



# MI 3394 CE MultiTester XA

Measuring  
instruments  
and testers

# Appliance / Machine / Switchboard safety Instrument Features

The MI 3394 CE MultiTesterXA is a portable instrument intended for electrical safety testing and CE certification of electrical appliances, machines and switchboards during the production. The instrument features in strong data management facility enabling the user to create custom auto-tests with predefined limits for pass/fail evaluation, to import predefined structure including test sequences or complete projects from PC software. The PC software Metrel Electrical Safety Manager enables the upload of automated test sequences, projects, downloading of test results, automatic data storage into a file and printing of test reports. Due to selected test functions, durable construction and accompanying PC SW package CE MultiTesterXA is the perfect instrument for electrical safety testing in the most demanding environments like laboratories, automated production lines or specialized workshops.



# Appliance / Machine / Switchboard safety Instrument Description

The new CE MultiTesterXA, 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/DC programmable (up to 1.5kV), Differential leakage, Ipe leakage, Touch leakage, Power, Leak's & Power and Discharge time. The CE MultiTesterXA provides Hi-Pot (AC 0-5kV & DC 0-6kV) tests, 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 CE MultitesterXA comes complete with a menu driven, 3.4" graphical colour touch screen intuitive display that enables the complete configuration and execution of applied tests.



## MEASURING FUNCTIONS

- High Voltage, programmed (AC/DC).
- High Voltage burn-out test with optional A 1560 Burn Link adapter.
- Continuity tests.
- Insulation resistance measurement.
- Substitute / Differential / Touch / PE leakage current.
- Discharge time.
- Functional test (power P/S/Q, voltage, current, cos fi, frequency, ThdU, ThdI,PF).

## KEY FEATURES

- Data management: the instrument features in unique user friendly data management facility and state of the art memory organizer.
- Multiple test terminals: different test terminals enabling the user to chose from performing single tests or autosequences from single test socket.
- Support for Test Adapter: A 1460 CE ADAPTER enables execution of auto tests from single test terminal.
- MicroSD: support for microSD memory card (8-GB supplied with the instrument) up to 32GB.
- Colour display: 3.4" colour LCD display with touch screen.
- Hi-pot: high voltage AC (5kV at 500VA) and DC (6kV) test.
- Continuity: 4 - wire continuity test with selectable test current (0.2 A, 4 A, 10A, 25A) enabling precise measurements.
- Communication: 4 - RS232, USB 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.

## APPLICATION

- Laboratories,
- Automated production lines,
- Specialized workshops.

## STANDARDS

### Functionality

- IEC 60335 Household and similar electrical appliances
- 61439 Low-voltage switchgear and controlgear assemblies
- IEC 60598 Luminaires
- IEC 60950 Safety of information technology equipment
- IEC 61010 Safety requirements for electrical equipment
- VDE 0701-702 Inspection after repair, modification of electrical appliances
- Periodic inspection on electrical appliances
- General requirements for electrical safety
- EN 50191 Erection and operation of electrical test equipment

### Safety

- EN 61010-1
- EN 61010-2-030
- EN 61010-031
- EN 61557

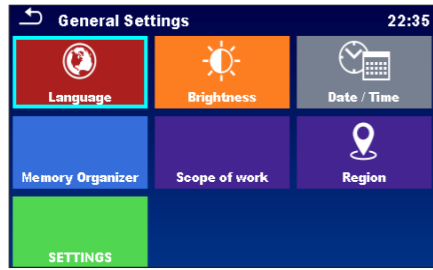
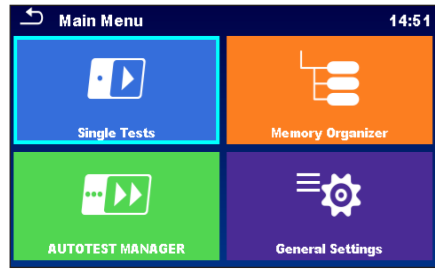
## ORDERING INFORMATION

### Euro set:

- Instrument CE MultiTesterXA
- HV test pistol with 2 m cable, 2 pcs
- Continuity test lead, 2.5 m, 2 pcs
- Continuity test lead, red, 1.5 m, 1pcs
- Insulation test lead, 2.5 m
- Insulation test lead, black, 2.5 m
- Crocodile clip, black, 3 pcs
- Crocodile clip, red, 2 pcs
- Discharge time cable
- Mains cable
- Bag for accessories
- Calibration certificate
- RS232 cable
- USB cable
- CD with instruction manual (full version)
- PC SW Metrel ES Manager

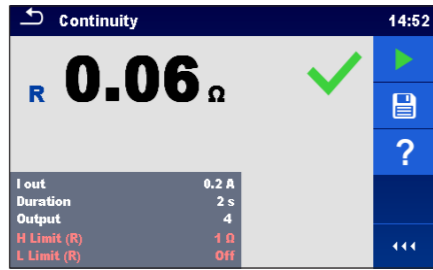
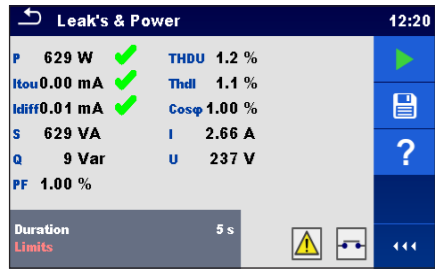


# Appliance / Machine / Switchboard safety Instruments Menues



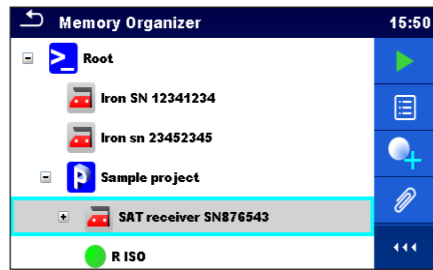
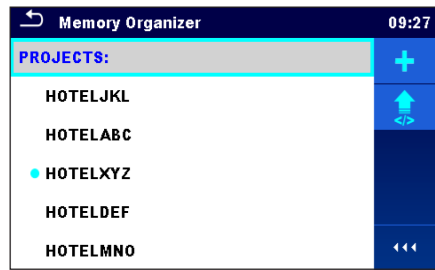
## INTUITIVE MENUS

Intuitive colour menus, with large icons for simple and quick manipulation and operation with instrument.



