. You can also get an adaptor to charge your tester from your vehicle.**

Each instrument includes everything you need to test:

- Comes complete with test leads, stakes, batteries, calibration certificate and rugged polypropylene carry case.

**DET10C and DET20C**

Earth resistance clamp testers

Earth resistance clamp testers are suitable for measuring earth resistance of installations such as buildings, pylons and RF transmitter sites and for inspection of lightning protection systems.

- Measures ground rod resistance
- Measures ground leakage current
- Automatically self calibrates
- Auto ranging
- High and low alarms
- Memory and downloading
Megger has a complete range of analogue, digital and analogue/digital multimeters to provide the solution to electrical and electronic fault finding and testing.

**Multimeters**

**AVO300 series**
Tough and simple multimeters offering large single parameter display and autoranging.

**M7000 series**
High specification dual parameter display multimeter offering measurement accuracies up to 0.2%.

**M8000 series**
Professional dual parameter display multimeter offering measurement accuracies up to 0.08%. The M8037 also offers true RMS.

**Model 8 Mark7**
The multimeter that has become the industry standard, due to its robust construction.

**Clampmeters**

**DCM series**
A choice of 3 clamp meters and a fork multimeter for use during the installation, maintenance and checking of electrical systems and equipment.

**MMC850**
MMC850 offers a unique solution to current measurement in multi-core cables, without the need to split cores. Simply clamp the MMC850 to a multicore cable and read the current flowing. Not shown on selection chart – please ask for datasheet.

**Hand-held electrical test tools**

**Multifunction tester**

**MFT1500 series**
Offering insulation resistance, continuity, earth loop impedance and RCD testing in one tester. Ideal for installation testing and periodic inspection, the top of the range model offers Bluetooth connectivity for paperless certification.

**Insulation and continuity testers**

**MIT300 series**
A CATIV 300 V insulation and continuity tester that comes in five version from basic tough 2 voltage digital tester to a downloading 3 voltage tester, there is also an analogue 3 voltage tester.

**MIT200 series**
A light-weight, CATIII 600 V insulation and continuity tester ideal for the maintenance engineer whose on the move.

**Earth loop impedance testers**

**LT300**
A high current loop tester that is ideal for industrial applications with 50 V to 500 V and 16 Hz to 400 Hz operational range.

**LTW300 Series**
2-wire non-tripping loop testers that makes loop impedance testing simple where there is no neutral present.

**LTW425**
2-wire non-tripping loop tester that makes measurement close to the source of supply possible as it measure loop impedance down to 3 decimal places.

**Portable appliances testing**

A range of testers are offered for in-service inspection and testing of electrical equipment in accordance with the IEE code of practice. PAT4 series offer a sophisticated tester with on-board asset database for high speed testing while the PAT32 is a more manual tester.

Donald Mackie was a Scottish engineer who first put the measurement of Amps, Volts and Ohms together, inventing the AVOmeter multimeter. The first multimeter was manufactured by The Automatic Coil Winder Company (predecessor to AVO, later Megger) in 1923. By 1965, the company had already created over one million AVOmeters.
Watthour meter testing

Virtually all types of ANSI socket-mounted, panel-mounted and bottom-connected (3 or 4 wire) electricity meters can be tested with PHAZER instruments, while STATES Type FMS Semiflush-Mounted Test Switches provide a compact, versatile means to disconnect, test or measure devices and circuits in panelboards such as relays, metering, control circuits and other instrumentation applications.

PHAZER® (not CE marked)

Watthour meter test system
The PHAZER family of watthour meter test sets are true three-phase, fully automatic systems capable of testing virtually all types of ANSI socket-mounted and bottom-connected single- and three-phase (three and four wire) electricity meters.

The PHAZER family consists of specific models for testing socket-mounted meters and specific models for testing panel-mounted and bottom-connected meters. Offering state of the art optical sensing and a built-in automatic calibration routine.

STATES® switches

Test switches
Covers the complete area of panel connections from terminal block to knife switches. All products give long term connection quality and mechanical stability.

MA10 Portable watthour meter standards
The MA10 watthour standards are totally autoranging on the potential input, current input and auxiliary power input. The three summing current inputs can be used to perform closed link testing. Models with VARhour and Qhour capabilities are available for testing multi-function solid state meters.

You have a right to safety
EN61010 - 1 2001 is very specific about transient immunity. In the section on “Circuits or components used as transient overvoltage limited devices”, the standard specifies the performance of components and their applicable impulse withstand voltage.
Megger recommends that wherever possible, you should specify CAT IV instruments that keep you and your electrical instrumentation safe. In most cases, Megger has doubled the impulse withstand voltage from 4kV to 8kV. In addition nominal mains supply has increased from 300V to 600V for your protection.

CAT IV compliant instruments

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CATIV testing
PowerDB

Acceptance and Maintenance test data management software

A powerful software package that offers a revolutionary approach to managing electric utility and industrial electrical testing data. The software is designed from a ground-up approach, and is easily the most advanced package on the market. It employs over 160 industry standard test forms that have been developed and used by industry specialists during the last 20 years.

