

METRAHIT | PM PRIME & METRAHIT | PM PRIME BT

3-349-683-03

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Professional Multimeters / High Resolution TRMS Digital Multimeters

- 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 \rightarrow +, °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 ... 10 A direct current measurement, 16 A short-term and current measurement with current clamp transformers and sensors (transformation ratio 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 interface (METRAHIT PM PRIME BT only)
- Connector jack for external power pack



CAT IV


 Deutsche Akkreditierungsstelle
D-K-15080-01-01


Applications

The instruments included in the so-called Professional series (E series or 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 TRMS 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 routed 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 numbers EP 1801 598 and 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 touch 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 event of dangerous touch voltage.

Measurement with Current Clamp Transformers and Sensors

Current transformer clamps 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.

Fast Acoustic Continuity Test

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 ... 300 Ω in 10 Ω steps.

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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 instrument is equipped with measurement data memory (2 MB) which is synchronized by means of a quartz-movement and 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 0.1 s 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 via the data interfaces described below and 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 from the PC, and momentary and saved measurement data can be read out via the bidirectional infrared interface. The optional USB X-TRA interface adapter is required to this end.

With the METRAHIT PM PRIME BT (M248B), this connection can be established conveniently via Bluetooth as an alternative.

For both connections, either METRAWin 10 (see accessories) or a terminal program is required (interface protocol available upon request).

Furthermore, connection with Android devices (smartphone or tablet) is possible via Bluetooth and the multimeter can be used in combination with the METRALOG smartphone app.

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 61010-1/ VDE 0411-1 | Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements |
| 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 Features

| Function | METRAHIT PM PRIME / METRAHIT PM PRIME BT |
|---|--|
| Voltage V_{DC} ($R_i = 10\text{ M}\Omega$) | ✓ |
| Voltage V_{AC} TRMS ($R_i = 5\text{ M}\Omega$) | ✓ |
| Voltage V_{AC+DC} TRMS ($R_i \geq 5\text{ M}\Omega$) | ✓ |
| Frequency, Hz @ V_{AC} , V_{AC+DC} | ... 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 ... 1 MHz |
| Duty cycle as % | 2.0% ... 98% |
| Voltage level measurement, dB | @ V_{AC} @ V_{AC+DC} |
| Resistance Ω | ✓ |
| Continuity test where $I_{CONST} = 1\text{ mA}$ | ✓ |
| Diode test where $I_{CONST} = 1\text{ mA}$ | ✓ |
| Temperature measurement °C/°F @ T_C | Type K |
| Temperature measurement °C/°F R_{TD} | Pt100/Pt1000 |
| Capacitance measurement in F | ✓ |
| Current, A_{DC} | 300 μ A / 3 mA |
| Current, A_{AC+DC} TRMS | 30mA/300mA |
| 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} | ... 30 kHz |
| Measurement with current clamp with adjustable transformation ratio | ∞ mV / A ∞ mA / A |
| Data logger function ¹ (memory) | 16 MBit (2 MB) |
| Relative value measurement Δ REL | ✓ |
| Zero point | ✓ |
| Min / Max / Data Hold | ✓ |
| IR interface (38.4 kBd) | ✓ |
| Bluetooth interface (38.4 kBd) | METRAHIT PM PRIME BT 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 0.1 s to 9 h

Scope of Delivery

- 1 Multimeter
- 1 KS17-2 cable set
- 2 Batteries, 1.5 V, type AA
- 1 DAkKS calibration certificate
- 1 Rubber holster
- 1 Condensed operating instructions*

* Complete operating instructions are available for download from the Internet at www.gossenmetrawatt.com.

Extended, Voluntary Manufacturer's Guarantee

- 36 months for materials and workmanship
1 to 3 years for calibration (depending upon application)

