



# Application Catalogue 2023

Measuring  
instruments  
and testers

# Metrel has introduced a range of Certified Training Modules based on, and adjusted to comply with, the EU-countries industry standards

## The necessary equipment

Metrel's Safety and Quality Tester Instruments cover the needs of installers, constructors, planners and inspectors. Each tester supports test procedures and measuring methods according to the main standards and other regulation. The Test instruments represent a strong tool for troubleshooting, testing, diagnosing and reporting.

**Advanced Features** and several key solutions are specifically highlighted with regard to the competitors' solutions.

**Applications and Solutions** can be found in a number of additional operation and Good to Know documents related to the relevant industry sectors.

**Certified Training Modules** and **Seminars** are supported by the **Metrel Academy**. Within the Knowledge section we make recommendations and suggestions in support of national vocational qualification schemes. We can also offer training with completely new Training Modules for new application areas.

## SOLID KNOWLEDGE BASE

Metrel is continuously investing in developing the R&D working groups, which leads to new product solutions and improved technical and application knowledge. We are pleased to say that a number of our design engineers and product managers have thoroughly developed their technical knowledge and application experience about different markets for our products, so we can proudly state that we are Experts in our Field.

Metrel works in co-operation with important external organizations and institutions like:

- IEC Technical Committees and their Working Groups
- Faculties of Electrotechnics at different Universities
- Electrotechnical Associations
- Engineers Associations
- Electrical Safety Boards
- Chambers of Engineers
- Chambers of Commerce and Industry
- Chambers of Craft and Small Business

## PARTNERSHIP

Metrel is cooperating closely with important associations and committees related to its industry sectors and is a member of the Slovenian Institute for Standardization. We have individuals who participate in several technical committees, as well as internationally in IEC Technical Committees. Metrel is also involved in the Committee for the Electrotechnical Safety and Low-voltage electrical installations (NNELI) as a partner company through »eTest scheme« in Slovenia. We are a partner company of E-Check Association of electrical installers in Germany and cooperate with similar associations in other countries.



## REFERENCES

Through our own participation in providing and supporting national vocational qualification programs in the field of electrical safety during past decades, and through our close collaboration with professionals from various industries, at Metrel Academy we are aware of the importance to continuously develop knowledge and new skills through various

levels of training and qualification programs. This ensures self-confidence of the workforce in companies involved with Electrical Safety, it boosts their competitiveness, and enables safe and profitable working processes of their customers.

Metrel's participation in preparation of curricula for electrical engineering in Slovenia includes the following:

- Preparation of the Knowledge and Skills catalogue
- Giving assistance in defining qualification requirements list for the candidates in the vocational qualification program
- Preparation of the Assessment Exams catalogue

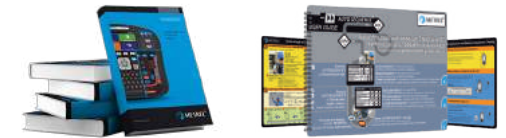
Metrel also assists experts working on the vocational qualification programs through its distribution – partners' network worldwide. This has been mostly related to the application of Metrel test and measurement instruments.

## CERTIFIED TRAINING MODULES

Certified Training Modules and Seminars are supported with packages of printed Handbooks, White paper, Exercises, Quick Guide Charts, and Posters together with other elements of Application and Technical Support. All low voltage training modules can be performed on Metrel's application trainer.

## MODULE PACKAGES

E-HANDBOOKS, QUICK GUIDE CHARTS, and EXERCISES about measuring and testing based on the International / European Standardization for every participant.



## Wall Posters

- Wall posters visually represent typical testing and measurement procedures and / or troubleshooting tasks, or a list of required customized tests in certain areas of application.

## Scope of Application & Technical Support

- Demonstration Equipment
- Testing instruments
- Power Point Presentations on product solutions
- On-line Technical Support: any inquires related to Metrel products can be sent on the following addresses:
  - info@metrel.si
  - info@metrel.co.uk
  - info@metrel.de
- Bespoke product training for an individual customer or larger groups of people
- Complete distributor set-up training (product, repair, and calibration training)
- B2B web support provides specific technical information for Metrel partners
- Download centre enables you to download files with technical product information

## QUALIFICATION CERTIFICATE

European Qualification Certificate adjusted to the EU-countries industry standards ensures the competency of individual participants who pass the final Exam on Theoretical and Practical knowledge for the specific locally approved Training Module.

**Know-How Package** - for a Transparent Localization Process

**Knowledge Catalogue** - for the specific Training Module for modification to a local - National regulation.

**Exams Catalogue** - with the definition of the minimum level of the Entry conditions for a participant.

**Approved Certificate** - approval of the obtained qualification when signed by a local authorized

organization like:

- Training organization
- Electrical Safety Board Organization, as for example NNELI etest / local - National AIE partner

**Metrel Academy** has put out a comprehensive list of training sessions in order to help you master the latest measurement and testing technologies.



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# LV Installation Safety & Industry Machine & EVSE & Operation Condition Quality & Switchboards & Continuity, Insulation, Z Loop impedance, RCD, Earth...



## GENERAL FEATURES

- **Predefined and/or programmable AUTO SEQUENCES.** Automatic LIVE and DEAD tests, programmable, no lost or forgotten results / parameters, worst case evaluated, human error factor minimized;
- Automatic evaluation of safety at test point, up to 50 parameters, **Fuse and RCD characteristics**, adjusted and custom limits and tested results combined together and evaluated simply as **PASS / FAIL**;
- Report Creator with powerful two way communication PC SW Tool MESM or EuroLink PRO;
- Up to 5 times faster than any existing equivalent Safety testing procedure.

## ADVANTAGES

- **TN / TT / IT** and other earthing systems support;
- **3- and 4-wire Zloop (L-PE) and Zline (L-N and L-L)** impedances at entry and exit points of circuits, comparison of both results and  **$\Delta U$  calculation in %**, **Ipsc and Ipfc** calculation, **Fuse protection evaluation**;
- Uc, Zline & Zloop tests combined into one automated impedance testing procedure (**Z AUTO**);

- **Automated RCD** testing procedure (RCD AUTO);
- **Contact voltage measurement with P/S probe**;
- Test of RCD protection at **AC / A / F / B / B+ / MI RCD / EV RCD** current shape on G or S type;
- Evaluation of PE **continuity**, automatic polarity switch;
- PE resistance evaluation;
- **Insulation** testing (Switchboard, Circuits, Insulation of Walls and Floors, Antistatic Floors, Automatic insulation testing);
- **PI / DAR calculation**;
- **Varistor test**;
- **TRMS Clamp-on Leakage** Current testing;
- **Over voltage protection** with ramp;
- **IMD and ISFL testing on IT** systems, Medical site testing, Mobile Installations;
- Test of **IMD, ELM** and **RCM** devices with **ISFL** pre-test and Voltage balance evaluation;
- **Earth / Ground** resistance testing: 2-wire, 3-wire, 4-wire (option), 1 clamp, 2 clamps;
- **Functional inspections**;
- **EVSE AUTO SEQUENCES** and functional inspections;
- Machine **functional and visual** inspections;
- **Measurement filtering** by selected **area group**;
- Other tools for **Three Phase** Systems, **Locating fuses** and cables, **Illumination** measuring, **high resolution Z impedance** for power lines, QR and/or barcode scanner support;








# Circuit Protection Parts Selection Guide

- PC SW (**Metrel ES Manager**) and Android (**aMESM**) support.

## APPLICATION

- Testing of TT, TN and IT systems;
- Testing of single and multiphase systems;
- Initial and periodic testing and inspections of domestic and industrial installations;
- Low Voltage Electrical Installation Safety testing;
- Electrical Safety in Working places;
- Electrical Safety in Public Areas;
- Fire Safety and Hazards, Troubleshooting of overloaded electrical systems, hot wiring or connections, failed components;
- Maintenance (Low Voltage installations maintenance, Preventive and Predictive maintenance, Corrective maintenance / Reactive repairs);
- Lightning installations;
- Testing on high and low frequency installations (industrial, aircraft, railway, mining, chemistry, ferry boat);
- Construction sites;
- Mobile LV Generator Units;
- Facility Management, maintenance and care of commercial or institutional buildings, such as hospitals;
- Hotels, office complexes, arenas, schools or convention centers;
- Machine and switchboard testing;
- Medical installation testing;
- Fire brigades, ambulance, military and police vehicles;
- Mobile Video/Audio, Concert Halls, Fairs, Playgrounds;
- Electrical Vehicle Supply Equipment (EVSE) testing;
- Observation of insulation trends.

