GOSSEN METRAWATT

METRA**HIT** | 27M and METRA**HIT** | 27I
Milliohm Resistance Meter and Digital Multimeter, Insulation Tester and Data Logger

3-349-206-03
6/10.08

- The **METRA HIT 27M** is a compact milliohm resistance meter plus multimeter and thermometer for the measurement of low-value contact resistance on aircraft outer skins (lightning protection, wick test), and for general low-resistance measurements.
- The **METRA HIT 27I** is used additionally for service and repair work performed on airplane and helicopter electrical systems (voltage, insulation, milliohm and temperature measurement).
  In addition to its own multimeter functions for electrical quantities, the instrument also includes a mega-ohm measuring function with insulation test voltages of 50, 100, 250 and 500 V, as well as temperature measurement with Pt100 and Pt1000 sensors.

Quality Management System
DQS Certified per
DIN EN ISO 9001 reg. no. 1262

Deutscher Kalibrierdienst DKD - K - 19701
Calibration Certificate
DIN EN ISO/IEC 17025
DKD



METRA HIT 27M Features

- **All-in-one:**
  Milliohm resistance meter, multimeter, insulation tester * and data logger
  Compact and rugged for service under harsh conditions and laboratory use, a single device for many applications
- **Kelvin connection (4-wire measurement)**
  Suppresses influence from conductor and contact resistances on measuring results
- **Measuring current can be selected according to the measuring task:**
  Adaptation to various resistance measuring requirements and optimized battery service life
- **DATA Hold**
  For quick, reliable measurement and storage of individual measured values, e.g. voltages at discrete cells in batteries and emergency power supplies
- **Overload protection**
  Protects the instrument in the event of inadvertent connection to mains power
- **DKD calibration certificate as standard feature**
  Reduced operating costs for use within ISO 9000 quality systems, documented traceability
- **Operation with storage batteries**
  3 NiMH storage batteries are included as a standard feature.

* With METRA HIT 27I only

METRA HIT 27I Features

Includes all METRA HIT 27M functions plus:

- **Insulation resistance tester ***
  Testing with 50 to 500 V for components, cables and conductors, for example in aircraft and in on-board electrical systems
- **LCD panel with background illumination ***
  High contrast, even under adverse ambient light conditions
- **Compact and multifunctional**
  Can be used advantageously in aircraft cockpits as well as in other constricted spaces, which would otherwise require the use of several individual instruments.
- **Mains power or storage battery operation**
  Furnished with 3 NiMH storage batteries and a mains power battery charger as standard equipment for optimized instrument availability and low operating costs
- **DKD calibration certificate as standard feature**
  Reduced operating costs for use within ISO 9000 quality systems, documented traceability

Special version for use in explosive atmospheres: METRA HIT | 27EX, see separate datasheet.

METRAHIT 27M and METRAHIT 27I
Milliohm Resistance Meter and Digital Multimeter, Insulation Tester and Data Logger

Applications

The METRA HIT 27 is a compact, rugged and reliable instrument, which is equally suitable for precision measuring and recording tasks in the factory, for on-site service and in the laboratory:

- Adjustment of shunts in instrumentation
- Testing of electrical connections at conductor bars for open-pit mining, in potential bonding systems, and for industrial and household applications
- Testing of cable resistance, wiring, shunt resistors in PCBs and thick-film circuits
- Measurement of contact resistance in relays, contactors and power interrupters
- Testing of resistance in fuses, as well as conductor resistance in heavy current circuits
- Testing of winding resistance in transformers, coils, small motors etc.
- Testing of discharge resistance on aircraft, and at aircraft outer skin components
- Contact resistance testing in uninterruptible power supplies
- Measurement of cell voltages, for example in on-board batteries and emergency power supplies
- Contact resistance testing at welding seams

