GOSSEN METRAWATT
GMC-INSTRUMENTS GROUP

METRAHIT Iso and METRAHIT Coil
TRMS Multimeter with Insulation Measurement and Interturn Short-circuit Measurement (Coil only)

3-349-415-03
14/8.25

- **Insulation resistance measurement up to 3.1 GΩ** with interference voltage detection, test voltages: 50 V, 100 V, 250 V, 500 V, 1000 V
- **Interturn short-circuit measurement** with 1000 V (**METRAHIT COIL** only)
- **Multimeter with diverse functions** (V, Ω, F, Hz)
- **TRMS measurements:** TRMS AC / AC+DC for current/voltage up to 10 kHz
- Activatable **low-pass filter**, 1 kHz/–3 dB in the V AC range
- **Direct current measurement**, 100 nA to 10 A
- **Current measurement with clip-on current sensors – CLIP**
  A transformation ratio of 1 mV:1 mA to 1 mV:1 A can be selected and is taken into consideration at the display.
- **Precision temperature indicator**, °C or °F,
  for Pt100/Pt1000 sensors and type K thermocouples
- **Diode measurement** (I_K = 1 mA, U_{flow} to 5.1 V) and **continuity testing**
- **Duty cycle measurement**, 5 to 95% (**METRAHIT COIL** only)
- **Display**: 3¾ digits, 3100 steps, illumination can be activated
- **Acoustic signals** for: continuity testing, dangerous contact voltages, exceeded overload limits
- **Min-Max value storage**
- **Data memory** and internal clock, power pack adapter socket
- IP 54 **Housing** protection, dust and splash protected, protective cover
- **Bidirectional infrared interface** for exchanging data with a PC
- **Windows software** available as accessory for processing and graphic display of measured values via USB interface

CE

600 V CAT III
1000 V CAT II

MADE IN GERMANY

3 YEARS WARRANTY

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-K-15080-01-00



Application

The **METRAHIT ISO** and **METRAHIT COIL** multimeters are rugged portable measuring instruments. They are suitable for servicing household appliance, machines (e.g. forklifts) and systems (e.g. photovoltaic). The instruments can be used in the field and are equipped with an internal, mains-independent power supply.

METRAHIT COIL allows for interturn short-circuit measurements in combination with the **COIL TEST ADAPTER**. By comparing the measurement results, asymmetries at the windings of 3-phase machines can be directly detected, which, in turn, is an indication of possible short-circuits. In the case of single-phase motors testing is performed by comparison with a known setpoint value.

Interturn short-circuit measurement in the inductance range with the standard adapter **COIL**: 10 µH to 50 mH @ 100 Hz

The standard adapter **COIL** is universially suitable for a great number of electric machines of different performance classes. With regard to DIN standard motors this corresponds to performances from approximately 15 kVA to 80 MVA. Adapters for motors with different inductivity are available upon request.

Features

RMS Value with Distorted Waveshape

The utilized measuring method allows for waveshape independent TRMS measurement of periodic quantities (AC) and pulsating quantities (AC and DC) for voltage and current at up to 10 kHz.

Activatable Filter for V AC Measurement

A 1 kHz low-pass filter can be activated if required, e.g. for measurements at cables with parasitic external signals. The input signal is checked by a voltage comparator for dangerous voltages as long as the low-pass filter is activated, which are indicated at the display if present.

Diode Testing with Constant Current I_c = 1 mA

This function can be used to test the polarity of diodes, and to test electrical circuits for short-circuiting and interruptions. The test voltage source makes it possible to measure LEDs and reference diodes up to 5.1 V, e.g. also white LEDs.

Fast Acoustic Continuity Test I_k = 1 mA

Testing for short-circuiting and interruption is possible with the selector switch in the position. The threshold value for acoustic signaling can be set to 1, 10, 20, 30, 40 or 90 Ω.

Insulation Resistance Measurement with Interference Voltage Detection

Depending upon the utilized instrument variant, insulation resistance can be measured with an adjustable test voltage of 50 to 1000 V.

