METRA*Hit*®28S and 29S
Precision Digital Multimeter, Power Meter

3-348-866-03
5/8.00

METRA*Hit*®28S and 29S

- 300,000 digits and triple display
- Precision multimeter (V, dB, A, Ω, F, Hz, F, °C/°F)
- Current measurement with (clip-on) current transformer: a transformation ratio of 1000:1 or 10000:1 is utilized for display purposes
- Integrated quartz movement for recording of MIN/MAX values relative to real-time
- AUTO SELECT automatic measured quantity recognition (V, Ω and F)

METRA*Hit*®29S

- Power and energy measurements (W, VAr, VA, Wh, PF) with analog signals or energy measurement with pulses, current measurement value, mean values and peak power values are displayed
- Power disturbances recording
- Large, 128 kB measurement value memory

QUALITY MANAGEMENT SYSTEM

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

Deutscher Kalibrierdienst DKD - K - 19701 DKD-Calibration Certificate

Applications

METRA*Hit*®28S and 29S multimeters are high performance precision instruments for the lab, service and training.
With a display range of 300,000 digits as well high level accuracy and long-term stability, they fulfill all calibration and R&D laboratory demands. Battery operation allows for on-site precision servicing and calibration.

Features

Convenient Triple Display

The current measurement value, as well as two other values, are updated and displayed, e.g. minimum and maximum value. The usual switching back and forth between display values is no longer necessary. Display resolution for the main display value can be varied from 4¾ places for AC to 5¾ places for DC (METRA*Hit*®29S: from 2¾ to 5¾ places). The measurement rate, adjustable from 1 ms to 0.5 s, allows for high-speed recorder, precision data logger and mean value recorder functions with the help of METRAwin®10/METRA*Hit*® (optional PC software).

High Resolution and Precision

5¾ places, or 309,999 digits, allow for cost effective calibration of tested devices and components, as well as precise reference measurements.

Effective Value for Distorted Waveforms

The implemented measurement process provides for effective value measurement (TRMS) independent of the waveform up to 100 kHz.

Additional Functions

Continuity testing with acoustic signal, event counting (number of events and event durations), counts zero crossings, stopwatch, data comparison and wide-range capacitance measurement. The integrated temperature measurement function allows for the connection of thermocouples and platinum resistance thermometers.

Overload Protection

The instrument is protected from overload in the voltage range. Acoustic signalling occurs if measuring range limits are exceeded. The FUSE display indicates a defective fuse in the current range.

Calibration

METRA*Hit*®28S and 29S multimeters are shipped with a DKD calibration certificate. They can be automatically calibrated with the CS92E calibration system via the RS232 data interface.

Infrared Measurement Data Transmission *

These devices include a serial, duplex data interface for remote control and measurement value transmission via infrared light.

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Automatic Blocking System (ABS) *

Automatic blocking of connector sockets prevents incorrect connection of measurement cables, and selection of incorrect measuring quantities. Thus hazards for the operator, the instrument and the system are substantially reduced, and in many cases entirely eliminated.

Automatic Measurement Value Storage *

The DATA HOLD function allows for storage of the digitally displayed measurement value. A patented process assures that the actual measurement value, and not random values, are stored when rapid measurement magnitude changes occur. The stored measurement value appears at the digital display.

* Protected by patent

Sampling Rate

The sampling rate determines the time interval after which the respective measurement value is transmitted to the interface, or saved to measurement value memory.
Depending upon the measured quantity, sampling rates can be set in steps of 1, 2 or 5 from 0.05 s to 10 min.

Additional Functions, METRA*Hit*®29S

Power Measurement

The METRA*Hit*®29S is a compact high performance measurement instrument for direct and alternating current for single and three-phase current measurements. The current path can be connected directly, or with a clip-on current transformer. If a current transformer is connected to the multimeter (mA or A input), all current and power displays appear with the correct value in accordance with the selected transformation ratio. The utilized current transformer must have a transformation ratio of 1000:1 or 10,000:1.
Universal power measuring functions include the measurement of active, reactive, and apparent power, as well as power factor and energy .
Furthermore, mean and peak values (e.g. a 15 minute max. value) can be measured during a predefined period of time. Type WZ12D, Z3511, Z3512 and Z3514 current clips are suitable for use with the instrument.

Power Disturbance Recording

The instrument is capable of continuously recording line voltage and power disturbances. The following power disturbances can be acquired: violation of predetermined limit values, power failure and positive or negative pulses. Each of these events is stored to memory and can be queried at a later point in time. The type of event, the time of its occurrence and its duration (except for pulses) are displayed.

If memory mode is deactivated, approximately 250 events can be stored to volatile memory and read out at the display.
These data remain in storage until the instrument is switched to a different operating mode.
If memory mode is activated, the events are recorded at the instrument as a non-compressed data file which is uploaded to a PC at a later point in time.

