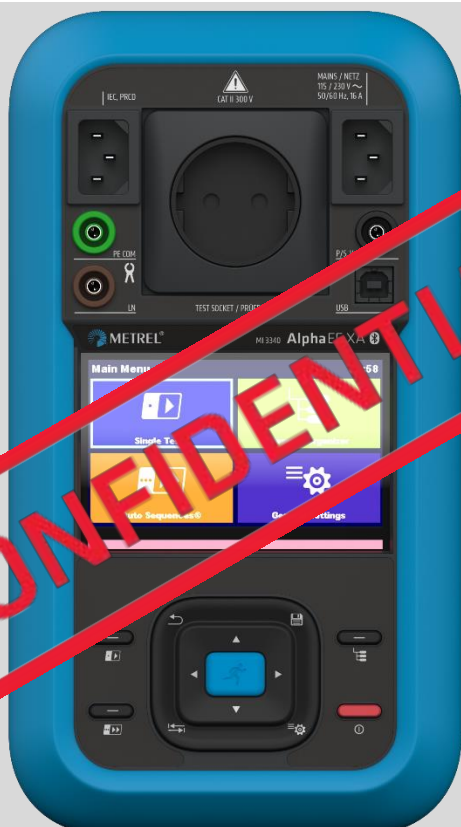


Safety of medical equipment/Electrical Equipment

MI 3340 M AlphaEE XA

Safety of medical equipment/Electrical Equipment



The **MI 3340 M AlphaEE XA** is Metrel's latest tester for verifying the electrical safety of medical equipment. It complies with **ANSI/AAMI ES1, NFPA 99**, and selected parts of **IEC 62353** and **IEC 60601-1** standards. Designed primarily for **recurrent testing** and **post-repair inspections** of medical devices where **patient lead testing is not required**, the AlphaEE XA offers a dependable solution for healthcare safety compliance.

The **cutting-edge AlphaEE XA** features a newly developed, ergonomic housing that redefines ease and comfort in medical equipment testing. Engineered for **robust performance and optimal balance**, it enables **effortless one-handed operation**, making it ideal for professionals in dynamic environments.

With a **user-friendly interface**, the instrument offers both **touchscreen control** and **function key navigation**, allowing users to choose their preferred mode of operation. This dual-interface design enhances flexibility and efficiency—whether you're performing quick routine checks or conducting in-depth diagnostics.

MEASURING FUNCTIONS

- Visual inspections;
- Auto test (Continuity + Insulation resistance + Alternative leakage)
- Continuity (EN 50699) 200mA; **10A peak current**;
- Protective earth resistance (IEC 60601) 200mA; **10A peak current**;
- Ground Wire Resistance (AAMI/NFPA 99) 200mA; **10A peak current**;
- Equipment leakage (EN 62353), (**Direct**, Differential, Alternative);
- Earth Leakage Current (IEC 60601) *SfcN, Polarity Nor./Rev.*;
- Ground Wire Leakage Current (AAMI/NFPA 99) *SfcN, Polarity Nor./Rev.*;
- Touch leakage current (EN 62353) (Direct, Alternative);
- Enclosure Leakage current (IEC 60601) *SfcN/SfcPE, Polarity Nor./Rev.*;
- Chassis Leakage Current (AAMI/NFPA 99) *SfcN/SfcPE, Polarity Nor./Rev.*;
- Touch Voltage (Predelana funkcija SELV/PELV)
- Insulation Resistance (Riso, Riso-S) 50V, 100V, 250V, 500V;
- Insulation Resistance Medical (LN-PE, LN-P/S, LN-AP, PE-AP);
- Protective conductor current (Direct, Residual, Alternative);
- Leaks & Power (Itou, Idiff, P, S, Q, PF, THDu, THDi, Cos ϕ , I, U);
- Point to Point Leakage current (Direct)
- Power (P, S, Q, PF, THDu, THDi, Cos ϕ , I, U);
- Voltage, SELV/PELV;
- Polarity / Active polarity test;
- Clamp current;*;
- Socket test;
- Functional inspections.

