MI 3325 MultiServicerXD Technical info

Measuring instruments and testers

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METREL®

Appliance / Machine / Switchboard safety Instrument Features

The MI 3325 MultiServicerXD is a top-of-the-line multifunctional instrument covering diverse industrial applications, where ruggedness and reliability are a must. In Metrel range of the instruments it is introduced as a successor of MI 3321 MultiServicerXA. The new platform integrated in the MI 3325 MultiServicerXD features support for colour touch screen technology, advanced memory organizer including large SD card storage media and state of the art AUTOSEQUENCE®s.

APPLICATIONS:

- Factory machinery safety testing,
- Industrial safety testing,
- Periodic safety testing,
- Production line safety testing,
- Portable appliances safety testing,
- Arc welding equipment safety testing,
- Switchgear, control gear (cabinets), safety testing.

The instrument features a strong data management facility enabling the user to create custom auto-tests with predefined limits for pass/fail evaluation, import predefined structure including test sequences or complete projects created in MESM. The Metrel Electrical Safety Manager (MESM) PC software enables upload of automated test sequences, projects, downloading of test results, automatic data storage into a file and printing of professional test reports specially designed for specific applications. Due to selected test functions, durable construction and accompanying PC SW package MI 3325 MultiServicerXD is the perfect instrument for electrical safety testing in the most demanding industrial environments and automated production lines or specialized workshops.

Appliance / Machine / Switchboard safety Instrument Description

The new MI 3325 MultiServicerXD, in conjunction with the CE Adapter A 1460 provides a thorough and expeditious solution in the execution of auto tests via a single test terminal. By using the PC software, Metrel Electrical Safety Manager, the user can create custom test sequences and upload them to the advanced data management facility on the instrument. There are numerous test sequences consisting of the following test functions: continuity, insulation, HV AC programmable (up to 1.5 kV), differential leakage, Ipe leakage, Touch leakage, Power & Leak's & Power. The MultiServicerXD provides Hi-Pot AC 100 V ... 5 kV test, state of the art data management facility (MEMORY ORGANIZER) and the ability to create multi-level test structures or sequences for fast and reliable execution. The MI 3325 MultiServicerXD comes complete with a menu driven, 3.4˝ graphical colour touch screen that enables complete configuration and execution of applied tests.

MEASURING FUNCTIONS

- Continuity (2-wire & 4-wire), 0.2 A, 4 A, 10 A, 25 A + voltage drop @ 10 A;
- HV AC, HV AC programmable 100 V - 5000 V;
- Insulation resistance (Riso, Riso-S) 50 V, 100 V, 250 V, 500 V, 1000 V (DC);
- Sub-Leakage Current, (Isub, Isub-S) 110 V AC, 230 V AC;
- Z loop – fault loop impedance and prospective fault current (Ipsc, Ulpe, Uc(P));
- Zs rcd – fault loop impedance and prospective fault current in system with RCD (Ipsc, pe, Uc(P));
- Z line – line impedance and prospective short-circuit current (Ipsc, Uln);
- Functional test (power P/S/Q, voltage, current, cos fi, frequency, ThdU, ThdI, PF);
- Touch leakage current;
- RCD testing (RCD Uc, RCD t, RCD I);
- Differential leakage current;
- PE leakage current;
- Polarity;
- Clamp current;
- Voltage, frequency, phase rotation;
- Varistor test;
- Voltage drop;
- Discharging time.

KEY FEATURES

- Touch screen: high resolution colour touch screen, 4.3" TFT.
- Double manipulation: keyboard and touch screen enable the user to control the instrument in any manner they like.
- Pre-defined AUTOSEQUENCE®s: enable the user simple and quick execution of test sequence.
- Support for RCD testing: all instruments support testing of A, AC, B, B+ and F RCDs.
- Testing of welding equipment (only in combination with A 1422 Active 3-phase Adapter. MI 3325 MultiServicerXD support testing of welding equipment in accordance with IEC/EN 60974-4.
- Functional inspections.
- Visual inspections.
- Custom inspections (visual and functional).
- Built-in help screens for referencing on site.
- Built-in fuse tables for automatic evaluation of the line / loop impedance result.
- Monitoring of all 3 voltages in real-time.
- Hi-pot: high voltage AC (5 kV @ 250 VA).
- Continuity: 4 – wire continuity test with selectable test current (0.2 A, 4 A, 10 A, 25 A) enabling precise measurements.
- Communication: RS-232, USB, Ethernet and Bluetooth communication ports enabling downloading, uploading and remote control over instrument.
- Multi-system testing: the instrument can be used on TT, TN, IT and 115 V supply systems.
- Automated RCD testing procedure (RCD AUTO).
- Automated Impedance testing procedure (Z AUTO).
- Measurement filtering according to the selected area group.
- Large memory: support for microSD memory cards, 8 GB card already integrated in the instrument, although that can be expanded to 32 GB.
- PC SW Metrel ES Manager: enables creation of test structures, user-defined AUTOSEQUENCE®s, professional test reports and data transfer for archiving.

Appliance / Machine / Switchboard safety Instrument Description

The industrial applications covered by the instrument are as follows:
- Safety of machinery (in compliance with IEC/EN 60204 Ed.6),
- Safety of low-voltage switchgear and control gear testing (in compliance with IEC/EN 61439-1 Ed.2),
- Safety of portable appliances (in compliance to VDE 0701-0702, AS/NZS 3760, Code of Practice),
- Safety of arc welding equipment (in compliance with IEC/EN 60974-4 Ed.2).

ORDERING INFORMATION

Standard set
- Instrument MI 3325 MultiServicerXD
- HV test lead with test probe
- HV test lead with crocodile
- Mains cable
- IEC test cable
- Residual voltage test cable
- Plug test cable
- 3-wire test lead, 3 m
- Continuity test lead, 2.5 m, 2 pcs
- Test lead, red, 1.5 m
- Test probe, 4 pcs (black, red, green, blue)
- Crocodile clip, green
- Crocodile clip, blue
- Crocodile clip, black, 3 pcs
- Crocodile clip, red, 3 pcs
- Calibration certificate
- RS-232 cable
- USB cable
- CD with instruction manual (full version)
- PC SW Metrel ES Manager BASIC *
- Protective bag for accessories **

* Metrel ES Manager can be downloaded free of charge from Metrel Web server. license
** Mounted on the case

APPLICATION

- Factory machinery safety testing,
- Industrial safety testing,
- Periodic safety testing,
- Production line safety testing,
- Portable appliances safety testing,
- Arc welding equipment safety testing,
- Switchgear, control gear, safety testing.

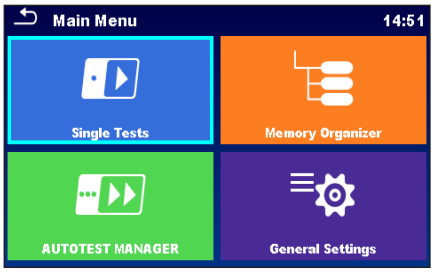
STANDARDS

Functionality:
- VDE 0701-702, Code of Practice, AS/NZS 3760, IEC/EN 61439, IEC/EN 60204, IEC/EN 60974-4, EN 50191.

Safety:
- EN 61010-1, EN 61010-2-030, EN 61010-031, EN 61010-2-032, EN 61557.

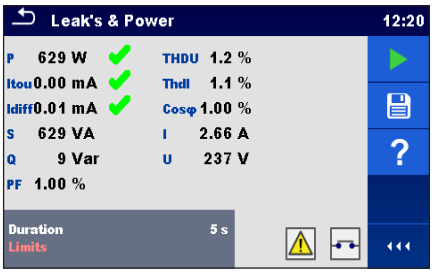
EMC
- EN 61326-1.

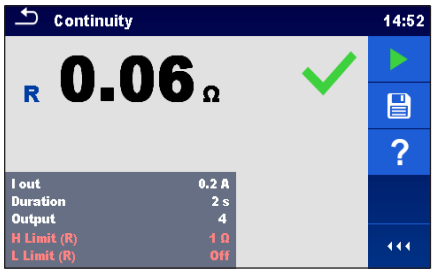
Appliance / Machine / Switchboard safety Instruments Menus



INTUITIVE MENUS

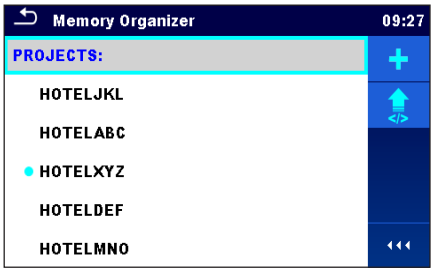
Intuitive colour menus with large icons for simple and quick manipulation and operation. With the help of area groups it is possible to limit the offered single tests for specific application.

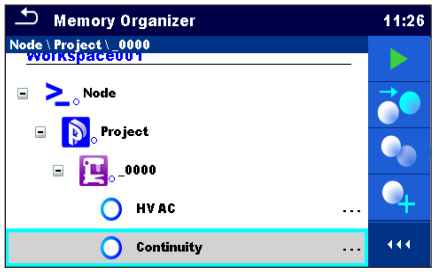




MEASUREMENT MENUS

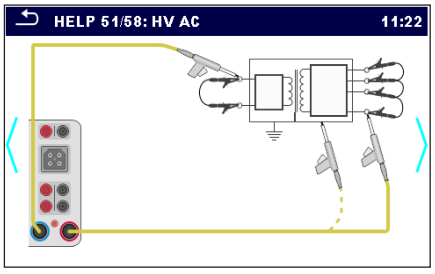
Containing complete information of performed test or test sequence.
In the single test screens measuring results, sub-results, limits and parameters of the measurement are displayed. In addition to that on-line statuses, warnings and other information are also displayed.

