MEASURING INSTRUMENTS AND TESTERS

- 17th Edition Electrical Installation Testers
- Power Quality Analysis
- High Voltage Insulation Diagnostics
- Appliances/Machines/Switchboard Safety
- LAN Cabling Certification
- Indoor Environment Quality
- Digital Multimeters/Clamp Meters/Voltage and Continuity Testers

METREL®

CATALOG 2010

www.metrel.co.uk

Metrel UK; Unit 1, Hopton House, Ripley Drive; Normanton, West Yorkshire, WF6 1QT

Instruments Designed with Future in Mind?

METREL is one of the world leading manufacturers and distributor of high quality electrical measurement and test instruments, providing the market with innovative solutions on the following segments:

17th Edition Installation Testers

Metrel provides single and multifunctional electrical installation testers. The testers are used for initial and periodic testing of domestic and industrial installations. Testing of single and multiphase systems and testing of TT, TN, IT and 110 V systems. Metrel meters enable a selection of functionalities and measurements (depending on the model), can be downloadable or non-downloadable. All meters comply with the 17th Edition BS7671 and Part P requirements.

Power Quality Analysis

The power quality testers can be widely used for general power quality assessment in distribution and industrial low and middle voltage electric systems (according to EN 50160), capturing and recording of power supply events, flicker measurement, power factor correction measurements, harmonics measurements, transients recording and over-voltage protection devices performance testing, assessment of UPS, consumption profile recording, ect.

High Voltage Insulation Diagnostics

Metrel's high voltage diagnostic equipment (5 - 10 kV) is used for testing insulation resistance of rotating machinery and cables, production line periodic testing and maintenance, troubleshooting and analysis of all kinds of insulation problems. It gives effective readings in high noise environments such as high voltage substations and switchyards. Some of key features (depends on the model) are PI, DD, DAR testing, R(t) graph, High 5 mA charging current, selectable noise rejection filters.

Portable Appliance Testers / Machines / Switchboard Safety

Metrel's testers can be used in professional PAT testing, general PAT testing, factory/warehouse PAT testing, Multi-location PAT testing and after repair safety testing. Metrel's testers enable a selection of key features (depending on model) for example auto-sequencing, automatic testing and Pass/Fail evaluation, RCD testing, project uploading, BAR coding system and PASS/FAIL barcode label printing, flash test, tests both 230 V appliances and 110 V appliances and much more.

LAN Cabling Certification

Metrel's LAN testers (copper and fiberoptic) are designed to be used for verification of LAN networks up to CAT6/Class E, testing fiber link performance and verification of fiber networks, troubleshooting and fault finding of connections/links, troubleshooting in IT networks. Combined MI 2016 and MI 5100 can create a cost effective solution for the verification of fiber and copper LAN networks.

Environmental Testers

The meters are used for indoor areas, factory conditions, industrial process monitors, power stations, offices, domestic dwellings, indoor or dry outdoor sound level measurement, industrial sound measurement, band-pass and acoustic filter testing, working environment testing, calibration work, acoustic equipment testing and much more. The users are coming form the HVAC industry, maintenance people, lab mangers and others fields.

Digital Multimeters / Clamp Meters / Voltage & Continuity Testers

The DMM's, clamp meters and voltage continuity testers are used for general / basic testing up to high level industrial testing, electronic fault finding, field servicing and heavy duty electrical testing. Some of the key features are (depending on the model): TRMS testing, high accuracy, temperature measurement, lead alert, conductance, PC communication, autocheck function, recording and much more.

Metrel UK

Customer commitment
Sales and Marketing operate from our premises in Normanton, having a supporting network of independent distributors. Metrel UK provides to its customers, a complete service including calibration and repairs, technical support and after sales service.

Commitment to quality
Metrel's quality assurance system is based on BS EN ISO 9001. We continue to achieve and maintain this standard through continuous training of our staff and in the design of our instruments.
Our commitment to quality is recognized by our customers and is ensured by a continuous and extensive research and development of new accurate, reliable and safe to use products.

Services
Metrel UK is also providing a selection of Services:

Calibration
Standard & Express services, including next day and same day Call 'N' Cal.

Repair
UK based repair & service centre.

Medi-Cal Service / refurbish your old meter
Full service of all the mechanically actuated components, new firmware & full adjustment. Calibration & service certificates included.

SmartWater - make it safe
SmartWater forensic security marking for meters and accessories.

Checkpoint
Interim spot checks on all settings, certificate provided.

Technical Helpline
Call: 01924 24 5000
Free Technical Advice from our experienced technicians from 8.00 am until 5.00 pm.

Bespoke Trainings on how to use Metrel's meters
To be able to use Metrel's products to the full potential our engineers can provide you with a bespoke training at your or our premises. For a quote please call our Technical Helpline.

Where to get a Metrel meter?
Metrel's products are available from a range of electrical distributors in the UK. To find your preferred stockist please call our advice line on 01924 24 5000 and we will make sure that you get your product on time.

Ordering information

Sales / Technical & Customer Support
Tel.: (0)1924 24 50 00
Fax: (0)1924 24 50 07
E-mail: info@metrel.co.uk
Web: www.metrel.co.uk

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Contents

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- **17th Edition Electrical Installation Testers**
- **Power Quality Analysis**
- **High Voltage Insulation Diagnostics**
- **Appliances/Machines/Switchboard Safety**
- **LAN Cabling Certification**
- **Indoor Environment Quality**
- **Digital Multimeters/Clamp Meters/Voltage and Continuity Testers**

Electrical Installation Testers

Compliant with BS7671:2008 17th Edition and Part P of Building Regulations

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Glossary - Testing the Safety of Electrical Installation

All in one insulation testing
A full automated procedure where the resistance between L-N, L-PE and N-PE are all performed with the single press of the test button.

Autosequence
Autosequencing is a method by which a series of installation tests are performed with a single press of the test button. By pressing the test button, the instrument will automatically start working through the list of tests, pausing where appropriate. Autosequence testing can be up to 5 times faster than conventional methods.

Continuity resistance test
A 200 mA resistance test to ensure that the resistance between two points is sufficiently low for the application.

Dead testing
Testing on circuits that do not have a voltage applied to them (e.g. a continuity or insulation test).

Electrical Installation safety testing
This is a combination of dead circuit and live testing.
The dead circuit tests are:
- Continuity.
- Insulation.
- Earth resistance testing.

Live testing includes:
- Voltage measurement.
- Phase sequence.
- Line impedance measurement.
- Loop impedance measurement.
- RCD testing.

These tests are performed in order to ensure that the requirements are met for the protection of persons, livestock and property against the risk of electric shock and to ensure that the automatic disconnection of the supply is performed correctly.

Earth resistance testing
Earth resistance testing is used on TN, TT and IT systems to ensure that the resistance of the earth electrode is sufficiently low so that, in the case of a fault, a dangerous voltage does not appear on any parts of the installation or on any appliances which have a connection to earth.

Insulation resistance
The insulation is intended to prevent any contact with live parts and withstanding mechanical, chemical, electrical and thermal stresses. The insulation resistance test is performed with a D.C. voltage test on a dead system and the resistance must be above the minimum limit set out in the appropriate standards and regulations.

Loop impedance test
This is a live test used to measure the fault loop impedance between the line and earth conductor (sometimes the neutral is required to prevent an RCD/RCBO from tripping during the test). This function can be used for both Z(e) and Z(s) testing.

Live testing
Performing tests on circuits that have a voltage applied to them (e.g. an RCD trip time test)

Line impedance test
This is a live test used to measure the impedance between the line and neutral conductor or between lines on a 3-phase system.

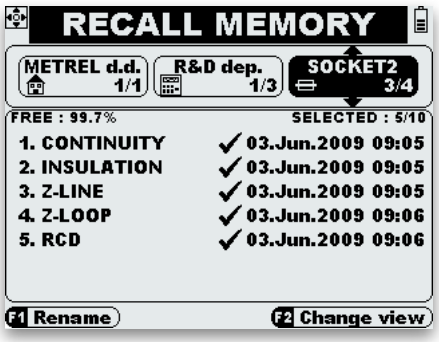
Loop impedance tables
Various RCDs, fuse types and ratings can be selected on the test instrument. When a loop test is performed, the measured value is automatically compared to the maximum values set out in the standards (BS7671:2008) and either a PASS or FAIL symbol will appear on-screen to inform the user if the measurement is within the required limits.

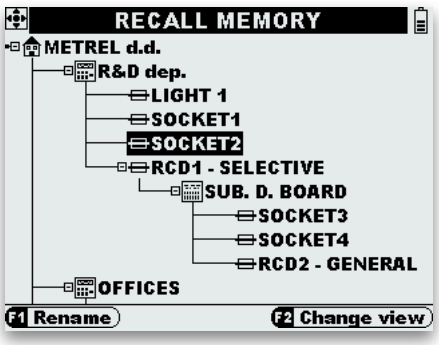
Phase rotation
A test used for determining the phase sequence of a 3-phase system. Example results displayed on the tester are (1.2.3), (2,1,3).

RCD Auto
An automated function which performs RCD testing at x1/2, x1 and x5 current multipliers at both 0° and 180° automatically. This removes the need to walk repeatedly between the RCD and the test instrument to measure trip-times.

RCD Ramp test
A test which slowly ramps up the current between line and PE conductor until the RCD/RCBO trips. After this test, the current required to trip the RCD is displayed which can then be used to find the cause of nuisance tripping occurring in a circuit.

Structure building
Design buildings in the instrument as they are laid out in the installation. This includes the distribution boards, circuits, sub-distribution boards and earth connections. This visual interpretation of the electrical installation makes the saving and recalling of test results quick and simple.





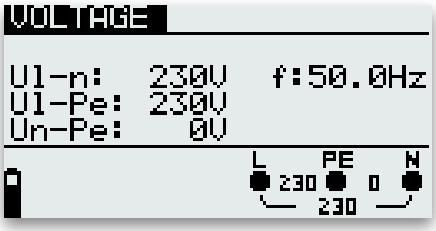
Accessories: page 1.30

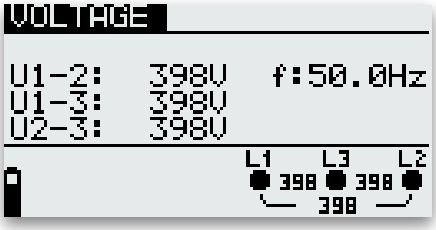
Trip-lock
A method of performing a loop test on RCD protected circuits without tripping the RCD. All Metrel multifunctional testers have the non trip facility. The TripLock function is ZLoop (RCD) MI 3000 tester, Z(s) RCD testing MI 3100, MI 3002, MI 3102; Z-loop (protection: RCD) MI 3101, MI 3105.

Tip commander
An electronic remote to help make continuity, insulation testing easier by placing the test button and either memory or backlight button in the hand of the electrician. Available as a 2-wire tip commander or 3-wire tip-commander that allows loop and RCD testing.

Time delayed (S-type) RCDs
As the changes to BS7671:2008 (also know as the 17th Edition) have come into force, the requirements for residual current device (RCD) protection of circuits has increased. In situations where multiple RCDs occur in an installation, the need to discriminate or co-ordinate when the RCDs will trip has become more important. If a 100mA RCD and a 30mA RCD are protecting the same circuit (e.g. one at source and one on the individual circuit) and a fault above 100 mA occurs, it may not always be the case that the 30 mA RCD trips first (e.g. the 100 mA RCD could have a faster response time in the case of a fault). In this situation, a time delayed or S-type RCD is required at the source of the installation so that the 30 mA RCD has time to trip and, if the problem is caused by a none RCD protected circuit, the supply is still safely disconnected.
Not all installation test instruments have the ability to check time delayed or S-type RCDs. Therefore as RCDs become more commonplace, it is useful to have a test instrument that has the ability to test them. All Metrel's multifunctional test instruments and single function live circuit testers have the ability to test both general and time delayed RCDs providing you with the peace of mind that you are prepared for whatever the future may hold.

Online Voltage Monitoring
Built into all of Metrel's MI3000 series multifunctional installation testers is the online voltage monitoring function. This function displays on one screen the AC voltages and frequency occurring between L to PE, L to N and N to PE (single phase systems) and L1 to L2, L2 to L3 and L3 to L1 (3-phase systems).
This feature is very useful for fault finding on systems e.g. quickly identifying incorrect connections, disconnected wires and incorrect voltages





Safety CAT Ratings
Transients are very fast, high energy spikes that can occur on the mains power supply. Low energy transients can be caused by simply turning on a switch to a circuit or electromagnetic interference while high energy transients can be caused, for example, by a powerful motor stalling or a lightning striking a power line.
Transients can have a variety of effects which could include blowing the protective fuse in the appliance, causing light bulbs to blow, causing insulation between conductors to break down and, in the case of high energy transients causing appliances connected to the supply to set on fire or produce dangerous sparks.
The less protection provided against these transients enables higher energy transients to occur (i.e. If lightning strikes the power lines, you would not expect the full fault voltage to occur at the power supply socket on the wall in your house). The level of danger due to transients is therefore divided into categories. This is illustrated in the diagram below:

The higher the CAT rating of your test instrument, the more protection it will give you in the case of a fault occurring on the system under test (e.g. A CAT IV/300 V installation test instrument provides significantly more protection to the user in the case of a fault than a CAT III/300 V installation test instrument).
All Metrel's MI 3000 series multifunctional test instruments are rated CAT IV/300 V. CAT IV 300V means that the instrument is suitable for testing up to CAT IV locations up to 300 V between line and earth and, due to the relationship set out in IEC/EN 60364, testing in CAT III locations up to 600 V between Line and Earth.

Accessories: page 1.30

Selection Guide for Multifunctional Testers

		BASIC TESTERS	
Part No.		MI 3000 EurotestEASI Plus	MI 3100 EurotestEASI
Test / **Features**	**Description**		
INSULATION EN 61557-2	With DC voltage	100 - 1000 V	100 - 1000 V
	Range	0 - 1000 MΩ	0 - 1000 MΩ
	All-in-one insulation test (L-PE, N-PE, L-N)		
	Adjusting test time to capacitance of load		
CONTINUITY EN 61557-4	Automated R1+R2 testing		
	R low 200 mA DC	✓	✓
	Range	0 - 1999 Ω	0 - 1999 Ω
	Automatic polarity swap	✓	✓
	Low current DC Resistance	✓	✓
LINE/LOOP EN 61557-3	Line impedance measurement	✓	✓
	Loop impedance measurement (Ze & Zs)	✓	✓
	High accuracy TRIP LOCK impedance	✓	✓
	Built-in loop impedance tables for automatic PASS/FAIL decision		✓
RCD EN 61557-6	RCD type (general & selective)	A, AC	A, AC
	RCD trip time measurement	✓	✓
	Ramp test	✓	✓
	RCD auto	✓	✓
	10, 30, 100, 300, 500, 1000 mA	✓	✓
VOLTAGE FREQUENCY	Real-time AC voltage measurement	✓	✓
	Simultaneous voltage measurement over 3 phases	✓	✓
	Frequency measurement	✓	✓
PHASE SEQUENCE	L1 - L2 - L3	✓	✓
EARTH EN 61557-5	Three wire resistance		
	Two wire resistance		
	One clamp & three wire resistance		
	Two clamps		
	High noise immunity with two clamps		
	Specific earth resistance		
AUTO SEQUENCE TESTS	Autotest of insulation on all conductors L-N-PE		
	AUTOSEQUENCE ® procedure on switchboard		
	AUTOSEQUENCE ® procedure on circuit		
	Automatic evaluation of safety, based on all measured values		
OTHER MEASUREMENTS	LUX light measurement (A 1172 & A 1173)		
	TRMS leakage current		
	Medical sites (IT RMD test)		
	Varistor overvoltage		
	Fuse/fault locator (A 1191)		
	High resolution loop impedance (mΩ) (A 1143)		
SPECIAL FUNCTIONALITIES	Frequency span	45 - 65 Hz	45 - 65 Hz
	Supports 110 V systems	✓	✓
	TN/TT and IT earthing system mode	✓	✓
ON LINE WARNINGS / INFORMATION	Touch electrode	✓	✓
	HELP menu		✓
COMMUNICATION PORTS	RS232		
	USB		
SOFTWARE MEMORIES	Number of memory locations		
	EuroLink PRO		
	EuroLink PRO Plus (A 1196)		
GENERAL DATA	Safety category	CAT IV/300 V	CAT IV/300 V
	In-built battery charger	✓	✓
	Batteries	6 x AA	6 x AA
	Weight	1.3 kg	1.3 kg
	Size (mm)	230 x 103 x 115	230 x 103 x 115

Accessories: page 1.30

17th Edition Installation Testers

PROFESSIONAL DOWNLOADABLE TESTERS	
MI 3002	MI 3102
EurotestDL	EurotestXE
	
100 - 1000 V	100 - 1000 V
0 - 1000 MΩ	0 - 1000 MΩ
✓	✓
0 - 1999 Ω	0 - 1999 Ω
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
A, AC	A, AC
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
	✓
	✓
	Optional
	Optional
	✓
45 - 65 Hz	45 - 65 Hz
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
500	500
✓	✓
Optional	Optional
CAT IV/300 V	CAT IV/300 V
✓	✓
6 x AA	6 x AA
1.3 kg	1.3 kg
230 x 103 x 115	230 x 103 x 115

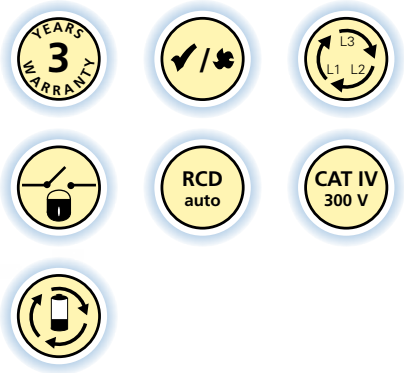
SPECIALIST DOWNLOADABLE TESTERS	
MI 3101	MI 3105
EurotestAT	EurotestXA
	
50 - 1000 V	50 - 1000 V
0 - 1000 MΩ	0 - 1000 MΩ
✓	✓
✓	✓
Optional	Optional
✓	✓
0 - 1999 Ω	0 - 1999 Ω
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
A, AC, B	A, AC, B
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
	✓
	✓
	3 A and more
Optional	Optional
✓	✓
✓	✓
✓	✓
✓	✓
	Optional
	✓
	✓
✓	✓
Optional	Optional
Optional	Optional
15 - 500 Hz	15 - 500 Hz
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
2000	2000
✓	✓
Optional	Optional
CAT IV/300 V	CAT IV/300 V
✓	✓
6 x AA	6 x AA
1.3 kg	1.3 kg
230 x 103 x 115	230 x 103 x 115

- 3 years manufactures waranty
- Autosequence
- Pass fail evaluation
- Phase Sequence
- Triplock
- Earth
- Clamp measurement
- RCD auto test
- Safety category
- Help menu
- Loop impedance tables
- Rechargeable
- Downloadable

Accessories: page 1.30

MI 3000 EurotestEASI Plus

BS7671:2008 (17th Edition) and Part P Multifunctional Installation Tester



The MI 3000 EurotestEASI Plus is a fast, accurate and easy to use rechargeable installation tester which is popular with both new and experienced users. The large, bright LCD screen is perfect for working in dark conditions while the online voltage monitoring system and phase sequencing facility enable this unit to work extremely well on both single phase and 3 phase systems.
Performs continuity, insulation, RCD, loop, line, voltage and phase sequence tests required by the BS7671:2008 (17th Edition) and Part P Building Regulations.

KEY FEATURES:

- **Online voltage monitoring:** monitors all 3 voltages in real-time.
- **Upgradeable:** if changes occur to the regulations, changes can be made to the firmware to keep the unit up to date.
- **Polarity swap:** automatic polarity reversal on continuity test.
- **Insulation range:** wide range of insulation test voltages from 100 V to 1000 V, reading up to 1000 MΩ.
- **TripLock function:** Zs (RCD) function performs a loop test without tripping the RCD/RCBO.
- **Multi-system testing:** tests on TT, TN, IT and 110 V systems.
- **Built-in charger & rechargeable batteries:** unit has an inbuilt charging circuit and comes complete with a set of rechargeable NiMH batteries.
- **RCD auto:** automated RCD testing reduces circuit test time.
- **Phase sequence test:** required by BS7671:2008 17th Edition.

APPLICATION:

- Initial and periodic testing of domestic and industrial installations.
- Testing of single and multiphase systems.
- Testing of TT, TN, IT and 110 V systems.

STANDARDS:

Functionality:
EN 61557
Other reference standards for testing:
BS 7671;
IEC/EN 60364;
EN 61008;
EN 61009;
EN 60755;
AS/NZ 3760;
CEI 64.8;
HD 384;
VDE 413
Electromagnetic compatibility (EMC):
EN 61326
Safety (LVD):
EN 61010-1;
EN 61010-031

Accessories: page 1.30

TECHNICAL SPECIFICATION:

INSULATION EN 61557-2	With DC voltage	100 - 1000 V
	Range	0 - 1000 MΩ
CONTINUITY EN 61557-4	R low 200 mA DC	✓
	Range	0 - 1999 Ω
	Automatic polarity swap	✓
	Low current DC Resistance	✓
LINE/LOOP EN 61557-3	Line impedance measurement	✓
	Loop impedance measurement (Ze & Zs)	✓
	High accuracy TRIP LOCK impedance	✓
RCD EN 61557-6	RCD type (general & selective)	A, AC
	RCD trip time measurement	✓
	Ramp test	✓
	RCD auto	✓
	10, 30, 100, 300, 500, 1000 mA	✓
VOLTAGE FREQUENCY	Real-time AC voltage measurement	✓
	Simultaneous voltage measurement over 3 phases	✓
	Frequency measurement	✓
PHASE SEQUENCE	L1 - L2 - L3	✓
SPECIAL FUNCTIONALITIES	Frequency span	45 - 65 Hz
	Supports 110 V systems	✓
	TN/TT and IT earthing system mode	✓
ON LINE WARNINGS / INFORMATION	Touch electrode	✓
GENERAL DATA	Safety category	CAT IV/300 V
	In-built battery charger	✓
	Batteries	6 x AA
	Weight	1.3 kg
	Size (mm)	230 x 103 x 115

KEY FEATURES

Large LCD screen with backlight

User friendly keyboard enables simple and fast adjustment.

ORDERING INFORMATION:

Part No.	Description
MI 3000	**EurotestEASI Plus**

STANDARD KIT INCLUDES:

Part No.	Description
MI 3000	EurotestEASI Plus
A 1003	Mains plug
A 1301	Test lead 3 x 1.5 m (brown, green, blue)
A 1147	Rechargeable NiMH AA batteries (6 pcs)
83005447	12 V battery charging adaptor
83005401	UK mains cable for charging adaptor
20205354	Battery holder
A 1015	Test probe (blue)
A 1298	Test probe (brown)
A 1062	Test probe (green)
83005485	Crocodile clip (blue)
A 1297	Crocodile clip (brown)
A1062	Test probe (green)
20901041	Carrying neck strap
A 1289	Soft carrying bag
	Short instruction manual
	Instruction manual on CD
	Calibration certificate

Accessories: page 1.30

MI 3100 EurotestEASI

BS7671:2008 (17th Edition) and Part P Multifunctional Installation Tester with Help Screens and Loop Impedance Tables

The MI 3100 EurotestEASI is true work horse when it comes to modern day testing. Containing all the features of its brother, the MI 3000 EurotestEASI Plus (a fast, accurate and easy to use rechargeable installation tester), the MI 3100 EurotestEASI also incorporates full schematic help screens for each test, describing exactly how to connect the instrument into the installation and how to perform a test. The unit also contains a fully upgradeable list of fault loop impedance limits for PASS/FAIL evaluation according to modern day regulations and the unit comes complete with a Tip Commander to make installation testing a fast and easy process.
Performs continuity, insulation, RCD, loop, line, voltage and phase sequence tests required by the BS7671:2008 (17th Edition) and Part P Building Regulations.

KEY FEATURES:

- **Help screens:** unit comes complete with in-built help screens for referencing on site.
- **Automatic loop evaluation:** built-in loop impedance tables allow automatic evaluation of the loop resistance compared to the regulations.
- **Tip commander:** unit comes complete with a tip-commander to simplify continuity and insulation testing.
- **Online voltage monitoring:** monitors all 3 voltages in real-time.
- **Upgradeable:** if changes occur to the regulations, changes can be made to the firmware to keep the unit up to date.
- **Polarity swap:** automatic polarity reversal on continuity test.
- **Insulation range:** wide range of insulation test voltages from 100 V to 1000 V, reading up to 1000 MΩ.
- **TripLock function:** Zs (RCD) function performs a loop test without tripping the RCD/RCBO.
- **Multi-system testing:** tests on TT, TN, IT and 110 V systems.
- **Built-in charger & rechargeable batteries:** unit has an inbuilt charging circuit and comes complete with a set of rechargeable NiMH batteries.
- **RCD auto:** automated RCD testing reduces circuit test time.
- **Phase sequence test:** required by BS7671:2008 17th Edition.

APPLICATION:

- Initial and periodic testing of domestic and industrial installations.
- Testing of single and multiphase systems.
- Testing of TT, TN, IT and 110 V systems.

STANDARDS:

Functionality: EN 61557
Other reference standards for testing: BS 7671; IEC/EN 60364; EN 61008; EN 61009; EN 60755; AS/NZ 3760; CEI 64.8; HD 384; VDE 413
Electromagnetic compatibility (EMC): EN 61326
Safety (LVD): EN 61010-1; EN 61010-031

Accessories: page 1.30

17th Edition Installation Testers

TECHNICAL SPECIFICATION:

INSULATION EN 61557-2	With DC voltage	100 - 1000 V
	Range	0 - 1000 MΩ
CONTINUITY EN 61557-4	R low 200 mA DC	✓
	Range	0 - 1999 Ω
	Automatic polarity swap	✓
	Low current DC Resistance	✓
LINE/LOOP EN 61557-3	Line impedance measurement	✓
	Loop impedance measurement (Ze & Zs)	✓
	High accuracy TRIP LOCK impedance	✓
	Built-in loop impedance tables for automatic PASS/ FAIL decision	✓
RCD EN 61557-6	RCD type (general & selective)	A, AC
	RCD trip time measurement	✓
	Ramp test	✓
	RCD auto	✓
	10, 30, 100, 300, 500, 1000 mA	✓
VOLTAGE FREQUENCY	Real-time AC voltage measurement	✓
	Simultaneous voltage measurement over 3 phases	✓
	Frequency measurement	✓
PHASE SEQUENCE	L1 - L2 - L3	✓
SPECIAL FUNCTIONALITIES	Frequency span	45 - 65 Hz
	Supports 110 V systems	✓
	TN/TT and IT earthing system mode	✓
ON LINE WARNINGS / INFORMATION	Touch electrode	✓
	HELP menu	✓
GENERAL DATA	Safety category	CAT IV/300 V
	In-built battery charger	✓
	Batteries	6 x AA
	Weight	1.3 kg
	Size (mm)	230 x 103 x 115

KEY FEATURES

Large LCD screen with backlight

User friendly keyboard enables simple and fast adjustment.

ORDERING INFORMATION:

Part No.	Description
MI 3100	**EurotestEASI**

STANDARD KIT INCLUDES:

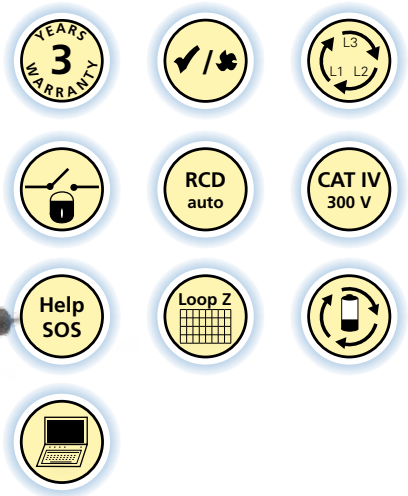
Part No.	Description
MI 3100	EurotestEASI
A 1175	Tip commander (2-wire, 1.5 m) with a spiral cable
A 1003	Mains plug
20901041	Carrying neck strap
A 1301	Test lead 3 x 1.5 m (brown, green, blue)
A 1147	Rechargeable NiMH AA batteries (6 pcs)
83005447	12 V battery charging adaptor
83005401	UK mains cable for charging adaptor
20205354	Battery holder
A 1015	Test probe (blue)
A 1298	Test probe (brown)
A 1062	Test probe (green)
83005485	Crocodile clip (blue)
A 1297	Crocodile clip (brown)
83005484	Crocodile clip (green)
A 1289	Soft carrying bag
	Short instruction manual
	Instruction manual on CD
	Calibration certificate

Accessories: page 1.30

17th Edition Installation Testers
MULTIFUNCTIONAL TESTER - Professional range

MI 3002 EurotestDL

BS7671:2008 (17th Edition) and Part P Downloadable Multifunctional Installation Tester with Help Screens and Loop Impedance Tables



The MI 3002 EurotestDL is the ideal unit for engineers who perform high volume testing or work regularly on TT, TN and 110V systems. Containing all the necessary tests for installation testing, the MI 3002 EurotestDL can also perform online voltage monitoring and phase sequence testing. All the results can be quickly saved and referenced on the unit while out on site and can be downloaded via the A 1291 EuroLink PRO software, included in the standard set, to the computer for evaluation of report generation after testing (A 1292 optional upgrade to EuroLink PRO Plus software which enables automatic printing to NICEIC forms).
Performs continuity, insulation, RCD, loop, line, voltage and phase sequence tests required by the BS7671:2008 (17th Edition) and Part P Building Regulations.

KEY FEATURES:

- **Downloadable:** downloads via RS232 or USB cable directly to the PC via the software included with the unit.
- **Help screens:** unit comes complete with in-built help screens for referencing on site.
- **Automatic loop evaluation:** built-in loop impedance tables allow automatic evaluation of the loop resistance compared to the regulations
- **Tip commander:** unit comes complete with a tip-commander to simplify continuity and insulation testing.
- **Online voltage monitoring:** monitors all 3 voltages in real-time.
- **Upgradeable:** if changes occur to the regulations, changes can be made to the firmware to keep the unit up to date.
- **Polarity swap:** automatic polarity reversal on continuity test.
- **Insulation range:** wide range of insulation test voltages from 100 V to 1000 V, reading up to 1000 MΩ.
- **TripLock function:** Zs (RCD) function performs a loop test without tripping the RCD/RCBO.
- **Multi-system testing:** tests on TT, TN, IT and 110 V systems.
- **Built-in charger & rechargeable batteries:** unit has an inbuilt charging circuit and comes complete with a set of rechargeable NiMH batteries.
- **RCD auto:** automated RCD testing reduces circuit test time.
- **Phase sequence test:** required by BS7671:2008 17th Edition.

APPLICATION:

- Initial and periodic testing of domestic and industrial installations.
- Testing of single and multiphase systems.
- Testing of TT, TN, IT and 110 V systems.

STANDARDS:

Functionality: EN 61557
Other reference standards for testing:
BS 7671; IEC/EN 60364; EN 61008; EN 61009; EN 60755; AS/NZ 3760; CEI 64.8; HD 384; VDE 413
Electromagnetic compatibility (EMC):
EN 61326
Safety (LVD):
EN 61010-1; EN 61010-031

Accessories: page 1.30

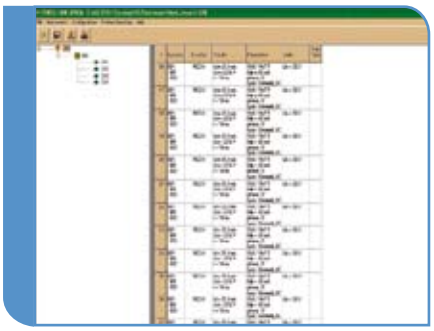
17th Edition Installation Testers

TECHNICAL SPECIFICATION:

INSULATION EN 61557-2	With DC voltage	100 - 1000 V
	Range	0 - 1000 MΩ
CONTINUITY EN 61557-4	R low 200 mA DC	✓
	Range	0 - 1999 Ω
	Automatic polarity swap	✓
LINE/LOOP EN 61557-3	Line impedance measurement	✓
	Loop impedance measurement (Ze & Zs)	✓
	High accuracy TRIP LOCK impedance	✓
	Built-in loop impedance tables for automatic PASS/ FAIL decision	✓
RCD EN 61557-6	RCD type (general & selective)	A, AC
	RCD trip time measurement	✓
	Ramp test	✓
	RCD auto	✓
	10, 30, 100, 300, 500, 1000 mA	✓
VOLTAGE FREQUENCY	Real-time AC voltage measurement	✓
	Simultaneous voltage measurement over 3 phases	✓
	Frequency measurement	✓
PHASE SEQUENCE	L1 - L2 - L3	✓
SPECIAL FUNCTIONALITIES	Frequency span	45 - 65 Hz
	Supports 110 V systems	✓
	TN/TT and IT earthing system mode	✓
ON LINE WARNINGS / INFORMATION	Touch electrode	✓
	HELP menu	✓
COMMUNICATION PORTS	RS232	✓
	USB	✓
SOFTWARE MEMORIES	Number of memory locations	500
	EuroLink PRO	✓
	EuroLink PRO Plus (A 1196)	Optional
GENERAL DATA	Safety category	CAT IV/300 V
	In-built battery charger	✓
	Batteries	6 x AA
	Weight	1.3 kg
	Size (mm)	230 x 103 x 115

KEY FEATURES

Large LCD screen with backlight



EuroLink PRO enables the following acivities:
- data downloading,
- creation of simple report,
- export of measured data to spreadsheet.

EuroLink PRO Plus can print onto NICEIC certificates.

ORDERING INFORMATION:

Part No.	Description
MI 3002	**EurotestDL**

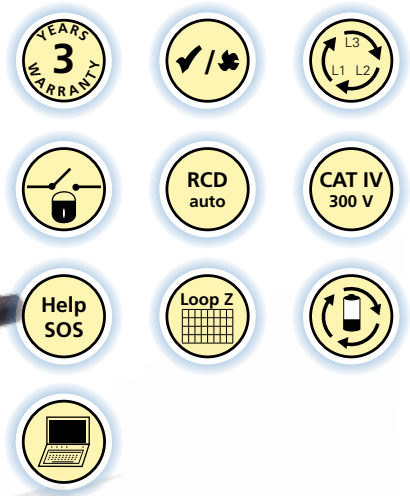
STANDARD KIT INCLUDES:

Part No.	Description
MI 3002	EurotestDL
A 1176	Tip commander (2-wire, 1.5 m) with a spiral cable
A 1003	Mains plug
20901041	Carrying neck strap
A 1301	Test lead 3 x 1.5 m (brown, green, blue)
A 1147	Rechargeable NiMH AA batteries (6 pcs)
83005447	12 V battery charging adaptor
83005401	UK mains cable for charging adaptor
20205354	Battery holder
A 1015	Test probe (blue)
A 1298	Test probe (brown)
A 1062	Test probe (green)
83005485	Crocodile clip (blue)
A 1297	Crocodile clip (brown)
83005484	Crocodile clip (green)
A 1289	Soft carrying bag
A 1291	EuroLink PRO with USB cable and RS232 cable
	Short instruction manual, Instruction manual on CD, Calibration certificate

Accessories: page 1.30

MI 3102 EurotestXE

BS7671:2008 (17th Edition) and Part PDownloadableMultifunctionalInstallation Tester with Help Screens, Loop Impedance Tables and with earth spike, TRMS current and LUX testing.



The MI 3102 EurotestXE is the ideal unit for engineers who perform high volume testing or work regularly on TT systems. Performing all the necessary tests for installation testing, the MI 3102 EurotestXE can also perform online voltage monitoring, phase sequence testing, Earth spike resistance testing (using the leads included in the standard set), LUX testing (optional A 1172, A 1173) and TRMS current testing (optional A 1018, A 1019 and A 1074). All the results can be quickly saved and referenced on the unit while out on site and can be downloaded via the A 1291 EuroLink PRO software, included in the standard kit, to the computer for evaluation and report generation after testing (A 1292 optional upgrade to EuroLink PRO Plus software whtch enables automatic printing to NICEIC forms).
Performs continuity, insulation, RCD, loop, line, voltage, earth resistance testing and phase sequence tests required by the BS7671:2008 (17th Edition) and Part P Building Regulations.

KEY FEATURES:

- **Earth spike testing:** unit performs both 2 and 3 wire earth spike testing.
- **Medical site testing:** ISFL– First fault leakage current, IMD – insulation monitoring device check.
- **Downloadable:** downloads via RS232 or USB cable directly to the PC via the software included with the unit.
- **Help screens:** unit comes complete with in-built help screens for referencing on site.
- **Automatic loop evaluation:** built-in loop impedance tables allow automatic evaluation of the loop resistance compared to the regulations.
- **Tip commander:** unit comes complete with a tip-commander to simplify continuity and insulation testing.
- **Online voltage monitoring:** monitors all 3 voltages in real-time.
- **Upgradeable:** if changes occur to the regulations, software changes can be made to the firmware to keep the unit up to date.
- **Polarity swap:** automatic polarity reversal on continuity test.
- **Insulation range:** wide range of insulation test voltages from 100 V to 1000 V, reading up to 1000 MΩ.
- **TripLock function:** Zs (RCD) function performs a loop test without tripping the RCD/RCBO.
- **Multi-system testing:** tests on TT, TN, IT and 110 V systems.
- **Built-in charger & rechargeable batteries:** Unit has an inbuilt charging circuit and comes complete with a set of rechargeable NiMH batteries.
- **RCD auto:** Automated RCD testing reduces circuit test time.
- **Phase sequence test:** requested by BS7671:2008 17th Edition.
- **TRMS Leakage test:** Optional current clamp measurement (accessory A1018, A1019 and A1074).
- **LUX testing:** optional light measurement function - accessory A 1172 Type B probe or A 1173 Type C probe.

APPLICATION:

- Initial and periodic testing of domestic and industrial installations.
- Testing of single and multiphase systems.
- Testing of TT, TN, IT and 110 V systems.
- Medical installation testing.