General

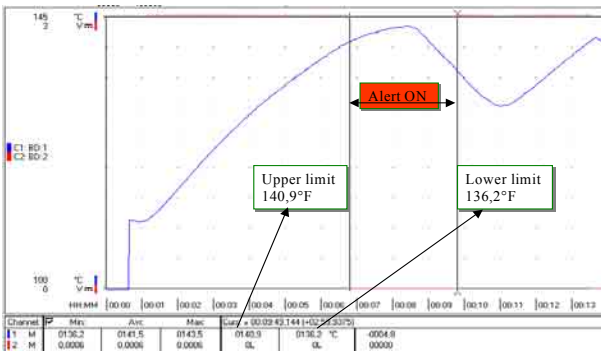
The METRA HIT 27 milliohm resistance meters are the modern alternative for the well known TH2 (Thomson) and Wh2 (Wheatstone) measuring bridges. They provide an expanded measuring range, greater accuracy and easier reading. As universal measuring and test instruments, they acquire and record values to an integrated memory module including resistance in the milliohm and micro-ohm ranges, as well as “normal multimeter resistance values” in the ohm to mega-ohm ranges by feeding a measuring current to the resistor, conductor or contact under test. The respective measuring current is determined by the rotary selector switch setting and lies within a range of 1 to 0.02 A in the milliohm ranges. The instrument also measures and records insulation resistance (METRA HIT 27I only) with test voltage selectable in steps, for example in order to test resistance in on-board electrical systems for aircraft, ocean going vessels etc., and for testing overvoltage arresters and much more.

Easy Operation

Operation is very easy. Simply connect the low-resistance device under test to the instrument with the included measurement cables, Kelvin clips or 4-pole probes (KC27), and select the ideal measuring range.

Integrated Measured Value Memory and Interface

Each METRA HIT 27 is equipped with a measured value memory module and can thus be utilized as a data logger or a recording instrument for all measuring functions. Measurement results can be transmitted to a PC either off-line via the optical interface which is furnished as standard equipment, or online with an optional bidirectional adapter. In this way, for example, characteristic voltage and temperature curves (see figure below) can be displayed and analyzed in line recorder format relative to real-time, or individual measured values, e.g. voltages for each of the cells in a storage battery, can be saved with the DATA Hold function and analyzed at a PC in tabular form.



METRAwin®10/METRA HIT (software option):
Recorded characteristic temperature curve and triggering characteristics (2-channel recording with 2 METRA HIT instruments) plus evaluation at a PC

METRAwin®10/METRA HIT Software Option

Measurement data recorded to the measured value memory module can be evaluated at a PC if required with the help of the IR interface supplied as standard equipment and a bidirectional IR adapter (BD adapter) with conversion to the RS 232 protocol.
METRAwin®10/METRA HIT software (see above figure) is recommended to this end, and is suitable for display, analysis and documentation of measurement results using Windows® 98, NT, 2000 or XP. The software is available as an accessory. User-friendly complete packages (e.g. the BD Pack or the complete METRA HIT 27AS case) are easy to connect and install and include everything required for high performance measurement data processing.

Offset Balancing

Automatic offset balancing is provided for the lower measuring ranges. Manual offset balancing, as required with the METRA HIT 17 predecessor model, is thus no longer necessary.

Protection Against Operator Error

The METRA HIT 27 is safeguarded against erroneous short-term connection to devices under test with fault voltages of up to 600 V by means of protective devices.

Test Functions and Automatic Functions

All METRA HIT 27 instruments are equipped with diode and continuity test functions, as well as automatic and manual measuring range selection and battery shutdown.

Protective Cover for Harsh Conditions

The device features a very compact, rugged design. Beyond this, it 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.

Applicable Regulations and Standards

IEC/EN 61010-1:2001 **VDE 0411-1:2002**	Safety requirements for electrical equipment for measurement, control and laboratory use
EN 60529 **VDE 0470, Part 1**	Test instruments and test procedures Protecti on provided by enclosures (IP code)
DIN EN 61326 **VDE 0843 Part 20**	Electrical equipment for measurement, control and laboratory use – EMC requirements

Milliohm Resistance Meter and Digital Multimeter, Insulation Tester and Data Logger