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Characteristic Values

| Meas. Function | Measuring Range | Resol. at Upper Range Limit | | | Input Impedance | | Intrinsic Uncertainty at Reference Conditions | | | Overload Capacity | |
|---|---------------------------|--|--------------|----------|--|----------------------------------|---|--|--|---|--------------------|
| | | DC | AC/AC+DC | 3099 | | | $\pm(\dots \% \text{rdg.} + \% \text{MR} + \dots \text{d})$ | $\pm(\dots \% \text{rdg.} + \dots \text{d})$ | $\pm(\dots \% \text{rdg.} + \dots \text{d})$ | Value | Time |
| V | 300 mV | 1 μ V | 10 μ V | 3099,999 | >10 M Ω | > 5 M Ω // < 50 pF | $ 0,02 + 0.005 + 10$ with ZERO | $ 0,5 + 30^2$ | $ 0,5 + 30$ | 600 V | Max. 10 s |
| | 3 V | 10 μ V | 100 μ V | | >10 M Ω | > 5 M Ω // < 50 pF | $ 0,02 + 0.005 + 5$ | $ 0,2 + 30^1$ | $ 0,5 + 30$ | DC AC RMS sine | Cont. |
| | 30 V | 100 μ V | 1 mV | | >10 M Ω | > 5 M Ω // < 50 pF | $ 0,02 + 0.005 + 5$ | | | | |
| | 300 V | 1 mV | 10 mV | | >10 M Ω | > 5 M Ω // < 50 pF | $ 0,02 + 0.005 + 5$ | $ 0,2 + 30$ | $ 0,5 + 30$ | | |
| | 600 V | 10 mV | 100 mV | | >10 M Ω | > 5 M Ω // < 50 pF | $ 0,02 + 0.005 + 5$ | $ 0,2 + 30$ | $ 0,5 + 30$ | | |
| | | | | | Display Range for Reference Voltage $U_{REF} = 0.775 \text{ V}$ | | | Intrinsic Uncertainty | | | |
| dB | 0.3 V / 3 V ... 600 V~ | | | 0.01 dB | -42 dB ... +57 dB | | | 0.1 dB ($U > 10\% \text{ MR}$) | | 600 V AC RMS sine | Cont. |
| | | DC | AC/AC+DC | | Voltage Drop at Approx. Range Limit | | \approx | \sim^2 | \approx^2 | | |
| A | 300 μ A | 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 μ A | | 170 mV | | $ 0,02 + 0,01 + 5$ | | | | |
| | 300 mA | 1 μ A | 10 μ A | | 200 mV | | $ 0,1 + 0,05 + 5$ | | | | |
| | 3 A | 10 μ A | 100 μ A | | 150 mV | | $ 0,2 + 0,05 + 5$ with ZERO | $ 0,7 + 30$ | $ 0,7 + 30$ | 10 A: $\leq 5 \text{ min.}^{10 11}$ 16 A: $\leq 30 \text{ s}^{11}$ | |
| | 10 A | 100 μ A | 1 mA | | 470 mV | | $ 0,2 + 0,05 + 5$ | $ 0,5 + 30$ | $ 0,5 + 30$ | | |
| A \sphericalangle | Factor: 1:1/10/100/1000 | | Input | | Input Impedance | | | | | | |
| | 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 continuous 3 A: 5 min. | |
| | 0.3/3/30/300 A | | 300 mA | | | | | | | | |
| | 3/30/300/3000 A | | 3 A | | | | | | | | |
| A \sphericalangle | 0.3/3/30/300 A | | 300 mV | | Voltage measurement input (V jack) $R_i = 5 \text{ M}\Omega/10 \text{ M}\Omega$ | | See voltage measuring ranges for specification. | | | Meas. input 600 V TRMS | |
| | 3/30/300/3000 A | | 3 V / 30 V | | | | | | | | |
| Ω | 300 Ω | 1 m Ω | | | Open-Circuit Voltage | Measuring current at range limit | $\pm(\dots \% \text{rdg.} + \% \text{MR} \dots \text{d})$ | | | 600 V DC AC RMS sine | Max. 10 s (PTC) |
