

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	0.01 Ω ...10 Ω	± (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 max. as per IEC 1010, 2 ... 26 periods

Measuring time:

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
0.01 Ω ...0,15 Ω ...10k Ω	0.1 Ω ... 10 Ω	± (10% of m.v. + 3 digit)

Test current: 1 A for < 20 Ω

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

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

Programmable limits: 0.01 Ω ... 9.99 k Ω

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 k Ω , for ($R_A + R_{probe}$) > 20k Ω no start)

Programmable limits: 0.01 Ω ... 9.99 k Ω

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 k Ω ... 3 k Ω ... 300 M Ω man	1 k Ω ...1 M Ω	± (8 % of m.v. + 1 digit)
1 k Ω ... 3 k Ω ... 10 M Ω auto	1 k Ω ... 100 k Ω	

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

Programmable limit: Riso Limit: 1 k Ω ... 299 M Ω (**man**)
 1 k Ω ... 9.9 M Ω (**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 k Ω (L/N-PE); serves as discharge resistance for any capacitors in the measuring circuit.

Max. interference voltage: $U_{eff} = \frac{1}{10}$ 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

Earthelectrode fault voltage (SEV 3569)

Earthelectrode voltage, with probe only

Range	Resolution	Measuring method
0...U _N	0.1 V	$U_F = R_A \cdot I_k$

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

"Elliptical 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 Veff 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. 1Hz.

Measuring range	Resolution	Operating error
0.00..0.10..99.9 kWh	0.01W ..0.1kWh	±(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: Continous 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 Ix	0.1 Ix / mV ... 999 Ix / 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:

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Forma ELECTRO TEST
Installations Prüfung 1998
Inst-Nr 0002AR
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| P1/WCD | Ilim | 30 mA | RAMP AC 0 | | |
| Um | 230 V | ISE-LIM | 50 W | Conf | 00 |
| RA A | 0.00 Ohm | RA B | 0.00 Ohm | | |
| US-PE | 0 V | IF | 50.0 Ia | II | 2 mA |
| UF | 0.1 V | IA | 93 mA | IA | 23 mA |
| IA | 4.4 Ohm | RA | 1.05 Ohm | R | 4.4 Ohm |
| Ik | 52 A | | | | |
  
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Order Codes

Description	Order no.
UNILAP 100 XE incl. carrying case 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	A 1855 06211 AT, CH, GB
UNILAP 100 XE incl. carrying case 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	A 1855 06212 AT, CH, GB
Accessories Barcode-reader Test probe with START and illumination function Active temperature probe (type K) -60...800°C Accuset with quick-charging (1.5 Ah) Earth stakes with cable reel (50m) PC software WinSAT 100 IrDA® adapter for PCs IrDA® printer HP Deskjet 340 CBi Measuring set 1 Measuring set 2 Clip-on current transformer Cable for clip-on current transformer Adapter for stakless measurement 3 alligator clips 3 test tips Mains plug adapter F (NFC61303) - AT (Schuko) Adapter for 3-phase outlets Appliance test adapter	A 6914 40300 A 6914 06110 A 6899 06111 A 6403 04111 A 6045 10300 A 6899 00182 A 6412 07000 A 6413 06211 A 6045 10500 A 6045 10600 A 6805 01015 A 6002 09100 A 6002 09018 A 6009 17103 A 6009 54300 A 6045 06112 A 6009 17200 A 6045 10200

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