



- This comprehensive kit contains Avionic specific test and measure equipment for use in the MRO field
- Featuring 73 pieces including Aero specific test leads (sizes 12 through 22) and BNC Coax Cable/Adapters
- Offered in a Military Grade, shock resistant, airtight, waterproof Tool Case.

The Avionic Service case with a comprehensive range of Test Accessories has been put together in a combined effort by Silvertronic and one of the biggest European Airlines to meet the demand for Avionic Test scenarios such as "AOG" Aircraft On Ground, Standard Service issues for example by Line Maintenance as well for general MRO requirements. The Avionic Service Case went through a long testing time at the Airline with numerous Test applications to make this Service Case a versatile electrical Test companion in most common Test needs. Containing Avionic Test Leads, Test Accessories & Adapters, Coaxial-Adapter kit, Test-Lead extensions and the optional "Aero" Digital Multimeter which is designed for avionic testing may also be used for insulation measurement.

The "Tool Control" facility is a vital part of the kit whereby each component space is labelled for quick visual inspection. The special Avionic leads are displayed in the lid of the case for initial visual inspection but thereafter can be stored in the respective colour coded tool rolls, which are supplied within the kit.

Silvertronics Avionic Service Case comes in a sturdy black polypropylene case which is ideal for the service environment as it is resilient to scratches, dents and is shock resistant. The case is also airtight, waterproof, dustproof and will remain afloat should it end up in water. Temperature range is -23 to +99 degrees Celsius. Overall dimensions are 49 cm x 19 cm x 43 cm, Weight 6.1kg.

Contents: GMC-I „Aero“ DMM with Power Supply , Aero Leads 22 AWG Male & Female, Aero Leads 20 AWG Male & Female, Aero Leads 16 AWG Male & Female, Aero Leads 12 AWG Male & Female, Aero Leads GTA Male & Female „NG“, Cable Extensions 6m, BNC Coaxial Adapter Kit, BNC Coaxial cable, Various Test Prods & Test Leads, 4 mm Adapter, 4 mm / 4mm Coupler, Crocodile Clips and 6 Storage Pouches for the Aero Leads.

Part No. 815002 Avionic Service Case with DMM
Part No. 815003 Avionic Service Case without DMM

SILVERTRONIC

LEADS
...the way forward!

