

# METRAHIT | ISO AERO

## TRMS Multimeter with Insulation Measurement

3-349-557-03  
1/4.09

- **Insulation resistance measurement** with interference voltage detection, test voltages: 10 V, 50 V, 100 V, 250 V, 500 V
- **Multimeter with diverse functions** (V,  $\Omega$ , 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**
- **Display:** 4 $\frac{3}{4}$  place, 30000 digits, 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

**600 V CAT III**  
**1000 V CAT II**



**DKD**  
Calibration Certificate  
Included

Quality Management System



DQS Certified per  
DIN EN ISO 9001 reg. no. 1262



### Application

The **METRAHIT | ISO AERO** multimeter is a rugged portable measuring instrument. It is suitable for servicing household appliance, machines (e.g. forklifts) and systems (e.g. photovoltaic). The instrument can be used in the field and is equipped with an internal, mains-independent power supply.

### 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  $\Omega$ ) position. The threshold value for acoustic signaling can be set to 1, 10, 20, 30, 40 or 90  $\Omega$ .

#### Insulation Resistance Measurement with Interference Voltage Detection

**Depending upon the utilized instrument variant, insulation resistance can be measured with an adjustable test voltage of 10 V ... 500 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 M $\Omega$  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.

#### 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.

## TRMS Multimeter with Insulation Measurement

### 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.

### IEC 61010-1, 2<sup>nd</sup> Issue

Multimeters manufactured as of 1 January 2004 may not be the source of any possible hazard, regardless of the utilized combination of input voltages, function settings and range selections. Possible hazards include electrical shock, fire, sparking and explosion.

### 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. DE 40 27 801 C2 and US 5,166,599)

### 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)

### DKD calibration certificate

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

In addition to standard quantities, our DKD 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 DKD calibration center.

### Selection List

Function	METRAHIT   ISO AERO
V AC+DC TRMS (Ri = 1 MΩ)	•
V AC / Hz TRMS (Ri ≥ 9 MΩ)	1 kHz filter
V AC+DC TRMS (Ri ≥ 9 MΩ)	•
V DC (Ri ≥ 9 MΩ)	•
Hz (V AC)	... 300 kHz
Bandwidth, V AC	15 Hz ... 10 kHz
A AC / Hz TRMS	300 μA
A AC+DC TRMS	3/30/300 mA
A DC	3 A / 10 A
Fuses	10 A / 1000 V
Transformation Ratio >C	mV/A, mA/A
Hz (A AC)	... 30 kHz
R <sub>ISO</sub> MΩ@U <sub>ISO</sub>	10 V / 50 V / 100 V / 250 V / 500 V
Resistance Ω	•
Continuity (🔊)	•
Diode ... 5.1 V → ←	•
Temperature TC (K)	•
Temperature RTD	•
Capacitance — —	•
Min-Max / data hold	•
4 MBit memory <sup>1)</sup>	•
IR Interface	•
Power pack socket	•
Protection	IP 54
Measuring category	1000 V CAT II, 600 V CAT III

<sup>1)</sup> For 15,000 measured values, sampling rate adjustable from 0.1 seconds to 9 hours

### Scope of delivery

- 1 Insulation multimeter
- 1 Protective rubber cover
- 1 Condensed operating instructions
- 1 CD ROM with Operating instructions
- 1 DKD calibration certificate
- 2 Batteries, 1.5 V, type AA, installed
- 1 Power pack NA | X-TRA

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## TRMS Multimeter with Insulation Measurement