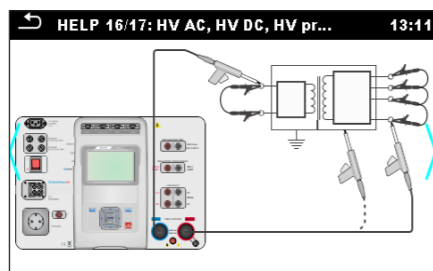
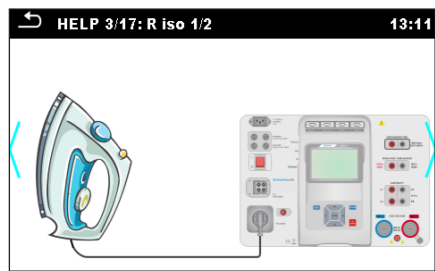
## MEASUREMENT MENUS

Containing complete information of performed test or test sequence.



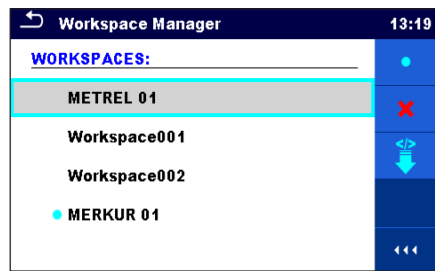
## MEMORY ORGANIZER

Is a tool for storing and working with test data, enabling creation of single tests, auto-tests and the tree structure.



## HELP SCREENS

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

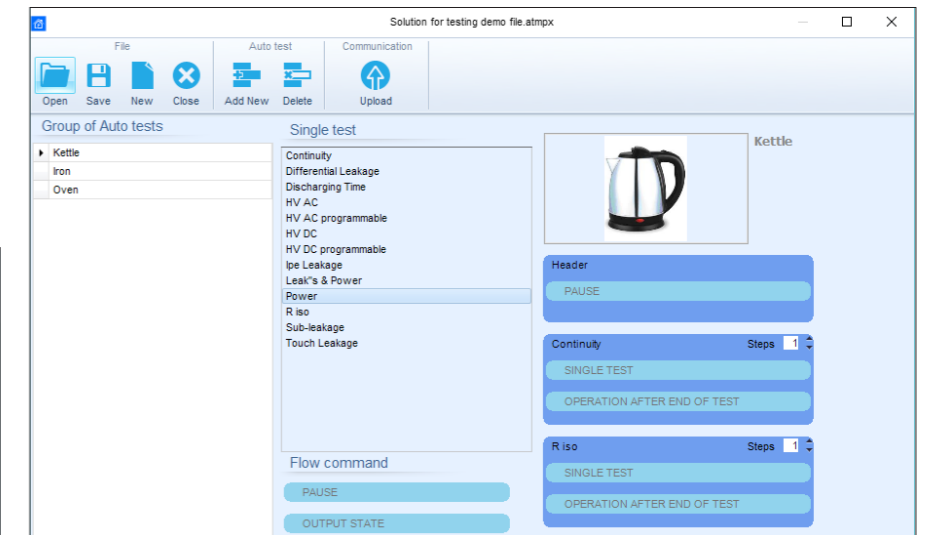
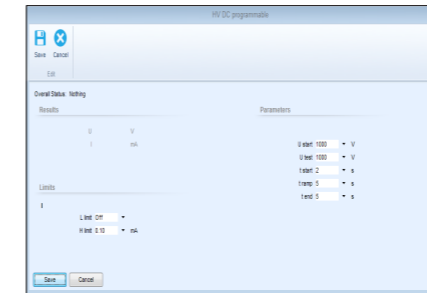