| | 3 k Ω | 10 m Ω | | | < 2 V | Approx. 0.5 mA | $ 0,05 + 0,01 + 5$ with active ZERO function | | | | |
| | 30 k Ω | 100 m Ω | | | < 2 V | Approx. 130 μ A | $ 0,05 + 0,01 + 5$ with active ZERO function | | | | |
| | 300 k Ω | 1 Ω | | | < 2 V | Approx. 20 μ A | $ 0,05 + 0,01 + 5$ | | | | |
| | 3 M Ω | 10 Ω | | | < 2 V | Approx. 2 μ A | $ 0,05 + 0,01 + 5$ | | | | |
| | 30 M Ω | 100 Ω | | | < 2 V | Approx. 1 μ A | $ 0,1 + 0,02 + 5$ | | | | |
| d) | 300 Ω | — | 0.1 Ω | | < 4.5 V | Approx. 1 mAconst. | $ 1 + 5$ with active ZERO function | | | 600 V | Max. 10 s |
| \rightarrow | 4,5 V ³ | — | 1 mV | | < 6 V | Approx. 1 mAconst. | $ 0,2 + 3$ | | | 600 V | Max. 10 s |
| F | | | | | Discharge Resistance | $U_{0 \text{ max}}$ | $\pm(\dots \% \text{rdg.} + \dots \text{d})^4$ | | | 600 V DC AC RMS sine | Max. 10 s |
| | 3 nF | — | — | 1 pF | 1 M Ω | 2 V | $ 2 + 15$ with active ZERO function | | | | |
| | 30 nF | — | — | 10 pF | 1 M Ω | 2 V | $ 1 + 6$ with active ZERO function | | | | |
| | 300 nF | — | — | 100 pF | 100 k Ω | 2 V | | | | | |
| | 3 μ F | — | — | 1 nF | 100 k Ω | 2 V | $ 1 + 6$ | | | | |
| | 30 μ F | — | — | 10 nF | 10 k Ω | 2 V | | | | | |
| | 300 μ F | — | — | 100 nF | 2.5 k Ω | 2 V | $ 5 + 6$ | | | | |
| 3 mF | — | — | 1 μ F | | 2 V | | | | | | |
| Hz (V) Hz (A) Hz (A \sphericalangle) Hz (V) | 300 Hz | 0.001 Hz | | | | f_{min}^5 | $\pm(\dots \% \text{rdg.} + \dots \text{d})$ | | | Hz (V) ⁶ , Hz(A \sphericalangle) ⁶ 600 V Hz (A): ⁷ | Max. 10 s |
| | 3 kHz | 0.01 Hz | | | | 5 Hz | $ Hz(V) 0.05 + 2^8$ $ Hz(A) 0.05 + 3^8$ | | | | |
| | 30 kHz | 0.1 Hz | | | | 10 Hz | | | | | |
| | 300 kHz | 1 Hz | | | | | | | | | |
| MHz | 300 Hz | 0.001 Hz | | | | 1 Hz | $ 0,05 + 2$ | High level: 3 ... 5 V | Unipolar signal | 600 V | Max. 10 s |
| | 3 kHz | 0.01 Hz | | | | | | | | | |
| | 30 kHz | 0.1 Hz | | | | | | | | | |
| | 300 kHz | 1 Hz | | | | | | | | | |
| | 1 MHz | 10 Hz | | | | | | | | | |
| % | 2.00 to 98.00% | | — | 0.01% | 15 Hz ... 1 kHz | | $ 0,1\% \pm 10 \text{ d}$ | High level: 3 ... 5 V | Uni or bipolar signal | 600 V | Max. 10 s |
| | 5.00 to 95.00% | | — | 0.01% | 1 kHz ... 10 kHz | | $ 0,1/0,15\% \text{ per kHz} \pm 10 \text{ d}$ | High level: 3 ... 5 V | Uni or bipolar signal | | |
| $^{\circ}\text{C}/^{\circ}\text{F}$ | Pt 100 | -200.0 ... +100.0 $^{\circ}\text{C}$ | | | | | $\pm(\dots \% \text{rdg.} + \dots \text{d})$ | | | 600 V DC/AC RMS sine | Max. 10 s |
| | Pt 1000 | +100.0 ... +850.0 $^{\circ}\text{C}$ | 0.1 K | | | | $ 0,3 + 10^9$ | | | | |
| | K (NiCr-Ni) | -250.0 ... +1372.0 $^{\circ}\text{C}$ | | | | | | $ 1\% + 2.0 \text{ K}^9$ | | | |
| | Int. temp. meas. | -10 ... +80 $^{\circ}\text{C}$ | 0.1 K | | Auxiliary display in ampere range | | $\pm 2 \text{ K}$ | | | | |