If the instrument detects interference voltage of greater than 15 V AC or 25 V DC during insulation testing, an error message is briefly displayed at the LCD panel. The instrument is then automatically switched to voltage measurement TRMS (AC + DC) with an input resistance of approximately 1 MΩ and the currently measured voltage value is displayed.

Analog Scale for Quick Trend Display – Pointer

The analog scale (with additional negative axis range for zero-frequency quantities) allows for faster recognition of measured value fluctuation than is possible with a digital display.

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Automatic/Manual Measuring Range Selection

Measured quantities are selected with the rotary switch. The measuring range can be automatically matched to the measured value, or selected manually.

High Resolution Mode

Via mem function „Set Resol“, the multimeter (in V DC and Ohm-function) can be switched to a high-resolution operating mode with 30,000 digits and enhanced accuracy.

Automatic Storage of Measured Values

The DATA HOLD function automates the storage of measured values after they have settled in. A patented process assures that random values are not saved to memory in the case of rapidly changing measured quantities, but rather the actual measured value. The stored measured value appears at the digital display. The analog display continues to read out the current measured value.

Overload Protection

Overload protection safeguards the instrument in all measuring functions against voltage of up to 1000 V. Voltages of greater than 1000 V and currents of greater than 10 A are indicated acoustically. FUSE appears at the display if the fuse for the current measuring input blows.

Battery Charging Status – Power Saving Circuit

The battery charging status is indicated by means of four symbols.

The device is switched off automatically if the measured value remains unchanged for a period of between 10 and 59 minutes (adjustable), and if none of the controls are activated during this time. Automatic shutdown can be deactivated by switching the instrument to continuous operation.

Three Connector Jacks with Automatic Blocking Sockets (ABS) *

All current ranges are implemented via a single connector jack which prevents any possibility of operator error. Beyond this, the automatic blocking sockets prevent incorrect connection of the measurement cables, as well as selection of the wrong measured quantity. Danger to the user, the instrument and the device under test resulting from operator error is thus ruled out.

* Patented (patent no. EP 1801 598 and US 7,439,725)

Housing and Protective Cover for Harsh Conditions

- New housing design
- Separate battery and fuse compartments
- Intelligent key functions with SMD button

The instrument is protected against damage in the event of impacts or dropping by means of a soft rubber cover with tilt stand and test probe holder. The rubber material also assures that the instrument does not wander if it is set up on a vibrating surface.

Infrared Data Interface

The device can be remote configured, and momentary and saved measurement data can be read out via the bidirectional infrared interface. The USB | X-TRA interface adapter and **METRAwin 10** software are required to this end (see accessories). Interface protocol and device driver software for LabVIEW® (National Instruments™) are available upon request.

Voluntary Manufacturer's Guarantee

36 months for materials and workmanship

1 to 3 years for calibration (depending upon application)

DAkkS calibration certificate

METRAHIT ISO cable multimeters are furnished with an internationally valid DAkkS calibration certificate (recognized by EA and ILAC).

In addition to standard quantities, our DAkkS calibration lab is also accredited for high value ohmic resistance of up to 30 GΩ / 1000 V.

After the specified calibration interval has elapsed (recommended interval: 1 to 3 years), the multimeters can be inexpensively recalibrated at our own DAkkS calibration center.

Overview of Features Included

Function	METRAHIT ISO	METRAHIT COIL
V AC+DC TRMS (Ri = 1 MΩ)	•	•
V AC / Hz TRMS (Ri ≥ 9 MΩ)	• 1 kHz filter	• 1kHz filter
V AC+DC TRMS (Ri ≥ 9 MΩ)	•	•
V DC (Ri ≥ 9 MΩ)	•	•
Hz (V AC)	... 300 kHz	... 300 kHz
Bandwidth, V AC	15 Hz ... 10 kHz	15 Hz ... 10 kHz
A AC / Hz TRMS	300 µA 3/30/300 mA 3 A / 10 A	300 µA 3/30/300 mA 3 A / 10 A
A AC+DC TRMS		
A DC		
Fuses	10 A / 1000 V	10 A/1000 V
Transformation Ratio ➢C	mV/A, mA/A	mV/A, mA/A
Hz (A AC)	... 30 kHz	... 30 kHz
Insulation resistance $M\Omega@_{UISO}$	test voltage selectable	test voltage selectable
Interturn short-circuit measurement $M\Omega_{COIL}$	—	•
Duty cycle measurement %	—	•
Resistance Ω	•	•
Continuity	•	•
Diode ... 5.1 V	•	•
Temperature TC (K)	•	•
Temperature RTD	•	•
Capacitance	•	•
Min-Max / data hold	•	•
4 MBit memory [1]	•	•
IR Interface	•	•
Power pack socket	•	•
Protection	IP 54	IP 54
Measuring category	1000 V CAT II, 600 V CAT III	1000 V CAT II, 600 V CAT III