FEATURES	Description	MI 3155 EurotestXD	MI 3152 EurotestXC	MI 3152H EurotestXC 2,5 kV	MI 3102 BT EurotestXE	MI 3102H BT EurotestXE 2,5kV	MI 3100 SE EurotestEASI	MI 3125 BT EurotestCOMBO
								
<b>AUTO SEQUENCES</b>	Programmable AUTO SEQUENCES	•	•	•	•	•	•	•
	Pre-programmed AUTO SEQUENCES	•	•	•	•	•	•	•
<b>AUTO TEST</b>	Auto TT (U, Zln, Zs, Uc)	•	•	•	•	•	•	•
	Auto TN/RCD (U, Zln, Zs, Rpe)	•	•	•	•	•	•	•
	Auto TN (U, Zln, Zlp, Rpe)	•	•	•	•	•	•	•
	Auto IT (U, Zl, Is, Im)	•	•	•	•	•	•	•
<b>VOLTAGE</b>	Voltage TRMS, Frequency	•	•	•	•	•	•	•
	1-phase / 3-phase support	• / •	• / •	• / •	• / •	• / •	• / •	• / •
	Low & high limit /U <sub>n</sub> setting	• / •	• / •	• / •	• / •	• / •	• / •	• / •
	Phase SEQUENCE L1-L2-L3	•	•	•	•	•	•	•
<b>INSULATION</b>	50 V - 1 kV / 2,5 kV PI DAR	• / •	• / -	• / •	• / -	• / •	• / -	• / -
	Auto L-PE, N-PE, L-N	•	•	•	•	•	•	•
<b>CONTINUITY</b>	Rlow (200mA) / 4-wire	• / •	• / -	• / -	• / -	• / -	• / -	• / -
	Continuity (7 mA)	•	•	•	•	•	•	•
<b>RPE</b>	RPE / RPE (RCD)	16 ... 400 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz
<b>ZLINE</b>	Zline, Ipsc, ΔU% / FUSE tables	16 ... 400 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz
	3- wire / 4-wire	• / •	• / -	• / -	• / -	• / -	• / -	• / -
<b>ZLOOP</b>	Zloop, Ipsc / FUSE tables Zs(rcd)	16 ... 400 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz	45 ... 65 Hz
	3- wire / 4-wire	• / •	• / -	• / -	• / -	• / -	• / -	• / -
<b>RCD</b>	RCD t, Uc, RCD I ramp, Uc, Auto	AC / A / B / F / B+	AC / A / B / F / B+	AC / A / F	AC / A / B / F / B+	AC / A / F	AC / A / F	AC / A / B / F / B+
	MI RCD, EV RCD / PRCD-S, PRCD-K	• / •	• / •	• / •	• / •	• / •	• / -	• / -
<b>EARTH</b>	Earth 3W	•	•	•	•	•	•	•
	Earth 2 Clamps	Optional	Optional	Optional	Optional	Optional	Optional	Optional
	RO adapter	Optional	Optional	Optional	Optional	Optional	Optional	Optional
<b>OTHER</b>	Power (S, Q, PF, THDU)	•	•	•	•	•	•	•
	Harmonics (U, I)	•	•	•	•	•	•	•
	Current Leakage / Load	•	•	•	•	•	•	•
	IT support / IMD, ISFL	• / •	• / •	• / •	• / •	• / •	• / -	• / -
	Varistor	•	•	•	•	•	•	•
	PI / DAR calculation	•	•	•	•	•	•	•
	Area groups	•	•	•	•	•	•	•
	Commanders	•	•	•	•	•	Optional	Optional
	EVSE	Optional (full)	Optional (full)	Optional (full)	Optional	Optional	Optional	Optional
	Locator	Optional	Optional	Optional	Optional	Optional	Optional	Optional
	LUX Sensor	Optional	Optional	Optional	Optional	Optional	Optional	Optional
	Ring (UK installations)	Optional	Optional	Optional	Optional	Optional	Optional	Optional
<b>PC SW MESM</b>	BASIC license / PRO license	• / Optional	• / Optional	• / Optional	• / Optional	• / Optional	• / Optional	• / Optional
<b>COMMUNICATION PORTS &amp; PC FEATURES</b>	RS232 / USB / Bluetooth	• / • / •	• / • / •	• / • / •	• / • / •	• / • / •	• / • / Optional	• / • / •
	Work space manager	•	•	•	•	•	•	•
	Memory /SD card	8 GB / • (removable)	8 GB / •	8 GB / •	4 /1800	4 /1800	4 /1800	4 /1700
	Colour touch screen	•	•	•	•	•	•	•
<b>GENERAL DATA</b>	IP protection	IP 56	IP 40	IP 40	IP 40	IP 40	IP 40	IP 40
	Batteries	4.4 Ah Li-Ion	6 x AA	6 x AA	6 x AA	6 x AA	6 x AA	6 x AA

# PV Systems, Inverters, Panels, Modules Testing, Maintenance, Troubleshooting Photovoltaic Modules, Panels, Strings, Inverters...



## GENERAL FEATURES

- **Automatic** measurements on PV Systems. Combined photovoltaic tester and electrical installation safety tester. Environment measurements and calculation to STC. Insulation measurements under energised PV system.
- Large **PV module Data Base**;
- **PASS/FAIL** evaluation of electrical safety test results;
- **Report Creator** with powerful two way communication PC SW Tool EuroLink PRO.

## ADVANTAGES

- **PV installation testing:**
  - **Uoc, Isc, Irradiance and Temperature** measurements;
  - **I - U curve** of modules and strings on PV systems;
  - **MPP** determination and **STC** calculations;
  - **Irradiance** and Temperature **Logger**;
  - **Insulation** under Voltage of PV panels and strings;

## Power measurements on AC and DC:

- **DC / AC TRMS Clamp-on** Current testing;
- **Efficiency** of Solar Panels and Inverters;

## Electrical Safety testing:




- **Zloop** L-N and L-L, RCD protection;
- **Continuity** and Earth Bond test;
- **Insulation** testing through Switchboard, at Circuits;
- **Over voltage** protection testing;
- **Earth / Ground** resistance testing;
- **TRMS Clamp-on Leakage** Current testing.

## APPLICATION

- Safety testing of PV and electrical installations.
- Measuring and Testing the Efficiency of the whole System.
- MPP check, Inverter check, Working point of Inverter Testing.
- Maintenance and troubleshooting based on I-V characteristic checking for possible deviations from the standard shape.



# Selection Guide

FEATURES	Description	MI 3108 EurotestPV	MI 3109 EurotestPV Lite	A 1378 EurotestPV Remote
				
<b>ELECTRICAL INSTALLATION SAFETY</b>	Insulation resistance up to 1000 V	•	•	
	Continuity 200 mA	•	•	
	Line / Loop Impedance	•		
	RCD A, AC, B	•		
	Earth resistance	•		
	Rotary field	•		
<b>PV GENERATOR MEASUREMENTS</b>	Isc, Uoc	1000 V / 15 A	1000 V / 15 A	
	Automatic test sequence		•	
	I-V curve	•	•	
	Umpp, Imp, Pmax	•	•	
	Extrapolation to STC	•	•*	
	Rs (calculated in PC SW)	•	•	
<b>ENVIRONMENT MEASUREMENTS</b>	Irradiance	•	•*	•
	Module temperature	•	•*	•
	Logger			•
<b>PV SYSTEM POWER MEASUREMENTS</b>	DC side measurements U, I, P	•	•	
	AC side measurements (single phase) U, I, P	•	•	
	Single phase PV and inverter energy conversion efficiency	•	•	
	Three phase PV and inverter energy conversion efficiency	Option**	Option**	
<b>EXTENDED POWER FUNCTIONALITY</b>	P, Q, S, THDU, PF/cos fi	•		
	AC/DC current	•		
	Scope function	•		
	Energy	•		
	Harmonics (up to 11 <sup>th</sup> )	•		
<b>STANDARD/ OPTIONAL ACCESSORIES</b>	Tip Commander	Option		
	Remote unit (logger)	Option	Option	•
	PV safety probe	•	Option	
	MC3 and MC4 adaptors	•	•	
	AC/DC current clamp	•	•	
	PV reference cell	•	Option	
	Temperature probe	•	Option	
<b>PC SW</b>	PC SW EuroLink PRO Plus	•	•	

\* Environment data can be entered manually or measured with optional accessory.  
 \*\* Three phase PV efficiency can be measured by synchronisation with any Metrel Power Analyser.

