GOSSEN METRAWATT

METRA**HIT** | ULTRA
High Resolution TRMS System Multimeter

- Handheld digital multimeter with TRMS measurement including, amongst other measuring functions:
  V AC TRMS, V AC+DC TRMS, V DC,
  A AC TRMS, A AC+DC TRMS, A DC
  dB, Hz(V), Hz(A), Ω, V-▸+-, °C / °F (TC/RTD)

- Resolution of 310,000 digits, triple display, display illumination can be activated under difficult lighting conditions

- 1 kHz / -3 dB low-pass filter can be activated in the alternating voltage measuring ranges

- 1 nA to 10 A direct current measurement, 16 A short-term, current measurement with current clamp transformers and sensors (transformation ration is accounted for by the display)

- Temperature measurement with Pt100/Pt1000 resistance thermometer

- Broad range capacitance measurement

- TRMS AC and AC + DC, 100 kHz bandwidth

- Measurement data memory for up to 300,000 measured values

- Instrument can be **remote controlled** via IR interface with optional accessory: USB X-TRA (Z216C)

- Instrument can be **remote controlled** via Bluetooth IR interface (M248B variant only)

- Connector jack for external power pack

CAT IV

Quality Management System

DQS certified per
DIN EN ISO 9001

DAkkS
German
Accreditation Body
D-K-15080-01-01
DAkkS Calibration Certificate
as Standard Feature

Applications

Instruments included in the so-called E and high-resolution series are extremely rugged, reliable digital multimeters with housings made of impact resistant ABS. With a resolution of 310,000 digits and roughly 30 different measuring functions, they've been developed for professional use.

Features

RMS Value with Distorted Waveform

The utilized measuring method allows for waveform independent RMS measurement (TRMS AC and AC+DC) for voltage (up to 100 kHz) and current (up to 10 kHz).

Activatable Filter for V AC Measurement

A 1 kHz low-pass filter can be activated if required, for example when measuring motor voltage at electronic frequency converters. The input signal is checked by a voltage comparator for dangerous voltages as long as the low-pass filter is activated. A high-voltage symbol appears at the display if dangerous voltage (> 45 V) is present.

Automatic / Manual Measuring Range Selection

Measured quantities are selected by means of a rotary switch and a function key. The measuring range is automatically matched to the measured values. The measuring range can also be selected and locked manually with a key.

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. Auto-ranging is available in all current measuring ranges.
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 10 2005 062 624, US 7,439,725)

Overload Protection

Overload protection safeguards the instrument in all measuring functions for up to 600 V. Voltages of greater than 600 V and currents of greater than 10 or 16 A are indicated acoustically. Dangerous contact voltages are indicated when the 1 kHz low-pass filter has been activated.
FUSE appears at the display if the fuse for the current measuring input blows. Switching between high and low impedance measuring functions is disabled in the vent of dangerous contact voltage.

Measurement with Current Clamp Transformers and Sensors

Current clamp transformer and sensors are used for current measurements without interrupting the circuit under test, and for high amperages (> 16 A). The measured current value is automatically calculated and displayed for the user with the help of the adjustable clamp factor.

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Fast Acoustic Continuity Test

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 ... 300 Ω in 10 Ω steps.

Automatic Storage of Measured Values *

The DATA function automatically saves the digitally displayed measured value after settling in. Acoustic signaling is also used to indicate whether the new measured value deviates from the initial reference value less or more than 0.1% of the measuring range.
* Patented

Storage of Min-Max Values

Comparable to the slave-pointer function of an analog instrument, the device saves the highest and lowest measured values after the Min-Max function has been activated or reset. These extreme values can be queried at the display.

Memory Mode Operation

The **METRAHIT ULTRA** is equipped with a quartz-movement synchronized measurement data memory (2048 kB), which has enough capacity for up to 300,000 measured values depending upon configuration. This allows for use of the instrument as an autonomous real-time data logger.

Measurement data recording is executed either:

- Time-controlled with an adjustable storage interval ranging from 0.5 ms (for V/A DC only) to 9 hours
- Dependent upon measured value in the event of exceeded limit/delta value
- Automatically after the measured value settles in
- As an individual measured value by pressing a key

Memory content can be read out from a PC with the help of the USB X-TRA adapter, as well as analyzed and documented with **METRAwin 10** evaluation software.