[1] For 15,000 measured values, sampling rate adjustable from 0.1 seconds to 9 hours

Scope of Delivery

1 Insulation multimeter **METRAHIT ISO** or **METRAHIT COIL**
1 Protective rubber cover
1 Pair of safety measurement cables with 4 mm test probes, 1000 V CAT II, 600 V CAT III (KS17-2)
1 DAkkS calibration certificate
2 Batteries, 1.5 V, type AA, installed
1 **COIL TEST ADAPTER** for interturn short-circuit measurement (only in combination with **METRAHIT COIL**)
1 Condensed operating instructions*, English/German

* Detailed operating instructions are available for download on the Internet at www.gossenmetrawatt.com

TRMS Multimeter with Insulation Measurement and Interturn Short-circuit Measurement (Coil only)

Technical Data

Meas. Function (input)	Measuring Range		Resolution at Upper Range Limit		Input Impedance		Intrinsic Uncertainty under Reference Conditions ±(... % rdg. + ... d)				Overload Capacity [2]	
			30000	3000	⎓	~ / ≂	30000 ⎓	3000 ⎓	3000 ~ [1] [11]	3000 ≂ [1] [11]	Value	Time
V	300.0	mV	10 µV	100 µV	9 MΩ	9 MΩ // < 50 pF	0.15 + 15 [10]	0.2 + 3 [10]	1 + 3 (> 100 D)	1.5 + 5 (> 100 D)	1000 V DC AC RMS Sine [6]	Cont.
	3.000	V	100 µV	1 mV	9 MΩ	9 MΩ // < 50 pF	0.15 + 15	0.15 + 2	1 + 3 (> 30 D)	1.5 + 5 (> 100 D)		
	30.00	V	1 mV	10 mV	9 MΩ	9 MΩ // < 50 pF	0.15 + 15	0.15 + 2				
	300.0	V	10 mV	100 mV	9 MΩ	9 MΩ // < 50 pF	0.15 + 15	0.15 + 2				
	1000	V	100 mV	1 V	9 MΩ	9 MΩ // < 50 pF	0.15 + 15	0.2 + 2				
					Voltage drop at approx. range limit			⎓	~ [1] [11]	≂ [1] [11]		
A	300.0	µA		100 nA	18 mV	18 mV		0.5 + 5	1.5 + 5 (> 100 D)	1.5 + 5 (> 100 D)		
	3.000	mA		1 µA	160 mV	160 mV		0.2 + 3	1.5 + 5 (> 30 D)	1.5 + 5 (> 100 D)	0.3 A	Cont.
	30.00	mA		10 µA	32 mV	32 mV		0.5 + 3				
	300.0	mA		100 µA	200 mV	200 mV		0.2 + 3				
	3.000	A		1 mA	120 mV	120 mV		1 + 5			10 A	5 min [12]
	10.00	A		10 mA	400 mV	400 mV		1 + 5				
	Factor 1:1/10/100/1000			Input	Input impedance			⎓	~ [1] [11]	≂ [1] [11]		
A⋗C @ A	0.03/0.3/3/30	A		30 mA	Current measurement input (jack A~)			—	1.5 + 5 (> 100 D)	—	0.3 A	Cont.
	0.3/3/30/300	A		300 mA								
	3/30/300/3k	A		3 A				Plus clip-on current transformer error			3 A	5 min
