

METRA HIT | 22 ... 26S/M

Analog-Digital Multimeters with Signal Generator

3-349-026-03
9/4.06

METRA HIT | 22/23/24/25/26

- Precision multimeter (V, dB, Ω , F, Hz, °C/°F, V \rightarrow I)
- Resolution: 10 μ V, 10 m Ω
- Integrated quartz movement for MIN-MAX recording with reference to real-time
- Rectangular signal generator functions
- Infrared data interface
- DKD Calibration Certificate

METRA HIT | 23/24/25/26

- Current measurement (10 A), direct or with clip-on current transformer: Display value is based on a transformation ratio of 1,000:1 or 10,000:1
- METRA HIT | 23S: 16 A measuring range (no fuse protection) especially for measurements on current transformers

METRA HIT | 22M/26M

- Large measurement data memory for up to 100,000 measured values
- Quartz movement for data logging with reference to real-time

METRA HIT | 25/26

- TRMS measurement



Signal Generator Function

CAT IV



DKD

QUALITY MANAGEMENT SYSTEM



DQS Certified per
DIN EN ISO 9001:2000
Reg. No. 1262



Applications

The 22S through 26S/M multimeters are rugged and reliable, hand-held or system instruments for maintenance, initial start-up, training and R&D in industry, for government authorities, in the test lab, in manufacturing and quality assurance, as well as at universities.

Features

TRMS Value for Distorted Waveshapes with METRA HIT | 25S and 26S/M

The utilized measuring method allows for TRMS measurements independent of waveshape.

METRA HIT | 25S: TRMS AC to 1 kHz

METRA HIT | 26S/M: TRMS AC and (AC+DC) to 20 kHz.

Pulse and Pulse Run Generator

This function allows for the testing of circuits and transmission paths by reading out individual pulses or pulse bursts with an amplitude of 3 V and a frequency ranging from 1 to 1000 Hz to the measurement input sockets.

Additional Functions

Continuity testing with acoustic signal, voltage for diode continuity, event counting (number and duration of events), stopwatch, data compare and long-range capacitance measurement. The integrated temperature measurement function allows for the connection of platinum sensors.

Automatic Blocking System (ABS) *

The automatic blocking system prevents incorrect connection of the measuring cables, as well as incorrect selection of the measured quantity. The potential for danger to the user, the instrument and the system is thus substantially reduced, and in many cases entirely eliminated.

IEC 61010-1, 2nd Edition

Multimeters manufactured as from 1st January, 2004 must not cause any hazard in any possible combination of the specified input voltages, function and range settings (Exception: specialized multimeter METRA HIT | 23S). Potential hazards include electric shock, fire, sparking and explosion.

Overload Protection

Overload protection safeguards the instrument in all measuring functions up to 1000 V. Overranging beyond the highest voltage and/or current measuring range is indicated with an acoustic signal. The FUSE display indicates that the fuse for the active current measuring range has blown.

Automatic / Manual Measuring Range Selection

Measured quantities are selected with the rotary switch. The measuring range is automatically matched to the measured value. The MAN/AUTO key allows for manual selection as well.

Analog Scale for Fast Trend Display

The analog scale (with additional negative axis range for zero-frequency quantities) allows for faster recognition of measured value fluctuation than is possible with a digital display.

* Patented

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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 less or more than 33% of the measuring range in comparison with the initial reference value.

* 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, as well as their point in time of occurrence, can be queried at the display.

Fast Acoustic Continuity Testing

It is thus possible to test for short-circuit and interruption when using the Ω and $V \rightarrow$ measuring functions. The threshold value for acoustic signaling is adjustable.

Battery Saving Circuit

The instrument is switched off automatically if the measured value remains constant for approx. 10 minutes, and if none of the keys or switches have been activated during this period. Automatic shut-down can be deactivated.

Protective Cover for Aggressive Environments

A soft rubber cover with a tilt stand and probe holder protects the instrument from impacts and drops. The rubber material assures a solid stance, even if the instrument has been placed on top of a vibrating surface.

Infrared Data Interface

The device can be remote configured, and momentary and saved measurement data (METRA HIT | 22M/26M) can be read out via the bidirectional infrared interface supplied as standard equipment. The BD232, USB-HIT interface adapter or the SI232-II memory adapter, as well as METRAwin[®]10/METRAHit[®] software are required to this end (see accessories). Device drive software for LabView is available upon request.

