

MI 3321i, MultiservicerXA-hw2



=PRCD type **S, K**

First machine tester covering all necessary tests according to new IEC/EN 60204 ed.5 including Loop impedance, RCD and HV test



Multifunctional portable test instrument MultiservicerXA-hw2 is intended to perform all necessary measurements for testing the electrical safety of portable electrical equipment, machines and switchgears.

Measurements are divided into four subgroups:

- Tests for testing portable DUTs according to **VDE 0701 0702**.
- Tests for testing electrical safety of machines according to **IEC/EN 60204 Ed.5**.
- Tests for testing safety of switchgears **IEC/ EN 60439** and the **new IEC 61439**.
- All tests. Because of large set of functions this instrument is suitable also for safety testing (type testing, maintenance and routine testing) according to other product standards. Up to 18 different measurements can be performed either as single test or pre-programmed test sequences (PAT mode).

FEATURES

- Up to 6000 test results including measuring parameters can be stored into internal memory.
- Upload of test results from PC to instrument. Comparisons between old and new test results can be performed on site.
- Fast testing either with bar code or RFID identification system.
- Printing of labels on site.

Multiservicer is fully compatible with new powerful METREL **PATLink PRO** database PC software package. Downloading, viewing and storing of measurement results is enabled as standard. Printing of test results and exporting of data to spreadsheet applications is enabled as well. Advanced analysis of measurement results, data upload to MultiservicerXA for on site comparison between old and new result (trend functionality) and creating of professional report is enabled with password protected **PATLink PRO Plus** version.

HIGHLIGHTS

- Large graphic LCD display with resolution of 240 x 128 dots, with back-light.
- Intuitive menu structure for maximal user-friendly manipulation.
- Help menus with schematic diagrams for illustration of proper connection of DUT to the testing instrument.
- Three communication ports (1 x USB and 2 x RS232) for communication with PC, barcode scanner, RFID reader/writer and printers.
- Soft touch keyboard with cursor keys.
- Built-in real time clock.

STANDARDS APPLIED

Electromagnetic compatibility (EMC)
EN 61326

Safety (LVD)
EN 61010 – 1
EN 61010 - 031

Functionality
VDE 0701-0702
EN 60204-1 Ed.5
EN 60439
IEC 61439-1

Measurements
IEC/EN 61557 (parts 1, 2, 3, 4, 6, 7 and 10) and VDE 0404 (part 1 and 2) standards.



Overview of measurements

PAT TESTING

- EARTH BOND RESISTANCE
- INSULATION RESISTANCE
- INSULATION RESISTANCE - S
- SUBSTITUTE LEAKAGE CURRENT
- SUBSTITUTE LEAKAGE - S
- DIFFERENTIAL LEAKAGE CURRENT
- TOUCH LEAKAGE CURRENT
- POLARITY TEST
- CLAMP CURRENT TEST
- PRCD TEST
- POWER / FUNCTIONAL TEST

MACHINE TESTING

- CONTINUITY (SINGLE / AUTO)
- INSULATION RESISTANCE
- HIGH VOLTAGE TEST
- LOOP IMPEDANCE AND PROSPECTIVE FAULT CURRENT
- RCD TESTS
- DISCHARGING TIME
- VOLTAGE, FREQUENCY, THREE-PHASE ROTARY FIELD
- FUNCTIONAL TEST

SWITCHGEAR TESTING

- CONTINUITY
- INSULATION RESISTANCE
- HIGH VOLTAGE TEST
- DISCHARGING TIME
- VOLTAGE, FREQUENCY, THREE-PHASE ROTARY FIELD
- FUNCTIONAL TEST

Technical specifications

1.1 Withstanding 1890 V, 2500 V

Withstanding voltage

Range	Resolution	Accuracy
0.00 - 3.00 kV	0.01 kV	(5 % of reading + 5 digit)

Withstanding current

Range	Resolution	Accuracy
0.0 - 99.9 mA	0.1 mA	(10 % of reading + 8 digit)