## WORKSPACE MANAGER

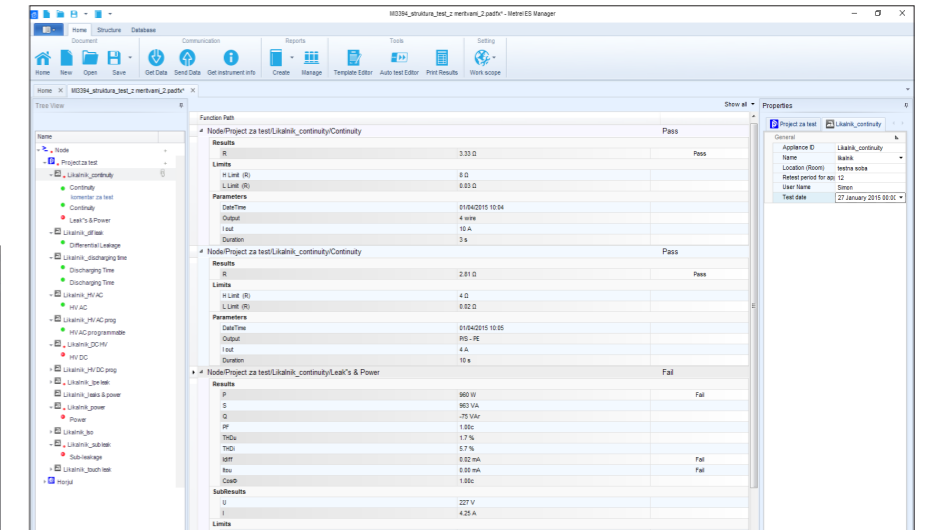
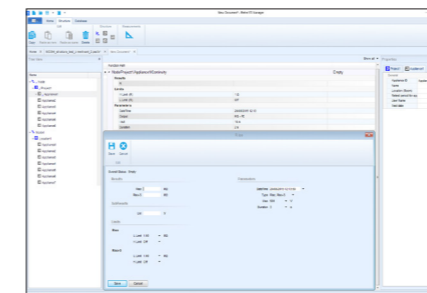
Is intended to manage technology of work with different Workspaces and Exports stored on the microSD card. Each workspace can contain one or more user defined structure with measurement, similar to projects.

# Appliance / Machine / Switchboard safety Metrel Electrical Safety Manager

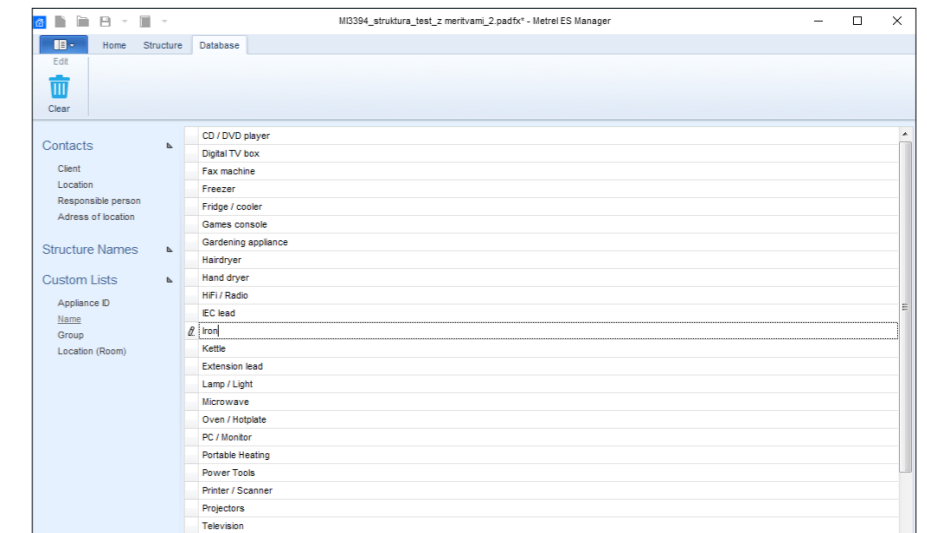
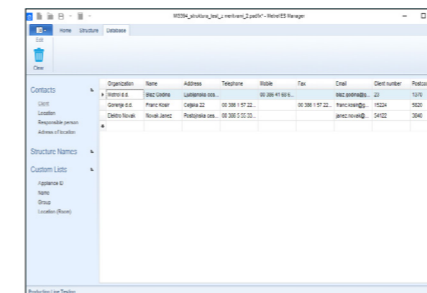
Custom auto sequence, or group of them can be created on the PC SW and then uploaded to the instrument.



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.



# Appliance / Machine / Switchboard safety Instruments Sets

Due to the differences in testing standards globally, it has becoming increasingly important for manufacturers to ensure that their products are safe for the consumer and industrial markets. Depending on the application Metrel offers different sets in combination of tester plus accessories.

|   | MI 3394<br>LINE SET | MI 3394<br>ST SET | MI 3394<br>LAB SET |
|---|---------------------|-------------------|--------------------|
| <b>STANDARD</b>                           |                     |                   |                    |
| MI 3394 Instrument CE MultiTesterXA       | •                   | •                 | •                  |
| A 1460 CE Test adapter                    | •                   |                   |                    |
| S 2073 HV test lead 5m, without pistols   |                     | •                 |                    |
| A 1560 Burn Link adapter                  |                     |                   | •                  |
| A 1105 Barcode scanner                    | •                   |                   |                    |
| A 1511 Tip Comander                       | •                   |                   |                    |
| HV test pistol with 2 m cable, 2 pcs      |                     |                   | •                  |
| Continuity test lead, 2.5 m, 2 pcs        | •                   | •                 | •                  |
| Continuity test lead, red, 1.5 m, 1pcs    | •                   | •                 | •                  |
| Insulation test lead, red, 2.5 m          | •                   | •                 | •                  |
| Insulation test lead, black, 2.5 m        | •                   | •                 | •                  |
| Crocodile clip, black, 3 pcs              | •                   | •                 | •                  |
| Crocodile clip, red, 2 pcs                | •                   | •                 | •                  |
| Discharge time cable                      | •                   | •                 | •                  |
| Mains cable                               | •                   | •                 | •                  |
| Bag for accessories                       | •                   | •                 | •                  |
| Calibration certificate                   | •                   | •                 | •                  |
| RS232 cable                               | •                   | •                 | •                  |
| USB cable                                 | •                   | •                 | •                  |
| A 1521 USB isolator                       | •                   |                   |                    |
| CD with instruction manual (full version) | •                   | •                 | •                  |
| PC SW Metrel Electrical Safety Manager    | •                   | •                 | •                  |
| <b>OPTIONAL</b>                           |                     |                   |                    |
| A 1496 2-LED signal tower lamp HV         | •                   | •                 | •                  |
| A 1497 4-LED signal tower lamp            | •                   | •                 | •                  |
| A 1495 Remote pedal                       | •                   | •                 | •                  |

## THE NEED FOR TESTING

Protecting users from potentially life threatening injuries from electrocution as a result of faulty insulation, or inadequate grounding, is of a paramount importance. The new CE MultiTesterXA, in conjunction with the A 1460 CE Adapter, provides a thorough and expeditious solution in the execution of auto tests via a single test terminal. This solution is intended for electrical safety testing and CE certification of electrical appliances, machines and switchboards during production.