A⋗C @ V	0.3/3/30/300	A		300 mV	Voltage measurement input approx. 9 MΩ (V socket)			0.5 + 3	1.5 + 3 (> 300 D)	1.5 + 5 (> 300 D)	Meas. input [6]: 1000 V RMS	max. 10 s
	3/30/300/3k	A		3 V					1.5 + 3 (> 30 D)	1.5 + 5 (> 100 D)		
	30/300/3k/30k	A		30 V				Plus clip-on current sensor error				
					Open-circuit voltage	Meas. current at range limit	±(... % rdg. + ... d) 30000	3000				
Ω	300.0	Ω	10 mΩ	100 mΩ	< 1.4 V	Approx. 300 µA	0.5 + 15 with ZERO active	0.5 + 3 with ZERO active			1000 V DC AC RMS Sine	max. 10 s
	3.000	kΩ	100 mΩ	1 Ω	< 1.4 V	Approx. 200 µA	0.5 + 15	0.5 + 2				
	30.00	kΩ	1 Ω	10 Ω	< 1.4 V	Approx. 30 µA	0.5 + 15	0.5 + 2				
	300.0	kΩ	10 Ω	100 Ω	< 1.4 V	Approx. 3 µA	0.5 + 15	0.5 + 2				
	3.000	MΩ	100 Ω	1 kΩ	< 1.4 V	Approx. 0.3 µA	0.5 + 15	0.5 + 2				
	30.00	MΩ	1 kΩ	10 kΩ	< 1.4 V	Approx. 33 nA	2.0 + 20	2.0 + 5				
◁))	300.0	Ω		100 mΩ	ca. 10 V	Approx. 1 mA const.	3 + 5					
⊣▶	5.1	V [3]		1 mV	ca. 10 V		2 + 5					
					Discharge resist.	$U_{0\,max}$	±(... % rdg. + ... d)					
F	30.00	nF		10 pF	10 MΩ	0.7 V	1 + 6 [4] with ZERO function active				1000 V DC AC RMS Sine	max. 10 s
	300.0	nF		100 pF	1 MΩ	0.7 V	1 + 6 [4]					
	3.000	µF		1 nF	100 kΩ	0.7 V	1 + 6 [4]					
	30.00	µF		10 nF	12 kΩ	0.7 V	1 + 6 [4]					
	300.0	µF		100 nF	3 kΩ	0.7 V	5 + 6 [4]					
						f_{min} [5]	±(... % rdg. + ... d)					
Hz (V)/ Hz (A) Hz (A⋗C)	300.0	Hz		0.1 Hz		1 Hz	0.1 + 2 [8]				Hz (V) [6]: Hz(A⋗C)[6]: 1000 V Hz (A): [7]	max. 10 s
	3.000	kHz		1 Hz								
	30.00	kHz		10 Hz		10 Hz						
Hz (V)	300.0	kHz		100 Hz		100 Hz						
				Resolution	Voltage MR [13]	Frequency MR	±(... % MR + ... d)					
%	2.0 .... 98.0			0.1 %	3 V	15 Hz ... 1 kHz	0.2% MR + 8 d				1000 V DC AC RMS Sine [6]	Cont.
	10.0...90.0					1 kHz ... 4 kHz	0.2% MR/kHz + 8 d					
	5.0 .... 95.0				30 V	15 Hz ... 1 kHz	0.2% MR + 8 d					
	10.0...90.0					1 kHz ... 4 kHz	0.2% MR/kHz + 8 d					
					300 V & 1000 V possible, but not specified							
							±(... % rdg. + ... d) [9]					
°C	Pt 100	− 200.0 ... + 850.0 °C		0.1 °C			0.5 %+ 15				1000 V DC/AC RMS Sine	max. 10 s
	Pt 1000	− 150.0 ... + 850.0 °C					0.5 %+ 15					
	K (NiCr-Ni)	− 250.0 ... + 1372.0 °C					1% + 5 K					

