

Installation Tester

UNILAP 100 XE

- Installation Tester as per DIN VDE 0100, ÖVE EN1, BS, SEV and NIV
- 2 years warranty
- 3 years calibration interval



Technical Data

General:

| | |
|---------------------------------|---|
| Display: | 3-½ digit (1999), 7-Segment-Liquid-Crystal-Display, 17 mm high, with illumination |
| Operating temp. range: | 0° C ... + 35° C |
| Working temp. range: | - 10° C ... + 50° C |
| Storage temp. range: | - 20° C ... + 60° C |
| Reference temp. range: | 23 °C ±2 °C |
| Intrinsic error: | Refers to the reference temperature |
| Temperature coefficient: | ± 0.1 % of m.v. / K |
| Operating error: | Refers to the operating temperature range IEC 61557-1 |
| Climatic class: | JWG as per DIN 40040 and IEC 654-1; Relative humidity 65 % annual mean, 85 % max., no damp. |
| Protection: | IP 40 as per DIN 40050 and IEC 529-2 |
| Safety class: | class II (□) 300 V, install. category III as per IEC 1010-1 / EN 61010-1, pollution degree 2. |
| Test voltage: | 3700 V as per IEC 1010-1 / EN 61010-1 |
| Input protection: | By software and varistors against voltages $U_{eff} > 600$ V and quick-acting fuses (6.3 A / 500 V) |
| Max. voltage to earth: | $U_{eff} = 300$ V |
| Clearance / creepage distances: | Correspond to IEC 1010-1 / EN 61010-1 |
| Emission: | Class B as per EN 50081-1 and IEC 61326-1 |
| Immunity: | Class A as per EN 50082-1 and IEC 61326-1 |
| Quality standard: | as per DIN ISO 9001 |

| | |
|------------------|--|
| Auxiliary power: | 6 pcs. 1.5 V alkaline manganese batteries (IEC LR 6) or accu 7.2 V / 1500 mAh (option) |
| Dimensions: | 265 x 265 x 90 mm (L x W x H) incl. lid and compartment for accessories |
| Weight: | approx. 2.3 kg without batteries and without accessories approx. 5.7 kg SET 1 in carrying case approx. 6.2 kg SET 2 in carrying case |

IrDA® Interface (Infrared Data Association) as standard. For easy PC-communication (remote control, data acquisition, reading of stored data).

Integrated data memory for 255 data records (~6000 measurement values).

Integrated real time clock with date. Barcode-reader useable.

The limits prescribed by the standards can be adapted individually.

A limit infringement is indicated by audible and optical warnings.

Automatic compensation for standard accessories.

Compensation for line extensions up to 5 Ω possible.

Protective conductor check

| | |
|----------------------|--|
| Nominal voltage: | 50 V ... 300 V AC / 15.3 ... 100 Hz between contact electrode and PE-line |
| Internal resistance: | Approx. 1.5 MΩ |

Phase indication

| | |
|----------------------|---|
| Nominal voltage: | 20 V ... 300 V AC / 15.3...420 Hz |
| Internal resistance: | Approx. 400 kΩ |
| Admiss. overload: | Max. $U_{eff} = 600$ V |
| Note: | The voltage of the "L" and "N" wire is measured to "PE", evaluated and a symbol indicates the live contact. |

Voltage (DC/AC), Frequency

| Range | Resolution | Frequency Range | Operating error |
|---------------------|------------|-------------------|---------------------|
| 0...50...440...550V | 1 V | DC, 15.3...420 Hz | ±(1% of mv +1dig) |
| 15.3...99.9...420Hz | 0.1...1Hz | 5...440V | ±(0.1% of mv +1dig) |

Internal resistance: 300...400 kΩ (L – N – PE)

Residual current operated device check

(FI-RCD / IEC 61557-6)