Metrel has designed and developed three separate models to address various tests and applications as required.

# Appliance / Machine / Switchboard safety LINE Set

The **LINE set** is defined to be most ideal for automated testing of equipment on production lines. The MI 3394, in combination with the A 1460, provides the user full hands free operation in executing the tests. Metrel Electrical Safety Manager PC software enables configuration of test procedures (sequences) which are uploaded to the tester and used for automated testing. Test sequences can be started via a remote pedal or tip commander. Predefined test limits are used for the evaluation of PASS/FAIL status, with results being automatically stored on the microSD memory card. Unique ID of the tested equipment can be added via barcode scanner during the test procedure.



## KEY FEATURES

- Custom defined automatic test sequences via PC software Metrel Electrical Safety Manager,
- Execution of test sequences via A 1460 CE Adapter,
- Hands free operation,
- PASS/FAIL and warning lamps,
- Programmable inputs and outputs,
- Programmable messages, pauses and several different flow commands,
- Execution of all tests via single test terminal.
- Built-in microSD memory card (8GB supplied with the instrument).
- A 1460 has a built-in robust fuse housing, enabling countless change of protective fuses.
- A 1460 has a built-in parallel test terminals to the test socket (enabling the user to plug in custom made test terminal).
- Test commander has a built in LED torch lamp and PASS/FAIL status LED lamps.
- Execution of test commands via test commander test button.
- Bar-code scanner is enabling identification of barcode labeled appliances.

## Appliance / Machine / Switchboard safety STANDARD Set

The **STANDARD set** is defined based on typical requirements of a small production processes. The instrument's intuitive touch screen display enables easy selection of required tests and test limits for fast test execution. Test limits are used for PASS/FAIL evaluation, results of the test can be stored under different memory structure levels. The standards set enables execution of all available single tests. Optionally, the user can also use barcode scanner for entering the equipment's ID.



### KEY FEATURES

- Creation of structure with dedicated tests,
- PASS/FAIL evaluation of test results,
- Execution of all single tests,
- Programmable High Voltage (AC + DC) test,
- 4-wire continuity test.
- Execution of auto-test via test terminals of the instrument.
- Built-in microSD memory card (8GB supplied with the instrument).

## Appliance / Machine / Switchboard safety LAB Set

The **LAB set** is defined to cover requirements that are most often required in test laboratories or R&D department's for type testing. One of the most important test to be carried out is the dielectric withstand test which can be destructive or non-destructive. The MI 3394 supports the execution of both. To execute the destructive withstanding test, the Burn Link Adapter (A 1560) must be used. The lab set includes also a set of professional HV test pistols for carrying out AC + DC HV tests safely. The rest of the available tests can be carried out via different test terminals. All the tested data can be stored on an 8GB micro SD card.



### KEY FEATURES

- Execution of all single tests,
- Programmable High Voltage (AC + DC) test,
- HV burn test, with limited breakdown current,
- 4-wire continuity test,
- PASS/FAIL evaluation of test results. Professional high quality HV test pistols.
- Burn link adapter for execution of insulation breakdown test.

# Appliance / Machine / Switchboard safety A 1460 CE Adapter Description

A 1460 CE Adapter is intended to support Auto tests of electrical equipment with the Metrel CE Multitester instrument. Operation is completely controlled by the instrument via the TC1 communication connector.



Following tests can be performed via test adapter (Note: as an Autotest only).

| Measuring function                    |   |
|---------------------------------------|---|
| Continuity 2W, 4W                     | 0.2 A, 4 A, 10 A, 25 A                            |
| Insulation (P)                        | 50 V, 100 V, 250 V, 500 V, 1000 V                 |
| HV AC, Programmable HV AC             | 100 ... 1500 V in 10 V steps (Iout max ...100 mA) |
| HV DC, Programmable HV DC             | 100 ... 1500 V in 10 V steps (Iout max ...100 mA) |
| Discharging time                      |   |
| 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 available flow commands:

- Flow Commands
- PAUSE
- OUTPUT STATE
- WAIT INPUT mode
- LAMPS Pass/Fail mode
- LAMPS HV mode
- BUZZER mode
- EXTERNAL OK KEY mode
- NO NOTIFICATION mode
- APPLIANCE INFO
- FLOW PROTOCOL