1 15 ... 45 ... 65 Hz ... 10 (5) kHz sine. See page 6 regarding influence
2 At 0° ... + 40° C
3 Display of up to max. 5.1 V, "OL" in excess of 5.1 V.
4 Applies to measurements at film capacitors and battery operated
5 Lowest measurable frequency for sinusoidal measuring signals symmetrical to the zero point
6 Overload capacity of the voltage measurement input: power limiting: frequency x voltage max. 3×10^6 V x Hz at > 100 V
7 Overload capacity of the current measurement input: See current measuring ranges for maximum current values.
8 Input sensitivity, sinusoidal signal, 10% to 100% of voltage or current measuring range; limitation: up to 30% of the range at up to 100 kHz in the mV measuring range., 30% of the range in the 3 A measuring range
The voltage measuring ranges with max. 30 kHz apply in the A measuring range.
9 Plus sensor deviation
10 With ZERO function active
11 With short circuited terminal tips
Exception: residual value of 1 to 10 digits, in the mV/µA range 1 to 35 d at zero point due to the TRMS converter
12 10 minute cool-down period
13 Required signal range 30% to 100% of the voltage measuring range

Key: d = digit(s), MR = measuring range, rdg. = reading

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Insulation Resistance Measurement [1]

Measuring Range	Resolution	Nominal Voltage U_{ISO}	Intrinsic Uncertainty under Reference Conditions ±(% rdg + d)
0.3 V ... 1000 V ≂ [2)]		Ri=1MΩ	3 + 30 > 100 digits
5 ... 310.0 kΩ	0.1 kΩ	50, 100, 250, 500 V	3 + 5
0.280 ... 3.100 MΩ	1 kΩ	50, 100, 250, 500, 1000 V	3 + 5
02.80 ... 31.00 MΩ	10 kΩ	50, 100, 250, 500, 1000 V	5 + 5
028.0 ... 310.0 MΩ	100 kΩ	50, 100, 250, 500, 1000 V	5 + 5
0280 ... 3100 MΩ	1 MΩ	500, 1000 V	5 + 5

[1] During insulation resistance measurement ($MΩ_{@UISO}$): If ERROR is displayed >> limits: $U_{interference}$ > 10 ... 20 V and $U_{interference} \neq U_{ISO}$, Ri < 50 kΩ @ Uiso 50 V, Ri < 100 kΩ @ Uiso 100 V, Ri < 250 kΩ @ Uiso 250 V, Ri < 500 kΩ @ Uiso 500 V, Ri < 1000 kΩ @ Uiso 1000 V

[2] Interference voltage measurement TRMS (V AC + DC) with 1 MΩ input resistance, Bandwidth 15 Hz ... 500 Hz, measuring error 3% + 30 Digit

Measuring Function	Nom. Voltage U_N	Open-Circuit Voltage U_o	Nom. Current I_N	Short-Circuit Current I_k	Acoustic Signal for	Overload Capacity Value	Overload Capacity Time
$U_{interference}$/ $MΩ_{@UISO}$	—	—	—	—	U > 1000 V	1000 V≂	Cont.
$MΩ_{@UISO}$	50, 100, 250, 500 V	Max. 1.2x U_{Iso}	1.0 mA	< 1.2 mA	U > 1000 V	1000 V≂	10 s
$MΩ_{@UISO}$	1000 V	Max. 1.1x U_{Iso}	0.5 mA	< 1.2 mA	U > 1000 V	1000 V≂	10 s

Interturn Short-circuit Measurement (METRAHIT COIL only)

Measuring Range	Resolution	Nominal Voltage U_{ISO}	Intrinsic Uncertainty at Reference Conditions ±(% rdg. + d)
0.3 V ... 1000 V ≂ [2)]		Ri=1MΩ	3 + 30 > 100 digits
10.0 ... 30.9 µs	0.1 [µs]	1000 V	10 + 5 digits
31 ... 250 µs	1 [µs]		

[2)] Interference voltage measurement TRMS (V AC + DC) with 1 MΩ input resistance, frequency response width 15 Hz ... 500 Hz, accuracy 3% + 30 digits

Interturn short-circuit measurement in the inductance range: 10 µH to 50 mH @ 100 Hz

Internal Clock

Time format	DD.MM.YYYY hh:mm:ss
Resolution	0.1 s
Accuracy	±1 min./month
Temp. Influence	50 ppm/K

Reference Conditions

Ambient temperature	+23 °C ±2 K
Relative humidity	40% … 75%
Measured qty. frequency	45 Hz … 65 Hz
Measured qty. waveshape	Sine
Battery voltage	3 V ±0.1 V

