GOSSEN METRAWATT

METRA HIT ONE

Analog-Digital Multimeter

- Resolution: 10 µV, 10 mΩ, 1 µA
- Precision temperature measurement
- Automatic and manual measuring range selection
- Measured value memory, data hold, min-max value
- Overload and blown fuse indicators
- IP 40 protection
- Protective rubber cover
- 3 year guarantee
- **METRAHit ONE Plus:** infrared interface enables multiple measuring system and PC analysis

Applied for
Quality Management System

DQS certified per
DIN EN ISO 900, reg. no.1262

Deutscher
Kalibrierdienst
DKD - K -
19701

DKD

DIN EN ISO/IEC 17025
Calibration Certificate
Upon Request

Features

Automatic Blocking Sockets (ABS) *

Automatic blocking sockets prevent incorrect connection of measurement cables and inadvertent selection of the wrong measured quantity. This significantly reduces danger to the user, the instrument and the system under test, and eliminates it entirely in many cases.

Automatic / Manual Measuring Range Selection

Measured quantities are selected with the rotary switch. The measuring range is automatically matched to measured values. The measuring range can be selected manually as well with the help of the AUTO/MAN key.

Display of Negative Values at the Analog Scale

Negative values are also displayed at the analog scale for zero-frequency quantities, allowing for observation of measured quantity fluctuation around the zero-point.

Storage of min-max values

In addition to displaying the current measured value, the minimum or maximum value can be continuously refreshed and saved.

Automatic Storage of Measured Values *

The data hold function allows for storage of the digitally displayed measured value. A patented process assures that random values are not saved to memory in the case of rapidly changing measured quantities, but rather the actual measured value. The stored measured value appears at the digital display. The analog display continues to read out the current measured value.

Continuity Test

Allows for the detection of short-circuits and interrupted conductors. In addition to displaying test results, an acoustic signal can also be generated if desired.

Power Saving Circuit

The device is switched off automatically if the measured value remains unchanged for a period of approximately 10 minutes, and if none of the controls are activated during this time. Automatic shutdown 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. The rubber material also assures that the instrument does not wander if it is set up on a vibrating surface.

Interface and METRAwin®10/METRAHit ® Software (optional)

The **METRAHit ONE Plus** multimeter is equipped with a serial IR interface, by means of which measured values, control settings and device type can be transmitted to a PC using a data frame. These values are transmitted in an electrically isolated fashion through the housing to a plug-in interface using infrared light.

* Patented

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Applicable Regulations and Standards

IEC 61010-1/EN 61010-1/ VDE 0411-1	Safety requirements for electrical equipment for measurement, control and laboratory use
EN 60529 VDE 0470, Part 1	Test instruments and test procedures Protection provided by enclosures (IP code)
IEC 61326/EN 61326	Electromagnetic compatibility (EMC)

Variants

Model / Type Article Number	METRAHit ONE M204B	METRAHit ONE M204C	METRAHit ONE Plus M204D
Cable set and battery	✔	✔	✔
Protective rubber cover		✔	✔
Infrared interface			✔

Characteristic Values

Measuring Function	Measuring Range	Resolution 3000	Input Impedance ===	Input Impedance ~	Intrinsic Error at Max. Resolution under Reference Conditions ±(... % rdg. + ... d) ===	Intrinsic Error at Max. Resolution under Reference Conditions ±(... % rdg. + ... d) ~	Overload Capacity [1] Value	Overload Capacity [1] Time	Measuring Function
V	30 mV	10 µV	>10 GΩ // < 40 pF	10 MΩ // < 40 pF	0.5 + 3	—	600 V DC AC eff sine	Cont.	**V**
	300 mV	100 µV	>10 GΩ // < 40 pF	10 MΩ // < 40 pF	0.5 + 3	—			
	3 V	1 mV	11 MΩ // < 40 pF	11 MΩ // < 40 pF	0.5 + 3	1 + 3			
	30 V	10 mV	10 MΩ // < 40 pF	10 MΩ // < 40 pF	0.5 + 3				
	300 V	100 mV	10 MΩ // < 40 pF	10 MΩ // < 40 pF	0.5 + 3				
	600 V	1 V	10 MΩ // < 40 pF	10 MΩ // < 40 pF	0.5 + 3				