Output voltage: 1890 V (-0/+20 %), 2500 V (-0/+20 %), grounded
 Trip out current (mA): 2, 5, 10, 20, 50, 100; (accuracy ±10 %)

1.2 Withstanding 1000 V

Withstanding voltage

Range	Resolution	Accuracy
0.00 - 1.50 kV	0.01 kV	(5 % of reading + 5 digit)

Withstanding current

Range	Resolution	Accuracy
0.0 - 199.9 mA	0.1 mA	*(5 % of reading + 5 digit)
200 - 500 mA	1 mA	*(5 % of reading + 5 digit)

Output voltage / power: 1000 V -0 %, +20 % / 200 W at U_{mains} 230 V, grounded
 Trip out current (mA): 5, 10, 20, 50, 100, 200; (accuracy ±10 %)
 Timer (s): 2, 3, 5, 10, 30. START/STOP button must be pressed for operation

1.3 Discharging time

Range	Resolution	Accuracy
0.0 - 9.9 s	0.1 s	*(5 % of reading + 3 digit)

Peak voltage

Range	Resolution	Accuracy
0.0 - 550 V	1 V	*(5 % of reading + 5 digit)

1.4 Continuity

Continuity 10 A

Range	Resolution	Accuracy
0.00 Ω - 1.99 Ω	0.01 Ω	(5 % of reading + 3 digits)

Continuity 200 mA

Range	Resolution	Accuracy
0.00 Ω - 1.99 Ω	0.01 Ω	±(5 % of reading + 3 digits)

Open circuit voltage: <9 V AC

1.5 Insulation resistance, Insulation -S resistance

Insulation resistance

Range	Resolution	Accuracy
0.000 M Ω - 0.500 M Ω	0.001 M Ω	±(10 % of reading + 5 digits)
0.501 M Ω - 1.999 M Ω	0.001 M Ω	±(5 % of reading + 3 digits)
2.00 M Ω - 19.99 M Ω	0.01 M Ω	
20.0 M Ω - 199.9 M Ω	0.1 M Ω	

Insulation -S resistance

Range	Resolution	Accuracy
0.000 M Ω - 0.500 M Ω	0.001 M Ω	±(10 % of reading + 5 digits)
0.501 M Ω - 1.999 M Ω	0.001 M Ω	±(5 % of reading + 3 digits)
2.00 M Ω - 19.99 M Ω	0.01 M Ω	

Nominal voltages: 250 V DC, 500 V DC (-0 %, +10 %)

1.6 Subleakage current, Subleakage -S current

Substitute leakage current

Range	Resolution	Accuracy
0.00 mA - 19.99 mA	0.01 mA	±(5 % of reading + 5 digits)

Open circuit voltage: <50 V AC at rated mains voltage

1.7 Differential leakage current

Range	Resolution	Accuracy
0.00 mA - 9.99 mA	0.01 mA	±(5 % of reading + 5 digits)

1.8 Power / Functional test

Apparent power

Range	Resolution	Accuracy
0.00 kVA - 4.00 kVA	0.01 kVA	±(5 % of reading + 3 digits)

1.9 Touch leakage current

Range	Resolution	Accuracy
0.00 mA - 2.50 mA	0.01 mA	±(10 % of reading + 5 digits)

1.10 Polarity test

Test voltage <50 V AC
 Detects Pass, L-open, N-open, PE-open, L-N crossed, L-PE crossed, N-PE crossed, L-N shorted, L-PE shorted, N-PE shorted, multiple faults

1.11 Clamp current TRMS current

Range	Resolution	Accuracy*
0.00 mA - 9.99 mA	0.01 mA	±(5 % of reading + 10 digits)
10.0 mA - 99.9 mA	0.1 mA	±(5 % of reading + 5 digits)
100 mA - 999 mA	1 mA	±(5 % of reading + 5 digits)
1.00 A - 9.99 A	0.01 A	±(5 % of reading + 5 digits)
10.0 A - 24.9 A	0.1 A	±(5 % of reading + 5 digits)