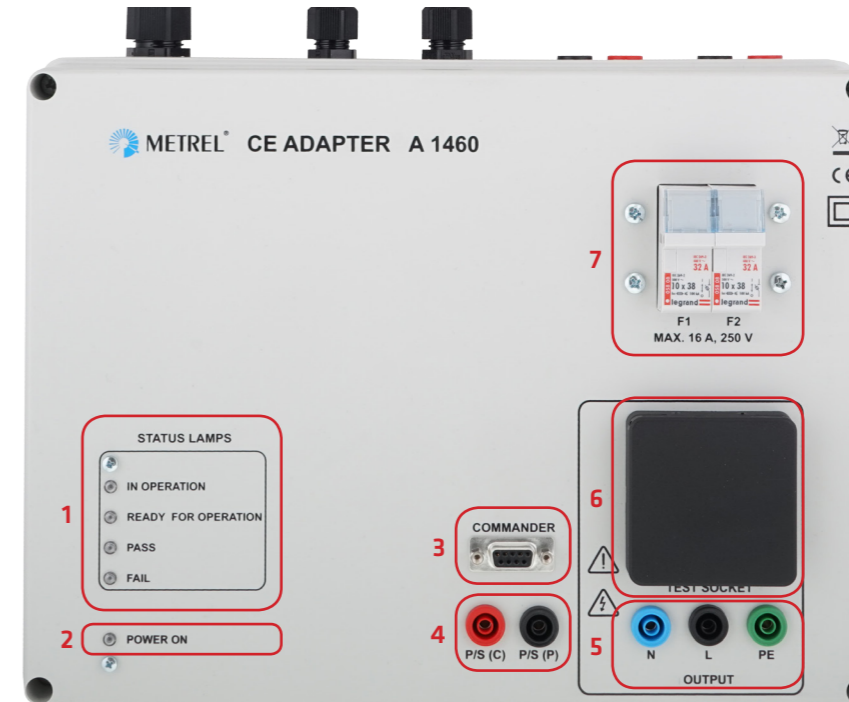
List of available measurements:

- Measurement
- Continuity
- Differential Leakage
- Discharging Time
- HV AC
- HV AC programmable
- HV DC
- HV DC programmable
- Ipe Leakage
- Leak's & Power
- Power
- R iso
- Sub-leakage
- Touch Leakage

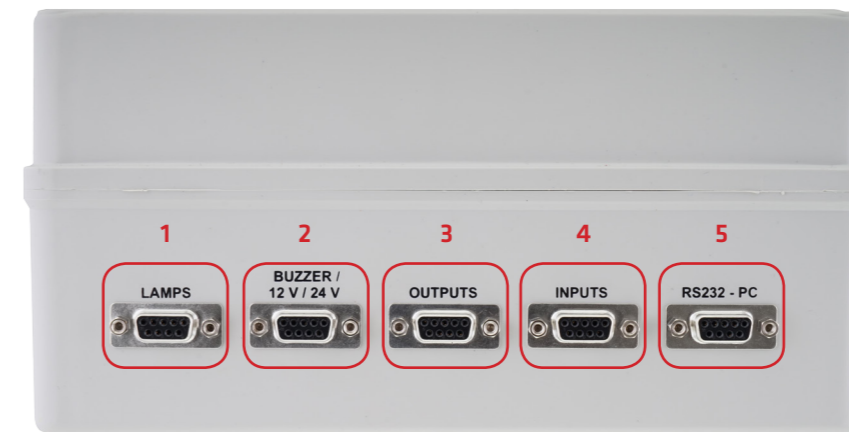
While the Auto test is running it is controlled by pre-programmed flow commands. Examples of actions controlled by flow commands are:

- 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 status.
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. RS232-PC connector for connection to PC (for service purpose only)