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 disabled by switching the instrument to continuous operation. The standby mode for the infrared/Bluetooth interface can be deactivated.

Protective Cover for Harsh Conditions

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.

Data Interfaces

The device can be remote configured, and momentary and saved measurement data can be read out via the bidirectional infrared interface (M248B: additionally via Bluetooth interface).
The USB X-TRA interface adapter is required for the infrared interface, and **METRAwin 10** software is required for both interfaces (see accessories). The interface protocol is available upon request.

DAkkS Calibration Certificate

Each multimeter is individually adjusted, subjected to final inspection and calibrated. Adherence to the specification is confirmed by means of the included DAkkS calibration certificate, which is valid worldwide (recognized by EA and ILAC). After the specified calibration interval has elapsed (recommended interval: 1 to 3 years), the multimeters can be recalibrated at any time in our own DAkkS calibration laboratory.

Applicable Regulations and Standards

IEC/EN 61010, part 1:2010/VDE 0411-1:2011	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
DIN EN 60529 DIN VDE 0470, part 1	Test instruments and test procedures – degrees of protection provided by enclosures (IP code)

Included Functions

Function	METRAHIT ULTRA
Voltage, V_{DC} (Ri = 10 MΩ)	✓
Voltage, V_{AC} TRMS (Ri = 5 MΩ)	✓
Voltage, V_{AC+DC} TRMS (Ri ≥ 5 MΩ)	✓
Frequency, Hz @ V_{AC}, V_{AC+DC}	Up to 300 kHz
1 kHz low-pass filter	@ V_{AC} @ V_{AC+DC}
Bandwidth @ V_{AC+DC} or V_{AC}	100 kHz
Pulse frequency, MHz @ 5 V TTL	1 Hz to 1 MHz
Duty cycle as %	2.0% ... 98%
Voltage level measurement, dB	@ V_{AC} @ V_{AC+DC}
Resistance, Ω	✓
Continuity test where ICONST = 1 mA	✓
Diode test where I_{CONST} = 1 mA	✓
Temp. measurement °C/°F @ T_C	Type K
Temperature measurement °C/°F R_{TD}	Pt100/Pt1000
Capacitance measurement in F	
Current, A_{DC}	300 µA / 3 mA
Current, A_{AC+DC} TRMS	30 mA/300 mA
Current, A_{AC} TRMS	3 A / 10 A (16 A)
Bandwidth @ A_{AC+DC} or A_{AC}	10 kHz
Frequency, Hz @ A_{AC} @ V_{AC+DC}	Up to 30 kHz
Measurement with current clamp with adjustable transformation ratio	✂ mV / A ✂ mA / A
Data logger function [1] (memory)	16 MBit
Relative value measurement ΔREL	✓
Zero point	✓
Min / Max / data hold	✓
IR interface (38.4 kBd)	✓
Bluetooth interface (38.4 kBd)	M248B only
Power pack socket	✓
Rubber holster	✓
Fuse	10 A / 1000 V
Protection	IP 52
Measuring category	600 V CAT III 300 V CAT IV
DAkkS Calibration Certificate	✓

[1] 16 MBit = 2048 kByte = 300,000 measured values, sampling rate adjustable from 0.5 seconds to 9 hours

Scope of Delivery

- 1 Multimeter
- 1 KS17-2 cable set
- 2 Batteries, 1.5 V, type AA
- 1 Condensed operating instructions, English/German
- 1 CD ROM with operating instructions in English and German, as well as other available languages
- 1 DAkkS calibration certificate
- 1 Rubber holster

Extended, Voluntary Manufacturer's Guarantee

36 months for materials and workmanship

1 to 3 years for calibration (depending upon application)

