

Power and industrial test equipment.

More than 20 new products

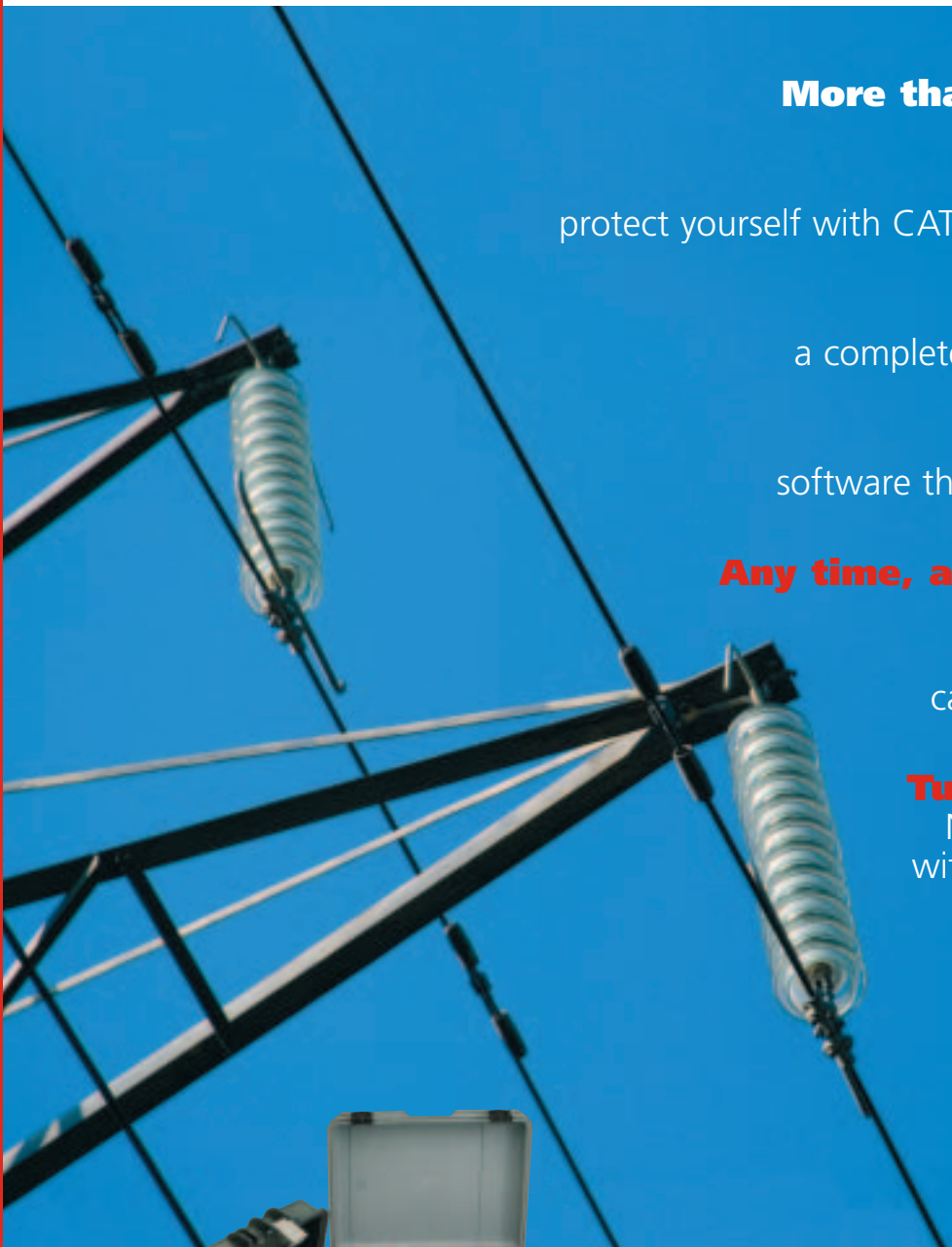
Safer working
protect yourself with CAT IV 5kV and 10kV testers

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



Megger

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The word 'Megger' is a registered trademark



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 measures ratio, phase deviation and excitation current. TTR300 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.

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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 34 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.

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Printed circuit boards are purpose designed by Megger. Components are supplied from reel-based automatic feeders

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

New

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 MIT520/2 can detect insulation deterioration earlier than other testers. Results storage and download give you full diagnostic information for later analysis. MIT520/2 can be powered using either mains or its on-board rechargeable battery, now with improved battery-life management.

MIT1020/2

New

10 kV diagnostic insulation resistance tester

MIT1020/2 gives you the ability to test insulation to 10 kV, giving greater flexibility, and also complies with IEEE43:2000. With CATIV safety and measuring up to 35 TΩ, it allows automatic IR, PI, DAR, SV and DD tests. Results storage and download give full diagnostic information for later analysis. MIT1020/2 can be powered using either mains or its on-board rechargeable battery with improved battery-life management.

MIT510/2

New

5 kV insulation resistance tester

With CATIV safety, MIT510/2 is an easy to operate insulation resistance tester that is very tough. Measuring up to 15 TΩ, it allows automatic IR. 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.

S1-552/2

New

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-chargeable battery, now with improved battery-life management.

S1-554/2

New

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-chargeable battery, now with improved battery-life management.

S1-1052/2

New

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 on-board re-chargeable battery with improved battery life management. S1-1050/2 has a CATIV safety rating.

S1-1054/2

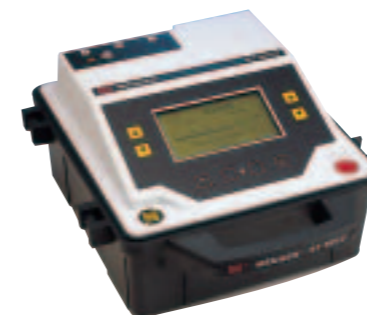
New

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 re-chargeable battery with improved battery-life management. S1-1054/2 offers 4 mA noise rejection and software noise filtering, and class leading performance.



A choice of 5 kV or 10 kV insulation resistance testers to suit needs and budgets.



S1-5010 is heavy duty and mains or battery powered

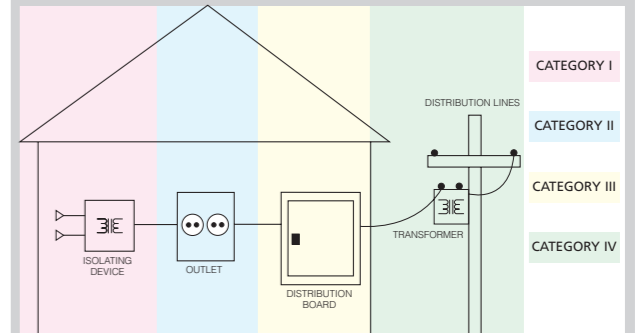
S1-5010 5 kV graphical insulation resistance tester

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.

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

Basic 5 kV 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.



BM15 is battery powered, and very easy to use

MJ15

Basic 5 kV insulation resistance tester

MJ15 offers a unique combination of hand-cranked generator and battery to give a "go / no go" tester with four test voltages and an analogue display. The MJ15 is a tough and easy to use and offers a test current of 1 mA and a maximum reading of 20 GΩ



MJ15 has an analogue display and offers hand crank or battery power

CATIII and CATIV hand held insulation testers

MIT200 series

Light-weight insulation and continuity tester

The MIT200 series are CATIII 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.

MIT300 series

Insulation resistance and continuity testers for electricians

Designed to be tough enough to soak up the treatment meted out to testers on site the MIT300 series offer CATIV 300 V safety with flexibility. The MIT300 comes in five 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.

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

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.