# Special Installations Testing, Maintenance, Troubleshooting & Integrated IT Systems

## Z Line impedance, RCD, RCM, ELM, IMD, Earth...



### GENERAL FEATURES

- **AUTOSEQUENCE** automatic tests, worst case evaluated, human error factor minimized;
- **Automatic evaluation of safety for Medical Locations, Integrated IT systems** and Installations on Vehicles, Fuse characteristics, supported **IMD, ELM, RCM devices**, adjusted limits and tested results combined together and evaluated simply as **PASS / FAIL**;
- **Insulation and Earth Bonding** Continuity for industrial environment and Special installations and Locations;
- **Earth / Ground Resistance / Soil Resistivity** in-line, triangle or mirror connection for close overlapped funnels on earthing systems, urban environment, also for industrial and noisy environment;
- Report Creator with powerful two way communication PC SW Tool EuroLink PRO.

### ADVANTAGES

- **Test of IMD, ELM and RCM** devices with ISFL pre-test and Voltage balance evaluation;
- **Zloop L-N and L-L** impedances at the entry and at the end of circuits, comparison of both results and **dU calculation in %**;
- **Earth Bond** testing with minimum 200 mA, **2 A, 10 A**, both polarities, Inductive mode supported;
- **Insulation testing** through Switchboard, at Circuits, Insulation of Walls and Floors, Antistatic Floors testing;
- **PI and DAR** factor Insulation testing on cables, transformers, motors;

- **Overvoltage varistors** and **Surge arresters** testing with up to 2.5 kV voltage ramp;
- **TRMS Clamp-on Leakage** Current testing;
- **Lightning systems** and PE Conductive loops testing with Two Clamps method;
- 2-wire, 3-wire, 4-wire, 1 clamp, 2 clamps **Earth / Ground** resistance testing.









### APPLICATIONS

- Medical Sites and Specific Medical Units, Surgery Rooms, Ambulance Vehicles and Emergency Cars, Helicopters, Boats.
- Mobile Video / Audio / Concert Halls / Fair playground, Satellite / Video Broadcast Vehicles.
- Military and Police Portable Stations and Units, Vehicles, Helicopters, Airports, Mobile Units, Mobile Restaurant Units.
- Racing Team Mobile Units, Restaurant Units.
- Fire Brigade Engines and Vehicles, Fire Boats, Emergency Vehicles and Cars.
- Generators of working Ships and Boats, Fishing Boats and Ships, Transport Ships, Tourist Cruisers Ships, Marina places, Mobile Units with Integrated IT Generators / Transformers / LV Electrical Installations.
- Gas stations, Pipes, Ground metal plates and covers, Oil tanks.
- Earth, Ground and Lightning protection Systems of Buildings and Industrial Halls, from single earthing points to complex systems.





# Selection Guide

FEATURES	Description	MI 3110 EurotestIM	MD 9272 Leakage / Power Clamp	MI 3123 Earth / Clamp	MI 3122 Z Line-Loop / RCD	MI 3121 Insulation / Continuity	MI 3121H Insulation / Continuity	MI 3242 MicroOhm 2A	MI 3309 BT DeltaGT
									
<b>AUTOSEQUENCES</b>	AUTOSEQUENCE Programmable	•							•
	Auto IT (U, ZI, Is, Im)	•							•
	Auto VDE								•
	Auto Custom								•
<b>INSULATION</b>	IMD insulation monitor	•							
	50 V - 1 kV					•	•		
	250 V, 500 V					•	•		•
	2,5 kV PI DAR						•		
<b>LEAKAGE CURRENT</b>	ISFL L1, L2 first Fault leakage	•							
	Differential leakage current		•						•
	Touch leakage current								•
	Substitute leakage current								•
	Leakage current with clamp		•						•
<b>CONTINUITY</b>	Current 200 mA					•	•	•	•
<b>EARTH BOND</b>	Current 2 A, 4-wire							•	
<b>ZLINE</b>	Zline, Ipssc, ΔU% / FUSE tables	•				•			
<b>ZLOOP</b>	Zloop, Ipfc / FUSE tables Zs(rcd)					•			
<b>RCD</b>	RCD t, Uc								AC / A*
	RCD I ramp, Uc								
	Auto								
	PRCD-S, PRCD-K								•
<b>EARTH</b>	Earth 3W			•					
	Earth 2 Clamps			•					
	RO adapter			•					
<b>VOLTAGE</b>	Voltage TRMS, Frequency	•	•		•	•	•		•
	Phase SEQUENCE L1-L2-L3								
<b>POLARITY</b>	IEC lead test								•
	Active polarity								•
<b>OTHER</b>	Power (S, Q, PF, THDU)		•						•**
	Functional test								•
	Harmonics (U, I)		•						
	Barcode								•
	Printer								•
<b>BLUETOOTH MODULE</b>	External (dongle)								•
<b>PC SW</b>	PC SW	•		•	•	•	•	•	•
<b>COMMUNICATION PORTS</b>	RS232 and USB	•		•	•	•	•	•	•

\* RCD t, only  
\*\* S, only

# Special Installations Testing, Maintenance, Troubleshooting, Airports, Railway, Industry, EVSE Ground Power Units, Sub-systems, Z impedance, Step/Contact, ELR, dR 300 A, EVSE, Mode 2/3 EV cables...



## GENERAL FEATURES

- **Hi precision 4-wire 300 A Z Line and Z Loop impedance tester;**
- **Hi range impedance** measurements in **800 V / 16 ... 420 Hz AC** networks;
- **Hi current dR 300 A 4-wire partial voltage drop** and **current path resistance** measurements;
- **Earth Leakage Relay (ELR) testing;**
- **Ground fault analysis** with Contact, Touch and Step Voltage;
- One-Clamp hi current grounding method with clamps (Flex & Iron);
- **DC source & line resistance measurements** in **3 ... 260 V DC** networks;
- **Functional, diagnostic and electrical safety testing of EVSE;**
- **Safety testing of Mode 2 EV cables and Mode 3 EV cables;**
- **Bluetooth communication** with Metrel's electrical safety testers;
- IP protection: IP65 (closed), IP54 (opened);
- **Up to CAT IV 600 V (3000 m)** safety category.

## ADVANTAGES

- **Earth Leakage Relay (ELR) Trip-out Testing** Time and Current;
- Supported **ELR types AC, A, B;**
- **Floating voltmeter** for partial contact results;
- **Selectable test load** (16.6 % to 100 %);
- Improved **thermal performance;**
- **Accessible inputs/outputs** for connection of safety testers;

- **Portable battery** (Li-ion) or mains powered test instrument;
- **Automated 3-phase system testing;**
- **Remote controlled** with supported Metrel safety testers or aMESM.

## APPLICATIONS

- Automatic trip-out protection evaluation in case of faults in transformers, generators, turbines, contactors, distribution boards and switch yards whenever energetic loads and sources of protection exceed 200 A.
- Power transformer and motor winding measurement.
- Live Power Transformer Hi Precision 4-wire 300 A Z Line / Loop Impedance Testing.
- Partial Voltage Drops and Partial Clamp Current's Path Resistance testing.
- Impedance testing of airport's Ground Power Units (GPU), railway systems.
- High accuracy battery resistance testing.
- DC Networks' and Power Sources' Line and Loop Resistance testing.
- Testing the integrity of Grounding systems and Lightning systems with High Current grounding method flex & iron One-Clamp method.
- Earth Leakage Relay (ELR/MRCD) testing.
- High current injection ground fault simulation.
- EVSE functional and safety testing.
- Safety testing of 1-phase and 3-phase Mode 2 and Mode 3 EV cables.
- Monitoring of the charging process.
- Automated testing of 3-phase systems.



# and EV cables Selection Guide

FEATURES	Description	MI 3144 Euro Z 800V	MI 3143 Euro Z 440V	A 1722 PRCD adapter	A 1632 eMobility Analyser	A 1631 EV monitoring cable	A 1532 XA EVSE adapter	A 1532 EVSE adapter	A 1507 3-phase switch adapter
									
<b>ELECTRICAL INSTALLATION SAFETY</b>	Zline mOhm high precision L-L, L-N, Ipsc - 4 wire	•	•						
	Zloop mOhm high precision L-PE, Ipcf - 4 wire	•	•						
	ΔR high current - 4 wire	•	•						
	R selective high current - 4 wire	•							
	DC source & Line Resistance	•							
	Earth Potential	•	•						
	ELR Test Current	•							
<b>FUNCTIONAL</b>	Diagnostic test (EVSE)				•				
	Diagnostic test (Mode 2 EV cable)				•				
	CP simulation				•		•	•	
	PP simulation				•		•	•	
	Input error simulation				•				
	Output error simulation				• / • / •		• / • / •	• / - / -	
	CP short / PE open / Diode short								
	Load test					•	•		
	Monitoring					•			
	Automated 3-phase system testing								•
	Single phase PRCDs support			•					
Threephase PRCDs support			•						
Probe test			•						
<b>CONNECTIVITY</b>	Communication Port USB								
	Remotely controled via Android App	•	•		•				
	Remotely controled via Metrel tester	•	•		•				•
	Built-in Bluetooth	•	•		•				•
	Android Application	•	•		•				
	Communication Port RS232 - PS/2	•	•						
<b>PC SW/ ANDROID APP</b>	MESM	•	•	•	•		•	•	•
	aMESM	•	•	•					
	eMobility				•				

# Portable Appliances Safety Testing, CE Marking & Machines Electrical Safety & Switchboards Safety Earth bond, Insulation, Differential / Touch / Substitute Leakage...