Characteristic Values

Meas. Function	Measuring Range	Resolution at Upper Range Limit DC 309,999	AC/AC+DC 30,999	3099	Input Impedance ⎓	~ / ⎓	Intrinsic Uncertainty under Reference Conditions ±(...% rdg + % MR +... d) ⎓	±(... % rdg. + ... d) ~	±(... % rdg. + ... d) ⎓ [2]	Overload Capacity [12] Value	Time
V	300 mV	1 µV	10 µV		>10 MΩ	> 5 MΩ // < 50 pF	0.02 + 0.005 + 10 with ZERO	0.5 + 30 [2]	0.5 + 30	600V DC AC RMS Sinusoidal	Max. 10 sec.
	3 V	10 µV	100 µV		>10 MΩ	> 5 MΩ // < 50 pF	0.02 + 0.005 + 5	0.2 + 30 [1]	0.5 + 30		Cont.
	30 V	100 µV	1 mV		>10 MΩ	> 5 MΩ // < 50 pF	0.02 + 0.005 + 5		0.5 + 30		
	300 V	1 mV	10 mV		>10 MΩ	> 5 MΩ // < 50 pF	0.02 + 0.005 + 5		0.5 + 30		
	600 V	10 mV	100 mV		>10 MΩ	> 5 MΩ // < 50 pF	0.02 + 0.005 + 5	0.2 + 30	0.5 + 30		

Meas. Function	Measuring Range				Display Range for Reference Voltage U_{REF} = 0.775 V			Intrinsic Uncertainty		Overload Capacity Value	Time
dB	0.3 V / 3 V ... 600 V~			0.01 dB	-42 dB ... + 57 dB			0.1 dB (U > 10% MR)		600 V AC RMS sine	Cont.

Meas. Function	Measuring Range	DC	AC/AC+DC		Voltage drop at approx. range limit		±(...% rdg + % MR +... d) ⎓	~ [2]	⎓ [2]	Overload Capacity Value	Time
A	300 µA	1 nA	10 nA		65 mV		0.05 + 0.02 + 5 with ZERO	0.5 + 30	0.5 + 30	0.7 A	Cont.
	3 mA	10 nA	100 nA		170 mV		0.05 + 0.01 + 5				
	30 mA	100 nA	1 µA		170 mV		0.02 + 0.01 + 5				
	300 mA	1 µA	10 µA		200 mV		0.1 + 0.05 + 5				
	3 A	10 µA	100 µA		150 mV		0.2 + 0.05 + 5 with ZERO	0.7 + 30	0.7 + 30	10 A: ≤ 5 min. [10, 11]	
	10 A	100 µA	1 mA		470 mV		0.2 + 0.05 + 5	0.5 + 30	0.5 + 30	16 A: ≤ 30 s [11]	

Meas. Function	Factor: 1:1/10/100/1000	Input			Input impedance						
A ✂	0.03, 0.3, 3, 30 A	30 mA			Current measurement input (✗ A socket)		See current measuring ranges for specification. Plus current transformer clamp error			Meas. input 0.7 A cont. 3 A: 5 min.	
	0.3, 3, 30, 300 A	300 mA									
	3/30/300/3000 A	3 A									
A ✂	0.3, 3, 30, 300 A	300 mV			Voltage measurement input (V jack) Ri = 5 MΩ/10 MΩ		See voltage measuring ranges for specification.			Meas. input 600 V TRMS	
	3/30/300/3000 A	3 V / 30 V									

Meas. Function	Measuring Range				Open-circuit voltage	Measuring current at range limit	±(... % rdg. + % MR ... d)			Overload Capacity Value	Time
Ω	300 Ω	1 mΩ			< 2 V	Approx. 0.5 mA	0.05 + 0.01 + 5 with ZERO function active			600 V DC AC RMS Sinusoidal	Max. 10 sec. (PTC)
	3 kΩ	10 mΩ			< 2 V	Approx. 130 µA	0.05 + 0.01 + 5 with ZERO function active				
	30 kΩ	100 mΩ			< 2 V	Approx. 20 µA	0.05 + 0.01 + 5				
	300 kΩ	1 Ω			< 2 V	Approx. 2 µA	0.05 + 0.01 + 5				
	3 MΩ	10 Ω			< 2 V	Approx. 1 µA	0.1 + 0.02 + 5				
	30 MΩ	100 Ω			< 2 V	Approx. 200 nA	1 + 0.2 + 5				
🔊	300 Ω	—		0.1 Ω	< 4.5 V	Approx. 1 mA const.	1 + 5 with ZERO function active			600 V	Max. 10 sec.
⯈⊢	4,5 V [3]	—		1 mV	< 6 V	Approx. 1 mA const.	0.2 + 3			600 V	Max. 10 sec.