Calibration Certificate

The multimeters are shipped with a DKD calibration certificate which is internationally recognized (EA, ILAC). The instruments can be re-calibrated at our own DKD calibration lab after the customer defined calibration interval has expired (manufacturer recommendation: 1 to 3 years).

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Applicable Regulations and Standards

IEC/EN 61010 Part1:2001/ VDE 0411-1:2002	Safety requirements for electrical equipment for measurement, control and laboratory use
DIN EN 61326 VDE 0843 Part 20	Electrical instruments for control technology and laboratory use – EMC Requirements
DIN EN 60529 DIN VDE 0470 Part 1	Test instruments and test procedures – Protection provided by enclosures (IP code)

Additional Functions, METRA HIT | 22M/26M

Memory Mode

The instrument is equipped with a quartz-movement-synchronized measured value memory (128 kB), with a capacity for 13,000 to 100,000 measured values depending upon configuration. This allows for use as a real-time data logger.

Measurement data recording is executed either:

- In a time controlled fashion with an adjustable sampling interval within a range of 1 ms (for V DC only) to 10 min. (see sampling rate in the table on page 3)
- Dependent upon measured value in the event of exceeded limit/delta value
- As an individual measured value by pressing a key

The contents of the memory can be read out with the help of a PC which has been connected to the multimeter via the BD232, SI232-II or USB-HIT adapters, and then analyzed and documented with the METRAwin[®]10/METRAHit[®] analysis software.

Features List

METRA HIT Function	22S	22M	23S	24S	25S	26S	26M
AC Measurement	arithmetic mean value				TRMS _{AC}	TRMS _{AC, AC+DC}	
Current – A _{max}	not applicable	... 16 A		... 10 A/max. 16 A/30 s			
Band Width V _{AC}	... 1 kHz					... 20 kHz	
Pulse Generator	•	•	•	•	•	•	•
MIN-MAX / Data Hold	•	•	•	•	•	•	•
Continuity, Diode	•	•	•	•	•	•	•
Fuse, 1000 V	not applicable	1.6 A		1.6 A and 16 A			
Power Current Transformer	—	—	•	—	—	—	—
Clip-On Transformer Factor	•	•	•	•	•	•	•
128 kByte Memory	—	•	—	—	—	—	•
Quartz Movement	•	•	•	•	•	•	•
Protective Rubber Cover	—	•	•	•	•	•	•

Standard Equipment

- 1 Multimeter
- 1 Cover for aggressive environments (except METRA HIT | 22S)
- 1 KS17-2 cable set
- 2 Batteries
- 1 Operating instructions
- 1 DKD calibration certificate

Guarantee

3 years material and workmanship

1 to 3 years for calibration (depending on the scope of application)