With functions such as TRMS voltage measurement, polarisation index (PI), dielectric absorption ratio (DAR), capacitance measurement and high insulation resistance ranges, makes the MIT400 is suitable for the testing required in manufacturing, panel building, railways, motors, cable inspection, street lighting, avionics as well as the electrical supply industry



MIT480 series

Insulation resistance and continuity testers for telecommunications

MIT480 series testers offer 50 and 100 V test voltages, ideal for the telecoms industry. They all provide CATIV 600 V safety. MIT480 series also offers frequency, capacitance and distance by capacitance functions and a 75 V live circuit inhibit feature to match the special needs of telecoms engineers.

MIT480 series is a true diagnostic instrument measuring insulation resistance up to 200 GΩ. They measure insulation deterioration long before most testers even offer a reading.

MIT40X

Insulation resistance and continuity testers for special applications

Based on the class leading MIT400 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.

	Light-weight insulation and continuity testers				Electrician's insulation and continuity testers				Industrial maintenance insulation and continuity testers				Telecommunications insulation and continuity testers				
	MIT200	MIT210	MIT220	MIT230	MIT300	MIT310	MIT310A	MIT320	MIT330	MIT400	MIT410	MIT420	MIT430	MIT40X	MIT480	MIT481	MIT485
1000 V insulation test																	
500 V insulation test																	
250 V insulation test																	
50 V and 100 V insulation test																	
10 V to 100 V in 1 V steps																	
Resistance to	1000 MΩ	1000 MΩ	1000 MΩ	1000 MΩ	1000 MΩ	1000 MΩ	1000 MΩ	1000 MΩ	1000 MΩ	20 GΩ	100 GΩ	200 GΩ	200 GΩ	20 GΩ	100 GΩ	200 GΩ	200 GΩ
Continuity 0.01 to 200 Ω																	
Continuity 0.01 to 100 Ω																	
Live circuit warning	25 V	25 V	25 V	25 V	25 V	25 V	25 V	25 V	25 V	50 V	50 V	50 V	50 V	50 V	75 V	75 V	75 V
Polarization Index PI																	
Dielectric absorption rate DAR																	
Frequency measurement										40-400 Hz	40-400 Hz	40-400 Hz			40-400 Hz	40-400 Hz	
Capacitance measurement																	
Capacitance by distance																	
Data storage																	
USB downloading																	
Bluetooth downloading																	
Safety	CATIII 600 V	CATIII 600 V	CATIII 600 V	CATIII 600 V	CATIV 300 V	CATIV 300 V	CATIV 300 V	CATIV 300 V	CATIV 300 V	CATIV 600 V	CATIV 600 V	CATIV 600 V	CATIV 600 V	CATIV 600 V	CATIV 600 V	CATIV 600 V	CATIV 600 V
FREE calibration certificate																	

5 kV and 10 kV insulation tester guide

Insulation resistance testing											
Model		BM15	MJ15	MIT510	MIT520	S1-552	S1-554	MIT1020	S1-1052	S1-1054	S1-5010
Display	Graphical										
	Analogue	■	■								
Power Supply	Analogue/Digital										
	Mains power			■	■	■	■	■	■	■	■
	Rechargeable	□	□	■	■	■	■	■	■	■	■
Test Voltage	Hand crank		■								
	Dry cell	■	■								
	10.0 kV			■	■	■	■	■	■	■	■
	5.0 kV	■	■	■	■	■	■	■	■	■	■
Measurements	2.5 kV	■	■	■	■	■	■	■	■	■	■
	1.0 kV	■	■	■	■	■	■	■	■	■	■
	500 V	■	■	■	■	■	■	■	■	■	■
	250 V			■	■	■	■	■	■	■	■
	25 V steps 50 V to 5 kV					■	■	■	■	■	■
	10 V steps 50 V to 1 kV then 25 V steps 1 kV to max test voltage							■	■	■	■
	Max reading	20 GΩ	20 GΩ	15 GΩ	15 TΩ	15 TΩ	15 TΩ	35 TΩ	35 TΩ	35 TΩ	5 TΩ
Min reading	100 kΩ	100 kΩ	10 kΩ	10 kΩ	10 kΩ	10 kΩ	10 kΩ	10 kΩ	10 kΩ	10 kΩ	
Test Types	Voltage	■	■	■	■	■	■	■	■	■	■
	Capacitance			■	■	■	■	■	■	■	■
	Leakage current			■	■	■	■	■	■	■	■
	Polarisation Index			■	■	■	■	■	■	■	■
Other Features	Dielectric absorption ratio			■	■	■	■	■	■	■	■
	Step Voltage			■	■	■	■	■	■	■	■
	Dielectric Discharge			■	■	■	■	■	■	■	■
	Timer control			■	■	■	■	■	■	■	■
Software	Timer display			■	■	■	■	■	■	■	■
	4 mA max noise rejection							■	■	■	■
	2 mA max noise rejection							■	■	■	■
	5 mA test current							■	■	■	■
	3 mA test current			■	■	■	■	■	■	■	■
	2 mA test current							■	■	■	■
	1 mA test current	■	■								
	USB output							■	■	■	■
	RS232 output							■	■	■	■
	RS232 control							■	■	■	■
PowerDB lite				■	■	■	■	■	■	■	
PowerDB full version				□	□	□	□	□	□	□	

■ feature □ option

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.



220000 series has advanced performance with long-term reliability provided by filtered half-wave rectification

High voltage test equipment					
Model	d.c. test sets	d.c. output		a.c. output	
		Continuous	Short circuit	Continuous	Short circuit
220005	5 kV	5 mA	5 mA		
220015	15 kV	2 mA	5 mA		
220070	70 kV	3.5 mA	5 mA		
220123	120 kV	2.5 mA	5 mA		
220164	160 kV	2 mA	5 mA		
a.c. test sets					
230315				3 kV	12 mA
230415				4 kV	12 mA
230425	5 kV	-	17 mA	4 kV	12.6 mA
686100		Non-resonant		50/100 kV	80/150 mA
681100		Resonant		50/100 kV	80/150 mA
686100		Non-resonant		50/100 kV	40/75 mA
681100		Resonant		50/100 kV	40/75 mA

Tan delta

Delta 2000

10 kV fully automated capacitance and tanδ 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

Capacitance dissipation factor and tan delta

Delta 3000

New

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.

670000 series

2.5 and 12 kV semi-automatic capacitance and tanδ test bridge

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

670000 comes complete with interference suppression circuits for testing in high-voltage switchyards, automatic balancing of dissipation factor, and direct readout of capacitance, dissipation factor and watts dissipated



CB100

Low voltage capacitance and tanδ 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.

CB100 lets you read capacitance and dissipation factor directly from the instrument – no calculation required



Model	Insulation testing					
	Delta 3000	Delta 2000	CB100	670025	670065	670070
Output voltage	12 kV	12 kV	28 V	2.5 kV	12 kV	12 kV
Capacitance measuring range in µF	0-0.11 or 0-1 with inductor	0-0.11 or 0-1 with inductor	0-1.2	0-0.22	0-0.22	0-0.22 or 0-1 with inductor
Dissipation factor	0-90%	0-90%	0-30%	0-200%	0-200%	0-200%
UST test	■	■	■	■	■	■
GST test	■	■	■	■	■	■
GST guarded test	■	■	■	■	■	■
Watts loss measurement	■	■	■	■	■	■
Current measurement	■	■	■	■	■	■
Range extension	■	■	■	■	■	■
Interference suppression	Automatic	Automatic	Inherent	Manual	Manual	Manual
Balancing	Automatic	Automatic	Manual	Manual	Manual	Manual
Data storage	■	■	■	■	■	■
Bar code reader	■	■	■	■	■	■
Comlink PC software	■	■	■	■	■	■
RS232 printer output	■	■	■	■	■	■
PowerDB Onboard	■	■	■	■	■	■
USB communications	■	■	■	■	■	■

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 safest to specify a power quality instrument that can make measurement of frequency, flicker, dip/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 power 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 particular applications and requirements. Some examples include: Power quality studies, harmonics analysis, power factor and energy consultation, tolerance curve studies (CBEMA/ITIC, SEMI F47, User Defined), auto data analysis pass/fail reports, EN50160 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.