KEY FEATURES

- **Ergonomic housing:** Experience ultimate convenience with our ergonomic housing, designed for effortless single-handed operation.
- **Li-Ion battery:** Enjoy extended use and rapid recharging with Li-Ion battery, leveraging advanced Li-Ion technology for longer operation times and quicker charge cycles.
- **Pre-defined AUTOSEQUENCE®s:** According to: **ANSI/AAMI ES1, NFPA99, IEC 62353 and IEC 60601-1**.
- Simulation of **Single fault conditions, Open Earth, Open Neutral**.
- **Insulation resistance test (50V, 100V):** Lower test voltages at insulation resistance tests make it easy to safely evaluate charging stations for e-bikes and other electric transportation devices.
- **Active polarity test:** Ensure flawless functionality with our active polarity test, specifically designed to verify devices—such as smart extension leads—that require mains voltage to operate.
- **Colour touch screen:** Offers users a quick overview and effortless parameter adjustment, enhancing both efficiency and user experience.
- **Auto Continuity:** The **Auto start** feature enables a rapid and efficient assessment of devices with a larger number of metal parts that require inspection.
- **BlackBox protocol:** The primary purpose of the Black Box protocol is to enable execution of Single tests and AutoSequences via remote applications.
- **PC SW Metrel ES Manager:** Enables creation of test structures, user-defined AUTOSEQUENCE®s, professional test reports and data transfer for archiving.
- **aMESM Android SW:** Enables QR code scanning, and uploading of pre-prepared user-defined AUTOSEQUENCE®s.

* (With optional A 1579).