Master Aero Service Kit With Digital Multimeter

KIT P/N: 815002

NSN: 4920-01-618-7054

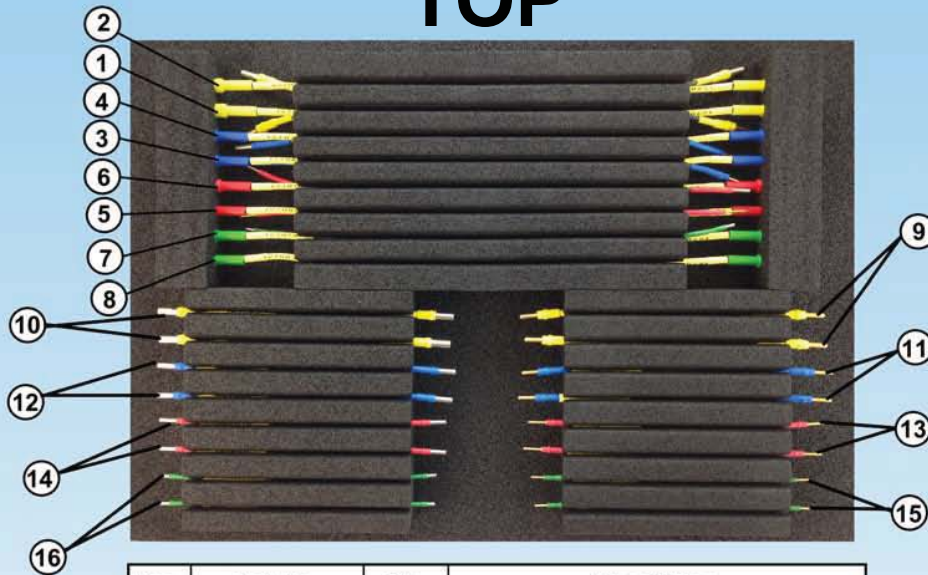


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TOP



Pos.	Part. No.	Qty.	Description
1	127080	2	Aero Lead 12 4mmS/Male Yellow
2	127076	2	Aero Lead 12 4mmS/Fem Yellow
3	127081	2	Aero Lead 16 4mmS/Male Blue
4	127077	2	Aero Lead 16 4mmS/Fem Blue
5	127082	2	Aero Lead 20 4mmS/Male Red
6	127078	2	Aero Lead 20 4mmS/Fem Red
7	127079	2	Aero Lead 22 4mmS/Fem Green
8	127083	2	Aero Lead 22 4mmS/Male Green
9	127072	2	Aero Lead 12 Male/Male Yellow
10	127068	2	Aero Lead 12 Fem/Fem Yellow
11	127073	2	Aero Lead 16 Male/Male Blue
12	127069	2	Aero Lead 16 Fem/Fem Blue
13	127074	2	Aero Lead 20 Male/Male Red
14	127070	2	Aero Lead 20 Fem/Fem Red
15	127075	2	Aero Lead 22 Male/Male Green
16	127071	2	Aero Lead 22 Fem/Fem Green

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KIT P/N: 815002

NSN: 4920-01-618-7054

BOTTOM



Pos.	Part No.	Qty	Description	Pos.	Part No.	Qty	Description
17	825005	1	Avionic Digital Multi Meter ISO DMM	31	124044_R	1	4mm to 4mm Safety Plug Adapter - Red
18	825005PS	1	DMM Power Supply	32	125099_R	1	4mm to 4mm Coupler - Red
19	119503QDF/B	1	Pouch / Black	33	125099_B	1	4mm to 4mm Coupler - Black
19	127084	2	Aero Lead GTA Male/Male Black	34	121039/R	1	Thin Spike Prod - Red
19	127085	2	Aero Lead GTA 4mm/Male Black	35	121039/B	1	Thin Spike Prod - Black
19	127086	2	Aero Lead GTA Female/Female Black	36	116338	1	TNC Male to BNC Female Adapter
19	127087	2	Aero Lead GTA 4mm/Female Black	37	116337	1	BNC Male to Male Adapter
20	119503QDF/W	1	Pouch / White - Empty	38	116336	1	BNC Female to Female Adapter
21	119503QDF/G	1	Pouch / Green - Empty	39	126017/R	1	Small Crocodile Clip, 300V - Red
22	119503QDF/R	1	Pouch / Red - Empty	40	126017/B	1	Small Crocodile Clip, 300V - Black
23	119503QDF/BL	1	Pouch / Blue - Empty	41	123680/ORSK/1.2/B	1	Test Lead, Rt Angle to Stackable, 1.2m, Black
24	119503QDF/Y	1	Pouch / Yellow - Empty	41	123680/ORSK/1.2/R	1	Test Lead, Rt Angle to Stackable, 1.2m, Red
25	825009	1	Volt Stick	42	123680/OFOR/1.2/B	1	Test Lead, Rt Angle to Straight, 1.2m, Black
26	116333	1	BNC Male to Double Stacking Banana Plug	42	123680/OFOR/1.2/R	1	Test Lead, Rt Angle to Straight, 1.2m, Red
27	116332	1	BNC Female to Double Stacking Banana Plug	43	134390/6M/R	1	CordPro, 6M, Straight to Right Angle Plug, Red
28	116334	1	BNC Male to Double Stacking Binding Post Jacks	44	121348_R	1	OEM Lantern Prod, Red
29	116335	1	BNC Female to Double Stacking Binding Post Jacks	45	121348_B	1	OEM Lantern Prod, Black
30	124044_B	1	4mm to 4mm Safety Plug Adapter - Black	46	121026/R	1	Sprung Hook, Red
KIT P/N 815002				47	121026/B	1	Sprung Hook, Black
				48	134390/6M/B	1	CordPro, 6M, Straight to Right Angle Plug, Black
				49	116340	1	BNC Coax Patch Cable, High Flex

METRAHIT | ISO AERO
TRMS Multimeter with Insulation Measurement

 3-349-557-03
 3/9.12

- **Insulation resistance measurement** with interference voltage detection, test voltages: 10 V, 50 V, 100 V, 250 V, 500 V
- **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**
- **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


Quality Management System


 DQS Certified per
 DIN EN ISO 9001

 Deutsche
 Akkreditierungsstelle
 D-K-15080-01-01

DAkkS Calibration Certificate as Standard Feature


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 Ω 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 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 Ω 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, 2nd 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)

DAkkS calibration certificate

METRAHIT | ISO AERO 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.