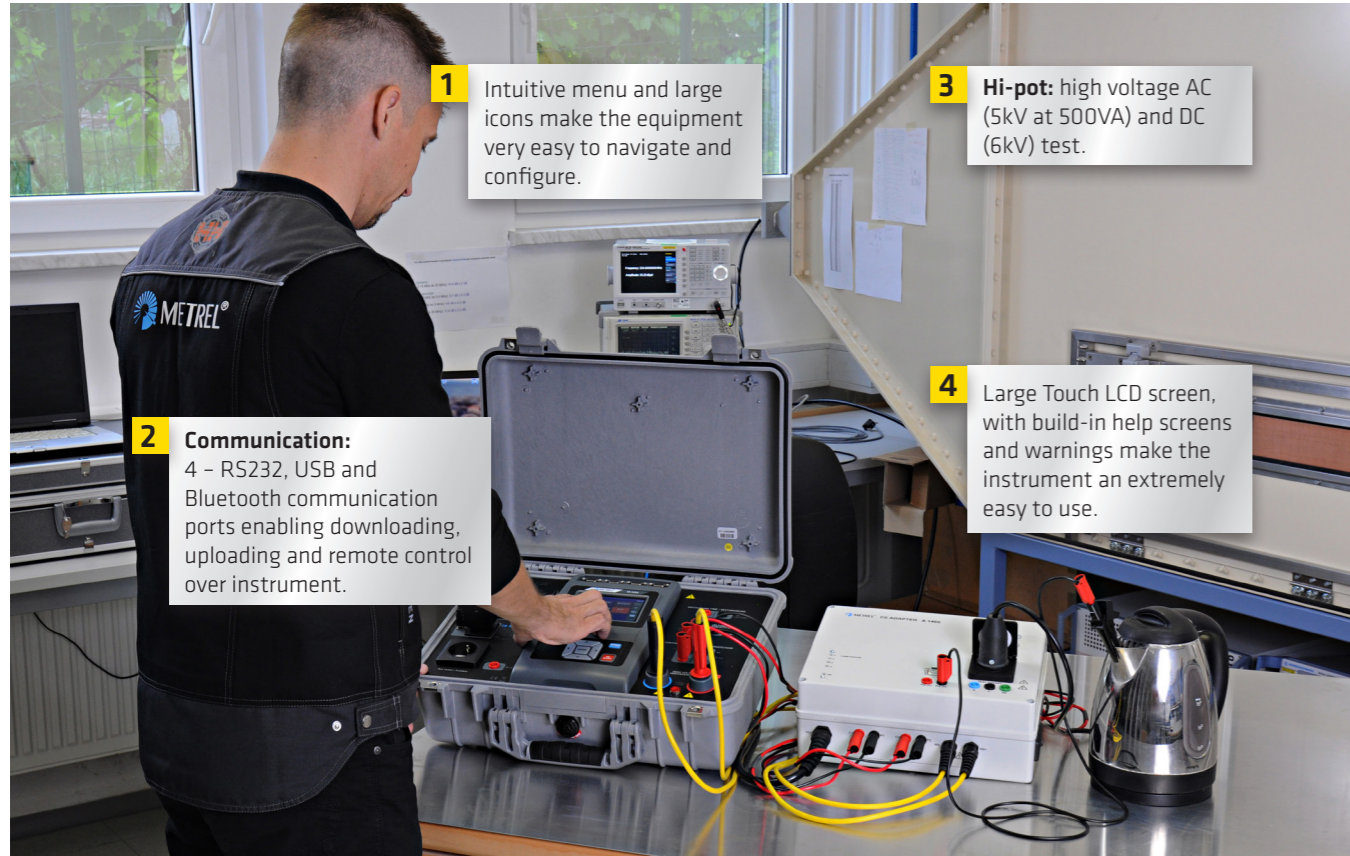


1. Inputs for connection to Continuity 4 wire outputs on the instrument
2. Inputs for connection to HV outputs on the instrument
3. Input for connection to TC1 connector on the instrument - L,N,PE, P/S outputs of the instrument - Input / Output command control

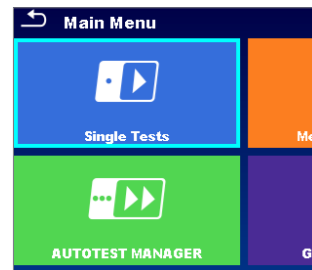
# Appliance / Machine / Switchboard safety

## CE marking, laboratory type testing and automated line routine testing

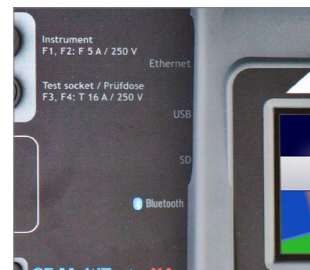
The **CE mark**, is a mandatory conformity marking for certain products sold within the European Economic Area (EEA) since 1985. The CE marking is also found on products sold outside the EEA that are manufactured in, or designed to be sold in, the EEA. This makes the CE marking recognizable worldwide even to people who are not familiar with the European Economic Area. The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EC directives.



1. Intuitive test menus...



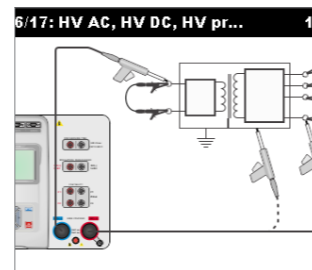
2. Advanced communication facility...



3. HiPot AC/DC...



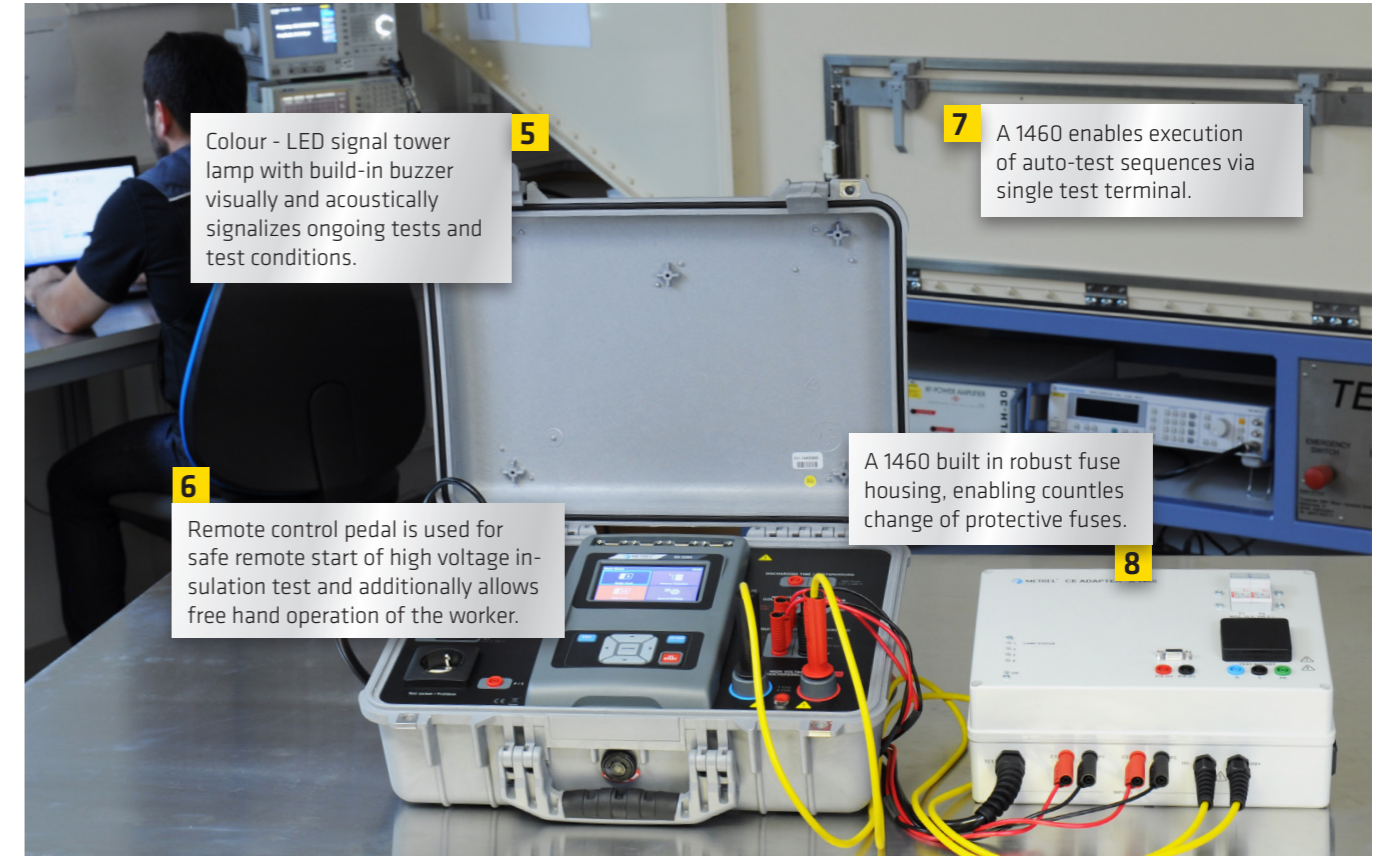
4. Help menus...



