

METRAHIT IM XTRA BT & METRAHIT IM E-DRIVE BT & METRAHIT IM TECH BT

Isolation Tester, Milliohmmeter, TRMS Multimeter, Short-Circuited Coil Tester

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- **Insulation resistance measurement up to 3.1 GΩ** with interference voltage detection, test voltages: 50, 100, 250, 500 and 1000 V per EN 61557-2 (METRAHIT IM XTRA BT / METRAHIT IM E-DRIVE BT only)
- **DAR:** dielectric absorption rate, **PI:** polarization index (METRAHIT IM XTRA BT / METRAHIT IM XTRA BT only)
- **4-wire milliohm measurement** (Kelvin connection) with 200 mA or 1 A measuring current for the precise measurement of extremely small resistances with a resolution of 1 $\mu\Omega$
- **2-wire Rlo measurement** with 200 mA test current per EN 61557-4 (METRAHIT IM XTRA BT / METRAHIT IM E-DRIVE BT only)
- **Short-circuited coil test** with 1000 V and optional COIL adapter (METRAHIT IM XTRA BT / METRAHIT IM E-DRIVE BT only)
- **Multifunctional measuring instrument** (V, A, Ω , F, Hz, °C/°F, %) (METRAHIT IM XTRA BT / METRAHIT IM E-DRIVE BT only), RPM (METRAHIT IM XTRA BT / METRAHIT IM E-DRIVE BT only)
- **TRMS_{AC} / AC+DC measurement** for current/voltage value up to 10/100 kHz
- **Current measurement direct or with clamp sensors** – with adjustable CLIP factor
- **Capacitance measurement**
- **Precision temperature measurement** °C, and °F for RTD and TC-K sensors
- **Diode measurement** ($I_K = 1$ mA, U_{Flow} up to 4.5 V) and continuity testing
- **Data logger** thanks to integrated memory module and real-time clock, individual measurements as well
- **Programmable sequences** for test routines (METRAHIT IM XTRA BT / METRAHIT IM E-DRIVE BT only)
- **Color graphic display**
- **Modular power supply:** standard quick-change rechargeable lithium battery, change without interrupting the measuring circuit thanks to touch protected module socket
- **Automatic blocking sockets** for the current input
- Test probe with START (ISO) and STORE keys
- **Housing** with **IP52 protection**, dust protected and drip-proof, replaceable rubber holster
- **Interfaces:** Bluetooth
- **IZYTRONIQ** windows software for documentation, preparation of test reports



CE

600 V CAT IV
1000 V CAT III



reddot award 2018
winner industrial design



Applications

The **METRAHIT IM XTRA BT**, **METRAHIT IM E-DRIVE BT** and **METRAHIT IM TECH BT** are portable, extremely rugged multimeters designed for use in the field. They're suitable for maintenance, service and diagnosis at electric machines, drive units and systems, for example in automotive, energy and automation applications.

METRAHIT IM XTRA BT and **METRAHIT IM E-DRIVE BT** multimeters are all-in-one instruments: insulation tester, milliohmmeter, short-circuited coil tester and universal multimeter. They're ideal for safety testing and diagnosis at electric and hybrid vehicles, as well as all types of electric machines.

The **METRAHIT IM XTRA BT** and the **METRAHIT IM E-DRIVE BT** make it possible to test coils for short-circuits within an inductance range of 10 μ H to 50 mH (at 100 Hz) in combination with the optional **COIL Adapter 50mH**. This range corresponds to motors in accordance with DIN standards with power ratings of roughly 15 kVA to 80 MVA. A universal adapter for motors with medium power ratings is in preparation.

METRAHIT IM TECH BT is a handy ALL-In-ONE universal multimeter and milliohmmeter.

Features

Insulation Resistance Measurement with Interference Voltage Detection (METRAHIT IM XTRA BT / METRAHIT IM E-DRIVE BT only)

Insulation resistance measurement with test voltages of 50 to 1000 V. If interference voltage of greater than 15 V AC or 25 V DC is detected during insulation measurement, the device issues an optical and acoustic warning whereupon measurements cannot be launched. Afterwards, automatic switching to TRMS_{AC+DC} voltage measurement at 1 MΩ takes place and the currently measured voltage is displayed as U_{ext} .