SLM8 (not CE marked)

8 channel recording volt-ammeter

The SLM8 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 RS232 data port allows bi-directional communication.

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



PA9 Wireless

New

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,



power, energy, events, flicker (PST/PLT), THD, TDD, individual harmonics, and frequency. Operating in real-time, it graphically displays harmonic content, power and source direction. It has remote communications and alarm capabilities. PA9 wireless includes enhanced MEGPA9IEC software.

PA9 Wireless Starter Kit, shown here, includes 4 voltage cables and 3 raintight CTs.

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, IEEE519).

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.



On-site trending, analysis and data retrieval without a computer and intelligent downloading

Power Quality		PA9+	PA9+ wireless
Model			
Voltage range	20 V to 600 V ac or dc True RMS through 63rd harmonic	■	■
Crest factor	1500 V peak Current 1.4 of full scale at peak Resolution 0.1% of full scale	■	■
Current	Accuracy ± 0.25% of reading ± 0.05% of range	■	■
Voltage/Current connection	V = 4 colour coded pairs of safety banana jacks I = 5 Amp miniature circular connector Power provided for flexible CTs	■	■
Frequency	Fundamental 20 Hz to 70 Hz autoranging	■	■
Power from phase A	90 V to 600 V ac, 100 V to 600 V dc	■	■
Trigger events	RMS level current or voltage Transient level current or voltage Harmonic content current or voltage	■	■
Communications	RS232 Compact flash card Wireless modem Wired modem	■ ■ ■ □	■ ■ ■ □

■ feature □ option

Automatic protection test

now with 'Click-on-Fault', GPS and current adaptor options!

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 Protective 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 easy set up of multi-state dynamic tests that are normally associated with trip and reclosing schemes. 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 analogue output 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.

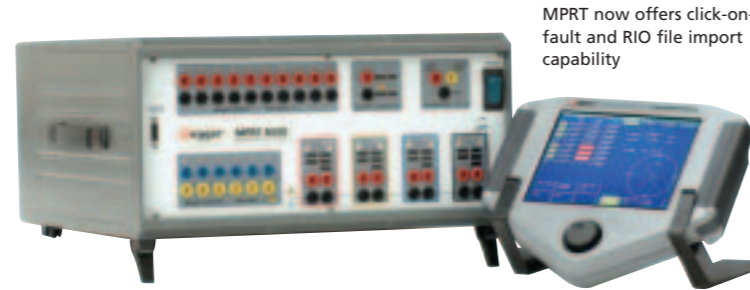
Test Results Import – allows you to read other test set result files and import them into the AVTS database.

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



MGTR is a portable GPS system designed to enable end-to-end tests



MPRT now offers click-on-fault and RIO file import capability

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 (TouchView 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-Gens, the system can deliver up to four voltages and four currents or with convertible voltage 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.

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 milliamps 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 7.5 mA up to 0.20 A

New

Automatic protection test

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 down time.

AVTS packages have a powerful graphical interface that is developed and continuously upgraded by Megger to simplify fully automatic and complex relay testing. It is designed to meet the existing and future needs of protection technicians and engineers worldwide, helping to improve efficiency and reduce testing errors.



AVTS can display the voltage and current output waveforms in time sequence with the binary inputs and outputs.

K500

Protective relay tool kit

A comprehensive range of relay tools containing over 40 specific items. The whole kit is supplied in either a lightweight soft case or a tough lockable vinyl case.



MPRT relay test set with touch view interface makes it easy to perform manual and semi-automatic relay testing

Automatic protection test		
Model	MPRT8415	MPRT8430
Input voltage	90 to 264 Vac, 50/60 Hz	
Battery simulator	d.c. output voltages of 24 V	
	d.c. output voltages of 48 V	
	d.c. output voltages of 125 V	
	d.c. output voltages of 250 V	
Power output	Max phase output at 150 VA per phase	150 Volts rms
	Max phase output at 200 VA per phase	15 Amps
a.c. Voltage amplitude	Accuracy ± 0.05% typical, 0.1% guaranteed	300 Volts rms
	Resolution: .001/0.01	30 Amps
a.c. Current amplitude	Measurements: true RMS	
	Accuracy: ±0.05% typical, 0.1% or ±20 mA, whichever is greater, guaranteed	
d.c. Voltage amplitude	Resolution: .001/0.01	
	Measurements: True RMS	
d.c. Current amplitude	Accuracy: ±0.1% typical, 0.25% or ±20 mA, whichever is greater, guaranteed	
	Resolution: .0001/0.001	
Convertible source in a.c. Current mode	Measurements: True RMS	
	Accuracy: ±0.05% typical, 0.1% or ±12.5 mA, whichever is greater, guaranteed	
Phase Angle	Resolution: .0001	
	Measurements: True RMS	
Safety, EMC, RFI, ESD conformance	Ranges 0.01 to 359.99 degrees, counter clockwise, or Clockwise rotation, or ±0.01 to ±180.00 degrees	
	Accuracy: ± 0.02° typical ± 0.25° at 50/60 Hz max	
Weight	IEC 61010-1, Amendments 1 and 2, EN 50081-2, EN 50082-2, EN 61000-3-2, 61000-3-3, IEC 61000-4-2/3/4/5/6/8/11.	
	18.9 kg	
GPS unit	MGTR GPS timing reference for synchronized end-to-end testing	
Low current adaptor	maximum of three currents 10 to 200 milliamps each phase	

■ feature □ option

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

PCITS2000/P enables you to test relay protection systems and their current transformers together. It has a built-in timer to record protection relay operation



These tough self-contained test sets are designed for operation by one person and are comparatively light. With a separate hand-held controller connected by an expandable cable it allows the operator to work close to a protective relay while controlling a test.

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.

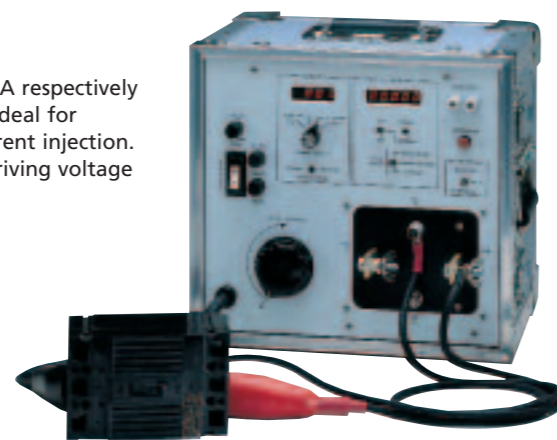


DDA-1600 is a digital data acquisition system. It has a modular, portable design, has variable pulse time and firing-angle output current control, and can test a wide range of breakers

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 commissioning applications requiring high current injection. The CB current injection sets offer adequate driving voltage for all but the highest circuit impedance.



CB-832 tests thermal, magnetic or solid-state motor overload relays; moulded-case circuit breakers; and ground-fault trip devices

		Protection testing									
Model		CB832	PCITS2000/2	CB845	MS2	DDA1600	DDA3000	DDA6000	SCITS100	SCITS120	SR98
Output current	In Amps	0 - 1800	0 - 2000	0 - 5000	0 - 240	0 - 19200	0 - 35000	0 - 50000	0 - 100	0 - 120	0 - 115
	Number of ranges	3	2	4					3	4	4
Voltage output	V a.c.		0 - 250						0 - 120	0 - 240	0 - 300
	V d.c.								0 - 240	0 - 240	0 - 240
Power	In VA	1750		7200					2400	700	920
	Period in S	0 - 999.99	0 - 600	0 - 999.99	0 - 999.99	0 - 99999	0 - 99999	0 - 99999	0 - 599.99	0 - 999.99	0 - 9999.99
Time	Resolution in S	0.001	0.01	0.001	0.001	0.0001	0.0001	0.0001	0.01	0.001	0.0001
	Cycles	0 - 99999		0 - 99999	0 - 99999	0 - 99999	0 - 99999	0 - 99999		0 - 99999	0 - 99999.9

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.