Characteristic Values

Measuring Function	Measuring Range	Resolution at Upper Range Limit	Input Impedance		Intrinsic Error at Max. Resolution under Reference Conditions ±(... % rdg. + ... d)		Overload Capacity [3]	
		4¾ 30000 / 3¾ 3000 [1]	DC	AC [6]	DC	AC [6]	Value	Time
V	3 V	100 µV	2.1 MΩ	2.1 MΩ // < 50 pF	0.1 + 10 [4]	0.2 + 10 (>500 d)	600 V DC AC eff sine	Cont.
	30 V	1 mV	2.1 MΩ	2.1 MΩ // < 50 pF	0.1 + 5	0.2 + 10 (>500 d)		
	300 V	10 mV	2.1 MΩ	2.1 MΩ // < 50 pF	0.1 + 5	0.2 + 10 (>500 d)		
	600 V	100 mV	2.1 MΩ	2.1 MΩ // < 50 pF	0.1 + 5	0.2 + 10 (>500 d)		
			Open-Circuit Voltage	Measuring Current, Approx.	±(... % rdg. + ... d)			
mΩ @1A (4 L)	3 mΩ	0.001 mΩ	3.5 … 4 V	1 A [7]	1 + 10		±0.6 V [11]	Cont.
	30 mΩ	0.001 mΩ	3.5 … 4 V	1 A [7]	0.5 + 10			
	300 mΩ	0.01 mΩ	3.5 … 4 V	1 A [7]	0.5 + 10			
mΩ (4 L)	30 mΩ	0.01 mΩ	3.5 … 4 V	200 mA	0.25 + 10		±0.6 V [11] [4]	Cont.
	300 mΩ	0.01 mΩ	3.5 … 4 V	200 mA				
	3 Ω	0.1 mΩ	3.5 … 4 V	20 mA				
	30 Ω	1 mΩ	3.5 … 4 V	20 mA				
Ω (2 L)	300 Ω	10 mΩ	3.5 … 4 V	1 mA	0.1 + 10 [4]		600 V DC AC eff sine	max. 10 s
	3 kΩ	100 mΩ	3.5 … 4 V	100 µA	0.1 + 5 [4]			
	30 kΩ	1 Ω	3.5 … 4 V	20 µA	0.1 + 5			
	300 kΩ	10 Ω	3.5 … 4 V	20 µA	0.1 + 5			
	3 MΩ	100 Ω	3.5 … 4 V	10 µA	0.1 + 5			
	30 MΩ	1 kΩ	3.5 … 4 V	10 µA	1.5 + 10			
🔊	300 Ω	0.1 Ω	3 V	1 mA	1 + 5			
→|←	3 V	0.1 mV	3 V	1 mA	1 + 5			
			Test Voltage	Measuring Current				
MΩ @ ... V	30 MΩ	0.01 MΩ	50/100/250/500 V	< 1.5 mA	2 + 10		600 V DC/AC	max. 10 s
	300 MΩ	0.1 MΩ	50/100/250/500 V		2 + 10			
	3000MΩ [10]	1 MΩ	50/100/250/500 V		3 + 10			
			f_{min} [2]		±(... % rdg. + ... d)			
Hz	300 Hz	0.01 Hz	1 Hz		0.05 + 5 [5]		600 V AC	Cont.
	3 kHz	0.1 Hz						

	Temperature Sensor	Measuring Range	Resolution	Intrinsic Error at Max. Resolution under Reference Conditions ±(...% rdg. + ... d) [8]		
°C / °F	Pt 100 [9]	−200.0 … +100.0 °C	0.1 °K	1 K + 5	600 V DC AC eff sine	max. 10 s
		+100.0 … +600.0 °C		0.5 + 5		
	Pt 1000	−200.0 … +100.0 °C		1 K + 5		
		+100.0 … +600.0 °C		0.5 + 5		
	Ni 100	−60.0 … +180.0 °C		0.5 + 5		
	Ni 1000	−60.0 … +180.0 °C		0.5 + 5		

[1] Display: 3¾ places in following ranges: 3 mΩ @ 1A, 30 mΩ, 🔊, MΩ@...V, a different sampling rate can also be selected in the rAtE menu for saving and transmitting measured values.

[2] Lowest measurable frequency for sinusoidal measuring signals symmetrical to the zero point

[3] At 0° to + 40° C

[4] ZERO is displayed for "zero balancing" function.