Measuring Function	Measuring Range	Resolution 3000	Voltage drop at approx. range limit ===	Voltage drop at approx. range limit ~	Intrinsic Error ===	Intrinsic Error ~	Overload Capacity Value	Overload Capacity Time	Measuring Function
A	300 µA	100 nA	15 mV	—	1.0 + 5 (> 10 d)		0.36 A	Cont.	**A**
	3 mA	1 µA	150 mV	150 mV	1.0 + 2	1.5 + 2 (> 10 d)			
	30 mA	10 µA	650 mV	—	1.0 + 5 (> 10 d)	—			
	300 mA	100 µA	1 V	1 V	1.0 + 2	1.5 + 2 (> 10 d)			
	3 A	1 mA	100 mV	—	1.0 + 5 (> 10 d)	—	10 A [4]	Cont.	
	10 A	10 mA	270 mV	270 mV	1.0 + 2	1.5 + 2 (> 10 d)			

Measuring Function	Measuring Range	Resolution 3000	Open-circuit voltage	Measuring current at range limit	±(... % rdg. + ... d)	Overload Capacity Value	Overload Capacity Time	Measuring Function
Ω	30 Ω	10 mΩ	max. 3.2 V	max. 250 µA	0.7 + 3 [2]	600 V DC AC eff sine	max. 10 s	**Ω**
	300 Ω	100 mΩ	max. 3.2 V	max. 250 µA	0.7 + 3			
	3 kΩ	1 Ω	max. 1.25 V	max. 45 µA	0.7 + 3			
	30 kΩ	10 Ω	max. 1.25 V	max. 4.5 µA	0.7 + 3			
	300 kΩ	100 Ω	max. 1.25 V	max. 1.5 µA	0.7 + 3			
	3 MΩ	1 kΩ	max. 1.25 V	max. 150 nA	0.7 + 3			
	30 MΩ	10 kΩ	max. 1.25 V	max. 15 nA	2.0 + 3			
⊶⊢	2 V	1 mV	max. 3.2 V		0.5 + 3			⊶⊢

Measuring Function	Measuring Range		Resolution 3000			±(... % rdg. + ... d)	Overload Capacity Value	Overload Capacity Time	Measuring Function
°C	Pt100	−200.0 ... +200.0 °C	0.1 °C			2 K + 5 d [3]	600 V DC / AC eff sine	max. 10 s	**°C**
		+200.0 ... +850.0 °C				1.0 + 5 [3]			
	Pt1000	−100.0 ... +200.0 °C				2 K +2 d [3]			
		+200.0 ... +850.0 °C				1.0 + 2 [3]			

[1] At 0 to + 40 °C
[2] With zero balancing, or + 35 digits without zero balancing
[3] Without sensor
4) 12 A for 5 min, 16 A for 30 s
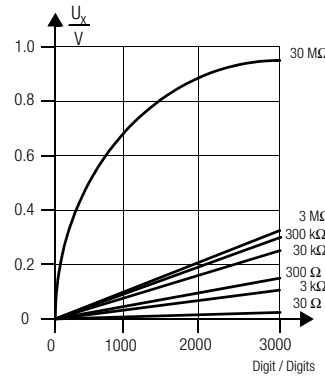
Key

rdg. = reading (measured value)
d = digit

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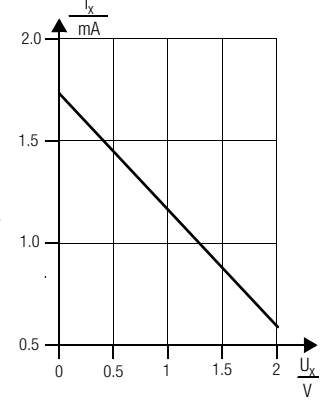
Influencing Quantities and Influence Error