Measuring functions: RCD-test without tripping
Tripping test with pulses or ramp (tripping time, tripping current)
Fault voltage
Loop impedance, short-circuit current (without tripping)
Earth resistance (with probe)
Standard/ selective RCDs

Test currents: $I_{\Delta N}$ x1, x2, x5
positive, negative phase position
positive, negative pulsating dc current
pulses, current steps

Voltage range: 95 ... 145 V, 175 ... 300 V

Frequency range: 15.3 ... 17.5 Hz, 45 ... 65 Hz

Admissible overload: Max. U_{eff} = 600 V

| Rated residual operating current $I_{\Delta N}$ (mA) | Operating error | Notes |
|--|-----------------------------------|---|
| 0.3 x $I_{\Delta N}$: 10, 30, 100, 300, 500 | 0 ... -10 % of 0.3 $I_{\Delta N}$ | non-tripping test: 500 / 2000 ms |
| 1 x $I_{\Delta N}$: 10, 30, 100, 300, 500 | 0 ... +10 % of $I_{\Delta N}$ | with tripping test pulse, 500 ms |
| 2 x $I_{\Delta N}$: 10, 30, 100, 300, 500 | 0 ... +10 % of $I_{\Delta N}$ | with tripping test pulse, $I_{\Delta N max}$ = 500 mA |
| 5 x $I_{\Delta N}$: 10, 30, 100 | 0 ... +10 % | |
| 27...105 % of $I_{\Delta N}$ | ±10 % of $I_{\Delta N}$ | |

| | | |
|---|-----------|-----------|
| Variable rated residual current 6 ... 1000, resolution 1 mA | see above | see above |
|---|-----------|-----------|

| Fault voltage range (U_F) | Resolution | Operating error |
|-------------------------------|------------|------------------------------|
| 0.5 ... 99.9 V | 0.1 V | (0...± 8 % of mv. + 2 digit) |

Automatic test stop: U_F >50 V complies with IEC 1010

| Tripping time (t_A) | Resolution | Operating error |
|-------------------------|------------|-----------------|
| 0 ... 500 ms (300 ms) | 1 ms | ± 4 ms |

| Loop-impedance Z_S resp. earth resistance R_A | Resolution (Ω) | Operating error |
|---|----------------|--------------------------|
| 0.2 Ω...9.99 kΩ | 0.01Ω...10Ω | ± (10% of mv. + 4 digit) |

Test current period as per IEC 1010-1. Limitation of duration period taking into account the fault voltage as per IEC 61557-6 and IEC 1010-1.

Positive or negative pulsating direct current:

Tripping test - corresponding to the applicable standards which admit 0.35 ... 1.4 $I_{\Delta N}$ as tripping current. For ramp function the tripping current is shown as TRMS of the half-wave current.

Earthing resistance (RA ext ~) IEC 61557-5

Measuring method: Current / voltage measurement with probe

Voltage ranges: 95 ... 145 V, 175 ... 300 V, outside these ranges will not be started.

Frequency ranges: 15.3 ... 17.5 Hz, 45 ... 65 Hz

Admiss overload: Max. U_{eff} = 600 V before start, (for > 5 V no start), termination of measurement for U_{eff} > 50 V
Measuring time: max. as per IEC 1010, 2 ... 26 periods

Automatic compensation for standard accessories.

Compensation for line extensions up to 5 Ω possible.

| Probe voltage | Resolution | Operating error |
|---------------|------------|---------------------------|
| 1 ... 70 V | 1 V | ± (2 % of m.v. + 1 digit) |

| Measuring range | Resolution | Operating error |
|----------------------|----------------|---------------------------|
| 0.01Ω...0,15Ω...10kΩ | 0.1 Ω ... 10 Ω | ± (10% of m.v. + 3 digit) |

Test current: 1 A for < 20 Ω

Max. interference voltage: For U_{S-PE} > 20V no measurement

Max. probe resistance: 10 kΩ, for (R_A + R_{probe}) > 20 kΩ no start

Programmable limits: 0.01Ω ... 9.99 kΩ

Earthing resistance (RA int) IEC 61557-5

Measuring method: Current / voltage measurement with probe
Standard **3-pole measurement** and special function **4-pole measurement**

Admiss. overload: Max. U_{eff} = 600 V before start (for > 5 V no start), termination of measurement for U_{eff} > 50 V

Probe resistance: 10 kΩ, for (R_A + R_{probe}) > 20kΩ no start)

Programmable limits: 0.01Ω ... 9.99 kΩ

Test lead compensation: Possible when probe connected (3-pole measurement).