1 Specified accuracy valid as of 1% of the measuring range.

2 Specified accuracy valid as of 2% of the measuring range.

3 Display up to 4.5 V, "OL" for higher values.

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 \times voltage max. $3 \times 10^6 \text{ V} \times \text{Hz}$ where $U > 100 \text{ V}$

7 Overload capacity of the current measurement input: see current measuring ranges for max. current values

8 Input sensitivity, sinusoidal signal: 10% ... 100% of the voltage/current range; in the 300 kHz range, specified intrinsic uncertainty is valid as of 15% of the measuring range.

9 Plus sensor deviation

10 As of a measured value of 7 A, measurement is limited to an ambient temperature of 30 $^{\circ}\text{C}$ or a maximum duration of 5 minutes.

11 Off-time > 30 min. and $T_A \leq 40 \text{ }^{\circ}\text{C}$ after a 10 or 16 A measurement

12 At 0 $^{\circ}$... +40 $^{\circ}\text{C}$

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

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Professional Multimeters

Influencing Quantities and Influence Error

| Influencing Quantity | Sphere of Influence | Measured Quantity/ Measuring Range | Influence Error (...% rdg.l + ... d) / 10 K |
|-----------------------------------|---|--|--|
| Temperature | 0 °C ... +21 °C and +25 °C ... +40 °C | V $\overline{\text{---}}$ | 0.05 + 5 |
| | | V \sim , V $\overline{\text{---}}$, dB | 0.2 + 10 |
| | | 300 Ω ... 30 M Ω , $\overline{\text{---}}$) | 0.1 + 10 |
| | | A $\overline{\text{---}}$, A \sim , A $\overline{\text{---}}$ | 0.3 + 10 |
| | | 30 nF, 300 nF, 3 μ F, 30 μ F | 0.5 + 10 |
| | | 3 nF, 300 μ F | 3 + 10 |
| | | Hz | 0.05 + 5 |
| | | \rightarrow | 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 | Influence Error (... % rdg. + ... d) |
|----------------------|-----------------------------|---|
| DATA | V, A, Ω , Hz, dB, °C | ± 10 d |
| MIN / MAX | V, A, Ω , Hz, dB, °C | ± 30 d |

| Influencing Quantity | Measured Quantity Measuring Range | Sphere of Influence | Intrinsic Uncertainty \pm (... % rdg.l + ... d) ¹ | |
|----------------------|---------------------------------------|--|---|---|
| Frequency | V _{AC} V _{AC+DC} | 300.00 mV ... 30.000 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 ... 5 kHz 2 + 30 > 5kHz ... 20 kHz 3 + 30 | |
| | | I _{AC} I _{AC+DC} | 300 μ A ... 10 A | > 16 Hz ... 45 Hz 3 + 30 > 65 Hz ... 10 kHz 3 + 30 |
| | | | | |

¹ Intrinsic uncertainty in the V AC ranges applies as of 1% of the measuring range.

² Signals > 50 kHz: plus 5%

³ Power limiting: frequency \times voltage max. 3×10^6 V \times Hz where U > 100 V

| Influencing Quantity | Sphere of Influence | Measured Quantity Measuring Range | Influence Error ⁵ |
|----------------------|---------------------|--------------------------------------|------------------------------|
| Crest factor CF | 1 to 3 | V \sim , A \sim | ± 1 % rdg.l |
| | > 3 ... 5 | | ± 3 % rdg.l |

⁵ Except for sinusoidal waveform

| Influencing Quantity | Sphere of Influence | Measured Quantity | Influence Error |
|----------------------|--------------------------|---|-----------------------------------|
| Relative humidity | 75% | V $\overline{\text{---}}$, V \sim , Ω , A, Hz, °C | 1 \times intrinsic uncertainty |
| | 3 days Instrument off | | |
| Battery voltage | 2.0 ... 3.6 V | V, A, Ω , F, Hz, dB, °C | Included in intrinsic uncertainty |

| Influencing Quantity | Sphere of Influence | Measured Quantity Measuring Range | Damping |
|--|--|--|----------|
| Common Mode Interference Voltage | Interference quantity max. 600 V \sim 50 Hz ... 60 Hz, sine | V $\overline{\text{---}}$ (3 V ... 600 V MR) | > 120 dB |
| | | 3 V \sim | > 60 dB |
| | | 30 V \sim | > 65 dB |
| | | 300 V/600 V \sim | > 50 dB |
| Series mode interference voltage | Interference quantity: V \sim , respective nominal value of the measuring range, max. 600 V \sim , 50 Hz ... 60 Hz sine | V $\overline{\text{---}}$ | > 70 dB |
| | | V \sim | > 120 dB |