### Technical Data

Meas. Function (input)	Measuring Range	Resolution at Upper Range Limit		Input Impedance		Intrinsic Error under Reference Conditions				Overload Capacity <sup>2)</sup>	
						±(... % rdg. + ... d)					
						30000	3000	30000	3000	3000	3000
<b>V</b>	300.0 mV	10 μV	100 μV	9 MΩ	9 MΩ // < 50 pF	0.15 + 15 <sup>10)</sup>	0.2 + 3 <sup>10)</sup>	1 + 3 (> 100 D)	1.5 + 5 (> 100 D)	1000 V DC AC RMS Sine <sup>6)</sup>	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				
<b>Voltage drop at approx. range limit</b>						---	~ <sup>1) 11)</sup>	≅ <sup>1) 11)</sup>			
<b>A</b>	300.0 μA		100 nA	18 mV	18 mV		0.5 + 5	1.5 + 5 (> 100 D)	1.5 + 5 (> 100 D)	1000 V DC AC RMS Sine <sup>6)</sup>	Cont.
	3.000 mA		1 μA	160 mV	160 mV		0.2 + 3	1.5 + 5 (> 30 D)	1.5 + 5 (> 100 D)		
	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				
	10.00 A		10 mA	400 mV	400 mV		1 + 5				
Factor 1:1/10/100/1000		<b>Input</b>		<b>Input impedance</b>		---	~ <sup>1) 11)</sup>	≅ <sup>1) 11)</sup>			
<b>A</b>	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			Plus clip-on current transformer error	3 A	5 min			
	3/30/300/3k A		3 A								
<b>A</b>	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)	1.5 + 5 (> 100 D)	Meas. input <sup>6)</sup> : 1000 V RMS max. 10 s	
	3/30/300/3k A		3 V			Plus clip-on current sensor error	1.5 + 3 (> 30 D)	1.5 + 5 (> 100 D)			
	30/300/3k/30k A		30 V								
				<b>Open-circuit voltage</b>	<b>Meas. current at range limit</b>	±(... % rdg. + ... d)					
<b>Ω</b>	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 <sup>3)</sup>		1 mV	ca. 10 V		2 + 5					
				<b>Discharge resist.</b>	<b>U<sub>0</sub> max</b>	±(... % rdg. + ... d)					
<b>F</b>	30.00 nF		10 pF	10 MΩ	0.7 V	1 + 6 <sup>4)</sup> 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 <sup>4)</sup>					
	3.000 μF		1 nF	100 kΩ	0.7 V	1 + 6 <sup>4)</sup>					
	30.00 μF		10 nF	12 kΩ	0.7 V	1 + 6 <sup>4)</sup>					
	300.0 μF		100 nF	3 kΩ	0.7 V	5 + 6 <sup>4)</sup>					
				<b>f<sub>min</sub> <sup>5)</sup></b>	±(... % rdg. + ... d)						
<b>Hz (V)</b>	300.0 Hz		0.1 Hz			0.1 + 2 <sup>8)</sup>			Hz (V) <sup>6)</sup> : Hz(A<img alt="clip-on current transformer symbol" style="vertical-align: middle;"/>) <sup>6)</sup> : 1000 V Hz (A): <sup>7)</sup>	max. 10 s	
<b>Hz (A)</b>	3.000 kHz		1 Hz								
<b>Hz (A) </b>	30.00 kHz		10 Hz								
<b>Hz (V)</b>	300.0 kHz		100 Hz								
						±(... % rdg. + ... d) <sup>9)</sup>					
<b>°C</b>	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	-250.0 ... +1372.0 °C				1 % + 5 K					
	(NiCr-Ni)										

<sup>1</sup> 15 ... 45 ... 65 Hz ... 10 (5) kHz sine. See page 6 regarding influence

<sup>2</sup> At 0° ... + 40° C

<sup>3</sup> Display of up to max. 5.1 V, "OL" in excess of 5.1 V.

<sup>4</sup> Applies to measurements at film capacitors and battery-operated

<sup>5</sup> Lowest measurable frequency for sinusoidal measuring signals symmetrical to the zero point

<sup>6</sup> Overload capacity of the voltage measurement input:  
power limiting: frequency x voltage max. 3 x 10<sup>9</sup> V x Hz at > 100 V

<sup>7</sup> Overload capacity of the current measurement input:  
See current measuring ranges for maximum current values.