TECHNICAL SPECIFICATION

FUNCTION		MEASURING RANGE	RESOLUTION	ACCURACY
Continuity / Protective earth resistance				
¹ Continuity (200 mA)	R	0.00 Ω ... 19.99 Ω	0.01 Ω	±(2 % of reading + 2 D)
¹ Continuity (10 A peak current)		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 ... 1999 Ω	1 Ω	± 5 % of reading
Insulation Resistance (Riso, Riso-S)				
² Insulation resistance, Insulation resistance – S (50 V, 100 V)	Riso Riso - S	0.00 MΩ ... 19.99 MΩ	0.1 MΩ	±(3 % of reading + 2 D)
² Insulation resistance, Insulation resistance – S (250 V, 500 V)	Riso Riso - S	0.00 MΩ ... 19.99 MΩ 20.0 MΩ ... 99.9 MΩ 100.0 MΩ ... 199.9 MΩ	0.01 MΩ 0.1 MΩ 0.1 MΩ	±(3 % of reading + 2 D) ± 5 % of reading ± 10 % of reading
Output voltage	Um	0 V ... 600 V	1 V	±(3 % of reading + 2 D)
Insulation Resistance Riso (medical equipment)				
⁸ Riso	Riso Riso - S	0.00 MΩ ... 19.99 MΩ 20.0 MΩ ... 99.9 MΩ	0.01 MΩ 0.1 MΩ	±(3 % of reading + 2 D) ± 5 % of reading
Output voltage	Um	0 V ... 600 V	1 V	±(3 % of reading + 2 D)
Ipe Leakage				
³ PE leakage current	Ipe	0.000 mA ... 1.999 mA 2.00 mA ... 19.99 mA	1 µA 0.01 mA	±(3 % of reading + 3 D) ± 5 % of reading
Power	P	0 W ... 19.99 W 20 W ... 199.9 W 200 W ... 1999 W 2.00 kW ... 3.70 kW	0.01 W 0.1 W 1 W 10 W	±(5 % of reading + 5 D) ± 5 % of reading ± 5 % of reading ± 5 % of reading
Differential Leakage				
⁴ Differential leakage current	Idiff	0.000 mA ... 1.999 mA 2.00 mA ... 19.99 mA	1 µA 0.01 mA	±(3 % of reading + 3 D) ± 5 % of reading
Power	P	0 W ... 19.99 W 20 W ... 199.9 W 200 W ... 1999 W 2.00 kW ... 3.70 kW	0.01 W 0.1 W 1 W 10 W	±(5 % of reading + 5 D) ± 5 % of reading ± 5 % of reading ± 5 % of reading
Substitute Leakage Current, Substitute leakage current – S				
⁵ Substitute Leakage Current, Substitute leakage current – S	Isub Isub - S	0.00 mA ... 1.99 mA 2.00 mA ... 19.99 mA	0.01 mA 0.01 mA	±(3 % of reading + 3 D) ± 5 % of reading
Cont+Ins+Sub		Refer to technical specification for Continuity (R), Insulation Resistance (Riso) and Sub-Leakage current (Isub).		
Touch Leakage				
³ Touch leakage current	Itou			
Power	P			
Equipment Leakage/Earth Leakage/Ground Wire Leakage				
⁹ Equipment leakage current (direct, differential, alternative)	Ieq	0.000 mA ... 1.999 mA 2.00 mA ... 19.99 mA	1 µA 0.01 mA	±(3 % of reading + 3 D) ± 5 % of reading
Ulpe (direct, differential, alternative)	Ulpe	0 V ... 299 V	0 V ... 299 V	
Power (direct, differential)	P	0.00 W ... 19.99 W 20.0 W ... 199.9 W 200 W ... 1999 W 2.00 kW ... 3.70 kW	0.01 W 0.1 W 1 W 10 W	±(5 % of reading + 5 D) ± 5 % of reading ± 5 % of reading ± 5 % of reading
Touch Current/Enclosure Leakage/Chassis Leakage				
³ Touch current	Itou	0.000 mA ... 1.999 mA 2.00 mA ... 19.99 mA	1 µA 0.01 mA	±(3 % of reading + 3 D) ± 5 % of reading
Ulpe	Ulpe	0 V ... 299 V	1 V	±(2 % of reading + 2 D)
Power	P	0.00 W ... 19.99 W 20.0 W ... 199.9 W 200 W ... 1999 W 2.00 kW ... 3.70 kW	0.01 W 0.1 W 1 W 10 W	±(5 % of reading + 5 D) ± 5 % of reading ± 5 % of reading ± 5 % of reading
Leak's & Power				
Power (active)	P	0 W ... 19.99 W 20 W ... 199.9 W 200 W ... 1999 W 2.00 kW ... 3.70 kW	0.01 W 0.1 W 1 W 10 W	±(5 % of reading + 5 D) ± 5 % of reading ± 5 % of reading ± 5 % of reading
³ Touch leakage current	Itou	0.000 mA ... 1.999 mA 2.00 mA ... 19.99 mA	1 µA 0.01 mA	±(3 % of reading + 3 D) ± 5 % of reading
⁴ Differential leakage current	Idiff	0.000 mA ... 1.999 mA 2.00 mA ... 19.99 mA	1 µA 0.01 mA	±(3 % of reading + 3 D) ± 5 % of reading
Power (apparent)	S	0 VA ... 19.99 VA 20 VA ... 199.9 VA 200 VA ... 1999 VA 2.00 k VA ... 3.70 k VA	0.01 VA 0.1 VA 1 VA 10 VA	±(5 % of reading + 5 D) ± 5 % of reading ± 5 % of reading ± 5 % of reading
Power (reactive)	Q	± (0.00 var ... 19.99 var) ± (20.0 var ... 199.9 var) ± (200 var ... 1999 var) ± (2.00 k var ... 3.70 k var)	0.01 var 0.1 var 1 var 10 var	±(5 % of reading + 5 D) ± 5 % of reading ± 5 % of reading ± 5 % of reading
Power factor	PF	0.00 i ... 1.00 i 0.00 c ... 1.00 c	0.01	±(5 % of reading + 5 D)
Total Harmonic Distortion (voltage)	THDU	0.0 % ... 99.9 %	0.1 %	±(5 % of reading + 5 D)
Total Harmonic Distortion (current)	THDI	0 mA ... 999 A 1.00 mA ... 16.00 A	1 mA 10 mA	±(3 % of reading + 5 D) ± 5 % of reading
Cosine φ	Cosφ	0.00 i ... 1.00 i	0.01	±(5 % of reading + 5 D)