[5] Range 3 V~: U_E = 0.15 $V_{eff/rms}$ . . . 3 $V_{eff/rms}$
30 V~: U_E = 1.5 $V_{eff/rms}$ . . . 30 $V_{eff/rms}$
300 V~: U_E = 15 $V_{eff/rms}$ . . . 300 $V_{eff/rms}$
600 V~: U_E = 300 $V_{eff/rms}$ . . . 600 $V_{eff/rms}$
For voltages > 100 V: power limiting of $1.8 \cdot 10^6$ V · Hz

[6] 20 … 45 … 65 Hz … 1 kHz sine, see influences on page 4.

[7] Pulsating measuring current with interval of T = 1 s

[8] Plus sensor deviation

[9] Temperature value is based upon the characteristic curve per EN 60751.

[10] In the case of high resistance values of greater than 300 MΩ, the capacitive influence of the person performing the measurement or the measurement cable may distort the measured value. Use short or shielded measurement cables for this reason.

[11] In the event of an overcharge, the integrated FF 1.6 A/1000 V fuse blows.

Key

rdg. = reading (measured value), R = measuring range, d = digit(s),
2/4 L = 2/4-wire measurement

Milliohm Resistance Meter and Digital Multimeter, Insulation Tester and Data Logger

Influencing Quantities and Influence Error

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range [1]	Influence Error ± (... % rdg. + d) / 10 K
Temperature	0 … +21 °C and +25… +40 °C	V DC	0.1 + 5
		V AC	0.5 + 5
		mΩ @ 1 A 4L	1 + 5
		mΩ @ 200 mA 4L	1 + 5
		300 Ω … 300 kΩ 2L	0.2 + 5
		3 MΩ 2L	0.5 + 5
		30 MΩ 2L	1 + 5
		Insulation, 30 MΩ … 3 GΩ	2 + 5
		Hz	0.1 + 5
		°C (RTD)	0.5 + 10

) With zero balancing

Influencing Quantity	Frequency	Measured Quantity / Measuring Range	Influence Error [1] ± (... % rdg. + d)
Frequency V_{AC}	> 20 Hz ... 45 Hz	3 V to 600.0 V	2 + 10
	> 65 Hz ... 1 kHz		

[1] Specified error valid as of display values of 10% of the measuring range

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range [1]	Influence Error
Relative Humidity	75% 3 days instrument off	all measured quantities	1 x intrinsic error

[1] With zero balancing

Influencing Quantity	Sphere of Influence	Measuring Range	Damping ±dB
Common Mode Interference Voltage	Interference quantity max. 600 V ~	V DC	> 90 dB
	Interference quantity max. 600 V ~ 50 Hz, 60 Hz sine	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 =	> 60 dB
	Interference quantity: max. 600 V DC	V ~	> 60 dB

Real-Time Clock

Accuracy ±1 minute per month

Temperature Influence 50 ppm/K

Reference Conditions

Ambient temperature +23 °C±2 K

Relative humidity, 40 ... 60%

Measured quantity frequency 45 ... 65 Hz

Measured quantity wave shape Sinusoidal, deviation between RMS and rectified value < 0.1%

Storage battery voltage 3.6 V ± 0.2 V

Response Time (after manual range selection)

Measured Quantity / Measuring Range	Response Time for Digital Display	Measured Quantity Step Function
V DC, V AC	1.5 s	from 0 to 80% of upper range limit value
mΩ @ 1 A 4L	2 s	from ∞ to 50% of upper range limit value
mΩ	1.5 s	
300 Ω ... 3 MΩ	2 s	
3 GΩ *	5 s	
Continuity	< 50 ms	
→|←	1.5 s	
°C Pt100	max. 3 s	
>10 Hz	1.5 s	from 0 to 50% of upper range limit value

* Without parallel connected capacitance

Display

LCD panel (65 mm x 30 mm) with display of up to 3 measured values, unit of measure, type of current and various special functions.

Display / char. height 7-segment characters
Main display: 12 mm
Auxiliary displays: 7 mm

Number of places 4¾ places, ≙ 30999 steps

Overflow display "**OL**" appears

Polarity display "–" sign is displayed if plus pole is connected to ⊥

LCD Test All display segments available during operation of the METRA HIT 27 are activated after the instrument is switched on.