Meas. Function	Measuring Range	DC	AC/AC+DC		Discharge resistance	$U_{0\,max}$	±(... % rdg. + ... d) [4]			Overload Capacity Value	Time
F	3 nF	—	—	1 pF	1 MΩ	2 V	2 + 15 with ZERO function active			600 V DC AC RMS sine	Max. 10 s
	30 nF	—	—	10 pF	1 MΩ	2 V	1 + 6 with ZERO function active				
	300 nF	—	—	100 pF	100 kΩ	2 V	1 + 6				
	3 µF	—	—	1 nF	100 kΩ	2 V					
	30 µF	—	—	10 nF	10 kΩ	2 V					
	300 µF	—	—	100 nF	2.5 kΩ	2 V	5 + 6				
	3 mF	—	—	1 µF		2 V					

Meas. Function	Measuring Range					f_{min} [5]	±(... % rdg. + ... d)			Overload Capacity Value	Time
Hz (V)	300 Hz	0.001 Hz				5 Hz	Hz(V) 0.05 + 2 [8] Hz(A) 0.05 + 3 [8]			Hz (V) [6]: Hz(A✂) [6] 600 V	Max. 10 sec.
Hz (A)	3 kHz	0.01 Hz									
Hz (A✂)	30 kHz	0.1 Hz									
Hz (V)	300 kHz	1 Hz				10 Hz				Hz (A): [7]	
MHz	300 Hz to 1 MHz	0.01 ...100 Hz				1 Hz		> 3 V ... 5 V		600 V	Max. 10 sec.
%	2.00 to 98.00%	—	0.01%	15 Hz ... 1 kHz			0.1 MR ± 10 d	> 3 V ... 5 V		600 V	Max. 10 sec.
	5.00 to 95.00%	—	0.01%	1 ... 10 kHz			0.1 MR per kHz ± 10 d	> 3 V ... 5 V			

Meas. Function	Measuring Range						±(... % rdg. + ... d)			Overload Capacity Value	Time
°C/°F	Pt100 Pt1000	−200.0 ... +100.0 °C	0.1 K				0.3 + 10 [9]			600 V DC/AC RMS sine	Max. 10 sec.
		+ 100.0 ... +850.0 °C									
	K (NiCr-Ni)	−270.0 ... +1372.0 °C					1% + 2.0 K [9]				
	Internal temp. measurement	−10 ... +80 °C	0.1 K		Auxiliary display in ampere range		±2 K				

[1] Specified accuracy valid as of 1% of the measuring range
[2] Specified accuracy valid as of 2% of the measuring range
[3] Display of up to max. 4.5 V, above which overload display appears: "OL"
[4] Applies to measurements at film capacitors during battery operation
[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 for U > 100 V
[7] Overload capacity of the current measurement input: see current measuring ranges for max. current values.

[8] Input sensitivity, sinusoidal signal: 10% to100% of voltage/current measuring range; in the 300 kHz range the specified intrinsic uncertainty applies as from 15% of MR
[9] Plus sensor deviation
[10] As of a measured value of 7 A, measurement is limited to an ambient temperature of 30 °C or a maximum duration of 5 minutes.
[11] Off-time > 30 min. and $T_A \leq 40$ °C after a 10 or 16 A measurement
[12] At 0 ° ... + 40 °C

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

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Internal Clock

Time format	DD.MM.YYYY hh:mm:ss
Resolution	0.1 sec.
Accuracy	±1 minute per month
Temperature Influence	50 ppm/K

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 ⎓	0.05 + 5
		V ∼, V ⎓∼, dB	0.2 + 10
		300 Ω ... 30 MΩ, ◁))	0.1 + 10
		A ⎓, A ∼, A ⎓∼	0.3 + 10
		30 nF, 300 nF, 3 μF, 30 μF	0.5 + 10
		3 nF, 300 μF	3 + 10
		Hz	0.05 + 5
		⊶	0.1 + 5
		°C/°F (Pt100/Pt1000)	0.1 + 10
		°C/°F thermocouple K [2]	0.1 + 10

[1] With zero balancing
[2] Prerequisite: stable ambient temperature (t > 30 min.)