## GENERAL FEATURES

- **AUTOSEQUENCE** automatic testing programmable or standardized shortcuts of any kind of Machines, Switchboards, Controlgear, Portable Appliances, Fixed Appliances, IT equipment, IEC cords, portable RCD devices and extension leads;
- **Automatic evaluation** of safety with simple **PASS / FAIL** information but supported with all subresults for detailed report;
- **3-phase** appliance testing;
- **PATLink Android** scanning of the QR codes, containing information of the previous results, the test status, and the previously used test sequence;
- **Scan, test and print** barcoding system, and **PASS / FAIL** barcode label printing make retesting quick and simple;
- **Active polarity** for P/RCD protected extension leads testing;
- **Report Creator** with powerful two way communication PC SW Tool PATLink PRO.

## ADVANTAGES

- **HV Withstanding dielectric** test with programmable voltage ramp AC, **500 VA**, up to **5.1 kV**, fixed voltage levels **1 kV, 1,89 kV, 2.5 kV** and limited power **Flash tests on 1.5 kV / 3 kV**;
- **Earth bond** / continuity resistance test with test currents 200 mA and powerful **10 A / 25 A**;
- **Insulation** resistance, Touch leakage current and Substitute leakage current on inner and exposed isolated accessible conductive parts

for class I / class II appliances;







- **Differential Leakage, Touch Leakage and Substitute Leakage** test;
- Functional test and TRMS load currents testing;
- Innovative **Active Polarity** function for testing **RCD / PRCD** protected cords while voltage is applied to tested item;
- **Trend** function showing comparison of old and new test results on large graphic LCD display;
- Instrument can be powered from both **mains supply and internal battery**;
- Results can be **read / written / sent** via **USB, Bluetooth, External Printer, Barcoding, QR Coding and RFID** system.

## APPLICATIONS

- Type testing of Appliances, Machines and Switchgears / Controlgears after production in producer's R&D phases and Laboratories.
- CE marking and Routine testing after production.
- Testing of Power Tools, Extension Leads and Appliances on Construction sites.
- Testing of Appliances protected with RCDs (type AC, A, and B), portable PRCDs (type K, S).
- Service departments (after repair testing), Hire and Rental Industry (before hire and after return testing).
- Periodic testing of Portable Appliances for Hotels, Schools, Kindergardens, Public places, Restaurants, Kitchens, Shopping Centers, Stores, Fire Brigades, Military, Expo Centers, Concert Halls, Events.
- Testing of Hard-wired Appliances.



# Selection Guide

FEATURES	Description	MI 3325 MultiServicerXD	MI 3394 CE MultiTesterXS	MI 3394 CE MultiTesterXA	MI 3360 OmegaGT XA	MI 3309 BT DeltaGT	MI 3311 GammaGT
							
<b>AUTOSEQUENCES</b>	CE marking /PAT / MACHINE / SWITCHBOARD / MEDICAL / WELDING	• / • / • / • / - / •	• / • / • / • / - / -	• / • / • / • / - / -	- / • / - / - / • / •	- / • / - / - / - / -	- / • / - / - / - / -
	AUTOSEQUENCE Programmable	•	•	•	•	•	•
	Auto VDE	•	•	•	•	•	•
	Auto CUSTOM	•	•	•	•	•	•
<b>WITHSTANDING</b>	Ramp test 100 ... 5100 VAC (500 VA)	•**	•	•	•	•	•
	Ramp test 500 ... 6000 VDC	•	•	•	•	•	•
	Test voltage 1000 VAC / 1500 VAC / 1890 VAC / 2200 VAC / 3000 VAC	• / • / • / • / •	• / • / • / • / •	• / • / • / • / •	- / • / - / - / •	•	•
<b>CONTINUITY</b>	Current 200 mA	•	•	•	•	•	•
<b>EARTH BOND</b>	Current 4 A / 10 A / 25 A	• / • / •	• / • / •	• / • / •	- / • / •	- / - / -	- / - / -
<b>INSULATION</b>	50 VDC / 100 VDC / 250 VDC / 500 VDC / 1000 VDC	• / • / • / • / •	• / • / • / • / •	• / • / • / • / •	- / - / • / • / -	- / - / • / • / -	- / - / • / • / -
<b>LEAKAGE CURRENT</b>	Differential leakage current	•	•	•	•	•	•
	Touch leakage current	•	•	•	•	•	•
	PE leakage current	•	•	•	•	•	•
	Substitute leakage current	•	•	•	•	•	•
	Leakage current measurement with optional clamp	•	•	•	•	•	•
<b>DISCHARGE TIME</b>	60 V (1 ... 5 s)	•	•	•	•	•	•
	120 V (1 ... 5 s)	•	•	•	•	•	•
<b>RCD</b>	RCD t, Uc	AC / A / B / B+ / F			AC / A / B / B+ / F	AC / A*	
	RCD I ramp, Uc						
	Auto						
	PRCD-S, PRCD-K	•***			•	•	
<b>ZLINE</b>	Zline, Ipsc, ΔU% / FUSE tables	•					
	MI 3143 / MI 3144 (Adapters)	• / •					
<b>ZLOOP</b>	Zloop, Ipf / FUSE tables Zs(rcd)	•					
<b>THREE PHASE</b>	A 1322 Active 3-phase Adapter	Optional			Optional		
<b>APPLIANCES</b>	A 1422 Active 3-phase Adapter Plus	Optional			Optional		
<b>VOLTAGE</b>	Voltage TRMS / Frequency	• / •	• / -	• / -		• / -	• / -
	Phase SEQUENCE L1-L2-L3	•					
<b>POLARITY</b>	IEC lead test	•			•	•	•
	Active polarity	•			•		
<b>OTHER</b>	Safety modules		Optional				
	Functional test	•	•	•	•	•	
	EVSE (A 1632 eMobility Analyser)	Optional					
	Power	•	•	•	•	•	
	Barcode	Optional	Optional	Optional	Optional	Optional	Optional
	Printer	Optional	Optional	Optional	Optional	Optional	Optional
<b>BLUETOOTH</b>	Built in	•	•	•	•	•	
<b>MODULE</b>	External (dongle)						•
<b>PC SW</b>	PC SW PATLink PRO Plus						•
	PC SW Metrel ES Manager	•	•	•	•	•	
<b>COMMUNICATION</b>	RS232 / USB / Ethernet	• / • / •	• / • / •	• / • / •	• / • / -	• / • / -	• / • / -
<b>PORTS</b>	Remote	•	•	•	•	•	

\* RCD t, only / \*\* 250 VA only / \*\*\* PRCD-S and S+ only

# Power and Voltage Quality & Consumption and Disturbances

## Power, Harmonics, THD, TID, TDD, Phase diagram, Unbalance, Flicker, Transient, Waveform...



### GENERAL FEATURES

- **Automatic Voltage and Power Quality Analysis** according to EN 50160 with PASS / FAIL limit evaluation, including flickers and harmonics;
- IEEE 519 - 2022 Standard for Harmonic Control in Electric Power systems report creation;
- Energy Demand report creation;
- Compliance with power quality standard IEC 61000-4-30 Class A/S;
- Predefined recorder profile for EN 50160 survey;
- **Troubleshooting and Maintenance Tool** to discover voltage sags and swells, resonant states, high neutral conductor currents in 3-phase systems, asymmetry, transients;
- **Designing Tool** of filtering systems, power correction equipment, over voltage protection and UPS systems;
- Power Quality Negotiating background Tool;
- **Download, view and analyse with PowerView PC SW** platform that contains a package of functionalities needed for evaluation of power quality phenomena and creation of complex reports.