Measuring time: Approx. 3 sec, continuous measurement is possible (3-pole measurement).

Special function selective earthresistance measurement

Like standard function but:

Operating error: ± (20 % of m.v. + 3 dig)

Min. current through clip-on current transformer: 1 mA

Special function stake-less earthing measurement

Like special function but:

Measuring range: 0.01...9.9 Ω

Insulation resistance (RISO) IEC 61557-2

Measuring method: Current / voltage measurement

Nominal output voltage: 100 / 250 / 500 V DC

Open-circuit voltage: Approx. 105 / 260 / 520 V DC

Nominal current: > 1 mA DC (>2.5 mA DC at 250 V)

Short-circuit current: < 7 mA DC

Admiss. overload: Max. U_{eff} = 600 V AC; (test is locked)

| Measuring range | Resolution | Operating error |
|--|-----------------|---------------------------|
| 1 kΩ ... 3 kΩ ... 300 MΩ man | 1 kΩ...1 MΩ | ± (8 % of m.v. + 1 digit) |
| 1 kΩ ... 3 kΩ ... 10 MΩ auto | 1 kΩ ... 100 kΩ | |

Measuring time: As long as the "START" button is pressed; Subsequent automatic discharge of the test piece via 400 kΩ

Programmable limit: Riso Limit: 1 kΩ ... 299 MΩ (**man**)
1 kΩ ... 9.9 MΩ (**auto**)

AUTO: Test sequence N - PE, L - PE, L - N, programmable

| DC voltage | Resolution | Operating error |
|-------------|------------|---------------------------|
| 1 ... 520 V | 1 V | ± (8 % of m.v. + 5 Digit) |

Internal resistance: Approx. 400 kΩ (L/N-PE); serves as discharge resistance for any capacitors in the measuring circuit.

Max. interference voltage: U_{eff} = U_{10} of nominal output.
No measurement is started at higher voltages.

Loop impedance (ZS/R) L-PE or L-N (L) IEC 61557-3

Measuring method: Voltage drop as per IEC 61557

Nominal voltage: 95 ... 145 V, 175...300 V, 330 ... 440 V (only L-N (L))

Reference voltage: 110 / 230 / 400 V or 127 / 220 / 380 V AC or measured voltage

Frequency range: 15.3 ... 17.5 Hz, 45 ... 65 Hz

Test current:

| L-PE | L-N(L) | Voltage range | Test current | |
|------|--------|---------------|---------------|--------------|
| | | | Zs = 0 Ω | Zs = 200 Ω |
| X | X | 55 ... 145 V | 2.4...3.61 A | 0.2...0.61 A |
| X | X | 175 ... 300 V | 1.75...3.0 A | 0.58...1 A |
| | X | 330 ... 440 V | 2.75...3.67 A | 1...1.4 A |

| Measuring range | Resolution | Operating error |
|-----------------|----------------|--------------------------|
| 0.07 ... 199 Ω | 0.01 Ω ... 1 Ω | ± (5% of m.v. + 3 digit) |

Measuring time : Approx. 4 - 50 periods;
Duration as per IEC 1010

Mains imped. angle: $\cos \varphi > 0.5$

Max. inductance: 5 mH in voltage range > 175 V

Programmable limit: Zs LIMIT: 0.01 ... 199 Ω

Admiss. overload : Max. U_{eff} = 600 V AC
(measurement is not started outside the admissible voltage and frequency ranges)

