

Contractor and service technician insulation tester and multimeter **ISO plus**

Areas of application:

- **Inspection of new electrical installations**
 - **Maintenance of electrical equipment and installations**
 - **Troubleshooting and repair of electrical equipment**
 - **Measurement of insulation quality**
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Description:

The **ISO plus** has been designed specially for contractor/service technician applications. In addition to insulation testing up to 1 kV the **ISO plus** incorporates low resistance and continuity testing as well as leakage current measurement directly or with LEM current probes (CT's). Selectable scaling factors provide current ranges from 200 μ A to 200 A. Furthermore the **ISO plus** offers all the functionality of industry standard multimeters including TRMS voltage and frequency measurement in a true hand held design.

This unique combination satisfies universal applications in:
Insulation measurement up to 20G Ω with test voltages of 100V, 250V, 500V and 1000V.

Low-resistance measurement according to EN 61557-4 with a short-circuit current of >200mA, for applications with non-fused earth conductor connections and equipotential bus bars.

Fast continuity testing with selectable buzzer threshold between 0,2 Ω and 50 Ω and a maximum response time of 100ms meeting all test standards.

Leakage Current measurement through an external current transformer with selectable transformer ratio from 1:1 up to 1:1000 and ranges from 200 μ A to 200A.

Voltage measurement with display of AC and DC values up to 600V with a 800V overrange feature.

With additional functions including ZERO (test lead null / relative), REC (Min, Max, Avg), LIMIT (Alarm) and SMART HOLD (hands free), the **ISO plus** provides a complete measurement solution in one compact handheld instrument.



Main features:

- Easy to use handheld design measuring V, Ω , M Ω , Hz, A (mA)
- Large dual display with bright EL backlight and bargraph
- Unique built in protection against external voltages without fuse damage and warning of live circuits
- Fully compliant with all European standards for insulation testing
- Insulation measurements up to 20 G Ω with 100, 250, 500 and 1000V test voltages and display of test current
- On screen display of Polarisation Index and Dielectric Absorption Ratio for insulation quality
- Auto ranging resistance measurement to 200k Ω with 200mA low resistance test and lead compensation
- Continuity test with adjustable thresholds and fast responding buzzer
- True RMS voltage measurement with display of AC, DC and AC+DC values and mV resolution
- Leakage current measurement directly or with LEM current probes in current ranges from 200 μ A to 200A
- LIMIT (adjustable alarm) to quickly and reliably identify fault conditions
- REC function for MIN, MAX, AVG values
- ZERO (Δ REL) function to compensate measuring leads and for relative measurements
- Intelligent auto power off to extend battery life

TECHNICAL SPECIFICATIONS:

General:

Display: 1999 digit dual LC-display with special symbols, digit height 17 mm, 30 segment analogue bar with over- and underflow and special display sign, EL backlight

Temperature ranges:

Working temp.: -10° C ...+50° C (+14° F...+122° F)

Operating temp.: 0° C ...+35° C (+32° F...+95° F)

Storage temp.: -20° C ...+60° C (-4° F ...+140° F)

Reference temp.: +23° C ± 2° C (+73° F ± 4° F)


Temperature coefficient: 0.1 x operating error/K

Intrinsic Error refers to the reference temperature range

Climatic class: B2 (IEC 654-1), -5° C...+45° C, 5%...85% RH, no dew

Maximum operating altitude: 2000m

Protective type: IP40 according to EN 60529

Safety:  Protection by reinforced insulation 600V CATIII pollution degree 2

Test voltage: 5550 V AC, measuring circuit to enclosure

Emission: IEC/EN 61326-1:1997 +A1:1998 class B

Immunity: EN 61000-4-2:1995 - B, EN 61000-4-3: 1996

EN 61000-4-4:1995 - B, EN 61000-4-5: 1995

EN 61000-4-6:1996 - B, EN 61000-4-8: 1993

Intrinsic error: Refers to the reference temperature range and is guaranteed for 2 years.

Operating error: Refers to the operating temperature range and is guaranteed for 2 years.

Quality system: developed, designed and manufactured according to DIN ISO 9001

External voltage: measurement inhibited for external voltage
 $U_x > 10\%$ of U_N for $M\Omega$ and $>3V$ for R

Max. overload: 800 Veff RMS or
 $RMS \times frequency < 5 \times 10^4 VHz$

Auxiliary power: 4 x 1,5 V mignon cells alkali-manganese (IEC LR6)

Battery life span: typical (no backlight) > 2000 measurements in $M\Omega$. Battery life typically 100 hours continuous operation for resistance, voltage measurements and mA measurements.

Fuse 630mA quick acting 600V 10kA/32x6.3mm

Dimensions: 220 x 98 x 52 mm (12 x 3.75 x 2 inches)

Weight: 0.8 kg / 1.8 lbs (including batteries)

Warranty: 2 years

Calibration

interval: 2 years recommended

$M\Omega$ - R_{ISO} Insulation Resistance

Method: Voltage/current measurement as per EN 61557-2

Nominal test voltage: $U_N = 100V, 250V, 500V, 1000V$ DC

Open circuit voltage: $U_0 < 1.1 \times U_N$

Nominal current: $I_N \geq 1mA$ DC at U_N

$I_N \geq 2.5mA$ DC at 100k Ω at 250V

Short circuit current: <10mA DC

Measuring range	Resolution	Operating error
1.8k Ω ...2 G Ω	0.1k Ω ...1M Ω	$\pm(2\%$ of rdg+4D)
2G Ω ...20G Ω	10M Ω	$\pm(4\%$ of rdg+4D)

Display of the measuring current I_{ISO} .

