AMPI-520

Multifunction electrical installations meter

Diagnostic testing of electrical installations in accordance with IEC 61557

AMPI-520

Loop, RCD, insulation and earth testing in a single instrument

amperis

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Measures short-circuit loop impedance, RCD tripping current and time, insulation and earth resistance, continuity and phase sequence.

Overview

Rotary selector, function keys and graphic display

Short-circuit loop measurement

Impedance is measured with a 23 A (44 A phase-to-phase) short-circuit resistor, in the 95…440 V range at 45…65 Hz, with automatic short-circuit calculation and detection of the phase-to-neutral and phase-to-phase voltage. A UNI-Schuko plug allows automatic measurement, and an adapter extends the test to three-phase networks.

- Loop measurement with 0.01 Ω resolution, without tripping RCDs of 30 mA or above.
- Testing of general and selective RCDs for a rated differential current of 10, 30, 100, 300, 500 and 1000 mA, types AC, A and B.
- Trip and response time test (mode tA) and RCD tripping current test (IA) with sine-wave, unidirectional half-period and DC test currents.

Insulation, earth and continuity

Insulation resistance is measured with 250 V, 500 V or 1000 V test voltage up to 3 GΩ, with automatic discharge after the measurement and acoustic signals at 5 s intervals to obtain the characteristic curve. Earth resistance and bidirectional continuity of protective (PE) conductors are measured with self-calibration of the test leads, and phase sequence is checked and displayed.

- Automatic measurement of all resistances on 3, 4 or 5-wire cables with the optional AUTO-ISO adapter.
- Overvoltage protection, battery-charge indicator, auto shut-off and USB interface.
- Memory divided into 10 banks of 99 records each.

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The meter also measures alternating voltage, current, frequency, active, reactive and apparent power and power factor, and lets the stored records be transferred to a PC.

Network measurement and software

Test leads, clamps and probes supplied with the instrument

Voltage, frequency and power factor

- Phase-to-neutral voltage U L-N: 100…440 V.
- Phase-to-phase voltage U L-L: 100…440 V, at 45…65 Hz, with display of phase-to-phase voltages and phase sequence (forward, reverse).
- Frequency: 45.0…65.0 Hz for voltages in the 50…440 V range, accuracy ± 0.1 % of the measured value + 1 digit.
- Power factor cosφ: 0.00…1.00, resolution 0.01.

Active (P), reactive (Q) and apparent (S) power are measured and displayed together with cosφ; the manufacturer does not publish a separate numeric range, resolution or accuracy for the current or power channels.

Treatment of the records on a PC

The measurements stored in the instrument's 10 memory banks can be downloaded to a PC over the USB interface. Dedicated software transfers the stored records and lets them be organised into documentation of the electrical measurements, and a second program is available to create the corresponding drawings and diagrams for the report.

Practical use

- Periodic diagnostic testing of electrical installations under IEC 61557.
- Certification records for electrical installers, with the calibration certificate supplied.
- Auto shut-off and continuous battery-charge indication for extended field use.

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Short-circuit loop impedance Z L-PE, Z L-N, Z L-L

Measured with the 23/40 A current range in accordance with IEC 61557: 0.13…1999.9 Ω (for 1.2 m leads).

Range	Resolution	Accuracy
0.00…19.99 Ω	0.01 Ω	±(5 % m.v. + 3 digits)
20.0…199.9 Ω	0.1 Ω	±(5 % m.v. + 3 digits)
200…1999 Ω	1 Ω	±(5 % m.v. + 3 digits)

Short-circuit loop impedance Z L-PE RCD (RCD range, 15 mA)

Range	Resolution	Accuracy
0.00…19.99 Ω	0.01 Ω	±(6 % m.v. + 10 digits)
20.0…199.9 Ω	0.1 Ω	±(6 % m.v. + 5 digits)
200…1999 Ω	1 Ω	±(6 % m.v. + 5 digits)

Without RCD tripping (IΔn ≥ 30 mA): voltage range 95…270 V (for Z L-PE and Z L-N) and 95…440 V (for Z L-L); frequency 45…65 Hz.
RCD range (15 mA): voltage range 95…270 V; frequency 45…65 Hz.