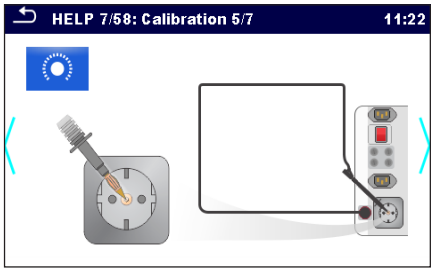




MEMORY ORGANIZER

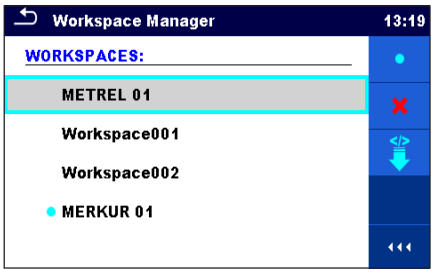
Is a tool for storing and working with test data, enabling creation of single tests, auto-tests and the tree structure, the data is organized in a tree structure with structure objects and measurements





HELP SCREENS

Contain diagrams for proper connection of the instrument and referencing at the test site.



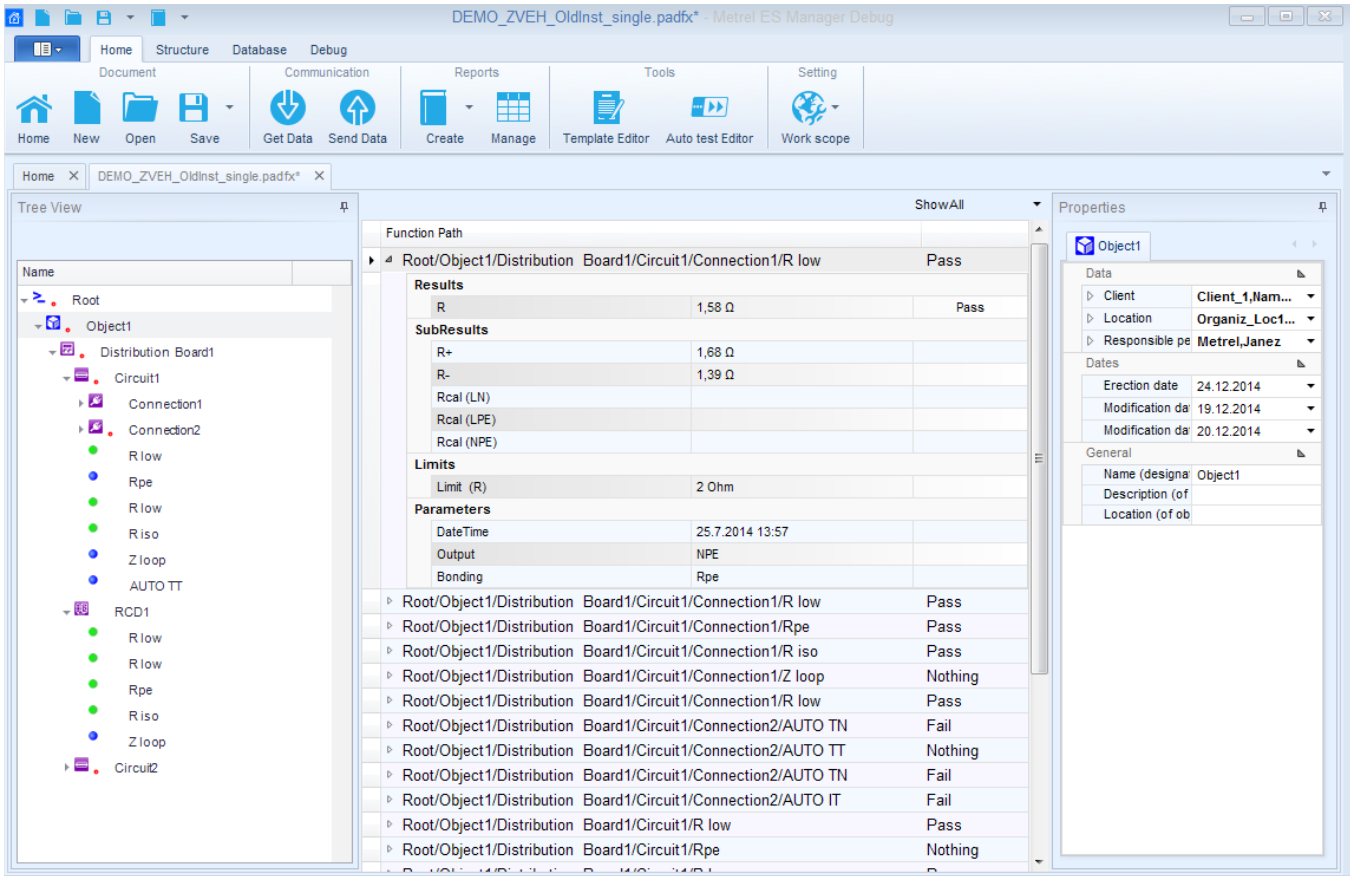
WORKSPACE MANAGER

Is intended to manage technology of work with different workspaces and exports stored on the microSD card. Each workspace can contain one or more user defined structures with measurements, similar to projects.

Appliance / Machine / Switchboard safety
Metrel Electrical Safety Manager

The Metrel Electrical Safety Manager (MESM) is a common application for management of wide palette of Metrel's electrical safety testers, portable appliance testers, machine testers and industrial safety testers. This application has a unified user interface with the new generation of Metrel's instruments - same view same meaning. It enables pre-treatment of measurements, viewing and editing of the measurement results and generation of professional reports. Depending on the instrument model or type the user can create AUTOSEQUENCE®s, custom tests or single tests. They can be integrated into the custom created test structures and then uploaded into the measurement instrument.

The downloaded measurement results can be viewed, analysed, edited and finally a professional report can be created and printed. These professional reports are predefined templates according to national standards and regulatory organisations where the user enters all the needed protocol data while the measurement results are automatically inserted into the predefined forms. This application is fully compatible with the new generation of Metrel's multifunction testers.

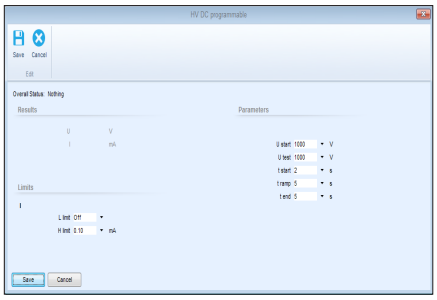


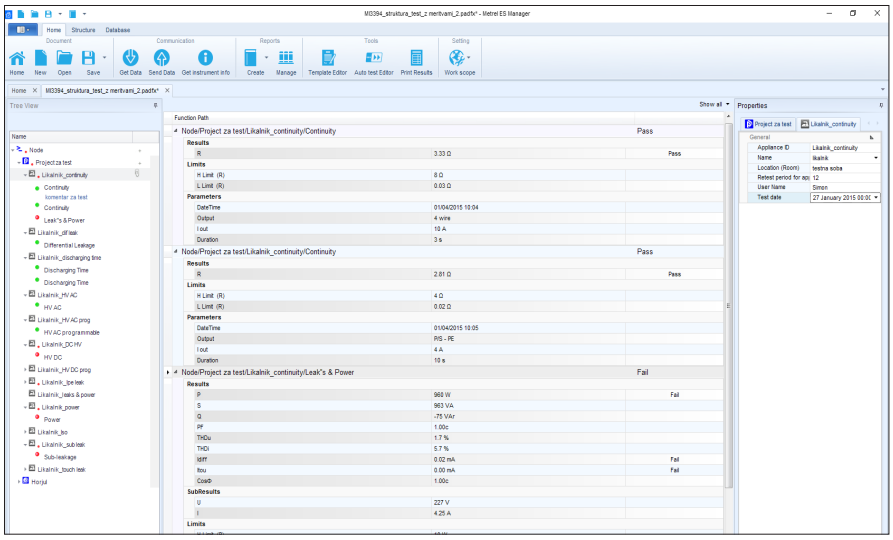
KEY FEATURES

- Common platform for a wide range of Metrel's instruments: a Windows based application for most of the future Metrel's instruments.
- Multilevel test structure editor: the structure equipped with custom AUTOSEQUENCE®s can be created in advance on the PC and then simply uploaded to your tester.
- Measurement editor: enables definition of tests within the test structure with all parameters and sub parameters. After the structure is uploaded to the instrument, such predefined test can be selected and started without additional settings.
- AUTOSEQUENCE®s editor: application for easy and efficient preparation of AUTOSEQUENCE®s or custom tests.
- Report creator: enables automatic generation of professional test reports which include visual inspection of tested object and test results in tabular form.
- Multilingual reports according to local regulations: support for different languages for the application and reporting.
- Export of test results: test results in text (.csv) or .xml format can be exported to other programs.

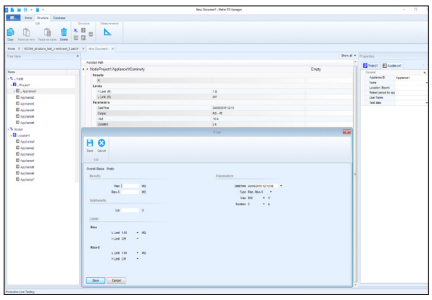
Appliance / Machine / Switchboard safety
Metrel Electrical Safety Manager

Custom AUTOSEQUENCE®s, or a group of them can be created in the PC SW and then uploaded to the instrument.

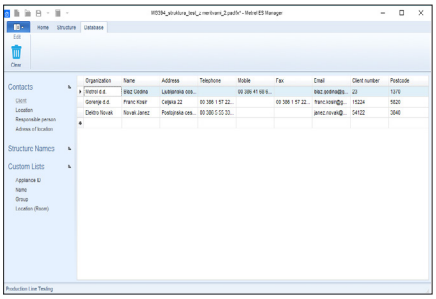


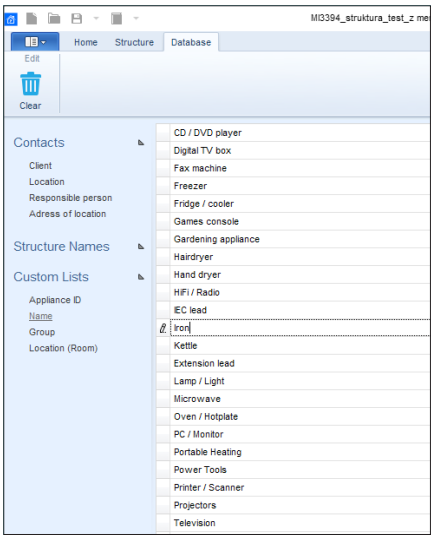


User defined structure with measurements and limits can be created on the PC SW and then uploaded to instrument.