<sup>8</sup> 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.

<sup>9</sup> Plus sensor deviation

<sup>10</sup> With ZERO function active

<sup>11</sup> 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

<sup>12</sup> 10 minute cool-down period

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

## TRMS Multimeter with Insulation Measurement

### Insulation Resistance Measurement <sup>1)</sup>

Measuring Range	Resolution	Nominal Voltage $U_{ISO}$	Intrinsic Error under Reference Conditions $\pm(\% \text{ rdg} + d)$
0.3 V ... 1000 V $\approx$ <sup>2)</sup>		$R_i = 1 M\Omega$	$3 + 30 > 100$ digits
5 ... 310.0 k $\Omega$	0.1 k $\Omega$	10//50/100/250/500 V	5 + 30 // 3 + 5
0.280 ... 3.100 M $\Omega$	1 k $\Omega$	10//50/100/250/500 V	5 + 30 // 3 + 5
02.80 ... 31.00 M $\Omega$	10 k $\Omega$	10//50/100/250/500 V	5 + 30 // 5 + 5
028.0 ... 310.0 M $\Omega$	100 k $\Omega$	10//50/100/250/500 V	5 + 30 // 5 + 5
0280 ... 3100 M $\Omega$	1 M $\Omega$	500 V	5 + 5

<sup>1)</sup> During insulation resistance measurement ( $M\Omega_{@ISO}$ ): If ERROR is displayed as „Error“ >> limits:  $U_{interference} > 10 \dots 20$  V and  $U_{interference} \neq U_{ISO}$ ,  $R_i < 10$  k $\Omega$  @  $U_{ISO}$  10 V,  $R_i < 50$  k $\Omega$  @  $U_{ISO}$  50 V,  $R_i < 100$  k $\Omega$  @  $U_{ISO}$  100 V,  $R_i < 250$  k $\Omega$  @  $U_{ISO}$  250 V,  $R_i < 500$  k $\Omega$  @  $U_{ISO}$  500 V

<sup>2)</sup> Interference voltage measurement TRMS (V AC + DC) with 1 M $\Omega$  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	Time
$U_{interference}/M\Omega_{@ISO}$	—	—	—	—	$U > 1000V$	1000 V $\approx$	Cont.
$M\Omega_{@ISO}$	10, 50, 100, 250, 500 V	Max. $1.1 \times U_{ISO}$	1.0 mA	< 1.5 mA	$U > 1000V$	1000 V $\approx$	10 s

### Internal Clock

Time format DD.MM.YYYY hh:mm:ss  
 Resolution 0.1 s  
 Accuracy  $\pm 1$  min./month

### Reference Conditions

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

### Influencing Quantities and Influence Error

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range <sup>1)</sup>	Influence Error (...% rdg. + ... d) / 10 K
Temperature	0 °C ... +21 °C and +25 °C ... +40 °C	V $\approx$	0.2 + 5
		V $\sim$	0.4 + 5
		300 $\Omega$ ... 3 M $\Omega$	0.5 + 5
		30 M $\Omega$	1 + 5
		mA/A $\approx$	0.5 + 5
		mA/A $\approx$	0.8 + 5
		30 nF ... 300 $\mu$ F	1 + 5
		Hz	0.2 + 5
		°C/°F (Pt100/Pt1000)	0.5 + 5

<sup>1)</sup> With zero balancing

Influencing Qty.	Measured Quantity / Measuring Range	Sphere of Influence	Intrinsic uncertainty <sup>3)</sup> $\pm(\dots \% \text{ rdg.} + \dots d)$
Fre-quency	V <sub>AC</sub> 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
	A <sub>AC</sub> 300 $\mu$ A ... 10 A	> 15 Hz ... 45 Hz	3 + 10 > 300 digits
		> 65 Hz ... 10 kHz	
		> 65 Hz ... 10 kHz	
A <sub>AC</sub> +DC 300 $\mu$ A ... 10 A	> 15 Hz ... 45 Hz	3 + 30 > 300 digits	
	> 65 Hz ... 10 kHz		
A <sub>AC</sub> $\approx$	300 mV / 3 V / 30 V <sup>2)</sup>	> 65 Hz ... 10 kHz	3 + 5 > 300 digits
	30 mA / 300 mA / 3 A	> 65 Hz ... 10 kHz	3 + 30 > 300 digits

<sup>2)</sup> Power limiting: frequency x voltage max.  $3 \times 10^6$  V x Hz

<sup>3)</sup> 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 AC and A (AC+DC) ranges.