### ADVANTAGES

- **Voltage TRMS**, peak, crest factor (**4-channel**), 0 ... 1000 Vrms;

- **Current TRMS**, peak, crest factor (**4-channel**), automatic clamp recognition;
- **Power** (fundamental, non fundamental, combined, active, reactive, apparent), Power factor, cos  $\phi$ , Unbalance;
- Power harmonics;
- Harmonics Pollution;
- Energy (fundamental, non fundamental, combined, active, reactive, apparent, generated, consumed);
- **Harmonic analysis** up to 50th harmonic, THD, TID, TDD measurement, K-Factor;
- **VFD measurement;**
- **50/60 Hz, 400 Hz;**
- Power measurement: IEEE 1459 / Classic (Vector, Arithmetic);
- **Flicker measurement;**
- **Waveform displaying and Transient snapshotting;**
- **Fast logging and Inrush Current recording;**
- Fast transient recording;
- Signalling;
- Temperature measurement;
- Faster troubleshooting due to on-screen displaying of trends and captured events;
- Voltage events and user defined alarms capture:
- **GPS** time synchronization;
- Internal memory allows recording over one year period exchangeable SD card;
- Instrument, or a group of them, can be



# Selection Guide

remotely controlled and programmed via Ethernet or GPRS/Wi-Fi modem.

## APPLICATIONS

- Power Factor Compensation measurements, Power Quality, Maintenance, Filters, Inrush current measurement.
- Power quality assessment and troubleshooting in low and middle voltage electrical systems.
- Energy assessment to quantify the before and after installation improvements in energy consumption in order to justify energy saving devices,
- Checking power correction equipment performance.
- Long-term analysis, to uncover hard-to-find or intermittent issues.
- Predictive maintenance, to detect and prevent power quality issues before they cause downtime.
- Load studies, to verify electrical system capacity before adding loads.
- Inrush current, unbalance/asymmetry recording to optimize systems efficiency.
- Fast transient detections.
- Electrical Safety in Public Areas.

FEATURES	Description	MI 2893 Power Master XT	MI 2892 Power Master	MI 2885 Master Q4	MI 2884 Energy Master XA	MI 2883 Energy Master
						
<b>CLASS</b>	IEC 61000-4-30 Class A / Class S	Class A 0.1% (Independent certificate)	Class A 0.1% (Independent certificate)	Class S (0.1%) (Independent certificate)	Class S (0.2%)	Class S (0.2%)
<b>INPUTS</b>	Number of current measuring inputs	4	4	4	4	4
	Number of voltage measuring inputs	4	4	4	3	3
<b>PERIODICS</b>	TRMS Voltage measurement (Min., Max., Avg.)	•	•	•	•	•
	TRMS Current measurement (Min., Max., Avg.)	•	•	•	•	•
	Current in neutral conductor	•	•	•	•	•
	Power Factor and cos fi	•	•	•	•	•
	Power measurement (W, VA, VAR)	•	•	•	•	•
	Energy measurement	•	•	•	•	•
	THD and harmonics analysis	•	•	•	•	•
	Frequency measurement	•	•	•	•	•
	Flicker measurement	•	•	•	•	•
	Voltage events (sags, swells, interruptions)	•	•	•	•	•
	Unbalance	•	•	•	•	•
	EN 50160 Analysis / IEEE 519 Analysis	• / •	• / •	• / •	• / •	• / •
<b>ON LINE</b>	Scope function	•	•	•	•	•
	Phase diagram	•	•	•	•	•
	Harmonics measurement	•	•	•	•	•
<b>SPECIAL TOOLS</b>	Transients measurement	• (> 1 Msamples/sec)	• (> 49 ksamples/sec)	• (> 49 ksamples/sec)	• (> 30 ksamples/sec)	
	Waveform recording	•	•	•	•	
	Inrush currents	•	•	•	•	
	Electricity meter accuracy check		•	•		
	Variable Frequency Drives	•	•	•		
<b>OTHER</b>	Interharmonics analysis	•	•	•	•	•
	Connection check	•	•	•	•	•
	Smart clamps auto ranging	•	•	•	•	•
	Signalling	•	•	•	•	•
	Temperature measurement	•	•	Optional	Optional	Optional
<b>PC SW</b>	PC SW PowerView3 (free of charge)	•	•	•	•	•
	EN 50160 / IEEE 519 /Energy consumption report	• / • / •	• / • / •	• / • / •	• / • / •	• / • / •
	Regional reporting (optional) /Export of data via custom filtering	• / •	• / •	• / •	• / •	• / •
<b>COMMUNICATION</b>	MicroSD memory card	•	•	•	•	•
<b>PORTS</b>	RS232	GPS receiver only	GPS receiver/ Scanning photo head	GPS receiver/ Scanning photo head		
	USB	•	•	•	•	•
	Ethernet / Intranet	• / •	• / •	• / •		
	GPS time synchronisation	•	•	•		
	Remote instruments control (4G/WiFi)	Optional	Optional	Optional		

# HV Safety and Quality in Industrial Systems & Power Generation & Distribution Systems & Equipotential Bonding, Insulation Analysis, Step / Contact, Transformer testing...



## GENERAL FEATURES

- **Equipotential Bonding and Connectivity** Testing with MicroOhm meter is just what needed to show reliable and stable results;
- **HV Insulation Analysis** with high EMC immunity, three wire connection with Guarded test leads in the set. Powerful generator with fast charging and discharging of Capacitive loads;
- **Voltage Funnel during Fault Simulation** in case of ground fault or lightning strike around objects, analysing with **Step Voltage and Contact Voltage** measuring, **Earth / Ground Resistance and Soil Resistivity** measuring with Step / Contact System;
- **Transformer measurements:** The operation is straightforward and clear to enable the user to operate the instrument without the need for special training;
- Report Creator with powerful PC SW Tool HVLink PRO or MESM.

## ADVANTAGES

- **Equipotential Bonding with 4 wire** MicroOhm meter with **2A, 10A or 100A** battery operated generator with results in fine resolution up to **1 nanoOhm**;
- **HV Insulation Analysis up to 10 kV, 3 wire** connection with +, - and Guard, with **PI, DAR, DD, Ramp test, Withstanding** programmable procedure and Step Voltage. Graphical presentation of results R(t);
- **Smallest Step / Contact Voltage System** with **wireless synchronized Voltmeters** all in one solution, with **powerful generator of up to 55 A**, eliminating earth current noise even in

- low power operating mode. It is extremely **safe operating on 50 V** only which is important for testing in public area surrounding;
- Single and 3- phase transformer winding resistance and turn ratio measurements.

## APPLICATIONS

- Equipotential Bonding and Connectivity of bigger cross-section conductors, bars and metal stripes, connected in parallel.
- Testing of Automatic Disconnection Ability in case of Fault in Power Transformer, Fuse characteristics evaluation with 4-wire 300 A High-Current Testing.
- Insulation Characteristics of Charging and Discharging, Influence of temperature, dirt, humidity, mechanical and electrical stresses, high-energy radiation, Testing on Capacitive loads, Long Cables and Transformers.
- Insulation testing on separated systems of gas stations, pipes, ground metal plates and covers of oil tanks.
- Overvoltage and Surge Protection Periodical Testing.
- Earth and Ground systems, Soil resistivity, Lightning protection of Power Generators, Industrial Power Systems, Power Substations.
- Ground Networks Analysing of Antenna Towers, HV Power Distribution towers, Industrial Platforms, Power Transformers, Generators, PV systems etc, research on Earthing and Spreading of Voltage Funnels.
- Transformer winding resistance and turn ratio measurements.