Influencing Quantity	Measured Quantity / Measuring Range	Sphere of Influence	Intrinsic Uncertainty ±(... % rdg. + ... d) [1]
Frequency	V_{AC} V_{AC+DC} 300.00 mV ... 30.00 V	> 15 Hz ... 45 Hz	2 + 30
		> 65 Hz ... 1 kHz	1 + 30
		> 1kHz ... 20 kHz	2 + 30
		> 20kHz ... 100 kHz	3 + 30 [2]
	300.00 V [3] 600.00 V [3]	> 15 Hz ... 45 Hz	2 + 30
		> 65 Hz ... 1 kHz	1 + 30
		> 1kHz ... 20 kHz	3 + 30
	I_{AC} I_{AC+DC} 300 μA ... 10 A	> 15 Hz ... 65 Hz	3 + 30
		> 65 Hz ... 10 kHz	

[1] Intrinsic uncertainty in the frequency response applies as of 10% ... 100% of the measuring range.
[2] Signals > 50 kHz: plus 5%
[3] Power limiting: frequency x voltage max. 3×10^6 V x Hz where U > 100 V

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 waveform

Influencing Quantity	Sphere of Influence	Measured Quantity	Influence Error
Relative humidity	75% 3 days instrument off	V ⎓, V ∼, Ω, A, Hz, °C	1 x intrinsic uncertainty
Battery voltage	1.8 ... 3.6 V	V, A, Ω, F, Hz, dB, °C	Included in intrinsic uncertainty

Influencing Quantity	Sphere of Influence	Measured Qty./ Measuring Range	Damping
Common mode interference voltage	Interference quantity max. 600 V ∼	V ⎓ (3 V ... 600 V MR)	> 120 dB
	Interference quantity max. 600 V ∼ 50 Hz ... 60 Hz, sine	3 V ∼	> 60 dB
		30 V ∼	> 65 dB
		300 V/600 V ∼	> 50 dB
Series mode interference voltage	Interference quantity: V ∼, respective nominal value of the measuring range, max. 600 V ∼, 50 Hz ... 60 Hz sinusoidal	V ⎓	> 70 dB
	Interference quantity max. 600 V —	V ∼	> 120 dB

Reference Conditions

Ambient temperature	+23 °C ±2 K
Relative humidity	40 to 75% (no condensation allowed)
Meas. quantity frequency	Range: 45 ... 65 Hz
Meas. quantity waveform	Sinusoidal
Battery voltage	range: 1.8 ... 3.2 V

Response Time (after manual range selection)

Measured Quantity / Measuring Range	Response Time, Digital Display	Jump Function of the Measured Quantity
V ⎓, V ∼, dB A ⎓, A ∼	1.5 s	From 0 to 80% of upper range limit value
3 nF ... 300 μF	Max. 3 s	
300 Ω ... 3 MΩ	3 s	From ∞ to 50% of upper range limit value
30 MΩ	8 s	
Continuity	< 50 ms	
°C (Pt100)	Max. 3 s	
⊶	1.5 s	
>10 Hz	1.5 s	From 0 to 50% of upper range limit value

Data Interface – Infrared

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
	– Read out stored measurement data

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

Data Interface – Bluetooth (M248B only)

The **METRAHIT ULTRA BT** Bluetooth multimeter variant (M248B) is identical to the **METRAHIT ULTRA** (M248A), except that it is also equipped with a Bluetooth interface.

Wireless data exchange via Bluetooth is an alternative to the optional IR-USB cable connection using the USB X-TRA accessory (Z216C).

The **METRAHIT ULTRA BT** with Bluetooth interface is connected directly to the Bluetooth interface of a Windows PC. However, no communication takes place with peripheral devices such as printers, scanners and the like.

The transmission range is roughly 5 to 8 meters.

Remote control via Bluetooth is identical to corresponding communication via an IR-USB connection.

The only prerequisite for wireless data exchange between the multimeter and the PC is authentication by means of an access code which must be set up at the multimeter and at the PC.

Internal Measured Value Storage

Memory capacity	16 MBit for approx. 300,000 measured values with indication of date and time

Power Supply

Battery	2 ea. 1.5 V mignon cell (2 ea. size AA) Alkaline manganese per IEC LR6 (2 ea. 1.2 V NiMH rechargeable battery also possible)
Service life	With alkaline manganese: approx. 200 hrs.
Battery indicator	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 NA X-TRA power pack has been plugged into the instrument, the installed batteries are disconnected automatically. Rechargeable batteries can only be recharged externally.

Display

Transreflective LCD panel (65 mm x 36 mm) with display of up to 3 measured values, 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.