STANDARDS:

Functionality: EN 61557
Other reference standards for testing:
BS 7671; IEC/EN 60364;
EN 61008; EN 61009;
EN 60755; AS/NZ 3760;
CEI 64.8; HD 384; VDE 413
Electromagnetic compatibility (EMC):
EN 61326
Safety (LVD):
EN 61010-1; EN 61010-031

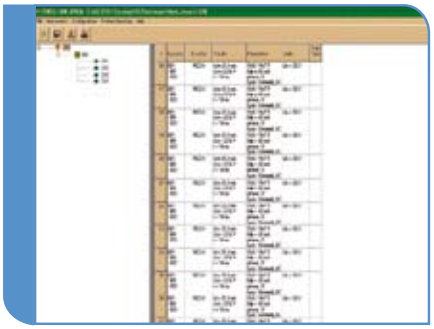
Accessories: page 1.30

TECHNICAL SPECIFICATION:

INSULATION EN 61557-2	With DC voltage	100 - 1000 V
	Range	0 - 1000 MΩ
CONTINUITY EN 61557-4	R low 200 mA DC	✓
	Range	0 - 1999 Ω
	Automatic polarity swap	✓
	Low current DC Resistance	✓
LINE/LOOP EN 61557-3	Line impedance measurement	✓
	Loop impedance measurement (Ze & Zs)	✓
	High accuracy TRIP LOCK impedance	✓
	Built-in loop impedance tables for automatic PASS/FAIL decision	✓
RCD EN 61557-6	RCD type (general & selective)	A, AC
	RCD trip time measurement	✓
	Ramp test	✓
	RCD auto	✓
	10, 30, 100, 300, 500, 1000 mA	✓
VOLTAGE FREQUENCY	Real-time AC voltage measurement	✓
	Simultaneous voltage measurement over 3 phases	✓
	Frequency measurement	✓
PHASE SEQUENCE	L1 - L2 - L3	✓
EARTH EN 61557-5	Three wire resistance	✓
	Two wire resistance	✓
OTHER MEASUREMENTS	LUX light measurement (A 1172 & A 1173)	Optional
	TRMS leakage current (A 1018, A 1019 & A 1074)	Optional
	Medical sites (IT RMD test)	✓
SPECIAL FUNCTIONALITIES	Frequency span	45 - 65 Hz
	Supports 110 V systems	✓
	TN/TT and IT earthing system mode	✓
ON LINE WARNINGS / INFORMATION	Touch electrode	✓
	HELP menu	✓
COMMUNICATION PORTS	RS232	✓
	USB	✓
SOFTWARE MEMORIES	Number of memory locations	500
	EuroLink PRO	✓
	EuroLink PRO Plus (A 1196)	Optional
GENERAL DATA	Safety category	CAT IV/300 V
	In-built battery charger	✓
	Batteries	6 x AA
	Weight	1.3 kg
	Size (mm)	230 x 103 x 115

KEY FEATURES

Large LCD screen with backlight



EuroLink PRO enables the following acivities:
- data downloading,
- creation of simple report,
- export of measured data to spreadsheet.

EuroLink PRO Plus can print onto NICEIC certificates.

ORDERING INFORMATION:

Part No.	Description
MI 3102	**EurotestXE**

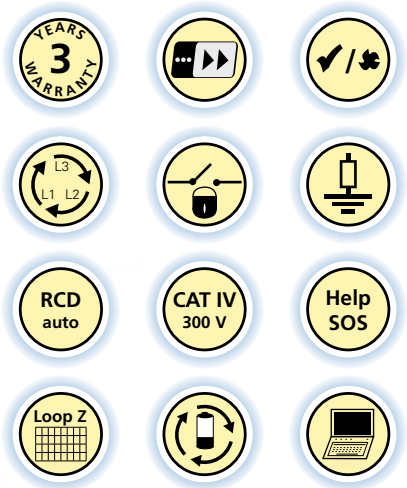
STANDARD KIT INCLUDES:

Part No.	Description
MI 3102	EurotestXE
A 1176	Tip commander (2-wire, 1.5 m) with a spiral cable
A 1003	Mains plug
20901041	Carrying neck strap
A 1301	Test lead 3 x 1.5 m (brown, green, blue)
A 1147	Rechargeable NiMH AA batteries (6 pcs)
83005447	12 V battery charging adaptor.
83005401	UK mains cable for charging adaptor
20205354	Battery holder
A 1015	Test probe (blue)
A 1298	Test probe (brown)
A 1062	Test probe (green)
83005485	Crocodile clip (blue)
A 1297	Crocodile clip (brown)
83005484	Crocodile clip (green)
A 1289	Soft carrying bag
A 1291	EuroLink PRO with USB cable and RS232 cable
S 2026	Earth spike kit (20 m black, 20 m green, 4.5 m blue, 2 spikes)
	Short instruction manual, Instruction manual on CD
	Calibration certificate

Accessories: page 1.30

MI 3101 EurotestAT

BS7671:2008 (17th Edition) and Part P Downloadable Multifunctional Installation Tester with inspection and Autosequence testing facility.



Breaking new ground in fast, efficient installation testing is the MI 3101 EurotestAT. This remarkable instrument reinvents the wheel of installation testers with amazing, never before seen features including "All-in-one" insulation testing, automated ring continuity testing (via the optional A1214 EasiSwitch), Auto-sequence testing, variable sensitivity fuse/wire locating facility (optional A 1191) and built-in battery charging circuitry. It is amazing how so many features can be condensed into such a small, but easy to use unit. All the results can be quickly saved and referenced on the unit while out on site and can be downloaded via the A 1291 EuroLink PRO software, included in the standard kit, to the computer for evaluation and report generation after testing (A 1292 optional upgrade to EuroLink PRO Plus software whtch enables automatic printing to NICEIC forms). Performs continuity, insulation, RCD, loop, line, voltage, earth resistance testing and phase sequence tests required by the BS7671:2008 (17th Edition) and Part P Building Regulations.

KEY FEATURES:

- **Five times faster:** the features of the MI 3101 can significantly reduce testing time, becoming up to five times faster than a normal installation tester.
- **Autosequences:** build a list of tests, press the test button and let the tester do all the work.
- **All-in-one insulation:** perform tests between L-N, L-PE and N-PE simultaneously in under 10 seconds.
- **Automated R1+R2:** using the optional EasiSwitch, the unit can significantly reduce the time taken to perform R1+R2 testing.
- **Schedules of inspection:** Built-in schedules of inspection can be completed on the MI 3101 and then downloaded via the included EuroLink PRO software.
- **Structure building:** build a structure of the installation either on the software (which can then be sent to your tester) or on the tester so that your results are always saved on the correct circuit.
- **Fuse location:** locate circuit fuses/wires/faults using the optional A 1191 Fuse locator.
- **Earth spike testing:** Unit can perform both 2 and 3 wire earth spike testing and specific earth resistance measurement.
- **Downloadable:** downloads via RS232 or USB cable directly to the PC via the software included with the unit.
- **Help screens:** unit comes complete with in-built help screens for referencing on site.
- **Automatic loop evaluation:** built-in loop impedance tables allow automatic evaluation of the loop resistance compared to the regulations
- **Online voltage monitoring:** monitors all 3 voltages in real-time.
- **Upgradeable:** if changes occur to the regulations, software changes can be made to the firmware to keep the unit up to date.
- **Polarity swap:** automatic polarity reversal on continuity test.
- **Insulation range:** wide range of insulation test voltages from 50 V to 1000 V, reading up to 1000 MΩ.
- **TripLock function:** Zs (RCD) function performs a loop test without tripping the RCD/RCBO.
- **Multi-system testing:** tests on TT, TN, IT and 110 V systems.
- **Wide frequency range** 15 - 500 Hz.
- **Built-in charger & rechargeable batteries:** unit has an inbuilt charging circuit and comes complete with a set of rechargeable NiMH batteries.
- **RCD auto:** automated RCD testing reduces circuit test time.
- **Phase sequence test:** requested by BS7671:2008 17th Edition.

APPLICATION:

- Initial and periodic testing of domestic and industrial installations (testing in aviation, railway networks, agriculture).
- Testing of single and multiphase systems.
- Testing of TT, TN, IT and 110 V systems.
- High volume testing (industrial, aircraft, railway, mining, chemistry, fery boat)

STANDARDS:

Functionality: EN 61557
Other reference standards for testing: BS 7671; IEC/EN 60364; EN 61008; EN 61009; EN 60755; AS/NZ 3760
EMC: EN 61326
Safety (LVD):EN 61010-1; EN 61010-031

Accessories: page 1.30

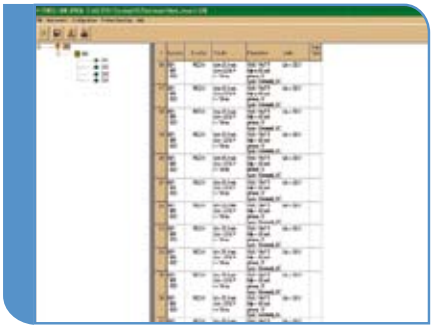
17th Edition Installation Testers

TECHNICAL SPECIFICATION:

INSULATION EN 61557-2	With DC voltage	50 - 1000 V
	Range	0 - 1000 MΩ
	All-in-one insulation test (L-PE, N-PE, L-N)	✓
	Adjusting test time to capacitance of load	✓
CONTINUITY EN 61557-4	Automated R1+R2 testing	Optional
	R low 200 mA DC	✓
	Range	0 - 1999 Ω
	Automatic polarity swap	✓
	Low current DC Resistance	✓
LINE/LOOP EN 61557-3	Line impedance measurement	✓
	Loop impedance measurement (Ze & Zs)	✓
	High accuracy TRIP LOCK impedance	✓
	Built-in loop impedance tables for automatic PASS/FAIL decision	✓
RCD EN 61557-6	RCD type (general & selective)	A, AC, B
	RCD trip time measurement	✓
	Ramp test	✓
	RCD auto	✓
	10, 30, 100, 300, 500, 1000 mA	✓
VOLTAGE	Real-time AC voltage measurement	✓
FREQUENCY	Simultaneous voltage measurement over 3 phases	✓
	Frequency measurement	✓
PHASE SEQUENCE	L1 - L2 - L3	✓
EARTH EN 61557-5	Three wire resistance	✓
	Two wire resistance	✓
	Specific earth resistance	Optional
AUTO SEQUENCE TESTS	Autotest of insulation on all conductors L-N-PE	✓
	AUTOSEQUENCE ® procedure on switchboard	✓
	AUTOSEQUENCE ® procedure on circuit	✓
	Automatic evaluation of safety, based on all measured values	✓
OTHER MEASUREMENTS	Varistor overvoltage	✓
	Fuse/fault locator (A 1191)	Optional
	High resolution loop impedance (mΩ) (A 1143)	Optional
SPECIAL FUNCTIONALITIES	Frequency span	15 - 500 Hz
	Supports 110 V systems	✓
	TN/TT and IT earthing system mode	✓
ON LINE WARNINGS	Touch electrode	✓
	HELP menu	✓
COMMUNICATION	RS232	✓
	USB	✓
SOFTWARE MEMORIES	Number of memory locations	2000
	EuroLink PRO	✓
	EuroLink PRO Plus (A 1196)	Optional
GENERAL DATA	Safety category	CAT IV/300 V
	In-built battery charger	✓
	Batteries	6 x AA
	Weight	1.3 kg
	Size (mm)	230 x 103 x 115

KEY FEATURES

Large LCD screen with backlight



EuroLink PRO enables the following acivities:
- data downloading,
- creation of simple report,
- export of measured data to spreadsheet.

EuroLink PRO Plus is also anabling printing on NICEIC certificates.

ORDERING INFORMATION:

Part No.	Description
MI 3101	**EurotestAT**

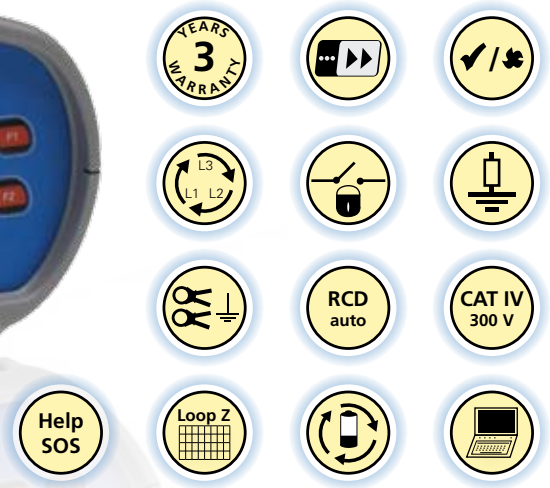
STANDARD KIT INCLUDES:

Part No.	Description
MI 3101	EurotestAT
A 1003	Mains plug
20901041	Carrying neck strap
A 1301	Test lead 3 x 1.5 m (brown, green, blue)
A 1147	Rechargeable NiMH AA batteries (6 pcs)
83005447	12 V battery charging adaptor.
83005401	UK mains cable for charging adaptor
20205354	Battery holder
A 1015	Test probe (blue)
A 1298	Test probe (brown)
A 1062	Test probe (green)
83005485	Crocodile clip (blue)
A 1297	Crocodile clip (brown)
83005484	Crocodile clip (green)
A 1289	Soft carrying bag
A 1291	EuroLink PRO with USB cable and RS232 cable
	Short instruction manual, Instruction manual on CD
	Calibration certificate

Accessories: page 1.30

MI 3105 EurotestXA

BS7671:2008 (17th Edition) and Part P Downloadable Multifunctional Installation Tester with inspection, Autosequence testing facility and earth resistance measurement via clamps.



The flagship model of Metrel's installation testers is the MI 3105 EurotestXA. Standing well above the crowd the MI 3105 has all the features a test engineer would need and plenty more to offer. Features including "All-in-one" insulation testing, automated ring continuity testing, Autosequence testing, variable sensitivity fuse/wire locating facility (optional A1191) and built-in battery charging circuitry make this an exemplary unit. Additional features include TRMS current measurement, 3wire/single clamp/two clamps earth spike testing (optional 4-wire soil resistivity, A 1199 ρ Adapter) and LUX testing (optional A 1173, A 1172). All the results can be quickly saved and referenced on the unit while out on site and can be downloaded, via the A 1290 EuroLink PRO software included in the standard kit, to the computer for evaluation and professional report generation after testing. Performs continuity, insulation, RCD, loop, line, voltage, earth resistance testing and phase sequence tests required by the BS7671:2008 (17th Edition) and Part P Building Regulations.

KEY FEATURES:

- **Autosequences:** build a list of tests, press the test button and let the tester do all the work. This feature combined with the A 1214 EasiSwitch can significantly reduce testing time, becoming up to five times faster than a normal installation tester.
- **All-in-one insulation:** perform tests between L-N, L-PE and N-PE simultaneously in under 10 seconds.
- **Automated R1+R2:** using the optional A1214 EasiSwitch, the unit can significantly reduce the time taken to perform R1+R2 testing.
- **Schedules of inspection:** built-in schedulesofinspectioncanbecompletedonthe MI 3105 and then downloaded via the included EuroLink PRO software.
- **Structure building:** build a structure of the installation either on the software (which can then be sent to your tester) or on the tester so that your results are always saved on the correct circuit.
- **Fuse location:** locate circuit fuses/wires/faults using the optional A 1191 Fuse locator.
- **Earth spike testing:** Unit can perform both 2 and 3 wire earth spike testing and specific earth resistance measurement.
- **Downloadable:** downloads via RS232 or USB cable directly to the PC via the software included with the unit.
- **Help screens:** unit comes complete with in-built help screens for referencing on site.
- **Automatic loop evaluation:** built-in loop impedance tables allow automatic evaluation of the loop resistance compared to the regulations.
- **Online voltage monitoring:** monitors all 3 voltages in real-time.
- **Upgradeable:** if changes occur to the regulations, software changes can be made to the firmware to keep the unit up to date.
- **Polarity swap:** automatic polarity reversal on continuity test.
- **Insulation range:** wide range of insulation test voltages from 50 V to 1000 V, reading up to 1000 MΩ.
- **TripLock function:** Zs (RCD) function performs a loop test without tripping the RCD/RCBO.
- **Multi-system testing:** tests on TT, TN, IT and 110 V systems.
- **Wide frequency range** 15 - 500 Hz.
- **Built-in charger & rechargeable batteries:** unit has an inbuilt charging circuit and comes complete with a set of rechargeable NiMH batteries.
- **RCD auto:** automated RCD testing reduces circuit test time.
- **Phase sequence test:** required by BS7671:2008 17th Edition.
- **TRMS Leakage test:** measure and save TRMS load / leakage currents passing around the system.
- **LUX testing:** optional light measurement function - accessory A 1172 Type B probe or A 1173 Type C probe.

APPLICATION:

- Initial and periodic testing of domestic and industrial installations
- Testing on high and low frequency installations e.g. testing in aviation, railway networks etc..
- Testing of single and multiphase systems.
- Testing of TT, TN, IT and 110 V systems.
- High volume testing (industrial, aircraft, railway, mining, chemistry, fery boat)

STANDARDS:

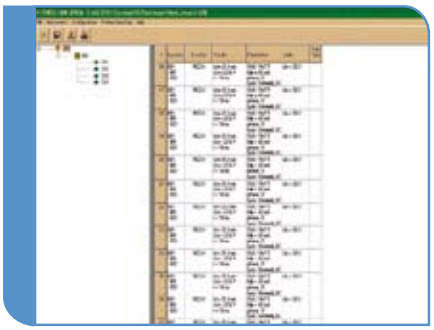
Functionality: EN 61557
Other reference standards for testing:
BS 7671; IEC/EN 60364; EN 61008; EN 61009; EN 60755; AS/NZ 3760
EMC: EN 61326
Safety (LVD): EN 61010-1; EN 61010-031

Accessories: page 1.30

TECHNICAL SPECIFICATION:

INSULATION EN 61557-2	With DC voltage	50 - 1000 V
	Range	0 - 1000 MΩ
	All-in-one insulation test (L-PE, N-PE, L-N)	✓
	Adjusting test time to capacitance of load	✓
CONTINUITY EN 61557-4	Automated R1+R2 testing	Optional
	R low 200 mA DC	✓
	Range	0 - 1999 Ω
	Automatic polarity swap	✓
	Low current DC Resistance	✓
LINE/LOOP EN 61557-3	Line impedance measurement	✓
	Loop impedance measurement (Ze & Zs)	✓
	High accuracy TRIP LOCK impedance	✓
	Built-in loop impedance tables for automatic PASS/FAIL decision	✓
RCD EN 61557-6	RCD type (general & selective)	A, AC, B
	RCD trip time measurement	✓
	Ramp test	✓
	RCD auto	✓
	10, 30, 100, 300, 500, 1000 mA	✓
VOLTAGE FREQUENCY	Real-time AC voltage measurement	✓
	Simultaneous voltage measurement over 3 phases	✓
	Frequency measurement	✓
PHASE SEQUENCE	L1 - L2 - L3	✓
EARTH EN 61557-5	Three wire resistance	✓
	Two wire resistance	✓
	One clamp & three wire resistance	✓
	Two clamps	✓
	High noise immunity with two clamps	3 A and more
	Specific earth resistance	Optional
AUTO SEQUENCE TESTS	Autotest of insulation on all conductors L-N-PE	✓
	AUTOSEQUENCE ® procedure on switchboard	✓
	AUTOSEQUENCE ® procedure on circuit	✓
	Automatic evaluation of safety, based on all measured values	✓
OTHER MEASUREMENTS	LUX light measurement (A 1172 & A 1173)	Optional
	TRMS leakage current	✓
	Medical sites (IT RMD test)	✓
	Varistor overvoltage	✓
	Fuse/fault locator (A 1191)	Optional
	High resolution loop impedance (mΩ) (A 1143)	Optional
SPECIAL FUNCTIONALITIES	Frequency span	15 - 500 Hz
	Supports 110 V systems	✓
	TN/TT and IT earthing system mode	✓
ON LINE WARNINGS	Touch electrode	✓
	HELP menu	✓
COMMUNICATION	RS232	✓
	USB	✓
SOFTWARE MEMORIES	Number of memory locations	2000
	EuroLink PRO	✓
	EuroLink PRO Plus (A 1196)	Optional
GENERAL DATA	Safety category	CAT IV/300 V
	In-built battery charger	✓
	Batteries	6 x AA
	Weight	1.3 kg
	Size (mm)	230 x 103 x 115

Large LCD screen with backlight



EuroLink PRO enables the following acivities:
- data downloading,
- creation of simple report,
- export of measured data to spreadsheet.

EuroLink PRO Plus is also anabling printing on NICEIC certificates.

ORDERING INFORMATION:

Part No.	Description
MI 3105	**EurotestXA**

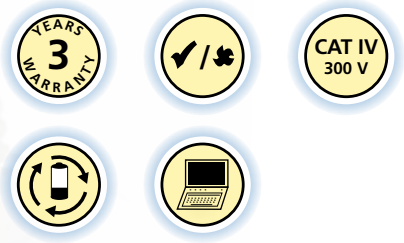
STANDARD KIT INCLUDES:

Part No.	Description
MI 3105	EurotestXA
A 1003	Mains plug
20901041	Carrying neck strap
A 1301	Test lead 3 x 1.5 m (brown, green, blue)
A 1147	Rechargeable NiMH AA batteries (6 pcs)
83005447	12 V battery charging adaptor
83005401	UK mains cable for charging adaptor
20205354	Battery holder
A 1015	Test probe (blue)
A 1298	Test probe (brown)
A 1062	Test probe (green)
83005485	Crocodile clip (blue)
A 1297	Crocodile clip (brown)
83005484	Crocodile clip (green)
A 1289	Soft carrying bag
A 1291	EuroLink PRO with USB cable and RS232 cable
S 2026	Earth spike kit (20 m black, 20 m green, 4.5 m blue, 2 spikes)
A 1018	High accuracy current clamp
A 1019	Current clamp
	Short instruction manual, Instruction manual on CD, Calibration certificate

Accessories: page 1.30

MI 3121 SMARTEC® Insulation / Continuity

BS7671:2008 (17th Edition) and Part P Professional Downloadable Insulation, Continuity and AC Voltage Tester



The astounding MI 3121 SMARTEC Insulation /Continuity tester takes dead testing to another level. With both an analogue and digital display, the unit can accurately measure up to 2000 Ω on continuity and up to a staggering 30 GΩ (30,000 MΩ) on insulation. With configurable limits, the bright red and green indicator lights and on screen tick/cross give a clear pass/fail indication, even in the darkest of conditions. The MI 3121 is rechargeable and has a magnetic back in order to free up hands for testing. The CAT IV protection rating ensures that, as long as the instrument is used correctly, the user is safe in almost any situation. The unit also has built in help screens and can store up to 1900 results. All the results can be quickly saved and referenced on the unit while out on site and can be downloaded via the optional A 1291 EuroLink PRO software or A 1290 EuroLink PRO Plus software which enables automatic printing onto NICEIC forms. Performs continuity, insulation and AC voltage measurement tests.

KEY FEATURES:

- **Downloadable:** downloads via RS232 or USB cable directly to the PC via the optional A 1290 and A 1291 software.
- **Help screens:** unit comes complete with in-built help screens for referencing on site.
- **Polarity swap:** automatic polarity reversal on continuity test.
- **Insulation range:** wide range of insulation test voltages from 50 V to 1000 V, reading up to 30 GΩ (30,000 MΩ).
- **Built-in charger & rechargeable batteries:** unit has an inbuilt charging circuit and comes complete with a set of rechargeable NiMH batteries.
- **Custom limits:** set limits on both Insulation and continuity and large green and red lights will indicate a PASS or FAIL reading.
- **Easy to use:** large bright LCD display with large buttons for easy use (even while wearing gloves).

APPLICATION:

- Domestic dead circuit testing.
- Industrial dead circuit testing.
- Telecommunication systems testing.
- Resistance measurements.

STANDARDS:

Functionality: EN 61557
Electromagnetic compatibility (EMC): EN 61326-1; EN 61326-2-2
Safety (LVD): EN 61010-1; EN61010-031

Accessories: page 1.30

TECHNICAL SPECIFICATION:

CONTINUITY	200 mA Continuity test	✓
	Range	0 - 1999
	Automatic polarity reversal	✓
	Low current DC measurement	✓
	Configurable limits	✓
	Lead compensation facility	✓ (up to 20 Ω)
INSULATION	Test voltages	50, 100, 250, 500, 1000 V
	Range	0 - 30 GΩ
	Configurable limits	✓
AC VOLTAGE MEASUREMENT	Range	0 - 550 V
	TRMS measurement	✓
FREQUENCY MEASUREMENT	Range	0 - 500 Hz
OTHER FEATURES	Analogue and digital display	✓
	On-screen pass/fail evaluation	✓
	Built-in battery charger	✓
	Backlight	✓
COMMUNICATION	RS232	✓
	USB	✓
SOFTWARE MEMORIES	Number of memory locations	1900
	EuroLink PRO (A 1291)	Optional
	EuroLink PRO Plus (A 1290)	Optional
GENERAL DATA	Batteries	6 x AA
	Safety category	CAT IV/300 V
	Weight	0.85 kg
	Size (mm)	135 x 230 x 75

KEY FEATURES

Large LCD screen with backlight and PASS/FAIL indicators.

Simple and fast manipulation

USB and RS232 communication.

ORDERING INFORMATION:

Part No.	Description
MI 3121	**Smartec Insulation / Continuity**

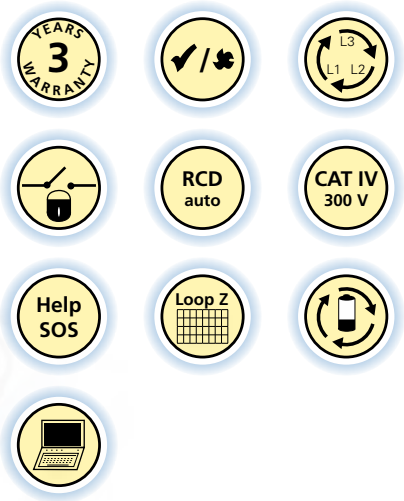
STANDARD KIT INCLUDES:

Part No.	Description
MI 3121	Smartec Insulation / Continuity
20901090	Soft hand strap
A 1055	Test lead (2 x 1.5 m Red, Black)
A 1147	Rechargeable NiMH AA batteries (6 pcs)
83005447	12 V battery charging adaptor
83005401	UK mains cable for charging adaptor
A 1016	Test probe (red)
A 1014	Test probe (black)
A 1064	Crocodile clip (red)
A 1013	Crocodile clip (black)
	Short instruction manual
	Instruction manual on CD
	Calibration certificate

Accessories: page 1.30

MI 3122 SMARTEC® Z Line-Loop / RCD

BS7671:2008 (17th Edition) and Part P Downloadable Ze, Zs Line, RCD and Phase Sequence Tester



The MI 3122 SMARTEC Z Line-Loop / RCD is designed specifically for Live circuit testing. This fully featured rechargeable unit can perform Ze and Zs testing, RCD trip time testing, RCD ramp current testing, automated RCD testing, and Line resistance testing (for 3 phase systems). The online voltage monitoring system allows the electrician to monitor what is happening on three simultaneous voltages in real-time while the built-in fault loop impedance tables allows for automated evaluation of loop readings. The bright red and green lights combined with an onscreen pass/fail indication and on-board help screens means that circuit testing and be perform with the greatest of ease while still ensuring the circuit meets the relevant safety regulations. All the results can be quickly saved and referenced on the unit while out on site and can be downloaded via the optional A 1291 EuroLink PRO software or A 1290 EuroLink PRO Plus software which enables automatic printing onto NICEIC forms. Performs RCD, loop, line, AC voltage and phase sequence tests required by the BS7671:2008 (17th Edition) and Part P Building Regulations.

KEY FEATURES:

- **Help screens:** unit comes complete with built-in help screens for referencing on site.
- **Automatic loop evaluation:** built-in loop impedance tables allow automatic evaluation of the loop resistance compared to the regulations.
- **Online voltage monitoring:** monitors all 3 voltages in real-time.
- **Phase sequence test:** requested by BS7671:2008 17th Edition.
- **Upgradeable:** if changes occur to the regulations, software.
- **TripLock function:** Zs (RCD) function performs a loop test without tripping the RCD/RCBO.
- **Built-in charger & rechargeable batteries:** unit has an inbuilt charging circuit and comes complete with a set of rechargeable NiMH batteries.
- **RCD auto:** automated RCD testing reduces circuit test time.
- **Downloadable:** downloads via RS232 or USB cable directly to the PC via the optional A 1290 and A 1291 software .

APPLICATION:

- Domestic and Industrial live circuit testing.
- Single phase and 3-phase testing on TT/TN systems.

STANDARDS:

Functionality:
EN 61557
Electromagnetic compatibility (EMC):
EN 61326-1;
EN 61326-2-2
Safety (LVD):
EN 61010-1; EN61010-031

Accessories: page 1.30

17th Edition Installation Testers

TECHNICAL SPECIFICATION:

RCD EN 61557-6	Current range	10, 30, 100, 300, 500, 1000 mA
	Trip time measurement	✓
	RCD ramp test	✓
	RCD auto test	✓
	180 degree function	✓
	RCD multipliers	1/2, 1, 2, 5
	RCD type (general & selective)	A, AC
LINE/LOOP EN 61557-3	Line impedance measurement	✓
	Loop impedance measurement (Ze & Zs)	✓
	High accuracy TRIP LOCK impedance	✓
	PFC range	✓
	PSC range	✓
	Built-in loop impedance tables for automatic PASS/FAIL decision	✓
VOLTAGE FREQUENCY	Real-time AC voltage measurement	✓
	Simultaneous voltage measurement over 3 phases	✓
	Frequency measurement	✓
PHASE SEQUENCE	L1 - L2 - L3	✓
ON LINE WARNINGS / INFORMATION	Touch electrode	✓
	HELP menu	✓
COMMUNICATION	RS232	✓
	USB	✓
SOFTWARE MEMORIES	Number of memory locations	1900
	EuroLink PRO (A 1291)	Optional
	EuroLink PRO Plus (A 1290)	Optional
GENERAL DATA	Safety category	CAT IV/300 V
	Built-in battery charger	✓
	Batteries	6 x AA
	Weight	0.85 kg
	Size (mm)	135 x 230 x 75

KEY FEATURES

Large LCD screen with backlight and PASS/FAIL indicators.

Simple and fast manipulation

USB and RS232 communication.

ORDERING INFORMATION:

Part No.	Description
MI 3122	**Smartec Z Line-Loop / RCD**

STANDARD KIT INCLUDES:

Part No.	Description
MI 3122	Smartec Z-Loop-Line / RCD tester
20901090	Soft hand strap
A 1003	Mains plug
A 1301	Test leads 3 x 1.5 m (brown, green, blue)
83005447	12 V battery charging adaptor
83005401	UK mains cable for charging adaptor
A 1015	Test probe (blue)
A 1298	Test probe (brown)
A 1062	Test probe (green)
83005485	Crocodile clip (blue)
A 1297	Crocodile clip (brown)
83005484	Crocodile clip (green)
	Short instruction manual
	Instruction manual on CD
	Calibration certificate

Accessories: page 1.30

MI 3123 SMARTEC® Earth / Clamp

BS7671:2008 (17th Edition) and Part P Professional Downloadable 2, 3 and 4 wire, earth spike resistance tester with optional clamp testing

The MI 3123 SMARTEC Earth / Clamp is a remarkable earth spike resistance tester with the ability to perform 2-wire and 3-wire earth spike testing and 4-wire soil resistivity testing. With the optional A 1018 and A 1019 current clamps, the unit can perform one clamp resistance measurement, two clamps (no contact) earth spike testing and TRMS current measurement up to 20 A. Only weighing 0,85 kg, this rechargeable unit has configurable limits which can provide automated PASS/FAIL evaluation of test results. The lightweight design, large bright LCD screen, built-in help screens, optional downloading via RS232 or USB and CAT IV protection rating make the MI 3123 an incredible earth spike resistance test instrument.

KEY FEATURES:

- **Earth spike testing:** 2-wire and 3-wire earth spike testing and soil resistivity testing.
- **Earth resistance testing via clamps:** optional one clamp and two clamps earth spike resistance testing (required optional A 1018 and A 1019 clamps).
- **Downloadable:** downloads via RS232 or USB cable directly to the PC via the optional A 1290 and A 1291 software.
- **Help screens:** unit comes complete with in-built help screens for referencing on site.
- **Built-in charger & rechargeable batteries:** unit has an inbuilt charging circuit and comes complete with a set of rechargeable NiMH batteries.
- **Custom limits:** set limits on both Insulation and continuity and large green and red lights will indicate a PASS or FAIL reading.
- **Easy to use:** large bright LCD display with large buttons for easy use (even while wearing gloves).

APPLICATION:

- Testing on TT and IT systems.
- Testing sub-station earthing.
- Lightning system testing.

STANDARDS:

Functionality:
EN 61557
Electromagnetic compatibility (EMC):
EN 61326-1;
EN 61326-2-2
Safety (LVD):
EN 61010-1; EN61010-031

Accessories: page 1.30

TECHNICAL SPECIFICATION:

EARTH EN 61557-5	3-wire resistance	✓
	2-wire resistance	✓
	One clamp & three wire resistance	Optional
	Two clamps	Optional
	High noise immunity with two clamps	3 A and more
	Specific earth resistance	✓
OTHER MEASUREMENTS	TRMS leakage current (A 1018, A 1019 & A 1074)	Optional
ON LINE WARNINGS	HELP menu	✓
COMMUNICATION	RS232	✓
	USB	✓
SOFTWARE MEMORIES	Number of memory locations	1900
	EuroLink PRO (A 1291)	Optional
	EuroLink PRO Plus (A 1290)	Optional
GENERAL DATA	Safety category	CAT IV/50 V
	In-built battery charger	✓
	Batteries	6 x AA
	Weight	0.85 kg
	Size (mm)	135 x 230 x 75

KEY FEATURES

Large LCD screen with backlight and PASS/ FAIL indicators.

USB and RS232 communication.

ORDERING INFORMATION:

Part No.	Description
MI 3123	**Smartec Earth / Clamp**

STANDARD KIT INCLUDES:

Part No.	Description
MI 3123	Smaretc Earth / Clamp
20901090	Soft hand strap
20691900	Test lead 20 m (green)
20691012	Test lead 4.5 m (blue)
20691015	Test lead 4.5 m (red)
20691901	Test lead 20 m (black)
A 1022	Earth test rod (4 pcs)
A 1147	Rechargeable NiMH AA batteries (6 pcs)
83005447	12 V battery charging adaptor.
83005401	UK mains cable for charging adaptor
	Short instruction manual
	Instruction manual on CD
	Calibration certificate

Accessories: page 1.30

MI 2126 Earth 2/3

2 and 3 Wire Earth Spike Tester

The MI 2126 is a high quality, professional grade test instrument, for performing two- and three-wire earth resistance measurements in accordance with European standard EN 61557-5, on which the estimation of earthing quality is based. The equipment was designed and produced according to many years of experience of producing and dealing with earth resistance and electric installation test equipment.

KEY FEATURES:

- **Easy to use:** only 3 buttons control all the operations of the test instrument and instruction manual explains the various earth spike testing methods.
- **Portable:** light in design and battery operated, the MI 2126 can easily be placed with your other test instruments for moving between test sites.
- **Reliable:** reliable results even in the presence of stray currents.
- **Repeatability:** outstanding repeatability of test results especially in the case of high test probe resistance of various earthing structures (e.g. asphalt, sand, and stone).

APPLICATION:

- 2 wire and 3 wire earth spike resistance testing.
- Testing single rod and multiple spiked earthing networks.

STANDARDS:

Functionality:
BS7671
EN 61557-1 - Electrical safety in low voltage distribution systems General requirements
EN 61557-5 - Electrical safety in low voltage distribution systems
Resistance to earth: DIN/VDE 0100, CEI 64.8, EN/IEC 61010-1
Electromagnetic compatibility (EMC):
EN 61326 - Electrical equipment for measurement, control and laboratory use.
Safety (LVD):
EN 61010-1

TECHNICAL SPECIFICATION:

FEATURES	
EARTH RESISTANCE	
3-wire resistance	✓
2-wire resistance	✓
Display range	0 ÷ 19.99 kΩ
Test voltage:	<40 V, 125 Hz / 150 Hz, sine wave
Short-circuit test current	<20 mA
High noise rejection	✓
Potential and current probe resistance test:	✓
GENERAL DATA	
Power supply voltage	4 x 1.5 V, C type
Protection classification:	double insulation
Power consumption:	5 VA
Size (mm)	280 x 70 x 80
Weight	0.4 kg

ORDERING INFORMATION:

Part No.	Description
MI 2126	**Earth 2/3**

STANDARD KIT INCLUDES:

Part No.	Description
MI 2126	Earth 2/3
83005246	Carrying strap
A 1024	Test lead 4.5 m (black)
20691893	Test lead 15 m (red)
A 1025	Test lead 20 m (blue)
A 1022	Earth test rod (2 pcs)
	Instruction manual
	Calibration certificate

MI 3103 GigaOhm 1 kV

Insulation / Continuity Tester

The MI 3103 GigaOhm 1 kV tester is a slim line, easy to use installation tester with the ability to perform accurate resistance measurements quickly and efficiently. Features including A.C. voltage testing, built-in fuse protection and CAT III protection ensure that the user is safe and protected while the easy to read display and rotary dial (which can be used even while wearing gloves) makes the MI 3103 Gigaohm 1 kV a extremely good value, versatile and straightforward instrument to use.

KEY FEATURES:

- Slim design.
- Easy to use.
- 250 V, 500 V and 1000 V insulation testing.
- Tests up to 2000 MΩ.
- 200 mA continuity testing.
- Large LCD display.
- Low current testing for induction systems.
- AC voltage measurement.

APPLICATION:

- Domestic installation dead testing.
- Periodic installation testing.

STANDARDS:

Functionality:
IEC/EN61557-1
IEC/EN 61557-2
IEC/EN 61557-4
IEC/EN 61557-10
BS 7671
Electromagnetic compatibility (EMC):
IEC 61326 Class B
Safety (LVD):
EN/IEC 61010-1 (instrument)
EN/IEC 61010-2-31 (accessories)

TECHNICAL SPECIFICATION:

CONTINUITY	
200 mA	✓
Range	0 - 2000 Ω
Changes polarity	✓
Lead nulling facility	✓ (up to 5 Ω)
Low current DC measurement	yes
INSULATION	
Test voltages	250 V, 500 V, 1000 V
Range	0 - 2000 MΩ
OTHER FEATURES	
AC voltage measurement	✓
Auto shut off	✓
GENERAL DATA	
Power source	4 x 1.5 V, C type
Protection	CAT III/300 V
Size (mm)	280 x 70 x 80
Weight	0.5 kg

ORDERING INFORMATION:

Part No.	Description
MI 3103	**GigaOhm 1kV**

STANDARD KIT INCLUDES:

Part No.	Description
MI 3103	GigaOhm 1 kV
83005246	Carrying strap
83003679	Test lead with test probe, 2 m, (black)
83003678	Test lead with test probe, 2 m, (red)
A 1013	Crocodile clip (black)
	Instruction manual
	Calibration certificate

Accessories: page 1.30

A 1143 Euro- Z 290 A

High accuracy Z Loop/Line Tester

The A 1143 Euro- Z 290 A is a professional portable high current impedance tester. It performs high precision line and high precision fault loop impedance measurements in environments up to CAT IV/310 V.

KEY FEATURES:

- Designed to work independantly or in conjunction with the: MI 2086 Eurotest 61557, MI 3101 EurotestAT, MI 3105 EurotestXA and MI 3321 MultiServicerXA.
- Adapts the instruments to read from 0.1 mΩ up to 19.99 Ω.
- Works on both single phase and 3-phase systems (110 V to 440 V)
- Test current up to 350 A.
- High overvoltage category CAT IV/310 V.
- IPSC and IPFC readings calculated up to 400 kA.
- Carry all the accessories in the strong, rugged, durable case of the unit.
- Built-in LCD for standalone measurement.

APPLICATION:

- High accuracy loop and line measurements.
- High accuracy Ze measurements.
- Power transformer and motor winding measurement.