# Construction Sites Selection Guide

FEATURES	Description	MI 3252 MicroOhm 100A	MI 3250 MicroOhm 10A	MI 3210 TeraOhmXA 10 kV	MI 3205 TeraOhmXA 5 kV	MI 3201 TeraOhm 5 kV Plus	MI 3202 GigaOhm 5 kV	MI 3290 Earth Analyser	MI 3288 Earth Insulation Tester	MI 3280 DT Analyser	MI 3281 WR Analyser <b>NEW</b>	MI 3295 Step Contact Voltage
<b>EARTH BOND / WINDING RESISTANCE</b>	Test current range	100 A	10 A					200 mA	200 mA	1 A	20 A	
	Resolution	1 nΩ	0.1 μΩ					10 mΩ	1 mΩ	0.1 mΩ	0.1 μΩ	
	Single / Continuous mode	•	•					•	•			
	Inductive mode		•					•	•		•	
<b>TRANSFORMER TESTING</b>	Winding resistance 1 ph/ 3 ph									•/•	•/•	
	Turn ratio 1 ph/ 3 ph									•/•		
	Tap changer control										•	
	Demagnetization										•	
<b>INSULATION ANALYSING</b>	Custom test shortcut			•				•				
	Test voltage range			50 Vdc ... 10 kVdc	50 Vdc ... 5 kVdc	250 Vdc ... 5 kVdc	250 Vdc ... 5 kVdc		50 Vdc ... 2.5 kVdc			
	Insulation resistance measuring range			20 TΩ	15 TΩ	10 TΩ	1 TΩ		100 GΩ			
	Calculation of DD, DAR, PI, R(t)			•	•	•			•			
	Ramp voltage test			•	•	•			•			
	Step voltage test			•	•	•			•			
	Bar graph			•	•	•	•		•			
	Leakage current			•	•	•			•			
	Automatic discharge			•	•	•	•		•			
<b>EARTH SYSTEMS</b>	Test current up to 55 A											•
	Autonomous step voltage meter							•				•
	Step & contact voltage							•	•			•
	Earth resistance 2W / 3W / 4W							•/•/•	•/•/•			- / - / •
	Specific earth resistance Wenner / Schlumberger							•/•	•/•			•/ -
	Multi frequency method							•	•			
	High frequency method							•	-			
	Selective 1/4 clamp method							•/•	•/ -			
	Stakeless 2 clamp method							•	•			
<b>VOLTAGE</b>	Voltage 600 Vdc / 1000 Vdc			•/ -	•/ -	•/ -	•/ -		•/•			
	Voltage 750 Vac								•			
<b>OTHER</b>	Robust AC current rejection 4 mA			•	•							
	Noise immunity filter	•	•	•	•	•	•	•	•			•
	PASS / FAIL evaluation	•	•	•	•	•	•	•	•	•	•	•
	Temperature compensation		•								•	
	Dual powered	Lead	NiMH	Lead / Li-Ion	Li-Ion	NiMH	NiMH	Li-Ion	Li-Ion	Li-Ion		
<b>PC SW</b>	PC SW	•	•	•	•	•	•	•	•	•	•	•
<b>COMMUNICATION PORTS</b>	RS232 / USB / BT	•/•/ -	•/•/ -	•/•/•	•/•/•	•/•/ -		-/•/•	-/•/•	-/•/•	-/•/•	•/•/ -

# General testing up to high level industrial testing, electronic fault finding, field servicing & heavy TRMS AC, DC voltage / current; Capacitance; Resistance; Diode test...



## GENERAL FEATURES

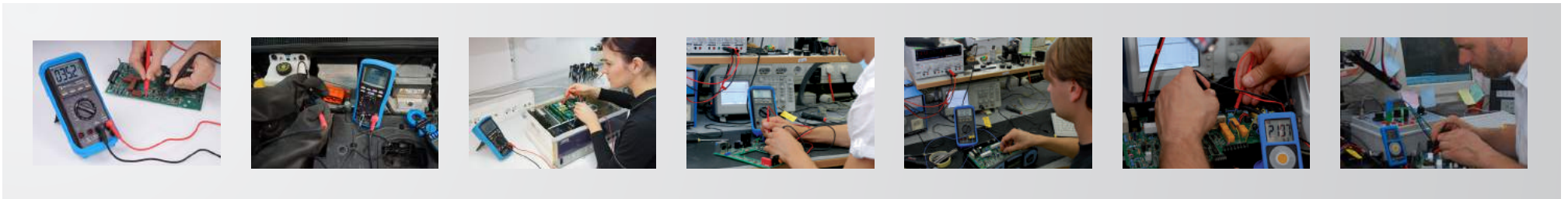
- **PC Link** software enables downloading test results to the computer;
- **Lead alert** indicates incorrect lead connection;
- **Temperature measurement** measures T1, T2 and T1 + T2 temperature in Celsius and in Fahrenheit;
- **MAX/MIN/HOLD** mode, displays maximum, minimum or average measured value;
- **Auto Hold automatically** feature freezes the stable result for later view;
- **Non-contact** and probe contact electric field detection;
- **Insulation resistance** measurement with up to 1000 V test voltage;
- **Continuity measurement** with 200 mA;
- **PI/DAR** measurement;
- **4-20mA DC current loop test**;

## ADVANTAGES

- **Relative zero mode** function for comparing the difference between signals or removing background noise;
- **100 kHz** Voltage Bandwidth;
- **Large 2-line** 500.000 counts LCD display;
- **Automatic detection** of AC voltage, DC voltage or resistance;
- **Frequency measurement** up to 1 MHz.










## APPLICATIONS

- High, Mid and Low level industrial testing.
- High, Mid and Low level electronic fault finding.
- HVAC (heating, ventilation and air conditioning) troubleshooting.
- Demanding measurement tasks in the laboratories.
- Everyday repair and maintenance practice.
- Heavy duty electrical testing.
- Field servicing.
- Automotive industry.
- Hobby work.
- Working in small enclosures.
- General purpose.



# duty electrical testing

## Selection Guide

FEATURES	Description	MD 9070	MD 9060	MD 9055	MD 9050	MD 9040	MD 9030	MD 9020	MD 9016	MD 9010
										
<b>MEASURING METHOD</b>	True RMS	•	•	•	•	•	•	•	•	•
<b>AC - MEASUREMENTS</b>	Current	0.1 uA ... 0.6 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 2 mA
	Voltage	1 mV ... 1000 V	0.01 mV ... 999.9 V	0.01 mV ... 1000 V	0.01 mV ... 999.9 V	0.01 mV ... 999.9 V	0.01 mV ... 999.9 V	0.01 mV ... 999.9 V	0.01 mV ... 999.9 V	1 mV ... 600 V
	Frequency	•	•	•	•	•	•	•	•	•
	Frequency of digital signals		•	•	•	•				
	100 kHz Voltage bandwidth		•							
	Duty cycle (%)		•	•						
<b>DC - MEASUREMENTS</b>	Current	0.1 uA ... 0.6 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 10 A	0.1 uA ... 2 mA
	Voltage	1 mV ... 1000 V	0.1 mV ... 999.9 V	0.1 mV ... 1000 V	0.01 mV ... 999.9 V	0.01 mV ... 999.9 V	0.01 mV ... 999.9 V	0.01 mV ... 999.9 V	0.01 mV ... 999.9 V	1 mV ... 600 V
<b>OTHER MEASUREMENTS</b>	Resistance	•	•	•	•	•	•	•	•	•
	Acoustic continuity	•	•	•	•	•	•	•	•	•
	Capacitance	•	•	•	•	•	•	•	•	•
	Diode	•	•	•	•	•	•	•	•	•
	Temperature T1 / T1 & T2		•/•	•	•/•		•/ -	•/ -	•/ -	
	Earth continuity test	•								
	Insulation resistance	•								
	Insulation resistance compare	•								
	PI / DAR	•								
	EF (Electric field detection)			•	•				•	•
	Conductance		•	•	•					
	VFD (Variable frequency drive)	•	•	•						
<b>OTHER FUNCTIONS</b>	Autocheck (VAC-DC; Ω) / (VAC-DC; AAC)			•	•					
	Data hold	•	•	•	•	•	•	•	•	
	MAX hold	•	•	•	•					
	MAX/MIN/AVG (recording)	•	•	•	•					
	Auto ranging	•	•	•	•	•	•	•	•	•
	Relative zero mode		•	•	•	•	•	•	•	
	Analogue bargraph	•	•	•	•	•			•	
	Lead alert		•	•	•	•	•	•		
	Count	6000	50.000 / 500.000	60.000	6000 / 9999	6000 / 9999	4000	4000	6000	6000
<b>TECHNICAL DATA</b>	Backlight	•	•	•	•	•	•	•	•	•
	IP protection	40	54	40	54	54	40	40	40	40
<b>COMMUNICATION</b>	PC Link		•		•	•			•	
<b>OVERVOLTAGE CATEGORY</b>	CAT IV / 1000 V		•		•	•			•	
	CAT IV / 600 V	•		•						
	CAT IV / 300 V		•		•	•	•	•	•	
	CAT III / 1000 V	•		•						
	CAT III / 600 V		•	•	•	•	•	•	•	
	CAT III / 300 V		•	•	•	•	•	•	•	•
	CAT II / 600 V		•	•	•	•	•	•	•	•
	CAT II / 1000 V		•	•	•	•	•	•	•	•

# General testing up to high level industrial testing, electronic fault finding, field servicing & heavy TRMS AC, DC current, Leakage current, Single/3-Phase Power, Voltage...