User can define several different databases, containing information about Contacts, Structure names and Custom Lists.





Metrel Electrical Safety Manager / MI 3325	Basic license	PRO license
Data download	•	•
Data upload		•
AUTOSEQUENCE® editor	•	•
AUTOSEQUENCE® download	•	•
AUTOSEQUENCE® upload	•	•
Print out of test results	•	•
Print out of professional reports		•
Upcoming retests (scheduler)	•	•
Export to Excel		•
Export to .xml		•

Appliance / Machine / Switchboard safety
A 1422 Active 3-phase adapter

Tester for arc welding equipment
- IEC EN 60974-4
- VDE 0544-4

The A 1422 Active 3-phase Adapter has all functionalities as its predecessor A 1322 plus complete support for testing of arc welding equipment. This makes it a perfect testing and troubleshooting instrument for the demanding user.

As its predecessor it has unique functions such as active polarity testing, differential leakage testing and testing of 3-phase RCDs, which makes the A 1422 Active 3-phase Adapter an ideal instrument for advanced applications. The A A 1422 Active 3-phase Adapter is designed for use alongside the MI 3325 MultiServicerXD enabling functional tests to be carried out on machines up to 40 A. Several test socket outlets make this instrument an ideal tool for testing industrial extension leads that may also be RCD protected.

COMPARISON TABLE BETWEEN ACTIVE 3-PHASE ADAPTORS

Measuring function	A 1322	A 1422
Earth bond / continuity resistance	•	•
Insulation resistance – s	•	•
3-phase differential leakage current	•	•
Touch leakage current	•	•
3-phase polarity test / 3-phase active polarity test	•	•
3-phase P/RCD test (100 mA, 300 mA)	•	•
Power / functional test	•	•
3-phase power / functional test	•	•
Continuity test (according to IEC/ EN 60974-4)		•
Insulation resistance (according to IEC / EN 60974-4)		•
Leakage current (according to IEC / EN 60974-4)		•
No load voltage (according to IEC / EN 60974-4)		•

KEY FEATURES

- Testing of open-circuit voltage at arc welding units in accordance to EN 60974-4.
- All tests on 3-phase electrical equipment can be carried out including live leakage test, power, polarity, RCD and Active polarity.
- Simple connection to the PAT/MACHINE tester with automatic detection.
- Simple test procedures, identical to single-phase equipment.
- Test sequence for 3-phase tests are automatically set based on entered test codes and input voltages.
- Built-in CEE 3-phase/32 A 5-pin, CEE 3-phase/16 A 5-pin and CEE 1-phase/16 A 3-pin test sockets.
- Instrument comes complete with all accessories necessary for comfortable measurements and is kept in a robust waterproof case.

APPLICATION

- Testing of single and 3-phase arc welding equipment.
- Professional 3-phase portable appliance testing.
- Professional 3-phase machine testing.

STANDARDS

Functionality
- EN 60974-4;
- VDE 0544-4;
- VDE 0404-1;
- VDE 0404-2;
- VDE 0701-0702;
- EN 60204-1 Ed.5;
- EN 60439;
- EN 61439-1;
- AS/NZS 3760;
- NEN 3140

Safety
- EN 61010-1;
- EN 61010-031

EMC
- EN 61326-1

Appliance / Machine / Switchboard safety
MI 3144 Euro Z 800 V and MI 3143 Euro Z 440 V

MI 3144 Euro Z 800 V or MI 3143 Euro Z 440 V both are fully operated test instruments that could be driven through aMESM Android app or MI 3325 MultiservicerXD. Powerful features for industrial environment are implemented where hi test current is crucial demand to evaluate results.

The **MI 3144 Euro Z 800 V** is a multi-function, portable battery (Li-ion) or mains powered test instrument with excellent IP protection: IP65 (case closed), IP54 (case opened). It can be controlled via an aMESM Android app or MI 3325 MultiServicerXD. The MI 3144 Euro Z 800 V is intended for measuring the effectiveness of automatic trip out protection in case of faults in transformers and other HV equipment. With its high precision line and loop impedances on AC and DC circuits, high current dR 300A loop and line measurements for testing of partial currents and partial voltage drops, contact voltage measurement, ELR electrical leakage relay testing with fault current injection and trip-out time measurement and DC source, accumulator, battery, DC lines and circuit measurement it is ideal for testing in industrial settings.

The **MI 3143 Euro Z 440 V** is a multi-function, portable battery (Li-ion) or mains powered test instrument with excellent IP protection: IP65 (case closed), IP54 (case opened). It can be controlled via an aMESM Android app or MI 3325 MultiServicerXD. The MI 3143 Euro Z 440 V is intended for measuring the effectiveness of automatic trip out protection in case of faults in transformers and other HV equipment. With its high precision line and loop impedances on AC circuits, high current dR 300 A loop and line measurements for testing partial voltage drops and contact voltage measurement, it is ideal for testing in industrial settings.

MAIN FEATURES

	MI 3144	MI 3143
Hi Precision 4-wire 300A Z Line and Z Loop Impedance Tester	•	•
Hi Range 800 V / 16 ... 420 Hz AC Networks	•	
Hi Range 440 V / 16 ... 420 Hz AC Networks	•	•
DC Source & Line Resistance 3 ... 260 V DC	•	
Hi Current dR 300 A 4-wire Partial Voltage drops	•	•
Hi Current dR 300 A 4-wire Current's Path Resistances	•	
Earth Leakage Relay (ELR) Trip-out Testing Time and Current	•	
ELR current injection test;	•	
ELR supported types AC, A, B;	•	
Ground Fault Analysis with Contact, Touch and Step Voltage	•	•
Floating Voltmeter for partial contact results	•	•
One-Clamp Hi Current Ground Integrity method with clamps (Flex & Iron)	•	

STANDARDS

Electromagnetic compatibility:
- EN 61326

Safety:
- EN 61010 - 1
- EN 61010 - 2 - 030
- EN 61010 - 031

Functionality:
- EN 61557
- IEEE 81 – 2012
- IEC 60947-2 Annex M
- EN 60909 - 0

Li-ion battery pack:
- EN 62133 - 2

GENERAL DATA

- CAT IV 600 V (3000 m) safety category;
- Portable battery (Li-ion) or mains powered test instrument;
- IP protection: IP65 (case closed), IP54 (case opened);
- Improved thermal performance;
- Bluetooth communication;
- Blackbox design (can be remote-controlled via an Android device).

TECHNICAL SPECIFICATION MI 3144

FUNCTION	Measuring range	Resolution	Accuracy
Impedance [Z]	0.1 mΩ ... 199.9 mΩ	0.1 mΩ	±(5 % of reading + 3 mΩ)
Z line mΩ	200 mΩ ... 1999 mΩ	1 mΩ	
Z loop mΩ	2.00 Ω ... 19.99 Ω	10 mΩ	±(5 % of reading + 3 digits)
Impedance [Z]	0.1 mΩ ... 199.9 mΩ	0.1 mΩ	±(5 % of reading + 3 mΩ)
High Current ΔR	200 mΩ ... 1999 mΩ	1 mΩ	
	2.00 Ω ... 19.99 Ω	10 mΩ	±(5 % of reading + 3 digits)
Impedance [Z]	0.1 mΩ ... 199.9 mΩ	0.1 mΩ	±(8 % of reading + 3 mΩ)
High Current Rsel	200 mΩ ... 1999 mΩ	1 mΩ	
	2.00 Ω ... 19.99 Ω	10 mΩ	±(8 % of reading + 3 digits)
DC Resistance [R]	0 mΩ ... 1999 mΩ	1 mΩ	±(5 % of reading + 3 digits)
R line mΩ	2,00 Ω ... 19,99 Ω	10 mΩ	
Earth Potential [U]	0.0 V ... 199.9 V	0.1 V	Calculated value
Utouch	200 V ... 999 V	1 V	
Earth Potential [U]	1 mV ... 1999 mV	1 mV	±(2 % of reading + 2 digits)
Um	2.00 V ... 19.99 V	10 mV	
	20.0 V ... 199.9 V	0.1 V	
ELR Test [I and t]	0.1 mA ... 199.9 mA	0.1 mA	±(5 % of reading + 3 digits)
ELR I	200 mA ... 1999 mA	1 mA	
	2.00 A ... 19.99 A	10 mA	
ELR Test [I and t]	0.1 ms ... 199.9 ms	0.1 ms	±(2 % of reading + 3 digits)
ELR t	200 ms ... 1999 ms	1 ms	
	2.00 s ... 20.00 s	10 ms	

FUNCTION	Type	Range	Measuring range	Display range	Resolution	Uncertainty
Current [I]	A 1281	0.5 A	10 mA ... 749 mA	0 ... 749 mA	1 mA	±(2.5 % of reading
I		5 A	0.10 A ... 7.49 A	0.00 ... 7.49 A	0.01 A	+ 3 digits)
		100 A	2 A ... 149 A	0.0 ... 99.9 A	0.1 A	
				100 ... 149 A	1 A	
		1000 A	20 A ... 999 A	0 ... 999 A	1 A	
Current [I]	A 1227	30 A	0.6 A ... 59.9 A	0.0 ... 59.9 A	0.1 A	±(3.5 % of reading
I	A 1609	300 A	6 A ... 599 A	0 ... 599 A	1 A	+ 3 digits)
		3000 A	0.06 kA ... 5.99 kA	0.00 ... 5.99 kA	0.01 kA	