STANDARDS:

Safety regulations: EN 61010-1:2001
Electromagnetic compatibility (EMC): EN 61326:2002
Measurements according to:
European standard EN61557:
General requirements: Part 1
Loop resistance Part 3

ORDERING INFORMATION:

Part No.	Description
A 1143	Euro- Z 290 A Tester

STANDARD KIT INCLUDES:

Part No.	Description
A 1143	Euro- Z 290 A adapter
20691959	Test lead, 2-wire, 2 pcs
A 1048	Test lead black, 2 m
A 1014	Test probe black
A 1016	Test probe red, 2 pcs
A 1013	Crocodile clip black, 3 pcs
A 1064	Crocodile clip red, 2 pcs
A 1017	RS232 cable
83005365	RS232/PS2 cable
	Instruction manual
	Calibration certificate

A 1199 ρ adapter

Specific earth resistance adapter

ρ adapter standard set is design to be used together with instruments EurotestAT MI 3101 or EurotestXA MI 3105 and the set of extension leads from 3-wire Earth sets. The fourth wire is added to ρ adapter standard set.

KEY FEATURES:

- Adapter for performing 4-wire specific earth resistance measurements.
- Designed for the MI 3101 Eurotest AT and MI 3105 EurotestXA.
- Comes complete with 4-wire test lead, 15 m red extension cable, 2 earthing spikes and carry case.
- Manual contains step by step guide on how to perform the test.
- Recommended use in combination with 3-wire 20 m earth test lead set (S 2026).

APPLICATION:

- 4-wire ground resistance measurement.
- Specific earth resistance measurement.

STANDARDS:

Safety regulations:
EN 61010-1:2001

Electromagnetic compatibility (EMC):
EN 61326:2002

ORDERING INFORMATION:

Part No.	Description
A 1199	ρ adapter

STANDARD KIT INCLUDES:

Part No.	Description
A 1199	ρ adapter
A 1020	Carrying bag
A 1022	2-earth spikes
20691893	Extension cable red 15 m
A 1021	Connection cable
	Instruction manual
	Calibration certificate

Accessories: page 1.30

A 1214 EASI Switch

Automated (R1 + R2) contuinuity adaptor

The A 1214 EASI Switch adaptor is the first and only adaptor that will allow R1+R2 measurements to be performed automatically (i.e. no need to exchange leads or use connectors). When used in conjunction with the MI 3101 EurotestAT and MI 3105 EurotestXA, the A 1214 can be quickly connected to all the wires of the ring circuit at the distribution board and directly and remotely controlled by the test instrument in order to perform all the necessary ring continuity tests. This is a very quick and easy method that significantly reduces the time involved in testing ring circuits.

KEY FEATURES:

- Automated R1+R2 testing of dead circuits (circuits with no voltage connected)
- Live, neutral and PE resistance all measured at a press of a button.
- Quick, efficient and easy
- Once connected, no need to exchange leads until all continuity tests are complete.
- When used with the MI 3101 Eurotest AT and MI 3105 Eurotest XA, the adaptor can be used to automatically calculate (R1+R2)/4 for easy results evaluation

APPLICATION:

- Continuity testing of ring circuits in both domestic and industrial situations

STANDARDS:

Safety regulations:
EN 61010-1:2001

Electromagnetic compatibility (EMC):
EN 61326:2002

ORDERING INFORMATION:

Part No.	Description
A 1214	EASI Switch

STANDARD KIT INCLUDES:

Part No.	Description
A 1214	Easi Switch
A 1020	Soft carrying bag
A 1013	Crocodile clip black, 2 pcs
83005485	Crocodile clip blue, 2 pcs
83005484	Crocodile clip green, 2 pcs
	Instruction manual
	Calibration certificate

HC 30S, HC 60M and HC 90L Hardcase

Heavy duty protection for your Metrel test Instrument

Although we do our best to try and avoid accidents sometimes accidents can happen. Protect your instrument from damage with the new HC range of hard carry case. Light, durable and easy to carry, these cases have gone through rigorous testing including drop tests, impact tests, rain resistance tests, water submersion tests and vibration tests to ensure that they are of the highest quality and provide unparalleled protection for your Metrel test instrument. Padlock holes are moulded into the case as standard to keep your unit secure and safe, while the lifetime manufacturers warranty provides total piece of mind.

KEY FEATURES:

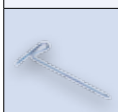
- **Lockable:** padlock holes allow the case to be padlocked and secured.
- **Drop tested:** drop tested from various heights up to 5.7 meters (19") at various angles and containing various weights to ensure that your instrument stays secure when the case is closed.
- **Impact tested:** dart impact tested to ensure full instrument protection.
- **Strong latches:** press & pull handle operation with extra-strength wide design to ensure that the case will not pop open when dropped.
- **Purge Valve:** locks the air into the case to ensure you're your instrument is kept in a stable environment.
- **Rainproof:** withstands intensive rainfall, keeping your instrument watertight.
- **Carry Handle:** a strong, durable inside core with soft overlay for comfortable transportation between sites.
- **Instruments supported**: suitable for Metrel MI 3xxx series Electrical Installation Testers (see accessories page for details)

Accessories: page 1.30

Accessories selection guide

Photo	Product group	Accessory decription	Part No.	Application / Instrument	MI 3000	MI 3100	MI 3002	MI 3102	MI 3101	MI 3105	MI 3121	MI 3122	MI 3123	MI 2126	MI 3103
	Bags, cases and straps	Carrying neck strap	2090 1041	Neck strap for carrying MI 3000 series multifunction installation test instruments.	✓	✓	✓	✓	✓	✓					
	Bags, cases and straps	Soft Carrying bag for Eurotest multifucn-tiona testers	A 1289	Soft Carrying bag for MI 3000 series multifunction test instruments.	✓	✓	✓	✓	✓	✓					
	Bags, cases and straps	Soft Carrying bag for Smartec single-fucn-tional testers	A 1271	Soft Carrying bag for MI 3000 series multifunction test instruments.							✓	✓	✓		
	Bags, cases and straps	Small hard case	HC 30S	Small hard case (L x W x D) 299 x 248 x 195 mm for instruments (IP65, waterproof, shockproof) including foam inlay.	✓						✓	✓	✓		
	Bags, cases and straps	Medium hard case	HC 60M	Medium hard case (L x W x D) 360 x 290 x 165 for instru-ments (IP65, waterproof, shockproof) including foam inlay.		✓	✓								
	Bags, cases and straps	Large hard case	HC 90L	Large hard case (L x W x D) 410 x 323 x 168 mm for instruments (IP65, waterproof, shockproof) including foam inlay.				✓	✓	✓					
	Batteries and chargers	Battery Holder	2020 5354	Battery holder (without bat-teries) for MI 3000 series multifunctional installation test instruments.	✓	✓	✓	✓	✓	✓					
	Batteries and chargers	1 x 1.2 V NiMH battery	8300 5106	Single rechargeable AA battery for use with installation test instruments.	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Batteries and chargers	12 V battery charging adaptor	8300 5447	12 V DC supply for MI 3000 series installation test instru-ments (requires 83005401 cable).	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Batteries and chargers	UK mains cable for charging adaptor	8300 5401	Two wire power supply cable for 83005447 charging adaptor.	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Batteries and chargers	Fast charger	A 1169	Fast charger for 12 AA / 6 C type / 6 D type / 4 x 9 V block type.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Batteries and chargers	6 cells AA battery charger	A 1160	Fast 6 cells AA battery charger with a set of 6 pcs of NiMH batteries including mains plug and car adaptor.	✓	✓	✓	✓	✓	✓	✓	✓	✓		

Accessories: page 1.30

Photo	Product group	Accessory decription	Part No.	Application \ Instrument	MI 3000	MI 3100	MI 3002	MI 3102	MI 3101	MI 3105	MI 3121	MI 3122	MI 3123	MI 2126	MI 3103
	Clamps	High accuracy current clamp (0.5 mA - 1000 A)	A 1018	High accuracy current clamp for TRMS current testing and Earth resistance testing (MI 3105 only).				✓		✓			✓		
	Clamps	Current Clamp (20 mA - 1000 A)	A 1019	Standard current clamp for TRMS current testing and Earth resistance testing (MI 3105 only).				✓		✓			✓		
	Clamps	200 A/0.2 A mini clamp for TRMS current measurement	A 1074	200 A mini clamp meter for current measurement in confined spaces.				✓		✓					
	Clamps	Leakage current clamp	A 1283	Current clamp for measuring low level leakage currents down to 10 uA.				✓		✓					
	Earth resistance testing accessories	Test lead set 2 m (blue,red, green, black)	S 2009	Test lead set enables connection of clamps for two clamps measurement of earth spike resistance soil resistivity testing									✓		
	Earth resistance testing accessories	Earth test set 50 m (4 wire)	S 2007	Leads for performing earth resistance measurement on distance up to 50 m.									✓		
	Earth resistance testing accessories	Earth Spike kit 20 m (20 m black, 20 m green, 4.5 m blue)	S 2026	Extension leads for performing 20 m 3-wire earth resistance testing.				✓	✓	✓					
	Earth resistance testing accessories	Earth Spike kit 50 m (50 m black, 50 m green, 4.5 m blue)	S 2027	Extension leads for performing 20 m, 3-wire earth resistance testing.				✓	✓	✓					
	Earth resistance testing accessories	20 m earth extension lead	A 1177	For R2 testing of exposed metal work or earth resistance testing	✓	✓	✓	✓	✓	✓	✓		✓		
	Earth resistance testing accessories	Earth test rod (1 pcs)	A 1022	Earth test rod for earth resistance testing.				✓	✓	✓			✓	✓	
	Locators	Fuse locator	A 1191	Receiver with variable sensitivity designed to detect the signals generated by the installation test instruments in order to locate faults/fuses/wires.					✓	✓					
	Locators	Fuse locator non-contact probe (for use with A 1191)	A 1192	Probe for A 1191 enables higher accuracy fault/fuse location.					✓	✓					
	Locators	Fuse locator probe (for use with A 1191)	A 1167	Contact probe for A 1191 directly locates test signal generated by test instrument.					✓	✓					

Accessories: page 1.30

17th Edition Installation Testers

Photo	Product group	Accessory decription	Part No.	Instrument / Application	MI 3000	MI 3100	MI 3002	MI 3102	MI 3101	MI 3105	MI 3121	MI 3122	MI 3123	MI 2126	MI 3103
	Locators	Clamp adaptor cable for A 1191	A 1068	Adapts the A 1191 Fuse locator for use cable location via current clamp.					✓	✓					
	Other	LUX probe (Type B)	A 1172	LUX probe Type B for light measurement (range 0.01 lux - 20,000 lux with 5% accuracy).				✓		✓					
	Other	LUX probe (Type C)	A 1173	LUX probe Type C for light measurement (range 0.01 lux - 20,000 lux with 10% accuracy).				✓		✓					
	Other	ρ adaptor	A 1199	Adaptor used for measuring soil resistivity/specific earth resistance.					✓	✓					
	Other	Euro-Z 290 A impedance adaptor	A 1143	Adaptor which allows the test instrument to measure loop impedance down to an accuracy of 0.001 Ω.					✓	✓					
	Other	Easiswitch	A 1214	Adaptor for performing automated ring continuity testing.					✓	✓					
	Other	Breakout box	MPA1	Allows installation tests to be performed without the need to disconnect mains socket from their enclosures.	✓	✓	✓	✓	✓	✓	✓	✓			✓
	Other	Eurocheck field calibrator	CS 2099	Professional multifunctional field calibrator intended for use with installation test instruments.	✓	✓	✓	✓	✓	✓	✓	✓			✓
	Other	Magnetic contact probe	A 1198	Alternative to crocodile clip. Connect cable to RCD, fuse or other magnetic contact.	✓	✓	✓	✓	✓	✓	✓	✓			✓
	Other	Insulated rod for test-ing on LV at a distance	A 1201	Rod enables insulation resistance and continuity measurement on hard of access objects, e.g. luminar-ies.	✓	✓	✓	✓	✓	✓	✓	✓			✓
	Other	Additional extension part for A 1201	A 1202	Extension part for rod.	✓	✓	✓	✓	✓	✓	✓	✓			✓
	Other	Holder for commander	A 1245	Holder can be wrapped around commander connector and stores commander and test tip into the special fork.	✓	✓	✓	✓	✓	✓					
	Remote testing devices	Tip Commander (2 wire, 1.5 m) with spiral cable	A 1175	Two wire tip commander with test button and backlight button.	✓	✓									

Accessories: page 1.30

17th Edition Installation Testers

Photo	Product group	Accessory decription	Part No.	Application \ Instrument	MI 3000	MI 3100	MI 3002	MI 3102	MI 3101	MI 3105	MI 3121	MI 3122	MI 3123	MI 2126	MI 3103
	Remote testing device	Tip Commander (2 wire, 1.5 m) with spiral cable	A 1176	Two wire tip commander with test button and save button.			✓	✓	✓	✓					
	Remote testing device	Tip Commander (3 wire, 1.5 m) with spiral cable	A 1194	Three wire tip commander with test button and backlight button.	✓	✓									
	Remote testing device	Tip Commander (3 wire, 1.5 m) with spiral cable	A 1197	Three wire tip commander with test button and save button.			✓	✓	✓	✓					
	Remote testing device	TipCommander (2 wire, 1,5 m) with spiral cable	A 1270	Two wire tip commander with test button and save button. SmarTec design.							✓	✓			
	Remote testing device	TipCommander (2 wire, 1,5 m) with straight cable	A 1244	Two wire tip commander with test button and save button			✓	✓	✓	✓	✓	✓			
	Software, Books, publications	EuroLink PRO Plus software (with USB & RS232 cables)	A 1290	EuroLink PRO Plus software with additional professional reports, complete with USB and RS232 cables.			✓	✓	✓	✓	✓	✓	✓		
	Software, Books, publications	EuroLink PRO software (with USB & RS232 cables)	A 1291	EuroLink PRO software with complete with USB and RS232 cables.			✓	✓	✓	✓	✓	✓	✓		
	Software, Books, publications	EuroLink PRO upgrade to PRO Plus	A 1292	Password upgrade for standard EuroLink PRO software to enable PRO Plus features (e.i. printing on NICEIC).			✓	✓	✓	✓	✓	✓	✓		
	Software, Books, publications	EuroLink PRO Plus software	A 1196	EuroLink PRO Plus software with additional professional reports.			✓	✓	✓	✓					
	Software, Books, publications	Electrical installation certificate booklet	MET01	For the initial certification of: a new installation, a review, the introduction of one or more new cirtuits to an existing installation. Certificast compliante with BS7671:2008.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Software, Books, publications	Schedule of Inspection and circuit details/ test results	MET02	For consumer units and/or distribution boards with up to 36 ways. Shall be used in conjunction with MET01 or MET04. Certificate pads fully compliant with BS7671:2008.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Software, Books, publications	Minor Electrical Installation Works Certificate	MET03	Certificate to varify testing after minor works have been performed on an existing electrical installation.	✓	✓	✓	✓	✓	✓	✓	✓			✓
	Software, Books, publications	Periodic Inspection Reports	MET04	For reporting on the condition of an existing electrical installation. Certificate pads fully compliant with BS7671:2008 wiring regulations.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Accessories: page 1.30

17th Edition Installation Testers

Photo	Product group	Accessory decription	Part No.	Instrument / Application	MI 3000	MI 3100	MI 3002	MI 3102	MI 3101	MI 3105	MI 3121	MI 3122	MI 3123	MI 2126	MI 3103
	Software, Books, publications	Part P Domestic Electrical Installation Certificate	MET05	For certifying an installation in a single dwelling, designed, constructed and inspected and tested by one person. Certificate pads fully compliant with BS7671:2008.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Test leads, cables, probes and crocodile clips	Mains Plug	A 1003	For live testing on circuits through the standard BS1373 domestic plug socket.	✓	✓	✓	✓	✓	✓		✓			
	Test leads, cables, probes and crocodile clips	Test leads 3 x 1.5 m (Black, Green, Blue)	A 1011	For performing live and dead testing on an installation.	✓	✓	✓	✓	✓	✓		✓			
	Test leads, cables, probes and crocodile clips	Test leads 3 x 1.5 m (Brown, Green, Blue)	A 1301	For performing live and dead testing on an installation.	✓	✓	✓	✓	✓	✓		✓			
	Test leads cables, probes and crocodile clips	Test leads (Red, Black)	A 1055	Test leads for MI 3121 Insulation/Countinuity tester							✓				
	Test leads, cables, probes and crocodile clips	Test lead 50 m, black	A 1164	Extension lead for continuity, insulation, earth resistance and other measurements.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Test leads, cables, probes and crocodile clips	Test lead 20 m, black	A 1153	Extension lead for continuity, insulation, earth resistance and other measurements.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Test leads, cables, probes and crocodile clips	Test lead 4 m, black	A 1154	Extension lead for continuity, insulation, earth resistance and other measurements.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Test leads, cables, probes and crocodile clips	4 m green extension lead	A 1012	4 m lead for extending the length of a test lead.	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Test leads, cables, probes and crocodile clips	Test lead with test probe, 2 m (Black)	8300 3679	Test lead with integrated test probe.											✓
	Test leads, cables, probes and crocodile clips	Test lead with test probe, 2 m (Red)	8300 3678	Test lead with integrated test probe.											✓
	Test leads, cables, probes and crocodile clips	Test probe (Blue)	A 1015	Blue Metrel test probe.	✓	✓	✓	✓	✓	✓		✓			
	Test leads, cables, probes and crocodile clips	Test probe (Brown)	A 1298	Brown Metrel test probe.	✓	✓	✓	✓	✓	✓		✓			

Accessories: page 1.30

Photo	Product group	Accessory decription	Part No.	Instrument / Application	MI 3000	MI 3100	MI 3002	MI 3102	MI 3101	MI 3105	MI 3121	MI 3122	MI 3123	MI 2126	MI 3103
	Test leads, cables, probes and crocodile clips	Test probe (Green)	A1062	Green Metrel test probe.	✓	✓	✓	✓	✓	✓		✓			
	Test leads, cables, probes and crocodile clips	Test probe (Red)	A 1016	Red Metrel test probe.							✓				✓
	Test leads, cables, probes and crocodile clips	Test probe (Black)	A1014	Black Metrel test probe.	✓	✓	✓	✓	✓	✓	✓	✓			✓
	Test leads, cables, probes and crocodile clips	Crocodile clip (Blue)	8300 5485	Blue Metrel Crocodile clip.	✓	✓	✓	✓	✓	✓		✓			
	Test leads, cables, probes and crocodile clips	Crocodile clip (Brown)	A 1297	Brown Metrel Crocodile clip.	✓	✓	✓	✓	✓	✓		✓			
	Test leads, cables, probes and crocodile clips	Crocodile clip (Green)	8300 5484	Green Metrel Crocodile clip.	✓	✓	✓	✓	✓	✓		✓			
	Test leads, cables, probes and crocodile clips	Crocodile clip (Red)	A 1064	Red Metrel Crocodile clip.							✓				✓
	Test leads, cables, probes and crocodile clips	Crocodile clip (Black)	A 1013	Black Metrel Crocodile clip.	✓	✓	✓	✓	✓	✓	✓	✓			✓

Accessories: page 1.30

Accessories: page 1.30

MEASURING INSTRUMENTS AND TESTERS

- 17th Edition Electrical Installation Testers
- **Power Quality Analysis**
- High Voltage Insulation Diagnostics
- Appliances/Machines/Switchboard Safety
- LAN Cabling Certification
- Indoor Environment Quality
- Digital Multimeters/Clamp Meters/Voltage and Continuity Testers

Power Quality Analysis

Power, Energy, Voltage, Power Factor and EN50160 Analysis

METREL®

CATALOG 2010

Glossary - Power Quality Analysis

Real Power (P)
Real power is the power generated if a voltage is placed over a purely resistive load and current is allowed to flow. This is also called active power and is usually measured in Watts (W) or KiloWatts (kW)

Energy
The generation or use of useable electric power over a period of time. This is usually expressed in kilowatt-hours (kWh)

Reactive Power (Q)
Reactive power is the power that is generated by reactive components (e.g. inductors, capacitors) to create a magnetic field. This is usually measured in Volt-ampers reactive (VAr).

Apparent Power (S)
Apparent power is the perceived power from a load that has both resistive and reactive components. Apparent power is the vector sum of both real and reactive power and is usually measured in Volt-Amperes (VA)

Power Factor
Is a measure of a power system's efficiency and is the ratio of real power (Watts) to apparent power (Volt-Amperes).

Fundamental frequency
The Fundamental frequency is the lowest and most predominant frequency in a power system (e.g. The fundamental frequency of the mains voltage in the UK is 50 Hz). The fundamental frequency is also called the first harmonic of the system

Harmonics
Harmonic are a interger frequency multiplication of the fundamental frequency (e.g. with a fundamental of 50 Hz, the 2nd harmonic is 50 x 2 = 100 Hz, 3rd harmonic is 50 x 3 = 150 Hz). Harmonics can be in the form of current harmonics or voltage harmonics and can be caused by a variety of modern day equipment including resonating transformers, switch-mode power supplies (SMPS), IT equipment etc. Harmonics can cause a variety of system problems including overheating, false tripping of protective devices, excessive current draw and power fluctuations.

Interharmonics
Interharmonics are harmonics that are not an integer multiplication of the fundamental. The main sources of interharmonic waveform distortion are static frequency converters, induction motors and arcing devices.

Total Harmonic distortion
This is the ratio of a wave's harmonic content (for voltage or current) to it's fundamental component. Note: This is expressed as a percentage and is also called the "harmonic factor"

Transients
A transient is a short surge of current or voltage, which often occurring before steady-state conditions have become established

In-rush current
As a motor begins, the current needed to start the motor can be 10 to 15 times the normal operating current. This initial surge of current can cause dips in voltage and can be hard to analyse the with normal test meters, hence a analyser with a fast logging function is required.

Flickers
Defined by the IEEE std 59 "Flicker is the impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time". It is thus a noticeable and repeated dip or change in voltage of a power system. This has many causes and many results including the surges in motors, problems to people with epilepsy, unpredicted responses of electronic circuits and displays to flicker.

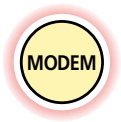
3 years manufactures waranty

EN 50160 Analysis

Harmonics measurement up to 63rd

Flickers measurement

Waveform monitoring



Modem communication

On-line PHASE diagram on LCD

Fast logging of inrush currents

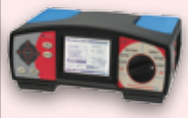
Energy measurement

On-line graphical scope


Downloadable

Accessories: page 2.14

Selection Guide for Power Quality Analysis

Part No.	MI 2092 Power Harmonics Analyser	MI 2292 Power Quality Analyser *Plus*	MI 2492 PowerQ	MI 2392 PowerQ *Plus*	MI 2130 VoltScanner
					
INPUTS					
Number of current measuring inputs	3	3	3	3	
Number of voltage measuring inputs	3	3	3	3	1
MEASUREMENTS					
TRMS Current measurement (Min., Max., Avg.)	✓	✓	✓	✓	
TRMS Voltage measurement (Min., Max., Avg.)	✓	✓	✓	✓	✓ (rms only)
Scope function	✓	✓	✓	✓	
On-Line harmonics measurement	✓	✓	✓	✓	
Frequency measurement	✓	✓	✓	✓	✓
Power measurement (W, VA, VAr)	✓	✓	✓	✓	
THD and harmonics analysis	✓	✓	✓	✓	
Power Factor and cos φ	✓	✓	✓	✓	
Recording of sags and swells	✓	✓		✓	✓
Recording of interruptions	✓	✓		✓	✓
Statistical evaluation	✓	✓			✓
Current in neutral conductor (calculated value)	✓	✓	✓	✓	
Phase diagram			✓	✓	
EN 50160 Analysis		✓		✓ (without flicker measurement)	1-phase, without flicker measurement
Flicker measurement		✓			
Transients measurement		✓			1-phase, voltage transients
Waveforms measurement		✓			
Fast logging mode		✓		✓	
Energy measurement	✓	✓	✓	✓	
Integration period	1 - 1800 s	1 - 1800 s	1 - 1800 s	1 - 1800 s	1 - 1260 s
COMMUNICATION PORTS					
USB COM port			✓	✓	
RS232 COM port	✓	✓	✓	✓	✓
GENERAL DATA					
Graphical LCD with backlight	160 x 116 dots	160 x 116 dots	160 x 160 dots	160 x 160 dots	
Maximal recording time	2 - 4 weeks	2 - 4 weeks	2 - 5 days	2 - 5 days	2 - 4 weeks
Memory module size	2 MB	2 MB	1 MB	1 MB	32 kB
PC Sofware	✓	✓	✓	✓	✓
Maximal test voltage – interphase value	900 V rms	900 V rms	952 V rms	952 V rms	265 V rms
Maximal test voltage – between phase and PE conductors	550 V rms	550 V rms	550 V rms	550 V rms	265 V rms
Frequency range	43 - 68 Hz	43 - 68 Hz	45 - 66 Hz	45 - 66 Hz	47 - 62 Hz
Over voltage category	CATIII/600 V	CATIII/600 V	CATIII/600 V	CATIII/600 V	CATIII/300 V
AC power supply	✓	✓	✓	✓	✓
Built-in battery charger	✓	✓	✓	✓	✓
Rechargeable batteries (NiMH)	4 x C type	4 x C type	6 x AA	6 x AA	4 x AA
Battery life (typically)	5 h	5 h	12 h	12 h	180 h
Weight	2 kg	2 kg	0.6 kg	0.6 kg	0,5 kg
Size (mm)	265 x 110 x 185	265 x 110 x 185	220 x 115 x 90	220 x 115 x 90	103 x 51 x 199

Accessories: page 2.14

MI 2092 Power Harmonics Analyser

3-phase power quality analyser for complete power quality assessment

3 YEARS WARRANTY

63rd Harm

ENERGY counter

ONLINE scope

The MI 2092 Power Harmonics Analyser is a versatile, easy to use instrument for long term analysis of 3-phase power systems. With the ability monitor a system for up to 4 weeks, the recorder can provide an entire months worth of data which could include voltage and current fluctuations, power draw and usage, system loading, harmonic disturbance, power factor fluctuations and many more. The on-screen oscilloscope provides a visual description of the shape of the waveform while the energy counter calculates how much energy has been used over the time of recording. Dependant on the connected clamps, the unit can read currents from 1 A up to 3 kA and the PowerLink software (included in the standard set) allows data analysis through either tables or graphs making system analysing, fault finding, problem solving and report writing much easier tasks.

KEY FEATURES:

- Three current and three voltage inputs.
- Internal memory module allows recording up to 4 weeks.
- 64 parameters can be monitored or recorded simultaneously.
- High accuracy measurement and recording of power quality parameters (U, I, f, cos φ, PF, P, Q, S, current and voltage harmonics up to 63rd order, etc.).
- 4-quadrant measurements (generator and load with capacitive or inductive character).
- Energy counter.
- On-Line scope function.
- Instrument can be configured either directly or over PC.

APPLICATION:

- General power quality assessment in distribution and industrial low and middle voltage electric systems.
- Capturing and recording of power supply events (shut-down's, interruptions, sags, dips).
- Power factor correction equipment measurements.
- Harmonics measurements and filter selection.
- Consumption profile recording.

STANDARDS:

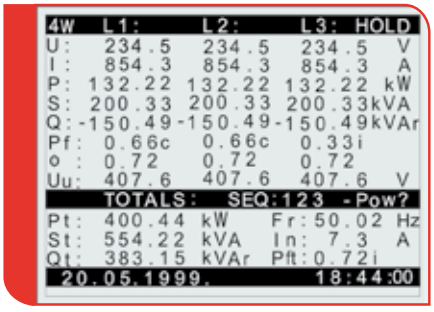
Safety:
IEC/EN 61010-1
EMC:
IEC/EN 61326-1
Measurements:
EN 50160,
EN 61000-4-30,
Class B

Accessories: page 2.14

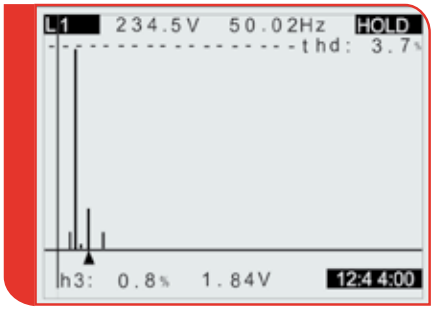
TECHNICAL SPECIFICATION:

INPUTS	
Number of current measuring inputs	3
Number of voltage measuring inputs	3
MEASUREMENTS	
TRMS Current measurement (Min., Max., Avg.)	✓
TRMS Voltage measurement (Min., Max., Avg.)	✓
Scope function	✓
On-Line harmonics measurement	✓
Frequency measurement	✓
Power measurement (W, VA, Var)	✓
THD and harmonics analysis	✓
Power Factor and cos φ	✓
Recording of sags and swells	✓
Recording of interruptions	✓
Statistical evaluation	✓
Current in neutral conductor (calculated value)	✓
Energy measurement	✓
Integration period	1 - 1800 s
COMMUNICATION PORTS	
RS232 COM port	✓
GENERAL DATA	
Graphical LCD with backlight	160 x 116 dots
Maximal recording time	2 - 4 weeks
Memory module size	2 MB
PC Sofware	✓
Maximal test voltage – interphase value	900 V rms
Maximal test voltage – between phase and PE conductors	550 V rms
Frequency range	43 - 68 Hz
Over voltage category	CATIII/600 V
AC power supply	✓
Built-in battery charger	✓
Rechargeable batteries (NiMH)	4 x C type
Battery life	5 h
Weight	2 kg
Size (mm)	265 x 110 x 185

KEY FEATURES



Meter Display Screen.



Harmonic Analysis.

ORDERING INFORMATION:

Part No.	Description
MI 2092	**PHA**

STANDARD KIT INCLUDES:

Part No.	Description
MI 2092	Power Harmonics Analyser
A 1033	Current clamp 1000 A, 3 pcs
A 1016	Test probes red, 3 pcs
A 1014	Test probe black, 1 pcs
A 1013	Crocodile clips, 4 pcs
20691933	Voltage measurement cables, 4 pcs
A 1036	Mains cable
20390010	PC SW Power Link with RS232 cable
83004706	Rechargeable batteries, 4 pcs
A 1006	Soft carrying bag
A 1020	Small soft carrying bag for current clamps
	Instruction manual
	Calibration certificate

Part No.	Description
MI 2092F	**PHA**

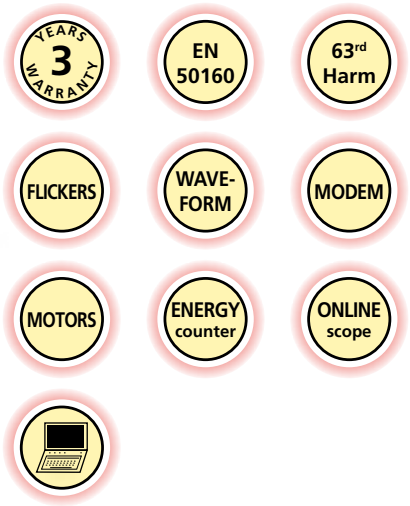
STANDARD KIT INCLUDES:

Description
Similar content as MI 2092: Current clamp 1000 A, 3 pcs (A 1033) replaced by 3-phase flexible current clamps 3000/300/30 A (A 1257).

Accessories: page 2.14

MI 2292 Power Quality Analyser *Plus*

Top of range, 3-phase power quality analyser, with EN 50160 Analysis and Flicker measurement



The MI 2292 Power Quality Analyser Plus is Metrel's top of the range Power system test instrument. With the ability to record up to 4 weeks worth of data, the MI 2292 can also perform a wide variety of tasks making it suitable for both low, mid and high level power system analysts alike. For the Configuration menu, the user can easily choose from a variety of options which include Periodic, Waveform analysis, Fast Logging (useful for in-depth analysis of a machines start-up or shut-down effects on a power network), Transients analysis and EN 50160 recording. With the ability to set up parameters on the instrument, via the software or remotely through the optional modem connection, the MI 2292 is a highly versatile but price competitive instrument suitable for almost any Power Analysis situation.

KEY FEATURES:

- High accuracy measurement and recording of power quality parameters (U, I, f, cos φ, PF, P, Q, S, current and voltage harmonics up to 63rd order, etc.).
- Power quality assessment according to EN 50160 including flicker measurement and standardized printout report in graph and table form.
- Transients measurements down to 20 µs with adjustable level triggers
- Waveform measurements with harmonics direction detection.
- Adjustable level and slope triggers on voltage and current.
- Instrument or a group of them can be remotely controlled and programmed via GSM modem.
- Three current and three voltage inputs combined with an internal memory modules.
- Allows recording up to 4 weeks.
- 64 parameters can be monitored or recorded simultaneously.
- Instrument can be programmed either directly or via PC.

APPLICATION:

- General power quality assessment in distribution and industrial low and middle voltage electric systems.
- Power quality analysis according to EN 50160.
- Capturing and recording of power supply events (shut-down's, interruptions, sags, dips).
- Flicker measurement.
- Power factor correction equipment measurements.
- Harmonics measurements and filter selection.
- Transients recording and over-voltage protection devices (MO varistors) performance testing.
- Assessment of UPS performance.
- Consumption profile recording.
- Motor's inrush currents monitoring and recording.

STANDARDS:

Safety:
IEC/EN 61010-1
EMC:
IEC/EN 61326-1
Measurements:
EN 50160, EN 61000-4-30, Class B

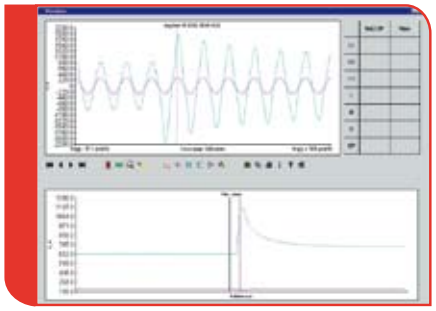
Accessories: page 2.14

Power Quality Analysis

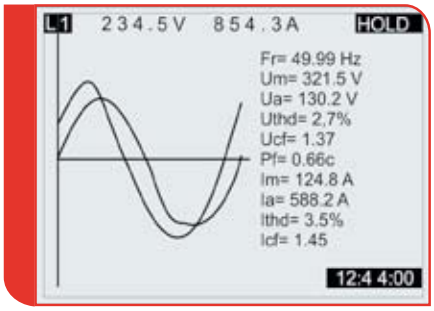
TECHNICAL SPECIFICATION:

INPUTS	
Number of current measuring inputs	3
Number of voltage measuring inputs	3
MEASUREMENTS	
TRMS Current measurement (Min., Max., Avg.)	✓
TRMS Voltage measurement (Min., Max., Avg.)	✓
Scope function	✓
On-Line harmonics measurement	✓
Frequency measurement	✓
Power measurement (W, VA, Var)	✓
THD and harmonics analysis	✓
Power Factor and cos φ	✓
Recording of sags and swells	✓
Recording of interruptions	✓
Statistical evaluation	✓
Current in neutral conductor (calculated value)	✓
EN 50160 Analysis	✓
Flicker measurement	✓
Transients measurement	✓
Waveforms measurement	✓
Fast logging mode	✓
Energy measurement	✓
Integration period	1 - 1800 s
COMMUNICATION PORTS	
RS232 COM port	✓
GENERAL DATA	
Graphical LCD with backlight	160 x 116 dots
Maximal recording time	2 - 4 weeks
Memory module size	2 MB
PC Sofware	✓
Maximal test voltage – interphase value	900 V rms
Maximal test voltage – between phase and PE conductors	550 V rms
Frequency range	43 - 68 Hz
Over voltage category	CATIII/600 V
AC power supply	✓
Built-in battery charger	✓
Rechargeable batteries (NiMH)	4 x C type
Battery life	5 h
Weight	2 kg
Size (mm)	265 x 110 x 185

KEY FEATURES



Waveform analysis.



Scope Display with display of additional information.

ORDERING INFORMATION:

Part No.	Description
MI 2292	**PQA *Plus***

STANDARD KIT INCLUDES:

Part No.	Description
MI 2292	Power Quality Analyser *Plus*
A 1033	Current clamp 1000 A, 3 pcs
A 1016	Test probes red, 3 pcs
A 1014	Test probe black, 1 pcs
A 1013	Crocodile clips, 4 pcs
S 2015	Safety flat clamps, 4 pcs
20691933	Voltage measurement cables, 4 pcs
A 1036	Mains cable
20390010	PC SW Power Link with RS232 cable
83004706	Rechargeable batteries, 4 pcs
A 1006	Soft carrying bag
A 1020	Small soft carrying bag for current clamps
	Instruction manual
	Calibration certificate

Part No.	Description
MI 2292F	**PQA *Plus***

STANDARD KIT INCLUDES:

Description
Similar content as MI 2292: Current clamp 1000 A, 3 pcs (A 1033) replaced by 3-phase flexible current clamps 3000/300/30 A (A 1257).

Accessories: page 2.14

MI 2492 PowerQ

Handheld, easy to use, 3-phase analyser for quick diagnosis of power quality

The MI 2492 PowerQ is a lightweight, handheld, 3-phase analyser for quick power quality assessment in low and middle voltage systems. All major power quality parameters like V, I, PF, cos φ, P, Q and S can be monitored on-line, measured or recorded. Thanks to various pre-set measuring profiles, different diagnostics can be performed on-site even without using a PC. Built into a rugged case, the MI 2492 PowerQ can be used in harsh industrial conditions and built-in memory modules allows up to five days of recording. Windows compatible PowerQ Link PC Software is delivered in a standard set and supports data downloading and making of test reports.

KEY FEATURES:

- Simultaneous measurement and recording of basic power parameters (U, I, P, Q, S, PF, cos φ, THD).
- Pre-set measuring profiles (U-I-f; Power, Harmonics).
- Voltage and current harmonics up to 50th component.
- Phase diagram.
- Voltage un-symmetry in 3-phase systems.
- On-line scope function.
- Windows compatible PowerQ Link PC Software for downloading and creating of test reports.

APPLICATION:

- Power quality assessment and troubleshooting in low and middle voltage electric systems.
- Power correction equipment performance testing and designing.
- Selection and designing of harmonics filters.
- Monitoring and managing of consumption profile.