Calculation of Polarisation Index I_P and Dielectric Absorption Ratio:

R_{ab} after pre-defined time interval:

$I_P = R_{ISO}(10min) / R_{ISO}(1min)$

$R_{ab} = R_{ISO}(1min) / R_{ISO}(30sec)$

In case of external voltage of $>10\%$ of U_N the measurement is not started (safety interlock).

R – Low Resistance Measurement:

Method: Voltage/current measurement as per EN 61557-4

Open circuit voltage: $U_0 \geq 4V$

Short circuit current: $I_k \geq 200mA$ DC up to 2 Ω as per EN61557

Measuring range	Resolution	Intrinsic error
0.2 Ω ...20 Ω	0.01 Ω	$\pm(1\%$ of rdg+3D)
20 Ω ...200 Ω	0.1 Ω	$\pm(1\%$ of rdg+2D)
200 Ω ...2k Ω	1 Ω	
2k Ω ...20k Ω	10 Ω	
2k Ω ...200k Ω	100 Ω	

In case of external voltages of $>3V$ the measurement with 200mA is not started.

SMR Serial mode rejection approx. 60dB at 50 and 60Hz

CMR Common mode rejection approx. 80dB at 50 and 60Hz

Continuity check:

Buzzer activated for external resistance within 100ms

Buzzer level adjustable with LIMIT function from 0,2...50 Ω .

Test lead compensation (ZERO) from 0.01...5 Ω .

V – TRMS Voltage Measurement

DC: Input resistance: 1MΩ / 100pF

Measuring range	Resolution	Intrinsic error VDC
2V	1mV	±(2% of rdg+5D)
20V	10mV	±(2% of rdg+2D)
200V	100mV	
600V	1V	

SMR Serial mode rejection approx. 60dB at 50 and 60Hz for DC (influence of AC signals to DCV-display)

CMR Common mode rejection approx. 80dB at 50 and 60Hz

Auto range set up time: 1.5s

Max. voltage frequency product: 5×10^4 VHz

Over-range up to 1000V with flashing Δ symbol.

AC: Specifications valid for AC RMS >5% of range

Measuring range	Resolution	Intrinsic error VAC 15Hz – 1kHz
2V	1mV	±(2% of rdg+5D)
20V	10mV	±(2% of rdg+5D)
200V	100mV	±(2% of rdg+3D)
600V	1V	±(2% of rdg+2D)

Displayed values for voltage measurements: AC, DC and AC+DC+F. Crest factor 3 for values at the end of the ranges
 $V_{peak} : 1200V_P$.

Over-range up to 800V with flashing Δ symbol.

Frequency range: DC, 15Hz...1kHz at ACRMS

F - Frequency Measurement (at V>0,5V)

Measuring range	Resolution	Intrinsic error
200Hz	0.1Hz	±(0.2% of rdg +3D)
1kHz	1Hz	

Method: Evaluation of zero crossings in signal

Temperature coefficient < 50ppm, sensitivity > 10% of voltage and current range end value

mA – RMS (Leakage) Current Measurement

Direct current measurement within the following ranges:

Measuring range	Resolution	Intrinsic error
20...199.9 μA	100 nA	±(3% of rdg+5digit)
0,2...1,999 mA	1 μA	±(3% of rdg+5digit)
2...19.99 mA	10 μA	±(3% of rdg+5digit)
20...199.9 mA	100 μA	±(3% of rdg+5digit)

Specifications valid for AC RMS >5% of range

Displayed values: AC

Frequency range: 15Hz...1kHz

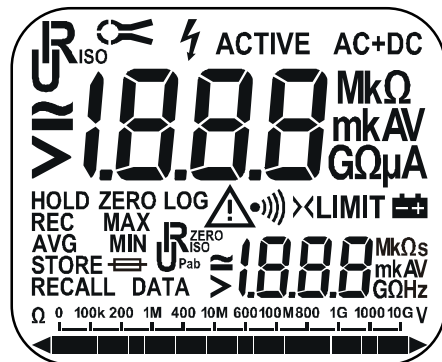
Max. overload: 630mA (Fuse)

Auto range setting time: 2s

Current compensation (ZERO) possible.

Direct current measurement (1:1) or measurement through an external current transformer with **current or voltage output** (integrated load) and transformer ratios of 1:1, 1:10, 1:100, 1:500 or 1:1000.

Clamp symbol in LCD at 1:10, 1:100, 1:500 and 1:1000.



Designation	Order-No.
ISO plus incl. 2 safety measuring leads with test prods, 1 alligator clip, 4 batteries 1,5V, operating instructions, 1 pouch with carrying belt	SI1300Z

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