TECHNICAL SPECIFICATION MI 3143

FUNCTION	Measuring range	Resolution	Accuracy
Impedance [Z]	0.1 mΩ ... 199.9 mΩ	0.1 mΩ	±(5 % of reading + 3 mΩ)
Z line mΩ	200 mΩ ... 1999 mΩ	1 mΩ	
Z loop mΩ	2.00 Ω ... 19.99 Ω	10 mΩ	±(5 % of reading + 3 digits)
Impedance [Z]	0.1 mΩ ... 199.9 mΩ	0.1 mΩ	±(5 % of reading + 3 mΩ)
High Current ΔR	200 mΩ ... 1999 mΩ	1 mΩ	
	2.00 Ω ... 19.99 Ω	10 mΩ	±(5 % of reading + 3digits)
Earth Potential [U]	0.0 V ... 199.9 V	0.1 V	Calculated value
Utouch	200 V ... 999 V	1 V	
Earth Potential [U]	1 mV ... 1999 mV	1 mV	±(2 % of reading + 2 digits)
Um	2.00 V ... 19.99 V	10 mV	
	20.0 V ... 199.9 V	0.1 V	

MEASUREMENT FUNCTIONS

		MI 3144	MI 3143
Hi Current Impedance 4-wire	Zline Zloop Impedance	•	•
	ΔR Hi Current	•	•
	R Selective	•	
DC Source & Line Resistance	DC Source	•	
	DC Line Resistance	•	
Earth Potential [U]	Utouch	•	•
	Ustep	•	•
	Ucontact	•	•
ELR Test [I and t]	Residual operating current	•	
	Combination time	•	
Current [I]	A 1609 flex clamp	•	
	A 1227 flex clamp	Optional	
	A 1281 iron clamp	Optional	

Appliance / Machine / Switchboard safety
A 1632 eMobility Analyser

The A 1632 eMobility Analyser is a special accessory designed for diagnostic testing of Electric Vehicle Supply Equipment (EVSE) together with supported Metrel's installation testers. It supports verification of electrical safety and functional testing of Type 1 and/or Type 2 EVSE as well as testing of Mode 2 and Mode 3 electrical vehicle (EV) charging cables and communication monitoring between the charging station and the EV during charging. Fully supported professional station-based and cable-based report creation with MESM software.

KEY FEATURES

- Functional testing of EVSE via simulation of electrical vehicle's CP and PP circuits.
- Diagnostic testing of EVSE via simulation of errors on CP circuit (output side).
- Electrical safety testing of EVSE.
- Functional testing of Mode 2 EV cables via simulation of electrical vehicle's CP and PP circuits.
- Diagnostic testing of Mode 2 EV cables via simulation of errors on CP circuit (output side) and mains (input side).
- Electrical safety testing of Mode 2 EV cables with installed IC-CPD protection.
- Electrical safety testing of Mode 3 EV cables.
- Accessible inputs/outputs for connection of safety testers.
- Bluetooth communication with Metrel safety testers.

STANDARDS

Electromagnetic compatibility
- EN 61326

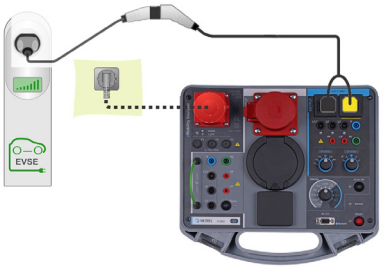
Safety
- EN 61010-1
- EN 61010-2-030
- EN 61010-031

Functionality
- EN 61851-1
- EN 61557 series
- EN 60364-6

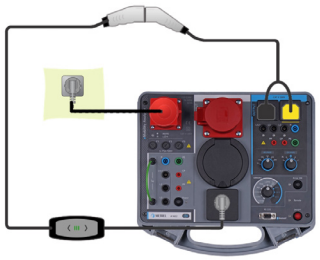
Li – ion battery pack
- IEC 62133

APPLICATION

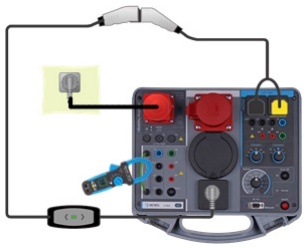
EVSE functional, diagnostic and EVSE electrical safety testing according to EN 60364-6 (visual inspectons, continuity, insulation, ZLine, ZLoop, RCD).



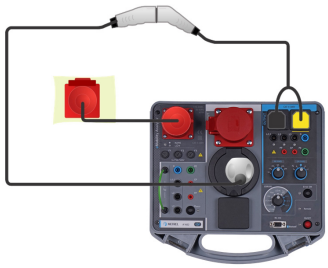
- Functional, diagnostic and electrical safety testing of 1-phase and 3-phase Mode 2 EV cables on input and output side.



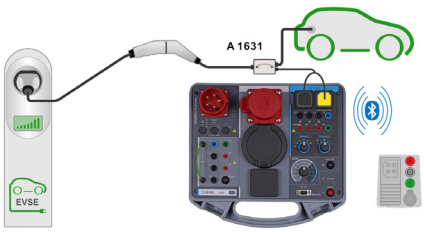
- Leakage current testing of Mode 2 EV cable in all charging states.



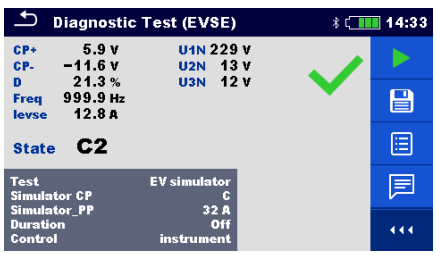
- Electrical safety testing of Mode 3 EV cables on input and output side.



- Monitoring of the charging process.



- Functional and diagnostic testing of charging stations, EV cables and monitoring of charging process via supported instruments.



TECHNICAL SPECIFICATION

Measurement functions		**Measuring range**	**Resolution**	**Accuracy**
Nominal system voltage range		100 V AC ... 440 V AC	1 V	±2 % of reading + 2 digits)
Nominal frequency range		0 Hz, 14 Hz ... 500 Hz		
Phase rotation		1.2.3 or 3.2.1		
Voltage UCP+, UCP-		-19.99 V ... 19.99 V	1 V	±(2 % of reading + 2 digits)
Frequency		500 ... 1500 Hz	0.1 Hz	±1 % of reading
Duty cycle		0.1 ... 99.9 %	0.1 %	±10 digits
Ievse		0.0 ... 99.9 A	0.1 A	Calculated value
Toff		0 ... 399 ms	1 ms	±(1 % of reading + 5 digits)
Simulation functions	State		Misc.	
PP simulation	n.c		> 300 kΩ	
	13 A		1.5 kΩ ± 1.5 %	
	20 A		680 Ω ± 1.5 %	
	32 A		220 Ω ± 1.5 %	
	63 A		100 Ω ± 1.5 %	
	80 A		56 Ω ± 1.5 %	
CP simulation	A		> 300 kΩ	
	B		2.74 kΩ ± 1.5 %	
	C		882 Ω ± 1.5 %	
	D		246 Ω ± 1.5 %	
Diag. functions	error		Misc.	
System state	A1		No EV connected	
	A2		No EV connected / PWM	
	B1		EV connected	
	B2		EV connected / PWM	
	C1		EV charged	
	C2		EV charged / PWM	
	D1		EV charged and ventilation on	
	D2		EV charged and ventilation on / PWM	
	E		Error	
	F		Failure	
	Invalid		CP signal can't be classified	
Error functions	State		Misc.	
Uinput fault	L/L1op		L/L1 conductor open	
	L/L2op		L/L2 conductor open	
	L/L3op		L/L3 conductor open	
	Nop		N conductor open	
	PEop		PE conductor open	
	L<>PE		L/L1and PE conductors crossed	
	Uext (PE)		External voltage on PE (on input side)	
Uoutput fault	Diode short/Error 1		CP diode shorted	
	CP short/Error 2		CP-PE shorted	
	PE open/Error 3		PE opened	
General				
	Battery power supply		7.2 V DC (4.4 Ah Li-ion)	
	Battery charging time		typical 4 h (deep discharge)	
	Mains power supply		115 V ~ ± 10 % 230 V ~ ± 10 % 230 V / 400 V 3~ ± 10 % 50 Hz - 60 Hz, 60 VA	
	Protection category		300 V CAT II	
	Measuring category		300 V CAT II	
	Degree of protection		IP 65 (case closed) IP 40 (case open) IP 20 (mains test socket)	
	Dimensions (W x H x D)		36 cm x 16 cm x 33 cm	
	Working temperature range		-10 °C ... 50 °C	
	Maximum relative humidity		90 %RH (0 °C ... 40 °C), non-condensing	
	Working nominal altitude		up to 3000 m	
	Bluetooth module		Class 2	

Appliance / Machine / Switchboard safety
A 1460 CE Adapter Description

The A 1460 CE Adapter is intended to support Auto tests of electrical equipment with the MI 3325 MultiServicerXD instrument. Operation is completely controlled by the instrument via the test socket and RS-232 (PC) connector.

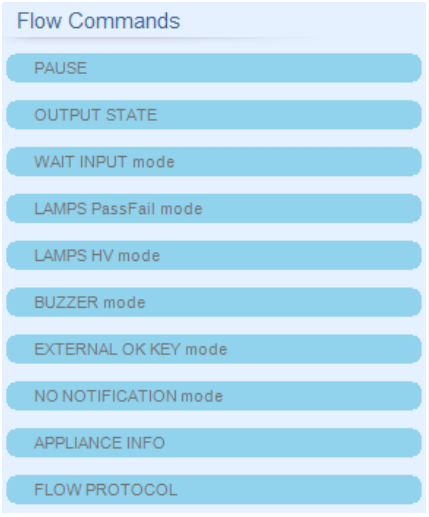
Foolowing tests can be performed via test adaper (note: as an Autotest only).