STANDARDS:

Safety:
IEC/EN 61010-1

EMC:
IEC/EN 61326-1

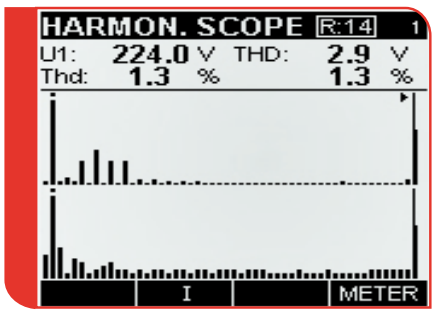
Measurements:
EN 50160,
EN 61000-4-30,
Class B

Accessories: page 2.14

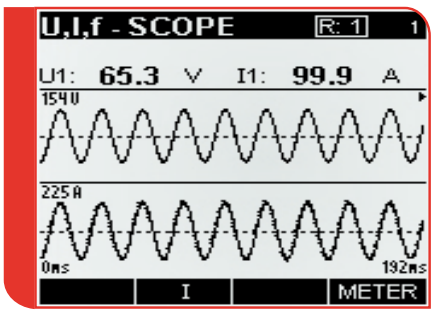
TECHNICAL SPECIFICATION:

INPUTS	
Number of current measuring inputs	3
Number of voltage measuring inputs	3
MEASUREMENTS	
TRMS Current measurement (Min., Max., Avg.)	✓
TRMS Voltage measurement (Min., Max., Avg.)	✓
Scope function	✓
On-Line harmonics measurement	✓
Frequency measurement	✓
Power measurement (W, VA, Var)	✓
THD and harmonics analysis	✓
Power Factor and cos φ	✓
Current in neutral conductor (calculated value)	✓
Phase diagram	✓
Energy measurement	✓
Integration period	1 - 1800 s
COMMUNICATION PORTS	
USB COM port	✓
RS232 COM port	✓
GENERAL DATA	
Graphical LCD with backlight	160 x 160 dots
Maximal recording time	2 - 5 days
Memory module size	1 MB
PC Sofware	✓
Maximal test voltage – interphase value	952 V rms
Maximal test voltage – between phase and PE conductors	550 V rms
Frequency range	45 - 66 Hz
Over voltage category	CATIII/600 V
AC power supply	✓
Built-in battery charger	✓
Rechargeable batteries (NiMH)	6 x AA
Battery life	12 h
Weight	0.6 kg
Size (mm)	220 x 115 x 90

KEY FEATURES



Harmonics screen



U, I, F scope

ORDERING INFORMATION:

Part No.	Description
MI 2492	**PowerQ**

STANDARD KIT INCLUDES:

Part No.	Description
MI 2492	PowerQ
A 1033	Current clamp 1000 A, 3 pcs
A 1016	Test probes red, 3 pcs
A 1014	Test probe black, 1 pcs
A 1013	Crocodile clip black, 1 pcs
A 1064	Crocodile clips red, 3 pcs
20691962	Voltage measurement cables, 4 pcs
	PC SW PowerQ Link with RS232 and USB cable
A 1135	Power supply adapter
A 1147	Rechargeable batteries, 6 pcs
A 1006	Soft carrying bag
	Instruction manual
	Calibration certificate

ORDERING INFORMATION:

Part No.	Description
MI 2492F	**PowerQ**

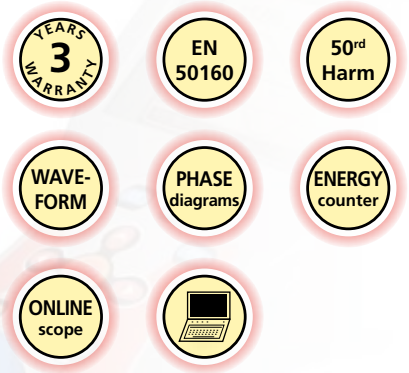
STANDARD KIT INCLUDES:

Description
Similar content as MI 2492: Current clamp 1000 A, 3 pcs (A 1033) replaced by 1-phase flexible current clamps 3000/300/30 A, 3 pcs (A 1227).

Accessories: page 2.14

MI 2392 PowerQ *Plus*

Advanced, handheld, easy to use, 3-phase power quality analyser



The MI 2392 PowerQ *Plus* is a genuine, portable, 3-phase power quality analyser which favourably competes with higher priced instruments and can be easily implemented in a variety of different situations. Due to the small dimensions and user friendly interface of the MI 2392 PowerQ *Plus*, it is ideally suited for routine or complex power quality assessment in heavy duty industrial environments. Pre-set logging screens allow on-site evaluation of all major power quality parameters (V, I, P, PF, cos φ, THD, individual harmonic components, phase shift, etc.). Windows compatible PowerQ Link PC Software (included in the standard set) greatly expands a functionality and versatility of the instrument.

KEY FEATURES:

- Simultaneous measurement and recording of basic power quality parameters (U, I, P, Q, S, PF).
- Harmonics analysis up to 50th component.
- Quick set-up functions.
- Phase diagram.
- Voltage unbalance calculation for 3-phase systems.
- On-line scope function.
- EN 50160 power quality assessment.
- Recording of anomalies and inrush currents via adjustable triggers.
- Lightweight design
- Windows compatible software package PowerQ Link.

APPLICATION:

- Power quality assessment and troubleshooting in low and middle voltage electrical systems.
- Balancing phase loads in 3-phase systems.
- Checking power correction equipment performance.
- Harmonics spectrum analysis for selection of harmonic filters.
- Capturing inrush currents e.g. motor s start up currents.
- Voltage fluctuation recording.
- Consumption recording.

STANDARDS:

Safety:
IEC/EN 61010-1

EMC:
IEC/EN 61326-1

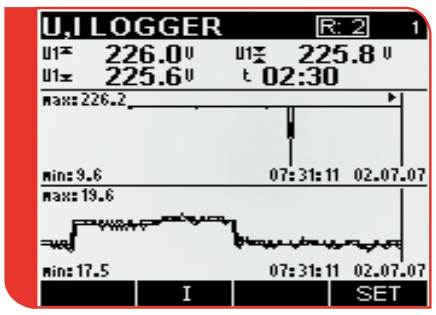
Measurements:
EN 50160,
EN 61000-4-30,
Class B

Accessories: page 2.14

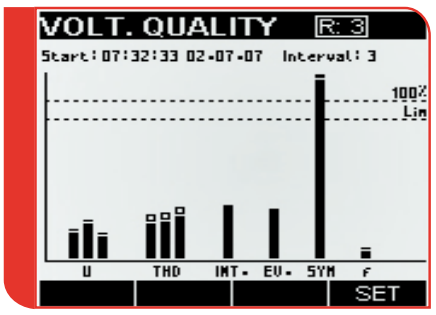
TECHNICAL SPECIFICATION:

INPUTS	
Number of current measuring inputs	3
Number of voltage measuring inputs	3
MEASUREMENTS	
TRMS Current measurement (Min., Max., Avg.)	✓
TRMS Voltage measurement (Min., Max., Avg.)	✓
Scope function	✓
On-Line harmonics measurement	✓
Frequency measurement	✓
Power measurement (W, VA, Var)	✓
THD and harmonics analysis	✓
Power Factor and cos φ	✓
Recording of sags and swells	✓
Recording of interruptions	✓
Current in neutral conductor (calculated value)	✓
Phase diagram	✓
EN 50160 Analysis	✓ (without flicker measurement)
Fast logging mode	✓
Energy measurement	✓
Integration period	1 - 1800 s
COMMUNICATION PORTS	
USB COM port	✓
RS232 COM port	✓
GENERAL DATA	
Graphical LCD with backlight	160 x 160 dots
Maximal recording time	2 - 5 days
Memory module size	1 MB
PC Sofware	✓
Maximal test voltage – interphase value	952 V rms
Maximal test voltage – between phase and PE conductors	550 V rms
Frequency range	45 - 66 Hz
Over voltage category	CATIII/600 V
AC power supply	✓
Built-in battery charger	✓
Rechargeable batteries (NiMH)	6 x AA
Battery life	12 h
Weight	0.6 kg
Size (mm)	220 x 115 x 90

KEY FEATURES



U,I logger screen



EN 50160 screen

ORDERING INFORMATION:

Part No.	Description
MI 2392	**PowerQ *Plus***

STANDARD KIT INCLUDES:

Part No.	Description
MI 2392	PowerQ *Plus*
A 1033	Current clamp 1000 A, 3 pcs
A 1016	Test probes red, 3 pcs
A 1014	Test probe black, 1 pcs
A 1013	Crocodile clip black, 1 pcs
A 1064	Crocodile clips red, 3 pcs
20691962	Voltage measurement cables, 4 pcs
	PC SW PowerQ Link with RS232 and USB cable
A 1135	Power supply adapter
A 1147	Rechargeable batteries, 6 pcs
A 1006	Soft carrying bag
	Instruction manual
	Calibration certificate

ORDERING INFORMATION:

Part No.	Description
MI 2392F	**PowerQ *Plus***

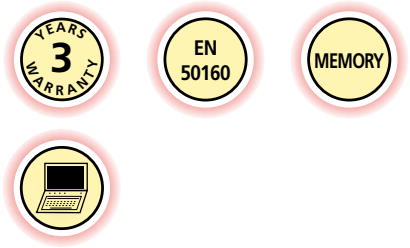
STANDARD KIT INCLUDES:

Description
Similar content as MI 2492: Current clamp 1000 A, 3 pcs (A 1033) replaced by 1-phase flexible current clamps 3000/300/30 A, 3 pcs (A 1227).

Accessories: page 2.14

MI 2130 Voltscanner

1-phase voltage recorder for quick EN 50160 power supply assessment



The MI 2130 Voltscanner is a 1-phase voltage recorder for testing supply voltage on a socket in accordance with EN 50160 power quality standard. Recording up to four weeks is possible and up to 3500 events can be stored into the instrument's memory. The instrument can be easily set up via the ScanLink software (included with the instrument) and then sent out to customers who can simply plug in the unit for the allocated time period and then send it back for analysis. MS Windows compatible PC Software ScanLink supports downloading and programming of the instrument. Transfer of recorded data to other MS programs (e.g. Excel, Word, etc.) is possible as well.

KEY FEATURES:

- Customers simply need to plug in the unit, wait, unplug and send back for analysis.
- EN 50160 Auto mode.
- Recording of voltage interruptions, dips, sags and swells.
- All events are selected by character, time and duration.
- Voltage transients down to 1µs can be captured.
- Adjustable triggering limits for voltage events.
- LED indication of recorded events, low battery, memory full and incorrect polarity connection.

APPLICATION:

- Pre-programmed instrument can be simply sent to the customer and connected to the socket for a definite period of time.
- Supply voltage testing in accordance with EN 50160.
- Ideal solution for IT managers who want to control input voltage.
- Voltage monitoring on the customer's side for power distribution companies.

STANDARDS:

Instrument is developed and manufactured in accordance with following standards:

Safety:
IEC/EN 61010-1

EMC:
IEC/EN 61326-1

Measurements:
EN 50160

Accessories: page 2.14

TECHNICAL SPECIFICATION:

INPUTS	
Number of voltage measuring inputs	1
MEASUREMENTS	
RMS Voltage measurement (Min., Max., Avg.)	✓
Frequency measurement	✓
Recording of sags and swells	✓
Recording of interruptions	✓
Statistical evaluation	✓
EN 50160 Analysis	1-phase, without flicker measurement
Transients measurement	1-phase, voltage transients
Integration period	1 - 1260 s
COMMUNICATION PORTS	
RS232 COM port	✓
GENERAL DATA	
Maximal recording time	2 - 4 weeks
Memory module size	32 kB
PC Sofware	✓
Maximal test voltage – interphase value	265 V rms
Maximal test voltage – between phase and PE conductors	265 V rms
Frequency range	47 - 62 Hz
Over voltage category	CATIII/300 V
AC power supply	✓
Built-in battery charger	✓
Rechargeable batteries (NiMH)	4 x AA
Battery life	180 h
Weight	0,5 kg
Size (mm)	103 x 51 x 199

ORDERING INFORMATION:

Part No.	Description
MI 2130	**Voltscanner**

STANDARD KIT INCLUDES:

Part No.	Description
MI 2130	Voltscanner
A 1003	Mains measuring cable, 1.5 m
A 1147	Rechargeable NiMH batteries 1.2 V, 4 pcs
20390019	PC SW ScanLink
A 1017	RS232 cable
	Instruction manual
	Calibration certificate

Accessories: page 2.14

Accessories selection guide

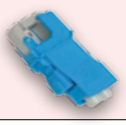
Photo	Product group	Accessory decription	Part No.	Instrument / Application	MI 2092	MI 2292	MI 2492	MI 2392	MI 2130
	Bags, cases and straps	Soft carrying bag	A 1020	Bag is suitable for instrument and accessories. Lateral opening for access to instrument's connector panel is provided.	✓	✓	✓	✓	
	Bags, cases and straps	Small soft carrying bag	A 1020	Soft carrying bag for accessories.	✓	✓	✓	✓	✓
	Batteries and chargers	Fast charger	A 1169	Fast charger for 12 AA / 6 C type / 6 D type / 4 x 9 V block type.	✓	✓	✓	✓	✓
	Batteries and chargers	6 cells AA battery charger	A 1160	Fast 6 cells AA battery charger with a set of 6 pcs of NiMH battaries.	✓	✓	✓	✓	✓
	Other	Current transformer 5 A/1 V	A 1037	3-phase transformer for power measure-ments on distribution panels with 5 A nominal output current.	✓	✓	✓	✓	
	Other	Magnetic contact probe	A 1198	Alternative to crocodil clip. Connect cable to RCD, fuse or other mag-netic contact.	✓	✓	✓	✓	✓
	Other	Modem	A 1100	Modem allows communication between the power quality analyser and the PC which further supports programming and downloading of the instrument.		✓			
	Other	GSM Modem	A 1101	GSM modem allows wireless communication between the power quality analyser and the PC which further supports programming and downloading of the instrument.		✓			
	Other	Safety fuse adapters	S 2014	Fused adapter protect the instrument and the user against current strike and over-load.	✓	✓	✓	✓	
	Other	Safety flat clamps	S 2015	Safety flat clamps assure good contact when connecting the test leads on bus-bars and other larger flat surfaces.	✓	✓	✓	✓	
		Current clamp 1000 A / 1 V	A 1033	Current clamp with special Metrel connector.	✓	✓	✓	✓	
	Clamps	Mini clamp 100 A/1 V to be used with A1039	A 1069	Current clamp-on adapter with measuring range 100 A with jaw opening 15 mm for power measurements. Requires A 1039 connection cable.	✓	✓	✓	✓	

Photo	Product group	Accessory decription	Part No.	Application \ Instrument	MI 2092	MI 2292	MI 2492	MI 2392	MI 2130
	Clamps	Mini clamp 5 A/1 V to be used with A 1039	A 1122	Current clamp-on adapter with measuring range 5 A with jaw opening 15 mm for power measurements. Requires A 1039 connection cable.	✓	✓	✓	✓	
	Clamps	3-phase flexible current clamps 2000/200/20 A / 1 V	A 1179	3-phase flexible current clamps with three selectable measuring ranges. Powered by alkaline or rechargeable batteries.	✓	✓	✓	✓	
	Clamps	3-phase flexible current clamps 3000/300/30 A / 1 V	A 1257	3-phase flexible current clamps with three selectable measuring ranges. Powered by alkaline or rechargeable batteries.	✓	✓	✓	✓	
	Clamps	1-phase flexible current clamps 3000/300/30 A / 1 V	A 1287	Single phase flexible current clamps with three selectable measuring ranges. Powered by alkaline or rechargeable batteries.	✓	✓			
	Clamps	1-phase flexible current clamps 3000/300/30 A / 1 V	A 1227	Single phase flexible current clamps with three selectable measuring ranges. Powered from instrument's 3-pin current terminal.			✓	✓	
	Software, Books, publications	USB/RS232 converter with 1 m fixed cable	A 1171	RS232/USB adapter for PC's without USB COM port.	✓	✓			✓
	Software, Books, publications	RS 232 communication cable	A 1017	Connects Metrel instrument to PC trough RS 1232 COM port	✓	✓			✓
	Test leads, cables, probes and crocodile clips	Crocodile clip, black	A 1013	Crocodile clip is useful for stable connection of measuring cable to test point.	✓	✓	✓	✓	✓
	Test leads, cables, probes and crocodile clips	Crocodile clip, red	A 1064	Crocodile clip is useful for stable connection of measuring cable to test point.	✓	✓	✓	✓	✓
	Test leads, cables, probes and crocodile clips	Crocodile clip, green	8300 5484	Crocodile clip is useful for stable connection of measuring cable to test point.					✓
	Test leads, cables, probes and crocodile clips	Crocodile clip, blue	8300 5485	Crocodile clip is useful for stable connection of measuring cable to test point.					✓
	Test leads, cables, probes and crocodile clips	Test probe, black	A 1014	Black Metrel test probe.					✓
	Test leads, cables, probes and crocodile clips	Test probe, red	A 1016	Red Metrel test probe.	✓	✓	✓	✓	

Accessories: page 2.14

Power Quality Analysis

Photo	Product group	Accessory decription	Part No.	Instrument / Application	MI 2092	MI 2292	MI 2492	MI 2392	MI 2130
	Test leads, cables, probes and crocodile clips	Test probe, green	A 1062	Green Metrel test probe.					✓
	Test leads, cables, probes and crocodile clips	Test probe, blue	A 1015	Blue Metrel test probe.					✓
	Test leads, cables, probes and crocodile clips	Mains measuring cable 1.5 m	A 1003	For voltage measurements and EN 50160 recording with the MI 2130.					✓
	Test leads, cables, probes and crocodile clips	Clamp adapter (for A 1069 and A 1122)	A 1039	Connection leads for connecting the A 1069 and A 1122 on Metrel power quality analysers.	✓	✓	✓	✓	
	Test leads, cables, probes and crocodile clips	Universal test lead 1.5 m with 3 safety test probes	S 1112	3-lead test lead for measurements on permanently wired loads or 3-phase sockets.					✓
	Test leads, cables, probes and crocodile clips	Crocodile clips, 3 pcs	S 2010	Set of crocodile clips for measurements on bus-bars, screws, etc.					✓

Accessories: page 2.14

MEASURING INSTRUMENTS AND TESTERS

- 17th Edition Electrical Installation Testers
- Power Quality Analysis
- **High Voltage Insulation Diagnostics**
- Appliances/Machines/Switchboard Safety
- LAN Cabling Certification
- Indoor Environment Quality
- Digital Multimeters/Clamp Meters/Voltage and Continuity Testers

METREL®

CATALOG 2010

High Voltage Insulation Diagnostics

High Voltage Insulation Resistance testing with PI, DD and DAR measurements

Glossary - HV Insulation Diagnostics

PI - Polarization Index
As a voltage is applied to an insulating material, the particles inside the materials line up and become polarized. The more atoms that become polarizes, the resistance of the material increases. In a insulating material, the quicker the particles polarize, the better the insulating material is. PI is defined in the IEEE Std 43-2000 as the ratio between two insulation resistances readings, during the test, the first is taken after 1 minute and the second is taken after 10minutes of continuous measurement.

DAR - Dielectric absorption ratio
The principle behind an insulating material is to keep two conductive materials separated. If an insulating material becomes contaminated (e.g. through dirt, grease etc) leakage current can be absorbed by the insulating material. This leakage current reduces the resistance of the material which results in less power can be delivered to the load. The Dielectric Absorption Ratio (DAR) is defined as the between two insulation resistances measured after 30 seconds and after 60 seconds (1min) of continuous measurement

IR - Insulation resistance of insulator, IEV 151-15-43: resistance under specified conditions between two conductive elements, separated by insulating materials.

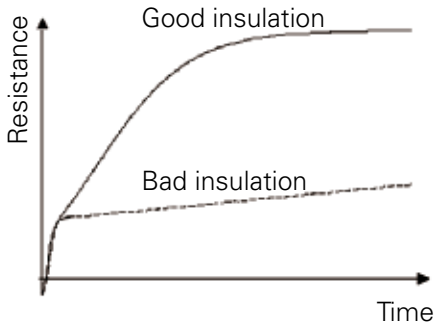
DD - Dielectric discharge test
After the power is turned off to a high voltage appliance, the built up charge needs time to dissipate away before the appliance is safe. Typically the insulation material is left connected to the test voltage for 10 - 30 min and then discharged before DD test is carried out. After 1 minute, the capacitance, voltage and discharge current is measured and the DD can be calculated.

Step voltage
test involves insulation resistance measurement at different test voltages. Good insulation will show very little deviation between particular readings. In case of micro-cracks, dirt or humidity in insulation system the insulation resistance decreases with rising test voltage. When performing a step voltage test, it is important to start with the lowest test voltage and then move to a higher voltage level. Typical test duration is 60 seconds.

Withstanding voltage test
This function offers Withstanding Voltage test of insulation material. It covers two types of tests:
a) Breakdown voltage testing of high voltage device, e.g. transient suppressors and
b) DC withstanding voltage test for insulation coordination purposes.
Both functions require breakdown current detection. The test voltage increases step by step from the Start up to the Stop value over a predefined time and it is kept at the Stop value for a predefined test time

Guard
Use of a guard terminal eliminates an influence of surface insulation currents on the measuring result and leads the surface current away from the main measuring circuit. Guard terminal is to be used in conjunction with shielded test leads when measuring insulation resistances in GΩ and TΩ range.

R(t) graphs
Sometimes a simple value does not show the full picture about the quality of an insulating material, R(t) graphs illustrates how resistance (on the Y or vertical axis) changes in relation to time (on the X or horizontal axis).



Leakage
AC or DC that flows trough or on the insulation's surface.

Voltage dependence test - Step voltage test
This test shows if the insulation under test has been electrically or mechanically stressed. In this instance the quantity and size of insulation anomalies such as cracks, local breakdowns, conductive parts, etc. is increased and the overall breakdown voltage is reduced.

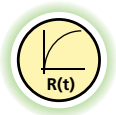
Guard terminal
The purpose of the GUARD terminal is to lead away potential leakage currents (e.g. surface currents), which are not a result of the measured insulation material itself but of the surface contamination and moisture.

3 years manufactures waranty

Test voltage 10 kV

Test voltage 5 kV

Safety category



R(t) graph insulation resistance

Diagnostic test


Downloadable

Accessories: page 3.12

Selection Guide for HV Insulation Diagnostics

Part No.:	MI 3202 GigaOhm 5 kV	MI 2077 TeraOhm 5 kV	MI 3201 TeraOhm 5 kV Plus	MI 3200 TeraOhm 10 kV
				
INSULATION				
Test Voltage Range	250 V - 5 kV	250 V - 5 kV	250 V - 5 kV	500 V - 10 kV
Measuring range	1 TΩ	5 TΩ	10 TΩ	10 TΩ
Voltage steps	250 V, 500 V, 1 kV, 2.5 kV, 5 kV	50 V	25 V	25 V
Automatic discharge after test	✓	✓	✓	✓
Calculation of DD, DAR, PI		✓	✓	✓
Withstanding voltage test		✓	✓	✓
Voltage ramp test		✓	✓	✓
Timer		✓	✓	✓
Leakage current measurement		✓	✓	✓
Capacitance measurement		✓	✓	✓
Short circuit / charge current	5 mA	1.4 mA	5 mA	5 mA
Guard terminal	✓	✓	✓	✓
Auto adjustment function	✓	✓	✓	✓
Audible warnings	✓	✓	✓	✓
Auto ranging	✓	✓	✓	✓
Shielded test leads	✓	Optional	✓	✓
VOLTAGE				
Voltage measurement AC/DC	up to 600 V AC and DC	up to 600 V AC and DC	up to 600 V AC and DC	up to 600 V AC and DC
ACCURACY				
Insulation	5 % + 3 d (to 0.1 TΩ) 10 % + 3 d (to 1 TΩ)	5 % + 3 d	5 % + 3 d (to 1 TΩ) 15 % + 3 d (to 10 TΩ)	5 % + 3 d (to 1 TΩ) 15 % + 3 d (to 10 TΩ)
Voltage	3 % + 4 V	3 % + 3 V	3 % + 4 V	3 % + 4 V
Capacitance		5 % + 2 d	5 % + 4 nF	5 % + 2 d
DISPLAY				
Display type	LCD	LCD	LCD	LCD
Back light	✓	✓	✓	✓
Graph insulation resistance R(t)			✓	✓
Bar graph	✓	✓	✓	✓
MEMORY, SOFTWARE AND COMMUNICATION				
USB / RS232 downloading		Optional / ✓	✓ / ✓	✓ / ✓
Number of memory locations		1000	1000	1000
Software		Optional TeraLink	Optional TeraLink PRO	Optional TeraLink PRO
SAFETY AND PROTECTION				
Safety category	CATIV/600 V	CAT III/600 V	CAT IV/600 V	CAT IV/600 V
POWER SUPPLY				
Rechargeable batteries	✓	Optional	✓	✓
In-built battery charger	✓	✓	✓	✓
Low Battery indication	✓	✓	✓	✓
Battery life (no load connected)	4 h @ 5 kV	4 h @ 5 kV	4 h @ 5 kV	4 h @ 10 kV
GENERAL DATA				
Weight	3 kg	2.1 kg	3 kg	5.5 kg
Size (mm)	310 x 130 x 250	265 x 110 x 185	310 x 130 x 250	345 x 160 x 335

Accessories: page 3.12

MI 3202 GigaOhm 5 kV

5 kV Insulation and Voltage tester

3 YEARS WARRANTY

5 kV

CAT IV 600 V

The MI 3202 GigaOhm 5 kV provides a quick and accurate reading of insulation resistance. The large segment LCD screen with backlight offers easy reading of results. The analogue/digital display with analogue graph has a range of up to 1 TΩ for insulation resistance and 600 V for voltage measurements. Five test voltages are available.

KEY FEATURES:

- **Quick setting:** quick & Easy test voltage selection.
- **Faster testing:** high 5 mA charging current to quickly charge capacitive loads.
- **Safe**: High CAT IV/600 V voltage protection.
- **Easy to read:** large, bright LCD display with backlight.
- **Effective testing:** high quality instrument, shielded test leads and accessories (included in the standard set).

APPLICATION:

- Testing insulation resistance of rotating machinery and cables.
- Production line periodic testing and maintenance.
- Troubleshooting and analysis of all kinds of insulation problems.

STANDARDS:

Instruments operation:
IEC/EN61557-2

Electromagnetic compatibility:
EN 61326 class B

Safety:
EN 61010-1 (instrument)
EN 61010-031(accessories)

Accessories: page 3.12

High Voltage Insulation Diagnostics

TECHNICAL SPECIFICATION:

INSULATION	
Test Voltage Range	250 V - 5 kV
Measuring range	1 TΩ
Voltage steps	250 V, 500 V, 1 kV, 2.5 kV, 5 kV
Automatic discharge after test	✓
Short circuit / charge current	5 mA
Guard terminal	✓
Auto adjustment function	✓
Audible warnings	✓
Auto ranging	✓
Shielded test leads	✓
VOLTAGE	
Voltage measurement AC/DC	up to 600 V AC and DC
ACCURACY	
Insulation	5 % + 3 d (to 0.1 TΩ) , 10 % + 3 d (to 1 TΩ)
Voltage	3 % + 4 V
DISPLAY	
Display type	LCD
Back light	✓
Bar graph	✓
SAFETY AND PROTECTION	
Safety category	CATIV/600 V
POWER SUPPLY	
Rechargeable batteries	✓
In-built battery charger	✓
Low Battery indication	✓
Battery life (no load connected)	4 h @ 5 kV
GENERAL DATA	
Weight	3 kg
Size (mm)	310 x 130 x 250

KEY FEATURES

Handle and shoulder strap make the unit easy to carry

ORDERING INFORMATION:

Part No.	Description
MI 3202	**GigaOhm 5 kV**

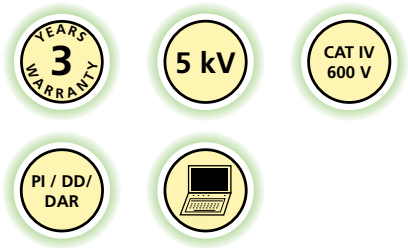
STANDARD KIT INCLUDES:

Part No.	Description
MI 3202	GigaOhm 5 kV
83005401	Mains cable
20691091	10 kV shielded test lead black, 2 m
20691090	10 kV shielded test lead red, 2 m
S 2036	10 kV crocodile set (black, red)
83001555	Guard lead green, 2 m
83005484	Crocodile clip green
A 1046	6 x 1.2 V NiMH batteries, C type
	Instruction manual
	Calibration certificate

Accessories: page 3.12

MI 2077 TeraOhm 5 kV

5 kV Insulation, Voltage and Faultfinding Tester



The MI 2077 TeraOhm 5 kV is an advanced, field proven instrument. Its small lightweight design make it easily portable and its bright LCD display ensures that readings can be made in almost any lighting conditions. PI, DD and DAR calculations, insulation measurements up to 5 TΩ, step voltage tests, withstanding voltage tests and capacitance measurement make fault finding easy and the automatic discharge of loads after test make the MI 2077 TeraOhm 5 kV tester an outstanding unit.

KEY FEATURES:

- **Automated testing:** PI, DD, DAR calculations with automated resistance ranging (AR).
- **Fault Finding:** fully programmable Step-Voltage and Withstanding Voltage test functions to assist in diagnosing faults in insulation.
- **Portable:** lightweight 2.1 kg design with carrier bag and neck strap.
- **Memory:** stores up to 1000 results with Date and Time stamp.

APPLICATION:

- Rotating Machines.
- Transformers.
- Cables.
- High Voltage Generators.
- Electrical Circuits.
- Surge arresters.
- Insulation systems.

STANDARDS:

Instruments operation:
IEC/EN 61557-2

Electromagnetic compatibility:
(EMC) EN 61326 Class B

Safety:
EN 61010-1 (instruments),
EN 61010-031 (accessories)

Accessories: page 3.12

High Voltage Insulation Diagnostics

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TECHNICAL SPECIFICATION:

INSULATION	
Test Voltage Range	250 V - 5 kV
Measuring range	5 TΩ
Voltage steps	50 V
Automatic discharge after test	✓
Calculation of DD, DAR, PI	✓
Withstanding voltage test	✓
Voltage ramp test	✓
Timer	✓
Leakage current measurement	✓
Capacitance measurement	✓
Short circuit / charge current	1.4 mA
Guard terminal	✓
Auto adjustment function	✓
Audible warnings	✓
Auto ranging	✓
Shielded test leads	Optonal
VOLTAGE	
Voltage measurement AC/DC	up to 600 V AC and DC
ACCURACY	
Insulation	5 % + 3 d
Voltage	3 % + 3 V
Capacitance	5 % + 2 d
DISPLAY	
Display type	LCD
Back light	✓
Bar graph	✓
MEMORY, SOFTWARE AND COMMUNICATION	
USB / RS232 downloading	Optional / ✓
Number of memory locations	1000
Software	Optional TeraLink
SAFETY AND PROTECTION	
Safety category	CAT III/600 V
POWER SUPPLY	
Rechargeable batteries	Optional
In-built battery charger	✓
Low Battery indication	✓
Battery life (no load connected)	4 h @ 5 kV
GENERAL DATA	
Weight	2.1 kg
Size (mm)	265 x 110 x 185

KEY FEATURES

Large custom LCD dot matrix display with bar graph and backlight.

User friendly keyboard enables simple and fast adjustment.

Guard connection terminal to eliminate the influence of surface insulation currents.

ORDERING INFORMATION:

Part No.	Description
MI 2077	**TeraOhm 5 kV**

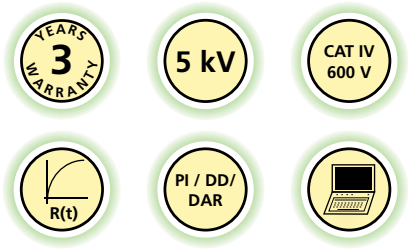
STANDARD KIT INCLUDES:

Part No.	Description
MI 2077	TeraOhm 5 kV
A 1006	Soft carrying bag
83005401	Mains cable
A 1048	Test lead black, 2 m
A 1047	Test lead red, 2 m
A 1049	Guard lead green with integrated crocodile clip, 2 m
A 1014	Test probe black
A 1016	Test probe red
A 1013	Crocodile clips, 2 pcs (black)
	Instruction manual, Calibration certificate

Accessories: page 3.12

MI 3201 TeraOhm 5 kV Plus

5 kV Insulation, Voltage and Faultfinding Tester



The new MI 3201 TeraOhm 5 kV insulation tester is a portable instrument intended to measure insulation resistance through the use of high voltage DC test voltages up to 5 kV. The large LCD screen allows real-time R(t) graphs to be displayed. Results can be stored and downloaded to a computer via USB and RS232 connections with the help of the optional TeraLink PRO software. The high quality instrument, shielded test leads and quality accessories included in the standard set enables you to perform you testing effectively.

KEY FEATURES:

- **Automated testing:** PI, DD, DAR calculations with automated resistance ranging (AR). All data is displayed during one single measurement.
- **Fault finding:** fully programmable step voltage and withstanding voltage test functions to assist in diagnosing faults in insulation.
- **R(t) graph:** real time resistance against time graph plotting facility to graphically illustrate the response of a material to an applied test voltage.
- **Faster testing:** high 5 mA charging current quickly charges capacitive loads.
- **Accurate:** selectable noise rejection filters (up to 5 mA) and shielded cables as standard ensure accurate readings.
- **Safe:** high CAT IV/600 V voltage protection.
- **Portable:** lightweight 3 kg design with carry handle and shoulder strap.

APPLICATION:

- Testing insulation resistance of rotating machinery and cables.
- Production line periodic testing and maintenance.
- Troubleshooting and analysis of all kinds of insulation problems.
- Diagnostic testing

STANDARDS:

Instruments operation:
IEC/EN61557-2

Electromagnetic compatibility:
EN 61326 class B

Safety:
EN 61010-1 (instrument)
EN 61010-031(accessories)

Accessories: page 3.12

High Voltage Insulation Diagnostics

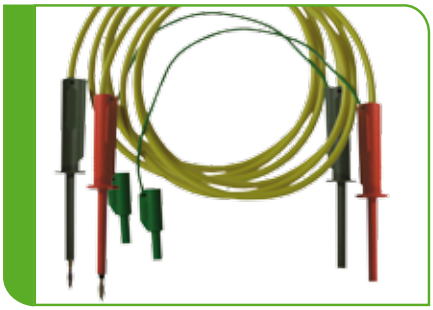
METREL®

TECHNICAL SPECIFICATION:

INSULATION	
Test Voltage Range	250 V - 5 kV
Measuring range	10 TΩ
Voltage steps	25 V
Automatic discharge after test	✓
Calculation of DD, DAR, PI	✓
Withstanding voltage test	✓
Voltage ramp test	✓
Timer	✓
Leakage current measurement	✓
Capacitance measurement	✓
Short circuit / charge current	5 mA
Guard terminal	✓
Auto adjustment function	✓
Audible warnings	✓
Auto ranging	✓
Shielded test leads	✓
VOLTAGE	
Voltage measurement AC/DC	up to 600 V AC and DC
ACCURACY	
Insulation	5 % + 3 d (to 1 TΩ), 15 % + 3 d (to 10 TΩ)
Voltage	3% + 4 V
Capacitance	5% + 4 nF
DISPLAY	
Display type	LCD
Back light	✓
Graph insulation resistance R(t)	✓
Bar graph	✓
MEMORY, SOFTWARE AND COMMUNICATION	
USB / RS232 downloading	✓ / ✓
Number of memory locations	1000
Software	Optional TeraLink PRO
SAFETY AND PROTECTION	
Safety category	CAT IV/600 V
POWER SUPPLY	
Rechargeable batteries	✓
In-built battery charger	✓
Low Battery indication	✓
Battery life (no load connected)	4 h @ 5 kV
GENERAL DATA	
Weight	3 kg
Size (mm)	310 x 130 x 250

KEY FEATURES

Real time resistance against time graph plotting facility



Shielded test leads 10 kV included in standard set

ORDERING INFORMATION:

Part No.	Description
MI 3201	**TeraOhm 5 kV Plus**

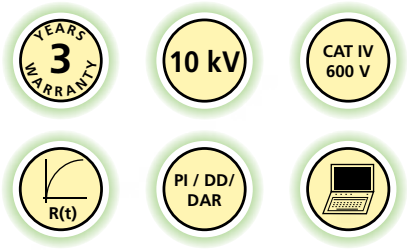
STANDARD KIT INCLUDES:

Part No.	Description
MI 3201	TeraOhm 5 kV Plus
83005401	Mains cable
20691091	10 kV shielded test lead black, 2 m
20691090	10 kV shielded test lead red, 2 m
S 2036	10 kV crocodile set (black, red)
83001555	Guard lead green, 2 m
83005484	Crocodile clip green
A 1046	6 x 1.2 V NiMH batteries, C type
	Instruction manual, Calibration certificate

Accessories: page 3.12

MI 3200 TeraOhm 10 kV

10 kV Insulation, Voltage and Fault-finding tester



The new MI 3200 TeraOhm 10 kV insulation tester is a portable instrument intended to measure insulation resistance through the use of high voltage DC test voltages up to 10 kV. The large LCD screen allows real-time R(t) graphs to be displayed. Results can be stored and downloaded to a computer via USB and RS232 connections with the help of the optional TeraLink PRO software. The high quality instrument, shielded test leads and quality accessories included in the standard set enables you to perform your testing effectively.

KEY FEATURES:

- **Automated testing:** PI, DD, DAR calculations with automated resistance ranging (AR). All data is displayed during one single measurement.
- **Fault Finding:** fully programmable Step-Voltage and Withstanding Voltage test functions to assist in diagnosing faults in insulation.
- **R(t) graph:** real time resistance against time graph plotting facility to graphically illustrate the response of a material to an applied test voltage.
- **Faster testing:** high 5 mA charging current quickly charges capacitive loads.
- **Accurate:** selectable noise rejection filters (up to 5 mA) and shielded cables as standard ensure accurate readings.
- **Safe:** high CAT IV/600 V voltage protection
- **Portable:** lightweight 5.5 kg design with carry handle.

APPLICATION:

- Testing insulation resistance of rotating machinery and cables.
- Production line periodic testing and maintenance.
- Troubleshooting and analysis of all kinds of insulation problems.
- Effective readings in high noise environments such as high voltage substations and switchyards.
- Diagnostic testing.