Influencing Quantities and Influence Error

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range [1]	Influence Error (...% rdg. + ... d) / 10 K
Temperature	0 °C ... +21° C and +25° C ... +40° C	V ⎓	0.2 + 5
		V ∼	0.4 + 5
		300 Ω ... 3 MΩ	0.5 + 5
		30 MΩ	1 + 5
		mA/A ⎓	0.5 + 5
		mA/A ≂	0.8 + 5
		30 nF ... 300 µF	1 + 5
		Hz	0.2 + 5
		°C/°F (Pt100/Pt1000)	0.5 + 5

[1] With zero balancing

Influencing Qty.	Measured Quantity / Measuring Range		Sphere of Influence	Intrinsic uncertainty [3] ±(... % rdg. + ... d)
Frequency	V_{AC} [2]	300 mV ... 300 V	> 15 Hz ... 45 Hz	2 + 5 > 300 digits
			> 65 Hz ... 2 kHz	2 + 5 > 300 digits
			> 2 kHz ... 10 kHz	3 + 5 > 300 digits
		1000 V	> 65 Hz ... 5 kHz	3 + 5 > 60 digits
	A_{AC}	300 µA ... 10 A	> 15 Hz ... 45 Hz	3 + 10 > 300 digits
			> 65 Hz ... 10 kHz	
	A_{AC+DC}	300 µA ... 10 A	> 15 Hz ... 45 Hz	3 + 30 > 300 digits
			> 65 Hz ... 10 kHz	
	A_{AC} ⩘	300 mV / 3 V / 30 V [2]	>65 Hz ... 10 kHz	3 + 5 > 300 digits
	A_{AC} ⩘	30 mA / 300 mA 3 A	>65 Hz ... 10 kHz	3 + 30 > 300 digits

[2] Power limiting: frequency x voltage max. 3 x 10^6 V x Hz

[3] The accuracy specification is valid as of a display value of 10% and up to 100% of the measuring range for both measuring modes with the TRMS converter in the A AC and A (AC+DC) ranges.

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range	Influence Error [5]
Crest factor CF	1 ... 3	V ∼, A ∼	± 1% rdg.
	> 3 ... 5		± 3% rdg.

[5] Except for sinusoidal waveshape

Influencing Quantity	Sphere of Influence	Measured Quantity	Influence Error
Relative Humidity	75%, 3 days, instrument off	V, A, Ω, F, Hz, °C	1 x intrinsic uncertainty
Battery voltage	2.0 to 3.6 V	ditto	Included in intrinsic uncertainty

Influencing Quantity	Sphere of Influence	Measured Qty. / Measuring Range	Damping
Common Mode Interference Voltage	Interference quantity max. 1000 V ∼	V ⎓	> 120 dB
	Interference quantity max. 1000 V ∼ 50 Hz ... 60 Hz, sine	3 V ∼, 30 V ∼	> 80 dB
		300 V ∼	> 70 dB
		1000 V ∼	> 60 dB
Series Mode Interference Voltage	Interference quantity: V ∼ , respective nominal value of the measuring range, max. 1000 V ∼ , 50 Hz ... 60 Hz sine	V ⎓	> 50 dB
	Interference quantity max. 1000 V —	V ∼	> 110 dB

Response Time (after manual range selection)

Measured Quantity / Measuring Range	Response Time, Digital Display	Jump Function of the Measured Quantity
V ⎓ , V ∼ A ⎓ , A ∼	1.5 s	From 0 to 80% of upper range limit value
300 Ω ... 3 MΩ	2 s	From ∞ to 50% of upper range limit value
30 MΩ, $M\Omega_{@UISO}$	Max. 5 s	
Continuity	< 50 ms	
°C (Pt 100)	Max. 3 s	
⇻	1.5 s	
30 nF ... 300 µF	Max. 5 s	From 0 to 50% of upper range limit value
>10 Hz	1.5 s	

Display

LCD panel (65 mm x 36 mm) with analog and digital display including unit of measure, type of current and various special functions

Background Illumination

Background illumination is switched off approximately 1 minute after it has been activated.