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.



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.



MS2 is capable of delivering 750 A instantaneously. It is ideal for over-current and earth fault relays and moulded case circuit breakers.

SITS120

Lighter weight current and voltage injection sets

A lighter weight option, this tough test set is suitable for general purpose relay testing.

A wide range of relays can be tested due to the flexibility of its operating system. Current and voltage on the output terminals are measured and displayed. An accurate timer measures the relay operating time.

Automatic protection testing				
Relay type	IEEE no.	SCITS100/2	SITS120	SR98
Time delay	2	■	■	■
Impedance	21			■
Volts per hertz	24			■
Synchronising	25			■
Directional power	32			■
Loss of excitation	40			■
Negative sequence over-current	46			■
Negative sequence under-voltage	47			■
Instantaneous over-current	50	■	■	■
Over-current	51	■	■	■
Moulded case breaker	52		■	■
Over-voltage	59		■	■
Directional over-current	67			■
Reclosing	79			■
Frequency	81			■
Differential	87			■**
Tripping	94			■
Auto synchronising	25A			■
Voltage controlled over-current	27 / 51	■	■	■
Under / over voltage	27 / 59		■	■
d.c. under / over current	37 / 76			■
Motor overload	51 / 86	■	■	■
Ground directional over-current	67N			■

**Two units required



Customer service teams at every Megger location are there to help you select the right product for your application

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

New

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:

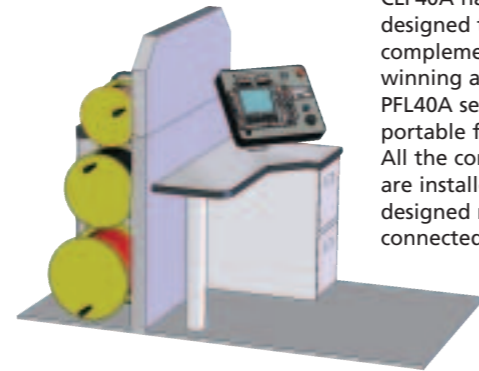
- Time Domain Reflectometry
- Digital Arc Reflection
- Surge Pulse Reflection
- Differential Arc Reflection



PFL20M is easily manoeuvred because of its compact design and large wheels

Van mountable cable fault locator

New



CLF40A has been designed to complement the award winning and successful PFL40A series of portable fault locators. All the control functions are installed in a newly designed remote panel, connected to the HV

unit by a flexible umbilical cable. This configuration lends itself to installation into a suitable vehicle by you, your designated contractor or by Megger. Every installation is different, and we show some options to you here. Ask to see our fully equipped demonstration vehicle that shows PFL40A in action. Megger offers a full installation and fitting service throughout Europe.

Email us at CFL@Megger.com for more details.



Cable fault location systems				
	PFL40A	PFL20A	PFL20M	CLF40A
Surge range	4kV / 8kV / 16kV / 34kV	■	■	■
	4kV / 8kV / 16kV	■	■	■
	16kV	■	■	■
Voltage output	40kV	■	■	■
	20kV	■	■	■
Joules	1500J	■	■	■
	2000J	■	■	■
Transit	Van mount	■	■	■
	Wheeled	■	■	■

PFL Series Cable Fault Locators

New

The standard system comes as a mobile, compact unit to meet your local requirements. All systems offer the facility to undertake cable testing.

- Cable and fault diagnosis
- Prelocation of cable faults
- Fault conditioning
- Pinpointing locating using acoustic methods



Models PFL40-1500 and 2000

Features include: DC testing to 40 kV

Each instrument uses DC testing to prove the integrity and confirm fault conditions in cable networks with a test voltage up to 40 kV and a current of 25 mA.

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 under test 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.

A.R.M.

Although not widely thought of as a fault condition method, the A.R.M. mode can be used in pinpointing faults.

Acoustic pinpoint fault location

Accurate acoustic pinpoint location of faults is achieved with the powerful 8/16/34 kV (4 kV is optional) surge generator (thumper), which comes in either 1500 Joules or 2000 Joules configurations.

Additional accuracy can be achieved by using the Megger MPP1001 or 1002 acoustic and electromagnetic pinpointer which easily and accurately shows the direction and distance to a fault.



ARC screen



Report screen

PFL40 features a large, colour screen and intuitive software which assists you in accurately tracing and locating cable faults.

Included accessories

Each PFL40 unit comes complete with:

- High voltage shielded output cable (15 m)
- Supply cable (7.6 m)
- Flexible ground cable (15 m)
- Ground rod
- Interlock shorting plug
- Cable bag and instruction manual

Stand-alone and rack-mounted cable reel assemblies also available.



Time domain reflectometers

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 CATIII 300 V phase-to-earth.



It takes less time to train users on TDR1000/P, as each key has a dedicated function, such as cursor left and right, velocity factor, range etc.

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 pin-point 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 two-channel TDR. capable of identifying and locating faults on metallic cables. The TDR2000P is suitable for use on dead or live cables without a blocking filter, up to CATIII 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.



TDR2000/2P can identify and locate a wide range of faults on metallic cables from a few metres to 20 km depending on cable type

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 MTDR has a range of up to 30 km.



New

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



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

DETEX®

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 Voltage detectors are available in seven models that cover a range from distribution class to transmission line voltages up to 550 kV



MPP1000

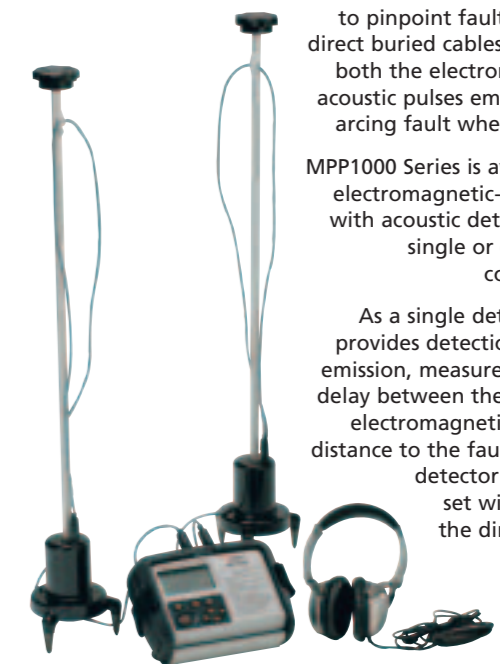
Cable Fault Pinpointer

MPP1000 series locators 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.