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 _{ISO} MΩ@U _{ISO}	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 ¹⁾	•
IR Interface	•
Power pack socket	•
Protection	IP 54
Measuring category	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
- 1 Protective rubber cover
- 1 Condensed operating instructions
- 1 CD ROM with Operating instructions
- 1 DAkkS calibration certificate
- 2 Batteries, 1.5 V, type AA, installed
- 1 Power pack NA | X-TRA

METRAHIT | ISO AERO

TRMS Multimeter with Insulation Measurement

Technical Data

Meas. Function (input)	Measuring Range	Resolution at Upper Range Limit		Input Impedance		Intrinsic Error under Reference Conditions ±(... % rdg. + ... d)				Overload Capacity ²⁾		
						30000	3000	3000	3000	Value	Time	
		30000	3000	≡	~ / ≡	≡	≡	~ ^{1) 11)}	≡ ^{1) 11)}			
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)	1000 V DC AC RMS Sine ⁶⁾	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		Input		Input impedance			~ ^{1) 11)}	≡ ^{1) 11)}				
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
A	0.3/3/30/300 A		300 mV	Voltage measurement input approx. 9 MΩ (⚡ V socket)				1.5 + 3 (> 300 D)	1.5 + 5 (> 300 D)	1000 V DC AC RMS Sine ⁶⁾	max. 10 s	
	3/30/300/3k A		3 V					0.5 + 3	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)						
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 ⁶⁾	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					
Ω	300.0 Ω	100 mΩ	100 mΩ	ca. 10 V	Approx. 1 mA const.	3 + 5						
Ω	5.1 V ³⁾	1 mV	1 mV	ca. 10 V		2 + 5						
				Discharge resist.	U_{0 max}	±(... % rdg. + ... d)						
F	30.00 nF	10 pF	10 pF	10 MΩ	0.7 V	1 + 6 ⁴⁾ with ZERO function active				1000 V DC AC RMS Sine ⁶⁾	max. 10 s	
	300.0 nF	100 pF	100 pF	1 MΩ	0.7 V	1 + 6 ⁴⁾						
	3.000 μF	1 nF	1 nF	100 kΩ	0.7 V	1 + 6 ⁴⁾						
	30.00 μF	10 nF	10 nF	12 kΩ	0.7 V	1 + 6 ⁴⁾						
	300.0 μF	100 nF	100 nF	3 kΩ	0.7 V	5 + 6 ⁴⁾						
				f_{min} ⁵⁾		±(... % rdg. + ... d)						
Hz (V)/ Hz (A) Hz (A) Hz (V)	300.0 Hz		0.1 Hz							Hz (V) ⁶⁾ , Hz (A) ⁶⁾ , 1000 V Hz (A): ⁷⁾	max. 10 s	
	3.000 kHz		1 Hz									
	30.00 kHz		10 Hz									
	300.0 kHz		100 Hz									
						±(... % rdg. + ... d) ⁹⁾						
°C	Pt 100	-200.0 ... +850.0 °C	0.1 °C					0.5 % + 15		1000 V DC/AC RMS Sine ⁶⁾	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 x 10³ 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

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

TRMS Multimeter with Insulation Measurement

Insulation Resistance Measurement ¹⁾

Measuring Range	Resolution	Nominal Voltage U _{ISO}	Intrinsic Error under Reference Conditions ±(% rdg + d)
0.3 V ... 1000 V \approx 2)		Ri = 1M Ω	3 + 30 > 100 digits
5 ... 310.0 k Ω	0.1 k Ω	10//50/100/250/500 V	5 + 30 // 3 + 5
0.280 ... 3.100 M Ω	1 k Ω	10//50/100/250/500 V	5 + 30 // 3 + 5
02.80 ... 31.00 M Ω	10 k Ω	10//50/100/250/500 V	5 + 30 // 5 + 5
028.0 ... 310.0 M Ω	100 k Ω	10//50/100/250/500 V	5 + 30 // 5 + 5
0280 ... 3100 M Ω	1 M Ω	500 V	5 + 5

