

The Insulation Expert

UNILAP ISO 5 kV

- Tests according to IEC 61557-2
- Insulation resistance 10 k Ω ... 30 T Ω
- Measuring voltages 500-1000-2500-5000 V DC
- Variable measuring voltages 250...5250 V DC in 50 V increments
- Stair-step measuring voltage for insulation and surge-voltage protector test (MOV)
- Voltage measurement 0 ... 600 V AC/DC
- Guarding technique
- Measuring current >1 mA
- Software for acquisition and protocol printout (option)

Description

The construction and operation of electrical devices and installations require the compliance with certain safety precautions to protect man. These safety controls are laid down in national and international regulations and must be checked at regular intervals. All safety controls are always based on insulation resistance measurements. The requirements in practice vary a great deal, however.

New regulations and increasing nominal mains voltages make ever greater demands on the measuring engineer and his test instruments. This has resulted an increasing number of areas of application for 5000 V insulation meters.

The insulation measurement which, as such, is basically simple faces multiple types of applications. The insulation quality of materials and various objects also has to be tested for instance. Overvoltage suppressors or other voltage limiting elements also have to be tested for faultless functioning.

Despite all these requirements simple operation, high overload capacity and protection against misoperation of the instrument must be guaranteed.

The UNILAP ISO 5kV insulation tester is an expert for all insulation tests and their applications.

The instrument meets highest technical requirements while covering as broad an area of application as possible and complies with all relevant regulations governing construction, safety and measurement. Other insulation meters in this category can, at best, provide an instrument with analog display whose size and weight do not meet the wishes of the users. The UNILAP ISO 5kV on the other hand features both an analog and a digital display and has been fitted in the well proven UNILAP housing. We have thus managed to realise the smallest and handiest 5kV insulation meter while complying with all the criteria laid down in IEC 1010.

We used the most state-of-the-art technologies, such as microprocessor control and SMD components, for the construction.



The most important functions and advantages are:

- Insulation resistance measurements with 250...5250 V DC from 10 k Ω to 30 T Ω .
- Fixed measuring voltages selectable via central switch: 500V – 1kV – 2.5kV – 5kV.
- Variable range from 250 V to 5250 V in 10 V and 50 V increments.
- Determination of polarisation index and dielectric absorption ratio.
- Polarisation index with freely programmable sampling times.
- Continuous measurements with freely selectable interval.
- Measurement of local insulation resistance with optionally available probe.
- Gradually increasing measuring voltage for insulation or overvoltage suppressor tests with selectable start-, stop- and breakdown-voltage, selectable number of voltage levels and duration per level.
- Free customer-specific configuration of basic settings via code programming:
 - display and setting of LIMITS with optical and acoustic warning in case of upper or lower limit violation (standard values are stored)
 - blocking of an undesirably high insulation measuring voltage.
 - default values for continuous measurements, overvoltage suppressor tests or polarisation index measurements with freely selectable sampling times can be stored.
- Fully automatic user guidance as protection against misoperation and damages.
- Automatic display of the external voltage prior to measurement and the voltage remaining applied after measurement.
- Quick reference within sight.
- With the optional (Docu-Pack or RS232) interface and the WINISO5kV application software remote control of all functions is possible. They can also be used for the individual configuration (code programming) of the instrument.
- Special accessories for measurements with GUARD technology or local insulation.

Technical Data

General

Display: 4-digit (2999), 7-segment-liquid-crystal-display, 16 mm high, with fluorescent illumination, 56-element analog scale for voltage and resistance ranges

Working temp. range: -10° C... 50° C (14 ... 122 °F)
 Operating temp. range: 0° C... 35° C (32 ... 86 °F)
 Storage temp. range: -30° C... 60° C (-22 ... 144 °F)
 Operating error: referring to the operating temperature range
 Climatic class: JWG as per DIN VDE 40040:
 Protection class: IP 40 as per DIN VDE 40050
 Safety class: complies with protective class II - IEC 61010 and EN 61010

Test voltage: 6 kV
 Safety: 1000 V Cat. II, pollution degree 2
 Quality standards: developed, designed and manufactured referring to DIN ISO 9001
 Max. external voltage: for > 50 V measurements are locked
 Power supply: 12 V Nickel / Metalhydrid - Accu, 2.4 Ah
 Dimensions: 265 x 265 x 90 mm (LxBxH), 110 mm with DOCU-PACK
 Weight: approx. 2.4 kg incl. accumulators
 approx. 5.0 kg incl. accessories in case

Insulation resistance (IEC 61557-2)

Analog display:

Range	Display	Resolution	Operating error*)
10 kΩ ... 30TΩ	5kΩ ... 1TΩ	5 kΩ ... 200 GΩ	± 1 display segment

Actual measuring voltage can be displayed.