## GENERAL FEATURES

- **PC Link** software enables downloading test results to the computer;
- **Different Jaw size** to cover different applications;
- **Shielded jaws** allowing the clamp meter to be used in the noisiest environments;
- **MAX/MIN/HOLD mode**, displays maximum, minimum or average measured value;
- **Power** and **power factor** measurements;
- **Non contact voltage** detection;
- **Non contact phase sequence** detection;
- **Harmonic analysis**;
- **Kilo-Watt-Hour recording** function (with memory recall).

## ADVANTAGES

- **Intelligent loss analysis**: complex algorithms detect loss and allow determining possible reasons for current loss;
- **Bluetooth connection** to Metrel testers;
- **1500 V DC range with CAT III** safety for work on solar plants;
- **Accurate**: readings of AC current with an accuracy of 0.8 % and a base resolution of 0.01 mA and voltage with an accuracy of 0.5 % and a base resolution of 0.1 V;

- **Lo-Z**: AutoCheck™ mode provides low (ramp-up) input impedance to drain ghost voltages;
- **High current**, up to 2000 A DC & AC clamp on measurement;
- **In-rush**, fast 30 ms Crest-MAX mode to capture in-rush currents.

## APPLICATIONS











- Load and leakage current measurement.
- RCD fault finding.
- UPS system testing.
- Solar and wind power system testing.
- High powered 3-phase machinery testing.
- High current electrical testing.
- Utility scale battery system testing.
- High level industrial testing.
- Power system checking.
- System maintenance.
- Process engineering.
- Working in small enclosures.
- General purpose.

FEATURES	Description
<b>MEASURING METHOD</b>	True RMS
<b>AC - MEASUREMENTS</b>	Current Voltage Frequency
<b>DC - MEASUREMENTS</b>	Current Voltage
<b>POWER MEASUREMENTS</b>	Active Reactive Apparent Power factor Crest factor kWhr recording 3-phase power
<b>OTHER MEASUREMENTS</b>	Resistance Acoustic continuity Capacitance Diode Temperature EF (Electric field detection) Phase (-180° ... +180°) Harmonics THD In-rush VFD (Variable frequency drive) Lo-Z (low input impedance) Leakage current
<b>OTHER FUNCTIONS</b>	Autocheck® V-Ω Data hold MAX hold MAX/MIN/AVG Peak value Auto ranging Relative zero mode Count
<b>TECHNICAL DATA</b>	Backlight Jaw opening
<b>COMMUNICATION</b>	PC Link
<b>OVERVOLTAGE CATEGORY</b>	CAT IV / 1000 V CAT IV / 600 V CAT IV / 300 V CAT III / 1500 VDC CAT III / 1000 V CAT III / 600 V








# duty electrical testing

## Selection Guide

MD 9273	MD 9272	MD 9260	MD 9250	MD 9240	MD 9235	MD 9231	MD 9226	MD 9225	MD 9210
									
10 µA...100 A	10 µA...100 A	0.1 A...2000 A	0.1 A...2000 A	10 mA...1000 A	10 mA...600 A	10 mA...1000 A	10 mA...600.0 A	0.1 A...400 A	10 mA...600 A
0.01V...600V	0.01V...600V	1mV...999.9V	1mV...999.9V	0.1V...600V	0.1V...600V	0.1V...1000V	0.1V...600.0V	1mV...600V	1mV...600V
		0.1 A...2000 A	0.1 A...2000 A			10 mA...1000 A	10 mA...600.0 A	0.1 A...400 A	
0.01V...600V	0.01V...600V	1mV...1500V	1mV...999.9V	0.1V...600V	0.1V...600V	0.1V...1000V	0.1V...600.0V	0.1mV...600V	0.1mV...600V
•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•
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\* only Auto V-A

FEATURES	Description	MD 1160-LCD	MD 1060-LED
			
<b>AC - MEASUREMENTS</b>	Voltage range	12 V ... 690 V	12 V ... 690 V
	Frequency	16 Hz ... 400 Hz	16 Hz ... 400 Hz
<b>DC - MEASUREMENTS</b>	Voltage range	12 V ... 690 V	12 V ... 690 V
<b>OTHER MEASUREMENTS</b>	TRMS	•	•
	Acoustic continuity indication	•	•
	Continuity test	0 ... 500 kΩ	0 ... 500 kΩ
	Single-Pole Phase	•	•
	Phase rotation	•	•
	Max. test current	< 3,5 mA @ 690 V	< 3,5 mA @ 690 V
	Automatic range selection	•	•
	Reaction time	< 0,1 s	< 0,1 s
<b>OTHER FUNCTIONS</b>	Automatic AC/DC recognition	•	•
	Automatic ON/OFF	•	•
<b>TECHNICAL INFORMATION</b>	LED torch lamp	•	•
	Display	LCD & LED	LED only
	IP protection	64	64
	Operating temperature	-15 ... 55 °C < 85% relative humidity	-15 ... 55 °C < 85% relative humidity
	Dimension	240 x 65 x 19 mm	240 x 65 x 19 mm
	Weight	180 g	170 g
<b>OVERVOLTAGE CATEGORY</b>	CAT IV / 600 V	•	•
	CAT III / 1000 V	•	•

FEATURES	Description	MD 126	MD 116	MD 106
				
<b>DETECTION RANGE</b>	Voltage	100 V ... 1000 V	12 V ... 1000 V	90 V ... 1000 V
	Frequency	50 ... 60 Hz	40 ... 400 Hz	50 ... 60 Hz
	Phase sequence	•	•	•
<b>INDICATION</b>	Optical	•	•	•
	Acoustical	•	•	•
	Vibrating	•	•	•
<b>TECHNICAL DATA</b>	IP protection	67	65	65
	Overvoltage cat.	CAT IV / 1000 V	CAT IV / 1000 V	CAT IV / 1000 V

# Building and facility management, electrical and other installations troubleshooting, mechanical

## Temperature, temperature difference...



### GENERAL FEATURES

- **High thermal resolution** 80 x 80 pxl or 120 x 150 pxl;
- **Temperature range** -20 ... 350°C for cameras and -20 ... 260°C for multimeter;
- Good sensitivity of **100 mK**;
- Accuracy 2°C or 2%;
- **Manual**, automatic or fixed focus;
- Small focal length of **7.5 mm**;
- Emissivity range 0.01 – 1.00;
- **Automatic, locked or manual** temperature span.

### ADVANTAGES

- High quality **French thermal sensor**;
- Sturdy, high IP, 2 m drop test;
- Very fast **refresh rate 50 Hz**;
- Set includes **bag or case** for protection and easy carrying;
- Powerful **Android app or PC software** (depending on the model) for transfer, editing, analysis of the images and report creation;
- **Bluetooth, USB and HDMI** connectivity;
- **Thermal and visible light video** with audio commentary.

### APPLICATIONS

- Troubleshooting electrical installations (switchboards, busbars, contacts, etc.);
- Troubleshooting electrical equipment (motors, transformers, etc.);
- Troubleshooting mechanical issues (gears, bearings, etc.);
- Inspecting and troubleshooting electrical vehicles;
- Solar farm inspection;
- Building and facility maintenance;
- Field service;
- Energy loss analysis;
- Troubleshooting other installations (windows, pipes, carpentry, etc.).

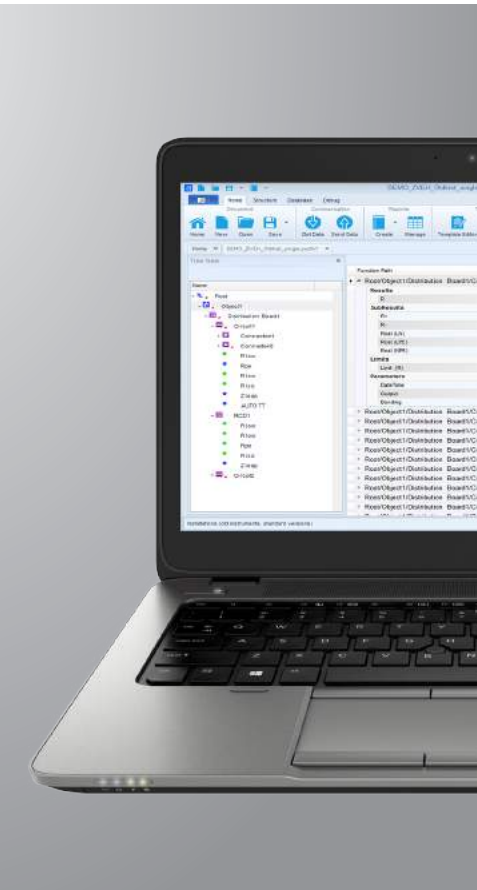


# and electrical inspections

## Selection Guide

FEATURES	Description	MD 9930 Thermal camera	MD 9910 Thermal camera	MD 9880 TRMS thermal multimeter
				