Reference Conditions

| | |
|-------------------------|--------------------------------------|
| Ambient temperature | +23 °C \pm 2 K |
| Relative humidity | 40 ... 75% (no condensation allowed) |
| Measured qty. frequency | 45 ... 65 Hz |
| Meas. quantity waveform | Sinusoidal |
| Battery voltage | 2.0 ... 3.2 V |

Response Time (after manual range selection)

| Measured Quantity Measuring Range | Digital Display Response Time | Measured Quantity Jump Function |
|---|----------------------------------|--|
| V $\overline{\text{---}}$, V \sim , dB A $\overline{\text{---}}$, A \sim | 1.5 s | From 0 to 80% of upper range limit value |
| 3 nF ... 300 μ F | max. 3 s | |
| 300 Ω ... 3 M Ω | 3 s | |
| 30 M Ω | 8 s | |
| Continuity | < 50 ms | From ∞ to 50% of upper range limit value |
| °C (Pt100) | max. 3 s | |
| \rightarrow | 1.5 s | From 0 to 50% of upper range limit value |
| > 10 Hz | 1.5 s | |

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 | Connection to PC (USB X-TRA interface adapter and METRAWin 10 software required, see accessories): – Select/query measuring functions and parameters – Query momentary measurement data – Read out stored measurement data |

Data Interface – Bluetooth (METRAHIT PM PRIME BT only)

The METRAHIT PM PRIME BT Bluetooth multimeter variant is identical to the METRAHIT PM PRIME, except that it is also equipped with a Bluetooth interface.

| | |
|------------------------|---|
| Bluetooth version | 2.1 + EDR |
| Frequency range | 2.4 ... 2.4835 GHz |
| Transmission intensity | Max. 2.5 mW (class 2) |
| Range | Approx. 20 m (depending on propagation conditions) |
| Functions | Connection to PC (METRAWin 10 software required, see accessories): – Select/query measuring functions and parameters – Query momentary measurement data – Read out stored measurement data Connection to Android device (smartphone, tablet) with METRALOG app – Display of multimeter's measured values – Recording of measuring operations – Transmission of logs via wireless and network services – Trigger in the event of exceeding or falling short of an adjustable limit value – Acoustic warning if trigger event occurs |

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Professional Multimeters


Internal Clock

| | |
|-----------------------|---------------------|
| Time format | DD.MM.YYYY hh:mm:ss |
| Resolution | 0.1 s |
| Accuracy | ±1 minute per month |
| Temperature influence | 50 ppm/K |

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) |
| Operating time | With alkaline manganese batteries: Approx. 200 hours |
| 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. 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 operating mode |
| Power pack socket | If the power pack has been plugged into the NA X-TRA instrument, the installed batteries are disconnected automatically. Rechargeable batteries can only be recharged externally. |

Display

Transreflective LCD panel (65 × 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 “⊥” |
| Sampling rate | 10 or 40 measurements per second with the Min-Max function except for the capacitance and frequency measuring functions |

| | |
|--------------|--|
| Refresh rate | Twice or 5 times per sec. (with or without filter) |
|--------------|--|

Acoustic Signaling

| | |
|-------------|---|
| 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 × 38 mm, switching capacity: 30 kA at 1000 V AC/DC, protects the current measurement input in the 300 μA to 10 A ranges |
|-----------|---|

Electrical Safety

| | | |
|--------------------|---------|--------|
| 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 61326-1, class B |
| Interference immunity | EN 61326-1 EN 61326-2-1 |

Ambient Conditions

| | |
|-----------------------------|---|
| Accuracy range | 0 °C ... +40 °C |
| Operating temperature T_A | –10 °C ... +50 °C * |
| Storage temperature | –25 °C ... +70 °C (without batteries) |
| Relative humidity | 40 ... 75%, no condensation allowed |
| Elevation | To 2000 m |
| Place of use | 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 × 87 × 45 mm (without rubber holster) |
| Weight | Approx. 0.4 kg with batteries |
| Protection | Housing: IP 52 (protection against ingress of solid foreign objects: protected against dust in harmful quantities, protection against water ingress: protection against falling dripping water, when the housing is inclined up to 15°) (pressure equalization via the housing) Sockets: IP 20 (protection against ingress of solid foreign objects: protected against solid foreign objects with diameters ≥ 12.5 mm, protection against ingress of water: protection against falling dripping water, when the housing is inclined up to 15°) |

METRAHIT | PM PRIME & METRAHIT | PM PRIME BT Professional Multimeters

Interface Adapter for USB Connection

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

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

The adapter does not require a separate power supply. Its baud rate is 38,400 baud.