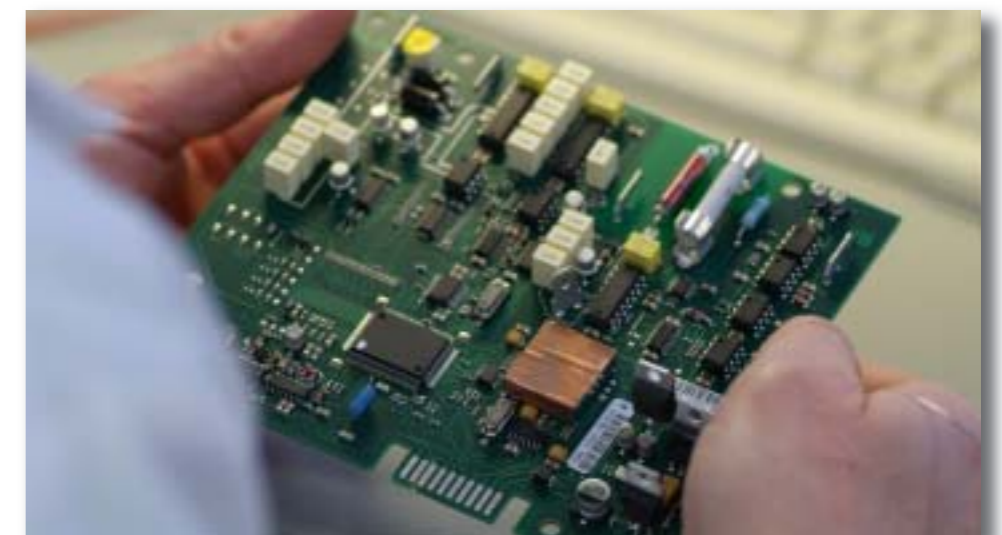
MPP1000 Series is available as an electromagnetic-only detector with acoustic detector, or with single or dual detector configurations.

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.



The MPP1000 is the accurate way to pin-point a fault on buried cables



Megger designs and lays out its own printed circuit boards. That way, quality can be built into your tester from the earliest moment

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.

Also included are a number of new communication technologies, providing a near seamless interface between the instrument and optional peripheral equipment, such as an "in-lid" USB full-sheet (A4 or letter) thermal-paper printer, USB flash drive, and external PC (via Ethernet port). For advanced users, a USB router can be connected to the instrument to provide simultaneous access to other equipment, such as a mouse or a keyboard. Storage space is provided by either the internal flash memory or external USB flash drive - sufficient to save literally tens of thousands of test data sets.

Reduced training time

A common user interface reduces the training time needed to understand the different instruments that a busy test engineer has to use. New instruments with PowerDB OnBoard such as TTR330 are truly forms-based, have a large 8.4" full-VGA bright colour display, and let you set up and control the instruments through on-screen test form views. On-screen test forms are exact replicas of the test forms which are printed as a permanent test form record once testing is complete. They are secure reports and generated directly from instrument so no human interface is needed.

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.

TTR25 is designed to operate in tough environments. It is extra rugged, with a high impact, shock resistant case, yet incredibly lightweight at a mere 870 g



With a turn ratio of 20,000:1, the TTR100 offers the highest turns ratio accuracy in the industry of 0.1%. The TTR100 features special software capabilities

TTR100 Hand-held transformer tester

Fully three-phase capable, TTR100 is the low cost solution for three-phase transformer testing. The lightest and most portable TTR test set available, it offers a full set of tests including; transformer turns ratio, excitation current, phase angle deviation, winding resistance and transformer polarity, the results can be stored on board for later downloading.

TTR300 series three-phase transformer turns ratio test sets are designed to measure the turns ratio of power, instrument, and distribution transformers in a substation or manufacturing environment. A rugged design makes the instruments well suited for use in a variety of harsh environments. TTR300 series testers are ideal for use by power transformer manufacturers. Their unique testing procedures and storage capability allows you to set up and test difficult three phase transformers (with multiple tap changers and bushing CTs) in a fraction of the time than it used to take. Tests include a pass/fail limit of individual ratios and measuring the phase deviation of the transformer primary versus secondary. This quickly indicates problems in the transformer such as partial shorted turns and core faults. This measurement is useful in verifying phase errors in all types of PTs and CTs. Each unit comes equipped with a remote-control switch for single person testing. This allows the operator to test transformers with LTCs very quickly.

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 upgradeable 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 fully automatic operation (either stand-alone or remote-control), is field upgradeable to a TTR330 or TTR320 without compromise to calibration and built-in capability for storing test results into internal memory in an open data format for direct input into Excel® or XML format via PowerDB LITE.

See page 37 for more information on PowerDB.

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 fully 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 fully 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.



TTR330 has PowerDB for rapid report generation

Transformer turns ratio testers							
	TTR25	TTR100	TTR550005	TTR300	TTR310	TTR320	TTR330
Turns ratio range	0.8 to 20,000	0.8 to 20,000	0.001 to 129.999	0.8 to 45,000	0.8 to 45,000	0.8 to 45,000	0.8 to 45,000
Excitation voltage	0.5 V, 1.5 V and 8 V	1.5 V and 8 V	8 V	8 V, 40 V, and 80 V	8 V, 40 V, and 80 V	8 V, 40 V, and 80 V	8 V, 40 V, and 80 V
Excitation current	0 -100 mA	0 -100 mA	0 -1 A	0 to 500 mA	0 to 500 mA	0 to 500 mA	0 to 500 mA
Single phase test	■	■	■	■	■	■	■
Automatic three phase test	■	■	■	■	■	■	■
Display Type	128 x 64 LCD	128 x 64 LCD	Analogue		5.7" mono	5.7" colour VGA	8.4" colour VGA
On-screen view	Text	Text			Text	Graphical icons	Test forms
Remote PC control				RS-232	RS-232	Ethernet	Ethernet
User defined settings		■		■	■	■	■
Display % error		■		■	■	■	■
Power DB Onboard							■
Keypad	7 key	19 key			16 key	Full QWERTY	Full QWERTY
Internal storage		200 datasets			200 datasets	10,000 datasets	10,000 datasets
Printer interface	RS-232	RS-232			RS-232	RS-232	USB
Software COMLINK	■	■	■				
PowerDB LITE				■	■	■	■
Power source	6 x AA	NiMH	Hand -cranked	120/230 V a.c.	120/230 V a.c.	120/230 V a.c.	120/230 V a.c.
Weight	1.5 kg	1.5 kg	7.3 kg	9.1 kg	10.4 kg	11.3 kg	11.3 kg

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.



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



MCTT-10 performs saturation and ratio tests on CTs using the voltage-comparison method

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.



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

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.

Current transformers can be tested in their equipment configuration, such as being mounted in transformers, oil circuit breakers or switchgear. However it is necessary for the equipment to be totally isolated from the electrical system prior to testing.

Transformer testing

MCT1600

New

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.



MCT1600 has a manual voltage output control knob. The user can perform any test required manually if only a spot check is needed.

MTO320

New

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.

The high contrast bright 5.7" full VGA colour display can be clearly read in direct sunlight. The graphical user interface allows automated setup and control through easy-to-read icon based screens. The full QWERTY keyboard speeds the entering of information such as nameplate-type data.

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.

MTO210

New

Transformer ohmmeter

MTO210 is a line-operated, field-portable instrument designed specifically to measure the d.c. resistance of all types of magnetic windings safely and accurately. It is mainly used all types of transformer windings but can also test rotating machine windings and perform low-current resistance measurements on connections, contacts and control circuits.

Three features combine to make this instrument unique

- dual measurement
- load tap-changer testing
- safety shutdown

The dual set of potential inputs measure the resistance of the primary and secondary windings of a single- or three-phase transformer simultaneously speeding up the measurement.

To achieve a tenfold improvement in reading time, a balancing current is applied to the secondary to attenuate the circulating current induced when the test current is applied to the primary winding.

When testing the windings and contact resistance on tap-changers with make-before-break contacts and voltage regulators, the internal shutdown circuit of MTO210, which will be triggered by a voltage kickback of a few microseconds if the tap-changer contacts are opened, can be used to check for pitted or misaligned contacts as the instrument will shut down if either condition occurs.

Users are protected by the shutdown circuit safety feature: any inadvertent disconnection of a test lead or loss of power to the instrument will safely discharge the energy stored in the test sample.