		0.00 c ... 1.00 c		
Current	I	0 mA ... 999 A 1.00 A ... 16.00 A	1 mA 10 mA	±(3 % of reading + 5 D) ± 3 % of reading
Voltage	U	0.0 V ... 199.9 A 200 V ... 264 V	0.1 V 1 V	±(3 % of reading + 10 D) ± 3 % of reading
Point to point leakage				
³ Touch leakage current	Itou	0.000 mA ... 1.999 mA 2.00 mA ... 19.99 mA	1 µA 0.01 mA	±(3 % of reading + 3 D) ± 5 % of reading
Power				
Power (active)	P	0 W ... 19.99 W 20 W ... 199.9 W 200 W ... 1999 W 2.00 kW ... 3.70 kW	0.01 W 0.1 W 1 W 10 W	±(5 % of reading + 5 D) ± 5 % of reading ± 5 % of reading ± 5 % of reading
Power (apparent)	S	0 VA ... 19.99 VA 20 VA ... 199.9 VA 200 VA ... 1999 VA 2.00 k VA ... 3.70 k VA	0.01 VA 0.1 VA 1 VA 10 VA	±(5 % of reading + 5 D) ± 5 % of reading ± 5 % of reading ± 5 % of reading
Power (reactive)	Q	± (0.00 var ... 19.99 var) ± (20.0 var ... 199.9 var) ± (200 var ... 1999 var) ± (2.00 k var ... 3.70 k var)	0.01 var 0.1 var 1 var 10 var	±(5 % of reading + 5 D) ± 5 % of reading ± 5 % of reading ± 5 % of reading
Power factor	PF	0.00 i ... 1.00 i 0.00 c ... 1.00 c	0.01	±(5 % of reading + 5 D)
Total Harmonic Distortion (voltage)	THDU	0.0 % ... 99.9 %	0.1 %	±(5 % of reading + 5 D)
Total Harmonic Distortion (current)	THDI	0 mA ... 999 A 1.00 mA ... 16.00 A	1 mA 10 mA	±(3 % of reading + 5 D) ± 5 % of reading
Cosine φ	Cosφ	0.00 i ... 1.00 i 0.00 c ... 1.00 c	0.01	±(5 % of reading + 5 D)
Current	I	0 mA ... 999 A 1.00 A ... 16.00 A	1 mA 10 mA	±(3 % of reading + 5 D) ± 3 % of reading
Voltage	U	0.0 V ... 199.9 A 200 V ... 264 V	0.1 V 1 V	±(3 % of reading + 10 D) ± 3 % of reading

FUNCTION	TEST PRINCIPLE
⁶ Polarity	Normal ... test voltage (230 V a.c.) Active ... test voltage (mains voltage)

FUNCTION		MEASURING RANGE	RESOLUTION	ACCURACY
Clamp current		0.10 mA ... 9.99 mA	0.01 mA	±(5 % of reading + 10 D)
	I	10.0 mA ... 99.9 mA	0.1 mA	±(5 % of reading + 5 D)
	I _{diff}	100 mA ... 999 mA	1 mA	±(5 % of reading + 5 D)
	I _{pe}	1.00 mA ... 9.99 mA	0.01 A	±(5 % of reading + 5 D)
		10.0 A ... 24.9 mA	0.1 A	±(5 % of reading + 5 D)
Enhanced TRMS test				
^x Voltage	U _{ln} , U _{npe} , U _{lpel}	80 V ... 300 V	1 V	±(3 % of reading + 3 D)
R loop	R _l	0.0 kΩ ... 1.9 kΩ	0.1kΩ	±(5 % of reading + 5 D)
SELV/PELV Voltage				
⁷ Voltage (u trms, U _{ac})	U _{trms} U _{ac}	0.0 V ... 199.9 V 200 V ... 264 V	0.1 V 1 V	±(2 % of reading + 10 D) ± 2 % of reading
Voltage U _{dc}	U _{dc}	0.0 V ... 199.9 V 200 V ... 264 V	0.1 V 1 V	±(2 % of reading + 10 D) ± 2 % of reading
Frequency	Freq	0 Hz (DC) 15.0 Hz ... 499.9 Hz		Indicative ±(0.2 % of reading + 1 D)

¹ Operating range (acc. to EN 61557-4)	0.08 Ω ... 199.9 Ω
Test currents	0.2 A, 10A
Current source	> 0.2 A at R < 2 Ω > 10 A @ R < 0.1 Ω @ 230 V < 7 V d.c. < 9 V a.c.
Open circuit voltage, > 0.2 A	
Open circuit voltage, > 10 A	
² Operating range (acc. to EN 61557-2)	0.08 MΩ ... 199.9 MΩ
Nominal voltages U _n	50 V, 100 V, 250 V, 500 V (- 0 %, + 10 %)
Short circuit current	max. 2.0 mA
³ Operating range (acc. to EN 61557-16)	0.010 mA ... 19.99 mA
⁴ Operating range (acc. to EN 61557-16)	0.010 mA ... 19.99 mA
Influence of load current	< 0.02 mA / A
⁵ Operating range (acc. to EN 61557-2)	0.02 mA ... 19.99 mA
Open circuit voltage	230 V a.c., 110 V a.c.
Current calculated to mains supply voltage (110 V or 230 V) is displayed.	
⁶ Test voltage (active)	> 230 V a.c.
Maximal current	< 2 mA
⁷ Result type	True r.m.s (TRMS), AC, DC
Input resistance	Input P/S 200 kΩ to earth Input PE 200 kΩ to earth
Nominal frequency range	0 Hz (DC), 15 Hz ... 500 Hz
Bandwidth	1 kHz
⁸ Operating range (acc. to EN 61557-2)	0.08 MΩ ... 199.9 MΩ
Nominal voltages U _n	500 V (- 0 %, + 10 %)
Short circuit current	max. 2.0 mA
⁹ Operating range direct and differential method (acc. to EN 61557-16)	0.010 mA ... 19.99 mA
Operating range alternative method (acc. to EN 61557-16)	0.020 mA ... 19.99 mA
Influence of load current (differential method)	< 0.02 mA/A