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Characteristic Values

Meas. Function	Measuring Range	Resolution at Upper Range Limit		Input Impedance			Intrinsic Deviation at max. Resolution under Reference Conditions		Overload Capacity		Sampling Rate		
		30000 ¹⁾	3000	22...24/26	25S	~ / ∞	±(... % of rdg. + ... d)	±(... % of rdg. + ... d)	Value	Duration	—	∞	~
V ⁴⁾	300 mV	10 μV		> 20MΩ	10 MΩ	5 MΩ // < 50 pF	0.05 + 3 ⁷⁾	0.5 + 30 (> 300 d)	1000 V DC AC eff sine	cont.	50 ms (22M/ 26M: 1 ms)	0.5 s	1 s
	3 V	100 μV		11MΩ	5 MΩ	5 MΩ // < 50 pF	0.05 + 3	0.2 + 30 (> 300 d)					
	30 V	1 mV		10MΩ	5 MΩ	5 MΩ // < 50 pF	0.05 + 3	0.2 + 30 (> 300 d)					
	300 V	10 mV		10MΩ	5 MΩ	5 MΩ // < 50 pF	0.05 + 3	0.2 + 30 (> 300 d)					
	1000 V	100 mV		10MΩ	5 MΩ	5 MΩ // < 50 pF	0.05 + 3	0.2 + 30 (> 300 d)					
dB	see table on next page			—	same as for V ∞		—	± 0.1 dB ¹¹⁾			1 s		
				Voltage Drop at Upper R. Limit	Load		—	~ / ∞ ⁸⁾			—	∞	~
A ⁴⁾	300 μA	10 nA		160 mV	500 Ω	0.1 + 5	0.5 + 30	1000 V DC AC eff sine	0.36 A	cont.	50 ms	0.5 s	
	3 mA	100 nA		160 mV	50 Ω	0.1 + 5	0.5 + 30						
	30 mA	1 μA		200 mV	6 Ω	0.05 + 5	0.5 + 30						
	300 mA	10 μA		300 mV	1.1 Ω	0.5 + 5	0.5 + 30						
	3 A	100 μA		110 mV	35 mΩ	0.5 + 10	0.75 + 30						
	10 A	1 mA		350 mV	35 mΩ	0.5 + 10	0.75 + 30						
			Open-Circuit Voltage	Meas. Current at Upper R. Limit	±(... % of rdg. + ... d)								
Ω	300 Ω	10 mΩ		0.6 V	max. 250 μA	0.1 + 5 ¹⁰⁾	1000 V DC AC eff sine	5 min.	0.5 s				
	3 kΩ	100 mΩ		0.6 V	max. 45 μA	0.1 + 5 ¹⁰⁾							
	30 kΩ	1 Ω		0.6 V	max. 4.5 μA	0.1 + 5							
	300 kΩ	10 Ω		0.6 V	max. 1.5 μA	0.1 + 5							
	3 MΩ	100 Ω		0.6 V	max. 150 nA	0.1 + 5							
	30 MΩ	1 kΩ		0.6 V	max. 15 nA	2 + 5							
Ω ⁴⁾	300 Ω		0.1 Ω	max. 3 V	max. 1.2 mA	1 + 3							
→ ⁴⁾	3 V ⁶⁾		1 mV	max. 3 V	max. 1.2 mA	0.2 + 5	50 ms						
→ ⁴⁾	3 V ⁶⁾	100 μV		max. 3 V	max. 1.2 mA	0.2 + 3	50 ms						
				Discharge Resist.	U _{0 max}	±(... % of rdg. + ... d)							
F	3 nF	1 pF		10 MΩ	3 V	1 + 6 ¹⁰⁾	1000 V DC AC eff sine	5 min.	2 s				
	30 nF	10 pF		10 MΩ	3 V	1 + 6 ¹⁰⁾							
	300 nF	100 pF		1 MΩ	3 V	1 + 6							
	3 μF	1 nF		100 kΩ	3 V	1 + 6							
	30 μF	10 nF		11 kΩ	3 V	1 + 6							
	300 μF	100 nF		2 kΩ	3 V	5 + 6							
	3000 μF	1 μF		2 kΩ	3 V	5 + 6							
	30000 μF	1 μF		2 kΩ	3 V	5 + 60							
			f _{min} ³⁾	±(... % of rdg. + ... d)		max. measuring voltage							
Hz	300.00 Hz	0.01 Hz		1 Hz	0.1 + 1 ¹¹⁾	1000 V	1000 V	cont.	1 s				
	3.0000 kHz	0.1 Hz											
	100.00 kHz	10 Hz								< 30 kHz: 300 V > 30 kHz: 30 V			
🕒	100 min ²⁾	100 ms (1/10 s)	±15 d										
			±(... % of rdg. + ... d)										
°C/°F	Pt 100/ Pt 1000	-200.0 ... -100.0 °C	0.1 °C			1 K ¹²⁾	1000 V DC/AC eff sine	5 min.	0.5 s				
		-100.0 ... +100.0 °C				0.8 K + 3 ¹²⁾							
		+100.0 ... +850.0 °C				0.5 + 3 ¹²⁾							

- 1) Display: 4% place, a different resolution and sampling rate can be selected for the storage and transmission of measured values in the rATE menu.
- 2) Stopwatch: format: mm:ss:h where m = minutes, s = seconds and h = hundredths of a second, max.: 99:59.9; key-controlled only
- 3) Smallest measurable frequency for sinusoidal measurement signals symmetric to the zero point
- 4) METRA HIT | 26S/M and 25S: TRMS measurement
- 5) Without 16 A fuse
- 6) Display: up to max. 1.8 V, otherwise "OL" appears at the display
- 7) At 0° to + 40° C
- 8) Values of less than 100 digits are suppressed.
- 9) 15 (20) ... 45 ... 65 Hz ... 1/20/100 kHz sine, see page 4 for influences.
- 10) 12 A – 5 min., 16 A – 30 s, METRA HIT | 23S: 16 A 10 min.
- 11) ZERO appears at display when "zero balancing" function is activated.
- 12) The amplitude of the input voltage must not exceed/fall below the following values:

Frequency	Minimum voltage amplitude	Maximum voltage amplitude
≤ 1 kHz	10% of measuring range	100 % of the voltage measuring range; e.g. in the 3 V measuring range above 10 kHz:
1 kHz ... 10 kHz	15% of measuring range	0.2 V ... 3 V
10 kHz ... 100 kHz	20% of measuring range	

¹²⁾ Plus sensor error

Key: rdg. = reading, R = measuring range, d = digit(s)

Measuring Function	Measuring Range	22S/M	23S	24S	25S ⁴⁾	26S/M ⁴⁾
A	300 μA	—	•	•	•	•
	3 mA	—	•	•	•	•
	30 mA	—	•	•	•	•
	300 mA	—	•	•	•	•
	3 A	—	•	•	•	•
	10 A	—	16 A ⁵⁾	•	•	•
A ~ ∞	mA/A	—	•	•	•	•
A ~ ∞	mV/A	•	—	—	—	—

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dB Ranges

Measuring Ranges	Display Range for Reference Voltage $U_{REF} = 0.775 V$	Resolution
300mV ~	-48 dB ... -8 dB	0.01 dB
3 V ~	-28 dB ... +12dB	0.01 dB
30 V ~	-8 dB ... +32 dB	0.01 dB
300 V ~	+2 dB ... +52 dB	0.01 dB
1000 V ~	+22 dB ... +63 dB	0.01 dB
Display (dB) = $20 \lg U_x (V) / U_{REF}$		

Real-Time Clock

Accuracy ± 1 min. per month
(except for METRA HIT | 22S:
clock stops when device is deactivated)

Temp. Influence 50 ppm per K

Influencing Quantities and Influence Errors

Influencing Quantity	Influence Range	Measured Quantity / Measuring Range ¹⁾	Influence Error (...% + ... d) / 10 K
Temperature	0 °C ... +21 °C and +25 °C ... +40 °C	V \equiv	0.2 + 10
		V ~	0.4 + 10
		300 μ A ... 30 mA \equiv / \approx	0.5 + 10
		300 mA \equiv / \approx	0.5 + 10
		3 A / 10 A \equiv / \approx	1 + 10
		300 Ω ... 300 k Ω	0.2 + 10
		3 M Ω	0.2 + 10
		30 M Ω	1 + 10
		3 nF ... 30 μ F	0.5 + 10
		Hz	0.5 + 10
		°C (Pt100)	0.5 + 10

METRA HIT | 26S/M: TRMS AC and (AC+DC) 15 Hz to 20 kHz
METRA HIT | 25S: TRMS AC 20 Hz to 1 kHz
METRA HIT | 22/23/24: mean value rectification, AC 20 Hz to 1 kHz

Influencing Quantity	Influence Range (max. resolution)	Frequency	Intrinsic Error ²⁾ \pm (... % of rdg. + ... d)
Frequency V_{AC}	300.00 mV	> 15 Hz ... 45 Hz	2.5 + 40 (> 300 d)
		> 65 Hz ... 1 kHz	1.0 + 30 (> 300 d) ³⁾
		> 1 kHz ... 20 kHz	3.0 + 50 (> 300 d)
	3.0000 V ... 300.00 V ⁴⁾	> 15 Hz ... 45 Hz	2.2 + 40 (> 300 d)
		> 65 Hz ... 1 kHz	0.7 + 30 (> 300 d) ³⁾
		> 1 kHz ... 20 kHz	2.2 + 50 (> 300 d)
1000.0 V ⁴⁾	> 15 Hz ... 45 Hz	2.2 + 40 (> 300 d)	
	> 65 Hz ... 1 kHz	2 + 30 (> 300 d)	
	> 1 kHz ... 10 kHz	10 + 50 (> 300 d)	

Influencing Quantity	Influence Range (max. resolution)	Frequency	Intrinsic Error ²⁾ \pm (... % of rdg. + ... d)
Frequency I_{AC} $I_{AC} + I_{DC}$	300.00 μ A ... 300.00 mA	> 15 Hz ... 45 Hz	1 + 30
		> 65 Hz ... 1 kHz	
	3.0000 A 10.000 A	> 15 Hz ... 45 Hz	1 + 30
		> 65 Hz ... 1 kHz	3 + 30

- 1) With zero balancing
2) Indicated error values apply as of a displayed value of 10% of the measuring range.
3) for METRA HIT | 22 to 25: 2% + 30 d
4) Power limitation: frequency x voltage max. 3,000,000 V x Hz