Polarization Index (PI) (METRAHIT IM XTRA BT / METRAHIT IM E-DRIVE BT only)

When test voltage is applied, insulation resistance is measured after one minute and after ten minutes. The polarization index is the ratio which results from the two measured values. In the case of electric drive units, a value of at least 2 indicates intact insulation and a value of greater than 4 indicates very good insulation.

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Absorption Index (DAR) (METRAHIT IM XTRA BT / METRAHIT IM E-DRIVE BT only)

Practically speaking, the absorption index test is a quick polarization index measurement. The ISO values measured after 30 and 60 seconds are used to generate a ratio.

Kelvin Connection for 4-Wire Measurement (4-L) (milliohm measurement)

The 4-wire measurement compensates for influences resulting from cable and contact resistances which must not be neglected when measuring very small resistances. Measuring current can be set to 200 mA or 1 A. In this way, even extremely small contact resistances can be measured, for example at welded and riveted joints and on aircraft outer skins (lightning protection and wick test), or equipotential bonding is measured in accordance with UN ECE R100 in hybrid and electric vehicles.

2-Wire Rlo Measurement with 200 mA Test Current per EN 61557 (METRAHIT IM XTRA BT / METRAHIT IM E-DRIVE BT only)

Low-resistance measurement per EN 61557-4 for earth, protective and equipotential bonding conductors. If excessive interference current is detected during insulation measurement, the device issues an optical and acoustic warning whereupon measurements cannot be launched.

RMS Value with Distorted Waveform

The utilized measuring method allows for waveform-independent TRMS measurement of alternating quantities (AC) and pulsating quantities (AC and DC) for voltage and current at up to 100 kHz.

Activatable Filter for V AC Measurement

A 1 kHz low-pass filter can be activated if required, for example when measuring 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, and these are indicated at the display if applicable.

Diode Testing with Constant Current $I_k = 1 \text{ mA}$

Testing of the polarity of diodes and checking for short-circuits and interruptions in electrical circuits. The test voltage source makes it possible to measure LEDs and reference diodes up to 4.5 V, e.g. also white LEDs.

Fast Acoustic Continuity Test $I_k = 1 \text{ mA}$

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

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 for quick, repetitive measurements.

Color Graphic Display

A high-resolution transmissive 3½" TFT color graphic display with 320 x 480 dots is used for measured values and menu navigation. The display is easily readable from all directions, as well as under difficult lighting conditions (controllable with light sensor). Graphic representation permits user-friendly menu navigation including help texts.

Analog Bar Graph for Quick Trend Displays

The bar graph (with additional negative axis range for zero-frequency quantities) permits faster detection of measured value changes as compared with digital value displays.

Display Resolution

High resolution with 30,000 digits and a basic accuracy of 0.15%.

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 is displayed as a digital value. The bar graph continuously indicates the momentary measured value.

Overload Protection

Overload protection safeguards the instrument in all measuring functions for up to 1000 V. Voltages of greater than 1000 V and currents of greater than 1 A are indicated acoustically. FUSE appears at the display if the fuse for the current or m Ω measurement input blows.

Battery Charge Level – Power Saving Circuit

The battery charge level is accurately indicated in the graphic display.

The device is switched off automatically if the measured value remains unchanged for a period of between 10 and 59 minutes (adjustable), if none of the controls are activated during this time and continuous operation is not activated.

Automatic Blocking Sockets (ABS)¹

All current ranges are implemented via a single connector jack which prevents any possibility of operator error.

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.

¹ patented (patent no. EP 1801 598 and US 7,439,725)

Housing and Protective Cover for Harsh Conditions

- New housing design
- Separate fuse compartment
- Quick-change rechargeable battery

The instrument is protected against damage in the event of impacts or dropping by means of a soft rubber cover with tilt stand. The rubber material also assures that the instrument doesn't wander if it's set up on a vibrating surface.

Data Interfaces

The instrument can be remote configured and momentary and saved measurement data can be read out via Bluetooth. For PC, the complete software **IZYTRONIQ** or **METRAHIT IM Data Reader** is required to this end. For smartphones and tablets with Android™, the **METRALOG** app is available.

Interface protocol and device driver software for **LabVIEW** (National Instruments™) are available upon request.

Voluntary Manufacturer's Guarantee

36 months for materials and workmanship.²

1 year for calibration.

² Detailed information and conditions available at <https://www.gmc-instruments.de/en/company/terms-and-conditions-of-delivery/>

DAkKS calibration certificate

The multimeter is furnished with a DAkKS calibration certificate, which is also recognized internationally (EA, ILAC).