# Appliance / Machine / Switchboard safety

## Multifunctional Portable test System CE MultiTesterXA with CE test adaptor

The new **CE MultiTesterXA**, in conjunction with the CE test adaptor A 1460, provides a thorough and expeditious solution in the execution of auto tests via a single test terminal. This solution is intended for electrical safety testing and CE certification of electrical appliances, machines and switchboards during the production.



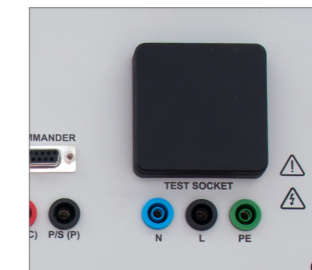
5. Warning light...



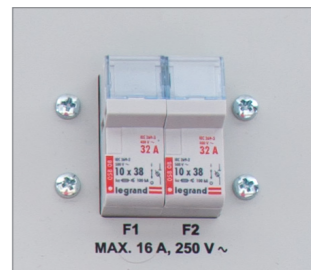
6. Remote test pedal...


















7. One in all test terminal...



8. Safety fuses...



# Appliance / Machine / Switchboard safety Accessories

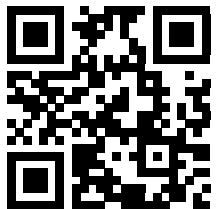
| Photo  | Part No.   | Description  | Target application   |
|--|------------|--|--|
|    | A 1460     | CE Adapter   | Provides a thorough and expeditious solution in the execution of auto tests via a single test terminal, A 1511 2M5 included in set.  |
|    | A 1495     | Remote control pedal                                       | Remote control pedal is used for safe remote start of high voltage insulation test and additionally allows free hand operation of the worker.  |
|    | A 1511 2M5 | Tip Commander 2,5 m  | Tip commander serves as a remote control for execution of passive tests, has a built in LED torch lamp and PASS/FAIL status LED's  |
|    | A 1511 5M  | Tip Commander 5 m  |  |
|    | A 1105     | Barcode scanner  | Barcode scanner can be used for identification of barcode labeled appliances.  |
|    | A 1560     | Burn Link adapter  | For performing insulation breakdown test with limited breakdown current "30mA"   |
|    | A 1497     | Warning lamp / 4 LED's signal tower with buzzer            | Colour - LED signal tower with build-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 24V                                  | If the LED tower lamp is used in combination with CE MultitesterXA the external power supply should be used.   |
|  | A 1060     | Power splitter for discharge time measurement              | T-type power splitter for measurements of discharge time on machinery and switchgear.  |
|  | A 1079     | Discharge time cable                                       | Adapter for measuring discharge time on internal electronic components.  |
|  | A 1458     | MicroSD card reader  | Move data between your computer and memory card with memory card reader.   |
|  | A 1017     | Communication cable RS232                                  | RS232 interface cable for connecting the instrument with the PC.   |
|  | A 1521     | USB isolator   | It is intended as galvanic insulation of USB interface between our products and PC to prevent damage of USB connected equipment in case of accidentally applied voltage difference between two types of equipment. |
|  | S 2073     | HV test lead 5m, without pistols                           | High voltage extension test leads for measurements on larger electrical equipment.   |
|  | 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.   |