(* Measuring voltage = 1000 V; Measuring rate: approx. 3/s)

Digital display:

Range	Resolution	Nominal voltage	Operating error
10 kΩ ... 299,9 GΩ	1k...0.1GΩ	250V...5250V	± (3% of reading + 3Dig)
0.30o ¹⁾ TΩ ... 2.99 TΩ	10 GΩ	1000V...5250V	± (3% of reading + 10Dig + 1 % / TΩ)
3.0o ¹⁾ TΩ ... 9.9 TΩ	0.1TΩ	5250V	±(3% of reading + 100Dig + 1%/GΩ)
10.0o ¹⁾ TΩ ... 29 TΩ	1 TΩ		

¹⁾ o means: digit is always 0

Automatic discharging after insulation measurement.

Time for discharging: 2.5 s for 1 μF

Pre-set limit value: < 500 kΩ

Nominal voltage: 250...5250 V DC variabel in steps of 50 V or 500 / 1000 / 2500 / 5000 V DC in fixed position

Open circuit voltage: max. 1.15 x nominal voltage

Measuring current: >1 mA DC at nominal voltage

Short circuit current: < 2 mA DC

Measuring rate: approx. 2 values/s

Max. overload: 1,2 x nominal voltage (measurement will not be started)

U_{eff}: 1000 V external voltage

Buzzer: at external voltage more than 1000 V or at continuous tests with timer

Interval measurement: adjustable from 10 s to 99:50 min

Dielectric

Absorption Ratio: $R_{ad} = \frac{R \text{ after } 1 \text{ min}}{R \text{ after } 30 \text{ s}}$

$R_{ad} < 1.1$ signifies bad insulation

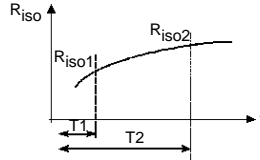
$R_{ad} > 1.25$ signifies good insulation

Polarization index: $I_p = \frac{R \text{ after } 10 \text{ min}}{R \text{ after } 1 \text{ min}}$

$I_p < 1.5$ signifies bad insulation

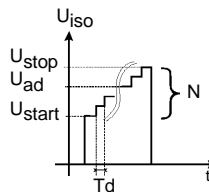
$I_p > 2$ signifies good insulation

I_p with progr. times: $I_{pt} = \frac{R \text{ after } T_2}{R \text{ after } T_1}$; T_1 and T_2 are adjustable



T_1 ... 5 s to 1595 s
 T_2 ... 10 s to 99:50 min

Stair-step measuring voltage for insulation- and MOV-tests



U_{ad} Programmable nominal voltage range: 50 ... 5250 V

U_{start} Programmable start voltage in % of U_{ad} range: 1 ... 099 %

U_{stop} Programmable stop voltage in % of U_{ad} range: 100 ... 255 %

N Programmable number of voltage steps range: 1 ... 255

T_d Duration of each voltage step range: 10 ... 2550 s

Voltage measurement with automatic AC/DC detection

Digital display:

Range	Display range	Resolution	Frequency range	Operating error
1... 600 V	1...699 V AC	1 V	45...400Hz	± (2% of mv + 1 Dig)
1... 600 V	1...1000 V DC	1 V	DC	± (2% of mv + 1 Dig)

Impedance: approx. 400 kΩ

Max. overload: $U_{eff} = 1000$ V external voltage

Order Codes

Designation	Order no.
UNILAP ISO 5 kV in carrying case including 3 safety measuring leads with test tips, 2 m long 3 alligator clips, insulated 1 carrying belt 1 charging adapter 16 V / 0.3 A Operating instructions	A 1865 06311
UNILAP ISO 5 kV , same as above with built-in RS 232 interface	A 1865 06312
UNILAP ISO 5 kV , same as above with DOCU-PACK	A 1865 06315
Accessories 3 safety measuring leads with test tips, 2 m long GUARD test lead set, 10 m GUARD test lead set, 2,5 m 3 alligator clips, insulated RS 232 interface (9-pole, Sub D) DOCU-PACK (incl. interface) WIN ISO, data acquisition and application software	A 6003 14206 A 6045 10400 A 6045 10401 A 6009 17103 A 6412 10213 A 6412 10214 A 6899 00171

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