After the user-specified calibration interval has elapsed (recommended interval: 1 to 3 years), the multimeter can be inexpensively recalibrated in our proprietary DAkKS calibration laboratory.

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Overview of Included Features

| Function | METRAHIT IM XTRA BT IM E-DRIVE BT | METRAHIT IM TECH BT |
|--|--------------------------------------|---------------------------------|
| V _{DC} (R _i = 9 MΩ) | • | • |
| V _{AC} / Hz TRMS (R _i = 9 MΩ) | 1kHz filter | 1kHz filter |
| V _{AC+DC} TRMS (R _i = 9 MΩ) ¹ | 1kHz filter | 1kHz filter |
| V _{AC+DC} TRMS (R _i = 1 MΩ) R _{ISO} range (interference voltage) | • | |
| Hz (V _{AC}) | ... 300 kHz | ... 300 kHz |
| V _{AC, AC+DC} bandwidth | 100 kHz | 100 kHz |
| A _{DC, AC, AC+DC} / Hz TRMS | 10 nA ... 1 A | 10 nA ... 1 A |
| Fuse F1 current measurement function | 1 A/1000 V - 30 kA ⁴ | 1 A/1000 V - 30 kA ⁴ |
| Current sensor transformation ratio \gg | 1 mV : 1 • 10 • 100 • 1000 mA | 1 mV : 1 • 10 • 100 • 1000 mA |
| Hz (A AC) | ... 30 kHz | ... 30 kHz |
| Insulation resistance R _{ISO} : test voltages | 50 • 100 • 250 • 500 • 1000 V | |
| Short-circuited coil test (1 kV) with COIL adapter | option | |
| Duty cycle measurement as % | • | |
| Speed measurement in RPM | • | |
| Resistance R _{lo} with 200 mA per EN 61557 | • | |
| Milliohm with 4-wire method, mΩ with 200 mA | • | • |
| Milliohm with 4-wire method, mΩ with 1 A pulse | • | • |
| Fuse F2 R _{lo} measurement function | 315 mA/1000 V - 30 kA ⁴ | |
| Resistance Ω | • | • |
| Continuity \square | • | • |
| Diode ... 4.5 V \rightarrow | • | • |
| Temperature °C/°F TC type K and Pt100/1000 ² | • | • |
| Capacitance $\text{—} $ | • | • |
| MIN/MAX/data hold | • | • |
| Test sequence | 1 (with 10 steps) | |
| Sequence functions Expert | option | option |
| 64 MBit memory ³ | • | • |
| Bluetooth interface | • | • |
| 3.5" TFT color graphic display | • | • |
| Push-button probe Start/Stop and Send/Store | • | |
| Quick-change battery with USB charging | • | • |
| Protection | IP52 | IP52 |
| Measuring category | 1000 V CAT III, 600 V CAT IV | 1000 V CAT III, 600 V CAT IV |

¹ Due to the system, the DC component indicated in the smallest measuring range (300 mV) has an offset. For a precise measurement of the DC component, please select measuring function VDC.

² with optional temperature sensors

³ For 300,000 measured values, sampling rate adjustable from 0.1 seconds to 9 hours

⁴ 30 kA = breaking capacity

Standard Equipment (depending on Device Variant)

- Multimeter with rubber holster
- HC40 hard case (for multimeter and accessories) (Z270K: black or Z270H: orange)
- Quick-change, rechargeable lithium polymer battery with USB power pack (5 V DC, 2 A) (Z270A or Z270G)
- Probe (with start/stop and store/send function) (Z270S) (**METRAHIT IM XTRA BT** and **METRAHIT IM E-DRIVE** only)
- Cable set KS17-2 (1 pair of safety measurement cables, red/black, with 4 mm test tips) (GTY362003P0002)
- Pair of KC4 Kelvin clips (Z227A) (**METRAHIT IM XTRA BT** and **METRAHIT IM TECH BT** only)
- KC&S Kelvin clip and Kelvin probe (Z227C) (**METRAHIT IM E-DRIVE BT** only)
- DAkKS calibration certificate
- Condensed operating instructions
 - * Comprehensive operating instructions available on the Internet for download from www.gossenmetrawatt.com
- IZYTRONIQ Business Starter license (card with registration key for software)