Digital

Display / char. height	7-segment characters Main display: 13 mm Auxiliary display: 7.5 mm
Number of places	309,999 steps
Overflow display	"OL" is displayed for ≥ 310,000 digits
Polarity display	"–" (minus sign) is displayed if plus pole is connected to "⊥"
Measuring rate	10 or 40 measurements per second with the Min-Max function except for the capacitance and frequency measuring functions
Refresh Rate	2 times per second, every 500 ms

Acoustic Signals

For voltage	Above 600 V in the 600 V range: intermittent (250 ms on, 250 ms off)
For current	– Above 10 A: intermittent signal – Above 16 A: continuous signal – For displayed temperature > 50 °C

Fuse

Fuse link	FF (UR) 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

Electrical Safety
per IEC 61010-1:2010/VDE 0411-1:2011

Protection class	II	
Measuring category	CAT III	CAT IV
Operating voltage	600 V	300 V
Pollution degree	2	
Test Voltage	5.2 kV~	

Electromagnetic Compatibility (EMC)

Interference emission	EN 610326-1:2006 class B
Interference immunity	EN 610326-1:2006 EN 610326-2-1:2006

Ambient Conditions

Accuracy range	0 °C to +40 °C
Operating temperature range T_A	–100 °C to +50 °C *
Storage temp. range	–25 °C to +70 °C (without batteries)
Relative humidity	40 to 75%, no condensation allowed
Elevation	To 2000 m
Deployment	Indoors, except within specified ambient conditions

*　Exception: current > 10 A to 16 A, operation at up to 40 °C

Mechanical Design

Housing	Impact resistant plastic (ABS)
Dimensions	200 x 87 x 45 mm (without rubber holster)
Weight	Approx. 0.4 kg with batteries
Protection	Housing: IP 52 (pressure equalization by means of the housing) Sockets: IP 20

Table Excerpt Regarding Significance of IP Codes

IP XY (1st digit X)	Protection Against Foreign Object Entry	IP XY (2nd digit Y)	Protection Against Penetration by Water
2	≥ 12.5 mm dia.	0	Not protected
5	Dust protected	2	Dripping (at 15° angle)

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Accessories for Operation at a PC

Interface adapter for USB connection

The following functions can be executed with the USB X-TRA bidirectional interface adapter:

- Configure the **METRAHIT** multimeter from a PC.

- Transmit live measurement data to the PC.

- Read data out of memory at the **METRAHIT** multimeter.

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.

METRAwin®10/METRA*Hit*® software

METRAwin®10/METRA*Hit*®PC software is a multilingual, measurement data logging program for recording, visualizing, evaluating and documenting measured values with reference to time from **METRAHIT** E series multimeters.

Communications between the PC and the measuring instrument(s) is established via available interface adapters.

One or more of the following operating modes are possible, depending on device and interface type (infrared or Bluetooth):

- **Device Configuration**
  Remote configuration and querying of device-specific functions and parameters, for example measuring function, measuring range and memory parameters. Frequently used device settings can be saved to configuration files for easy recall.

- **Online Recording of Measurement Data**
  Read-in, display and recording of momentarily measured data from the interconnected device
  – Measuring channels up to 10
  – Start recording   Manual, triggered by measured value, time triggered
  – Recording mode   > Time controlled with sampling interval of 0.05 s* ... 1 s ... 60 min.
                          > manually controlled
                          > measured value controlled in the event of exceeded limit/delta value
  – Recording duration: max. 10 million intervals

* Depending upon device type, measuring function, number of measuring channels and communication mode (e.g. via modem), sample intervals of less than 1 s cannot be used.
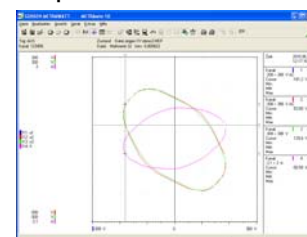
- **Reading Out and Visualizing Stored Data**
  If supported by the device: read-in and display of offline data recorded to device memory

For purposes of analysis, data recorded online or read in from the device's memory can be displayed in various formats:

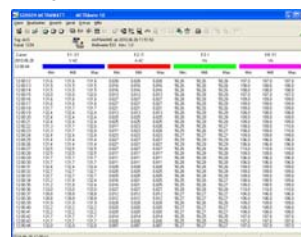**Y(t) Recorder Display**
for Up to 6 Channels
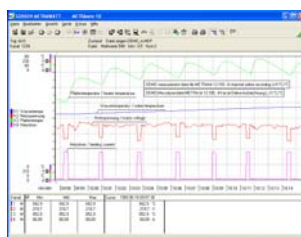
XY Recorder Display
for Up to 4 Channels

Multimeter Display
for Up to 4 Channels

Tabular Display
for Up to 10 Channels

System Requirements

METRAwin 10 (as of version 5.3) can be run on IBM compatible PCs with Microsoft Windows® XP, Vista (32/64 bit) or 7 (32/64 bit).