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range	Influence Uncertainty <sup>5)</sup>
Crest factor CF	1 ... 3	V $\sim$ , A $\sim$	$\pm 1\%$ rdg.
	> 3 ... 5		$\pm 3\%$ rdg.

<sup>5)</sup> Except for sinusoidal waveshape

Influencing Quantity	Sphere of Influence	Measured Quantity	Influence Error
Relative Humidity	75%, 3 days, instrument off	V, A, $\Omega$ , F, Hz, °C	1 x intrinsic uncertainty
Battery voltage	1.8 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 $\sim$	V $\approx$	> 120 dB
		3 V $\sim$ , 30 V $\sim$	> 80 dB
		300 V $\sim$	> 70 dB
		1000 V $\sim$	> 60 dB
Series Mode Interference Voltage	Interference quantity: V $\sim$ , respective nominal value of the measuring range, max. 1000 V $\sim$ , 50 Hz ... 60 Hz sine	V $\approx$	> 50 dB
		V $\sim$	> 110 dB

### Response Time (after manual range selection)

Measured Quantity / Measuring Range	Response Time, Digital Display	Jump Function of the Measured Quantity
V $\approx$ , V $\sim$ A $\approx$ , A $\sim$	1.5 s	From 0 to 80% of upper range limit value
300 $\Omega$ ... 3 M $\Omega$	2 s	
30 M $\Omega$ , $M\Omega_{@ISO}$	Max. 5 s	
Continuity	< 50 ms	
°C (Pt 100)	Max. 3 s	
$\rightarrow$	1.5 s	From $\infty$ to 50% of upper range limit value
30 nF ... 300 $\mu$ F	Max. 5 s	
>10 Hz	1.5 s	From 0 to 50% of upper range limit value

# TRMS Multimeter with Insulation Measurement

## 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:  
 $\mp 5 \dots 0 \dots \pm 30$  with 35 scale divisions for  $\equiv$ ,  $0 \dots 30$  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  $4\frac{3}{4}$  places,  $\cong 30000$  steps (V DC and  $\Omega$ ) switchable to  $3\frac{3}{4}$  places,  $\cong 3100$  steps  
 Overflow display "OL" is displayed for  $\geq 30000$  digits respectively  $\geq 3100$  digits  
 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 measuring functions  
 Refresh rate 2 times per second, every 500 ms

## Electrical Safety

Safety class II per EN 61010-1:2001/VDE 0411-1:2002  
 Measuring category CAT II CAT III  
 Nominal voltage 1000 V 600 V  
 Pollution degree 2  
 Test voltage 5.2 kV~ per EN 61010-1:2001/VDE 0411-1:2002

## 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  $\mu$ A 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. 1.8 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 $\equiv$			200 <sup>1)</sup>	
V $\sim$			150 <sup>1)</sup>	
$M\Omega_{ISO}$	10 V	1 $M\Omega$	50	
	10 V	10 $k\Omega$		3000
	100 V	1 $M\Omega$	50	
	100 V	100 $k\Omega$		3000
	500 V	500 $k\Omega$		600

<sup>1)</sup> Times 0.7 for interface operation

## Electromagnetic Compatibility (EMC)

Interference emission EN 61326-1:2006, class B  
 Interference immunity EN 61326-1:2006  
 EN 61326-2-1:2006

## 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

## TRMS Multimeter with Insulation Measurement

### 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	<ul style="list-style-type: none"> <li>– Select/query measuring functions and parameters</li> <li>– Query momentary measurement data</li> </ul>

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

### Accessories for operation at a PC (METRAHIT | X-TRA only)

#### Interface Adapter for USB Connection

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

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

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.