Short-circuit current

| Range | Display | Resolution | Operating error |
|-------------|-----------|----------------|---|
| 1 A...10 kA | 1...40 kA | 1...10...100 A | results from I _k = $\frac{U_N}{Z_s}$ |

U_N as selected: 1: 110V, 230V, 400V
2: 127V, 220V, 380V resp.
3: measured voltage

Valid ranges for U_N: 95 ... 145 V, 175 ... 300 V, 330 ... 440 V
(only at Z_{S L-N})

Valid ranges for frequency: 15.3 Hz...17.5 Hz, 45 Hz ... 65 Hz

Earth electrode fault voltage (SEV 3569)

Earth electrode voltage, with probe only

| Range | Resolution | Measuring method |
|--------------------|------------|--|
| 0...U _N | 0.1 V | U _F = R _A · I _k |

Detection of rotary field direction IEC 61557-7

Voltage range: 20 ... 440 V AC, 15.3 ... 65 Hz

Admiss. overload: Max. U_{eff} = 600 V AC

Max. current to earth: < 3.5 mA

Rotary direction display: Symbol for right- / left-handed

Internal resistance: 200 kΩ ... 400 kΩ

"Elliptic rotary fields" with two L-conductors and the neutral conductor can also be tested.

Low resistance measurements (R1kΩ) IEC 61557-4

Measuring method: Current / voltage measurement with automatic pole reversal.

Open-circuit voltage: Approx. 20 V DC

Short-circuit current: > 200 mA DC

Admiss. overload: Max. U_{eff} = 600 V (before START),
no START for > 5 V

| Measuring range | Resolution | Operating error |
|-------------------------------------|------------------|----------------------------|
| 0.01...0.12 ... 2.99...19.9Ω...1k Ω | 0.01...0.1...1 Ω | ± (5 % of m.v. + 3 digits) |

Measuring time: Approx. 2 s incl. voltage polarity reversal.

Continuous measurement: With depressed START button

Admissible inductance: Max. 5 H

Programmable limit: R_{LIMIT} 0.01 Ω ... 999 Ω

Series-mode

Interference voltage: Max. 40 V_{eff} AC, in case of higher voltage measurement is terminated.

Current measurement

(with clamp A 6805 01015)

Sinusoidal AC current 45...65 Hz

| Measuring range | Resolution | Operating error |
|-------------------|------------|-------------------------|
| 1...10 mA...199 A | 1 mA...1 A | ± (3 % of m.v. + 2 dig) |

Admiss. overload: max I_{eff} = 300 A

Active power

AC voltage and current 45...65 Hz, crest factor < 2, $\cos \varphi > 0.9$
U = 50 ... 440 V, I = 20 mA ... 199 A

| Measuring range | Resolution | Operating error |
|---------------------|------------------|------------------------|
| 0.1...1.0...99.9 kΩ | 0.1 Ω ... 0.1 kΩ | ±(3 % of m.v. + 3 dig) |

Admiss. overload: max I_{eff} = 300 A
max U_{eff} = 600 V

Energy measurement

Summing up the active power measured versus time for slowly or rarely variable power.

Measuring rate: approx. 1 Hz.

| Measuring range | Resolution | Operating error |
|------------------------|-------------------|------------------------|
| 0.00...0.10...99.9 kWh | 0.01W ... 0.1 kWh | ±(3 % of m.v. + 3 dig) |

Apparent power, power factor

Both quantities are computed values, resulting from the aforementioned quantities and only apply to sinusoidal voltages and currents.