Measuring function	
Continuity 2-wire, 4-wire	0.2 A, 4 A, 10 A, 25 A
Insulation (P)	250 V, 500 V
HV AC, programmable HV AC	100 ... 1500 V in 10 V steps (Iout max ...100 mA)
Substitute leakage	
Leaks & Power	
Differential leakage current	
PE leakage current	
Touch leakage current	
Power (P, S, Q, PF, THDU,THDI, Cos fi, U, I)	

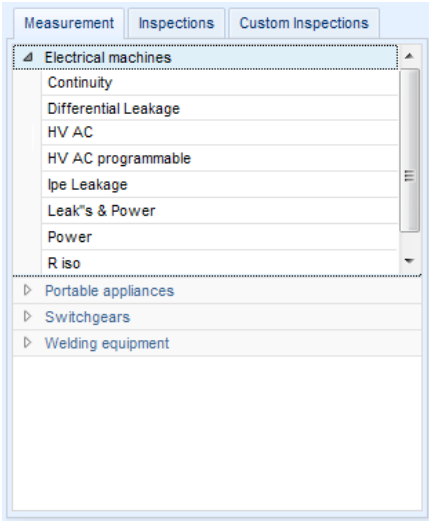
Preprogrammed sequences of measurements can be carried out in Auto test menu.
The sequence of measurements, their parameters and flow of the sequence testing can be programmed.
The results of an Auto test can be stored in the memory together with all related information.
Auto tests can be pre-programmed on PC with the Metrel Electrical Safety Manager software and uploaded to the instrument.
On the instrument parameters and limits of individual single test in the Auto test can be changed / set.

Metrel Electrical Safety Manager Auto test editor enables

List of availabel flow commands:



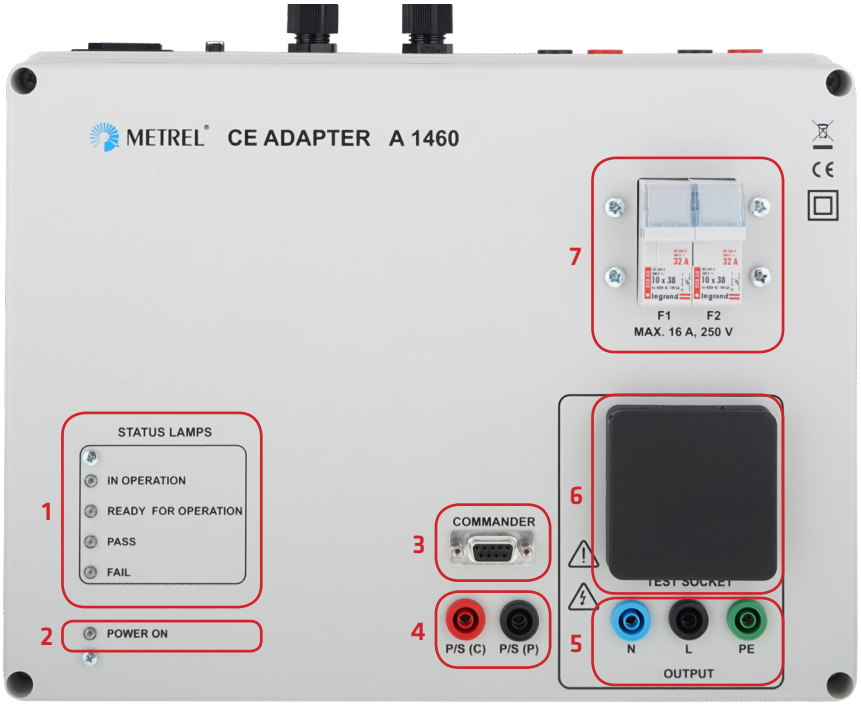
List of available measurements:



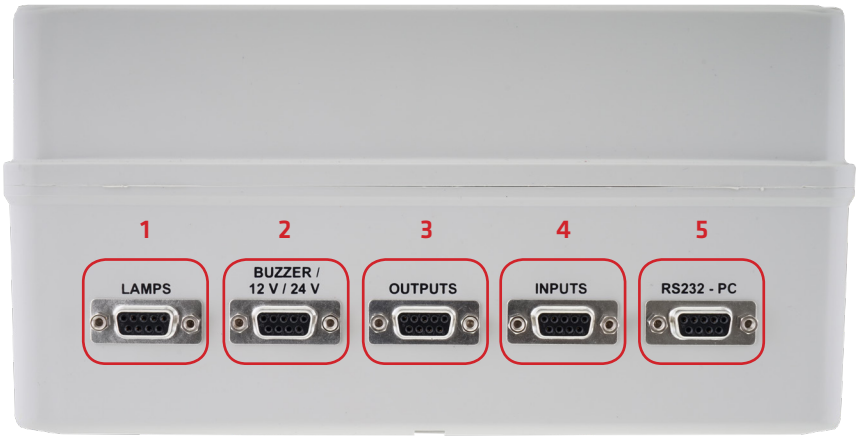
While the auto test is running it is controlled by pre-programmed flow commands. Examples of actions controlled by flow commands are:

- Pauses during the test sequence;
- Monitoring of input pins;
- Control of lamps, test adapter and other external devices;
- Proceeding of test sequence in regard to measured results etc.

Appliance / Machine / Switchboard safety
CE Adapter Features



1. External LAMPS satus
2. Power ON indication
3. 'COMMANDER' connector
4. P/S (C) (current) output for external probe, P/S (P) (potential) output for external probe
5. L, N, PE test outputs (in parallel with terminals of Test socket)
6. Test socket (in parallel with L, N, PE test outputs)
7. Robust fuse holders in series with L and N test conductors



1. 'LAMPS' connector for connecting (A 1497 or A 1496)
2. 'BUZZER/ VOLTAGE' connector for connecting (A 1497 buzzer mode)
3. 'OUTPUTs' connector (4 – programmable outputs can be used)
4. 'INPUTs' connector (4 – programmable inputs can be used)
5. RS-232 PC connector for connection to PC (for service purpose only)

1. Inputs for connection to continuity 4-wire outputs on the instrument
2. Inputs for connection to HV outputs on the instrument
3. Input for connection to TC1 connector on the instrument
   - L,N,PE, P/S outputs of the instrument
   - Input / output command control

Appliance / Machine / Switchboard safety
SDK and BLACK-BOX protocol

SDK AND BLACKBOX PROTOCOL

The advanced communication protocol SDK is an interface for data communication with Metrel's new generation test instruments and can be used to conveniently download and upload projects and AUTOSEQUENCE®s.

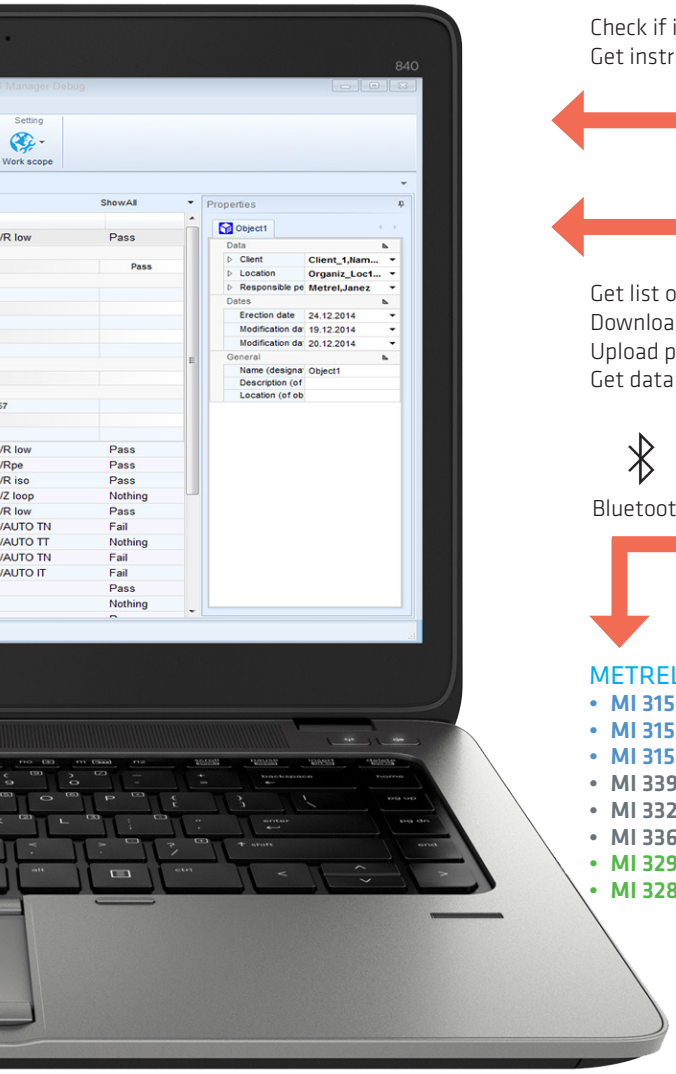
The SDK itself is a set of subroutine definitions, protocols, and tools for building application software. It is intended for those who want to develop software using .NET platform and need to interface with Metrel's instruments.

The Metrel Instrument Communication SDK bundles client libraries for accessing Metrel's instruments and provides a unified programming interface using C# programming language.

SDK includes a set of API calls which makes communication with Metrel's instruments simple for the user. It provides a way to manipulate data from instruments using a generic data model and make available a set of rules for extracting and viewing data.

SDK CAPABILITIES

- SDK enables access to all measurements on all new generation Metrel instruments in case the whole database is coupled with the Ion SDK.
- It is possible to get access to only a subset of Metrel instruments. In this case the SDK is compiled with a database subset. The SDK compiled in such a way will be able to recognize only the measurements of supported instruments.
- If required Metrel may decide to add new instruments. In this case the customer would obtain a new version of the SDK with added instruments and measurements in the SDK database.