Overview of Scope of Delivery

| Accessories | Type | Article No. | M273S | M274S | M272S |
|--|-------------------|--------------------|-------|-------|-------|
| METRAHIT IM XTRA BT | | M273D | X | | |
| METRAHIT IM E-DRIVE BT | | M274B | | X | |
| METRAHIT IM TECH BT | | M272B | | | X |
| Quick-change lithium polymer rechargeable battery & USB mains power pack | M27x | Z270A/ Z270G | X | X | X |
| USB mains power pack with 4 replaceable primary terminals (for Z270A/ Z270G) | M27x | Z270L | 0 | 0 | 0 |
| Push-button probe | Z270S | Z270S | X | X | — |
| Cable set | | GTY3620 03P0002 | X | X | X |
| 1 pair of Kelvin clips | KC4 | Z227A | X | 0 | X |
| 1 pair of Kelvin probes | KC27 | Z227B | 0 | 0 | 0 |
| 1 Kelvin clip & 1 Kelvin probe | KC&S | Z227C | 0 | X | 0 |
| Concentric Kelvin probes for 4-wire measurements | KCC | Z2270 | 0 | 0 | 0 |
| Cable reel for 4-wire measurements, 100 meters | KCV100 | Z227E | 0 | 0 | 0 |
| Hard case black orange | | Z270K Z270H | X | | X |
| Magnetic holder and Velcro fastener | HIT-Clip | Z117A | 0 | 0 | 0 |
| COIL adapter 10 μH ... 50 mH | COIL Adapter 50mH | Z270F | 0 | 0 | — |
| COIL adapter 10 μH ... 500 mH | COIL Adapter XTRA | Z270M | 0 | 0 | — |
| Set of test probes with alligator clips for COIL adapter XTRA | KSC-3L | Z110C | 0 | 0 | — |
| Adapter cable 4 mm male to 6 mm female | AK-4M/6F | Z110L | 0 | 0 | 0 |
| Functions expansion to 16 test sequences with up to 63 test steps each | Sequence Expert | Z270P | 0 | 0 | 0 |
| IZYTRONIQ Business Starter License | S101S & Z956A | S101S & Z956A | X | X | X |

Key

X = standard 0 = option — = not possible, not provided for

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Insulation Measurement

(METRAHIT IM XTRA BT and METRAHIT IM E-DRIVE BT only)

| Measuring Range | Resolution | Nominal Voltage U_{ISO} | Intrinsic Uncertainty at Reference Conditions $\pm(\% \text{ rdg.} + d)$ |
|-------------------------|----------------|---------------------------|--|
| 3 ... 1000 V \simeq^1 | | $R_i = 1M\Omega$ | 3 + 3 |
| 300 k Ω 2 | 0.1 k Ω | 50/100/250/500/1000 V | 2 + 10 |
| 3 M Ω | 1 k Ω | 50/100/250/500/1000 V | 2 + 10 |
| 30 M Ω | 10 k Ω | 50/100/250/500/1000 V | 2 + 10 |
| 300 M Ω | 100 k Ω | 50/100/250/500/1000 V | 5 + 10 |
| 3000 M Ω | 1 M Ω | 250/500/1000 V | 5 + 10 |

¹ TRMS interference voltage measurement (V_{AC+DC}) with 1 M Ω input resistance, frequency response width: > 65 ... 500 Hz, accuracy: 3% + 30 digits

² Current for the M Ω measurement with U_{ISO} is limited to 1 mA. And thus when measuring small insulation resistances, U_{Actual} deviates from U_{Set} , i.e. U_{Actual} is correspondingly smaller. Example: at R_{ISO} 200 k Ω max. 200 V.

| Measuring Function | Nom. Voltage U_N | Open-Circuit Voltage U_O Max. | Nom. Current I_N | Short-Circuit Current I_k | Acoustic Signal for | Overload Capacity Value | Overload Capacity Time |
|-----------------------------|-------------------------------------|-----------------------------------|--------------------|-----------------------------|---------------------|-------------------------|------------------------|
| $U_{int}/M\Omega @ U_{ISO}$ | — | — | — | — | $U > 1000 V$ | 1000 V \simeq | Cont. |
| $M\Omega @ U_{ISO}$ | 50 100 250 500 V 1000 V | 1.2x U_{ISO} 1.12x U_{ISO} | 1.0 mA | < 1.4 mA | $U > 1000 V$ | 1000 V \simeq | 10 s |