1.12 PRCD testing

Portable RCD trip-out time

Range	Resolution	Accuracy
0 ms - 300 ms ($\frac{1}{2} \times I_{\Delta N}$)	1 ms	± 3 ms
0 ms - 300 ms ($I_{\Delta N}$)	1 ms	
0 ms - 40 ms ($5 \times I_{\Delta N}$)	1 ms	

Test currents ($I_{\Delta N}$): 10 mA, 15 mA, 30 mA
 Test current multipliers: $\frac{1}{2} \times I_{\Delta N}$, $I_{\Delta N}$, $5 \times I_{\Delta N}$
 Test modes: single, autotest

1.13 RCD testing

1.13.1 General data

Nominal residual current (mA): 10, 30, 100, 300, 500, 1000
 Test current options: $0.5 \times I_{\Delta N}$, $I_{\Delta N}$, $2 \times I_{\Delta N}$, $5 \times I_{\Delta N}$
 Test current shape: Sine-wave (AC), pulsed (A)
 RCD type: G (non-delayed), S (time-delayed)

1.13.2 Contact voltage RCD-Uc

Range	Resolution	Accuracy
0.0 - 19.9 V	0.1 V	(-0 % / +15 %) of reading ± 10 digits
20.0 - 99.9 V		(-0 % / +15 %) of reading

Test current: max. $0.5 \times I_{\Delta N}$

1.13.3 Trip-out time

Range	Resolution	Accuracy
0.0 - 40.0 ms	0.1 ms	±1 ms
0.0 - max. time (ms)	0.1 ms	±3 ms

Test current: $\frac{1}{2} \times I_{\Delta N}$, $I_{\Delta N}$, $2 \times I_{\Delta N}$, $5 \times I_{\Delta N}$

1.13.4 Trip-out current

Range	Resolution	Accuracy
$0.2 \times I_{\Delta N}$ - $1.1 \times I_{\Delta N}$ (AC type)	$0.05 \times I_{\Delta N}$	±0.1 $\times I_{\Delta N}$
$0.2 \times I_{\Delta N}$ - $1.5 \times I_{\Delta N}$ (A type, $I_{\Delta N} \geq 30$ mA)	$0.05 \times I_{\Delta N}$	±0.1 $\times I_{\Delta N}$
$0.2 \times I_{\Delta N}$ - $2.2 \times I_{\Delta N}$ (A type, $I_{\Delta N} < 30$ mA)	$0.05 \times I_{\Delta N}$	±0.1 $\times I_{\Delta N}$

1.14 Fault loop impedance

1.14.1 Zs

Fault loop impedance / Prospective fault current

Range (Ω)	Resolution (Ω)	Accuracy
0.00 - 9.99	0.01	±(5 % of reading + 5 digits)
10.0 - 99.9	0.1	
100 - 999	1	±10 % of reading
1.00 k - 9.99 k	10	

Test current up to 14A

Nominal voltage range: 30 V - 500 V (45 Hz - 65 Hz)

1.14.2 Zs(rcd), Rs(rcd)

Fault loop impedance / Prospective fault current

Measuring range (Ω)	Resolution (Ω)	Accuracy
0.00 - 9.99	0.01	$\pm(5\% \text{ of reading} + 10 \text{ digits})$
10.0 - 99.9	0.1	
100 - 999	1	$\pm 10\% \text{ of reading}$
1.00k - 9.99k	10	

Nominal voltage range: 50 V - 500 V (45 Hz - 65 Hz)
No trip out of RCD.