Memory Mode

The instrument is equipped with a 128 kB measurement value memory which is synchronized with a quartz movement, and which has room for 13,000 to 60,000 measurement values depending upon configuration. Data can be stored to intermediate memory or uploaded directly to a PC. The system records data relative to real-time which allows for use as a real time data logger.
Depending upon the measured quantity, sampling rates can be adjusted in steps of 1, 2 or 5 within a range of 0.5 ms to 10 min. Selected measurement values can also be stored to memory 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 METRA*Hit*®BD232 IR adapter, and with METRAwin®10/ METRA*Hit*® analysis software.

Applicable Regulations and Standards

IEC 61010-1 DIN EN 61010 Part 1 VDE 0411-1	Safety regulations for electrical measurement, control, regulating and laboratory devices
DIN 43751	Digital measuring instruments
DIN EN 50081 Part 1	Generic standard for interference emission; residential, business and light industry
DIN EN 50082 Part 1	Generic standard for interference immunity; residential, business and light industry
VDI/VDE 3540	Reliability of measurement, control and regulating devices
DIN EN 60529 DIN VDE 0470 Part 1	Test instruments and procedures – level of protection provided by enclosures (IP code)

Standard Equipment

1 Multimeter
1 Protective case for operation under adverse conditions.
A cover made of pliable rubber including support bar protects the device from damage due to impacts and falls. The rubber material assures a secure stance for the instrument even on vibrating surfaces.
1 KS17 cable set
2 Batteries
1 Operating Instructions
1 DKD calibration certificate

Guarantee

3 years material and workmanship
1 ... 3 years (depending on application) for calibration

METRA*Hit*®28S and 29S Characteristic Values

Meas. Function	Measuring Range	Resolution at Measuring Range Upper Limit			Input Impedance		Inherent Deviation at highest resolution under reference conditions ±(...% of rdg. + ... % of range + ... D)	±(...% of rdg. . + ... D)	Overload Capacity [4]		Meas. Function
		300000 [1]	30000 [1]	3000 [1]	—	⎓	—	⎓ [5]	Value	Duration	
V	300 mV	1 µV	10 µV		> 20 MΩ	5 MΩ // < 50 pF	0.02 + 0.005 + 5 [10]	0.5 + 30	1050 V DC AC eff sine	cont.	**V**
	3 V	10 µV	100 µV		11 MΩ	5 MΩ // < 50 pF	0.02 + 0.005 + 5	0.2 + 30			
	30 V	100 µV	1 mV		10 MΩ	5 MΩ // < 50 pF	0.02 + 0.005 + 5	0.2 + 30			
	300 V	1 mV	10 mV		10 MΩ	5 MΩ // < 50 pF	0.02 + 0.005 + 5	0.2 + 30			
	1000 V	10 mV	100 mV		10 MΩ	5 MΩ // < 50 pF	0.02 + 0.005 + 5	0.2 + 30			
dB	see table following page				—	same as V ⎓	—	± 0.1 dB [11]			**dB**
					Volt. Drop, approx. for upper range limit B						
					—	⎓	—	⎓ [5]			
A	300 µA	1 nA	10 nA		160 mV	160 mV	0.05 + 0.02 + 5	0.5 + 30	0.36 A	cont.	**A**
	3 mA	10 nA	100 nA		160 mV	160 mV	0.05 + 0.01 + 5	0.5 + 30			
	20 mA	100 nA	1 µA		170 mV	170 mV	0.02 + 0.01 + 5	0.5 + 30			
	30 mA						0.05 + 0.01 + 5				
	300 mA	1 µA	10 µA		300 mV	300 mV	0.1 + 0.01 + 5	0.5 + 30			
	3 A		100 µA		110 mV	110 mV	0.2 + 0.05 + 5	0.5 + 30	10 A [6]	cont.	
	10 A		1 mA		350 mV	350 mV	0.2 + 0.05 + 5	0.5 + 30			
					Open-circuit voltage	Measuring current at upper ranger limit	±(...% of rdg. + ... % of range + ... D)				
Ω	300 Ω	1 mΩ			0.6 V	max. 250 µA	0.05 + 0.01 + 5 [7]		500 V DC AC eff sine	10 min	**Ω**
	3 kΩ	10 mΩ			0.6 V	max. 45 µA	0.05 + 0.01 + 5 [7]				
	30 kΩ	100 mΩ			0.6 V	max. 4.5 µA	0.05 + 0.01 + 5				
	300 kΩ	1 Ω			0.6 V	max. 1.5 µA	0.05 + 0.02 + 5				
	3 MΩ	10 Ω			0.6 V	max. 150 nA	0.1 + 0.02 + 5				
	30 MΩ	100 Ω			0.6 V	max. 15 nA	1 + 0.2 + 5				
Ω 🔊	300 Ω			0.1 Ω	max. 3 V	max. 1 mA	1 + 0 + 3				Ω 🔊
⏩ 🔊	300 mV			100 µV	max. 3 V	max. 1 mA	0.2 + 0 + 3				⏩ 🔊
⏩	3 V		100 µV		max. 3 V	max. 1 mA	0.2 + 0 + 3				⏩
					Discharge resistor	$U_{0\ max}$	±(...% of rdg. + ... % of range)				
F	3 nF			1 pF	10 MΩ	3 V	1.0 + 0.2 [7]		500 V DC AC eff sine	10 min	**F**
	30 nF			10 pF	10 MΩ	3 V	1.0 + 0.2 [7]				
	300 nF			100 pF	1 MΩ	3 V	1.0 + 0.2				
	3 µF			1 nF	100 kΩ	3 V	1.0 + 0.2				
	30 µF			10 nF	11 kΩ	3 V	1.0 +0.2				
	300 µF			100 nF	2 kΩ	3 V	5.0 + 1				
	3000 µF			1 µF	2 kΩ	3 V	5.0 + 1				
	30000 µF			1 µF	2 kΩ	3 V	5.0 + 1				
					f_{min} [3]		±(...% of rdg. + ... D)				
Hz	300.000 Hz	0.001 Hz			1 Hz		0.05 + 1 [8]		1000 V	cont.	**Hz**
	3.00000 kHz	0.01 Hz			1 Hz		0.05 + 1 [8]		1000 V		
	300.000 kHz	1 Hz			1 Hz		0.05 + 1 [8]		300 V 30 V		
⏱	100 min [2]		10 ms				±15 D		DC1000V AC 750V		⏱
							±(...% of rdg. + ... D)				
°C/°F	Pt 100/ Pt 1000 – 200.0 ... + 100.0 °C		0.1 °C				0.5 K + 3 [9]		500 V DC eff sine	10 min	**°C/°F**
	Pt 100/ Pt 1000 + 100.0 ... + 850.0 °C						0.2% + 3 [9]				
	K NiCr-Ni – 270.0 ... + 1372.0 °C		0.1 °C				0.7 + 3 [9. 10]		1050 V DC eff sine		
	J Fe-CuNi – 210.0 ... + 1200.0 °C		0.1 °C				0.8 + 3 [9. 10]				