### Internal Measured Value Storage

Memory capacity	4 MBit / 540 kB for approx. 15,000 measured values with indication of date and time
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### 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 (1 <sup>st</sup> char. X)	Protection against penetration by solid particles	IP XY (2 <sup>nd</sup> 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 61326:2006 VDE 0843, part 20	Electrical equipment for control technology and laboratory use – EMC requirements
EN 60529 VDE 0470, part 1	Test instruments and test procedures – degrees of protection provided by enclosures (IP code)

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## TRMS Multimeter with Insulation Measurement

### Order Information

For additional information regarding accessories please refer to

- Measuring Instruments and Testers catalog
- [www.gossenmetrawatt.com](http://www.gossenmetrawatt.com)

Designation	Type	Article Number
Special edition for avionic maintenance, consisting of METRAHIT TRMS-multimeter and insulation tester (10/50/100/250/500 V) and rubber holster, set incl. power supply adapter NA-XTRA with a wide input range of 90 V..250 V AC, warranty 3 years und DKD-calibration certificate	<b>METRAHIT   ISO AERO</b>	M246M
avionic service case incl. METRAHIT ISO Aero and special test & measurement accessories( 68 parts) for the avionic industries, inside a hard case	<b>Aero MasterTest Kit II</b>	M246N
Avionic Service case (without DMM), 68 parts, special test and measurement accessories for the avionic industries, includes measurement cables, hooks, clips, adapters and connectors for male and female MIL connections inside a hard case	<b>Aero MasterTest Kit I</b>	Z246A
Power pack: 90 ... 250 V AC / 5 V DC, 600 V CAT IV	NA   X-TRA	Z218G
<b>Accessory Cables and Adapters</b>		
Cable set (1 pair of measurement cables), 1.2 m, with VDE-GS mark (1000 V CAT III / 600 V CAT IV 16 A)	KS17-2	GTY3620034P0002
Cable set with 2 mm Ø steel tips with cable length 120 cm, 1000 V/CAT III	KS17S	Z110H
Cable set for telecommunication application 600 V CAT III 16 A	KS21T	Z110U
Cable set incl. test probes, clips and USA test probes, (1000 V CAT III / 600 V CAT IV 20 A)	KS-NTS	Z110W
Alligator clips (1 pair) for KS17-2	KY95-1	GTZ3215000R0002
Ri adapter, 200 kΩ / 230 V	R200K	Z101A
Clip-on current sensor, 10 mA ... 100 A, 1 mV / 10 mA, clip opening: 15 mm dia.	WZ12B	Z219B
<b>Accessories for Operation at a PC</b>		
Bidirectional interface adapter, IR-USB	USB   X-TRA	Z216C
METRAwin 10 software (available for <b>METRAHIT   ISO AERO</b> in fourth quarter of 2007)	METRAwin 10	GTZ3240000R0001
<b>Accessories for Temperature Measurement with Resistance Thermometer</b>		
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
<b>Protection and Transport Accessories</b>		
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
<b>Replacement Fuses</b>		
Fuses (pack of 10)	FF 10 A / 1000 V AC/DC	Z109L

**METRAHIT | ISO AERO**

# **TRMS Multimeter with Insulation Measurement**

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Prepared in Germany • Subject to change without notice

 **GOSSEN METRAWATT**

GMC-I Messtechnik GmbH  
Südwestpark 15  
90449 Nuremberg • Germany

Phone +49 911 8602-111  
Fax +49 911 8602-777  
E-Mail [info@gossenmetrawatt.com](mailto:info@gossenmetrawatt.com)  
[www.gossenmetrawatt.com](http://www.gossenmetrawatt.com)