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range	Influence Error [1] ±(... % rdg. + ... digits)
Temperature	0 °C ... +21 °C and +25 °C ... +40 °C	30/300 mV ⎓	1.0 + 3
		3 ... 300 V ⎓	0.15 + 1
		600 V ⎓	0.2 + 1
		V ∼	0.4 + 2
		300 µA ... 300 mA ⎓	0.5 + 1
		3 A/10 A ⎓	0.5 + 1
		A ∼	0.75 + 1
		30 Ω [2]	0.15 + 2
		300 Ω	0.25 + 2
		3 kΩ ... 3 MΩ	0.15 + 1
		30 MΩ	1.0 + 1
		− 200 ... + 200 °C	0.5 K + 2
		+ 200 ... + 850 °C	0.5 + 2
Measured Quantity Frequency	> 65 Hz ... 400 Hz	3 ... 600 V ∼	2.0 + 3
	> 400 Hz ... 1 kHz		2.0 + 3
	> 65 Hz ... 1 kHz	A ∼	2.0 + 3

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range	Influence Error
Battery Voltage	⊣⊢ [3] ... < 7.9 V > 8.1 V ... 10.0 V	V ⎓	± 2 digits
		V ∼	± 4 digits
		A ⎓	± 4 digits
		A ∼	± 6 digits
		30 Ω / 300 Ω / °C	± 4 digits
		3 kΩ ... 30 MΩ	± 3 digits
Relative Humidity	75% / 3 days / instrument off	V ≃ A ≃ Ω °C	1 x intrinsic error
DATA	—		± 1 digit
MIN / MAX	—	V ≃ , A ≃	± 2 digits

1) For temperature: specified error valid starting with temperature changes as of 10 K. For frequency: specified error valid starting with display values as of 300 digits.
2) With zero balancing
3) After the ⊣⊢ symbol appears at the display

Influencing Quantity	Sphere of Influence	Measuring Ranges	Damping
Common Mode Interference Voltage	Interference quantity max. 600 V ∼	V ⎓	> 120 dB
	Interference quantity max. 600 V ∼ 50 Hz, 60 Hz sine	3 V ∼, 30 V ∼	> 80 dB
		300 V ∼	> 70 dB
		600 V ∼	> 60 dB
Series Mode Interference Voltage	Interference quantity: V ∼, respective nominal value of the measuring range, max. 600 V ∼ , 50 Hz, 60 Hz sine	V ⎓	> 50 dB
	Interference quantity max. 600 V —	V ∼	> 110 dB

Response Time (after manual range selection)

Measured Quantity / Measuring Range	Response Time		Measured Quantity Step Function
	Analog Display	Digital Display	
V ⎓, V ∼, A ⎓, A ∼	0.7 s	1.5 s	from 0 to 80% of the upper range limit
30 Ω ... 3 MΩ	1.5 s	2 s	from ∞ to 50% of the upper range limit
30 MΩ	4 s	5 s	
⊶	0.7 s	1.5 s	
°C		max. 1 ... 3 s	from 0 to 50% of the upper range limit

Measuring Voltage for Resistance Measurement

Voltage U_x at resistance R_x to be measured relative to the measuring range and the display

Measuring Current for Diode and Continuity Testing

Measuring current I_x relative to displayed voltage value U_x at the device under test

Reference Conditions

Ambient temperature	+ 23 °C ± 2 K
Relative humidity	40 ... 60%
Measured quantity frequency	45 ... 65 Hz
Measured quantity waveshape	Sinusoidal
Battery voltage	8 V ± 0.1 V

Display

LCD panel (65 mm x 30 mm) with analog and digital display including unit of measure, type of current and various special functions

Analog:

Display	LCD scale with pointer
Scale length	55 mm for V ⎓ and A ⎓, 47 mm in all other ranges
Scaling	∓ 5 ... 0 ... ± 30 with 35 scale divisions for ⎓, 0 ... 30 with 30 scale divisions in all other ranges
Polarity display	With automatic switching
Overflow display	Triangle (13)
Measuring rate	20 measurements per second, 10 measurements per second for Ω

Digital:

Display / char. height	7-segment characters / 15 mm
Number of places	3¾-place ≙, 3100 steps
Overflow display	„0.L" appears
Polarity display	"−" sign is displayed if plus pole is connected to ⊥
Measuring rate	2 measurements per second, 1 measurement per second for Ω and °C

Power Supply

Battery	9 V flat-cell battery, zinc carbon per IEC6F22, alkaline manganese per IECLR6 or equivalent rechargeable NiCd battery
Service life	With alkaline manganese: approx. 750 hours for V ⎓ , A ⎓ approx. 200 hours for V ∼ , A ∼ Times 0.7 for interface operation

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Battery test	⊣ is displayed automatically if battery voltage drops to below approximately 7 V.