Order Information

Designation	Type	Article number
TRMS Multimeter for direct, alternating and pulsating current measurement (TRMS values), direct and via current clamp transformers and sensors in consideration of transformer ratios, frequency and resistance measurement, continuity test, diode measurement, temperature measurement with type K thermocouples, triple digital display with a resolution of 310,000 digits, measuring categories: 300 V/CAT IV, 600 V/CAT III, including KS17-2 measurement cable set, two mignon batteries, condensed operating instructions, CD ROM, DAkkS calibration certificate	**METRAHIT ULTRA**	M248A
Same as M248A but additionally with Bluetooth interface	**METRAHIT ULTRA BT**	M248B
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 immersion measurement, −40 to + 600 °C	Z3409	GTZ3409000R0001
Pt1000 temperature sensor for measurement in gases and liquids, −50 ... +220 °C	TF220	Z102A
Pt100 oven sensor, −50 ... +550 °C	TF550	GTZ3408000R0001
Ten adhesive Pt100 temperature sensors, −50 ... +550 °C	TS Chipset	GTZ3406000R0001
Replacement fuse		
Fuses (pack of 10)	FF (UR) 10 A / 1000 V AC/DC	Z109L
Power pack	NA X-TRA	Z218G
Rubber holster and carrying strap	GH X-TRA	Z104C
2 magnetic test probes with touch protection – set with magnetic holder, 5.5 mm measuring contact diameter, insulated, CAT III 1000 V / 4 A, temperature from -10 to 60 °C, holder power under standard conditions with flat head screws: 1200 g perpendicular to the contact surface; measuring instrument connection for multimeter via angled multilam plug	Set 1– magnetic test probes	Z502U

Transport Accessories

HitBag Cordura Belt Pouch
For **METRA HIT** (with/without rubber holster)

HC30 hard case
For two multimeters (with an without rubber holster) and accessories

F836 ever-ready case for multimeter (without rubber holster) and accessories

F829 carrying pouch for multimeters (with and without protective rubber cover) and accessories

Designation	Type	Article number
Imitation leather carrying pouch for **METRA HIT** and METRAmax	F829	GTZ3301000R0003
Cordura belt pouch for **METRA HIT** and METRAport series multimeters	HitBag	Z115A
Imitation leather ever-ready case with cable compartment	F836	GTZ3302000R0001
Ever-ready case for 2 **METRA HIT**s, 2 adapters and accessories	F840	GTZ3302001R0001
Hard case for one **METRA HIT** and accessories	HC20	Z113A
Hard case for two **METRA HIT**s and accessories	HC30	Z113A