STANDARDS:

Instruments operation:
IEC/EN61557-2
Electromagnetic compatibility:
EN 61326 class B
Safety:
EN 61010-1 (instrument)
EN 61010-031(accessories)

Accessories: page 3.12

High Voltage Insulation Diagnostics

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TECHNICAL SPECIFICATION:

INSULATION	
Test Voltage Range	500 V - 10 kV
Measuring range	10 TΩ
Voltage steps	25 V
Automatic discharge after test	✓
Calculation of DD, DAR, PI	✓
Withstanding voltage test	✓
Voltage ramp test	✓
Timer	✓
Leakage current measurement	✓
Capacitance measurement	✓
Short circuit / charge current	5 mA
Guard terminal	✓
Auto adjustment function	✓
Audible warnings	✓
Auto ranging	✓
Shielded test leads	✓
VOLTAGE	
Voltage measurement AC/DC	up to 600 V AC and DC
ACCURACY	
Insulation	5 %+ 3 d (to 1 TΩ), 15 %+ 3 d (to 10 TΩ)
Voltage	3 % + 4 V
Capacitance	5 % + 2 d
DISPLAY	
Display type	LCD
Back light	✓
Graph insulation resistance R(t)	✓
Bar graph	✓
MEMORY, SOFTWARE AND COMMUNICATION	
USB / RS232 downloading	✓ / ✓
Number of memory locations	1000
Software	Optional TeraLink PRO
SAFETY AND PROTECTION	
Safety category	CAT IV/600 V
POWER SUPPLY	
Rechargeable batteries	✓
In-built battery charger	✓
Low Battery indication	✓
Battery life (no load connected)	4 h @ 10 kV
GENERAL DATA	
Weight	5.5 kg
Size (mm)	345 x 160 x 335

KEY FEATURES

Intuitive keypad and connectivity to PC through RS232 and USB

Dot matrix LCD and connector panel for high quality shielded test leads 12 kV (included in standard set)

ORDERING INFORMATION:

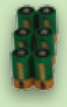
Part No.	Description
MI 3200	**TeraOhm 10 kV**

STANDARD KIT INCLUDES:

Part No.	Description
MI 3200	TeraOhm 10 kV
83005401	Mains cable
20691067	10 kV shielded test lead with tip, 2 m
20691069	10 kV shielded test lead black, 2 m
20691068	10 kV shielded test lead red, 2 m
S 2036	10 kV crocodile clip, set (black, red)
83001555	Guard lead green, 2 m
83005484	Crocodile clip (green)
83005714	6 x 1.2 V NiMH batteries, D type
	Instruction manual on CD, Calibration certificate

Accessories: page 3.12

Accessories selection guide

Photo	Product group	Accessory decription	Part No.	Application \ Instrument	MI 3202	MI 2077	MI 3201	MI 3200
	Bags, cases and straps	Soft carry case	A 1006	Case is suitable for instrument and accessory. Side opening for access to connector panel is provided.		✓		
	Bags, cases and straps	Soft Carrying bag with shoul-der strap	A 1271	Soft Carrying bag for accessories.	✓		✓	
	Batteries and chargers	6 x 1.2 V NiMH batteries, C type	A 1046	A set of 6 pieces of rechargeable batteries.	✓	✓	✓	
		6 x 1.2 V NiMH batteries, D type	8300 5714	A set of 6 pieces of rechargeable batteries.				✓
	Software, Books, publications	PC SW TeraLink with RS232 cable	A 1056	TeraLink PC Software supplied with RS232 interface cable supports downloading and creation of test reports.		✓		
	Software, Books, publications	PC SW TeraLink PRO with USB and RS232 cable	A 1275	TeraLink PRO is downloading and data management software with R(t) graph printing possibility. It is delivered with RS232 and USB COM.			✓	✓
	Software, Books, publications	USB/RS232 converter with 1 m fixed cable	A 1171	RS232/USB adapter for PC's without RS232 COM port.		✓		
	Test leads, cables, probes and crocodile clips	Crocodile clip green	8300 5484	Crocodile clip for reliable connection of guard test lead.	✓	✓	✓	✓
		Crocodile clip black	A 1013	Crocodile clip for reliable connection of test lead to object under test.		✓		
		Crocodile clip red	A 1064	Crocodile clip for reliable connection of test lead to object under test.		✓		
	Test leads, cables, probes and crocodile clips	10 kV crocodile set	S 2036	10 kV rated crocodile clip assures secure and permanent contact during the measurement on bus bars, fixing screws, etc.	✓		✓	✓
	Test leads, cables, probes and crocodile clips	10 kV shielded test lead 8 m	S 2029	Shielded test leads improve accuracy of HV insulation resistance measurement in environments with high content of external electromagnetic interferences.	✓		✓	✓
		10 kV shielded test lead 15 m	S 2030		✓		✓	✓
		5 kV shilded test lead 15 m	S 2039			✓		
		5 kV shilded test lead 10 m	S 2042			✓		
	Test leads, cables, probes and crocodile clips	HV test lead set 5 kV	S 2003	Test lead set 5 kV for safe testing in rough field of work.		✓		
	Test leads, cables, probes and crocodile clips	Guard lead	8300 1555	Guard lead green, 2 m	✓	✓	✓	✓
		Guard lead	A 1049	Guard lead green with integrated crocodile clip, 2 m		✓		

Accessories: page 3.12

MEASURING INSTRUMENTS AND TESTERS

- 17th Edition Electrical Installation Testers
- Power Quality Analysis
- High Voltage Insulation Diagnostics
- **Appliances/Machines/Switchboard Safety**
- LAN Cabling Certification
- Indoor Environment Quality
- Digital Multimeters/Clamp Meters/Voltage and Continuity Testers

Appliance Safety

In-service inspection and testing of Electrical Equipment

METREL®

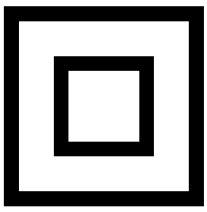
CATALOG 2010

Glossary - Testing the safety of electrical appliances

PAT testing
"PAT" is an abbreviation for Portable Appliance Testing.This refers to the formal inspection and testing of portable appliances to ensure that they are safe to use.

Class I appliance
Equipment in which protection from electric shock is provided by both basic insulation and connection of exposed metal parts to the protective conductor and onto the earthing of the plug.

Class II appliance
Equipment in which protection against electric shock is provided by basic insulation and an additional safety precaution (e.g. supplementary insulation) or via reinforced insulation. Class II symbols usually have the following symbol on them:

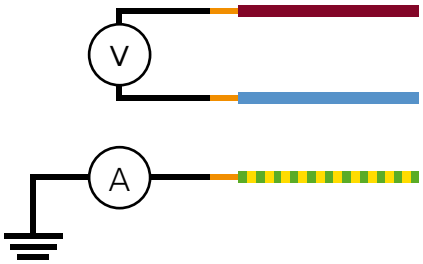


Visual check
This is a visual test of the equipment to confirm that there are no visible signs of damage or defects. This can be recorded on most of our PAT testers for future reference.

Earth Bond/Continuity test
Test to ensure that the earth cable has the ability to withstand a fault current should a problem occur in the appliance. IT equipment can have problems with high current Earth Bond tests, in which case a soft curent test (20 mA - 200 mA) continuity test can be performed to simply check an earth path exists (for Class I appliances only).

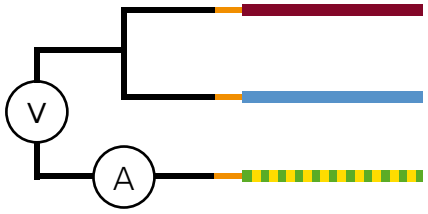
Insulation test
A high DC voltage test to ensure that the resistance between the phases (i.e. live and neutral) and earth is sufficiently high
enough to ensure that equipment is safe to use.

Leakage test
The amount of current that finds an alternative path back to the supply, other than through the neutral conductor. High leakage currents can cause both operation problems (e.g. tripping RCDs etc) and health and safety issues (e.g. cause voltages to appear on pipe-work which can cause injury). This test powers up the equipment with 230 V a.c. and measures the amount of leakage current the equipment produces.



Differential Leakage
If an appliance has more than one connection to ground (e.g. the metal housing of the appliance sits on the ground or is screwed down). A measure of the current passing through the cable may not be a true indication of the full leakage current supplied by the appliance. Differential leakage measures the difference in current between the live and neutral cable which provides a true value of how much current a appliance leaks to ground.

Substitute leakage
In this test the Live and Neutral conductors of the appliance are shorted together and a voltage of 40V a.c. is applied between this point and either the earth conductor (class I) or the probe connected to any exposed conductive parts (class I and class II). The test measures how much current passes from the live conductors into the test points.



Touch leakage test
This test measures the amount of current that would pass through the human body if a person was to touch the appliance while it was in operation. The PAT tester powers up the appliance and via a probe which the user connects to the appliance, simulates the average resistance of the Human body and measures how much current would pass through a person if they touched the appliance.

Polarity test
A polarity test checks
that all the connections in an IEC cable or extension cable are correctly fitted. Results include L-open, N-open, PE-open, L-PE shorted, L-N shorted, N-PE shorted, L-N crossed, L-PE crossed, N-PE crossed and multiple faults.

Flash test
Also refered to as Hi-Pot or Dielectric strength test. The test is a high a.c. voltage test which checks the dielectric strength of the insulation

Accessories: page 4.22

in a piece of equipment. This can be 1500 V for class I equipment and 3000 V for class II Equipment and tends to be used in accordance with CE tests once an appliance has been repaired.

RCD test
This test checks how long it takes for a portable RCD to trip in the case that a fault occurs.

Project Uploading
When retesting a site or location, project uploading allows previously saved information to be reloaded onto the PAT tester to speed up testing and enable trend comparison.

Autosequencing
Autosequencing is a series of tests that are initiated with the press of a button and are automatically executed in a particular order by the test instrument.

Custom tests
Custom tests allow the user of the test instrument to define the tests and times involved in the autosequence. This is extremely useful for unusual appliances or appliances that require a special method of testing that is not included in the standard autosequences.

Trend Comparison
Trend comparison allows test information from different dates to be compared in order to discover if deterioration is occurring in an appliance. Should deterioration be found, the test engineer can make a informed decision as to if the frequency of testing and inspection is sufficient for the appliance.

Accessories: page 4.22

Selection Guide for PAT testers

	BASIC PASS / FAIL PAT	ADVANCED CONFIGURABLE / DOWNLOADABLE PAT
Part No.	MI 3302	MI 2142
	SwiftPAT	AlphaPAT
		
MEASUREMENT		
Earth bond resistance (100 mA)	✓	✓
Earth bond resistance (200 mA)		
Earth bond resistance (10 A)		✓
Earth bond resistance (25 A)	✓	✓
Insulation resistance (250 V)	✓	✓
Insulation resistance (500 V)	✓	✓
Differential leakage current		✓
Touch leakage current		✓
Substitute leakage current	✓	✓
Leakage current measurements with optional clamp		✓
Flash test		
RCD test		
IEC Lead test (polarity test)	✓	✓
Load test		✓
ADDITIONAL FEATURES		
PASS/FAIL Indicators	✓	✓
Mains supply check		✓
230 V appliance testing	✓	✓
110 V appliance testing	Adapter	Adapter
Graphical LCD	✓	✓
Graphical On-Line help		✓
Back light	✓	✓
Real time clock		✓
QWERTY keyboard		
Auto testing (manualy select class and type of appliance)	✓	✓
Barcode shortcut auto testing		✓
Communication ports USB/RS232		-/✓
Test 'n' Tag (BAR code scaner + thermal lable printer)		
Downloadable		✓
Project upload from PC to instrument		
Trend (compare) on instrument's LCD		
Trend (compare) with PC SW PAT Link PRO Plus (optional)		✓
Memory Size	N/A	1100
STANDARD / OPTIONAL ACCESSORIES		
Scanner		Optional
Thermal label printer		
Receipt printer		Optional
Soft carring case with shoulder strap	✓	✓
PC SW PAT Link PRO (downoad, report, data export)	N/A	✓
PC SW PAT Link PRO Plus (downoad, PRO Plus report, data export, trend)	N/A	Optional
GENERAL DATA		
Weight	2.8 kg	3.5 kg
Size (mm)	265 x 110 x 185	265 x 110 x 185

Accessories: page 4.22

ADVANCED CONFIGURABLE / DOWNLOADABLE /UPLOADABLE /FLASH PAT	
MI 3304	MI 3305
BetaPAT Plus	OmegaPAT Plus
	
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
✓/✓	✓/✓
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
6500	6500
Optional	Optional
Optional	Optional
Optional	Optional
✓	✓
Optional	Optional
7.8 kg	8.9 kg
345 x 160 x 335	345 x 160 x 335

- 3 years manufactures waranty
- Autosequence
- Downloadable
- Help menu
- Uplodable
- Powers from 230 V & 110 V supplies
- Flash testing
- Pass fail evaluation
- RCD testing
- Trend analysis
- Fixed appliance testing
- Multi User

Accessories: page 4.22

MI 3302 SwiftPAT

PASS / FAIL Portable Appliance Tester

Portable, easy to use and straightforward! These phrases describe the MI 3302 SwiftPAT. To operate the unit, simply choose the class of the appliance (class I or class II), choose the type of appliance (Portable/ Handheld, IT, IEC Cable or Other) and press START. It's that simple! The PAT tester will perform all the appropriate tests and then display all the results on the screen including individual and overall PASS/FAIL markings for recording. The large, easy to read backlight display makes the unit ideal for working in almost all lighting situations while the ability to perform either hard or soft earth bond and insulation tests and also the ability to perform substitute leakage tests (all automatically selected by the machine) makes this unit perfect for anyone requiring a quick and simple evaluation of the safety of their appliances.

KEY FEATURES:

- **Autosequencing:** built in Autosequences speed up testing and ensure no tests are missed.
- **Automated:** automatic testing and Pass/Fail evaluation of results according to the code of practice.
- **Efficient:** all results shown at once for easy recording.
- **Adaptable:** tests both 230 V appliances and 110 V appliances (via socket adapter included in standard set).
- **Bright:** large, bright, backlight LCD display for working in dark locations.
- **Intelligent:** hard or soft tests are chosen automatically to reduce the risk of damage occurring on the selected appliance.

APPLICATION:

- Checking the safety of an appliance before use.
- Entry level Portable Appliance testing.

STANDARDS:

Measurements and testing in accordance with:
Code of practice for in-service inspection and testing of Electrical equipment
EN 60950
VDE 701
VDE 702
BS 89 - Measurements
IEC 61326 – EM compatibility
EN 61010 - Safety

Accessories: page 4.22

TECHNICAL SPECIFICATION:

MEASUREMENT	
Earth bond resistance (100 mA)	✓
Earth bond resistance (25 A)	✓
Insulation resistance (250 V)	✓
Insulation resistance (500 V)	✓
Substitute leakage current	✓
IEC Lead test (polarity test)	✓
Load test	✓
ADDITIONAL FEATURES	
PASS/FAIL Indicators	✓
230 V appliance testing	✓
110 V appliance testing	Adapter
Graphical LCD	✓
Back light	✓
Auto testing (manualy select class and type of appliance)	✓
GENERAL DATA	
Weight	2.8 kg
Size (mm)	265 x 110 x 185

KEY FEATURES

Large custom LCD dot matrix display with backlight. Simultaneous presentation of measuring results and test parameters.

Portable, easy to use and straightforward.

Connection terminal.

User friendly keyboard enables simple and fast adjustment.

ORDERING INFORMATION:

Part No.	Description
MI 3302	**SwiftPAT**

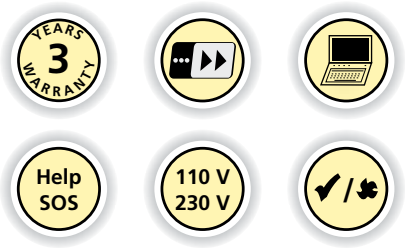
STANDARD KIT INCLUDES:

Part No.	Description
MI 3302	SwiftPAT
A 1006	Soft Carry case
A 1126	Earth Bond Cable
A 1136	110 V adapter
	Instruction manual
	Calibration certificate

Accessories: page 4.22

MI 2142 AlphaPAT

Downloadable
Portable Appliance Tester



The small, lightweight design of the MI 2142 AlphaPAT really does disguise the multitude of talents contained in such a unique unit. From new, the unit comes with over 110 pre-programmed automated sequences for use on Portable/Handheld equipment, heating and cooking equipment, IT equipment, moveable equipment and IEC power cables. For specially built equipment that does not fall into these categories, up to 50 custom automated sequences can be programmed into the unit to speed up testing while still ensuring the appliance's safety. The simple menu system, bright LCD screen, optional barcoding system, automated PASS/FAIL results evaluation and built-in help screens make this unit extremely easy to use while the ability to store up to 1100 results and download them onto a PC for storage or report creation makes the MI 2142 truly stand out in a crowd.

KEY FEATURES:

- **Autosequencing:** built in Autosequences speed up testing and ensure no tests are missed.
- **Automated:** automatic testing and Pass/Fail evaluation of results according to the code of practice.
- **Adaptable:** tests both 230 V appliances and 110 V appliances (via socket adapter included in standard set).
- **Multi-tasking:** can perform Hard and Soft Earth Bond test, 250 V / 500 V insulation tests, differential / substitute / touch leakage test, Load tests, fuse tests and polarity tests.
- **Intelligent:** hard or soft tests are chosen automatically to reduce the risk of damage occurring on the selected appliance.
- **Downloadable:** with memory capacity of 1100 locations, the unit can be downloaded to a computer via the PAT Link PRO software (included in the standard set).

APPLICATION:

- Domestic PAT testing.
- Hotel PAT testing.
- General PAT testing.
- Factory/warehouse PAT testing.

STANDARDS:

Measurements and testing in accordance with:

Code of Practice:
In-service inspection and testing of electrical equipment
IEC 60335-1
IEC 60598-1
IEC 60745
VDE 701 T1
VDE 702 T1

Accessories: page 4.22

TECHNICAL SPECIFICATION:

MEASUREMENT	
Earth bond resistance (100 mA)	✓
Earth bond resistance (10 A)	✓
Earth bond resistance (25 A)	✓
Insulation resistance (250 V)	✓
Insulation resistance (500 V)	✓
Differential leakage current	✓
Touch leakage current	✓
Substitute leakage current	✓
IEC Lead test (polarity test)	✓
Load test	✓
ADDITIONAL FEATURES	
PASS/FAIL Indicators	✓
Mains supply check	✓
230 V appliance testing	✓
110 V appliance testing	Adapter
Graphical LCD	✓
Graphical On-Line help	✓
Back light	✓
Real time clock	✓
Auto testing (manualy select class and type of appliance)	✓
Barcode shortcut auto testing	✓
Communication ports USB/RS232	-/✓
Downloadable	✓
Trend with PC SW PAT Link PRO Plus	✓
Memory Size	1100
GENERAL DATA	
Weight	3.5 kg
Size (mm)	265 x 110 x 185

KEY FEATURES

Clear and easy access to test procedure: select the auto test, press START.

Multi - input / output ports: Bar Code reader, RFID reader / writer, Printer, PC.

Small and lightweight design makes AlphaPAT ideal for PAT testing on variety of environments.

ORDERING INFORMATION:

Part No.	Description
MI 2142	**AlphaPAT**

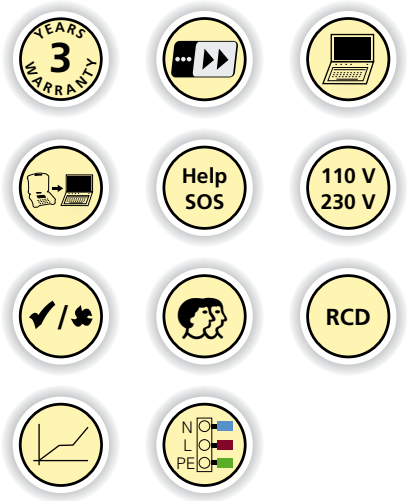
STANDARD KIT INCLUDES:

Part No.	Description
MI 2142	AlphaPAT
A 1006	Soft carry case
A 1126	Earth bond cable
A 1136	110 V adapter
A 1117	PC SW PAT Link with RS232 cable
	Instruction manual
	Calibration certificate

Accessories: page 4.22

MI 3304 BetaPAT Plus

Uploadable/Downloadable Portable Appliance Tester



The prime goal of a PAT testing engineer is to perform a job as quickly and efficiently as possible while ensuring that every appliance has been tested correctly. The innovative MI 3304 PAT testers is built with this in mind. This portable, self-contained and durable unit can be moved between sites with minimum time and effort. The large, bright LCD screen enables the unit to work in almost all lighting conditions while new features including portable RCD testing, clamp leakage current measurement, project uploading, appliance recall and retest functions, fixed appliance test ports, optional PASS/FAIL label printing and on-site test result comparison make this instrument perfect for PAT testing in almost any situation.

KEY FEATURES:

- **Autosequencing:** 110 Built in Autosequences speed up testing and ensure no tests are missed.
- **Automated:** automatic testing and Pass/Fail evaluation of results according to the code of practice.
- **RCD testing:** test trip times of Portable RCDs in accordance with the code of practice.
- **Project uploading:** upload previous test data for fast retesting of locations (requires PAT Link PRO Plus software).
- **Scan and test:** optional barcoding system and PASS/FAIL barcode label printing make retesting quick and simple.
- **Adaptable:** tests both 230 V appliances and 110 V appliances.
- **User friendly:** Large LCD screen, full QWERTY keyboard, help screens and warnings guide the user through correctly testing an appliance.
- **Multi-tasking:** can perform hard and soft earth bond test, 250 V and 500 V insulation tests, differential /substitute / touch leakage test, Load tests, fuse tests and polarity tests.
- **Multiple users and locations:** the name of the user, the building in which the instrument was tested and the room information can be typed in and stored alongside the test results and appliance information.
- **Intelligent:** hard or soft tests are chosen automatically to reduce the risk of damage occurring on the selected appliance.
- **Downloadable:** with memory capacity of 6500 locations, the unit can be downloaded to a computer via the PATLink software (included in the standard set).
- **Clamp leakage current measurement:** saves time by enabling quick measurement of leakage current with current clamps directly on power supply cable. No need to connect the test appliance to the tester.

APPLICATION:

- Professional PAT testing.
- General PAT testing.
- Factory/warehouse PAT testing.
- Multi-location PAT testing.
- After repair safety testing.

STANDARDS:

In accordance with Code of Practice:
In-service inspection and testing of electrical equipment
IEC 60335-1, IEC 60598-1, IEC 60745, VDE 701 T1, VDE 702 T1

Accessories: page 4.22

TECHNICAL SPECIFICATION:

MEASUREMENT	
Earth bond resistance (200 mA)	✓
Earth bond resistance (10 A)	✓
Earth bond resistance (25 A)	✓
Insulation resistance (250 V)	✓
Insulation resistance (500 V)	✓
Differential leakage current	✓
Touch leakage current	✓
Substitute leakage current	✓
Leakage current measurements with optional clamp	✓
RCD test	✓
IEC Lead test (polarity test)	✓
Load test	✓
ADDITIONAL FEATURES	
PASS/FAIL Indicators	✓
Mains supply check	✓
230 V appliance testing	✓
110 V appliance testing	✓
Graphical LCD	✓
Graphical On-Line help	✓
Back light	✓
Real time clock	✓
QWERTY keyboard	✓
Auto testing (manualy select class and type of appliance)	✓
Barcode shortcut auto testing	✓
Communication ports USB/RS232	✓/✓
Test 'n' Tag (BAR code scaner + thermal lable printer)	✓
Downloadable	✓
Project upload from PC to instrument	✓
Trend (compare) on instrument's LCD	✓
Trend (compare) with PC SW PAT Link PRO Plus	✓
Memory Size	6500
GENERAL DATA	
Weight	7.8 kg
Size (mm)	345 x 160 x 335

KEY FEATURES

Fast and easy access to test procedure: select the auto test and press START.

Multi - input / output ports:
- Bar Code reader
- Printer
- PC

ORDERING INFORMATION:

Part No.	Description
MI 3304	**BetaPAT Plus**

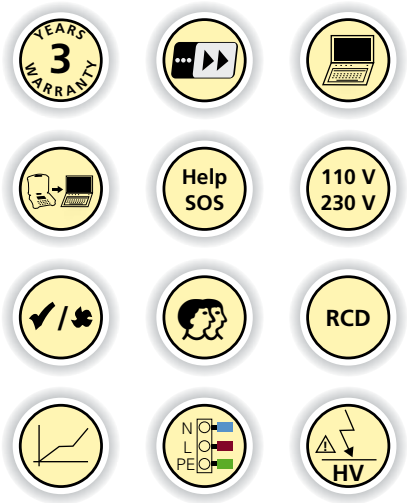
STANDARD KIT INCLUDES:

Part No.	Description
MI3304 / MI3305	BetaPAT Plus
A1126	Earth Bond Cable
20691095	PRCD cable
A 1203	PC SW PatLink PRO
A 1017	RS232 downloading cable
83004993	USB downloading cable
83005484	Crocodile clip (green)
A 1013	Crocodile clip (black)
A 1062	Test probe (green)
A 1014	Test probe (black)
20691928	Test lead (green 1.5 m)
20691926	Test lead (black 1.5 m)
	Instruction manual
	Calibration certificate

Accessories: page 4.22

MI 3305 OmegaPAT Plus

Uploadable/Downloadable Portable Appliance Tester with Flash Test



The prime goal of a PAT testing engineer is to perform a job as quickly and efficiently as possible while ensuring that every appliance has been tested correctly. The innovative MI 3305 PAT testers is built with this in mind. This portable, self-contained and durable unit can be moved between sites with minimum time and effort. The large, bright LCD screen enables the unit to work in almost all lighting conditions while new features including portable RCD testing, clamp leakage current measurement, flash test, project uploading, appliance recall and retest functions, fixed appliance test ports, optional PASS/FAIL label printing and on-site test result comparison make this instrument perfect for PAT testing in almost any situation.

KEY FEATURES:

- **Autosequencing:** 110 Built in Autosequences speed up testing and ensure no tests are missed.
- **Automated:** automatic testing and Pass/Fail evaluation of results according to the code of practice.
- **RCD testing:** test trip times of Portable RCDs in accordance with the code of practice.
- **Project uploading:** upload previous test data for fast retesting of locations (requires PRO Plus software).
- **Scan and test:** optional barcoding system and PASS/FAIL barcode label printing make retesting quick and simple.
- **Flash Test:** dielectic strength test after repair safety testing.
- **Adaptable:** tests both 230 V appliances and 110 V appliances.
- **User friendly:** large LCD screen, full QWERTY keyboard, help screens and warnings guide the user through correctly testing an appliance.
- **Multi-tasking:** can perform hard and soft earth bond test, 250 V / 500 V insulation tests, differential /substitute / touch leakage test, Load tests, fuse tests and polarity tests.
- **Multiple users and locations:** the name of the user, the building in which the instrument was tested and the room information can be typed in and stored alongside the test results and appliance information.
- **Intelligent:** hard or soft tests are chosen automatically to reduce the risk of damage occurring on the selected appliance.
- **Downloadable:** with memory capacity of 1100 locations, the unit can be downloaded to a computer via the PATLink software (included in the standard set).
- **Clamp leakage current measurement:** saves time by enabling quick measurement of leakage current with current clamps directly on power supply cable. No need to connect the test appliance to the tester.

APPLICATION:

- Professional PAT testing.
- General PAT testing.
- Factory/warehouse PAT testing.
- Multi-location PAT testing.
- After repair safety testing.

STANDARDS:

In accordance with Code of Practice:
In-service inspection and testing of electrical equipment
IEC 60335-1, IEC 60598-1, IEC 60745, VDE 701 T1, VDE 702 T1

Accessories: page 4.22

TECHNICAL SPECIFICATION:

MEASUREMENT	
Earth bond resistance (200 mA)	✓
Earth bond resistance (10 A)	✓
Earth bond resistance (25 A)	✓
Insulation resistance (250 V)	✓
Insulation resistance (500 V)	✓
Differential leakage current	✓
Touch leakage current	✓
Substitute leakage current	✓
Leakage current measurements with optional clamp	✓
Flash test	✓
RCD test	✓
IEC Lead test (polarity test)	✓
Load test	✓
ADDITIONAL FEATURES	
PASS/FAIL Indicators	✓
Mains supply check	✓
230 V appliance testing	✓
110 V appliance testing	✓
Graphical LCD	✓
Graphical On-Line help	✓
Back light	✓
Real time clock	✓
QWERTY keyboard	✓
Auto testing (manualy select class and type of appliance)	✓
Barcode shortcut auto testing	✓
Communication ports USB/RS232	✓/✓
Test 'n' Tag (BAR code scaner + thermal lable printer)	✓
Downloadable	✓
Project upload from PC to instrument	✓
Trend (compare) on instrument's LCD	✓
Trend (compare) with PC SW PAT Link PRO Plus	✓
Memory Size	6500
GENERAL DATA	
Weight	8.9 kg
Size (mm)	345 x 160 x 335

KEY FEATURES

Fast and easy access to test procedure: select the auto test and press START

Multi - input / output ports:
- Bar Code reader
- Printer
- PC

ORDERING INFORMATION:

Part No.	Description
MI 3305	**OmegaPAT Plus**

STANDARD KIT INCLUDES:

Part No.	Description
MI3304 / MI3305	OmegaPAT Plus
A1126	Earth Bond Cable
20691095	PRCD cable
83004105	Flash cable
A1203	PC SW PatLink PRO
A1017	RS232 downloading cable
83004993	USB downloading cable
83005484	Crocodile clip (green)
A 1013	Crocodile clip (black)
A 1062	Test probe (green)
A 1014	Test probe (black)
20691928	Test lead (green 1.5 m)
20691926	Test lead (black 1.5 m)
	Instruction manual
	Calibration certificate

Accessories: page 4.22

MI 3300 Portable Appliance Simulation Board

Multipurpose Portable Appliance Simulation Board

3 YEARS WARRANTY

The MI 3300 portable appliance simulation board is a great piece of equipment for teaching or demonstrating PAT testing. The MI 3300 simulates a wide variety of portable equipment in normal operation or in a variety of fault conditions with the simple flick of a switch. The strong, rugged, portable case with detachable lid allows the unit to be moved between sites or stored quickly and effortlessly after the session is complete. The in-built adaptability of the unit to simulate countless products along with the ability to safely replicate set fault conditions make this the ideal unit for teaching or assessing learning in classrooms, training sessions, demonstration sessions, seminars and on PAT training courses.

KEY FEATURES:

- **Unlimited:** a practically unlimited number of different pieces of equipment (portable, handheld, machine or switchgear) can be simulated by using different tablets (eight included in standard set).
- **Upgradeable:** on demand, the demonstration board can be simply upgraded with new tablets.
- **Reliable:** normal and fault situations can be switched on and off, offering reproducible fault conditions for the assessment of learning.
- **Adaptable:** simulates the following faults: Earth bond faults, insulation resistance faults, leakage and touch leakage faults, polarity and functional faults.
- **Portable:** the simulation board is built into a strong, rugged case with a detachable lid for storing leads, adapters, and manuals.

STANDARDS:

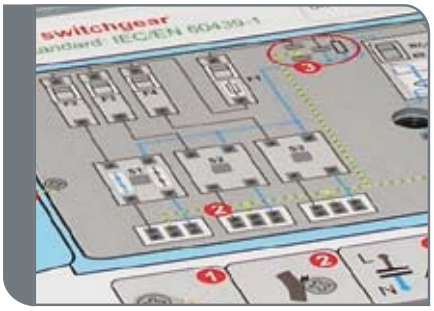
Faults built in accordance with limits set out by:
Code of practice for in-service inspection and testing of electrical equipment

Accessories: page 4.22

TECHNICAL SPECIFICATION:

CHARACTERISTICS	
Protection classification	Class I
Nominal input voltage	230 V (+6 %, -10 %)
Optional on request	115 V (+6 %, -10 %)
Power consumption	15 VA max
Overvoltage category	CAT II/300 V
Frequency range	45 Hz to 66 Hz
Pollution degree	2
GENERAL DATA	
Size (mm)	345 x 160 x 335
Weight	2.7 kg

KEY FEATURES



8 demonstration tables (iron, receiver, IEC cord, extension drum, coffee machine, washing machine, switchgear)

A practically unlimited number of different pieces of equipment (portable and handheld appliances, machines, switchgears) can be simulated by using different demonstration tables.

ORDERING INFORMATION:

Part No.	Description
MI 3300	**Portable Appliance Simulation Board**

STANDARD KIT INCLUDES:

Part No.	Description
MI 3300	PAT Demoboard with demonstration tables (iron, receiver, IEC cord ,extension drum, coffee machine, washing machine,switchgear) Handbook "Electrical Equipment Testing" on CD
83002466	Jumper for shorting L and N connections IEC cord Mains cable Class I mains cable for connecting PAT testers to PAT Demoboard Class II mains cable for connecting PAT testers to PAT Demoboard Measuring cable for testing discharging time Carrying bag for demonstration tables Instruction manual Calibration certificate

Accessories: page 4.22

Glossary - Testing the safety of electrical appliances, machines and switchboards

CE Marking
It is mandatory that any product sold in the European Union (EU) to have a CE label on it. The CE mark is a conformity mark which proves that a product has met all the health, safety and environmental requirements set out by European Directives in order to ensure that the product is suitable for sale.

CE

Discharge Time
When an appliance is high powered appliance, machines and switchgear are powered up, any inductive and capacitive components within them will become charged. When the device is switched off, people usually assume that the power will be immediately discharged but this is not always the case. Inductive and capacitive components can hold their charge (even after the power has been removed) which can prove dangerous for anybody who comes in contact with the appliance/machine/switchgear. The time it takes for an appliance to discharge can also change with time due to component degradation, impurities and pollution. The discharge time function on the Metrel test instruments measure how long it takes for the device to discharge itself to a safe level of voltage.

Functional Test
The functional test powers up an appliance to check that it works correctly. While doing this, the instrument can also measure a variety of different information including voltage, current, power usage, cos φ and power factor.

Loop test
In order for a high powered machine or switchgear to discharge correctly and for safety devices to act correctly and within the set time limits, it is important that the impedance of the fault loop (live to Earth impedance) that supplies power to the device is adequate and appropriate. A loop test measures the amount of impedance in the wiring that supplies the device. Once measured, this can be compared to fault loop impedance limits set out in the appropriate regulations in order to ensure that the device is safe to use.

Appliance
A device, machine or piece of equipment, especially an electrical one that is used in the house, such as a cooker or washing machine.

Machine
A piece of equipment with several moving parts which uses power to do a particular type of work.

Switchgear
A switching/ interrupting device used in connection with generation, transmission, distribution and conversion of electric power for controling, metering protecting and regulating devices.

Accessories: page 4.22

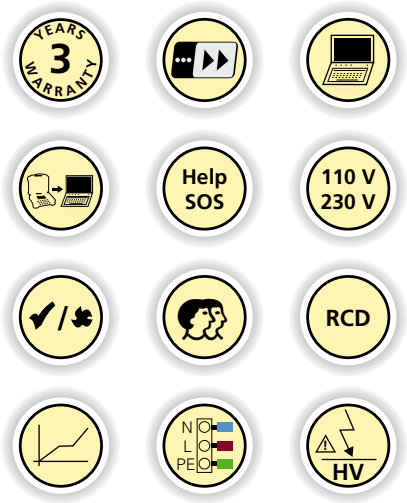
Selection Guide for electrical appliances, machines and switchboards

Part No.:	MI 3321 MultiServicerXA	MI 2094 CE Multitester
		
MEASUREMENTS		
Withstanding test 1000 V AC	✓	✓
Withstanding test 1890 V AC	✓	✓
Withstanding test 2500 V AC	✓	✓
Withstanding test 100 - 5000 V AC (500 VA)		✓
Earth bond resistance (100 mA)		✓
Earth bond resistance (200 mA)	✓	✓
Earth bond resistance (10 A)	✓	✓
Earth bond resistance (25 A)		✓
Insulation resistance 250 V DC	✓	✓
Insulation resistance 500 V DC	✓	✓
Insulation resistance 1000 V DC		✓
Differential leakage current	✓	✓
Touch leakage current	✓	✓
Substitute leakage current	✓	✓
Discharging time	✓	✓
Leakage current measurement with optional clamp	✓	
RCD test	✓	
Line impedance	✓	
Loop impedance	✓	
Voltage measurement	✓	✓
Frequency measurement	✓	
Phase rotation indication	✓	
IEC lead test (polarity test)	✓	
Functional (load) test	✓	✓
ADITIONAL FEATURES		
PASS/FAIL evaluation	✓	✓
Mains supply check	✓	✓
Graphical LCD	✓	✓
Graphical On-Line help	✓	
Back light	✓	✓
Real time clock	✓	✓
QWERTY Keyboard	✓	
Auto testing	✓	✓
Barcode shortcut auto testing	✓	
Communication ports RS232/USB	✓/✓	✓/ Optional
Test'n'tag (Barcode scanner + thermal label printer)	✓	
Downloadable	✓	✓
Project upload from PC to instrument	✓	
Trend (compare) on instrument's LCD	✓	
Trend (compare) with PC SW PAT Link PRO Plus	✓	
Memory size	6000	1638
STANDARD / OPTIONAL ACCESSORIES		
Barcode scanner	Optional	Optional
Thermal label printer	Optional	
Receipt printer	Optional	Optional
PC SW PAT Link PRO (download, report, data export)	✓	
PC SW PAT Link PRO Plus (download, PRO Plus report, data export, trend)	Optional	
PC SW CE Link (download, report, autosequence editor)		Optional
GENERAL DATA		
Power supply	110 V / 230 V	230 V
Weight	8.4 kg	13.5 kg
Size (mm)	345 x 160 x 335	410 x 175 x 370

Accessories: page 4.22

MI 3321 MultiservicerXA

Portable Appliance, Machine and Switchgear Safety Tester



Sometimes a normal Portable Appliance tester is not sufficient for testing all the equipment found in factories and in industrial locations. For hard wired appliances and large machinery, factors including discharge time, power and current consumption and resistance to excessive voltages play major parts in the safety testing of an appliance and can provide a much deeper insight into the possibility of machine/appliance deterioration. For situations like this, you need the MI 3321 MultiservicerXA. With an easy to use user interface, large LCD screen, quick reference testing guide and extra ports for testing fixed installations, the MI 3321 will make easy work out of your safety testing.

KEY FEATURES:

- **3 in 1:** tests suitable for testing portable appliances, machines and switchgear with functional and leakage tests being performed up to 16 A.
- **Configurable limits:** set limits on functional test and withstanding voltage test to reduce risk of damage to the appliance/machine or tester.
- **Automated:** automatic testing and Pass/Fail evaluation of results according to the code of practice.
- **RCD testing:** test trip times of Portable RCDs in accordance with the code of practice.
- **Project uploading:** upload previous test data for fast retesting of locations (requires PRO Plus software).
- **Scan and test:** optional barcoding system and PASS/FAIL barcode label printing make retesting quick and simple.
- **User friendly:** large LCD screen, full QWERTY keyboard, help screens and warnings guide the user through correctly testing an appliance.
- **Multi-tasking:** can perform hard and soft earth bond test, 250 V / 500 V insulation tests, differential /substitute / touch leakage test, Load tests, fuse tests and polarity tests.
- **ntelligent:** hard or soft tests are chosen automatically to reduce the risk of damage occurring on the selected appliance.
- **Downloadable:** with memory capacity of 1100 locations, the unit can be downloaded to a computer via the PATLink software.
- **Clamp leakage current measurement:** saves time by enabling quick measurement of leakage current with current clamps directly on power supply cable. No need to connect the test appliance to the tester.
- **Discharge time test:** measure how long it takes for the machine discharge after power is removed.
- **Withstanding voltage test:** 2500 V and 1000 V a.c. withstanding voltage test with settable limits test if your machines are capable of withstanding power spikes on the system.

APPLICATION:

- Factory machinery safety testing.
- Industrial safety testing.
- Switchgear safety testing.