Check if instrument is present
Get instrument info

Get list of project
Download project
Upload project
Get data display rules

Bluetooth USB Ethernet

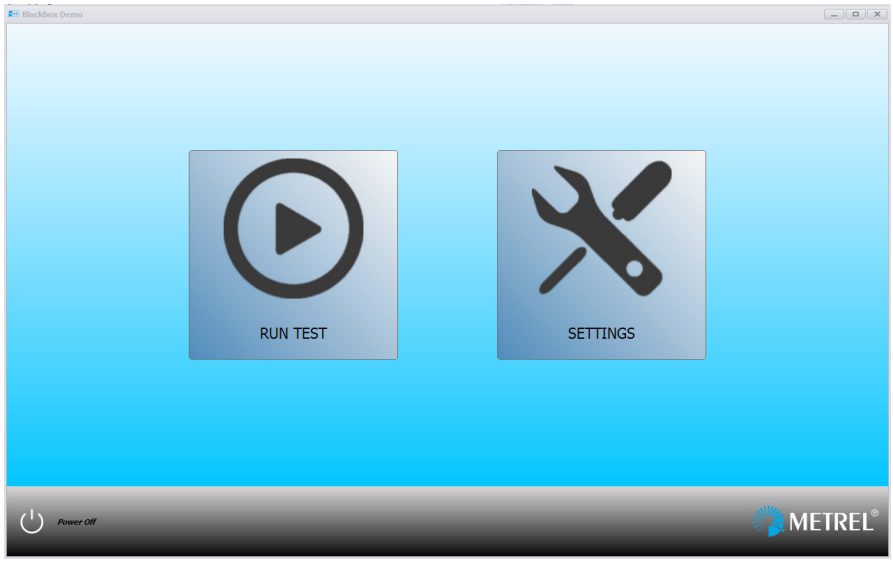
BLACKBOX PROTOCOLE

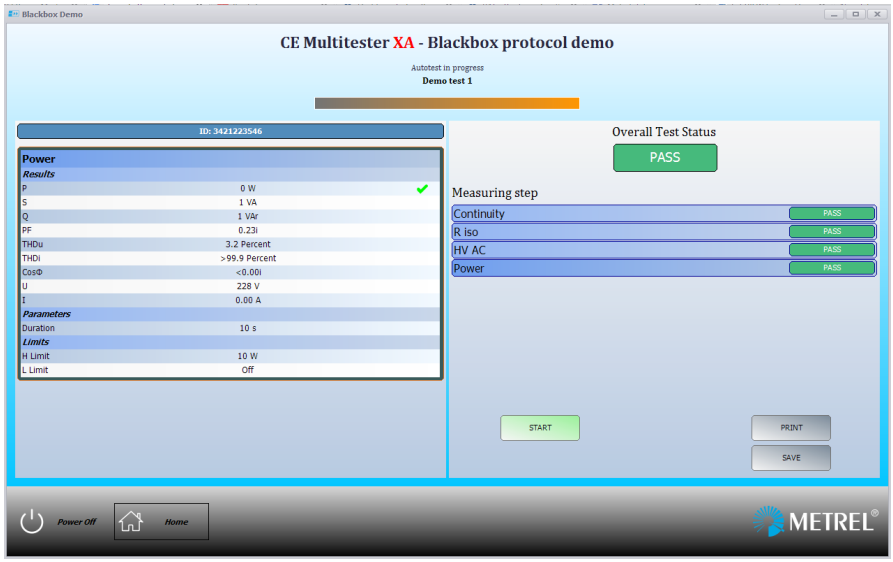
ION SDK

METREL INSTRUMENTS:

- **MI 3155** EurotestXD
- **MI 3152** EurotestXC
- **MI 3152H** EurotestXC 2,5kV
- **MI 3394** CE MultiTesterXA
- **MI 3325** MultiServicerXD
- **MI 3360** OmegaGT XA
- **MI 3290** Earth Analyser
- **MI 3280** Digital Transformer Analyser

Appliance / Machine / Switchboard safety
SDK and BLACKBOX protocol





BLACKBOX PROTOCOL

The instrument MI 3325 MultiServicerXD supports two communication protocols, basic and advanced.

The basic communication protocol called “Blackbox protocol” enables two-way communication intended for controlling the instrument as a Blackbox. It is basically a system of rules that allows a PC as a master to start communication by sending the request command to the instrument, which answers according to the protocol. This enables hands free operation as the control over the tester is delegated to an automatized system. Such solution is suitable for automatized production line testing. For presentation purposes Metrel has developed a PC SW application called Blackbox demo, which allows remote control over the tester via different communication ports (Ethernet, RS-232, USB or Bluetooth).

The Blackbox demo enables the user to start AutoSequence®s from the tester remotely and it enables an automatic print out of the test report after the AutoSequence® is completed. The Blackbox protocol is designed also to be used with other PC SW engineering tools such as Visual Basic, C++ and LabView, which, with some effort, can be used to perform remote communications between your computer and test instrument, as well as gather and store data for later analysis. However, if you simply wish to manually enter one command at a time using (Ethernet, RS-232, USB or Bluetooth), a communications package, such as HyperTerminal, can be very useful.

Appliance / Machine / Switchboard safety
Rack mount adapter

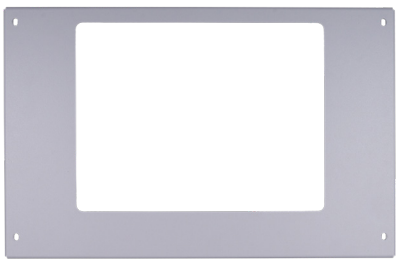
MI 3325 MultiServicerXD is a premium machine tester and undoubtedly the most advanced such product on the market today, offering great versatility in a variety of testing applications. Part of that adaptability is the option to use the instrument in the standalone mode or mounted in a rack, as a part of a larger testing line. Many of our customers have expressed greater interest in the latter and have reached to us for an adaptable mounting solution for a variety of racks.

For them, we have designed two rack mount adapters, intended to be used with RITAL square hole racks, but also suitable for a number of third-party racks. The A 1585 Rack mount adapter for MI 3325 MultiServicerXD enables the mounting of the said instrument, while the A 1585 Rack mount adapter for A 1460 CE Adapter ensures that this useful accessory is close to the instrument and can be easily connected at the back.

A 1585 Rack mount adapter for MI 3325 MultiServicerXD

A 1585 is a rack mount adapter for 19" rack, which is designed to hold the MI 3325 MultiServicerXD. This product kit includes the parts needed for complete and easy installation of the adaptor kit in RITAL square hole racks, and some third-party racks.

A 1586 Rack mount adapter for A 1460 CE Adapter



A 1586 is a rack mount adapter for 19" rack, which is designed to hold the A 1460 CE Adapter. This product kit includes the parts needed for complete and easy installation of the adaptor kit in RITAL square hole racks, and some third-party racks.

Appliance / Machine / Switchboard safety
Technical Data

Continuity 2W, 4W, test current (0.2 A, 4 A, 10 A, 25 A)

Function	Measuring range	Resolution	Accuracy
- R	0.00 Ω ... 19.99 Ω	0.01 Ω	±(2 % of reading + 2 D)
	20.0 Ω ... 99.9 Ω	0.1 Ω	±(3 % of reading)
	100.0 Ω ... 199.9 Ω	0.1 Ω	±(5 % of reading)
	200 Ω ... 999 Ω	1 Ω	Indicative

Voltage drop (Iout = 10 A)

Function	Measuring range	Resolution	Accuracy
- ΔU	0.00 Ω ... 19.99 Ω	0.01 Ω	±(2 % of reading + 5 D)
	20.0 Ω ... 99.9 Ω	0.1 Ω	±(3 % of reading)

HVAC, programmable HV AC, output voltage, * 100 V - 2500 V, ** 2510 V - 5000 V (floating to earth)

Function	Measuring range	Resolution	Accuracy
- Voltage (AC)	0 V ... 1999 V	1 V	±(3 % of reading)
	2.00 kV ... 5.99 kV	10 V	±(3 % of reading)
- Current, apparent	0.0 mA ... 49.9 mA** / 99.9 mA*	0.1 mA	±(3 % of reading + 3 D)
- Current, resistive	0.0 mA ... 49.9 mA** / 99.9 mA*	0.1 mA	Indicative
- Current capacitive	-49.9 mA ... 49.9 mA**	0.1 mA	Indicative
	-99.9 mA ... 99.9 mA*	0.1 mA	Indicative
- Short circuit current	> 200 mA		
- Output power	250 VA max		

Insulation resistance (250 V, 500 V), insulation resistance - S (250 V, 500 V), Riso - PAT / Riso - welding

Function	Measuring range	Resolution	Accuracy
- Riso/Riso-s	0.08 MΩ ... 19.99 MΩ	0.01 MΩ	±(3 % of reading + 2 D)
	20.0 MΩ ... 99.9 MΩ	0.1 MΩ	±(5 % of reading)
	100.0 MΩ ... 199.9 MΩ	0.1 MΩ	±(10 % of reading)
- Output voltage	0 V ... 600 V	1 V	±(3 % of reading + 2 D)

Insulation resistance (500 V and 1000 V) ISO installation

- Riso	0.15 MΩ ... 19.99 MΩ	0.01 MΩ	±(5 % of reading + 3 D)
	20.0 MΩ ... 199.9 MΩ	0.1 MΩ	±(5 % of reading)
	200.0 MΩ ... 999 MΩ	1 MΩ	±(10 % of reading)
- Output voltage	0 V ... 1200 V	1 V	±(3 % of reading + 3 D)

Insulation resistance (50 V, 100 V and 250 V) ISO Installation

- Riso	0.15 MΩ ... 19.99 MΩ	0.01 MΩ	±(5 % of reading + 2 D)
	20.0 MΩ ... 99.9 MΩ	0.1 MΩ	±(10 % of reading)
	100.0 MΩ ... 199.9 MΩ	0.1 MΩ	±(20 % of reading)
- Output voltage	0 V ... 300 V	1 V	±(3 % of reading + 3 D)
Measuring range according to EN 61557	0.15 MOhm ... 999 MOhm		