Analog

Display	LCD scale with pointer
Scaling	Linear: ∓ 5 ... 0 ... ±30 with 35 scale divisions for ⎓ , 0 ... 30 with 30 scale divisions in all other ranges
Polarity display	with automatic switching
Overflow display	with the ▶ symbol
Measuring rate	40 measurements per second and display refresh

Digital

Display / char. height	7-segment characters / 15 mm
Number of places	3¾ digits ≙ 3100 steps, the changeover function to 4¾ digits in measuring function V DC and Ω depends on parameter selection
Overflow display	"OL" is displayed for ≥ 30000 digits, or ≥ 3100 digits, respectively
Polarity display	"–" (minus sign) is displayed if plus pole is connected to "⊥"
Measuring rate	10 and 40 measurements per second with the Min-Max function except for the capacitance, frequency and duty cycle measuring functions
Refresh rate	2 times per second, every 500 ms

Electrical Safety

Safety class	II per DIN EN 61010-1:2011/VDE 0411-1:2011	
Measuring category	CAT II	CAT III
Nominal voltage	1000 V	600 V
Pollution degree	2	
Test voltage	5.2 kV~ per DIN EN 61010-1:2011/ VDE 0411-1:2011	

Fuses

Fuse link	FF 10 A / 1000 V AC/DC; 10 x 38 mm; Switching capacity: 30 kA at 1000 V AC/DC, protects the current measurement input in the 300 µA through 10 A ranges

Power Supply

Battery	2 ea. 1.5 V mignon cell (2 ea. size AA), alkaline manganese per IEC LR6
Service life	With alkaline manganese batteries: approx. 200 hours (without $M\Omega_{ISO}$ measurement)
Battery test	Battery capacity display with battery symbol in 4 segments: „ ▭ ". Querying of momentary battery voltage via menu function.
Power OFF function	The multimeter is switched off automatically: – If battery voltage drops to below approx. 2.0 V – If none of the keys or the rotary switch are activated for an adjustable duration (10 to 59 min.) and the multimeter is not in the continuous operation mode
Power pack socket	If the power pack has been plugged into the instrument, the installed batteries are disconnected automatically. Rechargeable batteries can only be recharged externally.

Measuring Function	Nominal Voltage U_N	Resistance of the DUT	Service Life in Hours	Number of Possible Measurements with Nominal Current per VDE 0413
V ⎓			200 [1]	
V ∼			150 [1]	
$M\Omega_{@UISO}$	100 V	1 MΩ	50	
	100 V	100 kΩ		3000
	500 V	500 kΩ		600
	1000 V	2 MΩ		200

[1] Times 0.7 for interface operation

Electromagnetic Compatibility (EMC)

Interference emission	EN 61326-1:2013, class B
Interference immunity	EN 61326-1:2013 EN 61326-2-1:2013

Ambient Conditions

Accuracy range	0 °C ... +40 °C
Operating temp. range	–10 °C ... +50 °C
Storage temp. range	–25 °C ... +70 °C (without batteries)
Relative humidity	40 to 75%, no condensation allowed
Elevation	to 2000 m
Deployment	Indoors, except within specified ambient conditions

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Data Interface

Type	Optical via infrared light through the housing
Data transmission	Serial, bidirectional (not IrDa compatible)
Protocol	Device-specific
Baud rate	38,400 baud
Functions	– Select/query measuring functions and parameters – Query momentary measurement data

The USB | X-TRA plug-in interface adapter (see accessories) is used for adaptation to the PC's USB port.

Internal Measured Value Storage

Memory capacity	4 MBit / 540 kB for approx. 15,000 measured values with indication of date and time

Mechanical Design

Housing	Impact resistant plastic (ABS)
Dimensions	200 x 87 x 45 mm (without protective rubber cover)
Weight	Approx. 0.35 kg with batteries
Protection	Housing: IP 54 (pressure equalization by means of the housing)