Continuity test

Open- circuit voltage: Approx. 5 V DC

Short-circuit current: Approx. 10 mA

Response threshold: < 100 Ω (± 20 Ω)

Response time: Approx. 20 msec for buzzer

Indication: Continuous buzzer tone, display

Sensor

AC (sine, 45...65 Hz) - or DC depending on selected function.
Programmable scale factor and display of important measuring units.

| Meas. range | Resolution | Operating error | Condition |
|------------------|------------|-----------------|-------------------|
| 0...10Vm...2.99V | 1mV/0.01V | ± (2 % + 2 dig) | sensor factor = 1 |

Input resistance: Approx. 1.5 MΩ

Admiss. overload: Max U_{eff} = 600 V

| | |
|-----------------------|---|
| Factor A DC | 1mA/mV ... 9.99 A / mV |
| Factor A AC | |
| Factor I _x | 0.1 I _x / mV ... 999 I _x / mV |
| Factor °C | 0.01°C / mV ... 9.99°C / mV |
| Factor V DC | 1 mV / mV ... 9.99 V / mV |
| Factor V AC | |

Measuring protocol-print in format A4:

| | | | |
|----------------------------|----------|-------------------------|-------------|
| Forma ELECTRO TEST | | | |
| Installations Prüfung 1998 | | | |
| Inst.-Nr. 0002AB | | | |
| ----- | | | |
| 1 P1/RCD | 1 Idn | 30 mA | 1 RAMP AC 0 |
| 1 Un | 230 V | 1 U _{eff} -LIM | 50 V |
| 1 R _k A | 0.00 Ohm | 1 R _k S | 0.00 Ohm |
| ----- | | | |
| 1 U L-PE | ~227 V | 1 U L-NE | ~227 V |
| 1 U N-PE | 0 V | 1 U N-NE | 0 V |
| 1 U L-NE | 0 V | 1 I | 50.0 mA |
| 1 U _{eff} | 0.1 V | 1 I _{eff} | 93 mA |
| 1 I _{eff} | 4.4 Ohm | 1 R _k | 1.05 Ohm |
| 1 I _k | 52 A | 1 R | 4.4 Ohm |
| ----- | | | |

Order Codes

| Description | Order no. |
|---|-----------|
| UNILAP 100 XE incl. carrying case A 1855 06211 AT, CH, GB Contents: 1 cable (3-pole plug/ 3 safety plugs), 1 cable (3-pole plug/mains plug country specific), 3 alligator clips, 3 test tips, 1 cable (plug / test tip), 1 carrying belt, 2 belt securing devices, 2 earth stakes, 1 cable reel (50 m wire), 1 cable reel (25 m wire), 6 batteries, 1 battery compartment Operating instructions in E, D or F | |
| UNILAP 100 XE incl. carrying case A 1855 06212 AT, CH, GB Contents: 1 cable (3-pole plug/ 3 safety plugs), 1 cable (3-pole plug/mains plug country specific), 3 alligator clips, 3 test tips, 1 cable (plug / test tip), 1 carrying belt, 2 belt securing devices, 2 earth stakes, 1 cable reel (50 m wire), 1 cable reel (25 m wire), 6 batteries, 1 battery compartment Operating instructions in E, D or F RS 232 interface | |
| Accessories Barcode-reader A 6914 40300 Test probe with START and illumination function A 6914 06110 Active temperature probe (type K) -60...800°C A 6899 06111 Accuset with quick-charging (1.5 Ah) A 6403 04111 Earth stakes with cable reel (50m) A 6045 10300 PC software WinSAT 100 A 6899 00182 IrDA® adapter for PCs A 6412 07000 IrDA® printer HP Deskjet 340 CBi A 6413 06211 Measuring set 1 A 6045 10500 Measuring set 2 A 6045 10600 Clip-on current transformer A 6805 01015 Cable for clip-on current transformer A 6002 09100 Adapter for stakless measurement A 6002 09018 3 alligator clips A 6009 17103 3 test tips A 6009 54300 Mains plug adapter F (NFC61303) - AT (Schuko) A 6045 06112 Adapter for 3-phase outlets A 6009 17200 Appliance test adapter A 6045 10200 | |

Distributor



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