<b>FEATURES</b>	IR sensor resolution	160 x 120 pxl	80 x 80 pxl	80 x 81 pxl
	Temperature range	-20 ... 350°C	-20 ... 380 °C	-20 ... 260°C
	Thermal sensitivity/NETD	0.1°C @ 30°C / 100 mK	0.1°C @ 30°C / 100 mK	0.1°C @ 30°C / 100 mK
	Thermal accuracy	±2°C or ±2 %	±2°C or ± 2 %	±3°C or ±3.0 %
	Field of vision	25° x 19°	21° x 21°	21° x 21°
	Spectral range	8 ... 14 μm	8 ... 14 μm	8 ... 14 μm
	Emmissivity range	0.01 ... 1.0	0.01 ... 1.0	0.01 ... 1.0
	Frame rate	50 Hz	50 Hz	50 HZ
	Focal length	9 mm	7.5 mm	7.5 mm
	Spatial resolution	2.78 mrad	4.53 mrad	4.53 mrad
	Level and span	Auto and manual	Auto	Auto
	Min focused distance	0.5m	0.5m	0.5m
	Focus	Manual	Fixed	Fixed
	Visible light camera	•		
	Fusion view	•		
	Display resolution	240 x 320 pxl	240 x 320 pxl	240 x 320 pxl
	Thermal video	•		
<b>GENERAL</b>	Data storage	Internal 100 MB + SD card up to 32 GB	Internal 100 images	
	Battery	Li-Ion, up to 4h	Li-Ion, up to 6h	Li-Ion, up to 6h
	Multimeter			•

# Electrical Installation Safety, HV Safety, Portable Appliance Testing, Power Quality Analysis and Measurement Structure Editor, Auto Sequence Editor, Professional Reporting, Excel & XML Export tool...



## GENERAL FEATURES\*

- **Unified user interface** with the new generation of Metrel's instruments - same view same meaning;
- **Multilevel test structure editor:** the installation structure can be created in advance on the PC and then simply uploaded to your tester;
- **Measurement editor:** enables **viewing and editing of measurement results**;
- **Auto Sequence® editor:** application for easy and efficient preparation of Auto Sequence®s or custom tests;
- **Upload/download of Auto Sequence®s and work structures** to/from the instrument from/to the **PC** and/or **Android smartphone/tablet**;
- **Report creator:** enables automatic generation of **professional test reports** which include visual inspection of tested object and test results in tabular form;
- Licence upgrading tool;
- Multilingual support.

## ADVANTAGES\*

- **Export of test results** to excel or .xml format for analysis and **integration to 3rd party SW**;
- Possibility to **upgrade FW** on devices;
- **Synchronize licenses** between the measuring device and the PC;
- Creation of **Auto Sequence®s** and **visual inspections**;

- Printing of **multilingual professional reports** or basic reports according to local regulations;
- **Automatic fill-out of reports** with measurement data;
- **Integration to other 3rd party SW** via **Metrel SDK library**;
- **Black-box protocol** for **online communication** and **starting tests remotely** on new generation of Metrel's instruments;
- **Remote control:** via GPRS communication remote handling of the power quality instruments;
- Complete database of tested installations in one location;
- **Easy data entering**;
- **Projects can be stored to your Dropbox account**;
- **Sending data to the main office** before leaving the test site;
- Overview of testing parameters;
- **Adding text, picture, video or voice records to test results**;
- Use of **smartphone's barcode or QR code scanner** for quicker data entry;
- View the results of the **I/V measurement in graphical** or numerical form;
- Use of smartphone's camera for QR and barcode scanning;
- Use of smartphone's virtual keyboard;
- **Built-in risk assessment tool** to provide correct re-test periods in accordance with COP version 4;
- **"Drag and drop"**: downloaded data can be

- easily organized into multiple sites and sub-site locations;
- **Data filtering:** data in a structure can be grouped by quantity or by phase;
- **GPS synchronization:** simultaneous measurement on different network points by using 2 or more synchronized instruments;
- On-line monitoring: when instrument is connected with PC, real-time observing of signals and parameters is possible via PowerView3 while instrument is measuring / recording in the background;
- SW updating.

## APPLICATIONS\*




















- Upload/download measurement results;
- Create, view, analyse and edit structures / Auto Sequence®s.
- Professional report creation and printing;
- Integration to 3rd party SW via SDK, blackbox protocol, Excel or XML.

**\*Note:** Presented features, functionalities and other information on this page represent a compound list of all software/Android app's capabilities and not capabilities of each separate software/Android app. Consult user manuals of each specific software/Android app for detailed information about supported features and functionalities.





# multimeter Windows Software and Android Apps Selection Guide

GROUP	Instrument/Software	SW 1201 MESM	SW 1203 Metrel SDK**	SW 1402 MMESM NEW	SW 0802 Power View3	SW 0201 PATLink PRO	SW 0101 EuroLink PRO	SW 0113 HVLINK PRO	SW 1309 MIRA	SW 1403 Black Box protocol	SW 1304 aMESM Android	SW 1303 aPAT Android	SW 1306 EuroLinkPV Android	SW 1308 PATLink Android	SW 1307 EuroLink Android	SW 1305 aMIRA Android	SW 1310 Data Rec.	SW 1311 Data Rec.	SW 1312 Data Rec.	SW 1313 Data Rec.
																				
<b>LICENCE</b>		P 1101	P 1104			A 1203	A 1292	A 1275				P 1102	A 1434		A 1433	A 1431				
<b>ELECTRICAL</b>	MI 3155 EurotestXD	•	•																	
<b>INSTALLATION</b>	MI 3152 EurotestXC	•	•																	
<b>SAFETY</b>	MI 3152H EurotestXC 2,5 kV	•	•																	
	MI 3102 BT EurotestXE	•	•***																	
	MI 3102H BT EurotestXE 2,5 kV	•	•***																	
	MI 3102H SE EurotestXE 2,5 kV	•	•***																	
	MI 3100 SE EurotestEASI	•	•***																	
	MI 3125 BT EurotestCOMBO	•	•***																	
	MI 3108 EurotestPV	•																		
	MI 3109 EurotestPV Lite	•																		
	MI 3144 Euro Z 800 V	•	•																	
	MI 3143 Euro Z 440 V	•	•																	
	MI 3121 Insulation / Continuity																			
	MI 3121H Insulation / Continuity																			
	MI 3122 Z Line-Loop / RCD																			
	MI 3123 Earth / Clamp																			
<b>APPLIANCE / MACHINE / SWITCHBOARD SAFETY</b>	MI 3325 MultiServicerXD	•	•																	
	MI 3394 CE MultiTesterXA	•	•																	
	MI 3394 CE MultiTesterXS	•	•																	
	MI 3360 OmegaPAT XA	•	•																	
	MI 3309 BT DeltaGT	•	•***																	
	MI 3311 GammaGT																			
	MI 6601 MediTest <b>NEW</b>		•	•																
<b>POWER QUALITY ANALYSIS</b>	MI 2893 Power Master XT																			
	MI 2892 Power Master																			
	MI 2885 Master Q4																			
	MI 2884 Energy Master XA																			
	MI 2883 Energy Master																			
<b>HIGH VOLTAGE INSULATION / CONTINUITY / EARTH / TRANSFORMER</b>	MI 3252 MicroOhm 100A																			
	MI 3210 TeraOhmXA 10 kV																			
	MI 3209 TeraOhmLT 10 kV																			
	MI 3201 TeraOhm 5 kV Plus																			
	MI 3290 Earth Analyser	•	•																	
	MI 3288 Earth Insulation Tester	•	•																	
	MI 3280 DT Analyser	•	•																	
	MI 3281 WR Analyser <b>NEW</b>	•	•																	
	MI 3295 Step Contact System	•	•***																	
<b>DIGITAL MULTIMETERS / CLAMP METERS</b>	MD 9060 Digital multimeter																			
	MD 9050 Digital multimeter																			
	MD 9040 Digital multimeter																			
	MD 9016 Digital multimeter																			
	MD 9250 Current clamp																			
	MD 9240 Current clamp																			
	MD 9930 Thermal camera																			
	MD 9910 Thermal camera																			

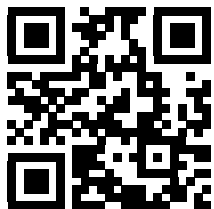
\* Supported by BT dongle. | \*\* Please contact your local distributor or contact person at Metrel for additional information regarding implementation and distribution of the Metrel SDK. | \*\*\* No licence needed.





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Distributor:



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

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