Short-Circuited Coil Test (only METRAHIT IM XTRA BT or METRAHIT IM E-DRIVE BT and with optional COIL Adapter)

| Measuring Range | Resolution | Nominal Voltage U_{SET} | Intrinsic Uncertainty at Reference Conditions $\pm(\% \text{ rdg.} + d)$ |
|---------------------------|-----------------|---------------------------|--|
| 0.3 ... 1000 V \simeq^1 | | $R_i = 1M\Omega$ | 3 + 30 > 100 digits |
| 10.0 ... 30.9 μs | 0.1 [μs] | 1000 V | 10 + 5 digits |
| 31 ... 250 μs | 1 [μs] | | |

¹ TRMS interference voltage measurement (V_{AC+DC}) with 1 M Ω input resistance, frequency response width: > 65 ... 500 Hz, accuracy: 3% + 30 digits

² The time value may vary for different COIL adapters by up to 10%. This has no influence whatsoever if you perform the measurements with the same COIL adapter and compare them with each other.

Inductance measuring ranges of optional COIL adapters:

- COIL adapter XTRA (Z270M): 10 μH up to 5 H
- COIL adapter 50mH (Z270F): 10 μH up to 50 mH

Internal Clock

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

Reference Conditions

| | |
|-----------------------------|-------------------|
| Ambient temperature | +23 °C ± 2 K |
| Relative humidity | 40% ... 75% |
| Measured quantity frequency | 45 Hz ... 65 Hz |
| Measured quantity waveform | Sinusoidal |
| Supply voltage | 4.0 V ± 0.1 V |

Influencing Quantities and Influence Error

| Influencing Quantity | Sphere of Influence | Measured Quantity / Measuring Range ¹ | Influence Error (...% rdg. + ... d) / 10 K |
|----------------------|---------------------------------------|--|--|
| Temperature | 0 °C ... +21 °C and +25 °C ... +40 °C | V \simeq | 0.2 + 5 |
| | | V \simeq | 0.4 + 5 |
| | | 300 Ω ... 3 M Ω | 0.5 + 5 |
| | | 30 M Ω | 1 + 5 |
| | | mA/A \simeq | 0.5 + 5 |
| | | mA/A \simeq | 0.8 + 5 |
| | | 30 nF ... 300 μF | 2 + 5 |
| | | Hz | 0.2 + 5 |
| | | °C/°F (Pt100/Pt1000) | 0.5 + 5 |

¹ With zero balancing

Frequency Influence for V_{AC} V_{AC+DC} Voltage Ranges

| Frequency Range | Deviation ¹ | | |
|----------------------|--|---|---|
| | 300 mV range $\pm (... \% \text{ rdg.} + ... d)$ | 3 V, 30 V, 300 V range 2 $\pm (... \% \text{ rdg.} + ... d)$ | 1000 V range 2 $\pm (... \% \text{ rdg.})$ |
| 15 Hz ... 45 Hz | 2 + 30 | 2 + 30 | 2 + 30 |
| > 65 Hz ... 1 kHz | 0.5 + 30 | 0.5 + 30 | 1 + 30 |
| > 1 kHz ... 10 kHz | 2 + 30 | 1.5 + 30 | 10 + 30 |
| > 10 kHz ... 20 kHz | 3 + 30 | 1.5 + 30 | — |
| > 20 kHz ... 50 kHz | 3 + 30 | 5 + 30 | — |
| > 50 kHz ... 100 kHz | 10 + 30 | 10 + 30 | — |

¹ For sinusoidal input signals > 10% to 100% of the range (mV range: as of 30% of range, at 1% to 10% of the range: $f < 50$ kHz, intrinsic error increased by 0.2% of the upper range limit.

² Overload capacity of the voltage measurement input: power limiting: frequency x voltage max. 6×10^6 V x Hz at > 100 V

Frequency Influence for I_{AC} / I_{AC+DC} Current Measuring Ranges

| Frequency Range | Influence Error ¹ | |
|--------------------|--|--|
| | 300 μA to 300 mA $\pm (... \% \text{ rdg.} + ... \text{ digits})$ | 1 A range $\pm (... \% \text{ rdg.} + ... \text{ digits})$ |
| 15 Hz ... 45 Hz | 2 + 30 | 2 + 30 |
| > 65 Hz ... 1 kHz | 1 + 30 | 1 + 30 |
| > 1 kHz ... 2 kHz | 1 + 30 | 1 + 30 |
| > 2 kHz ... 5kHz | 1 + 30 | 3 + 30 |
| > 5 kHz ... 10 kHz | 5 + 30 | 5 + 30 |