Transformer Ohmmeter and Current Transformer

Model		MTO210	MTO330	MCT1600
Instrument type	Transformer Ohmmeter	■	■	
	Current Transformer test set			■
Accuracy	+/-0.25% +0.25% of FS	■	■	
Test voltage	50V	■	■	
	Pre-test polarization check	■	■	
	Demag after test	■	■	
Lead lengths	20 metres (66 feet)	■	■	
Printer paper width	10cm (4 inches)	■	■	
	Field upgradable firmware	■	■	
Output range	Variable 5 mA - 10 A (dc)	■	■	
	Open-circuit test voltage: 50 V dc	■	■	
	Rating: Continuous use on all ranges	■	■	
Display	8.4 in (210 mm) full colour VGA	■	■	

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, international test specifications are pre-programmed, making it easy to use.



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

OTS60SX Manual testing

Lightweight semi-automatic 60 kV oil dielectric strength test set which is simple to use and can be powered from a range of mains supplies.

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.

OTS60PB Portable automatic testing

The smallest lightest fully automatic portable oil test set available with test voltage up to 60 kV. Internal rechargeable battery for operation in remote locations. Optional printer and fully programmed international test sequences.

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.

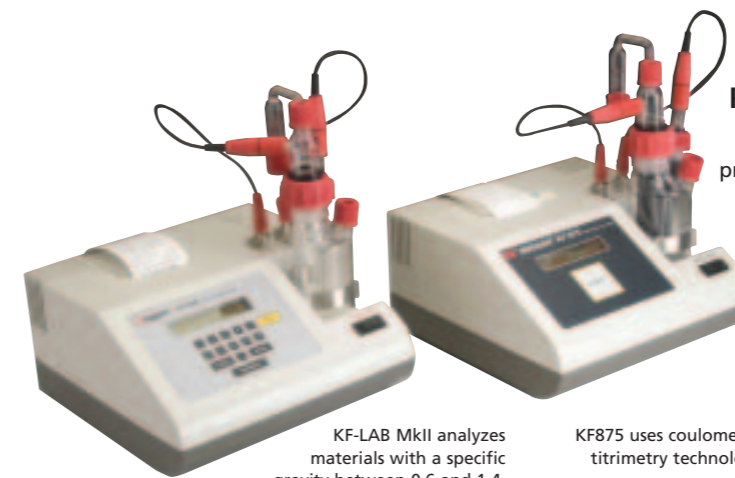
VCM100 Calibration meter

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

Transformer insulating oil dielectric strength testing					
Model	OTS100AF/2	OTS80AF/2	OTS60AF/2	OTS60PB	OTS60SX
Test voltage	100 kV	80 kV	60 kV	60 kV	60 kV
Function	Automatic	Automatic	Automatic	Automatic	Semi-automatic
Power supply	Mains	Mains	Mains	Rechargeable battery	Mains
Weight	40 kg	40 kg	40 kg	19 kg	17.5 kg

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

KF875 uses coulometric titrimetry technology

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.

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.

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 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 $\mu\Omega$, 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.



DLRO600 measures resistances between 0.1 Ω and 1 Ω , at high currents. It can provide test currents from 10 amps up to 600 amps subject to the load resistance and supply voltage. It is ideal for testing busbars



A large liquid crystal display provides all the information needed to perform a test; all test parameters and measurement results are displayed

DLRO200

200 A low resistance ohmmeter

Provides the operator with high resolution, 0.1 $\mu\Omega$, 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.

Low resistance measurement					
Model	DLRO600	DLRO200	DLRO10X	DLRO10	BT51
Measurement ranges	0.1 $\mu\Omega$ to 999.9 m Ω auto ranging	0.1 $\mu\Omega$ to 999.9 m Ω auto ranging	1.9999 m Ω 19.999 m Ω 199.99 m Ω 1.9999 Ω 19.999 Ω 199.99 Ω 1999.9 Ω	1.9999 m Ω 19.999 m Ω 199.99 m Ω 1.9999 Ω 19.999 Ω 199.99 Ω 1999.9 Ω	20.00 m Ω 2000 m Ω
Resolution	0.1 $\mu\Omega$	0.1 $\mu\Omega$	0.1 $\mu\Omega$	0.1 $\mu\Omega$	10 $\mu\Omega$
Accuracy	<1%	<1%	$\pm 0.2\%$	$\pm 0.2\%$	$\pm 1\%$
Current test range	10 A - 600 A	10 A - 200 A	0.1 mA - 10 A	0.1 mA - 10 A	2.0 A
Results storage	300	300	700		
RS232	■	■	■		
Power source	Mains Rechargeable battery	■	■	■	■
Weight excluding leads	14.5 kg	14.5 kg	2.6 kg	2.6 kg	4.5 kg

Low resistance testing

DLRO10X 10 A resistance ohmmeter with test results storage and downloading

The DLRO10X offers a 0.1 $\mu\Omega$ resolution with a maximum capability of 2 k Ω . Fast testing ability means users can achieve results in less than 3 seconds. At only 2.5 kg it is the smallest, lightest and most sophisticated 10 A low resistance ohmmeter available making it. Ideal for jobs like rail bond testing.

The DLRO10X has the capability of measuring inductive loads such as transformers and motor winding. Availability of readings can vary from a few seconds up to minutes depending on the inductance and resistance of the test item.

The DLRO10X adds on-board memory, RS232 download capability, maximum setting and manual or automatic range control to the features of the DLRO10. Uses easily interchangeable batteries.



DLRO 10X has real-time download of results and on-board storage for later download to a PC

DLRO10 10 A low resistance ohmmeter

The DLRO10 offers a 0.1 $\mu\Omega$ resolution with a maximum capability of 2 k Ω . Fast testing ability means users can achieve results in less than 3 seconds. At only 2.5 kg they are the smallest, lightest and simplest-to-use 10 A low resistance ohmmeter available. Uses easily interchangeable batteries.



DLRO10 has bright 4 1/2 digit LED display making it easy to read under all lighting conditions

BT51

2 A low resistance ohmmeter

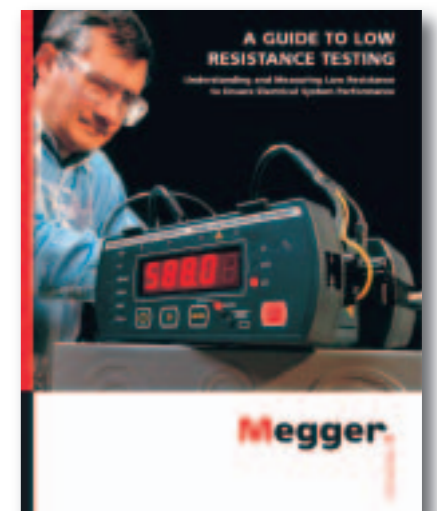
Low resistance ohmmeter ideally suited for bond testing applications, i.e. aircraft frames, electronic discharge and fuel tanks. Four terminal method of measurement ranges 0-20.00m Ω and 0-2000m Ω . High test current of 2A.



Why test for resistance?

Low resistance measurements are required to prevent long term damage to existing equipment and to minimize energy wasted as heat. They indicate any restrictions in current flow that might prevent a machine from generating its full power or allow insufficient current to flow to activate protective devices in the case of a fault. Periodic tests are made to evaluate an initial condition or to identify unexpected changes in the measured values, and the trending of this data helps indicate and may forecast possible failure conditions. Excessive changes in measured values point to the need for corrective action to prevent a major failure.

Ask for the free Megger guide to low resistance testing. This 32 page comprehensive guide is written in a clear, easy to read style. The booklet comprehensively covers both theory and practise. It has chapters on how to measure low resistance, choosing a low resistance tester, and evaluation and interpretation of results



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 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

BITE3 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, BITE3 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.