Background illumination METRA HIT 27I only

Power Supply

Storage batteries 3 ea. 1.2 V/2100 mAh NiMH (AA size)

Service life with 2100 mAh NiMH storage battery set

Measuring Function	Current [mA] / 3.6 V	Operating Hours [h]
V, Hz, Ω, →|←, °C	70	30
mΩ @ 1A	700	3
mΩ @ 200mA	260	8
mΩ @ 20mA	85	24
MΩ @ ... V / 1 MΩ	100	21
Standby (MEM + clock)	0.15	approx. 1 year

Additional consumption for:

Interface operation: 0.5 mA

LCD illumination: 25 mA at 3.6 V. If voltage drops below 2.7 V, the instrument is switched off automatically.

Storage battery test ⊣ is displayed automatically if storage battery voltage drops to below approx. 3.3 V

Storage battery charging with NA HIT 2x (Z218H) mains power battery charger (2100 mAh storage battery set: recharging time 20 hours)
or
with external NiMH quick charger Z206D: recharging time approx. 2 hours

Milliohm Resistance Meter and Digital Multimeter, Insulation Tester and Data Logger

Fuses

Fuse links for all mΩ measuring ranges	FF (UR) 1.6 A/1000 V AC/DC, 6.3 mm x 32 mm, 10 kA switching capacity at 1000 V AC /DC and ohmic load
Acoustic Signal	For display > 610 V in 600 V range (intermittent tone, 250 ms on/off)

Electrical Safety

Safety class	II per IEC/EN 61010-1:2001 /VDE 0411-1:2002
Measurement category	II
Operating voltage	600 V
Fouling factor	2
Test voltage	3.5 kV~ per IEC/EN 61010-1:2001/ VDE 0411-1:2002

Electromagnetic Compatibility (EMC)

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

Data Interface

With BD232 interface adapter as accessory:

Data transmission	Optical via infrared light through the housing
Type	RS 232 C, serial, per DIN 19241
Bidirectional baud rate (read and write)	SI232-II: all baud rates BD232: 9600 baud

Ambient Conditions

Accuracy range	0 °C ... +40 °C
Operating temp.	–10 °C ... +50 °C
Storage temperature	–25 °C ... +70 °C (w/o storage batteries)
Relative humidity	40% ... 60%, no condensation allowed
Elevation	to 2000 m
Deployment	Indoors only, except within specified ambient conditions

Mechanical Design

Protection	Housing: IP 54, connector jacks: IP 20

Extract from table on the meaning of IP codes

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

Dimensions	84 mm x 195 mm x 35 mm
Weight	approx. 420 gr. with storage batteries (without GH18 protective rubber cover)

Standard Equipment

METRA HIT 27M including

1 GH18 protective rubber cover with carrying strap
3 size AA NiMH storage batteries
1 KS17S measurement cable set
1 abbreviated operating instructions
1 operating instructions
1 DKD calibration certificate

METRA HIT 27I including

1 GH18 protective rubber cover with carrying strap
3 size AA NiMH storage batteries
1 NA HIT 2x mains power battery charger
1 KS17S measurement cable set
1 set of Kelvin clips KC4 (1 set = 2 each)
1 abbreviated operating instructions
1 operating instructions
1 DKD calibration certificate

METRA HIT 27AS (avionics set) consisting of

1 METRA HIT 27I
1 GH18 protective rubber cover with carrying strap
3 size AA NiMH storage batteries
1 NA HIT 2x mains power battery charger
1 KS17S measurement cable set
1 set of Kelvin clips KC4 (1 set = 2 each)
1 set of Kelvin probes KC27 (1 set = 2 each)
1 HC30 hard case
1 abbreviated operating instructions
1 operating instructions
1 adapter USB-HIT including USB cable and METRAwin®10/ METRA HIT software on CD-ROM
1 software METRAwin®90-2 on CD-ROM
1 DKD calibration certificate

Accessories

Mains power battery charger with broad range input
NA HIT 2x: AC 90 ... 250 V DC 5 V





NiMH quick charger Z206D

Microprocessor-controlled quick charging unit for 1 to 4 NiMH or NiCd storage batteries, AA or AAA type (micro and/or mignon) with a 100 ... 240 V AC power supply unit and 10 ... 15 V DC motor vehicle charging cable.