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RCD trip and response time test (mode tA)

Measurement range in accordance with IEC 61557: 0 ms up to the upper limit of the displayed value.

Breaker type	Multiplication factor	Measuring range	Resolution	Accuracy
General	0.5×IΔn	0…300 ms	1 ms	±(2 % m.v. + 2 digits)
General	1×IΔn	0…300 ms	1 ms	±(2 % m.v. + 2 digits)
General	2×IΔn	0…150 ms	1 ms	±(2 % m.v. + 2 digits)
General	5×IΔn	0…40 ms	1 ms	±(2 % m.v. + 2 digits)
Selective	0.5×IΔn	0…500 ms	1 ms	±(2 % m.v. + 2 digits)
Selective	1×IΔn	0…500 ms	1 ms	±(2 % m.v. + 2 digits)
Selective	2×IΔn	0…200 ms	1 ms	±(2 % m.v. + 2 digits)
Selective	5×IΔn	0…150 ms	1 ms	±(2 % m.v. + 2 digits)

Accuracy of the differential current: for 0.5×IΔn, -8…0 %; for 1×IΔn, 2×IΔn and 5×IΔn, 0…8 %.

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RCD tripping current (IA) with sine-wave test current

Selected rated current	Range	Resolution	Test current	Accuracy
10 mA	3.3…10.0 mA	0.1 mA	0.3×IΔn…1×IΔn	±5 % IΔn
30 mA	9.0…30.0 mA	0.1 mA	0.3×IΔn…1×IΔn	±5 % IΔn
100 mA	33…100 mA	1 mA	0.3×IΔn…1×IΔn	±5 % IΔn
300 mA	90…300 mA	1 mA	0.3×IΔn…1×IΔn	±5 % IΔn
500 mA	150…500 mA	1 mA	0.3×IΔn…1×IΔn	±5 % IΔn
1000 mA	330…1000 mA	1 mA	0.3×IΔn…1×IΔn	±5 % IΔn

IA with unidirectional half-period sine wave, 6 mA DC offset

Selected rated current	Range	Resolution	Test current	Accuracy
10 mA	4.0…20.0 mA	0.1 mA	0.4×IΔn…2×IΔn	±10 % IΔn
30 mA	12.0…42.0 mA	0.1 mA	0.4×IΔn…2×IΔn	±10 % IΔn
100 mA	40…140 mA	1 mA	0.4×IΔn…1.4×IΔn	±10 % IΔn
300 mA	120…420 mA	1 mA	0.4×IΔn…1.4×IΔn	±10 % IΔn
500 mA	200…700 mA	1 mA	0.4×IΔn…1.4×IΔn	±10 % IΔn

The measurement can start from the positive or negative half of the leakage current.

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RCD tripping current (IA) with DC test current

Selected rated current	Range	Resolution	Test current	Accuracy
10 mA	4.0…20.0 mA	0.1 mA	0.4×IΔn…2×IΔn	±10 % IΔn
30 mA	12.0…60.0 mA	1 mA	0.4×IΔn…2×IΔn	±10 % IΔn
100 mA	40…200 mA	1 mA	0.4×IΔn…2×IΔn	±10 % IΔn
300 mA	120…600 mA	1 mA	0.4×IΔn…2×IΔn	±10 % IΔn
500 mA	200…1000 mA	1 mA	0.4×IΔn…2×IΔn	±10 % IΔn

Low-voltage test and continuity of the protective (PE) conductor

Range	Resolution	Accuracy
0.00…19.99 Ω	0.01 Ω	±(2 % m.v. + 3 digits)
20.0…199.9 Ω	0.1 Ω	±(2 % m.v. + 3 digits)
200…400 Ω	1 Ω	±(2 % m.v. + 3 digits)

The measurement is possible for a positive or negative leakage current. “m.v.” = measured value.