BITE3 determines the health of lead-acid cells up to 2000 Ah by taking measurements of the most important battery parameters



BITE3 with ProActiv software offer a comprehensive data analysis system to provide reliable evaluation of batteries in the d.c. network. The analysis helps you avoid battery failures, budget for future battery string and cell replacements, and plan battery changeouts in an orderly manner

Battery testing		
Model	BITE3	BITE2P
For batteries of capacity	2000 Ah	7000 Ah
d.c. voltage range	0 - 30 V	0 - 25 V
d.c. voltage resolution	1 mV	1 mV
Impedance range	0 - 100 mΩ	0 - 100 mΩ
Impedance resolution	1 μΩ	1 μΩ
Weight	2.6 kg	14.5 kg

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 cabinetised UPS batteries, railway substations, signal and communications installations.



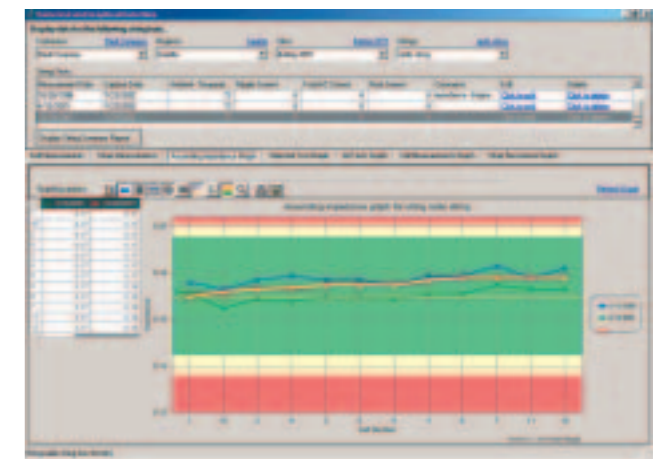
BITE 2P Battery Impedance Test Equipment determines the condition of lead-acid and nickel-cadmium cells up to 7000 Ah

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 standard 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.



Proactiv uses a standard MS Access database format. It allows users to organise and manage battery data such as voltages, impedance, intercell connection resistance, ripple current, specific gravity, IR thermographs and more

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.



The Battery Ground-Fault Tracer is an economical, manually-balanced instrument that identifies, tracks and locates ground faults in ungrounded d.c. battery systems - on-line. It is particularly effective in a high electrical noise environments, as the strength of the test current can be adjusted

BGL (not CE marked) Battery earth fault trace

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.



BGL simplifies fault tracing by identifying fault characteristic (resistive and capacitive) magnitudes

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 substation 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.



DET2/2 has excellent noise filtering and is ideal for big earth systems

DCM300E Earth leakage clamp

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



DCM300E was designed with safety in mind. It exceeds the requirements of IEC1010-2-32

Earth resistance testing		DET2/2
Feature		
Earth test technique	2-pole resistance measurement a.c.	■
	3-pole earth measurement a.c.	■
	4-pole earth measurement a.c.	■
Warnings or indicators	Noise interference	■
	P spike resistance high	■
	C spike resistance high	■
Outputs	Adjustable frequency 105 –160 Hz	■
	0.5 Hz steps	■
Displays	Max resolution 0.001 Ω high accuracy	■
Noise rejection	40 V peak to peak	■
Power supply	Battery status indicator	■
	Charge from vehicle battery	■
Case	Weather and dust proof to IP54	■
	Operation instructions on lid	■

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



Everything you need for earth ground testing, including a tough moulded polyethylene case

Variable test frequency keeps noise down, reliability up.

DET3 and DET4

New

Earth ground testers

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

DET3TA is a three pole testing solution for users who prefer an analogue instrument

DET3TC, when used with the optional ICLAMP allows fall of potential testing using the ART technique without needing to disconnect the electrode under 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

DET4TR2 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 a four pole tester with extended resistance range and variable test frequency. Use it for ART testing, two or three pole testing, four pole resistivity testing and stakeless testing.

DET4TCR2 is similar to DET4TC2, 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.



DET4TC2 comes as a bare tester or in a full kit

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

Earth ground testers		DET3TD	DET3TA	DET3TC	DET4TD2	DET4TR2	DET4TC2	DET4TCR2	DET10C	DET20C
Description										
Stakeless testing									■	■
Stakeless testing with optional test clamps										
ART (Attached Rod Technique) with optional clamp			■				■	■		
Selectable test frequency							■	■		
Earth voltage range 0 to 100V		■	■	■	■	■	■	■		
2-wire testing		■	■	■	■	■	■	■		
3-wire testing		■	■	■	■	■	■	■		
4-wire testing		■	■	■	■	■	■	■		
Dry cell batteries		■	■	■	■	■	■	■	■	■
Rechargeable batteries						■				
Backlit display							■	■		
Digital display		■		■	■	■	■	■	■	■
Analogue display			■							
Test results storage									■	■
Downloadable test results storage										■
Earth current range 0.2 mA to 35 A									■	■
Earth current range 0.5 mA to 19.9 A (with optional measuring clamp)				■			■	■		
Resistance range		0.1 to 2 kΩ	0.1 to 2 kΩ	0.1 to 2 kΩ	0.1 to 20 kΩ	0.1 to 20 kΩ	0.1 to 200 kΩ	0.1 to 200 kΩ	0.025 to 1.5 kΩ	0.025 to 1.5 kΩ
PowerDB lite					■	■	■	■		
PowerDB full version					□	□	□	□		

■ feature □ option

Donald MacAdie 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.



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.



DCM clampmeters are ideal for use in the installation, maintenance, monitoring or checking of electrical systems and equipment

Clampmeters and fork multimeter

Model		DCM310	DCM320	DCM330	DCM340
Safety rating	CAT III 600V	■	■		■
	CAT III 1000V			■	
	CAT IV 600V			■	
DC and AC volts	0 - 200.0 V range, 200.0 - 600.0 V accuracy	■	■		
Continuity	On < 20 Ω, Off >50 Ω, response time <50ms	■	■		
Resistance	Range 200.0 Ω ±1%, Accuracy ±5% digits	■	■		
	Range 0 - 400.0 Ω, Accuracy ±1% ±3 digits				■
	35mm diameter				■
Maximum conductor size	27 mm diameter	■	■		
	16 mm diameter			■	
Power requirement	1 x PP3 9 V alkaline battery	■			■
	2 x AAA 1.5 A alkaline battery		■	■	
AC current range	0-19.99 A	■			
	0-40.00 A		■		
	0-60.0 A				■
	20.0-199.9 A	■			
	40.00-200.0 A		■		
	60.0 - 400.0 A				■
	0 - 200.0 A			■	
	200-400 A	■	■		
	400 - 600 A				■
DC current range	0 - 60.0A				■
	60.0 - 400.0A				■
	400 - 600 A				■

Electrical contractors throughout the world depend on hand-held test equipment to ensure installations are safe and function correctly. Count on Megger to produce tough machines that are designed to surpass the requirements of wiring regulations.

MFT1500 series

Multifunction tester

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.



MFT1553 is the latest multifunction tester from Megger. It includes Bluetooth for rapid downloading of test data



MIT300 is ergonomically designed in landscape format to suit electrical contractors

MIT200 is an economical tester with all the essential functions you need

Insulation and continuity testers

MIT300 series

A CATIV 300 V insulation and continuity tester that comes in five versions 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.



LTW300 does not trip 30 mA RCDs and can be used on a wide range of voltages

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.



The Model 8 Mk 7 being manufactured here is a direct descendant of MacAdie's original design

Ask for the free electrical test instruments catalogue. It includes a comprehensive review of hand-held test tools, and has many interesting technical articles.



Wathour 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)

Wathour meter test system

The PHAZER family of wathour 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.