[1] Display: 5¾ places for DC, 4¾ places for AC,
other resolution and sampling rates can be selected for storage and transmission in the rAtE menu.

[2] Stopwatch; format: mm:ss:hh,
where m=minute, s=second and h=hundredth second, max.: 99:59:59

[3] Lowest measurable frequency
with sinusoidal measurement signal symmetric to zero point

[4] at 0 ° ... + 40 °C

[5] Values < 100 digits are suppressed, 16 ... 45 ... 65 Hz ... 100 kHz sine.
See page 4 for influences.

[6] 12 A – 5 min, 16 A – 30 s

[7] ZERO is displayed when the "Zero Balancing" function is active.

[8] Range 300mV ⎓: U_E = 50mV$_{eff/rms}$ . . . 300mV$_{eff/rms}$
3 V ⎓: U_E = 0,3 V$_{eff/rms}$ . . . 3 V$_{eff/rms}$
30 V ⎓: U_E = 3 V$_{eff/rms}$ . . . 30 V$_{eff/rms}$
300 V ⎓: U_E = 30 V$_{eff/rms}$ . . . 300 V$_{eff/rms}$
1000 V ⎓: U_E = 300 V$_{eff/rms}$ . . . 1000 V$_{eff/rms}$
for voltages > 100 V: power limiting at $3 \cdot 10^6$ V · Hz

[9] Plus sensor deviation

[10] Without integrated reference junction:
inherent deviation ±2 K

[11] For U > 10% of the measuring range

Key: D = Digit

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dB Ranges

Measuring Ranges	Display Range at Reference Voltage U_{REF} = 0,775 V	Resolution
300mV ⁓ 3 V ⁓ 30 V ⁓ 300 V ⁓ 1000 V ⁓	– 48 dB ... – 8 dB – 38 dB ... + 12dB – 18 dB ...+ 32 dB + 2 dB ...+ 52 dB + 22 dB ...+ 63 dB	0.01 dB 0.01 dB 0.01 dB 0.01 dB 0.01 dB 0.01 dB
	Display (dB) = 20 lg U_x (V) /U_{REF}	