STANDARDS:

Measurements in accordance with:
IEC 60204 Electrical equipment of machines
IEC 60439-1 Switchgear and controlgear assemblies
IEC 60755 Residual current operated protected devices
IEC 60598-1 Luminares
VDE 701, VDE 702 Repair and modification inspections and repeat tests of electrical appliances
IEC 50144-1 Safety of hand-held electric motor operated tools,
EN 60204 Ed. 5
IEC/EN 60439 and IEC 61439
MI 3321 is designed in accordance to the following standards:
- EN 61010-1 (safety)
- EN 50081-1 (electromagnetic compatibility)
- EN 61000-6-1 (electromagnetic compatibility)

Accessories: page 4.22

TECHNICAL SPECIFICATION:

MEASUREMENTS	
Withstanding test 1000 V AC	✓
Withstanding test 1890 V AC	✓
Withstanding test 2500 V AC	✓
Earth bond resistance (200 mA)	✓
Earth bond resistance (10 A)	✓
Insulation resistance 250 V DC	✓
Insulation resistance 500 V DC	✓
Differential leakage current	✓
Touch leakage current	✓
Substitute leakage current	✓
Discharging time	✓
Leakage current measurement with optional clamp	✓
RCD test	✓
Line impedance	✓
Loop impedance	✓
Voltage measurement	✓
Frequency measurement	✓
Phase rotation indication	✓
IEC lead test (polarity test)	✓
Functional (load) test	✓
ADITIONAL FEATURES	
PASS/FAIL evaluation	✓
Mains supply check	✓
Graphical LCD	✓
Graphical On-Line help	✓
Back light	✓
Real time clock	✓
QWERTY Keyboard	✓
Auto testing	✓
Barcode shortcut auto testing	✓
Communication ports RS232/USB	✓/✓
Test'n'tag (Barcode scanner + thermal label printer)	✓
Downloadable	✓
Project upload from PC to instrument	✓
Trend (compare) on instrument's LCD	✓
Trend (compare) with PC SW PAT Link PRO Plus	✓
Memory size	6000
STANDARD / OPTIONAL ACCESSORIES	
Barcode scanner	Optional
Thermal label printer	Optional
Receipt printer	Optional
PC SW PAT Link PRO (download, report, data export)	✓
PC SW PAT Link PRO Plus (download, PRO Plus report, data export, trend)	Optional
GENERAL DATA	
Power supply	110 V / 230 V
Weight	8.4 kg
Size (mm)	345 x 160 x 335

KEY FEATURES

Fast and easy access to test procedure: select the auto test and press START

ORDERING INFORMATION:

Part No.	Description
MI 3321	**MultiservicerXA**

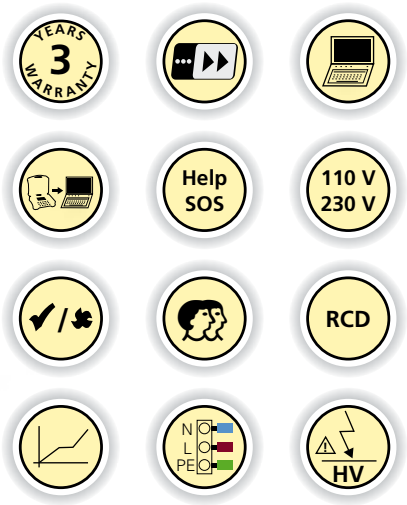
STANDARD KIT INCLUDES:

Part No.	Description
MI 3321	MultiServicerXA
20691908	HV test lead
A 1053	Plug test cable
20691127	3 wire test lead
20691121	Test lead (black, 1.5 m)
20691124	Test lead (red, 1.5 m)
20691126	Test lead (red, 4 m)
20691123	Test lead (green, 1.5 m)
A 1014	Test probe (black)
A 1016	Test probe (red)
A 1062	Test probe (green)
A 1015	Test probe (blue)
A 1013	Crocodile clip (black, 3 pcs)
20901023	Protective bag for accessories
	PC SW PAT Link PRO with RS232 and USB cable
	Instruction manual
	Calibration certificate

Accessories: page 4.22

MI 2094 CE Multitester

Portable CE marking verification device



MI 2094 CE Multitester is in a class of its own aimed for CE certification of electrical appliances, machines and switchboards during the production. It is also very suitable for testing the appliance after repairs and maintenance work. With the ability to test a multitude of different appliances to ensure that they conform to the CE safety legislation, the MI 2094 still manages to remain portable, safe and easy to use. The optional PC software A 1073 CE Link enables the upload of automated test sequences (autosequences), downloading of test results directly to the PC, automatic data storage into a file and also prints test reports. The MI 2094 makes light work of a very complex job.

KEY FEATURES:

- **Portable:** CE tester can easily be moved between locations or mounted for ease of use.
- **Safe:** high quality accessories and optional safety devices ensure that testing can be performed in a controlled, safe environment.
- **Easy to use:** rotational dial makes selecting single test simple and easy while the programmable autosequence testing make life even easier and stops the risk of missing a test.
- **Automatic:** programmable autosequences via the optional CE Link software.
- **Downloadable:** the optional PC software A 1073 CE Link enables the upload of test sequences (autosequences), downloading of test results directly to the PC, enables automatic data storage into a file and also prints test reports.

APPLICATION:

- Verifying that manufactured products meet the European safety legislation.
- For testing of electrical appliance after repairs and maintenance work.

STANDARDS:

In accordance with:
Testing standards:

IEC 60204-1	Electrical equipment of machines
IEC 60335-1	Household and similar electrical appliances
IEC 60439-1	Switchgear and control gear assemblies
IEC 60598-1	Luminaries
IEC 60745	Hand-held motor-operated tools
IEC 60755	Residual current operated protected devices
IEC 60950	Safety of IT equipment
IEC 61029	Transportable motor-operated tools
IEC 61558-1	Transformers and power supply units
EN 60065	Audio, video and similar electronic apparatus
VDE 701 T1	Repair and modification inspections
VDE 702 T1	Repeat tests of electrical appliances

Safety standards for the tester (LVD)

IEC 61010-1	Safety requirements for electrical equipment

Electromagnetic compatibility of the tester (EMC)

EN 61326	Audio, video and similar electronic apparatus
VDE 701 T1	Repair and modification inspections
VDE 702 T1	Repeat tests of electrical appliances

Accessories: page 4.22

TECHNICAL SPECIFICATION:

MEASUREMENTS	
Withstanding test 1000 V AC	✓
Withstanding test 1890 V AC	✓
Withstanding test 2500 V AC	✓
Withstanding test 100 - 5000 V AC (500 VA)	✓
Earth bond resistance (100 mA)	✓
Earth bond resistance (200 mA)	✓
Earth bond resistance (10 A)	✓
Earth bond resistance (25 A)	✓
Insulation resistance 250 V DC	✓
Insulation resistance 500 V DC	✓
Insulation resistance 1000 V DC	✓
Differential leakage current	✓
Touch leakage current	✓
Substitute leakage current	✓
Discharging time	✓
Voltage measurement	✓
Functional (load) test	✓
ADITIONAL FEATURES	
PASS/FAIL evaluation	✓
Mains supply check	✓
Graphical LCD	✓
Back light	✓
Real time clock	✓
Auto testing	✓
Communication ports RS232/USB	✓/Optional
Downloadable	✓
Memory size	1638
STANDARD / OPTIONAL ACCESSORIES	
Barcode scanner	Optional
Receipt printer	Optional
PC SW CE Link (download, report, autosequence editor)	Optional
GENERAL DATA	
Power supply	230 V
Weight	13.5 kg
Size (mm)	410 x 175 x 370

KEY FEATURES

Multi - input / output ports:
- Bar Code reader
- RFID reader / writer
- Printer
- PC

ORDERING INFORMATION:

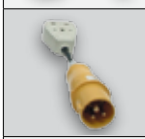
Part No.	Description
MI 2094	**CE Multitester**

STANDARD KIT INCLUDES:

Part No.	Description
MI 2094	CE MultiTester
A 1075	HV test pistol with 2 m cable, 2 pcs
A 1076	CONTINUITY test lead 2.5 m, 2 pcs
A 1077	Red INSULATION test lead 2.5 m
A 1078	Black INSULATION test lead 2.5 m
A 1013	Crocodile clip - black, 3 pcs
A 1064	Crocodile clip - red, 2 pcs
A 1079	Discharge time cable
A 1080	Mains cable
20900957	Accessories bag
	Instruction manual
	Calibration certificate

Accessories: page 4.22

Accessories selection guide

Photo	Product group	Accessory decription	Part No.	Instrument / Application	MI 3302	MI 2142	MI 3304	MI 3305	MI 3321	MI 2094
	Bags, cases and straps	Soft carry case	A 1006	Case is suitable for instrument and accessory. Side opening for access to connector panel is provided.	✓	✓				
	Remote testing device	Remote control pedal	A 0941	High voltage insulation test can be started safely and remotely by using the pedal which additionally allows free hand operation of the worker.						✓
	Remote testing device	Warning lamp	A 0942	Warning lamps visually signalises on-going phases of HV insulation test and warns the user on dangerous voltage conditions.						✓
	Clamps	Current clamp (low range, leakage)	A 1018	Current clamp-on adapter with jaw opening 51 mm for low range and leakage current measurements on EIS and PAT applications.		✓				
	Clamps	Leakage clamp	A 1283	Leakage clamp for accurate leakage current measurement.			✓	✓	✓	
	Software, Books, publications	RS232 communication cable	A 1017	RS232- COM cable for connecting the tester with the PC.		✓	✓	✓		✓
	Software, Books, publications	PS SW CELink with RS232 cable	A 1073	CE Link PC Software is multi-purpose download software for programming of the CE Multi-tester, creation of test reports and test data evaluation.						✓
	Software, Books, publications	PS SW PATLink with RS232 cable	A 1117	Basic download software with test report creation feature.		✓				
	Software, Books, publications	PC SW PAT Link PRO Plus with USB and RS232 cable	A 1203	Advanced PC SW enables download, PRO Plus report printout, trend (compare) featrure,and upload to some top range Metrel instruments.		✓	✓	✓	✓	
	Software, Books, publi-cations	USB/RS232 converter with 1 m fixed cable	A 1171	RS232/USB adapter for PC's without USB COM port.		✓				✓
	Other	110/230 V adapter	A 1104	Test instrument power sup-ply adaptor for plugging test instrument into 110V supply.			✓	✓		
	Other	110 V adapter	A 1136	110V adaptor for plugging 110V appliances into PAT test-ing instruments.	✓	✓				

Accessories: page 4.22

Photo	Product group	Accessory decription	Part No.	Instrument / Application	MI 3302	MI 2142	MI 3304	MI 3305	MI 3321	MI 2094
	Scanners, printers and labels	Receipt Printer	A 1103	Quick printing of test results measured with PAT test instrument onto receipt paper		✓	✓	✓	✓	✓
	Scanners, printers and labels	Bar code scanner	MD Wand	Identification of barcode labelled appliances is supported by the barcode reader.		✓	✓	✓	✓	
	Scanners, printers and labels	Bar code scanner	A 1161	Identification of barcode labelled appliances is supported by the barcode reader.						✓
	Scanners, printers and labels	Bar code labels	A 1106	Appliances can be marked with barcode labels for easier identification.		✓	✓	✓		
	Scanners, printers and labels	RS232 cable 9/25 pin for printer	A 1226	Communication table for A 1103 receipt printer		✓	✓	✓		
	Scanners, printers and labels	Label printer with power and data cable	A 1276	Printer supports printing of identification labels containing a complete appliance data information with PASS or FAIL test data evaluation.			✓	✓		
	Scanners, printers and labels	Spare label roll, size 50 x 30 mm	A 1277	Spare printing rolls for A 1276 printer.			✓	✓		
	Test leads, cables, probes and crocodile clips	Test probe, black	A 1014	Test probe for use with the A 1013.						✓
	Test leads, cables, probes and crocodile clips	Test probe, red	A 1016	Test probe for use with the A 1013.						✓
	Test leads, cables, probes and crocodile clips	Test probe, green	A 1062	Test probe for use with measuring cable.			✓	✓	✓	
	Test leads, cables, probes and crocodile clips	Crocodile clip (Red)	A 1064	Crocodile clip is useful for stable connection of measuring cable to test point.						✓
	Test leads, cables, probes and crocodile clips	Crocodile clip (Black)	A 1013	Crocodile clip is useful for stable connection of measuring cable to test point.					✓	✓
	Test leads, cables, probes and crocodile clips	Test cable 20 m	A 1153	Extension cable for insulation resistance and continuity measurement.			✓	✓	✓	✓

Accessories: page 4.22

Photo	Product group	Accessory decription	Part No.	Instrument / Application	MI 3302	MI 2142	MI 3304	MI 3305	MI 3321	MI 2094
	Test leads, cables, probes and crocodile clips	Test cable 4 m	A 1154	Extension cable for insulation resistance and continuity measurement.			✓	✓	✓	✓
	Test leads, cables, probes and crocodile clips	HV test lead with plug 6 m, set of 2 pcs	S 1057	High voltage extension test leads for measurements on larger electrical equipment.						✓
	Test leads, cables, probes and crocodile clips	CONTINUITY test lead 10 m, set of 2 pcs	S 1058	10 m test leads for PE continuity and earth bond measurement.						✓
	Test leads, cables, probes and crocodile clips	Continuity test lead 2,5 m	S 1072	Special extension lead for 4 lead earth bond measurement with high curent (10 A, 25 A).						✓
	Test leads, cables, probes and crocodile clips	Continuity extension, 10 m, set of 2 pcs	S 2012	Extension test lead for continuity measurements.					✓	

Accessories: page 4.22

MEASURING INSTRUMENTS AND TESTERS

- 17th Edition Electrical Installation Testers
- Power Quality Analysis
- High Voltage Insulation Diagnostics
- Appliances/Machines/Switchboard Safety
- **LAN Cabling Certification**
- Indoor Environment Quality
- Digital Multimeters/Clamp Meters/Voltage and Continuity Testers

LAN Cabling Certification

Computer Network Cable Testers and Certifiers

METREL®

CATALOG 2010

Glossary - LAN Cabling Certification

Wire map
Provides a visual map of how the connections on either side of a multi-core cable are connected together.

Near end
The part of the cable which is closest to the master test engineer.

Far end
The part of the cable which is furthest away from the master test engineer

Crosstalk
When the magnetic field generated by a pairs of wires creates interference on another pair of wires. This is sometimes abbreviated to "XT"

Near End Crossover Talk (NEXT)
NEXT monitors the effect sending a signal down one set of wires has on a second set of wire. Leaving the far end of the wires open, a signal is sent down one pair of wires and the induced signal is measured on the second set of wire. The ratio of the sent signal compared to the induced signal provides the NEXT value. NEXT tests should be performed at both sides of the cable. If a remote unit is used, one unit can check the transmitting side of the cable and by setting the MultiLAN to "Remote NEXT" test, the other side of the cable can be tested without the test engineer having to move location.

Power Sum Near End Cross Talk (PSNEXT)
In most modern LAN systems, a standard cable will contain 8 wires. PSNEXT looks at the effect of sending signals down three pairs of wires has on the pair of wires under test. This is calculated by performing a NEXT test on each pair of wires and then summing all the values together to create the PSNEXT value for the pair of wires under test.
In most cases, the PSNEXT test should be performed from both sides of the cable, hence the "Remote PSNEXT" test function can be used.

Far End Crossover Talk (FEXT)
FEXT looks at the effect a signal induced into one pair of wires will have on a receiver connected to a second pair of wires. To perform the test, a signal placed onto a single pair of wires and the signal on the other set of wires is measured at the other end of the cable.

Equal level far end crossover talk (ELFEXT)
ELFEXT is a FEXT test which takes into account the attenuation of the wires (providing a more realistic representation of the wires)

Power sum equal level far end crossover talk (PSELFEXT)
In most modern LAN systems, a standard cable will contain 8 wires. PSELFEXT looks at the effect of sending signals down three pairs of wires has on the pair of wires under test. This is calculated by performing a ELFEXT test on each pair of wires and then summing all the values together to create the PSELFEXT value for the pair of wires under test.

Attenuation
The loss of strength in a signal as it is transmitted over a cable or fibre

Attenuation to crosstalk Ratio (ACR)
The difference between attenuation and crosstalk, measured in dB, at a given frequency. The higher the ACR value is, the better the signal is at the receiving end compared to the crosstalk interference signal.
The ACR value should be taken at both ends of the cable, hence the "Remote ACR" function is provided to stop the engineer continually having to move the master unit between locations.

Propagation delay
The time it takes for a signal to pass from one side of the cable to the other.

Delay Skew
In multi-core cable, where each pair has their own propagation delay time, the delay skew is the difference between the first signal arriving and the last signal arriving.

Accessories: page 5.08

Selection Guide for LAN Cabling Certification

Part No.:	MI 2016 Multi LAN 350
	
FEATURES	
Frequency range	0 - 350 MHz
CAT 6	✓
CAT 5 / 5e	✓ / ✓
CAT 3	✓
Internal memory	✓
PC Software	✓
RS232 port and cable	✓
USB port and cable	✓
Talk over copper (Talk set)	✓
Cable identifiers	✓
RJ 45 output	✓
Opto LAN fiber test support	✓
TEST FUNCTIONS	
Wiremap	✓
NEXT / Remote NEXT	✓ / ✓
PSNEXT / Remote PSNEXT	✓ / ✓
ELFEXT / PSELFEXT	✓ / ✓
Return Loss / Remote Return Loss	✓ / ✓
ACR / Remote ACR	✓ / ✓
PSACR / Remote PSACR	✓ / ✓
Length	✓
Propagation delay	✓
Delay skew	✓
Impedance	✓
DC resistance	✓
TDR	✓
TDR with TDnext	✓

3 years manufactures waranty

LAN testing up to CAT 6

High frequency range

Fiber optic LAN testing

Time domain reflectometer

Automatic test sequence

Graphical LCD

Cable locator

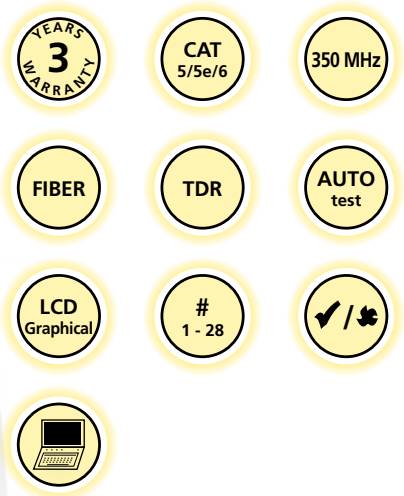
Pass fail evaluation

Downloadable

Accessories: page 5.08

MI 2016 Multi LAN 350

Professional LAN cable testing system



The MI 2016 Multi LAN 350 is a high performance, top quality, competitively priced LAN tester with the capabilities of testing up to CAT 6 (Class E) cabling (both permanent and channel). The fast and seamless execution of a complete autotest can be performed within 55 seconds while the built-in intercom system allows for easy communication through the length of the cabling. The autosequences, single tests (useful in troubleshooting), software as standard and the complete selection of accessories make LAN testing simple, easy and comprehensive.

KEY FEATURES:

- Top class CAT6/Class E LAN certification tester for testing high speed networks with a test frequency up to 350 MHz.
- Extensive database of Autotests for complete and quick LAN cabling verification in accordance with all leading test standards.
- Adapters available from the standard kit allow for both Channel and Permanent Link connection.
- High resolution TDR with TD Next function for quick determination of a distance to a faulty point along the cable.
- LANLink PC software package for seamless report creation and documentation of test results.
- Supports test standards TIA Cat 5e and 6, ISO 11801 Class D and Class E, EN 50173 Class D and E, etc.
- Simple, easy and comprehensive.

APPLICATION:

- Verification of LAN networks up to CAT6/Class E.
- Troubleshooting in IT networks.

STANDARDS:

Test standards:

- TIA Cat 5e and 6, ISO 11801 Class D and Class E, EN 50173 Class D and E, etc
- **Safety Standards:**
- IECIEN 611010-1
- IEC 60825-1

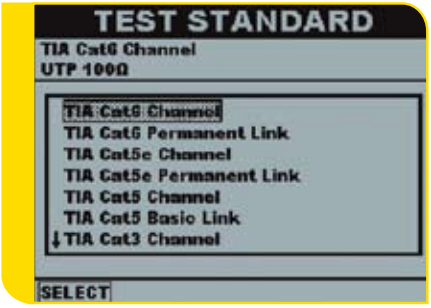
Accessories: page 5.08

LAN Cabling Certification

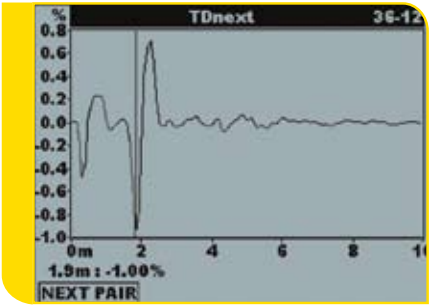
TECHNICAL SPECIFICATION:

SINGLE TESTS	
Wire map	✓
PSNEXT, Remote PSNEXT	✓
NEXT, Remote NEXT	✓
ELFEXT, Remote ELFEXT	✓
PSELFEXT, Remote PSELFEXT	✓
RETURN LOSS, Remote RETURN LOSS	✓
Attenuation	✓
PSACR, Remote PSACR	✓
ACR, Remote ACR	✓
Length	✓
Delay Skew	✓
Propagation Delay	✓
Impedance	✓
DC Resistance	✓
SCOPE FUNCTIONS	
TDR and TDnext	✓
Scope Test procedure	✓
AUTOTEST - COPPER CABLES	
Complete, Near End, Far End Autotest	✓
SPECIAL FEATURES	
PASS/FAIL evaluation	✓
Talk & trace interface	✓
Locating cables	✓
Noise Filter	✓
GENERAL DATA	
Permanent link connection	✓
Channel connection	✓
Feature Standard	TSB 67, TSB 95, TIA/EIA 568-B Level III
Test Standards	TIA Cat 5e, 6 ISO 11801 Class D (2002), E EN 50173 Class D (2002), E...
Cable Types	UTP, STP, ScTP, FTP
Autotest time:	55 sec (standard CAT6 test)
Display:	LCD Graphic type, 320 x 240 dots, backlight
Memory	500 Autotests
USB and RS 232 communication ports	✓
Charging time	12 hours
Typical battery life	8 hours
External supply/charger	✓
Power supply main unit	6 x 1.5 NiMH type C rechargeable batteries
Size (mm)	265 x 110 x 185
Weight	2.1 kg

KEY FEATURES



Selectable test standards for complet and quick LAN cabling verification.



TDNext function for determination of faulty points.

ORDERING INFORMATION:

Part No.	Description
MI 2016ST	**Multi LAN 350**

STANDARD (ST) KIT INCLUDES:

Part No.	Description
MI 2016	Multi LAN 350
20050418	Remote unit Multi LAN 350
20050419	Permanent Link adapter, 2 pcs
20050420	Chanel Link adapter, 2 pcs
A 1042	Locators (#1 - #4), 4 pcs
20050421	Attenuation calibration module
A 1135	Power supply adapter, 2 pcs
A 1041	Headphones set, 2 pcs
S 2019	6 x 1.2 V NiMH batteries, 2 pcs
	PC SW LAN Link with USB and RS232 cable
	Instruction manual
	Calibration certificate

ORDERING INFORMATION:

Part No.	Description
MI 2016PS	**Multi LAN 350**

PRO (PR) KIT INCLUDES:

Description
Similar content as MI 2016ST: Remote unit Multi LAN 350 replaced by Instrument Multi LAN 350

Accessories: page 5.08

MI 5100 OptoLAN

Fiber optic cable tester

The MI 5100 OptoLAN is intended for the verification of fiber optic parts of a LAN network. Test results can be compared against limits defined by the LAN standards (all popular standards included on the PM 420). Results can be either stored on the MI 5100 OptoLan and downloaded by USB to a computer or sent individually, by infra-red link, to the MI 2016 MultiLAN.

KEY FEATURES:

- Measures Insertion loss and optical power.
- Automatic wavelength detection on Powermeter PM420, no need for manual selection.
- Powermeter PM420 supports six wavelengths (MM-multimode and SM- Singlemode).
- Small size and light weight with very low power consumption.
- Built-in battery charger.
- Combined with MI 2016, the MI 5100 can create a cost effective solution for the verification of fiber and copper LAN networks.

APPLICATION:

- Testing fiber link performance.
- Verification of fiber networks.
- Troubleshooting and fault finding of connections/links etc.

STANDARDS:

MM LAN cabling and application standards:

- TIA/EIA 568A horizontal/backbone
- ISO 11801 Channel/Link
- EN 50173 Channel/Link
- 10Base/100Base/1000Base series

Measurement standards:

- ANSI/TIA/EIA-526-14A
- EN 61280-4-2

Safety Standards:

- IECIEN 611010-1
- IEC 60825-1

TECHNICAL SPECIFICATION:

OPTICAL POWER METER PM420 PM420LAN	
SPECIFICATIONS	
Photodetector	1 mm InGaAs
Working wavelengths	850 nm, 1300 nm, 1310 nm, 1490 nm, 1550 nm, 1625 (1650) nm
Uncertainty	±0.2 dBm
Accuracy	±5 %
Resolution	0.01 dB, 0.01 dBm
Dynamic range	-60 dBm to +10 dBm
	-53 dBm to +17 dBm
Dynamic range	-47dBm
AWD mode	-40dBm
GENERAL DATA	
Graphic LCD with BL	✓
PASS/FAIL evaluation	✓ (PM420-LAN only)
CW mode	✓
AWD mode	✓
No. of memory locations	512
Communication	USB, IrDA
Size (mm)	24 x 79 x 125
Weight	0.1 kg
Power supply	2 x NiMH type AA rechargeable batteries
Battery working time	> 40 hrs
Power supply adapter	✓

OPTICAL LIGHT SOURCE LS420	
SPECIFICATIONS	
OUTPUT POWER	
LED 850 nm	-20 dBm (62.5 µm)
LED 1300 nm	-20 dBm (62.5 µm)
Laser 650nm	LS420 (LED850/LED30/LD650) or VSP-05
GENERAL DATA	
Stability (1 hour, delta/2):	±0.03 dB
Size (mm)	24 x 79 x 130
Weight	0.1 kg
Power supply	2 x NiMH type AA rechargeable batteries
Battery working time	> 15 hrs
Power supply adapter	✓

KEY FEATURES

IR Fiber adapter FOA-1 enables transferring the test results from the memory of Optical Power Meter PM 420 to the instrument Multi LAN 350 MI 2016. The Multi LAN tester automatically recognise the adapter and the screen of the instrument will turn into fiber testing mode.
The measurement results can be stored in the three-level memory structure of Muti LAN 350 and arranged further on in a professional final report supported by LAN Link PC software.

ORDERING INFORMATION:

Part No.	Description
MI 5100ST	**OptoLAN**

STANDARD (ST) KIT INCLUDES:

Part No.	Description
PM420	Optical Power Meter PM420
LS420	Optical Light Source LS420
A 1133	Carrying bag
83005413	Visible pen VSP-01
	Patch cord FC - ST 50 µm
	Patch cord FC - SC 50 µm
	Patch cord ST - SC 50 µm
	Patch cord FC - ST 62.5 µm
	Patch cord FC - SC 62.5 µm
	Patch cord ST - SC 62.5 µm
	CS adapter
	ST adapter
A 1186	IR fiber adapter FOA-1
	PC SW package LAN Link
83004993	USB cable
	4 x 1.2 V NiMH batteries
	Battery charger, 2 pcs
	Instruction manual
	Calibration certificate

ORDERING INFORMATION:

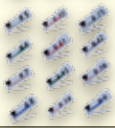
Part No.	Description
MI 5100PS	**OptoLAN**

PRO (PS) KIT INCLUDES:

Description
Similar content as MI 5100ST: PM420 replaced by PM420LAN

Accessories: page 5.08

Accessories selection guide

Photo	Product group	Accessory decription	Part No.	Instrument / Application	MI 2016	MI 5100
	Bags, cases and straps	Soft carrying bag	A 1006	Large soft carrying bag for transport and storage of test instrument and belonging accessories.	✓	
	Batteries and chargers	Fast charger	A 1169	Fast charger for 12 AA / 6 C type / 6 D type / 4 x 9 V block type.		✓
	Batteries and chargers	6 cells AA battery charger	A 1160	Fast 6 cells AA battery charger with a set of 6 pcs of NiMH battaries.	✓	✓
	Batteries and chargers	NiMH battery, C type	A 1046	Set of 6 pcs NiMH battery.	✓	
	Locators	Locator set II (#5 to #16). 12 pcs	A 1043	Locators simplify and accelerate nummerification and identification of LAN sockets. Set includes locators with number from #5 up to #16.	✓	
	Locators	Locator set III (#17 to #28). 12 pcs	A 1044	As described above. Transponders with numbers from #17 up to #28 are delivered with the set.	✓	
	Other	Illuminated microscope	A 1184	Microscope for checking the surface connections of Fiber optic cable.		✓
	Other	Optical Light source LS420 SM with Patch cord (3 pcs) for single mode (SM)	A 1185	Additional light source for single mode fiber optic cable testing.		✓
	Other	Multimode Fiber mandrels, 2 pcs	A 1187	Mandrels used with an LED source and optical power meter when measuring optical power loss in multimode fiber optic cabling.		✓
	Other	Wet cleaning tools with carrying bag	A 1188	Set of fiber optic cable surfaces and connections.		✓
	Other	Dry cleaning set	A 1189	Set of fiber optic cable surfaces and connections.		✓
	Remote testing device	Headphones	A 1041	Talk set with earphones allows communication over the communication cable.	✓	

MEASURING INSTRUMENTS AND TESTERS

- 17th Edition Electrical Installation Testers
- Power Quality Analysis
- High Voltage Insulation Diagnostics
- Appliances/Machines/Switchboard Safety
- LAN Cabling Certification
- **Indoor Environment Quality**
- Digital Multimeters/Clamp Meters/Voltage and Continuity Testers

Indoor Environment Quality

Environmental monitoring equipment for testing the conditions of Indoor environments

METREL® CATALOG 2010

Glossary - Indoor Environment Quality

HVAC
Heating, Ventilation and Air Conditioning

IEQ
Indoor Environmental Quality encompasses all aspects of the indoor setting including air quality, ventilation, ther-mal comfort, lighting and noise. IAQ - Indoor air quality may be broadly defined as the nature of air that affects the health and well-being of occupants.

WBGT
Wet Bulb Globe Temperature is commonly used as a guidance for environmental heat stress to prevent heat stroke during physical exercise or while at work. It determines heat stress given in humans on the job in thermally harsh environments. It is specified in ISO 7243 under 'Hot Environments.' Estimation of the heat stress on is based on the WBGT-index.

PMV
Predicted Mean Vote is average comfort vote predicted by a theoretical index for a group of subjects when subjected to a particular set of environmental conditions.

PPD
Predicted Percentage Dissatisfied is the percentage of subject population who will be dissatisfied (uncomfortable) in a given environment as predicted by a theoretical index.

Class 1 / Class 2
Instruments, processors and probes are classified as being Class 1 or Class 2 (also Type 1 or Type 2) according to the measurement accuracy achieved. A class 1 instrument may only be formed by combining a class 1 probe with a class 1 processor. Class 1 processor shall, at least, cover the range from 45 Hz to 7.1 kHz in one third octave bands. Class 2 processor shall, at least, cover the same range, or 45 Hz to 5,6 kHz in octave bands, as specified in ISO 9614.

Octave
The difference between two frequencies where one is twice the other. For example, 200 Hz is an octave higher than 100 Hz. 400 Hz is one octave higher than 200 Hz.

Decibel (dB)
A logarithmic measurement unit that describes a sound's relative loudness, though it can also be used to describe the relative difference between two power levels. In sound, decibels generally measure a scale from 0 (the threshold of hearing) to 130 dB (the threshold of pain). A 1dB difference over a broad frequency range is noticeable to most people, while a 0.5 dB difference can affect the subjective impression of a sound.

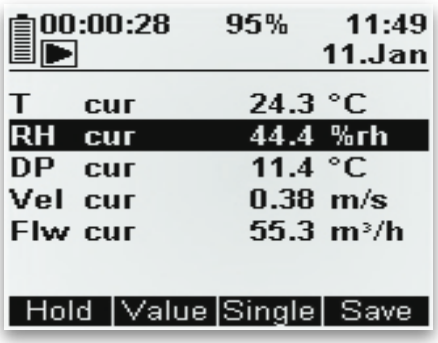
Illuminance
The density of incident luminous flux on a surface; illuminance is the standard metric for lighting levels, and is measured in lux (lx).

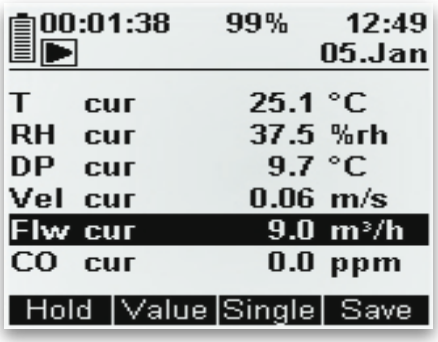
Luminance
The luminous intensity of a surface in a given direction per unit area of that surface as viewed from that direction.

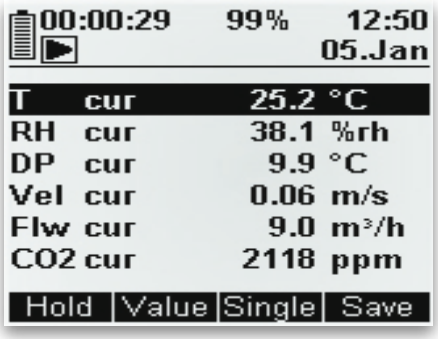
Carbon monoxide (CO)
Poisonous gas that has no color or odor. It is given off by burning fuel (as in exhaust from cars or household heaters) and tobacco products. Carbon monoxide prevents red blood cells from carrying enough oxygen for cells and tissues to live.

Carbon Dioxide (CO_2)
Colorless, odorless, noncombustible gas. Present in the atmosphere as a result of the decay of organic material and the respiration of living organisms, and it represents about 0.033% of the air. Carbon dioxide is produced by the burning of wood, coal, coke, oil, natural gas, or other fuels containing carbon, by the action of an acid on a carbonate, or naturally from springs and wells.

Measurement with universal microclimatic, illuminance, CO and CO_2 probes.

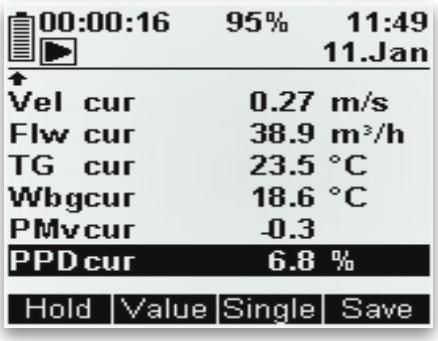


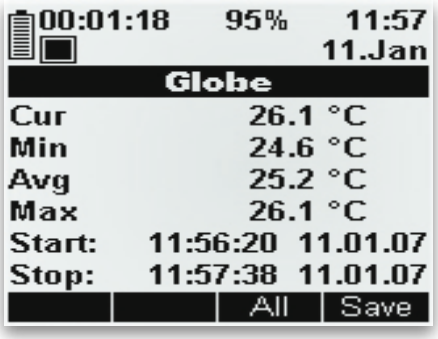


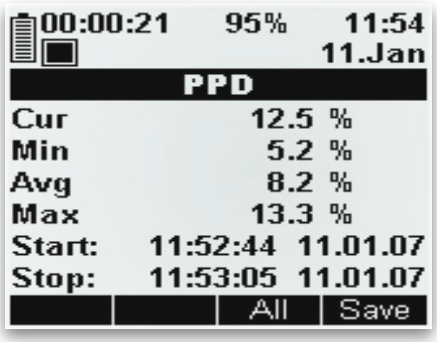


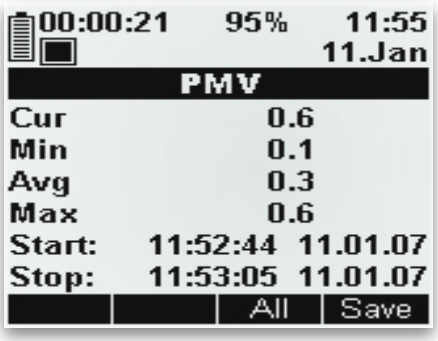
Accessories: page 6.12

Thermal comfort measurement and calculation.

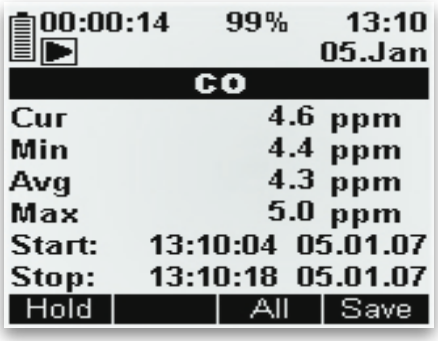


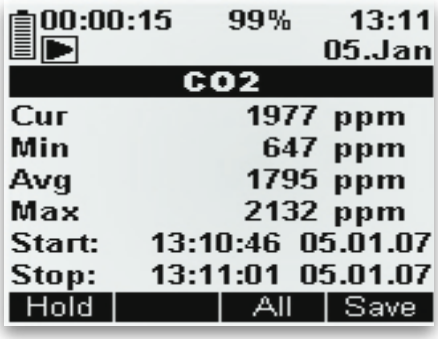




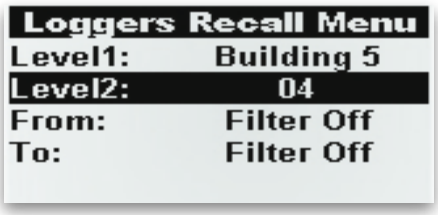


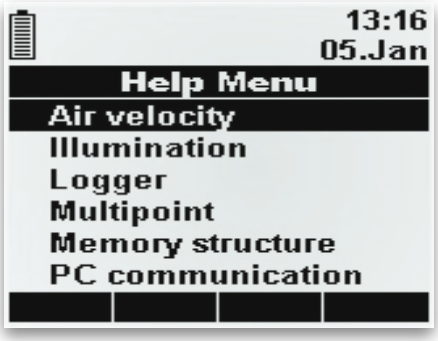
Detailed CO and CO2 measurement.



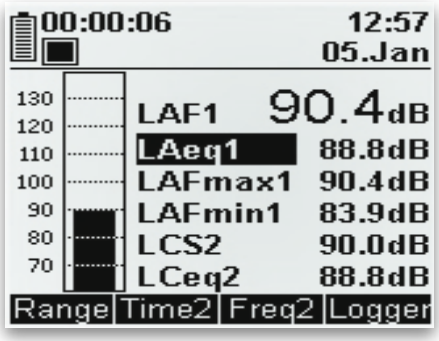


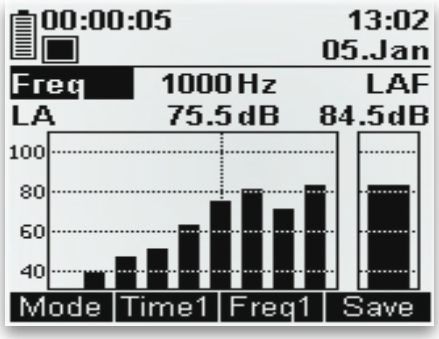
Recalling of memory, sample of help menu.

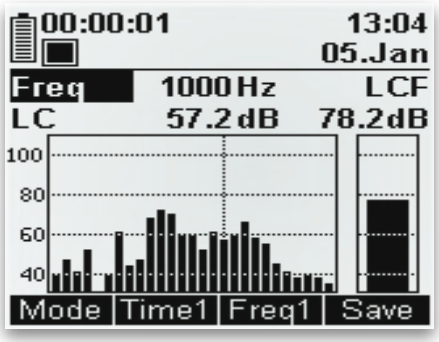




Sound level measurement, 1/1 and 1/3 octave analisys.