Electrical Safety

Safety class	II per IEC 61010-1/EN 61010-1/VDE 0411-1
Overvoltage category	CAT III
Nominal voltage	600 V
Fouling factor	2
Test voltage	5.2 kV~ per IEC 61010-1/EN 61010-1

Electromagnetic Compatibility (EMC)

Interference emission	EN 61326: 2002 class B
Interference immunity	EN 61326: 2002
	IEC 61000-4-2: 1995/A1: 1998
	Feature A: 8 kV atmospheric discharge
	4 kV contact discharge
	IEC 61000-4-3: 1995/A1: 1998
	Feature B: 3 V/m

Fuses

Fuse links for all ranges

up to 300 mA	FF(UR) 1.6 A/700 V, 6.3 mm x 32 mm, switching capacity: 50 kA at 700 V~ with ohmic load, protects all current measuring ranges up to 300 mA in combination with power diodes

Fuse links for all

ranges up to 10 A	FF(UR) 16 A/600 V, 10 mm x 38 mm, switching capacity: 100 kA at 600 V with ohmic load, protects 3 A and 10 A ranges to 600 V

Interface

Type	RS 232C, serial
Data transmission	Optical via infrared light through the housing
Baud rate	8192 bits per second

Ambient Conditions

Accuracy range	0 ... + 40 °C
Operating temp.	–10 ... + 50 °C
Storage temperature	– 25 ... + 70 °C without batteries
Relative humidity	45 ... 75%, no condensation allowed
Elevation	to 2000 m

Mechanical Design

Protection	IP 40, IP 20 at the connector jacks per DIN VDE 0470, part 1 / EN 60529
Dimensions	84 mm x 195 mm x 35 mm
Weight	Approx. 350 gr. with battery

Standard Equipment

- 1 digital multimeter
- 1 9 V flat-cell battery
- 1 set measurement cables
- 1 abbreviated operating instructions

Order Information

Description	Type	Article Number
Analog-digital multimeter	**METRA**Hit ONE	M204B
same as M204B plus protective rubber cover	**METRA**Hit ONE	M204C
same as M204C plus IR interface	**METRA**Hit ONE Plus	M204D
Accessories		
Power pack, 230 V~/4.5 V, 600 mA	NA4/500	Z218A
Pt100 temperature sensor for surface and immersion measurements, –40 ... +600 °C	Z3409	GTZ 3409 000 R0001
Pt1000 temperature sensor, –20 ... +220 °C for measurement in household appliances, as well as in gases and liquids, 3.2 mm diameter stainless steel immersion tube	TF220	Z102A
Clip-on current transformer, 15 A ... 180 A, 1000:1	WZ12A	Z219A
Clip-on current sensor	Z13B	Z213B
Carrying pouch	F829	GTZ 3301 000 R0003
Imitation leather carrying pouch for one METRA*Hit*® and accessories	F836	GTZ 3302 000 R0001
Imitation leather carrying pouch for two METRA*Hit*®, adapter and accessories	F840	GTZ 3302 001 R0001
Hard case for 1 METRA*Hit*® and accessories	HC20	Z113A
Hard case for two METRA*Hit*®, adapter and accessories	HC30	Z113A
Single-channel memory pack consisting of SI232-II, cable, METRAwin®10/METRA*Hit*® software and installation instructions	1-CH.Pack	GTZ 3231 020 R0001
Memory adapter	SI232-II	GTZ 3242 020 R0001
Single-channel pack including cable and METRAwin®10/METRA*Hit*® software with installation instructions	Z3231	GTZ 3231 000 R0001
RS 232 interface cable, 2 m (included with Z3231)	Z3241	GTZ 3241 000 R0001
METRAwin®10/METRA*Hit*® software update and installation instructions	Z3240	GTZ 3240 000 R0001
Fuses (pack of 10)	FF(UR) 1.6 A / 700 V	Z109E
Fuses (pack of 10)	FF(UR) 16 A / 600 V	Z109D

Please refer to our Measuring Instruments and Testers catalog for additional information concerning accessories.