Influencing Quantity	Influence Range	Measured Quantity / Measuring Range	Influence Error ²⁾
crest factor CF	1 ... 3	V ~, A ~	$\pm 1\%$ of rdg.
	> 3 ... 5		$\pm 3\%$ of rdg.
Measured Quantity Waveshape ³⁾	The allowable crest factor CF for the periodic quantity to be measured depends upon the displayed value:		

Influencing Quantity	Influence Range	Measured Quantity / Measuring Range ¹⁾	Influence Error
Relative Humidity	75% 3 days instrument off	V, A, Ω F, Hz °C	1 x intrinsic error

Influencing Qty.	Influence Range	Measuring Range	Damping
Common-Mode Interference Voltage	influencing quantity max. 1000 V ~ 50 Hz, 60 Hz sine	V \equiv	> 90 dB
		300 mV ... 30 V ~	> 60 dB
		300 V ~ 1000 V ~	> 60 dB
Series-Mode Interference Voltage	influencing quantity V ~, nominal measuring range value, max. 1000 V ~, 50 Hz, 60 Hz sine	V \equiv ⁴⁾	> 40 dB
		influencing quantity max. 1000 V \equiv	> 60 dB

- 1) With zero balancing
2) Except for sinusoidal waveshapes
3) METRA HIT | 26S/M and 25S only
4) For METRA HIT | 22/23/24: except for mV range

Reference Conditions

Ambient Temperature +23 °C \pm 2 K
Relative Humidity 40 ... 60%
Measured Qty. Frequency 45 ... 65 Hz
Measured Qty. Waveshape sine
Battery Voltage 3 V \pm 0.1 V

Response Time (after manual range selection)

Measured Quantity / Measuring Range	Digital Display Response Time	Measured Quantity Jump Function
V \equiv , V ~, A \equiv , A ~	1.5 s	from 0 to 80% of the measuring range upper limit
300 Ω ... 3 M Ω	2 s	from ∞ to 50% of the measuring range upper limit
30 M Ω	5 s	
Continuity	< 50 ms	
\rightarrow	1.5 s	from 0 to 50% of the measuring range upper limit
3 nF ... 300 μ F	max. 2 s	
3 000 μ F	max. 7 s	
30 000 μ F	max. 14 s	
> 10 Hz	max. 1.5 s	
°C	max. 3 s	

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Power Supply

Battery	2 ea. 1.5 V mignon cells (2 x AA size) alkaline-manganese cells per IEC LR6 zinc-carbon battery per IEC R6
Service Life	alkaline-manganese cells: approx. 100 hr.
Battery Test	“+” symbol is displayed automatically when battery voltage drops to below approx. 2.3 V.

Display

LC display field (65 mm x 30 mm) with analog and digital display of unit of measure, type of current and various special functions.

Analog

Display	LCD scale with pointer
Scale Length	55 mm for V $\bar{=}$ and A $\bar{=}$, 47 mm for all other ranges
Scaling	\mp 5 ... 0 ... \pm 30 with 35 graduations for $\bar{=}$, 0 ... 30 with 30 graduations for all other ranges
Polarity Display	with automatic reversal
Overload Display	► symbol appears
Sampling Rate	20 measurements per second

Digital

Display / Char. Height	7 segment characters / 12 mm
Places	4 $\frac{3}{4}$ places \cong 31,000 steps
Overload Display	“OL” is displayed
Polarity Display	“–” sign is displayed when plus pole is connected to “1”
Display Refresh	same as measuring range (see table), however, 2 times per second maximum

Data Interface

Type	Via optical, infrared interface through the housing
Data Transmission Protocol	Serial, bidirectional (not IrDa compatible)
Baud Rate	9600 baud
Functions	– Select / query measuring functions and parameters – Query / transmit current measurement data – Read out stored measurement data (22M/26M only)

BD232, SI232-II and USB-HIT plug-in interface adapters allow for adaptation to common computer interfaces, namely RS 232 C and USB (see accessories).