Mains supply	
Supply voltage, frequency	115 V / 230 V AC, 50 Hz / 60 Hz
Supply voltage tolerance	±10 %
Max. power consumption	300 VA (without load on test socket)
Max. load	10 A continuous, 16 A short duration, 1.5 kW motor
Mains supply overvoltage category	CAT II / 300V
Altitude	≤ 2000 m
Measuring categories	
Instrument	Cat II / 300 V
Test socket	Cat II / 300 V
Plug test cable	Cat II / 300 V
Altitude	≤ 2000 m
Protection classifications	
Power supply	Class I, mains supply, Class II, only battery supply
Pollution degree	2
Degree of protection	IP 40 IP 20 (mains test socket)
Case	Shock proof plastic / portable
Operation	Indoor use
Display	Colour TFT display, 4.3 inch, 480 x 272 pixels
Touch screen	Capacitive
EMC classifications	
Emission	Class B
Immunity	Industrial environment
Communication	
Memory	depends on microSD card size
RS232 interfaces	2
USB 2.0	Standard USB Type B
Bluetooth	Class 1
Dimensions (w×h×d)	15 cm × 7 cm × 17 cm
Weight	1.7 kg
Reference conditions	
Reference temperature range	15 °C ... 35 °C
Reference humidity range	35 % ... 65 % RH
Operation conditions	
Working temperature range	0 °C ... +40 °C
Maximum relative humidity	85 % RH (0 °C ... 40 °C), non-condensing
Storage conditions	
Temperature range	-10 °C ... +60 °C
Maximum relative humidity	90 % RH (-10 °C ... +40 °C) 80 % RH (40 °C ... 60 °C)

OPTIONAL ACCESSORIES

Part No.	Description	Photo	Part No.	Description
	A 1652 Barcode scanner Bluetooth		A 1579 Leakage current clamp I=0.5 - 10 A $\Phi=32$ mm	
	A 1653 QR/Barcode scanner Bluetooth		A 1488 BT Able printer, (battery or mains operated)	
	A 1297 Crocodile clip BR CAT III 1000V		A 1489 Label printer Able, with power and data cables, (battery or mains operated)	
	A 1309 Crocodile clip GN CAT III 1000V		A 1520 Labels for Able printer 250 pcs	
	A 1298 Measurement Tip BR CAT III 1000V		A 1341 Test lead L=1,5m GN 2,5mm2 stack banana plug/stack banana plug	
	A 1062 Measurement Tip GN CAT III 1000V		A 1342 Test lead L=1,5m BR 2,5mm2 stack banana plug/stack banana plug	
	A 1550 Soft padded carrying bag Size: XXL		A 1331 Test lead L=1,5m BK 1,5mm2 Crocodile clip/stack banana plug	
	P 1101 BASIC to PRO licence key upgrade for Metrel ES Manager		A 1271 Carrying bag (S)	
	P 1102 Metrel FW Profile Licence Key With PRO SW Set		SW 1304 aMESM android SW	



Standard set

- Instrument MI 3340 AlphaEE XA
- A 1493 Power cable L=2m 1.5mm² EU, 2pcs
- A 1340 Test lead L=1,5m 2,5mm² Black
- A 1014 Test probe Black CAT III 1000V
- A 1013 Crocodile clip Black CAT III 1000V
- A 1289 Soft padded carrying bag, Size: M
- A 1727 USB cable L=1m
- Calibration certificate
- Short instruction manual
- Instruction manual*
- Metrel ES Manager BASIC Licence*
- SW 1201 Metrel ES Manager (program installation)*
- *SW 1201 Metrel ES Manager and all documentation can be downloaded free of charge from Metrel Web server (<https://www.metrel.si/en/downloads/>) or Metrel Documentation center (<https://doc.metrel.si>).