1.14.3 High precision fault loop impedance Z m Ω L-Pe (with accessory A 1143)

Measuring range (m Ω)	Resolution (m Ω)	Accuracy
0.0 - 199.9	0.1	$\pm(5\% + 1 \text{ m}\Omega)$
200 - 1999	1	
2.00 - 19.99	10	5 %

Nominal voltage range: **100 V - 530 V**
Nominal frequency: 50 Hz

1.14.4 Contact voltage

Measuring range (V)	Resolution (V)	Accuracy
0 - 100	1	$\pm(10\% + 3 \text{ digits})$

1.15 Line impedance

Measuring range (Ω)	Resolution (Ω)	Accuracy
0.00 - 9.99	0.01	$\pm(5\% \text{ of reading} + 5 \text{ digits})$
10.0 - 99.9	0.1	
100 - 999	1	$\pm 10\% \text{ of reading}$
1.00k - 9.99k	10	

Test current up to: **14A**

1.15.1 High precision line impedance with A 1143)

Measuring range (m Ω)	Resolution (m Ω)	Accuracy
0.1 - 199.9	0.1	$\pm(5\% + 1 \text{ m}\Omega)$
200 - 1999	1	
2.00 - 19.99	10	5 %

Nominal voltage range: 100 V - 440 V
Nominal frequency: 50 Hz
Maximum test current: **350A**

1.16 Voltage, Frequency and Phase rotation

1.16.1 Phase rotation

Result displayed	1,2,3 or 3,2,1

Nominal system voltage range: 100 V AC - 550 V AC
Nominal frequency range: 14 Hz - 500 Hz

1.16.2 Voltage, Frequency

Range	Resolution	Accuracy
0 - 550 V	1 V	$\pm(2\% \text{ of reading} + 2 \text{ digits})$

Range (Hz)	Resolution (Hz)	Accuracy
0.0, 14.0 - 499.9	0.1	$\pm(0.2\% \text{ of reading} + 1 \text{ digit})$

1.17 General data

Rated supply voltage: 110 V / 230 V AC
Frequency of supply voltage: 50 Hz, 60 Hz
Max. power consumption: 300 VA (without DUT)
Rated DUT: 16 A resistive, 1.5 kW motor
Overvoltage category:
Instrument: CAT II / 300 V
Test socket: CAT II / 300 V
TP1 test socket: CAT III / 300 V
Plug test cable: CAT II / 300 V
Universal test cable: CAT III / 300 V
Protection classification: Class I
Pollution degree: 2
Degree of protection: IP 50 (closed and locked cover) / IP 20 main test socket
Case: shock proof plastic / portable
Display: 240*128 dots graphic matrix display with backlight
Dimensions (w×h×d): 33.5 cm × 16.0 cm × 33.5 cm
Weight (with standard accessories): 8.4 kg
Memory: 6000 memory locations
Interfaces: RS232, USB
Working temperature range: 0 °C - +40 °C
Maximum relative humidity: 85 % RH (0 °C - 40 °C), non-condensing

Ordering information:

Standard set

Part No. MI 3321hw2



- Instrument MultiservicerXA-hw2
- HV test lead
- Plug test cable
- 3 wire test lead
- Test lead - black, 1.5 m
- Test lead - red, 1.5 m
- Test lead - red, 4 m
- Test lead - green, 1.5 m
- Test probe, black
- Test probe, red
- Test probe, green
- Test probe, blue
- Crocodile clip black, 3 pcs
- PC SW PATLink PRO with RS232 and USB cable
- Protective bag for accessories
- Instruction manual
- Calibration certificate

Optional accessories:

Photo	Order No.	Acc. decription
	A 1105	Barcode scanner
	A 1106	Barcode labels, 1000 pcs
	A 1107	RFID reader / writer
	A 1108	RFID tags, 50 pcs
	A 1276	Label printer with power and data cables
	A 1295	Spare label roll for A 1276
	A 1143	Euro Z 290 A
	A 1203	Upgrade code PATLink PRO to PATLink PRO Plus
	A 1207	Three phase adapter
	A 1283	Shielded leakage current clamp
	A 1447	PRCD Extension adapter (from HW4)
	S 2012	Continuity test lead, 10 m, 2 pcs (red, black)

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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