Accessories: page 6.12

Selection Guide for Indoor Environment Quality

Part No.:	MI 6201PR	MI 6201EU Multinorm	MI 6201ST
			
FEATUERS			
Air Velocity	✓	✓	✓
Air Flow	✓	✓	✓
Relative Humidity	✓	✓	✓
Dew point	✓	✓	✓
Air teperature	✓	✓	✓
Temperature difference	Optional	Optional	Optional
K Thermocouple temperature	Optional	Optional	Optional
Illuminance	✓	✓	✓
Luminance	Optional	Optional	Optional
Contrast	Optional	Optional	Optional
Black globe radiant temperature	Optional	Optional	Optional
SOUND			
Class 1 (IEC 1672) SLM	✓		
Class 2 (IEC 1672) SLM		✓	✓
Real time 1/1 octave analysis	✓	✓	✓
Real time 1/3 octave analysis	✓	✓	✓
TEST PROBES			
A 1091 Universal microclimatic probe m/s, %rh, °C	✓	✓	✓
A 1127 Humidity/Temperature probe %rh, °C	Optional	Optional	Optional
A 1092 Illuminance probe type B	✓	✓	✓
A 1132 Luminance probe	Optional	Optional	Optional
A 1128 Thermocouple probe	Optional	Optional	Optional
A 1146 Class 1 sound probe	✓		
A 1151 Class 2 sound probe		✓	✓
A 1131 Black globe thermometer	Optional	Optional	Optional
A 1180 CO_2 probe	Optional	Optional	Optional
A 1181 CO probe	Optional	Optional	Optional
PC SOFTWARE			
A 1134 SensorLink PRO	✓	✓	✓
A 1167 SoundLink LITE	✓	✓	✓
A 1162 SoundLink PRO	Optional	Optional	Optional
CERTIFICATES			
ISO calibration certificate for complete system	✓	✓	
Calibration certificate			✓

Accessories: page 6.12

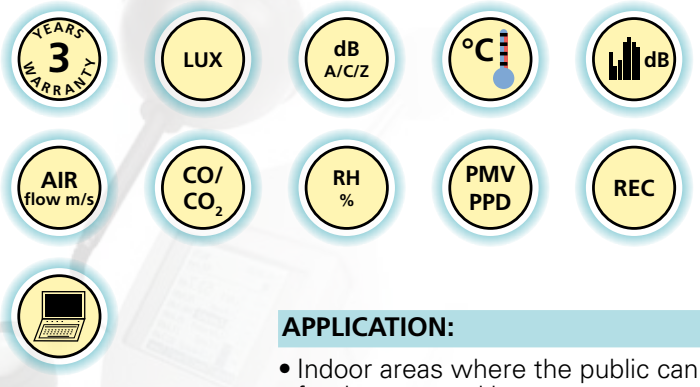
MI 6301PR	MI 6301EU	MI 6401EU	MI 6401ST
Fons		Poly	
			
		✓	✓
		✓	✓
		✓	✓
		✓	✓
		✓	✓
		Optional	Optional
		Optional	Optional
		✓	✓
		Optional	Optional
		Optional	Optional
		Optional	Optional
✓			
	✓		
✓	✓		
✓	✓		
		✓	✓
		Optional	Optional
		✓	✓
		Optional	Optional
		Optional	Optional
✓			
	✓		
		Optional	Optional
		Optional	Optional
		Optional	Optional
		✓	✓
✓	✓		
Optional	Optional		
✓	✓	✓	
			✓

- 3 years manufactures waranty
- Illuminance measurement
- Sound level measurement with A,C and Z weighting
- Temperature measurement
- Octave analysis
- Air velocity and flow measurement
- CO and CO_2 measurement
- Relative humidity measurement
- PMV and PPD on-line measurement
- Logger mode
- Downloadable

Accessories: page 6.12

MI 6201 Multinorm

Fully adaptable, professional indoor environment analyser



Poor working conditions can lead to low motivation, illness, stress and an increase in work related injuries. The MI 6201 is an invaluable tool for the monitoring and evaluation of indoor environmental conditions according to national and European standards. Adaptable by design and extremely easy to use, the MI 6201 can be used for measuring a amazing variety of different environmental conditions (most performed to an array of national and international standards and regulations). The SensorLink PRO software, which comes as standard with the unit, downloads the data stored on the unit, plots and prints the data in table and graph format, allows on screen graph plotting for straightforward data comparison and can exports of data in text file format. The Euro kit comes complete with full ISO accredited calibration certificate while the PRO kit comes complete with ISO calibration and an upgraded sound probe (class 1 standard).

KEY FEATURES:

- **Adaptable:** the MI 6201 Multinorm can be used as either a sound meter or environmental meter to reduce the amount of equipment to move between locations.
- **Environmental:** using various standard and optional probes, the MI 6201 can be adapted to measure and calculate a combination of up to 16 different environments conditions (maximum 11 at the same time).
- **Sound:** the MI 6201 can display 21 different sound quantities (displaying a maximum of 6 at a time) and will download 17 of these measurements for data analysis
- **Long lasting:** record up to 160 days worth of data.
- **Accommodating:** can be used for spot checking different locations or performing long investigations in a specific location.
- **Easy to use:** plug in the appropriate probes and the device will automatically adjusts then press a couple of buttons and the unit is recording.
- **PPD and PMV calculations:** predicted Percentage of Dissatisfied people (PPD) and Predicted Mean Vote (PMV) calculations performed automatically. Note: requires A 1131 black globe.
- **Weighting:** A, C and Z weightings with fast, slow and impulse weightings and full and 1/3 octave analysis in accordance with EN 61672 standard and EN 61260 respectively.
- **Downloadable:** up to 4000 test results can be stored in a two level memory structure.

APPLICATION:

- Indoor areas where the public can freely enter and leave.
- Factory conditions.
- Industrial process monitors.
- Power stations.
- Offices.
- Domestic dwellings.
- Indoor or dry outdoor sound level measurement.
- Industrial sound measurement.
- Band-pass and acoustic filter testing.
- Working environment testing.
- Calibration work.
- Acoustic Equipment testing.

STANDARDS:

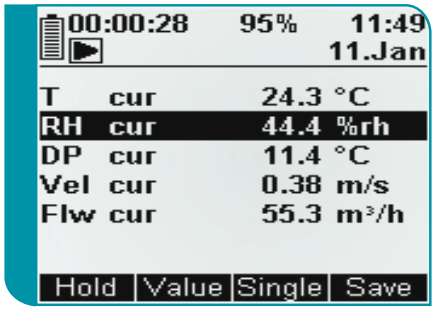
EN 61010-1 Safety
EN 61326 EMC
DIN 5032 P1 Photometry; methods of measurement
DIN 5032 P2 Photometry; Operation of electric lamps and measurement of the respective quantities
DIN 5032 P3 Photometry; Terms of measurement on gas luminaires
DIN 5032 P4 Photometry; Measurement of luminaires
DIN 5032 P6 Photometry; Photometers; Concepts, characteristics and their designation
DIN 5032 P7 Photometry; Classification of illuminance meters and luminance meters
EN 60751 Industrial platinum resistance thermometer sensors
EN 60584-1 Thermocouples - part 1: reference tables (IEC 60584-1:1995);
EN 12599 Ventilation for buildings Test procedures and measuring methods for handling over installed ventilation and air conditioning systems
EN ISO 7726 Ergonomic of thermal environment - Instruments for measuring physical quantities
ISO 10526 CIE STANDARD colorimetric illuminants
ISO 10527 CIE STANDARD colorimetric observers

Accessories: page 6.12

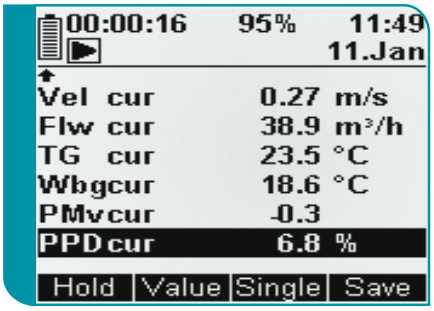
TECHNICAL SPECIFICATION:

MI 6201 SPECIFICATION (FOR THE STANDARD SET)	
Illuminance (A1092 type B probe)	
Illuminance range	0.01 lux to 20000 lux
0.01 lux to 19.99 lux	0.02 lux + 8 %
20.0 lux to 20000 lux	8 %
SOUND (A 1151 CLASS 2 PROBE & 1146 (A 1151 CLASS 1 PROBE)	
Noise weightings	A, C, Z
Time weighting	Fast, slow, impulse
Frequency range (A 1151)	20 Hz - 10000 Hz
Frequency range (A 1146)	20 Hz - 20000 Hz
EN61672 Class 2 conformance	EU kit
EN61672 Class 1 conformance	PR kit
MICROCLIMATE PROBE (A 1091)	
Air temperature range	-20 °C to 60 °C
Air temperature accuracy	±0.2 °C at 25 °C (0.5 °C over working range)
Relative humidity range	0.0 % to 100.0 %
Relative humidity accuracy (10 % - 90 %RH)	±2 %
Dew point calculation	✓
AIR VELOCITY	
Air velocity range	0.10 m/s to 20.0 m/s
Air velocity accuracy (0.10 m/s to 9.99 m/s)	±(0.05 m/s + 5 %)
Air velocity accuracy (10.0 m/s to 20.0 m/s)	±5 %
EXTRAS	
Globe Temperature (WBGT) Index	requires A 1131 black globe
Natural Wet Bulb Temp	
Black Globe Radiant Temperature	
PMV and PPD measurement	
Luminance	requires A 1132 Luminance probe
Contrast	
CO concentration	requires A 1181 CO probe
CO_2 concentration	requires A 1180 CO_2 probe
Standard K type thermocouple range	requires A 1128 probe
DOWNLOADING	
Memory	up to 4000 locations
Downloading methods	USB
Software included	✓
GENERAL DATA	
Size (mm)	110 x 85 x 220
Weight	0.5 kg
Power supply	6 x AA (rechargable) or mains
Internal charging circuitry	✓

KEY FEATURES



Measurement with universal microclimatic probe.



Thermal comfort measurement and calculation.

ORDERING INFORMATION:

Part No.	Description
MI 6201ST	**Multinorm**

STANDARD (ST) KIT INCLUDES:

Part No.	Description
MI 6201	Multinorm
A 1144	Probe adapter
A 1091	Universal microclimatic probe
A 1092	Illumination probe type B
A 1151	Class 2 sound probe with plastic shield (A 1158)
A 1157	Windscreen
A 1133	Carrying case
83004993	USB cable
A 1135	Power supply adapter/charger
A 1147	6 NiMH batteries
20242681	Tripod adapter
A 1274	SensorLink PRO
	SoundLink LITE software
	Instruction manual
	Calibration certificate

ORDERING INFORMATION:

Part No.	Description
MI 6201EU	**Multinorm**

EURO (EU) KIT INCLUDES:

Description
Standard kit with ISO calibration certificate for complete system instead of Calibration certificate.

ORDERING INFORMATION:

Part No.	Description
MI 6201PS	**Multinorm**

PRO (PR) KIT INCLUDES:

Description
Euro kit with Class 1 sound probe (A 1146) instead of Class 2 sound probe (A 1151).

Accessories: page 6.12

MI 6301 FonS

Professional sound measurement and monitoring test instrument

For a truly professional sound level meter, look no further than the MI 6301 Fons. Not only does the unit contain the usual A, C and Z weightings with fast and slow time weightings (in accordance with IEC 61672 standard), the unit has 2 independent sound channels which can be set to different weightings. Being able to display up to 6 different readings on the customisable screen, the MI 6301 Fons is ideal for spot checking different locations or performing long term analysis of an area. The SoundLink LITE software, which comes as standard with the unit, allows data to be downloaded, reviewed, exported and printed while the optional SoundLink PRO software enables full data analysis, charting and report generation. The Euro set includes a Class 2 sound probe and full ISO accredited calibration certificate while the PRO set includes a Class 1 sound probe with full ISO accredited calibration certificate.

KEY FEATURES:

- **Adaptable:** the MI 6301 can display 21 different sound quantities (displaying a maximum of 6 at a time) and will download 17 of these measurements for data analysis.
- **Weighting:** A, C and Z weightings with fast, slow and impulse weightings in accordance with EN 61672 standard.
- **Dual measuring:** two independent sound measuring channels that can be set to different time and weighting settings.
- **Octave measurement:** real time octave and one third octave frequency measurement in accordance with EN 61260.
- **Long lasting:** record up to 80 days worth of data.
- **Accommodating:** can be used for spot checking different locations or performing long investigations in a specific location.
- **One stop readings:** configure the display to show the readings required including MAX and MIN readings, peak readings, equalised readings, channel 1 and channel 2 readings.
- **Easy to use:** plug in sound probe then press a couple of buttons and the unit is recording.
- **Downloadable:** up to 2000 test results can be stored in the two level memory structure.

APPLICATION:

- Indoor or dry outdoor sound level measurement.
- Industrial sound measurement.
- Band-pass and acoustic filter testing.
- Working environment testing.
- Calibration work.
- Acoustic Equipment testing.

STANDARDS:

EN 61010-1 Safety
EN 61326 EMC
EN 61672 Electroacoustics Sound level meters
EN 61260 Electroacoustics Octave-Band and Fractional Octave-Band Filters

Accessories: page 6.12

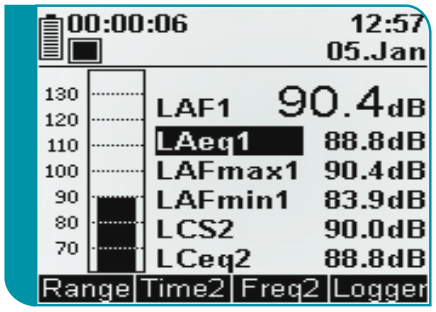
TECHNICAL SPECIFICATION:

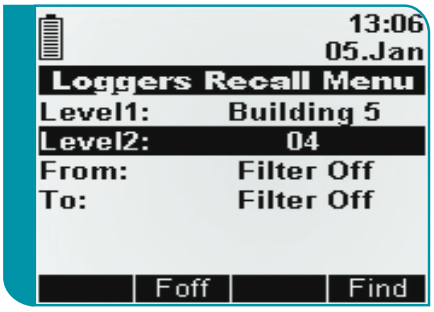
MI 6301 SPECIFICATION (FOR THE STANDARD SET)	
SOUND (A 1151 CLASS 2 PROBE & 1146 (A 1151 CLASS 1 PROBE)	
Noise weightings	A, C, Z
Time weighting	Fast, slow, impulse
Frequency range (A 1151)	20 Hz - 10000 Hz
Frequency range (A 1146)	20 Hz - 20000 Hz
EN61672 Class 2 conformance	EU kit
EN61672 Class 1 conformance	PR kit
DOWNLOADING	
Memory	up to 2000 locations
Downloading methods	USB
Software included	✓
GENERAL DATA	
Size (mm)	110 x 85 x 220
Weight	0.5 kg
Power supply	6 x AA (rechargable) or mains
Internal charging circuitry	✓

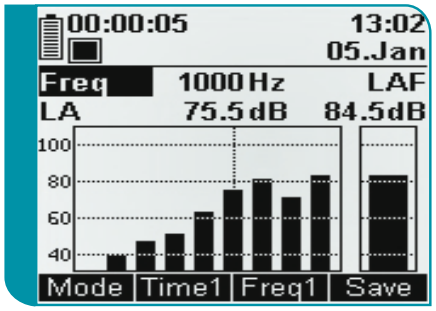
KEY FEATURES

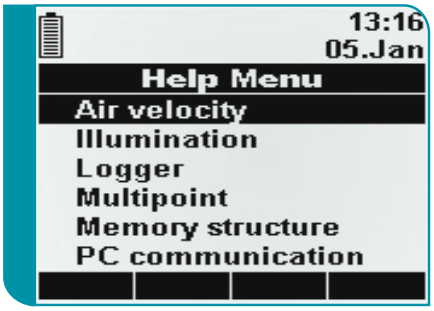
Sample of on-line reading data analysis with SoundLink PRO PC software.

Logged data analysis with SoundLink PRO PC software.









Sound measurement, 1/1 and 1/3 octave analisys.

Recalling of memory, sample of help menu.

ORDERING INFORMATION:

Part No.	Description
MI 6301EU	**FonS**

EURO (EU) KIT INCLUDES:

Part No.	Description
MI 6301	FonS
A 1151	Class 2 sound probe with plastic shield (A 1158)
A 1157	Windscreen
A 1133	Carrying case
83004993	USB cable
A 1135	Power supply adapter/charger
A 1147	6 NiMH batteries
20242681	Tripod adapter
	SoundLink LITE software
	Instruction manual
	Calibration certificate
	ISO calibration certificate for complete system

ORDERING INFORMATION:

Part No.	Description
MI 6301PS	**FonS**

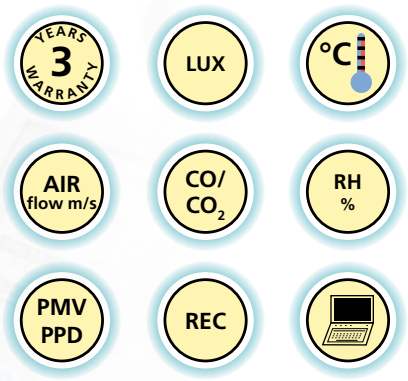
PRO (PR) KIT INCLUDES:

Description
Euro kit with Class 1 sound probe (A 1146) instead of Class 2 sound probe (A 1151).

Accessories: page 6.12

MI 6401 Poly

Professional Light, temperature and humidity analyser



Light, ventilation and humidity are extremely important factors in the working environment. Poor lighting conditions can cause drowsiness, headaches, illness and accidents. Poor ventilation and humidity can perpetuate the spread of sickness and disease. The MI 6401 Poly is designed specifically for testing the light, humidity and air temperature and air velocity of an environment and can be used for monitoring. Emergency lighting, ventilation systems, lighting conditions, air conditioning systems, factory conditions, production line conditions and man many more. All the results can be stored on the unit and downloaded to PC via the SensorLink PRO software which is included with the unit. For full data traceability, the MI 6401 Euro set includes a full ISO accredited calibration certificate for fully traceability back to international standards.

KEY FEATURES:

- **Adaptable:** using various standard and optional probes, the MI6401 can be adapted to measure and calculate a combination of up to 16 different environments conditions (maximum 11 at the same time).
- **Long lasting:** record up to 160 days worth of data.
- **Accommodating:** can be used for spot checking different locations or performing long investigations in a specific location.
- **Easy to use:** plug in the appropriate probes and the device will automatically adjusts then press a couple of buttons and the unit is recording.
- **PPD and PMV calculations:** predicted Percentage of Dissatisfied people (PPD) and Predicted Mean Vote (PMV) calculations performed automatically. Note: requires A 1131 black globe.
- **Downloadable:** up to 4000 test results can be stored in a two level memory structure.

APPLICATION:

- Indoor areas where the public can freely enter and leave.
- Factory conditions.
- Industrial process monitors.
- Power stations offices.
- Domestic dwellings.
- Ventilation testing.

STANDARDS:

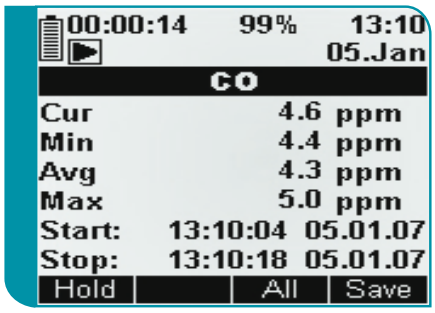
EN 61010-1 Safety
EN 61326 EMC
DIN 5032 P1 Photometry; methods of measurement
DIN 5032 P2 Photometry; Operation of electric lamps and measurement of the respective quantities
DIN 5032 P3 Photometry; Terms of measurement on gas luminaires
DIN 5032 P4 Photometry; Measurement of luminaires
DIN 5032 P6 Photometry; Photometers; Concepts, characteristics and their designation
DIN 5032 P7 Photometry; Classification of illuminance meters and luminance meters
EN 60751 Industrial platinum resistance thermometer sensors
EN 60584-1 Thermocouples - part 1: reference tables (IEC 60584-1:1995);
EN 12599 Ventilation for buildings Test procedures and measuring methods for handling over installed ventilation and air conditioning systems
EN ISO 7726 Ergonomic of thermal environment - Instruments for measuring physical quantities
ISO 10526 CIE STANDARD colorimetric illuminants
ISO 10527 CIE STANDARD colorimetric observers

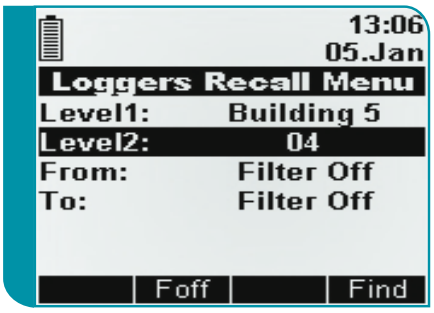
Accessories: page 6.12

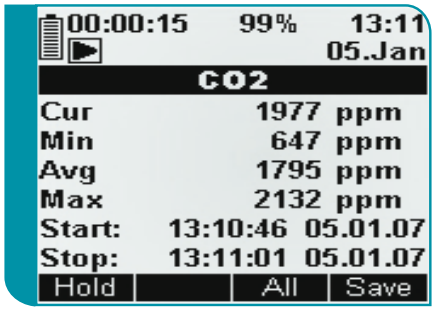
TECHNICAL SPECIFICATION:

MI 6401 SPECIFICATION (FOR THE STANDARD SET)	
Illuminance (A1092 type B probe)	
Illuminance range	0.01 lux to 20000 lux
0.01 lux to 19.99 lux	0.02 lux + 8 %
20.0 lux to 20000 lux	8 %
MICROCLIMATE PROBE (A 1091)	
Air temperature range	-20 °C to 60 °C
Air temperature accuracy	±0.2 °C at 25 °C (0.5 °C over working range)
Relative humidity range	0.0 % to 100.0 %
Relative humidity accuracy (10 % - 90 %RH)	±2 %
Dew point calculation	✓
AIR VELOCITY	
Air velocity range	0.10 m/s to 20.0 m/s
Air velocity accuracy (0.10 m/s to 9.99 m/s)	±(0.05 m/s + 5 %)
Air velocity accuracy (10.0 m/s to 20.0 m/s)	±5 %
EXTRAS	
Globe Temperature (WBGT) Index	requires A 1131 black globe
Natural Wet Bulb Temp	
Black Globe Radiant Temperature	
PMV and PPD measurement	
Luminance	requires A 1132 Luminance probe
Contrast	
CO concentration	requires A 1181 CO probe
CO_2 concentration	requires A 1180 CO_2 probe
Standard K type thermocouple range	requires A 1128 probe
DOWNLOADING	
Memory	up to 4000 locations
Downloading methods	USB
Software included	✓
GENERAL DATA	
Size (mm)	110 x 85 x 220
Weight	0.5 kg
Power supply	6 x AA (rechargable) or mains
Internal charging circuitry	✓

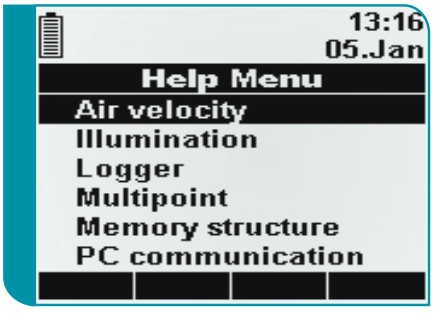
KEY FEATURES







Detailed CO and CO_2 measurment.



Recalling of memory, sample of help menu.

ORDERING INFORMATION:

Part No.	Description
MI 6401ST	**Poly**

STANDARD (ST) KIT INCLUDES:

Part No.	Description
MI 6401	Poly
A 1144	Probe adapter
A 1091	Universal microclimatic probe
A 1092	Illumination probe type B
A 1133	Carrying case
83004993	USB cable
A 1135	Power supply adapter/charger
A 1147	6 NiMH batteries
	SensorLink PRO software
	Tripod adapter
	Instruction manual
	Calibration certificate

ORDERING INFORMATION:

Part No.	Description
MI 6401EU	**Poly**

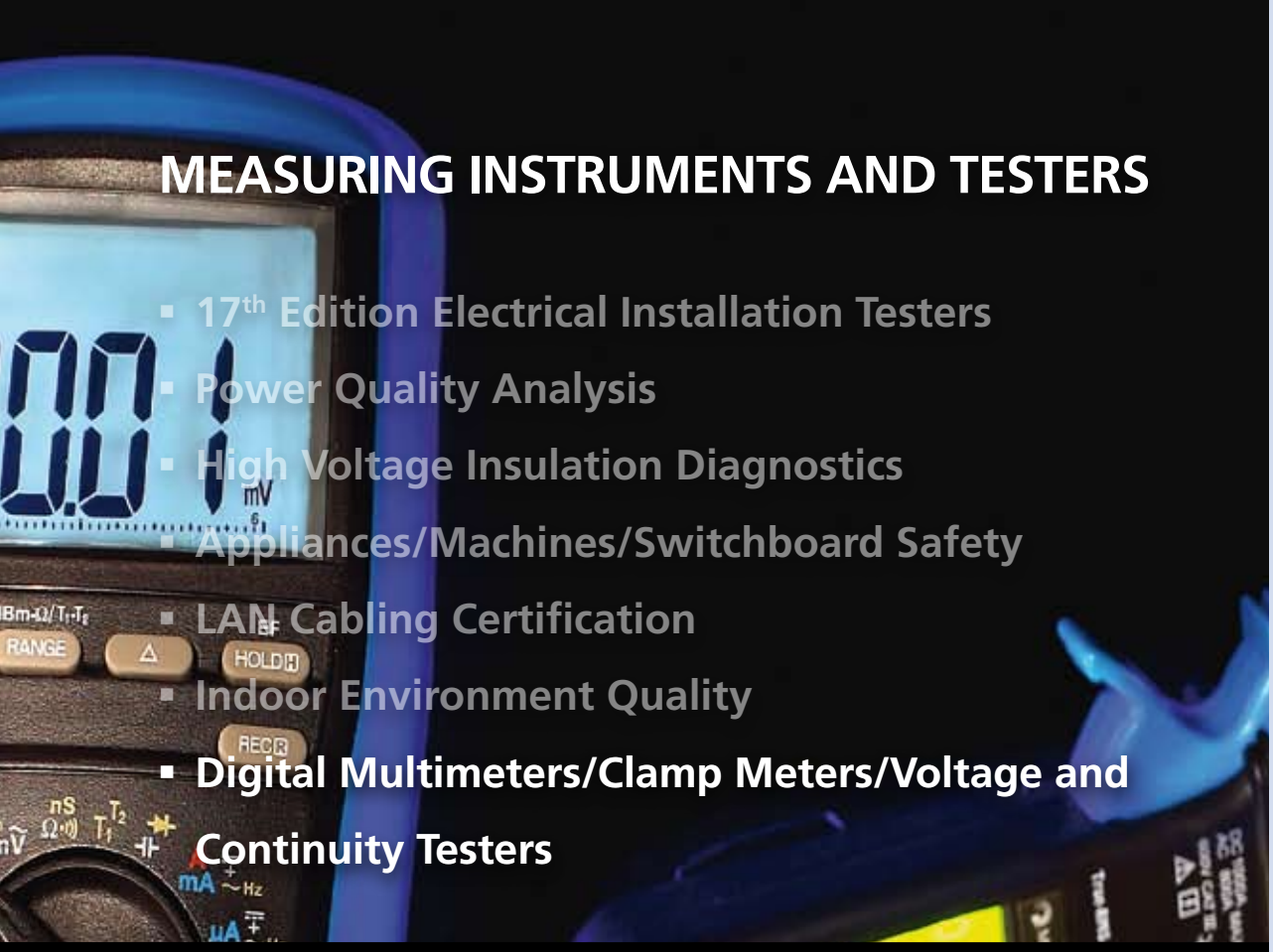
EURO (EU) KIT INCLUDES:

Description
Standard kit with ISO calibration certificate for complete system instead of Calibration certificate.

Accessories: page 6.12

Accessories selection guide

Photo	Product group	Accessory decription	Part No.	Instrument / Application	MI 6201	MI 6301	MI 6401
	Batteries and chargers	Fast 6 cell AA Charger with a set of 6 pcs NiMH batteries	A 1160	Battery charger for 6 rechargeable batteries size AA.	✓	✓	✓
	Probes	Humidity and air temperature probe	A 1127	Probe simultaneously measures relative air humidity (via electric capacitor) and air temperature (via Pt 1000 thermocouple).	✓		✓
	Probes	Thermocopic probe K wire	A 1128	Thermocouple probe K type servers for surface temperature measurements.	✓		✓
	Probes	Telescopic rod with 2.5 m cable	A 1130	Extension rod will help you reach measuring spots in ventilation ducts or remote places.	✓		✓
	Probes	Black globe termometer	A 1131	Black globe thermometer serves for assessment of ambient temperature i.e. temperature comfort.	✓		✓
	Probes	Luminance probe	A 1132	Luminance probe measures cd/m2 i.e. from the surface reflected light.	✓		✓
	Probes	CO_2 probe	A 1180	Probe measures concentration of CO_2 in the ambient air.	✓		✓
	Probes	CO probe	A 1181	Probe measures concentration of CO in exhausts of various combustion processes.	✓		✓
	Calibrators	Sound calibrator Class 1	A 1152	Sound calibrator Class 1 is a tool for periodical calibration of the instrument.	✓	✓	
	Calibrators	Sound calibrator Class 2	A 1165	Sound calibrator Class 2 is a tool for periodical calibration of the instrument.	✓	✓	
	Other	Tripod	A 1159	Tripod serves for fixing the instrument for longterm measurements.	✓	✓	✓
	Other	Tripod holder for instrument and black globe	A 1161	This tripod will fit both, the instrument and black globe thermometer.	✓		✓
	Software, Books, publications	PC SW SoundLink PRO	A 1162	SoundLink PRO is Windows compatible PC Software for detailed analysis of sound records including frequency analysis.	✓	✓	
	Test leads, cables, probes and crocodile clips	Extension cable (only for luminance and illuminance probe)	A 1145	Extension cable fits both, luminance and illuminance probe and serves for measurements on remote spots.	✓		✓



MEASURING INSTRUMENTS AND TESTERS

- 17th Edition Electrical Installation Testers
- Power Quality Analysis
- High Voltage Insulation Diagnostics
- Appliances/Machines/Switchboard Safety
- LAN Cabling Certification
- Indoor Environment Quality
- **Digital Multimeters/Clamp Meters/Voltage and Continuity Testers**

METREL®

CATALOG 2010

Digital Multimeters/Clamp Meters/Voltage and Continuity Testers

Labratory and Field Testing Equipment for Electrical and Electronic Parameters

Glossary - Multimeters

RMS
Root Mean Square. When an AC supply is placed onto a circuit, it produces heat. The RMS value is the equivalent DC supply that would produce the same amount of thermal heat as the actual AC supply.

True RMS
A specific method of measuring the RMS value of a signal. With inductive and capacititive systems distorting the sinusiodal wave of the mains supply, this method provides the most accurate RMS value regardless of the shape of the waveform. Other methods of measuring rms values exist, such as the rectifier or mean absolute deviation method; however, these methods are accurate only for sine wave signals.

Crest factor
The crest factor describes the ratio of the peak value to the RMS value of an electrica variable (AC voltage and AC current).
High crest factors cause distortion reactive power and harmonics in the supply network, and so are undesirable.
With high crest factors, electronic instruments often display inexact values. This must be considered when selecting an instrument. For example, if an instrument measures 20 A AC current, the peak value is around 28 A with a sinusoidal waveform. So the instrument must be able to handle much higher peak currents than the RMS value.

Number of Counts
The number of divisions into which a given measurement range is divided. This can be used to evaluate the resolution of an instrument

Accuracy
A value to show how accurately an instrument can read a specific value. This is usually written as a percentage (e.g. 5 V ± 5 %)

Resolution
The smallest possible change in a signal that would produce a change in the value on the screen of the test instrument

Overvoltage category
CAT the overvoltage category specifies the highest mains voltage (or lightning strike, short circuit due to incorrect use; etc.) that the instrument can withstand without danger for the tester or for the object being measured. The standard specifies four overvoltage categories. The overvoltage category affects component sizing via the air gap. The higher the category, the bigger is the distance to the power source.

CAT I
Electronic devices, signal level,

CAT II
Domestic appliances, portable appliances, single-phase loads, sockets, (>10 m from CATIII; >20 m from CAT IV),

CAT III
Three-phase distribution systems, lighting systems in large buildings, distribution panels,

CAT IV
Three-phase systems on power stations, electricity meters, outdoor installations and supply cable incoming feed

Digital Multimeters/Clamps metres/Voltage testers

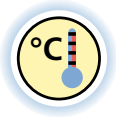
3 years manufactures waranty

Safety category

True RMS measurement

Non contact voltage detection

Automatic V / Ω measurement



Temperature measurement

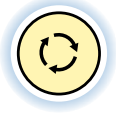

PC Link

Jaw size

Power measurement

THD measurement

Harmonic analysis


Phase rotation indication

RCD trip-out test

Accessories: page 7.19

Selection Guide for Multimeters

Part No.:	MD 9010 Multimeter	MD 9015 Multimeter	MD 9020 Multimeter	MD 9030 Multimeter	MD 9040 Multimeter	MD 9050 Multimeter
						
True RMS				✓	✓	✓
DC current range (A)	0.002	10	10	10	10	10
Basic accuracy (%)	1.2	0.8	1.2	1.2	0.2	0.2
Maximum resolution (µA)	0.1	0.1	0.1	0.1	0.1	0.1
AC current range (A)	0.002	10	10	10	10	10
Basic accuracy (%)	1.5	1	1.5	1.5	0.6	0.6
Maximum resolution (µA)	0.1	0.1	0.1	0.1	0.1	0.1
DC voltage range (V)	600	1000	1000	1000	1000	1000
Basic accuracy (%)	0.5	0.3	0.3	0.3	0.06	0.06
Maximum resolution (µV)	1000	100	100	100	10	10
AC voltage range (V)	600	750	1000	1000	1000	1000
Basic accuracy (%)	1.5	1	1.5	1.5	0.5	0.5
Maximum resolution (µV)	1000	100	100	100	10	10
Resistance measurement (MΩ)	6	25	40	40	60	60
Basic accuracy (%)	1	0.4	0.6	0.6	0.1	0.1
Maximum resolution (mΩ)	100	100	100	100	100	100
Acoustic continuity test	✓	✓	✓	✓	✓	✓
Diode test	✓	✓	✓	✓	✓	✓
Capacitance	✓	✓	✓	✓	✓	✓
Frequency measurement	✓	✓	✓	✓	✓	✓
Frequency of digital signals			✓	✓	✓	✓
Temperature measurement (Type K sensor)		T1	T1	T1		T1 & T2 (temperature comparison)
Autocheck® V / Ω	✓					✓
nS (conductance)						✓
Count	6000	2500	4000	4000	9999 (AC/DCV, Hz, nS) 6000 (mV, µ/m/A, Ω , F)	9999 (AC/DCV, Hz, nS) 6000 (mV, µ/m/A, Ω , F)
Backlight			✓	✓		✓
Analogue bar-graph					41 segment	41 segment
IR, RS232 interface		✓			✓	✓
Automatic and manual range selection	✓	✓	✓	✓	✓	✓
Automatic switch off	✓	✓	✓	✓	✓	✓
Non-contact eletrical field detection (EF)	✓	✓				✓
MAX hold			✓	✓		
Peak hold						✓
Data hold		✓	✓	✓	✓	✓
Recording (MAX / MIN / AVG)					✓	✓
Relative value		✓	✓	✓	✓	✓
Compensation for test leads					✓	✓
Overvoltage category	CAT III/300 V, CAT II/600 V	CAT IV/300 V, CAT III/600 V, CAT II/1000 V	CAT IV/300 V, CAT III/600 V, CAT II/1000 V	CAT III/600 V, CAT II/1000 V	CAT IV/1000 V	CAT IV/1000 V
Size with holster (mm)	113 x 53 x 10.2	160 x 82 x 48	198 x 97 x 55	198 x 97 x 55	208 x 103 x 64.5	208 x 103 x 64.5
Weight with holster (g)	78	345	396	396	635	635
CE mark	✓	✓	✓	✓	✓	✓

Accessories: page 7.19

MD 9010 Pocket-sized digital multimeter

3 YEARS WARRANTY | CAT III 300 V | EF | Auto-check

The MD 9010 is one of the smallest and lightest of our digital multimeters. The MD9010 unit can be used for a wide variety of applications. The high accuracy, large LCD display and features (including non-contact voltage detection and an auto-check function) make the unit extremely versatile and great value for money.

KEY FEATURES:

- **Autocheck function:** automatic detection of AC voltage, DC Voltage or resistance.
- **Pocketsized:** small, thin, ergonomic design.
- **Lightweight:** only 78 g.
- **EF Detection**: non contact voltage detection.
- **Safe:** protected against wrong connection and overvoltage CAT III/300 V and CAT II/600 V.
- **Multifunctional:** ideal for basic electronic and electrical testing.
- **Easy to read:** LCD display, 3-5/6 digit, 6000 counts.

APPLICATION:

- Low level electrical testing.
- Low level electronic fault finding.
- Basic field servicing.
- Hobby work.

ORDERING INFORMATION:

Part No.	Description
MD 9010	Multimeter

TECHNICAL SPECIFICATION:

FUNCTION	RANGE	ACCURACY
DC voltage	6.000 V - 600.0 V	from ±(0.5 % of reading + 3 digits) to ±(2.0 % of reading + 5 digits)
AC voltage, 50Hz - 60Hz	6.000 V - 600.0 V	±(1.5 % of reading + 5 digits)
DC current measurement	400.0 µA - 2000 µA	from ±(1.2 % of reading + 3 digits) to ±(1.5 % of reading + 3 digits)
AC current measurement	400.0 µA - 2000 µA	from ±(1.5 % of reading + 3 digits) to ±(2.0 % of reading + 3 digits)
Diode test	Open-circuit voltage <1.6 V DC	
Resistance measurement	600.0 Ω - 6.000 MΩ	from ±(1.0 % of reading + 4 digits) to ±(2 % of reading + 6 digits)
Frequency	10.00 Hz - 30.00 kHz	±(0.5 % of reading + 4 digits)
Capacitance	100.0 nF - 2000 µF	±(3.5 % of reading + 6 digits)
Power supply	3 V battery, IEC-CR2032	
Overvoltage category	CAT III/300 V and CAT II/600 V	

STANDARD KIT INCLUDES:

Part No.	Description
MD 9010	Multimeter with rubber holster 2 test leads Battery Instruction manual Warranty

Accessories: page 7.19

MD 9015 Pocket-sized multimeter with temperature measurement

The digital multimeter MD 9015 includes all the functions required to detect and diagnose most electrical and electro-technical problems. Offering one-handed operation and a display with large, easily-read figures, this compact instrument offers a high level of functionality while still maintaining its small size and portability.