MA10

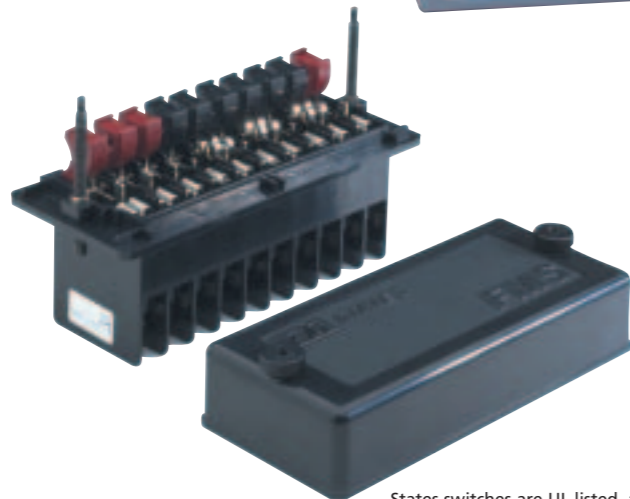
Portable wathour meter standards

The MA10 wathour 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.

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.







States switches are UL listed, and CSA certified

Innovation in electrical, electronic and physical design are characteristics of Megger's engineering teams.



CATIV testing

CAT IV compliant instruments	
1kV insulation testers 	MIT400 MIT410 MIT420 MIT430 MIT480 MIT481 MIT485 MIT40X
Clamp meters Loop testers 	DCM330 LT300 LTW315 LTW325 LTW335 LTW425
Ground earth testers 	DET3TA DET3TD DET3TC DET4TD2 DET4TR2 DET4TCR2 DET4TC2
5kV and 10kV insulation testers 	MIT520/2 S1-552/2 S1-554/2 MIT1020/2 MIT510/2 S1-1052/2 S1-1054/2

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.



CATIV protection gives confidence when insulation testing outside

PowerDB

Acceptance and Maintenance test data management software

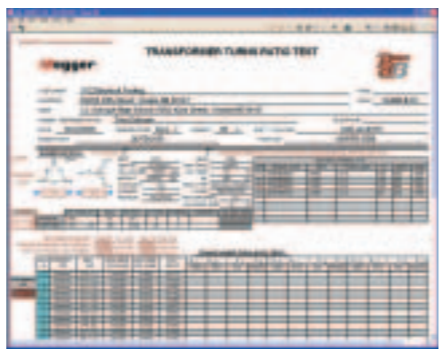
A powerful software package that offers a revolutionary approach to managing electric utility and industrial testing data. The software is designed from a ground-up approach, and is easily the most advanced package on the market. It employs over 160 industry standard test forms that have been developed 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
 - Ground Mat/Grid Tests
 - Instrument Transformers
 - Power Transformers
 - Insulation Fluids
 - Loadbreak Switches
 - Motor Control
 - Power Factor Tests
 - Relays
 - Switchboards
 - Transfer Switches
 - Wattour Meters
 - Transducers

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 screens 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.

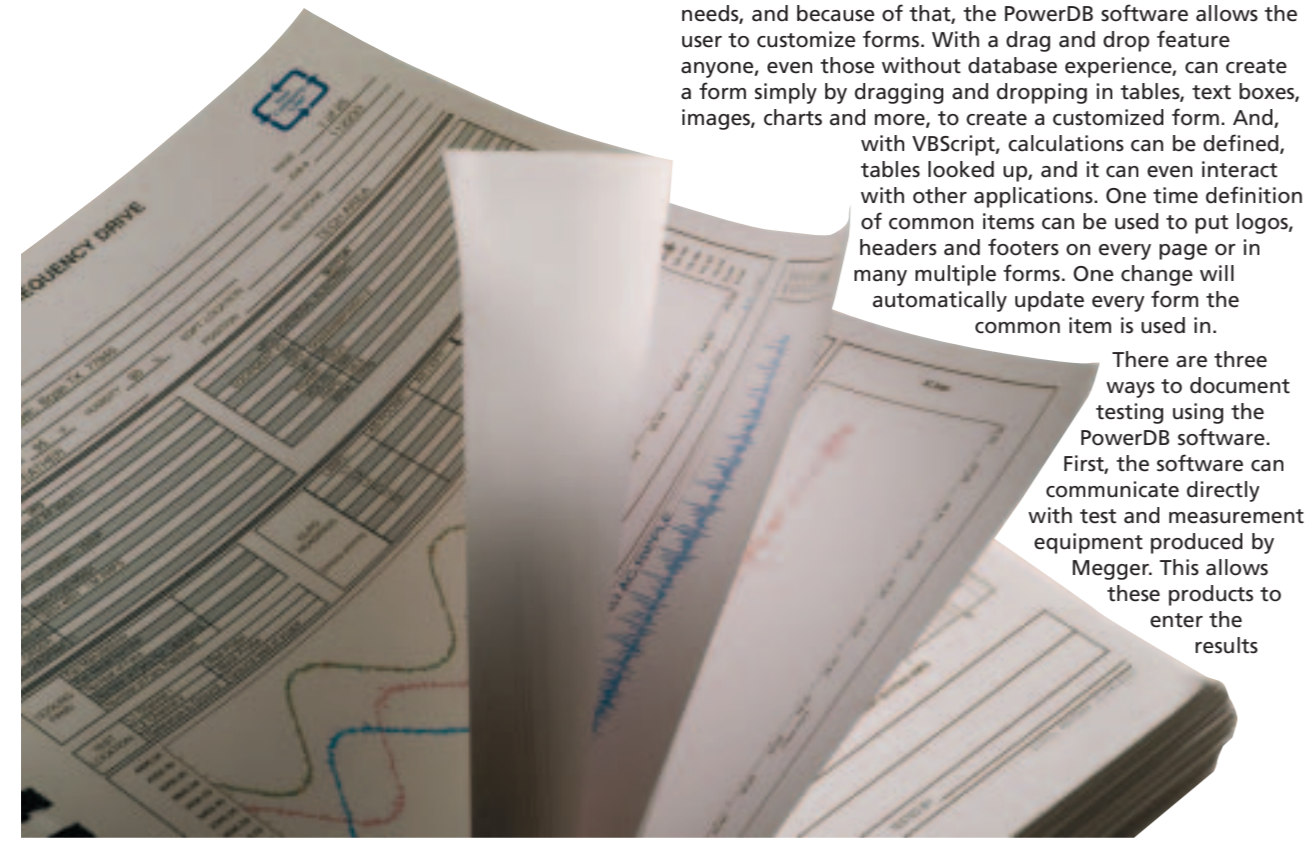


The software will also execute several tasks for the user, including equation calculations, temperature correction factors and charting. PowerDB helps predict possible equipment failure by

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 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

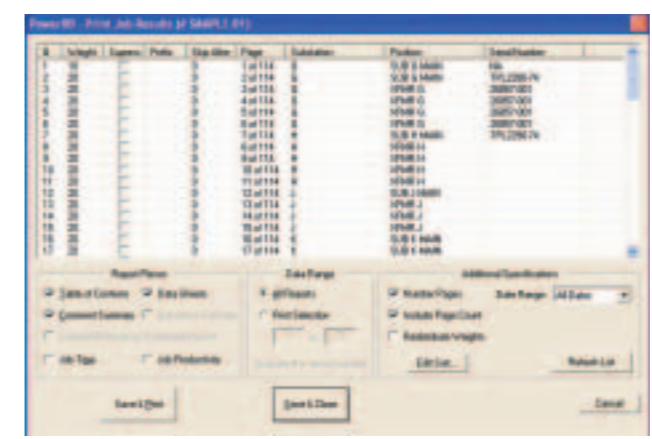


directly into data fields. Second, forms can be filled in using other applications, including Megger's Advanced Visual Test Software, entering data into the fields using information stored

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 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 speciality 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 means 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		
		PowerDB OnBoard	PowerDB lite	PowerDB full version
Product type	Software		■	■
	Firmware	■		
Cost options	Free with selected instruments	■	■	
	Separate purchase			■

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