Substitute leakage (Isub, Isub-S), open circuit voltage, 110 V AC, 230 V AC

Function	Measuring range	Resolution	Accuracy
- Isub	0.02 mA ... 1.99 mA	0.01 mA	±(3 % of reading + 3 D)
- Isub s	2.00 mA ... 19.99 mA	0.01 mA	±(5 % of reading)

Differential leakage current

Function	Measuring range	Resolution	Accuracy
- Idiff	0.010 mA ... 1.999 mA	0.001 mA	±(3 % of reading + 10 D)
	2.00 mA ... 19.99 mA	0.01 mA	±(5 % of reading)

PE leakage current

Function	Measuring range	Resolution	Accuracy
- Ipe	0.010 mA ... 1.999 mA	0.001 mA	±(3 % of reading + 3 D)
	2.00 mA ... 19.99 mA	0.01 mA	±(5 % of reading)

Touch leakage current

Function	Measuring range	Resolution	Accuracy
- Itou	0.010 mA ... 1.999 mA	0.001 mA	±(3 % of reading + 3 D)
	2.00 mA ... 19.99 mA	0.01 mA	±(5 % of reading)
Operating range (acc. to EN 61557-16)	0.010 mA ..... 19.99 mA		

Power

Function	Measuring range	Resolution	Accuracy
- P (active)	0.00 W ... 19.99 W	0.01 W	±(5 % of reading + 5 D)
	20.0 W ... 199.9 W	0.1 W	±(5 % of reading)
	200 W ... 1999 W	1 W	±(5 % of reading)
	2.00 kW ... 3.70 kW	10 W	±(5 % of reading)
- S (apparent)	0.00 VA ... 19.99 VA	0.01 VA	±(5 % of reading + 10 D)
	20.0 VA ... 199.9 VA	0.1 VA	±(5 % of reading)
	200 VA ... 1999 VA	1 VA	±(5 % of reading)
	2.00 kVA ... 3.70 kVA	10 VA	±(5 % of reading)

- Q (reactive)	0.00 VAr ... 19.99 VAr 20.0 VAr ... 199.9 VAr 200 VAr ... 1999 VAr 2.00 kVAr ... 3.70 kVAr	0.01 VAr 0.1 VAr 1 VAr 10 VAr	±(5 % of reading + 10 D) ±(5 % of reading) ±(5 % of reading) ±(5 % of reading)
- PF	0.00 i ... 1.00 i 0.00 c ... 1.00 c	0.01 0.01	±(5 % of reading + 5 D) ±(5 % of reading + 5 D)
- THDU	0.0 % ... 99.9 %	0.1%	±(5 % of reading + 5 D)
- THDI	0 mA ... 999 mA 1.00 A ... 16.00 A	1 mA 0.01 A	±(5 % of reading + 5 D) ±(5 % of reading)
- Cos Phi	0.00i ... 1.00i 0.00c ... 1.00c	0.01 0.01	±(5 % of reading + 5 D)
- U	0.1 V ... 199.9 V 200 V ... 264 V	0.1 1 V	±(3 % of reading + 10 D) ±(3 % of reading)
- I	0 mA ... 999 mA 1.00 A ... 16.00 A	1 mA 0.01 A	±(3 % of reading + 5 D) ±(3 % of reading)
RCD testing / current shape AC, A, F, B, B+ / RCD type (non-delayed, S time-delayed, PRCD, PRCD-K, PRCD-S)			
Function	Measuring range	Resolution	Accuracy
- I△ – Trip-out current	0.2 xI△N ... 1.1 xI△N (AC type); 0.2 xI△N ... 1.5 xI△N (A type, I△N≥30 mA); 0.2 xI△N ... 2.2 xI△N (A type, I△N<30 mA); 0.2 xI△N ... 2.2 xI△N (B type)	0.05 xI△N	±0.1 xI△N
- Uc – Contact voltage	0.0 V ... 19.9 V 20.0 V ... 99.9 V	0.1 V	(-0 % / +15 %) of reading ± 10 D (-0 % / +15 %) of reading
UC I△N - Contact coltage			
- Uc I△	0.0 V ... 19.9 V 20.0 V ... 99.9 V	0.1 V	(-0 % / +15 %) of reading ± 10 D (-0 % / +15 %) of reading
- t △N –Trip-out time	0.0 ms ... 40.0 ms 0.0 ms ... max. time* * For max. time refere to user manual.	0.1 ms	±1 ms ±3 ms
Trip out time			
- t I△	0 ms ... 300 ms	1 ms	±3 ms
Polarity, test voltage (normal) < 50 V / test voltage (active) mains voltage Power consumption of tested device during the active test.....< 25 VA			
Clamp current (true RMS current using 1000:1 current clamp)			
Function	Measuring range	Resolution	Accuracy
- I - Idiff - Ipe	0.00 mA ... 9.99 mA 10.0 mA ... 99.9 mA 100 mA ... 999 mA 1.00 A ... 9.99 A 10.0 A ... 24.9 A	0.01 mA 0.1 mA 1 mA 0.01 A 0.1 A	±(5 % of reading + 10 D) ±(5 % of reading + 5 D)
Accuracy of current transformer is not considered. Frequency range of current clamp is not considered.			
Voltage (online terminal voltage monitor (10 ... 550 V) + phase rotation)			
Function	Measuring range	Resolution	Accuracy
- TRMS (14 ... 500 Hz) Uln, Ulpe, Unpe, U1pe, U2pe, U12, U13, U23	0 V ... 550 V	1 V	±(2 % of reading + 2 D)
- Frequency	0.00 Hz ... 9.99 Hz 10.0 Hz ... 499.9 Hz	0.01 Hz 0.1 Hz	±(0.2 % of reading + 1 D)
Varistor test			
Function	Measuring range	Resolution	Accuracy
- DC voltage	0 V ... 1000 V	1 V	±(3 % of reading + 3 D)
- AC voltage	0 V ... 625 V	1 V	Consider accuracy of DC voltage
R low - resistance of earth connection and equipotential bonding			
Function	Measuring range	Resolution	Accuracy
- R	0.16 Ω ... 19.99 Ω 20.0 Ω ... 199.9 Ω 200 Ω ... 1999 Ω	0.01 Ω 0.1 Ω 1 Ω	±(3 % of reading + 3 D) ±(5 % of reading) ±(5 % of reading)
Measuring range according to EN 61557	0.16 Ω ... 1999 Ω		
Function	Measuring range	Resolution	Accuracy
- R+,R-	0.0 Ω ... 199.9 Ω 200 Ω ... 1999 Ω	0.1 Ω 1 Ω	±(5 % of reading + 5 D) ±(5 % of reading + 5 D)
Open circuit voltage Measuring current Test lead compensation	6.5 Vdc ... 18 Vdc min. 200 mA into load resistance of 2 Ω up to 5 Ω		

Appliance / Machine / Switchboard safety
Technical Data

Impedance Z loop, (L-PE, Test current @ 230 V ... 20 A (10 ms))			
Function	Measuring range	Resolution	Accuracy
- Z – Fault loop impedance	0.00 Ω ... 9.99 Ω 10.0 Ω ... 99.9 Ω 100 Ω ... 999 Ω 1.00 kΩ ... 9.99 kΩ	0.01 Ω 0.1 Ω 1 Ω 10 Ω	±(5 % of reading + 5 D) ±(10 % of reading) ±(10 % of reading) ±(10 % of reading)
Measuring range according to EN 61557	0.12 Ω ... 9.99 kΩ		
Impedance Zs rcd, L-PE			
Function	Measuring range	Resolution	Accuracy
- Z - Zs Rcd	0.00 Ω ... 9.99 Ω 10.0 Ω ... 99.9 Ω 100 Ω ... 999 Ω 1.00 kΩ .... 9.99 kΩ	0.01 Ω 0.1 Ω 1 Ω 10 Ω	±(5 % of reading + 12 D) ±(5 % of reading + 12 D) ±(10 % of reading) ±(10 % of reading)
Measuring range according to EN 61557 is 0.46 Ohm ... 9.99 kOhm for Itest = normal and 0.48 Ohm ... 9.99 kOhm for Itest = low.			
Function	Measuring range	Resolution	Accuracy
- Ipsc – Prospective fault current	0.00 A ... 9.99 A 10.0 A ... 99.9 A 100 A ... 999 A 1.00 kA ... 9.99 kA 10.0 kA ... 23.0 kA	0.01 A 0.1 A 1 A 10 A 100 A	Consider accuracy of fault loop resistance measurement
- Ulpe – Voltage	0 V ... 550 V 20.0 V ... 99.9 V* * for Z - Zs Rcd function	1 V 0.1 V	±(2 % of reading + 2 D)
Impedance Z line (L-L, L-N, Test current @ 230 V ... 20 A (10 ms))			
Function	Measuring range	Resolution	Accuracy
- Z Line impedance	0.12 Ω ... 9.99 Ω 10.0 Ω ... 99.9 Ω 100 Ω ... 999 Ω 1.00 kΩ ... 9.99 kΩ	0.01 Ω 0.1 Ω 1 Ω 10 Ω	±(5 % of reading + 5 D) ±(5 % of reading + 5 D) ± 10 % of reading ± 10 % of reading
- Ipsc – Prospective fault current	0.00 A ... 0.99 A 1.0 A ... 99.9 A 100 A ... 999 A 1.00 kA ... 99.99 kA 100 kA ... 199 kA	0.01 A 0.1 A 1 A 10 A 1000 A	Consider accuracy of line resistance measurement
- Uln – Voltage	0 V ... 550 V	1 V	±(2 % of reading + 2 D)
Voltage Drop (Zref 0.00 Ω ... 19.99 Ω, Test current @ 230 V ... 20 A (10 ms))			
Function	Measuring range	Resolution	Accuracy
-dU – Voltage drop	0.0 % ... 99.9 %	0.1 %	Consider accuracy of line resistance measurement (s)
Discharging time			
Function	Measuring range	Resolution	Accuracy
- t – Discharging time	0.0 s ... 10.0 s	0.1 s	±(5 % of reading + 2 D)
- Up – Peak voltage Threshold voltage: 34 V, 60 V, 120 V	0 V ... 550 V	1 V	±(5 % of reading + 3 D)