¹⁾ During insulation resistance measurement (M Ω _{@ISO}): If ERROR is displayed as „Error“ >> limits: U_{interference} > 10 ... 20 V and U_{interference} \neq U_{ISO}, Ri < 10 k Ω @ Uiso 10 V, Ri < 50 k Ω @ Uiso 50 V, Ri < 100 k Ω @ Uiso 100 V, Ri < 250 k Ω @ Uiso 250 V, Ri < 500 k Ω @ Uiso 500 V

²⁾ Interference voltage measurement TRMS (V AC + DC) with 1 M Ω 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 Value	Capacity Time
U _{interference} /M Ω _{@ISO}	—	—	—	—	U>1000V	1000 V \approx	Cont.
M Ω _{@ISO}	10, 50, 100, 250, 500 V	Max. 1.1x 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 ¹⁾	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 Ω ... 3 M Ω	0.5 + 5
		30 M Ω	1 + 5
		mA/A \approx	0.5 + 5
		mA/A \approx	0.8 + 5
		30 nF ... 300 μ F	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)
Fre- quency	V _{AC} 300 mV ... 300 V 1000 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
		> 65 Hz ... 5 kHz	3 + 5 > 60 digits
	A _{AC} 300 μ A ... 10 A	> 15 Hz ... 45 Hz	3 + 10 > 300 digits
		> 65 Hz ... 10 kHz	
	A _{AC} + DC 300 μ A ... 10 A	> 15 Hz ... 45 Hz	3 + 30 > 300 digits
		> 65 Hz ... 10 kHz	
	A _{AC} \approx \approx 300 mV / 3 V / 30 V ²	> 65 Hz ... 10 kHz	3 + 5 > 300 digits
A _{AC} \approx \approx 30 mA / 300 mA 3 A	> 65 Hz ... 10 kHz	3 + 30 > 300 digits	

²⁾ Power limiting: frequency x voltage max. 3 x 10⁶ 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 Uncertainty ⁵⁾
Crest factor CF	1 ... 3	V \sim , A \sim	\pm 1% rdg.
	> 3 ... 5		\pm 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	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 50 Hz ... 60 Hz, sine	V \approx	> 120 dB
		3 V \sim , 30 V \sim	> 80 dB
		300 V \sim	> 70 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
		Interference quantity max. 1000 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 Ω ... 3 M Ω	2 s	From ∞ to 50% of upper range limit value
30 M Ω , M Ω _{@ISO}	Max. 5 s	
Continuity	< 50 ms	
°C (Pt 100)	Max. 3 s	
\rightarrow	1.5 s	From 0 to 50% of upper range limit value
30 nF ... 300 μ F	Max. 5 s	
>10 Hz	1.5 s	

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 Ω) switchable to $3\frac{3}{4}$ places, $\cong 3100$ steps
 Overflow display "OL" is displayed for ≥ 30000 digits respectively ≥ 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 μ 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 ¹⁾	
V \sim			150 ¹⁾	
$M\Omega_{ISO}$	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

¹⁾ 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"> – 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
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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 st char. X)	Protection against penetration by solid particles	IP XY (2 nd 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)

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.



Accessory

Aero MasterTest Kit I (Z246A)



METRAHIT | ISO AERO

TRMS Multimeter with Insulation Measurement

Order Information

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, cable set KS17-2, set incl. power supply adapter NA-XTRA with a wide input range of 90 V..250 V AC, warranty 3 years und DAKKS-calibration certificate	METRAHIT ISO AERO	M246M
Avionic Service case incl. METRAHIT ISO AERO and special test & measurement accessories(68 parts) for the avionic industries, inside a hard case	Aero MasterTest Kit II	M246N
Avionic Service case (like M246N, but 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	Aero MasterTest Kit I	Z246A
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 Ø 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 (available for METRAHIT ISO AERO)	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

For additional information regarding accessories please refer to

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

¹⁾ with safety cap applied
²⁾ without safety cap applied

METRAHIT | ISO AERO

TRMS Multimeter with Insulation Measurement

Prepared in Germany • Subject to change without notice



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