Milliohm Resistance Meter and Digital Multimeter, Insulation Tester and Data Logger

Accessories

(See also table "Order Information" below)

The following accessories, some of which are included as standard equipment, are recommended for use with the METRA HIT 27:

Milliohm Measurement with Type KC4 Kelvin Clips

Kelvin clips are suitable for establishing contact between the METRA HIT 27 and low-resistance devices under test. They compensate for influence resulting from cable and contact resistance. The KC4 set includes two clips with insulated, twist-resistant jaws and good clamping action. They can be used for establishing contact with very fine wires, up to rails and rods with a maximum diameter of 15 mm. 4-pole connection is highly advisable for the measurement of values of less than 30 Ω.



Milliohm Measurement with Type KC27 Kelvin Probe

Same usage as KC4, but with two 2 spring loaded steel tips for piercing insulation coatings (e.g. on the outer skin of aircraft) and oxide layers (e.g. at oxidized battery contacts), in order to assure good contact for milliohm measurements, as well as for current and voltage measurements.

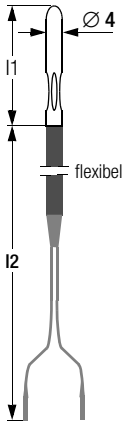


Extension Cable VL15



Temperature Measurement with TF220 / Current Measurement with Z13B

The TF220 is just one of many temperature sensors which can be selected from a wide ranging product spectrum. For further information regarding temperature and current sensors, as well as other accessories, please refer to our "*Measuring Instruments and Testers*" catalog or visit www.gossen-metrawatt.com



TF220



Z13B

Ever-Ready Cases and Hard Cases

The following hard-shell cases are available:

HC20 with space for one METRA HIT and accessories.

HC30 with space for 2 METRA HIT instruments, one 2-channel PC recording system with software, adapter, cable and accessories.

F836 imitation leather carrying pouch for one METRA HIT and accessories (dimensions: 175 x 210 x 75 mm)

F840 imitation leather carrying pouch for two METRA HIT instruments, 2 adapters and accessories (dimensions: 305 x 285 x 70 mm)

HC20





HC30



F836



F840 (with sample contents)

Milliohm Resistance Meter and Digital Multimeter, Insulation Tester and Data Logger

Cordura belt pouch HitBag

for multimeters of the METRA HIT and METRAport series



Avionics Set METRA HIT 27AS



Recording System with BD Pack

This option includes all additionally required hardware and software components for creating a PC supported measuring and recording system together with the METRA HIT 27. A full version of METRAwin®10/METRA HIT is included with this package, which can be run with Windows 95, 98, 2000, NT or XP (see figure on page 2).



USB-HIT Interface Adapter

Regarding its functions, this adapter conforms to the BD232 interface adapter, except that the bidirectional transmission takes place between the IR and USB interface.

It is not possible to establish a multi-channel system with this adapter.