¹ For sinusoidal input signals > 10% to 100% of the range.

| Influencing Quantity | Sphere of Influence | Measured Quantity / Measuring Range | Influence Error ¹ |
|----------------------|---------------------|-------------------------------------|------------------------------|
| Crest Factor CF | 1 ... 3 | V \sim , A \sim | $\pm 1\%$ rdg. |
| | > 3 ... 5 | | $\pm 3\%$ rdg. |

¹ Except for sinusoidal waveform

| Influencing Quantity | Sphere of Influence | Measured Quantity | Influence Error |
|-------------------------------|---------------------------------|----------------------------|-----------------------------------|
| Relative Atmospheric Humidity | 75% 3 days instrument off | V, A, Ω , F, Hz, °C | 1 x intrinsic uncertainty |
| Battery Voltage | | 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, sinusoidal | V \simeq | > 90 dB |
| | | 3 V \sim | > 90 dB |
| | | 30, 300 V \sim 1000 V \sim | > 150 dB > 150 dB |
| Series Mode Interference Voltage | Interference quantity: V \sim , respective nominal value of the measuring range, max. 1000 V \sim , 50 Hz ... 60 Hz sinusoidal | V \simeq | > 50 dB |
| | | V \sim | > 50 dB |

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Response Time (after manual range selection)

| Measured Quantity / Measuring Range | Digital Display Response Time | Measured Quantity Jump Function |
|--|-------------------------------|---|
| V $\overline{=}$, V \sim A $\overline{=}$, 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 | |
| $^{\circ}C$ (Pt 100) | Max. 3 s | |
| \rightarrow | 1.5 s | from 0 to 50% of upper range limit value |
| 30 nF ... 300 μF >10 Hz | Max. 5 s 1.5 s | |

Fuse

Current measuring ranges & 4-wire m Ω measuring ranges

F1: FF 1 A/1000 V AC/DC, 6.3 x 32 mm

Fuse with breaking capacity of 30 kA at 1000 V AC/DC, protects the current measurement input in the 300 μA to 1 A ranges

2-wire m Ω measuring ranges

F2: FF 0,315 A/1000 V 6.3 x 32 mm

(METRAHIT IM XTRA BT and METRAHIT IM E-DRIVE BT only) Fuse with breaking capacity of 30 kA at 1000 V AC/DC

Display

TFT color graphic display (55 x 36 mm) with analog and digital display including unit of measure, type of current and various special functions

Background Illumination

Activated background illumination can be regulated by means of a light sensor.


Analog Bar Graph

Scaling linear
Polarity display with automatic switching
Measuring rate 40 measurements per second and display refresh

Digital Measured Value Display

Resolution / char. height 320 x 480 dots, 12 mm
Number of places 31,000 / 3100
4 $\frac{3}{4}$ -place in the V, A, Hz and Ω measuring functions, depending on parameter setting
Overflow display "OL" is displayed for $\geq 31,000$ digits or ≥ 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 and duty cycle measuring functions
Refresh Rate 2 times per second, every 500 ms

Power Supply

Battery module 3.7 V, 4000 mAh, LiPo (approx. 25% self-discharge per year)
Service life approx. 20 hours (without M Ω_{ISO} measurement / R $_{LO}$ / R 4-wire measurement)
Battery indicator Battery charge level display via battery symbol: , querying of momentary exact charge level in % via menu function
Power OFF function The multimeter is switched off automatically:
– when battery voltage drops to below approx. 3.6 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

Rechargeable battery modules 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 EN 61557 |
|--------------------|--------------------------------|-----------------------|-----------------------|---|
| V $\overline{=}$ | | | 20 ¹ | |
| V \sim | | | 15 ¹ | |
| RINS | 100 V | 1 M Ω | 5 | |
| | 100 V | 100 k Ω | | 300 |
| | 500 V | 500 k Ω | | 60 |
| | 1000 V | 2 M Ω | | 20 |

¹ Times 0.7 for interface operation

Electromagnetic Compatibility (EMC)

Interference emission EN 61326-1 class B

Interference immunity EN 61326-1

Short-term measured value deviation of up to 10% may occur during electromagnetic interference thus reducing the specified operating quality.