KEY FEATURES:

- **Temperature:** measures temperature in Celsius up to 300 °C and Fahrenheit up to 572 °F.
- **High Accuracy:** 0.3 % basic accuracy.
- **EF Detection:** non contact voltage detection.
- **REL function:** relative function for comparing the difference between signals.
- **PC Link:** unit results can be linked onto a computer via the optional software.
- **Safe:** CAT II/1000 V, CAT III/600 V protection.

APPLICATION:

- HVAC.
- Low level electrical testing.
- Low level electronic fault finding.
- Basic field servicing.
- Hobby work.

TECHNICAL SPECIFICATION:

FUNCTION	RANGE	ACCURACY
DC voltage	250.0 mV - 1000 V	from ±(0.3 % of reading + 4 digits) to ±(1.0 % of reading + 4 digits)
AC voltage, 50 Hz - 500 Hz	250.0 mV - 750 V	from ±(1 % of reading + 3 digits) to ±(2.2 % of reading + 6 digits)
DC current measurement	250.0 µA - 10.00 A	from ±(0.8 % of reading + 3 digits) to ±(2.0 % of reading + 6 digits)
AC current measurement	250.0 µA - 10.00 A	from ±(1.0 % of reading + 4 digits) to ±(2.5 % of reading + 5 digits)
Diode test	Open-circuit voltage <1.8 V DC, Test current 1 mA	
Resistance measurement	250.0 Ω - 25.00 MΩ	from ±(0.4 % of reading + 2 digits) to ±(1.0 % of reading + 4 digits)
Temperature measurement	-20 °C - 300 °C	3 °C + 3 digits
Frequency	30 Hz - 1000 Hz	±(0.05 % of reading + 4 digits)
Capacitance	2.500 nF - 25.00 µF	from ±(1.0 % of reading + 4 digits) to ±(6 % of reading + 45 digits)
Power supply	2 x 1.5 V AAA size batteries	
Overvoltage category	CAT IV/300 V, CAT III/600 V, CAT II/1000 V	

ORDERING INFORMATION:

Part No.	Description
MD 9015	Multimeter

STANDARD KIT INCLUDES:

Part No.	Description
MD 9015	Multimeter with rubber holster 2 test leads Batteries Instruction manual Warranty

Accessories: page 7.19

MD 9020 General purpose Digital Multimeter

The MD 9020 is a high-quality digital multimeter, designed for everyday use in the laboratory and for maintenance and repair in the field and also in the industrial sector.

KEY FEATURES:

- **Hz measurement:** frequency measurement up to 1 MHz.
- **Lead alert:** incorrect lead connection alert.
- **Capacitance measurement:** up to 3 mF.
- **Temperature measurement:** up to 300 °C and Fahrenheit up to 575 °F.
- **Hold Functions:** MAX hold and data hold.
- **Safety:** CAT II/1000 V, CAT III/600 V protection.

APPLICATION:

- Mid level electrical testing.
- Mid level electronic fault finding.
- Field servicing.
- General purpose.

TECHNICAL SPECIFICATION:

FUNCTION	RANGE	ACCURACY
DC voltage	400.0 mV - 1000 V	from ±(0.3 % of reading + 4 digits) to ±(1.0 % of reading + 4 digits)
AC voltage 50 Hz - 500 Hz	400.0 mV - 1000 V	from ±(1.5 % of reading + 5 digits) to ±(4.0 % of reading + 5 digits)
DC current measurement	400.0 µA - 10.00 A	from ±(1.2 % of reading + 3 digits) to ±(2.0 % of reading + 5 digits)
AC current measurement	400.0 µA - 10.00 A	from ±(1.5 % of reading + 4 digits) to ±(2.0 % of reading + 6 digits)
Diode test	Open-circuit voltage <1.6 V DC, Test current 0.25 mA	
Resistance measurement	400.0 Ω - 40.00 MΩ	from ±(0.6 % of reading + 4 digits) to ±(2.0 % of reading + 4 digits)
Temperature measurement	-20 °C - 300 °C	±(2 % of reading + 3 °C)
Frequency	50.00 Hz - 1.000 MHz	±(0.5 % of reading + 4 digits)
Capacitance	500.0 nF - 3000 µF	±(3.5 % of reading + 6 digits)
Power supply	2 x 1.5 V AAA size batteries	
Overvoltage category	CAT IV/300 V, CAT III/600 V , CAT II/1000 V	

ORDERING INFORMATION:

Part No.	Description
MD 9020	Multimeter

STANDARD KIT INCLUDES:

Part No.	Description
MD 9020	Multimeter with rubber holster 2 test leads Batteries Instruction manual Warranty

MD 9030 TRMS General purpose Digital Multimeter

3 YEARS WARRANTY · CAT III 600 V · TRMS · EF · °C

The MD 9030 TRMS digital multimeter has been designed for use both in the laboratory and in the harsh industrial maintenance and repair sector. The TRMS functionality makes the unit suitable for a multitude of situations, while the large, bright, backlight screen and incorrect lead connection alert make it ideal for working in dark areas.

KEY FEATURES:

- **TRMS:** accurate readings on sinusoidal and non-sinusoidal signals.
- **Hz measurement:** frequency measurement up to 1 MHz.
- **Lead alert:** incorrect lead connection alert.
- **Capacitance measurement:** up to 3 mF.
- **Temperature measurement:** up to 300 °C and Fahrenheit up to 575 °F.
- **Hold Functions:** MAX hold and data hold.
- **Safety:** CAT II/1000 V, CAT III/600 V protection.
- **Backlight:** large, bright 3-3/4 digit, 4000 count LCD display with backlight for working in dark conditions.

APPLICATION:

- Mid level electrical testing.
- Mid level electronic fault finding.
- Field servicing.
- General purpose.

ORDERING INFORMATION:

Part No.	Description
MD 9030	Multimeter

STANDARD KIT INCLUDES:

Part No.	Description
MD 9030	Multimeter with rubber holster 2 test leads Batteries Instruction manual Warranty

TECHNICAL SPECIFICATION:

FUNCTION	RANGE	ACCURACY
DC voltage	400.0 mV - 1000 V	from ±(0.3 % of reading + 4 digits) to ±(1.0 % of reading + 4 digits)
TRMS AC voltage 50 Hz - 500 Hz	400.0 mV - 1000 V	from ±(1.5 % of reading + 5 digits) to ±(4.0 % of reading + 5 digits)
DC current measurement	400.0 µA - 10.00 A	from ±(1.2 % of reading + 3 digits) to ±(2.0 % of reading + 5 digits)
TRMS AC current measurement	400.0 µA - 10.00 A	from ±(1.5 % of reading + 4 digits) to ±(2.0 % of reading + 6 digits)
Diode test	Open-circuit voltage <1.6 V DC, Test current 0.25 mA	
Resistance measurement	400.0 Ω - 40.00 MΩ	from ±(0.6 % of reading + 4 digits) to ±(2.0 % of reading + 4 digits)
Temperature measurement	-20 °C - 300 °C	±(2 % of reading + 3 °C)
Frequency	50.00 Hz - 1.000 MHz	±(0.5 % of reading + 4 digits)
Capacitance	500.0 nF - 3000 µF	±(3.5 % of reading + 6 digits)
Power supply	2 x 1.5 V AAA size batteries	
Overvoltage category	CAT III/600 V , CAT II/1000 V	

Accessories: page 7.19

MD 9040 TRMS Industrial Digital Multimeter

CAT IV/1000 V overvoltage category and TRMS measurement of AC current and voltage are key features of the MD 9040. That's why it is particularly suitable for performing measurements on power supply sources in the most demanding applications in the industrial sector. Its high accuracy, 2-line LCD display of readings, diverse measurement functions, fast one-handed operation and outstanding value for money open up a wide range of possible uses.

KEY FEATURES:

- **TRMS:** accurate readings on sinusoidal and non-sinusoidal signals.
- **High accuracy:** basic accuracy of 0.1 %.
- **Lead alert:** incorrect lead connection alert.
- **PC Link:** unit results can be linked onto a computer via the optional software.
- **Capacitance measurement:** up to 25 mF.
- **Frequency measurement:** up to 1 MHz.
- **Safety:** CAT IV/1000 V.
- **Backlight:** 2-line LCD display with backlight, 9999 count (ACV, DCV, Hz, nS), 6000 count (mV, µA, mA, A, Ω, F).

TECHNICAL SPECIFICATION:

FUNCTION	RANGE	ACCURACY
TRMS AC voltage 40 Hz - 20 kHz	60.00 mV - 999.9 V	from ±(0.5 % of reading + 3 digits) to ±(3.0 % of reading + 4 digits)
DC voltage	60.00 mV - 999.9 V	from ±(0.08 % of reading + 2 digits) to ±(0.12 % + 2 digits)
DC current measurement	600.0 µA - 10.00 A	±(0.2 % of reading + 4 digits)
TRMS AC current measurement 40 Hz - 1 kHz	600.0 µA - 10.00 A	from ±(0.6 % of reading + 3 digits) to ±(1.0 % of reading + 4 digits)
Diode test	2.000V	±(1.0 % of reading + 1 digit
	Open-circuit voltage <3.5 V DC, Test current 0.4 mA	
Resistance measurement	0 - 600.0 Ω 0 - 60.00 MΩ	from ±(0.1 % of reading + 3 digits) to ±(1.5 % of reading + 5 digits)
Mains frequency	15.00 Hz - 50.00 kHz	±(0.04 % of reading + 4 digits)
Frequency of digital equipment	5.00 Hz - 1.000 MHz	±(0.004 % of reading + 4 digits)
Capacitance	60.00 nF - 25.00 mF	from ±(0.8 % of reading + 3 digits) to ±(6.5 % of reading + 5 digits)
Power supply	9 V battery, NEDA1604G, JIS006P, or IEC6F22	
Overvoltage category	CAT IV/1000 V	

APPLICATION:

- High level industrial testing.
- High level electronic fault finding.
- Field servicing.
- Heavy duty electrical testing.

ORDERING INFORMATION:

Part No.	Description
MD 9040	**Multimeter**

STANDARD KIT INCLUDES:

Part No.	Description
MD 9040	Multimeter with rubber holster 2 test leads Battery Instruction manual Warranty

MD 9050 TRMS Heavy Duty Industrial Digital Multimeter

The MD 9050 ranks among the best multimeters on the market. High resolution and accuracy, 2-line LCD display, fast data acquisition and transfer (via optical interface), CAT IV/1000 V, TRMS current and voltage measurement, non-contact voltage detector, conductance measurement, auto check and fast one-handed operation are highlights of the multimeter. The MD 9050 is the ideal choice for demanding measurement tasks in industry, in the laboratory, and in everyday repair and maintenance practice.

KEY FEATURES:

- **TRMS:** accurate readings on sinusoidal and non-sinusoidal signals.
- **High accuracy:** basic accuracy of 0.1%.
- **Temperature measurement:** T1, T2 and T1 + T2 measurement.
- **Lead alert:** incorrect lead connection alert.
- **Conductance:** conductance measurement (100 nS).
- **PC Link:** unit results can be linked onto a computer via the optional software.
- **Autocheck function:** automatic detection of AC voltage, DC Voltage or resistance.
- **Recording:** data recording facility.
- **Safety:** CAT IV (1000V).
- **Backlight:** 2-line LCD display with backlight, 9999 count (ACV, DCV, Hz, nS), 6000 count (mV, µA, mA, A, Ω, F).

TECHNICAL SPECIFICATION:

FUNCTION	RANGE	ACCURACY
TRMS AC and AC+DC voltage 40 Hz - 20 kHz	60.00 mV - 999.9 V	from ±(0.5 % of reading + 3 digits) to ±(3.0 % of reading + 4 digits)
Auto-check (ACV)	9.999 V - 999.9 V	± (1.0 % of reading + 4 digits)
DC voltage	60.00 mV - 999.9 V	from ±(0.08 % of reading + 2 digits) to ±(0.12 % of reading + 2 digits)
Auto-check (DCV)	9.999 V - 999.9 V	± (0.5 % of reading + 3 digits)
DC current measurement	600.0 µA - 10.00 A	±(0.2 % of reading + 4 digits)
TRMS AC and AC+DC current measurement 40 Hz - 1 kHz	600.0 µA - 10.00 A	from ±(0.6 % of reading + 3 digits) to ±(1.0 % of reading + 4 digits)
Diode test	2.000 V	±(1.0 % of reading + 1 digit
	Open-circuit voltage <3.5 V DC, test current 0.4 mA	
Resistance measurement	0 - 600.0 Ω 0 - 60.00 MΩ	from ±(0.1 % of reading + 3 digits) to ±(1.5 % of reading + 5 digits)
Conductance	99.99 nS	±(0.8 % of reading + 10 digits)
Auto-check (resistance measurement)	600.0 Ω - 60.00 MΩ	from ± (0,5 % of reading + 4 digits) to ±(2 % of reading + 2 digits)
Mains frequency	15.00 Hz - 50.00 kHz	±(0.04 % of reading + 4 digits)
Frequency of digital equipment	5.00 Hz - 1.000 MHz	±(0.004 % of reading + 4 digits)
Capacitance	60.00 nF - 25.00 mF	from ±(0.8 % of reading + 3 digits) to ±(6.5 % of reading + 5 digits)
Temperature	-50 °C - +1000 °C	±(0.3 % of reading +2 °C)
Power supply	9 V battery, NEDA1604G, JIS006P, or IEC6F22	
Overvoltage category	CAT IV/1000 V	

APPLICATION:

- High level industrial testing.
- High level electronic fault finding.
- Field servicing.
- Heavy duty electrical testing.

ORDERING INFORMATION:

Part No.	Description
MD 9050	Multimeter

STANDARD KIT INCLUDES:

Part No.	Description
MD 9050	Multimeter with rubber holster 2 test leads Type K sensor Battery Instruction manual Warranty

Accessories: page 7.19

Selection Guide for Clamp meters

Part No.:	MD 9210 Clamp meter	MD 9220 Clamp meter	MD 9230 Clamp meter	MD 9240 Clamp meter	MD 9270 Clamp meter
					
True RMS		✓	✓	✓	✓
DC current range (A)			1000 A		
Basic accuracy (%)			1.5		
AC current range (A)	600 A	2000 A	800 A	1000 A	150 A
Basic accuracy (%)	1.5	1.5	1.5	1	0.8
DC voltage range (V)	600 V	600 V	600 V	600 V	
Basic accuracy (%)	0.3	0.5	0.3	0.5	
AC voltage (V)	600 V	600 V	600 V	600 V	250 V, 600 V
Basic accuracy (%)	1.5	1.5	1	0.5	0.5
Resistance range	40.00 MΩ	6.000 MΩ	40.00 MΩ	999.9 Ω	
Basic accuracy (%)	0.6	1	0.6	1	
Acoustic continuity test	✓	✓	✓	✓	
Diode test	✓	✓	✓		
Capacitance	✓	✓	✓		
Frequency measurement	✓	✓		✓	✓
Temperature measurement (Type K sensor)				✓	
Autocheck® V-Ω		✓		Auto V-A	
Power measurement (W, VA & VAR)				Single-phase	✓
Count	4000	6000	4000	4000, 6000, 9999	3000
Backlight		✓	✓	✓	✓
COM port (data transfer)				✓	
Automatic and manual range selection	✓	✓	✓		
Automatic switch off	✓	✓	✓	✓	✓
Non-contact electrical field detection (EF)		✓			
MAX hold	✓		✓		✓
Peak value				✓	✓
Data hold	✓	✓	✓	✓	✓
Relative value	✓		✓		
Jaw opening	26 mm	45 mm	50 mm	45 mm	28 mm
Overvoltage category	CAT IV/300 V, CAT III/600 V	CAT IV/300 V, CAT III/600 V	CAT IV/300 V, CAT III/600 V	CAT IV/300 V, CAT III/600 V	CAT IV/300 V, CAT III/600 V
Size (mm)	190 x 63 x 32	224 x 78 x 40	227 x 78 x 40	224 x 78 x 40	212 x 59 x 37
Weight	139 g	220 g	290 g	224 g	225 g
CE mark	✓	✓	✓	✓	✓

Accessories: page 7.19

MD 9210 Mini clamp meter

Versatility, sturdy case, high accuracy and lots of measurement functions are key features of the current clamp MD 9210. If you're looking for a universal current clamp offering good value for money, look no further!

KEY FEATURES:

- **Jaw size:** 26 mm.
- **Lightweight:** only 139 g.
- **High specification:** reads up to 600 A with excellent accuracy.
- **Multifunctional:** measures AC current, AC and DC voltage, Resistance, Frequency, Capacitance, Diode test.
- **REL function:** helps to compare the difference between two signals or remove background noise for accurate measurement.
- **Hold functions:** max hold and data hold functions.

APPLICATION:

- Working in Small enclosures.
- General purpose.
- Testing 3-phase machinery.

TECHNICAL SPECIFICATION:

FUNCTION	RANGE	ACCURACY
DC voltage	400.0 mV	±(0.3 % of reading + 4 digits)
	4.000 V, 40.00 V, 400.0 V	±(0.5 % of reading + 3 digits)
	600 V	±(1.0 % of reading + 4 digits)
AC voltage, 50 Hz - 500 Hz	4.000 V, 40.00 V, 400.0 V	±(1.5 % of reading + 5 digits)
	600 V	±(2.0 % of reading + 5 digits)
AC current measurement, 50,60 Hz	40.00 A, 400.0 A, 600 A	±(1.5 % of reading + 8 digits)
Resistance measurement	400.0 Ω	±(0.8 % of reading + 8 digits)
	4.000 kΩ, 40.00 kΩ, 400.0 kΩ	±(0.6 % of reading + 4 digits)
	4.000 MΩ	±(1.0 % of reading + 4 digits)
	40.00 MΩ	±(2.0 % of reading + 4 digits)
Diode test	Open-circuit voltage <1.6 V DC, test current 0.25 mA	
Frequency	10 Hz - 100 kHz	±(0.5 % of reading + 4 digits)
Capacitance	500.0 nF - 3000 µF	±(3.5 % of reading + 6 digits)
Power supply	3 V battery, IEC-CR2032	
Overvoltage category	CAT IV/300 V, CAT III/600 V	

ORDERING INFORMATION:

Part No.	Description
MD 9210	Current clamp

STANDARD KIT INCLUDES:

Part No.	Description
MD 9210	Current clamp 2 test leads Battery Pouch Instruction manual Warranty

Accessories: page 7.19

MD 9220 High current clamp meter

The MD 9020 is a high-quality digital multimeter, designed for everyday use in the laboratory and for maintenance and repair in the field and also in the industrial sector.

KEY FEATURES:

- **TRMS:** accurate measurements on sinusoidal and non-sinusoidal signals.
- **Jaw size:** 45 mm.
- **High current:** measures up to 2000 A.
- **EF detector:** non contact voltage detector.
- **Multifunctional:** measures AC current, AC and DC voltage, Resistance, Frequency, Capacitance, Diode test.
- **Display:** easy to read backlight LCD screen, 3-5/6 digit, 6000 count.
- **Data Hold function**.

APPLICATION:

- High powered 3-phase machinery.
- High level industrial.
- High current electrical.

ORDERING INFORMATION:

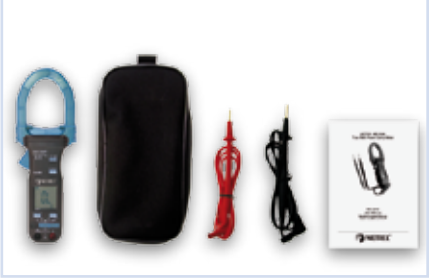
Part No.	Description
MD 9220	Current clamp

TECHNICAL SPECIFICATION:

FUNCTION	RANGE	ACCURACY
DC voltage	6.000 V	±(0.5 % of reading + 3 digits)
	60.00 V	±(1.0 % of reading + 5 digits)
	600.0 V	±(2.0 % of reading + 5 digits)
AC voltage measurement, 50,60 Hz	6.000 V, 60.00 V, 600.0 V	from ±(1.5 % of reading + 5 digits) to ±(2.0 % of reading + 5 digits)
AC voltage measurement , 50 - 500 Hz	6.000 V, 60.00 V, 600.0 V	from ±(2 % of reading + 5 digits) to ±(2.5 % of reading + 5 digits)
AC current measurement, 50,60 Hz	400.0 A, 2000 A	±(1.5 % of reading + 5 digits)
Resistance measurement	6.000 kΩ	±(1.2 % of reading + 6 digits)
	60.00 kΩ, 600.0 kΩ	±(1.0 % of reading + 4 digits)
	6.000 MΩ	±(2.0 % of reading + 4 digits)
Continuity test	600.0 Ω	±(2.0 % of reading + 8 digits)
Diode test	Open-circuit voltage <1.6 V DC, test current 0.4 mA	
Frequency	10 Hz - 30 kHz	±(0.5% of reading + 4 digits)
Capacitance	100,0 nF - 2000 µF	±(3.5% of reading + 5 digits)
Power supply	2 x 1.5 V AAA size batteries	
Overvoltage category	CAT IV/300 V, CAT III/600 V	

STANDARD KIT INCLUDES:

Part No.	Description
MD 9220	Current clamp 2 test leads Batteries Pouch Instruction manual Warranty



MD 9230 AC & DC current clamp meter

3 YEARS WARRANTY · CAT III 600 V · TRMS · Jaw 50 mm

The MD 9230 is a universal current clamp for measuring DC and TRMS AC voltages up to 600 V and DC and TRMS AC currents up to 1000 A. With a broad spectrum of measurement functions and features, it is an ideal tool for service companies and works electricians in the industrial sector.

KEY FEATURES:

- **TRMS:** accurate measurements on sinusoidal and non-sinusoidal signals.
- **Jaw size:** 50 mm.
- **High current:** measures up to 800 A AC and 1000 A DC.
- **REL function:** helps to compare the difference between two signals or remove background noise for accurate measurement.
- **Multifunctional:** measures AC and DC current, AC and DC voltage, Resistance, Frequency, Capacitance, Diode test.
- **Display:** easy to read backlight LCD screen, 3-3/4 digit, 4000 count.
- **Hold functions:** MAX hold and data hold functions.

APPLICATION:

- Off grid' solar and wind power systems.
- UPS systems.
- Utility scale battery systems.
- High level industrial.
- High current electrical.

ORDERING INFORMATION:

Part No.	Description
MD 9230	**Current clamp**

TECHNICAL SPECIFICATION:

FUNCTION	RANGE	ACCURACY
DC voltage	400.0 mV, 4.000 V, 40.00 V, 400.0 V, 600.0 V	±(0.3 % of reading + 3 digits) ±(0.5 % of reading + 3 digits) ±(1.0 % of reading + 4 digits)
AC voltage		
50 Hz - 500 Hz	400.0 mV	±(4.0 % of reading + 4 digits)
50 Hz, 60 Hz	4.000 V, 40.00 V, 400.0 V	±(1.0 % of reading + 4 digits)
60 Hz - 500 Hz	4.000 V, 40.00 V, 400.0 V	±(1.5 % of reading + 4 digits)
50 Hz - 500 Hz	600 V	±(2.0 % of reading + 4 digits)
DC current measurement	0 A - 400.0 A, 400 A - 1000 A	from ±(1.5 % of reading + 4 digits) to ±(5 % of reading + 30 digits)
AC current measurement 50 Hz, 60 Hz	400 A, 800 A	from ±(1.5 % of reading + 4 digits) to ±(5% of reading + 30 digits)
Resistance measurement	400.0 Ω, 4.000 kΩ, 40.00 kΩ, 400.0 kΩ, 4.000 MΩ, 40.00 MΩ	from ±(0.6 % of reading + 4 digits) to ±(2 % of reading + 4 digits)
Continuity test	400.0 Ω	±(1.5 % of reading + 6 digits)
Diode test	Open-circuit voltage <1.6 V DC, test current 0.4 mA	
Capacitance	500 nF - 3000 µF	±(3.5 % of reading + 6 digits)
Power supply	2 x 1.5 V AAA size batteries	
Overvoltage category	CAT IV/300 V, CAT III/600 V	

STANDARD KIT INCLUDES:

Part No.	Description
MD 9230	Current clamp 2 test leads Batteries Pouch Instruction manual Warranty

Accessories: page 7.19

MD 9240 Power clamp meter

The MD 9240 is a high-quality and extremely easy to handle power clamp meter. The current clamp enables TRMS AC current measurement up to 1000 A, single-phase power analysis, AC and DC voltage measurement, temperature measurement and more. As a result, the current clamp is suitable for maintenance and checking of distribution systems, switchboards and motors, or in systems where the supply network is heavily contaminated with harmonics.

KEY FEATURES:

- **TRMS:** accurate measurements on sinusoidal and non-sinusoidal signals.
- **Jaw size:** 45 mm.
- **High current:** up to 1000 A AC.
- **Power:** measures various power signals (W, VA, PF or THD).
- **Temperature:** measures temperature up to 300 °C.
- **PC Link:** unit results can be linked onto a computer via the optional software.
- **Peak hold:** peak hold function for monitoring starting motors.

APPLICATION:

- System maintenance.
- Power system checking.
- High level Industrial.
- High level Electrical.

ORDERING INFORMATION:

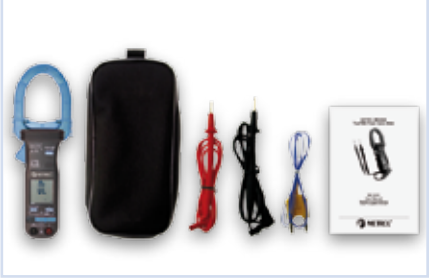
Part No.	Description
MD 9240	Current clamp

TECHNICAL SPECIFICATION:

FUNCTION	RANGE	ACCURACY
DC voltage	600.0 V	±(0.5 % of reading + 5 digits)
AC voltage ,50 Hz - 60 Hz, 45 Hz - 500 Hz - 3.1 kHz	600.0 V	±(0.5 % of reading + 5 digits), ±(1.5 % + 5 digits), ±(2.5 % + 5 digits)
AC current measurement 50 Hz - 60 Hz	40.00 A, 400.0 A, 1000 A	±(1.0 % of reading + 5 digits)
45 Hz - 500 Hz	40.00 A, 400.0 A, 1000 A	±(2.0 % of reading + 5 digits) ±(2.5 % of reading + 5 digits)
500 Hz - 3.1 kHz	40.00 A, 400.0 A, 1000 A	±(2.5 % of reading + 5 digits) ±(3 % of reading + 5 digits)
Temperature	-50 °C - 300 °C	±(2 % of reading + 3 °C)
Resistance measurement	999.9 Ω	±(1 % of reading + 6 digits)
Continuity test	10 - 300 Ω	
Frequency	5.00 Hz - 500.0 Hz	±(0.5 % of reading + 4 digits)
Power factor (PF)	0.10 - 0.99	±(3 digits), H from 1. to 21. ±(5 digits), H from 22. to 51.
Apparent power	0 - 600.0 kVA	±(2 % of reading + 6 digits), H 1./10. ±(3.5 % of reading + 6 digits), H 11./46. ±(5.5 % of reading + 6 digits), H 47./51.
Active power, reactive power	0 - 600.0 kW, kVar	from ±(2.0 % of reading + 6 digits)
Power supply	2 x 1.5 V AAA size batteries	
Overvoltage category	CAT IV/300 V, CAT III/600 V	

STANDARD KIT INCLUDES:

Part No.	Description
MD 9240	Current clamp 2 test leads Type K sensor Batteries Pouch Instruction manual Warranty



Accessories: page 7.19

MD 9270 Leakage Clamp meter with Power Functions

3 YEARS WARRANTY | CAT III 600 V | TRMS | Jaw 50 mm | W Power | THD | 50th Harm

The MD 9070 is an amazingly unique earth leakage clamp meter. Not only does it have the ability to accurately read the TRMS AC leakage current of a system, it can detect losses in the system and suggest possible reasons for the loss. The voltage measurement makes it a very versatile unit but combining these readings together to take power, harmonic, power factor (PF), total harmonic distortion (THD) and crest factor readings makes this a indespensible unit for also any electrician and engineer.

KEY FEATURES:

- **TRMS:** accurate measurements on sinusoidal and non-sinusoidal signals.
- **Shielded Jaw:** shielded jaw allows the unit to be used in the noisiest environments while the 28 mm opening makes it adaptable to most situations.
- **Accurate:** AC current read to an accuracy of 0.8 % with a base resolution of 0.01 mA and voltage to an accuracy of 0.5 % with a base resolution of 0.1 V.
- **Intelligent:** complex algorithms detect loss and provide possible reasons for loss.
- **Versatile:** measures, AC voltage, current.
- **Harmonics:** hold values and scroll through either currents or voltages up to the 50th Harmonic.
- **THD and PF:** dual displays allows readings to be displayed along with Total Harmonic Distortion (THD) or Power Factor (PF).
- **Protected:** CAT III/600 V safety protection.

APPLICATION:

- Load and leakage measurement.
- System maintenance.
- Power system checking.
- RCD fault finding.
- Process Engineering.

TECHNICAL SPECIFICATION:

FUNCTION	RANGE	ACCURACY
AC current measurement	40.00 mA, 400.0 mA, 4000 mA	±(0.8 % of reading + 3 digits)
	40.00 A	±(1.0 % of reading + 3 digits)
	150.0 A	±(2.0 % of reading + 5 digits)
AC voltage	250.0 V, 600.0 V	±(0.5 % of reading + 2 digits)
THD	0 - 99.9 %	±(2 % of reading + 3 digits)
	100 - 999 %	±(2 % of reading + 3 digits)
Crest Factor	1.00 - 2.99	±(2 % of reading + 2 digits)
	3.00 - 9.99	±(3 % of reading + 5 digits)
Peak Values	0 - 150.0 A	±(3 % of reading + 3 digits)
	0 - 600.0 V	±(3 % of reading + 3 digits)
Power factor (PF)	0.00 - 1.00	±(1 % of reading + 0.01 digits)
Phase	-180.0° to +180.0°	±(1 % of reading + 0.4 digits)
Apparent power	0 - 9999 VA	from ±(1 % + 0.03 d) to ±(1 % + 3 d)
	10 kVA - 999.9 kVA	from ±(2 % + 0.03 d) to ±(2 % + 0.3 d)
Active power	0 - 9999 W	from ±(1 % + 0.03 d) to ±(1 % + 3 d)
	10 kW - 999.9 kW	from ±(2 % + 0.03 d) to ±(2 % + 0.3)
Reactive power	0 - 9999 VAr	from ±(1 % + 0.03 d) to ±(1 % + 3 d)
	10 kVAr - 999.9 kVAr	from ±(2 % + 0.03 d) to ±(2 % + 0.3 d)
Jaw size	31 mm	
Power supply	2 x 1.5 V AAA size batteries	
Overvoltage category	CAT IV/300 V, CAT III/600 V	

ORDERING INFORMATION:

Part No.	Description
MD 9270	Current clamp

STANDARD KIT INCLUDES:

Part No.	Description
MD 9270	Current clamp 2 test leads Batteries Pouch Instruction manual Warranty

Accessories: page 7.19

Selection Guide for Voltage detectors

Part No.:	MD 1000 Voltage detectors	MD 1100 Voltage detectors
		
AC, DC VOLTAGE		
Range	12 V - 690 V	12 V - 690 V
Basic accuracy (%)		±(2.0 % of reading + 4 digits)
Operating time	Max. 30 s	Max. 30 s
Reaction time	<1s	<1s
Frequency range	0 - 400 Hz	0 - 400 Hz
CONTINUITY AND DIODE TEST		
Display	acoustic and LED display	acoustic and LCD display
Resistance range	0 - 500 kΩ	0 - 2 kΩ
Test current	400 µA	4 µA
RCD TRIP TEST		
RCD check	to trip 30 mA RCD, FI circuit breakers	to trip 30 mA RCD, FI circuit breakers
PHASE TEST		
Phase test	1-phase test	1-phase test
Phase rotation	2-phase phase rotation test	2-phase phase rotation test
Voltage display	>100 V AC	>100 V AC
DISPLAY		
	LED bar display	3 ½ digit, LCD with backlight
Ranges	12 V, 24 V, 48 V, 120 V, 230 V, 400 V, 690 V	12 V - 690 V ±(2% of reading + 4D)
EQUIPMENT SAFETY		
Overvoltage category	CAT IV/1000 V	CAT IV/1000 V
Standards	IEC, EN 61243-3, DIN VDE 0682-401, IEC 61010, GS38	IEC, EN 61243-3, DIN VDE 0682-401, IEC61010, GS38
POWER SUPPLY		
	2 x 1.5 V AAA (micro) size batteries	2 x 1.5 V AAA (micro) size batteries
GENERAL DATA		
Weight	200 g	200 g
Size (mm)	238 x 70 x 30	238 x 70 x 30

MD 1000 LED Voltage detector

The MD 1000 is a multi-function voltage tester. Because of its broad spectrum of measurement functions, it is suitable for use both in the home and in trade and industrial sectors.

KEY FEATURES:

- 12 V - 690 V DC and AC voltage range.
- Phase rotation measurement.
- RCD trip test (10 - 30 mA automatic internal load).
- Optical and acoustic continuity test.
- CAT IV/1000 V.

APPLICATION:

- General purpose.
- Electrical testing.

TECHNICAL SPECIFICATION:

FUNCTION	RANGE
Display	10 red LEDs for voltage, continuity, polarity and phase rotation measurement
Nominal voltage range	12 V, 24 V, 48 V, 120 V, 230 V, 400 V, 690 V (automatic range selection)
Phase indication	>100 V AC
Resistance range	0 - 500 kΩ
Frequency range	0 - 400 Hz
RCD test current	30 mA
Phase rotation determination	100 V - 690 V, 2-pole
Reaction time	< 0.1 s
Power supply	2 x 1.5 V AAA size batteries
Overvoltage category	CAT IV/1000 V

ORDERING INFORMATION:

Part No.	Description
MD 1000	Voltage tester

STANDARD KIT INCLUDES:

Part No.	Description
MD 1000	Voltage tester 2 x 1.5 V batteries (size AAA) Captive test probe protection Plastic probe guard (in accordance with GS38) Instruction manual Warrenty

Accessories: page 7.19

MD 1100 Voltage detector with LCD display

The MD 1100 is a high-quality voltage tester designed for the most demanding duties. With a broad spectrum of measurement functions and CAT IV/1000 V overvoltage category, the device is suitable for both the industrial sector and for everyday maintenance and repair practice.

KEY FEATURES:

- 12 V - 690 V DC and AC voltage range.
- Data hold function.
- LCD display with backlight.
- Phase rotation measurement.
- RCD trip test (10 - 30 mA automatic internal load).
- Optical and acoustic continuity test.
- Automatic switch off.
- CAT IV/1000V.

APPLICATION:

- Mid level electrical testing.
- Mid level electronic fault finding.
- Field servicing.
- General purpose.

ORDERING INFORMATION:

Part No.	Description
MD 1100	Voltage tester

STANDARD KIT INCLUDES:

Part No.	Description
MD 1100	Voltage tester 2 x 1.5 V batteries (size AAA) Captive test probe protection Plastic probe guard (in accordance with GS38) Instruction manual Warrenty

TECHNICAL SPECIFICATION:

FUNCTION	RANGE
Display	3-1/2 digit LCD display with backlight
Nominal voltage range	12 V - 690 V (automatic range selection)
Phase indication	>100 V AC
Resistance range	0 - 2 kΩ
Frequency range	0 - 400 Hz
RCD test current	30 mA
Phase rotation determination	100 V - 690 V, 2-pole
Reaction time	< 0.1 s
Power supply	2 x 1.5 V AAA size batteries
Overvoltage category	CAT IV/1000 V

Accessories: page 7.19

Accessories selection guide

Photo	Product group	Accessory decription	Part No.	Instrument / Application	Multimeters						Clamps				V. T.	
					MD 9010	MD 9015	MD 9020	MD 9030	MD 9040	MD 9050	MD 9210	MD 9220	MD 9230	MD 9240	MD 1000	MD 1100
	Probes	Type-K temperature probe	AMD 9023	Probe for contact temperature.		✓	✓	✓		✓				✓		
	Other	Banana pins to Type-K socket plug adapter	AMD 9024	Adapter is needed to connect the Type K probe with a multimeter.		✓	✓	✓		✓				✓		
	Software, Books, publications	PC RS232 interface kit	AMD 9025	Basic downloading software supplied on a CD.		✓										
	Software, Books, publications	PC software with data transfer kit	AMD 9040	Data transfer set enables communication with a multimeter. Supplied on a CD along with BC-100 cable.										✓		
	Software, Books, publications	PC software with USB and RS232 data transfer kit	AMD 9050	Communication set contains USB adapter, USB and RS232 driver with belonging PC software.					✓	✓						

Accessories: page 7.19

METREL®

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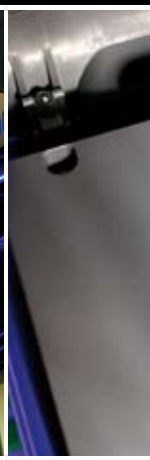

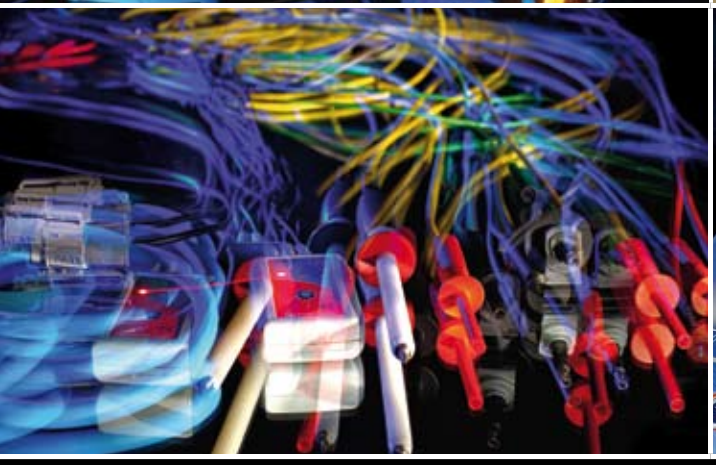

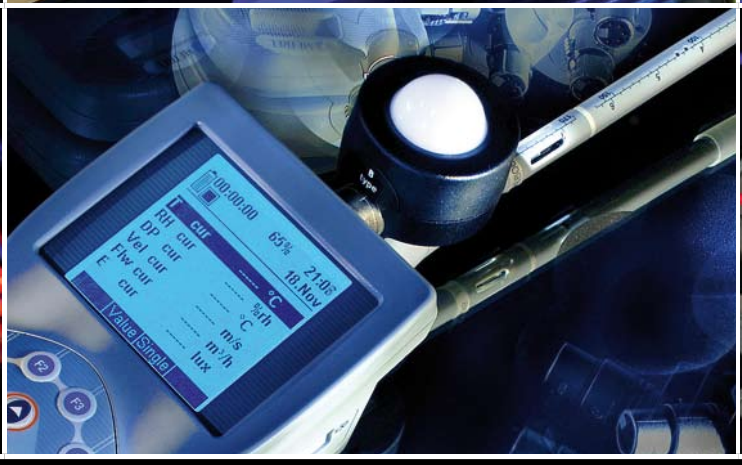

Note! Photographs in this catalogue may slightly differ from the instruments at the time of delivery.
Subject to technical change without notice.

2009/september/ang.j./D. Dolinar/Kočevski tisk