Table Excerpt Regarding Significance of IP Codes

IP XY (1st char. X)	Protection against penetration by solid particles	IP XY (2nd char. Y)	Protection against penetration by water
0	Not protected	0	Not protected
1	≥ 50.0 mm dia.	1	Vertical dripping
2	≥ 12.5 mm dia.	2	Dripping (15° inclination)
3	≥ 2.5 mm dia.	3	Spray water
4	≥ 1.0 mm dia.	4	Splashing water
5	Dust protected	5	Jet-water

Applicable Regulations and Standards

DIN EN 61010, part 1:2001/VDE 0411-1:2002	Safety requirements for electrical equipment for measurement, control and laboratory use
DIN EN 61326-1 VDE 0843-20-1	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements
EN 60529 VDE 0470, part 1	Test instruments and test procedures – degrees of protection provided by enclosures (IP code)

Accessories for operation at a PC

Interface Adapter for USB Connection

The USB | X-TRA bidirectional interface adapter includes the following functions:

- Configure the **METRAHIT ISO** from a PC.
- Transmit live measurement data to the PC.
- Read data out of memory from the **METRAHIT ISO**.

The adapter does not require a separate power supply.
Its baud rate is 38,400 baud.
A CD ROM is included which contains current drivers for Windows operating systems. |



METRAHIT COIL with COIL TEST ADAPTER



TRMS Multimeter with Insulation Measurement and Interturn Short-circuit Measurement (Coil only)

Order Information

Designation	Type	Article Number
Insulation multimeter See selection list or scope of delivery on page 2 for scope of delivery.	**METRAHIT ISO**	M246B
Insulation multimeter with interturn short-circuit measurement, for standard equipment see Selection List or Scope of Delivery on page 2	**METRAHIT COIL**	M246C
Power pack: 90 ... 250 V AC / 5 V DC, 600 V CAT IV	**NA** | X-TRA	Z218G
Accessory Cables and Adapters		
Cable set (1 pair of measurement cables), 1.2 m, with VDE-GS mark 600 V CAT IV 1 A [1], 1000 V CAT III 1 A [1] 1000 V CAT II 16 A [2]	KS17-2	GTY3620034P0002
Cable set with 2 mm ∅ steel tips with cable length 120 cm, 1000 V/CAT II	KS17-S	Z110H
Cable set incl. test probes, clips and USA test probes, (1000 V CAT II / III 20 A)	KS-NTS	Z110W
Cable set for telecommunication application (a-b-E) 1000 V CAT III 1 A [1]	KS21-T	Z110U
Alligator clips (1 pair) for KS17-2 1000 V CAT III 16 A	KY95-3	Z110J
Clip-on current sensor, 10 mA … 100 A, 1 mV / 10 mA, clip opening: 15 mm dia.	WZ12B	Z219B
Accessories for Operation at a PC		
Bidirectional interface adapter, IR-USB	USB | X-TRA	Z216C
METRAwin 10 software	**METRAwin 10**	GTZ3240000R0001
Accessories for Temperature Measurement with Resistance Thermometer		
Pt100 temperature sensor for surface and emersion measurements, -40 … +600 °C	Z3409	GTZ3409000R0001
Pt1000 temperature sensor for measurement in gases and liquids, -50 … +220° C (for servicing household appliances)	TF220	Z102A
Pt100 oven sensor, -50 … +550 °C	TF550	GTZ3408000R0001
Ten adhesive Pt100 temperature sensors, -50 … +550 °C	TS Chipset	GTZ3406000R0001
Protection and Transport Accessories		
Imitation leather carrying pouch	F829	GTZ3301000R0003
Cordura belt pouch	HitBag	Z115A
Ever-ready case for 2 instruments and accessories	F840	GTZ3302001R0001
Hard case for one instrument and accessories	HC20	Z113A
Hard case for two instruments and accessories	HC30	Z113A
Replacement Fuses		
Fuses (pack of 10)	FF 10 A/ 1000 V AC/DC	Z109L

[1] with safety cap applied
[2] without safety cap applied

For additional information regarding accessories please refer to

- Measuring Instruments and Testers catalog
- www.gossenmetrawatt.com

METRA**HIT** Iso and METRA**HIT** Coil

TRMS Multimeter with Insulation Measurement and Interturn Short-circuit Measurement (Coil only)

Edited in Germany • Subject to change without notice • A pdf version is available on the Internet

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