The software package provides data management for electric utility companies, electrical testing services acceptance jobs, or maintenance testing jobs. Data entry, storage and creating reports are all features of the software. In a single step, PowerDB is able to quickly create entire test documentation packages that include test reports, comment and deficiency summaries, table of contents and field service reports. In addition, users are able to use this flexible software to define data forms and customize them to different device types.

PowerDB's test forms are designed to be used with each of the following Centres:

- Batteries
- Cables
- Circuit Breakers
- Coordination Data
- Disconnects
- Generators
- Ground Fault Tests
- Instrument Transformers
- Power Transformers
- Insulation Fluids
- Loadbreak Switches
- Power Factor Tests
- Relays
- Switchboards
- Transfer Switches
- Watthour Meters
- Transducers

PowerDB is able to quickly create entire test documentation packages that include test reports, comment and deficiency summaries, table of contents and field service reports. In addition, users are able to use this flexible software to define data forms and customize them to different device types.

**Easier Management of Test Data**

This easy-to-operate software offers a straightforward approach to data management. The first basic step in creating this user-friendly package was to make test data entry screen and printed forms identical. Users will appreciate that what they see on the screen is what they will see in the printed version. PowerDB also simplifies testing and data management by allowing users to deliver reports electronically using e-mail, CD-ROM, web server and PDF files.

The software will also execute several tasks for the user, including calculations, temperature correction factors and charting. PowerDB helps predict possible equipment failure by trending previous results, which can be stored using PowerDB or imported from other software. This makes transitions from other software to PowerDB easy, and users can be prepared for possible problems with equipment.

The industry standard test form is not always what a company needs, and because of that, the PowerDB software allows the user to customize forms. With a drag and drop feature anyone, even those without database experience, can create a form simply by dragging and dropping in tables, text boxes, images, charts and more, to create a customized form. And, with VBScript, calculations can be defined, tables looked up, and it can even interact with other applications. One time definition of common items can be used to put logos, headers and footers on every page or in many multiple forms. One change will automatically update every data form the common item is used in.

There are three ways to document testing using the PowerDB software. First, the software can communicate directly with test and measurement equipment produced by Megger. This allows these products to enter the results electronically. Second, forms can be filled in using other applications including Megger's Advanced Visual Test Software, entering data into the fields using information stored in the other applications. Finally, data fields can be filled in using manual entry. This allows the user to enter the exact information that is desired.

**Built-in Report Flexibility**

PowerDB can create reports in one step, with customizable sorting of the order of test forms. Forms can be removed, and page numbering will be automatically adjusted. In a single print job, supplemental reports can also be printed at the same time as the primary report. The supplemental reports, including comment and deficiency summary reports, open up the data and information for all of the equipment tested on one job. Finally, all of the information can be generated for both the on-demand world using the optional PowerDB Web server. All of the user’s important information is published to the Web and can be accessed from anywhere in the world.

**Computerized Maintenance Management System Support**

Many electrical utilities and other company operations have invested in sophisticated CMMS systems, such as Digital Inspection's Cascade and MRO Software's MAXIMO. However, due to test instrument specific software packages and handwritten test results, these firms often struggle to get test data into their systems. One electric utility even referred to getting data into the CMMS as ‘feeding the monster’. PowerDB’s familiarity is ‘feeding the monster’.

PowerDB allows you to link easily with the CMMS system so that the system can pre-populate the PowerDB equipment database, send PowerDB all work orders, add forms based on the job plans, and even return the measurement points, obtained from a multitude of test sets, back to the CMMS system.

Furthermore, Megger will work directly with your CMMS personnel to integrate your data into your internal CMMS system.

**Simplifying the Compilation and Reporting Process**

The new PowerDB software package eliminates many common paperwork and recording problems. With the software, the number of man-hours devoted to preparing reports will be minimal. The user can customize the reports to be what a job requires but will not have to write the report, which is automatically generated by the software. Included in the reports are a table of contents, data sheets, as well as comment and deficiency summaries. PowerDB even comes with a built-in spell check.

Automatically generated professional reports mean that a testing company, for instance, is able to complete jobs faster and in a more efficient manner. PowerDB is well-suited for technicians who prefer to spend a minimum amount of time writing reports and want a more concise way to process data. Electronic records of test data can create a couple of different problems for companies and utilities. While many electronic records are hard to locate due to the vast amount of records kept on one system PowerDB makes it easier. By using its relational database it is much easier to find present and past records. And, because it has multiple safe guards, PowerDB prevents lost data. By saving documents that are in progress to multiple places, the problem of lost data is eliminated. PowerDB also synchronizes the date to several machines, meaning that a single crash does not create a costly loss of data.

### Asset Management System

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**Megger**

Test and measurement software

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Local in more places
Megger has technical support offices in 14 locations, and distributors in 170 countries. Call Megger today for help with your application problems.