Mechanical Design

Housing	shock-proof plastic (ABS)
Dimensions	84 mm x 195 mm x 35 mm
Weight	approx. 350 g with batteries
Protection	Housing: IP 50 Extract 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
5	dust-tight	0	not protected

Fuses for METRA HIT | 23/24/25/26

Fuses for Ranges to 300 mA	FF (UR) 1.6 A/1000 V AC/DC, 6.3 mm x 32 mm, 10 kA switching capacity at 1000 V, protects all current ranges up to 300 mA in combination with power diodes
to 10 A (not 23S)	FF (UR) 16 A/1000 V AC/DC, 10 mm x 38 mm, 30 kA switching capacity at 1000 V AC/DC protects 3 A and 10 A ranges

Electrical Safety

per IEC/EN 61010-1:2001/VDE 0411-1:2002

	METRA HIT 22/24/25/26		METRA HIT 23S
Protection Class	II		II
Measuring Category	III	IV	II
Operating Voltage	1000 V	600 V	600 V
Contamination Level	2		2
Test Voltage	6.7 kV~		5.2 kV~

Electromagnetic Compatibility (EMC)

Interference Emission	EN 61326: 2002 class B
Interference Immunity	EN 61326: 2002 IEC 61000-4-2: 8 kV atmospheric discharge 4 kV contact discharge IEC 61000-4-3: 3 V/m

Ambient Conditions

Operating Temperatures	–20° C ... +50° C
Storage Temperatures	–25° C ... +70° C (without batteries)
Relative Humidity	max. 75%, no condensation allowed
Elevation	to 2000 m
Deployment	indoors; outdoors: only in the specified ambient conditions

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Accessories for Operation with PCs

BD232 Interface Adapter

With the help of the bidirectional adapter BD232 METRA HIT | 20 multimeters can be configured via PC and the live measurement data can be transmitted to the computer. The adapter has no memory of its own, but can be used to read out data from the memory at the METRA HIT | 22M/26M. Up to 6 adapters can be cascaded for the creation of a multi-channel measuring system.



SI232-II Memory Adapter

The SI232-II memory adapter, which can be plugged in to hand-held multimeters, offers the same functions as the above-mentioned BD232 adapter and furthermore allows for on-site storage of measurement data without a PC as well as subsequent uploading to a PC. Data are synchronized with an integrated clock and can be retrieved via the LCD of the adapter.



Measurement data recording is executed either:

- In a time controlled fashion with an adjustable sampling interval within a range of 1 ms (for V DC only) to 10 min (see sampling rate in the table on page 3)
- Dependent upon measured value in the event of exceeded limit/delta value
- As an individual measured value by pressing a key

Adapters can be cascaded (also in combination with the BD232) in order to create a multi-channel system.

These adapters are also compatible with the older METRA HIT | 12S ... 18S multimeter range.

Memory Capacity:

128 kB (equal to about 60,000 ... 120,000 measured values, depending upon measuring function and measured value dynamics)

Adjustable Sampling Rate:

50 ms ... 1 min

USB-HIT Interface Adapter

This adapter is functionally identical to the BD232 interface adapter, although bidirectional transmission takes place between the IR and the USB interface in this case.

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



METRAwin[®]10/METRAHit[®] Software

METRAwin[®]10/METRAHit[®] PC software is a multilingual, measurement data logging program for recording, visualizing, evaluating and documenting measured values from METRA HIT | multimeters.

Communications between the PC and the measuring instrument(s) is established via available interfaces and memory adapters. Telephone modems can be interconnected as well. Depending upon device type, one or several of the following operating modes are possible:

- **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 measured value, time triggered
 - > Time controlled with sampling interval of 0.05 s* ... 1 s ... 60 min.
 - > Manually controlled
 - > Measured value controlled in the event of exceeded limit/delta value
 - Recording duration: max. 10 million intervals

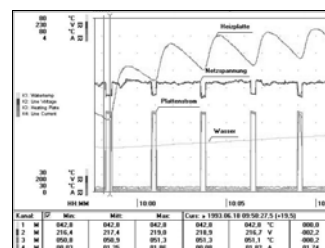
* Depending upon device type, measuring function, number of measuring channels and communication mode (e.g. via modem), sampling intervals of less than 1 s cannot be used.

Reading Out and Visualizing Stored Data

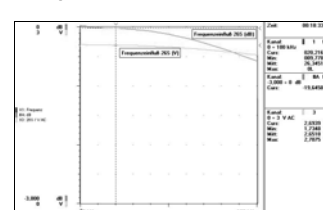
If supported by the device: read-in and display of offline data recorded to device memory.