General data	
Power supply	110 V / 230 V AC, 50 Hz / 60 Hz
Max. power consumption	300 VA (without load on mains test socket)
Max. load	10 A continuous, 16 A short duration, 1.5 kW motor
Measuring categories	
Mains test socket, IEC test socket	CAT II / 300 V
TC1 test socket, (C1, C2, P1, P2, P)	CAT III / 300 V
Protection classification	
Degree of protection	IP 54 (Closed case), IP 40 (Open case), IP 20 (Mains socket)
Communication	
Memory	Depends on microSD card size
RS-232 interfaces	Two DB9 ports RS-232-1 (PC), RS-232-2
INPUTs/OUTPUTs	24 Vmax (DB9 connector, 2X)
USB 2.0	Standard USB Type B
Bluetooth	Class 2
Ethernet	Dynamic IP (DHCP)
Dimensions (L x W x H)	420 x 325 x 180 mm / 420 x 325 x 250 mm (with accessories)
Weight	13.3 kg / 15.1 kg (with accessories)

Appliance / Machine / Switchboard safety Accessories

Photo	Part No.	Description	Target application
	MI 3144	Euro Z 800 V	Euro Z800 V is a hi-precision 4-wire 300 A Z line and Z loop impedance tester. The instrument supports hi range 800 V / 16 ... 420 Hz AC networks.
	MI 3143	Euro Z 440 V	Euro Z440 V is the hi-precision 4-wire 300 A Z line and Z loop impedance tester. The instrument supports hi range 440 V / 16 ... 420 Hz AC networks
	A 1632	eMobility Analyser	Adapter for for diagnostic testing of Electric Vehicle Supply Equipment (EVSE).
	A 1322	Active 3-phase adapter	A 1322 Multifunctional test adapter is designed for troubleshooting, as well as for periodic testing on 3-phase appliances and machinery.
	A 1422	Active 3-phase adapter Plus	A 1422 Multifunctional test adapter is designed for troubleshooting, as well as for periodic testing on 3-phase appliances, machinery, and arc welding equipment.
	A 1460	CE Adapter	Provides a thorough and expeditious solution in the execution of auto tests via a single test terminal, A 1511 2M5 Tip Commander 2,5 m included in set.
	A 1495	Remote control pedal	Remote control pedal is used for safe remote start of high voltage insulation test and additionally allows free hand operation of the worker.
	A 1585	Rack mount adapter for MI 3325	A 1585 is a rack mount adapter for 19" rack, which is designed to hold the MI 3325 MultiServicerXD. This product kit includes the parts needed for complete and easy installation of the adapter kit in RITAL square hole racks, and some third-party racks.
	A 1586	Rack mount adapter for A 1460 CE Adapter	A 1586 is a rack mount adapter for 19" rack, which is designed to hold the A 1460 CE Adapter. This product kit includes the parts needed for complete and easy installation of the adapter kit in RITAL square hole racks, and some third-party racks.
	A 1511 2M5	Tip Commander 2,5 m	Tip commander serves as a remote control for execution of passive tests, when used in combination with A 1460. Or for execution of 4-wire continuity test when used directly from MI 3325. The commander has a built in LED torch lamp including PASS/FAIL status LED's and start key for execution of the tests. When used directly from MI 3325 MultiServicerXD the A 1583 Connection cable must be used.
	A 1511 5M	Tip Commander 5 m	
	A 1511 10M	Tip Commander 10 m	
	A 1583	Connection cable	Connection cable for use of A 1511 Tip commander directly from MI 3325 MultiServicerXD.
	A 1207	Three phase adapter	The 3-phase adapter for substitute leakage current, insulation resistance and continuity measurements on electric loads equipped with 16 A and 32 A CEE 3P sockets.
	A 1110	Three phase adapter	3-phase test adapter for installation safety testing on 3-phase sockets type 16 A 3CEE.

Photo	Part No.	Description	Target application
	A 1111	Three phase adapter with switch	3-phase adapter with selection switch for installation safety testing on 3-phase sockets type 16 A 3CEE. The adapter allows seamless switching between measurements
	A 1316	3-phase adapter (16 A CEE-Schuko)	3-phase adapter for testing 3-phase appliances.
	A 1317	3-phase adapter (32 A CEE-Schuko)	3-phase adapter for testing 3-phase appliances.
	A 1388	Adapter Schuko / Schuko	Measuring adapter for leakage current measurements: for measuring differential leakage current, protective conductor current, neutral current and load current, through leakage current clamp. All wires are separated.
	A 1389	Adapter CEE 5-P 16 A / CEE 5-P 16 A	Measuring adapter for leakage current measurements: for measuring differential leakage current, protective conductor current, neutral current and load current, through leakage current clamp. All wires are separated.
	A 1390	Adapter CEE 5-P 32 A / CEE 5-P 32 A	
	A 1579	Leakage current clamp	Current clamp with high resolution for accurate leakage current measurements.
	S 2062	BT label printer set, (mains operated)	Printer supports printing of bar-codes which contain a complete appliance information and PASS or FAIL status of result, or QR codes which contain information of the previous results, the test status, and the previously used test sequence.
	A 1450	Spare label roll for S 2062	Spare label roll for S 2062, (2500 labels per roll).
	A 1628	Spare label roll for S 2062	Spare label roll for S 2062, 45x90 mm, (800 labels per roll).
	A 1652	Barcode scanner (Bluetooth)	Barcode scanner for identification of barcode labelled appliances.
	A 1653	QR / Barcode scanner (Bluetooth)	QR / Barcode scanner for identification of barcode labelled appliances.
	A 1105	Barcode scanner	Barcode scanner for identification of barcode labelled appliances.
	A 1105 2D	Barcode scanner 2D RS-232 connection	2D Barcode scanner for identification of barcode labelled appliances
	A 1571	NFC reader / writer	NFC reader / writer allows to read and upload test results and information about tested electrical equipment to the NFC tags (NTAG 216).

Appliance / Machine / Switchboard safety Accessories

Photo	Part No.	Description	Target application
	A 1572	NFC tags, fi 34 mm, self-stick 50 pcs	NFC tags have sufficient memory space to store test results, test code and tested appliance information.
	A 1573	NFC labels, fi 29 mm, self-stick 50 pcs	NFC labels have sufficient memory space to store test results, test code and tested appliance information.
	A 1574	NFC cable-tie, L 130 mm, 50 pcs	NFC cable-ties have sufficient memory space to store test results, test code and tested appliance information.
	A 1497	Warning lamp / 4 LED signal tower with buzzer	Colour LED signal tower with built-in buzzer visually and acoustically signalizes ongoing tests and test conditions.
	A 1496	Warning lamp / 2-LED signal tower HV	Warning lamps visually signalize ongoing HV insulation test and warn the user about dangerous voltage conditions.
	A 1499	External power supply 24 V	If the LED tower lamp is used in combination with instrument the external power supply should be used.
	A 1495 PL	Adapter for pedal and signal lamps	The adapteris designed to enable use of remote pedal and LED signal lights connected to the instrument.
	A 1060	Power splitter for discharge time measurement	T-type power splitter for measurements of discharge time on machinery and switchgear.
	A 1598	Residual voltage adapter	3-phase adapter for measurements of discharge time on machinery and switchgear, equipped with 16 A CEE 3P socket.
	A 1599	Residual voltage cable	Adapter for measurements of discharge time on machinery and switchgear.
	A 1494	HV test pistol with 2 m cable, blue	High voltage safety test probe for manual high voltage testing. The test tip is protected by an arc-resistant teflon tube which assures a long lifetime.
	A 1486	HV test pistol with 2 m cable, red	
	S 2073	HV test lead 5 m, without pistols	High voltage extension test leads for measurements on larger electrical equipment.
	A 1593	Large Kelvin test crocodile	Large robust Kelvin crocodile clip for accurate resistance measurements on larger objects.

Photo	Part No.	Description	Target application
	A 1595	Large test crocodile, black	Large robust crocodile clip for resistance measurements on larger objects.
	A 1596	Large test crocodile, red	
	A 1639 RED-2M5 A 1639 RED-5M A 1639 RED-10M A 1639 RED-15M	Large HV crocodile with cable	High voltage 10 kV test lead with integrated large crocodile clip for HV safety testing in automated or manual mode.
	A 1639 BLU-2M5 A 1639 BLU-5M		
	S 1058	Continuity test lead, 2 x 10 m, 2 pcs	Extension test leads for continuity measurements.
	S 1072	Continuity test lead with crocodile clip, 2 x 2.5 m, 2 pcs	Extension test leads with protection shield and with crocodile clips for continuity testing with high test currents (10 A, 25 A).
	S 2012	Continuity test lead, 10 m, 2 pcs (red, black)	Extension test lead for continuity measurements.
	P 1101	BASIC to PRO licence key upgrade for Metrel ES Manager	Licence key for upgrading the Metrel ES Manager to advanced version with professional report creation functionality.
	A 1578	RS-232 to USB adapter for external USB keyboard	The A 1578 adapter enables the connection of external USB keyboard, for easy data entering.
	A 1458	MicroSD card reader	Move data between your computer and memory card with memory card reader.
	A 1017	Communication cable RS-232	RS-232 interface cable for connecting the instrument with the PC.

Note: Accessories shown here represent just suggested/most versatile ones and not the entire range of complementary accessories. Please consult the current General Catalogue for a more complete overview of accessories.

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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.

BROCHURE_MI 3325 MultiServicerXD_2019_Ang_Februar