Current drivers for Windows-based operating systems are made available via free DriverControl software, which can be downloaded from our website.



Sample Application

METRAwin 10 Software

METRAwin 10 PC software is a multilingual, measurement data logging program for recording, visualizing, evaluating and documenting measured values with reference to time from METRAHIT Advanced and Professional as well as METRAHIT A and E series multimeters.

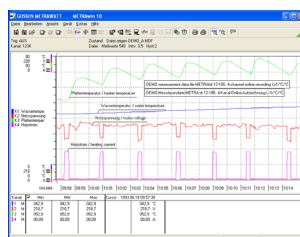
Communications between the PC and the measuring instrument(s) is established via available interface adapters.

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

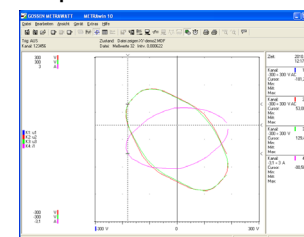
- **Device configuration**
Remote configuration and querying of device-specific functions and parameters, for example measuring function, measuring range and memory parameters. Frequently used device settings can be saved to configuration files for easy recall.
- **Online recording of measurement data**
Read-in, display and recording of momentarily measured data from the interconnected device.
 - Number of measuring channels Up to 10
 - Start recording Manual, triggered by meas. 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 on device type, measuring function, number of measuring channels and communication mode (e.g. via modem), sampling 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 instrument's memory can be displayed in various formats:

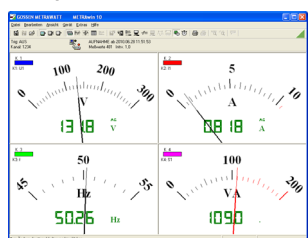
Y(t) Recorder Display for Up to 6 Channels



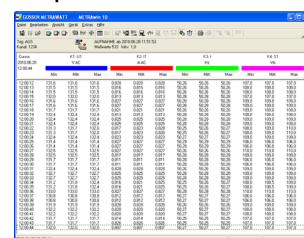
XY Recorder Display for Up to 4 Channels



Multimeter Display for Up to 4 Channels



Tabular Display for Up to 10 Channels



System Requirements

METRAwin 10 (as of version 6.20) runs on PCs, notebooks and tablets with Microsoft Windows® VISTA, 7, 8 or 10.

METRAHIT | PM PRIME & METRAHIT | PM PRIME BT Professional Multimeters

Order Information

| Designation | Type | Article Number |
|---|------------------------------|-----------------|
| TRMS Multimeter with 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, DAKKS calibration certificate | METRAHIT PM PRIME* | M248A |
| Same as M248A but with Bluetooth interface | METRAHIT PM PRIME 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 ... +600 °C | Z3409 | GTZ3409000R0001 |
| Pt1000 temperature sensor for measurements in gases and liquids, -50 ... +220 °C | TF220 | Z102A |
| Pt100 oven sensor, -50 ... +550 °C | TF550 | GTZ3408000R0001 |
| 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, holding power under standard conditions with flat head screws: 1200 g perpendicular to the contact surface, measurement instrument connection for multimeter via angled multilam plug | Set 1 – magnetic test probes | Z502U |

* Formerly METRAHIT ULTRA

** Formerly METRAHIT ULTRA BT

Transport Accessories

HitBag Cordura belt pouch

for multimeters of the METRAHIT series (with/without rubber holster)



HC30 hard case

for two multimeters (with and without rubber holster) and accessories



HitBag L Cordura belt pouch (without contents)

for METRAHIT series multimeters (with/without rubber holster) and accessories



Sample Content

F836 ever-ready case

for multimeter and accessories



Sample Content

F829 carrying pouch

for multimeters (with and without protective rubber cover) and accessories



| Designation | Type | Article Number |
|--|----------|-----------------|
| Imitation leather carrying pouch for METRAHIT and METRAmax | F829 | GTZ3301000R0003 |
| Cordura belt pouch for METRAHIT and METRAport series multimeters | HitBag | Z115A |
| Large, soft belt pouch for one METRAHIT or METRAport multimeter. Made of rugged, water-repellent Cordura with 3 separate compartments for measurement cables, clips, instructions, CD etc. | HitBag L | Z115B |
| Imitation leather ever-ready case with cable compartment | F836 | GTZ3302000R0001 |
| Ever-ready case for 2 METRAHITs, 2 adapters and accessories | F840 | GTZ3302001R0001 |
| Hard case for one METRAHIT and accessories | HC20 | Z113A |
| Hard case for two METRAHITs and accessories | HC30 | Z113A |