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Earthing resistance measurement RE

Voltage range in accordance with IEC 61557-5: 0.5…1999 Ω.

Range	Resolution	Accuracy
0.00…9.99 Ω	0.01 Ω	±(2 % m.v. + 4 digits)
10.0…99.9 Ω	0.1 Ω	±(2 % m.v. + 3 digits)
100…999 Ω	1 Ω	±(2 % m.v. + 3 digits)
1.00…1.99 kΩ	10 Ω	±(2 % m.v. + 3 digits)

Insulation resistance measurement

Range	Resolution	Accuracy
0…1999 kΩ	1 kΩ	±(3 % m.v. + 8 digits)
2.00…19.99 MΩ	0.01 MΩ	±(3 % m.v. + 8 digits)
20.0…199.9 MΩ	0.1 MΩ	±(3 % m.v. + 8 digits)
200…999 MΩ	1 MΩ	±(3 % m.v. + 8 digits)
1.00…3.00 GΩ	0.01 GΩ	±(4 % m.v. + 6 digits)

Measured in accordance with IEC 61557-2, depending on the applied test voltage: 50 V → 50 kΩ…250 MΩ; 100 V → 100 kΩ…500 MΩ; 250 V → 250 kΩ…1 GΩ; 500 V → 500 kΩ…2 GΩ; 1000 V → 1 MΩ…3 GΩ.
With UNI-Schuko connection, additional error of ± 2 %.

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Voltage, frequency and power factor measurement

Phase-to-neutral voltage U L-N (range)	100…440 V
Phase-to-phase voltage U L-L (range)	100…440 V (45…65 Hz)
Frequency (range)	45.0…65.0 Hz, for voltages in the 50…440 V range
Frequency (accuracy)	± 0.1 % of the measured value + 1 digit
Power factor cosφ (range)	0.00…1.00
Power factor cosφ (resolution)	0.01

Active (P), reactive (Q) and apparent (S) power are measured and shown together with cosφ. The manufacturer does not publish a numeric range, resolution or accuracy of its own for the current channel or for P, Q and S; this data is not included, in line with the rule of not adding data that is not published.

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Electrical safety, power supply and standards

Type of insulation	Double, in accordance with EN 61010-1 and IEC 61557, EMC
Measurement category	CAT IV 300 V in accordance with EN 61010-1
Protection class (EN 60529)	IP54
Power supply	LR14 alkaline batteries (5 units) or Ni-MH battery pack (optional)
Operating temperature	0...+50 °C
Standards	IEC 61557 (general), IEC 61557-2 (insulation resistance), IEC 61557-5 (earth resistance); EN 61010-1; EN 60529

Contents of supply

Standard	UNI-Schuko probe with start button (WS-03); 1.2 m test leads with banana plug (red, blue and yellow); test-lead reels with banana plug, 30 m red and 15 m blue; USB cable; pointed probes with banana connector (red, blue and yellow); alligator clips K02 (red and yellow); 0.3 m earth contact probe; L1 carrying case; carrying straps; LR14 (size C) battery holder and batteries; calibration certificate.
Optional	Test leads with banana plug, 5, 10 and 20 m (red); battery charger cable, also compatible with car lighter (12 V); AGT-16P, AGT-32P and AGT-63P three-phase plug adapters; AUTO-ISO-1000C adapter; TWR-1 universal-connection adapter for RCD testing; UNI-Schuko probe (WS-04); 0.8 m earth contact probe; L3 carrying case; C3 current clamp (Ø 52 mm); Ni-MH battery pack, 4.8 V 4.2 Ah; alligator clip K02 blue; cable clamp; test-lead reel; Z7 socket adapter; software for creating documentation of the electrical measurements and software for creating the corresponding drawings and diagrams.

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