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

Y(t) Recorder Display for Up To 6 Channels



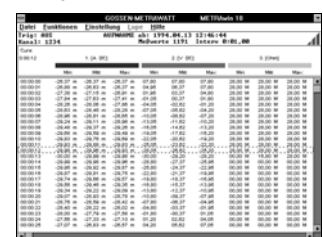
XY- Recorder Display for Up To 4 Channels



Multimeter Display for Up To 4 Channels



Tabular Display for Up To 10 Channels



System Requirements

METRAwin 10 (version 5.x) can be run on IBM compatible PCs with Microsoft Windows[®] 95, 98, ME, NT 4.0, 2000 or XP.

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Order Information

Designation	Type	Article Number
All multimeters include the KS17-2 measurement cable, operating instructions, DKD calibration certificate and the GH18 protective rubber cover (except for METRA HIT 22S)		
Analog-digital multimeter with signal generator for training and plant operations (current measurement with accessory current clip only)	METRA HIT 22S	M222A
Same as METRA HIT 22S but with 128 kByte memory	METRA HIT 22S	M222B
Analog-digital multimeter with signal generator for energy technology applications with 16 A current range (without 16 A fuse)	METRA HIT 23S	M223A
Universal analog-digital multimeter with signal generator	METRA HIT 24S	M224A
TRMS _{AC} analog-digital multimeter with signal generator, V _{AC} to 1 kHz	METRA HIT 25S	M225A
TRMS _{AC, AC+DC} analog-digital multimeter with signal generator, V _{AC} 15 Hz to 20 kHz	METRA HIT 26S	M226A
Same as METRA HIT 26S but with 128 kByte memory	METRA HIT 26M	M226B
Accessories for Operation with PCs		
Single-channel pack consisting of BD232 bidirectional interface adapter, cable and METRAwin [®] 10/METRAHit [®] software	BD-Pack 1 ²⁾	Z215A
Single-channel memory pack consisting of SI232-II memory adapter, cable and METRAwin [®] 10/METRAHit [®] software	1-CH. Pack II ¹⁾	GTZ 3231 020 R0001
4-channel memory pack consisting of SI232-II 4 memory adapters, cable and METRAwin [®] 10/METRAHit [®] software	4-CH. Pack II ¹⁾	GTZ 3234 020 R0001
Memory adapter for METRA HIT	SI232-II ^{D)}	GTZ 3242 020 R0001
Bidirectional interface adapter	BD232 ²⁾	GTZ 3242 100 R0001
RS 232 interface cable, 2 m	Z3241	GTZ 3241 000 R0001
METRAwin [®] 10/METRAHit [®] software update	Z3240	GTZ 3240 000 R0001
Bidirectional IR/USB interface adapter for METRA HIT s	USB-HIT	Z216A
Accessories for Voltage and Temperature Measurement		
Voltage measuring probe for electrical power installations of up to 1000 V	KS30	GTZ 3204 000 R0001
High-voltage probe, 3 kV/3 V	HV3	GTZ 3431 011 R0001
High-voltage probe, 30 kV/30 V (for direct voltage only)	HV30	GTZ 3431 001 R0001
Pt100 temperature sensor for surface and immersion measurements, -40 ... +600 °C	Z3409	GTZ 3409 000 R0001
Pt1000 temperature sensor for measurements in gases and liquids, -50 ... +220 °C	TF220	Z102A
Pt100 oven sensor, -50 ... +550 °C	TF550	GTZ 3408 000 R0001
10 adhesive Pt100 temperature sensors, -50 ... +550 °C	TS-Chipset	GTZ 3406 000 R0001
Replacement Fuses		
Fuses (pack of 10)	FF(UR) 1,6A/1000V AC/DC	Z109C
Fuses (pack of 10)	FF(UR) 16A/1000V AC/DC	Z109B

¹⁾ For METRA HIT | 23/24/25/26

²⁾ For METRA HIT | 22M/26M, especially recommended

^{D)} Data sheet available

Transport Accessories

Cordura Belt Pouch HitBag

for multimeters of the METRA HIT | (with/without protective rubber cover) and METRAport series



Hard Case HC20

for multimeters (with/without protective rubber cover GH18) and accessories



F836 Ever-Ready Case

for multimeters (without protective rubber cover) and accessories



F829 Carrying Pouch

for multimeters (with or without protective rubber cover GH18)



Designation	Type	Article Number
Protective rubber cover with carrying strap	GH18 ³⁾	GTZ 3212 000 R0001
Imitation leather carrying pouch for METRA HIT and METRAmax	F829	GTZ 3301 000 R0003
Cordura belt pouch for METRA HIT and METRAport	HitBag	Z115A
Imitation leather ever-ready case with cable compartment	F836	GTZ 3302 000 R0001
Ever-ready case for two METRA HIT s, two adapters and accessories	F840	GTZ 3302 001 R0001
Hard case for one METRA HIT and accessories	HC20	Z113A
Hard case for two METRA HIT s and accessories	HC30	Z113B

³⁾ for METRA HIT 22S/M

For additional information concerning accessories see our *Measuring Instruments and Testers Catalogue*.