Further information regarding accessories can be found:

- In our Measuring Instruments and Testers catalog
- On the Internet at www.gossenmetrawatt.com

METRAHIT | PM PRIME & METRAHIT | PM PRIME BT

Professional Multimeters

| Current Measuring Accessories | | | | | | | | |
|---|---|---|-----------------------------------|---------------------|-------------------------------------|-----------------------------------|---|---------------------|
| All current sensors and transformers are equipped with connection via 4 mm safety banana plugs. | | | | | | | | |
| Type | Designation | Measuring Range | Meas. Category | Max. Conductor Dia. | Transmission Factor | Frequency Range | Intrinsic Uncertainty \pm (% rdg.1 + ...) | Article Number |
| DC/AC Current Sensors with Voltage Output | | | | | | | | |
| CP30 | DC/AC current clamp sensor with battery mode (30 h) | 5 ... 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) | 0.5 ... 30 A 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) | 0.5 ... 100 A 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) | 0.5 ... 125 A 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 |
| AC Current Sensors with Voltage Output | | | | | | | | |
| WZ12B | AC current sensor clamp | 10 mA~ ... 100 A~ | 300 V CAT III | 15 mm | 100 mV/A | <u>45 to 65</u> ... 500 Hz | 1.5% + 0.1 mA | Z219B |
| WZ12C | AC current sensor clamp 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 to 65</u> ... 400 Hz | 3% + 0.15 mA, 2% + 0.1 A | Z219C |
| WZ11B | AC current sensor clamp with 2 measuring ranges | 0.5 ... 20 A~, 5 ... 200 A~ | 600 V CAT III | 20 mm | 100 mV/A, 10 mV/A | <u>30...48...65</u> ... 500 Hz | 1 ... 3% | Z208B |
| Z3512A | AC current sensor clamp 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 | <u>10...48...65</u> ... 3 kHz | 10.5 ... 3% , 10.2 ... 1% | Z225A |
| METRA-FLEX3000 | Flexible AC current sensor with 3 measuring ranges, battery mode (2000 h) | 0.5 ... 30 A, 0.5 ... 300 A, 5 ... 3000 A | 1000 V CAT III 600 V CAT IV | 176 mm | 100 mV/A, 10 mV/A, 1 mV/A | 10 Hz ... 20 kHz | 1% + 0.1 A 1% + 0.1 A 1% + 1 A | Z207E |
| METRA-FLEX300M | 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 ... 100 kHz | 1% + 0.2 A 1% + 0.2 A 1% + 1 A | Z207M |
| AC Current Transformers with Current Output | | | | | | | | |
| WZ12A | AC current transformer clamp | 15 ... 180 A~ | 300 V CAT III | 15 mm | 1 mA/A | <u>45 to 65</u> ... 400 Hz | 3% | Z219A |
| WZ12D | AC current transformer clamp | 30 mA ... 150 A~ | 300 V CAT III | 15 mm | 1 mA/A | <u>45 to 65</u> ... 500 Hz | 2.5% + 0.1 mA | Z219D |
| WZ11A | AC current transformer clamp | 1 ... 200 A~ | 600 V CAT III | 20 mm | 1 mA/A | <u>48 to 65</u> ... 400 Hz | 1% ... 3% | Z208A |
| Z3511 | AC current transformer clamp | 4 ... 500 A~ | 600 V CAT III | 30 x 63mm | 1 mA/A | <u>48 to 65</u> ... 1 kHz | 3% + 0.4 A | GTZ351100 0R0001 |
| Z3512 | AC current transformer clamp | 0.5 ... 1000 A~ | 600 V CAT III | 52 mm | 1 mA/A | <u>30...48...65</u> ... 5 kHz | 10.5% ... 0.7% | GTZ351200 0R0001 |
| Z3514 | AC current transformer clamp | 1 ... 2000 A~ | 600 V CAT III | 64 x 150mm | 1 mA/A | <u>30...48...65</u> ... 5 kHz | 10.5% + 0.1 A | GTZ351400 0R0001 |

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