Order Information

Description	Type	Article Number
Milliohm resistance meter and multimeter with memory	METRA HIT 27M	M227A
Insulation tester, milliohm resistance meter and multimeter with memory	METRA HIT 27I	M227B
Avionics set: insulation tester, milliohm resistance meter and multimeter with memory, adapter, software and extensive accessories	METRA HIT 27AS	M227C
Hardware Accessories		
Mains power battery charger AC 90...250 V DC 5 V	NA HIT 2x	Z218H
NiMH quick charger w/o storage batteries	Z206D	Z206D
Fuses for all mΩ measuring ranges	FF (UR) 1.6 A/ 1000 V AC/DC	Z109C
Kelvin clips (1 set = 2 each) for 4-pole connection of low-resistance DUTs, cable length: 120 cm	KC4	Z227A
Kelvin probes (1 set=2 each) with double steel tips for 4-pole connection of low resistance DUTs	KC27	Z227B
Cable set with 2 mm diameter steel tips and 120 cm cable, 1000 V / CAT III	KS17S	Z110H
Extension cable 1.5 square mm, max. 5 A / 33 V, 15 m long, on reel, for METRA HIT 27, 28C, 30M	VL15	Z110I
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
Transport Accessories		
Imitation leather carrying pouch for METRA HIT	F829	GTZ 3301000R0003
Cordura belt pouch for multimeters of the METRA HIT series	HitBag	Z115A
Imitation leather ever-ready case with cable compartment	F836	GTZ 3302000R0001
Ever-ready case for 2 METRA HITs, 2 adapters and accessories	F840	GTZ 3302001R0001
Hard case for one METRA HIT and accessories	HC20	Z113A
Hard case for two METRA HITs and accessories	HC30	Z113B
Accessories for Operation with PCs		
Single-channel pack consisting of BD232 bidirectional interface adapter, cable, METRAwin®10/METRA HIT software and installation instructions	BD-Pack 1	Z215A
Bidirectional interface adapter	BD232	GTZ 3242100R0001
RS232 interface cable, 2 m long (included with Z3231)	Z3241	GTZ 3241000R0001
METRAwin®10/METRA HIT software update and installation instructions	Z3240	GTZ 3240000R0001
Bidirectional interface adapter IR/USB for METRA HITs	USB-HIT	Z216A

- *For further information concerning accessories please refer to*
- *our Measuring Instruments and Testers catalog*
- *our website www.gossenmetrawatt.com*

Milliohm Resistance Meter and Digital Multimeter, Insulation Tester and Data Logger

Current Measuring Accessories All current sensors and transformers are equipped with a connector cable (1.2 to 1.5 m long) with 4 mm safety banana plugs									suitable for METRA HIT
Type	**Designation**	**Measuring Range**	**Meas. Category**	**Max. Wire Dia.**	**Transformation Ratio**	**Frequency Range**	**Intrinsic Error ±(% rdg. + ...)**	**Article Number**	**27M/I**
AC/DC Current Sensors with Voltage Output									
Z201A	Clip-on current sensor with battery mode (30 h)	0.01 ... 20 A~/30 A–	300 V / CAT III	19 mm	100 mV / A	DC ... 400 Hz ... 20 kHz	1% + 0.002 A	Z201A	●
Z202A	Clip-on current sensor with 2 measuring ranges, battery mode (50 h)	0.1 ... 20 A~/30 A–, 1 ... 200 A~/300 A–	300 V / CAT III	19 mm	10 mV / A, 1 mV / A	DC ... 2 kHz ... 10 kHz	1% + 0.03 A, 1% + 0.3 A	Z202A	●
Z203A	Clip-on current sensor with 2 measuring ranges, battery mode (50 h)	1 ... 200 A~/300 A–, 1 ... 1000 A~/A–	300 V / CAT III	31 mm	1 mV / A	DC ...10 kHz	1% +0.5 A	Z203A	●
Z13B	Clip-on current sensor with 2 measuring ranges, battery mode (50 h)	0.2 ... 40 A~/60 A–, 0.5 ... 400 A~/600A–	300 V / CAT IV	50 mm	10 mV / A, 1 mV / A	DC ... 65 Hz ... 10 kHz	1.5% + 0.5 A 2.5%	Z13B	●
AC Current Sensors with Voltage Output									
WZ12B	Clip-on current sensor	10 mA~ ... 100 A~	300 V / CAT III	15 mm	0.1 mV / mA	45 ... 65 ... 500 Hz	1.5% +0.1 mA	Z219B	●
WZ12C	Clip-on current sensor with 2 measuring ranges	1 mA~ ... 15 A~, 1 ... 150 A~	300 V / CAT III	15 mm	1 mV / mA, 1 mV / A	45 ... 65 ... 400 Hz	3% + 0.15 mA, 2% + 0.1 A	Z219C	●
WZ11B	Clip-on current 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... 48... 65 ... 500 Hz	1 ... 3%	Z208B	●
Z3512A	Clip-on current sensor with 4 measuring ranges	1 mA ... 1/10 A~ 100/1000 A~	600 V / CAT III	52 mm	1 V/A, 100 mV/A, 10 mV/A, 1 mV/A	10... 48... 65 ... 3 kHz	0.5 ... 3%, 0.2 ... 1%	Z225A	●

● Without restriction

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