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Ambient Conditions

| | |
|--|--|
| Accuracy range | 0 °C to +40 °C |
| Operating temperatures (Storage temperature with batteries) | -10 °C ... +50 °C -20 °C ... +50 °C with rubber holster |
| Storage temperatures | -25 °C ... +70 °C (without battery) |
| Relative humidity | 40 to 75 %, no condensation allowed |
| Elevation | to 2000 m |
| Deployment | Indoors, except within specified ambient conditions |

Data Interface

| | |
|--------------------|--|
| Type | Bluetooth 4.2 |
| Frequency band | 2.402 ... 2.480 GHz |
| Transmitting power | max. 91 mW |
| Functions | - Query measuring functions and parameters - Query momentary measurement data |

Internal Measured Value Storage

| | |
|-----------------|--|
| Memory capacity | 64 MBit for approx. 300,000 measured values with indication of date and time |
|-----------------|--|

Mechanical Design

| | |
|------------|--|
| Housing | Impact resistant plastic (ABS) |
| Dimensions | 235 × 105 × 56 mm (without rubber holster) |
| Weight | approx. 0.7 kg with battery module |
| Protection | Housing: IP 52 (pressure equalization by means of the housing) |

Excerpt from table on the meaning of IP Codes

| IP XY (1 st digit X) | Protection against foreign object entry | IP XY (2 nd digit Y) | Protection against the penetration of water |
|------------------------------------|---|------------------------------------|--|
| 0 | not protected | 0 | not protected |
| 1 | ≥ 50.0 mm dia. | 1 | vertically falling drops |
| 2 | ≥ 12.5 mm dia. | 2 | vertically falling drops with enclosure tilted 15° |
| 3 | ≥ 2.5 mm dia. | 3 | spraying water |
| 4 | ≥ 1.0 mm dia. | 4 | splashing water |
| 5 | dust protected | 5 | water jets |

Applicable Regulations and Standards

| | |
|---|--|
| EN 61010-1 | Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements |
| EN 61010-2-033 | Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-033: Particular requirements for hand-held multimeters and other meters, for domestic and professional use, capable of measuring mains voltage |
| EN 61326-1 | Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements |
| EN 60529 | Test instruments and test procedures – degrees of protection provided by enclosures (IP code) |
| EN 61557-1 (METRAHIT IM XTRA BT and METRAHIT IM E-DRIVE BT only) | Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c. – Equipment for testing, measuring or monitoring of protective measures Part 1: General requirements |
| EN 61557-2 (METRAHIT IM XTRA BT and METRAHIT IM E-DRIVE BT only) | Part 2: Insulation resistance |
| EN 61557-4 (METRAHIT IM XTRA BT and METRAHIT IM E-DRIVE BT only) | Part 4: Resistance of earth connection and equipotential bonding |

METRAHIT IM XTRA BT

with Accessory COIL Adapter 50mH (Z270F)



METRAHIT IM XTRA BT

with Accessory COIL Adapter XTRA (Z270M)