METRA HIT | 22 ... 26S/M

Analog-Digital Multimeters with Signal Generator

Current Measuring Accessories									Suitable for METRA HIT	
All current sensors and transformers are equipped with a connector cable (1.2 to 1.5 m long) with 4 mm safety banana plugs										
Type	Designation	Measuring Range	Meas. Category	Max. Wire Dia.	Transformation Ratio	Frequency Range	Intrinsic Error \pm (% rdg. + ...)	Article Number	22S/M 27M/I	23..26S/M 28S/29S
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~/600 A~	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	●	■
AF033A	AmpFLEX flexible current sensor with 2 measuring ranges, battery (150 h)	5 ... 30 A~, 5 ... 300 A~	1000 V / CAT III	Length: 600 mm	100 mV / A, 10 mV / A	10 ... 100 Hz ... 20 kHz	1% + 0.5 A, 1% + 0.5 A	Z207A	▲	■
AF11A	AmpFLEX flexible current sensor, battery (150 h)	5 ... 1000 A~	1000 V / CAT III	Length: 450 mm	1 mV / A	10 ... 100 Hz ... 20 kHz	1% + 2 A	Z207D	▲	■
AF33A	AmpFLEX flexible current sensor with 2 measuring ranges, battery (150 h)	5 ... 300 A~, 5 ... 3000 A~	1000 V / CAT III	Length: 900 mm	10 mV / A, 1 mV / A	10 ... 100 Hz ... 20 kHz	1% + 0.5 A, 1% + 2 A	Z207B	▲	■
AF101A	AmpFLEX flexible current sensor with 2 measuring ranges, battery (150 h)	5 A~... 1 k A~, 50 A~... 10 k A~	1000 V / CAT III	Length: 1200 mm	1 mV / A, 0.1 mV / A	10 ... 100 Hz ... 20 kHz	1% + 2 A, 1% + 10 A	Z207C	▲	■
AC Current Transformers with Current Output										
WZ12A	Clip-on current transformer	15 ... 180 A~	300 V / CAT III	15 mm	1 mA / A	45 ... 65 ... 400 Hz	3%	Z219A	—	■
WZ12D	Clip-on current transformer	30 mA ... 150 A~	300 V / CAT III	15 mm	1 mA / A	45 ... 65 ... 500 Hz	2.5% + 0.1 mA	Z219D	—	●
WZ11A	Clip-on current transformer	1 ... 200 A~	600 V / CAT III	20 mm	1 mA / A	48 ... 65 ... 400 Hz	1 ... 3%	Z208A	—	●
Z3511	Clip-on current transformer	4 ... 500 A~	600 V / CAT III	30 x 63 mm	1 mA / A	48 ... 65 ... 1 kHz	3% + 0.4 A	GTZ 3511 000 R0001	—	●
Z3512	Clip-on current transformer	0.5 ... 1000 A~	600 V / CAT III	52 mm	1 mA / A	30 ... 48 ... 65 ... 5 kHz	0.5% ... 0.7%	GTZ 3512 000 R0001	—	●
Z3514	Clip-on current transformer	1 ... 2000 A ~	600 V / CAT III	64 x 150 mm	1 mA / A	30 ... 48 ... 65 ... 5 kHz	0.5% + 0.1 A	GTZ 3514 000 R0001	—	●
Shunt Resistors for Multimeters without Current Measuring Function										
NW300mA	Plug-in shunt resistor, encapsulated	0 ... 300 mA	300 V / CAT III	—	1 mV / mA	DC ... 10 kHz	0.5%	Z205C	▲	—
NW3A	Plug-in shunt resistor, encapsulated	0 ... 3 A	300 V / CAT III	—	100 mV / A	DC ... 10 kHz	0.5%	Z205B	▲	—

● Without restriction ■ Not for power measurement with METRA HIT | 29S ▲ Not for METRA HIT | 27M/I

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