For additional information regarding accessories please refer to

• Measuring Instruments and Testers catalog

• www.gossenmetrawatt.com

METRA**HIT** ULTRA
High Resolution TRMS System Multimeter

Type	Designation	Measuring Range	Meas. Category	Max. Cable Diameter	Transmission Ratio	Frequency Range	Intrinsic Uncertainty ±(% rdg. + …)	Article Number
Current Measuring Accessories								
All current sensors and transformers are equipped with connection via 4 mm safety banana plugs.								
DC/AC current sensors with voltage output								
CP30	DC/AC current clamp sensor, with battery mode (30 h)	5 mA to 30 A (DC / AC pk)	300 V / CAT III	25 mm	100 mV/A	DC … 20 kHz (-3 dB)	1% + 2 mA	Z201B
CP330	DC/AC current clamp sensor, with 2 measuring ranges, battery mode (50 h)	Range: 0.5 … 30 A Range: 5 … 300 A (DC / AC rms)	300 V / CAT III	25 mm	10 mV/A, 1 mV/A	DC … 20 kHz (-3 dB)	1% + 50 mA 1% + 100 mA	Z202B
CP1100	DC/AC current clamp sensor, with 2 measuring ranges, battery mode (50 h)	Range: 0.5 … 100 A Range: 5 … 1000 A (DC / AC rms)	300 V / CAT III	32 mm	10 mV/A, 1 mV/A	DC … 20 kHz (-1 dB)	1% + 100 mA 1% + 500 mA	Z203B
CP1800	DC/AC current clamp sensor, with 2 measuring ranges, battery mode (50 h)	Range: 0.5 … 125 A Range: 5 … 1250 A (DC / AC rms)	300 V / CAT III	32 mm	10 mV/A, 1 mV/A	DC … 20 kHz (-1 dB)	1% + 100 mA 1% + 500 mA	Z204A
Z13B	DC/AC current clamp sensor, with 2 measuring ranges, battery mode (50 h)	0.2 … 40 A~/60 A–; 0.5 … 400 A~/600A– (DC / AC rms)	300 V CAT IV	50 mm	10 mV/A, 1 mV/A	<u>DC … 65 Hz</u> Up to 10 kHz	1.5% 2.0%	Z213B
AC Current Sensors with Voltage Output								
WZ12B	AC current clamp sensor	10 mA~ … 100 A~	300 V CAT III	15 mm	100 mV/A	<u>45 … 65</u> Up to 500 Hz	1.5% + 0.1 mA	Z219B
WZ12C	AC current clamp sensor with 2 measuring ranges	1 mA~ … 15 A~, 1 … 150 A ~	300 V CAT III	15 mm	1 mV/mA, 1 mV/A	<u>45 … 65</u> Up to 400 Hz	3% + 0.15 mA, 2% + 0.1 A	Z219C
WZ11B	AC current clamp sensor with 2 measuring ranges	0.5 … 20 A~, 5 … 200 A ~	600 V CAT III	20 mm	100 mV/A, 10 mV/A	30 … <u>48 … 65</u> Up to 500 Hz	1 to 3%	Z208B
Z3512A	AC current clamp sensor with 4 measuring ranges	1 mA … 1/10/100/ 1000 A~	600 V CAT III	52 mm	1 V/A, 100 mV/A, 10 mV/A; 1 mV/A	10 … <u>48 … 65</u> Up to 3 kHz	0.5 … 3%, 0.2 to 1%	Z225A
METRAFLE X3000	Flexible AC current sensor with 3 measuring ranges, battery mode (2000 h)	0.5 … 30 A, 0.5 … 300A, Range: 5 … 3000A	1000 V CAT III 600 V CAT IV	176 mm	100 mV/A, 10 mV/A, 1 mV/A	10 Hz to 20 kHz	1% + 0.1 A 1% + 0.1 A 1% + 1 A	Z207E
METRA- FLEX 300M	Flexible, miniature AC current sensor with 3 measuring ranges, battery mode (150 h)	1 … 3 A, 1 … 30 A, 5 … 300 A	1000 V CAT III 600 V CAT IV	50 mm	1 V/A, 100 mV/A, 10 mV/A	10 Hz to 100 kHz	1% + 0.2 A 1% + 0.2 A 1% + 1 A	Z207M
AC Current Transformers with Current Output								
WZ12A	AC current clamp transformer	15 … 180 A ~	300 V CAT III	15 mm	1 mA/A	<u>45 … 65</u> Up to 400 Hz	3%	Z219A
WZ12D	AC current clamp transformer	30 mA … 150 A~	300 V CAT III	15 mm	1 mA/A	<u>45 … 65</u> Up to 500 Hz	2.5% + 0.1 mA	Z219D
WZ11A	AC current clamp transformer	1 … 200 A ~	600 V CAT III	20 mm	1 mA/A	<u>48 … 65</u> Up to 400 Hz	1 to 3%	Z208A
Z3511	AC current clamp transformer	4 … 500 A ~	600 V CAT III	30 ea. 63 mm	1 mA/A	<u>48 … 65</u> Up to 1 kHz	3% + 0.4 A	GTZ351100 0R0001
Z3512	AC current clamp transformer	0.5 … 1000 A ~	600 V CAT III	52 mm	1 mA/A	30 … <u>48 … 65</u> Up to 5 kHz	0.5% … 0.7%	GTZ351200 0R0001
Z3514	AC current clamp transformer	1 … 2000 A ~	600 V CAT III	64 ea. 150 mm	1 mA/A	30 … <u>48 … 65</u> Up to 5 kHz	0.5% + 0.1 A	GTZ351400 0R0001