# Appliance / Machine / Switchboard safety Technical Data

| FUNCTION  | Measuring range   | Resolution                   | Accuracy  |
|---|---|------------------------------|---|
| <b>HVAC, Programmable HV AC</b>   |   |                              |   |
| - Test voltage (AC)   | 0 ... 1999 V<br>2.00 ... 5.99 kV  | 1 V<br>10 V                  | ± (3 % of reading)<br>± (3 % of reading)  |
| - Test current apparent capacitive resistive  | 0.0 ... 99.9 mA<br>0.0 mA ... 99.9 mA<br>-99.9 mA ... 99.9 mA                     | 0.1 mA<br>0.1 mA<br>0.1 mA   | ± (3 % of reading + 3 digits)<br>Indicative<br>Indicative                           |
| - Short circuit current   | > 200 mA  |                              |   |
| - Output power  | 500 VAmax   |                              |   |
| <b>HV DC, Programmable HV DC</b>  |   |                              |   |
| - Test voltage (DC)   | 0 ... 1999 V<br>2.00 ... 6.99 kV  | 1 V<br>10 V                  | ± (3 % of reading)<br>± (3 % of reading)  |
| - Test current  | 0.01 ... 9.99 mA  | 0.01 mA                      | ± (5 % of reading + 3 digits)   |
| <b>Discharging time</b>   |   |                              |   |
| - t   | 0.0 ... 9.9 s   | 0.1 s                        | ± (5 % of reading + 3 digits)   |
| - Up  | 0 ... 550 V   | 1 V                          | ± (5 % of reading + 3 digits)   |
| <b>Continuity (0.2A, 4A, 10A, 25A)</b>  |   |                              |   |
| - R   | 0.00 Ω ... 19.99 Ω<br>20.0 Ω ... 99.9 Ω<br>100.0 Ω ... 199.9 Ω<br>200 Ω ... 999 Ω | 0.01Ω<br>0.1Ω<br>0.1Ω<br>1 Ω | ± (2 % of reading + 2 digits)<br>± 3 % of reading<br>± 5 % of reading<br>Indicative |
| <b>Insulation resistance (250 V, 500 V, 1000 V), Insulation resistance - S (250 V, 500 V, 1000 V)</b> |   |                              |   |
| - Riso/Riso-s   | 0.00 MΩ ... 19.99 MΩ<br>20.0 MΩ ... 199.9 MΩ                                      | 0.01 MΩ<br>0.1 MΩ            | ± (3 % of reading + 2 digits)<br>± 5 % of reading                                   |
| - Output voltage  | 0 V ... 1200 V  | 1 V                          | ±(3 % of reading + 2 digits)  |
| <b>Insulation resistance (50 V, 100 V), Insulation resistance - S (50 V, 100 V)</b>                   |   |                              |   |
| - Riso/Riso-s   | 0.00 MΩ ... 19.99 MΩ<br>20.0 MΩ ... 199.9 MΩ                                      | 0.01 MΩ<br>0.1 MΩ            | ± (5 % of reading + 2 digits)<br>± 20 % of reading                                  |
| - Output voltage  | 0 V ... 1200 V  | 1 V                          | ±(3 % of reading + 2 digits)  |
| <b>(open circuit voltage &lt;50 V a.c.)</b>   |   |                              |   |
| - Isub / Isub s   | 0.00 mA ... 19.99 mA  | 10 μA                        | ± (5 % of reading + 3 digits)   |
| <b>Differential Leakage current</b>   |   |                              |   |
| - Idiff   | 0.00 mA ... 19.99 mA  | 0.01 mA                      | ± (3 % of reading + 5 digits)   |
| <b>PE leakage current</b>   |   |                              |   |
| - Ipe   | 0.00 mA ... 19.99 mA  | 0.01 mA                      | ± (3 % of reading + 3 digits)   |
| <b>Touch leakage current</b>  |   |                              |   |
| - Itou  | 0.00 mA ... 19.99 mA  | 0.01 mA                      | ± (3 % of reading + 3 digits)   |
| <b>Power</b>  |   |                              |   |
| - P   | 0 W ... 999 W<br>1.00 kW ... 3.70 kW  | 1 W<br>10 W                  | ± (5 % of reading + 5 digits)<br>± 5 % of reading                                   |
| - S   | 0 VA ... 999 VA<br>1.00 kVA ... 3.70 kVA  | 1 VA<br>10 VA                | ± (5 % of reading + 5 digits)<br>± 5 % of reading                                   |
| - Q   | ±(0 ... 999) VAr<br>±(1.00 ... 3.70) kVAr   | 1 VAr<br>10 VAr              | ± (5 % of reading + 5 digits)   |
| - PF  | 0.00i ... 1.00i<br>0.00c ... 1.00c  | 0.01<br>0.01                 | ± (5 % of reading + 5 digits)<br>± (5 % of reading + 5 digits)                      |
| - THDU  | 0.0% ... 99.9%  | 0.1%                         | ±(5 % of reading + 5 digits)  |
| - THDI  | 0.0% ... 99.9%  | 0.1%                         | ±(5 % of reading + 5 digits)  |
| - Cos fi  | 0.00i ... 1.00i<br>0.00c ... 1.00c  | 0.01<br>0.01                 | ±(5 % of reading + 5 digits)<br>±(5 % of reading + 5 digits)                        |
| - U   | 0.1 V ... 199.9 V<br>200 V ... 264 V  | 0.1<br>1 V                   | ±(3 % of reading + 10 digits)<br>±(3 % of reading)                                  |
| - I   | 0.00 A ... 16.00 A  | 0.01                         | ±(3 % of reading + 5 digits)  |
| Power supply  | 110 V / 230 V AC, 50 Hz / 60 Hz   |                              |   |
| Overvoltage category  | CAT II / 300 V, CAT II / 600 V (DISCH1 / DISCH2, only)                            |                              |   |
| Protection class  | I   |                              |   |
| HV output   | 5 kV a.c. / 6 kV d.c., double insulation  |                              |   |
| COM port  | 4 x RS232, 1 x USB, 1 x Bluetooth   |                              |   |
| Dimensions (w×h×d):   | 43,5 cm x 29,2 cm x 15,5 cm   |                              |   |
| Weight:   | 17 kg   |                              |   |



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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.

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