METRAHIT IM XTRA BT & METRAHIT IM E-DRIVE BT & METRAHIT IM TECH BT

Isolation Tester, Milliohmmeter, TRMS Multimeter, Short-Circuited Coil Tester

Order Information

| Designation | Type | Article Number |
|---|---------------------------|---------------------------------|
| Multimeter, milliohmmeter and isolation resistance tester (COIL Ready) with graphic display, Bluetooth, and software IZYTRONIQ Business Starter. R-ISO up to 1kV & mΩ @ 200 mA 2-wire & mΩ @ 200 mA 4-wire & mΩ @ 1 A 4-wire. Standard equipment comprises multimeter (M273D), push-button probe, cable set, kelvin-clips, hard case, rechargeable lithium battery, USB mains power pack, calibration certificate, and software license. | METRAHIT IM XTRA BT | M273S |
| Multimeter, milliohmmeter and isolation resistance tester (COIL Ready) with graphic display, Bluetooth, and software IZYTRONIQ Business Starter. R-ISO up to 1kV & mΩ @ 200 mA 2-wire & mΩ @ 200 mA 4-wire & mΩ @ 1 A 4-wire. Standard equipment comprises multimeter (M274B), push-button probe, cable set, each one Kelvin clip and Kelvin probe, hard case, rechargeable lithium battery, USB mains power pack, calibration certificate, and software license. | METRAHIT IM E-DRIVE BT | M274S |
| Multimeter and milliohmmeter with graphic display and IZYTRONIQ Business Starter software. 4-wire mΩ @ 200 mA and 1 A. The scope of delivery includes the DMM (M272B), 1 pair of Kelvin clips, cable set, hard case, rechargeable LiPo battery, USB mains power pack, calibration certificate and software license. | METRAHIT IM TECH BT | M272S |
| Expansion of scope of functions | | |
| METRAHIT IM Expert sequence functions: functions expansion to 16 test sequences with up to 63 test steps each | Expert sequence functions | Z270P |
| 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 diameter steel tips and 120 cm cable, 1000 V / CAT III | KS17-S | Z110H |
| Adapter cable 4 mm male to 6 mm female for the charging plug of hybrid and electric vehicles | AK-4M/6F | Z110L |
| Cable set including test probes, clamps and US test probes (1000 V CAT II / III 20 A) | KS-NTS | Z110W |
| Alligator clips (1 pair) for KS17-2 1000 V CAT III 16 A | KY95-3 | Z110J |
| Current clamp sensor, 10 mA ... 100 A, 1 mV/10 mA, clamp opening: 15 mm dia. | WZ12B | Z219B |
| Kelvin clips (1 set of 2 ea.) for 4-pole connection of low-resistance DUTs, cable length: 150 cm | KC4 | Z227A |
| Kelvin probes (1 set of 2 ea.) with double steel tips for 4-pole connection of low-resistance DUTs | KC27 | Z227B |
| Set including 1 Kelvin clip and 1 Kelvin probe, as well as 2 stainless steel tips for 4-wire measurement, 120 cm cable length with 4 mm angle plugs | KC&S | Z227C |
| Concentric Kelvin probes for the 4-wire measurement at measuring points which are difficult to access or close to each other; Cable length 100 cm, 300 V CAT II, 10 A, 4 mm safety plug (90° angle) | KCC | Z227O |
| Cable reel for 4-wire measurements at large objects (2-pole extension cable), cable length 100 meters | KCV100 | Z227E |
| Rechargeable lithium polymer battery, 14.8 Wh | M27x | Z270A |
| Rechargeable lithium polymer battery, 14.8 Wh | M27x | Z270G |
| Charger | M27x | Z270L |
| Coil adapter for interturn short circuit detection at inductivities from 10 μH to 50 mH | COIL Adapter 50mH | Z270F |
| Coil adapter for interturn short circuit detection at inductivities from 10 μH to 5 H | COIL Adapter XTRA | Z270M |
| Test probe set with alligator clips for COIL Adapter XTRA for the connection of the COIL Adapter XTRA to 3-phase machines; 1000 V CAT II / 16 A, 1000 V CAT III / 1 A, 600 V CAT IV / 1 A, cable length 1.3 m (without test probes and angle plug) | KSC-3L | Z110C |
| Push-button probe | Z270S | Z270S |
| AC/DC current clamp sensor, 5 mA ... 30 A, 100 mV/A | CP30 | Z201B |
| AC/DC current clamp sensor, 0.5 ... 30 A, 5 ... 300 A, 10 mV/A, 1 mV/A | CP330 | Z202B |
| AC/DC current clamp sensor, 0.5 ... 100 A, 5 ... 1000 A, 10 mV/A, 1 mV/A | CP1100 | Z203B |
| AC/DC current clamp sensor, 0.5 ... 125 A, 5 ... 1250 A, 10 mV/A, 1 mV/A | CP1800 | Z204A |
| Accessories for temperature measurement with resistance thermometer | | |
| Pt100 temperature sensor for surface and immersion 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 |
| Protection and transport accessories | | |
| Hard case with foam insert and compartments for 1 multimeter and 2 batteries, as well as 2 universal compartments for accessories. | HC40 | Z270K (black) Z270H (orange) |
| Magnetic holder and Velcro fastener (is attached to the rubber holster) | HIT-Clip | Z117A |
| Replacement fuses | | |
| Fuse F1 for current measuring ranges FF1 A/1000 V AC/DC (10 pcs.) | FF1 A/1000 V AC/DC | Z109O |
| Fuse F2 for milliohm measuring ranges FF0,315 A/1000 V AC/DC (10 pcs.) | FF0,315 A/1000 V AC/DC | Z109P |

- ¹ with plugged on safety caps
² without plugged on safety caps

For additional information regarding accessories please refer to:

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