AUTO SELECT

Automatic Measurement Magnitude Recognition

Meas. Quantity	Measuring Range for Recognition	Condition	Recognition Time
Voltage V ⎓	V_{eff} > 0.81 V . . . 500 V	—	1 s
Voltage V ⁓	V_{eff} > 1 V . . . 500 V	frequency > 20 Hz	1 s
Resistance	0 Ω . . . 15 MΩ	—	1 s
Capacitance	> 1.5 nF . . . 300 µF	Electrolytic capacitor must be correctly connected	1 s
Diode	voltage in forward direction max. 1 V	Diode must be correctly connected: anode to →	1 s

Power Measurements with METRA*Hit*®29S

Meas. Function	Measuring Range	Selector Switch Position		Resolution at Meas. Range Upper Limit	Overload Capacity at 0 ... + 40 °C	
		mA	A	10 000	Value	Duration
W, VAr, VA	1 mW	●		0.1 µW	V: 1050 V mA: 0.36 A A: 10 A DC AC eff sine	V / mA: continuously 10 A: cont. 12 A: 5 min 16 A: 30 s
	10 mW	●		1 µW		
	100 mW	●		10 µW		
	1 W	●		0.1 mW		
	10 W	●	●	1 mW		
	100 W	●	●	10 mW		
	1 kW	●	●	0.1 W		
	10 kW		●	1 W		

Inherent Deviation and Frequency Influence for Power and Energy Measurements with METRA*Hit*®29S

Meas. Quantity	Meas. Range	Inherent Deviation (... % of rdg + ... D)		
		15 Hz ... 45 Hz	45 Hz ... 65 Hz	65 Hz ... 1 kHz
Active power	300 mA ... 10 A	1.3+20	1+20	3+20
Reactive power		2.5+20	1.5+20	3+20
Apparent power		1.2+20	1+20	1.2+20
Power factor	±(0.02 ... 1)	2+2	1+2	2+2
¼ hr. power		1.2+20	1+20	1.3+20
Energy		1.2+2	1+2	1.3+2
Voltage		0.4+30	0.3+30	0.4+30
Current		0.7+30	0.6+30	0.9+30

System Monitoring with METRA*Hit*®29S

Interference Type	Meas. Range	Resolution	Inherent Deviation at Highest Resolution under Reference Conditions	Pulse Duration
Dropout*	300 V	4 V	5% of rdg + 5% v. B	Sampling rate: 2 ms
	1000 V	40 V	10% of rdg + 10% v. B	
Pulse	200 ... 1000 V	10 V	50 V	0.5 ... 5 µs

* Settings adjusted with trigger parameters

Real-Time Clock

Accuracy	±1 min/month
Temperature Effect	50 ppm/K

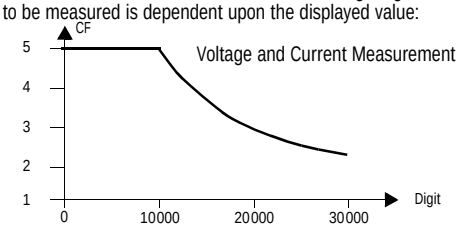
Influence Variables and Errors

Influence Variable	Sphere of Influence	Meas. Quantity / Meas. Range [1]	Influence Error ppm/K
Temperature	0 °C ... +21 °C and +25 °C ... +40 °C	V ⎓	30
		V ⁓	50
		300 µA ... 30 mA ⎓ + ≂	180
		300 mA ⎓ + ≂	290
		3 A / 10 A ⎓ + ≂	200
		300 Ω ... 300 kΩ	100
		3 MΩ	200
		30 MΩ	1000
		3 nF ... 30 µF	500
		Hz	50
		°C	100

Influence Variable	Frequency	Meas. Quantity / Meas. Range [1]	Influence Error [2] ± ... % of rdg.
Frequency V_{AC}	> 15 Hz ... 45 Hz	300.000 mV	2 + 10 D
	> 65 Hz ... 1 kHz		0.5
	> 1 kHz ... 10 kHz		1
	> 10 kHz ... 50 kHz		2
	> 50 kHz ... 100 kHz		10
	> 15 Hz ... 45 Hz	3.00000 V 30.0000 V 300.000 V	2 + 10 D
	> 65 Hz ... 1 kHz		0.5
	> 1 kHz ... 20 kHz		1.5
	> 20 kHz ... 100 kHz		2
	> 15 Hz ... 45 Hz	1000.00 V	2 + 10 D
	> 65 Hz ... 1 kHz		1
	> 1 kHz ... 10 kHz		10

Influence Variable	Frequency	Meas. Quantity / Meas. Range [1]	Influence Error ±(... % of rdg. +... D)
Frequency I_{AC}	> 15 Hz ... 45 Hz	300.00 µA ... 10.000 A	2 + 10
	> 65 Hz ... 5 kHz		0.75 + 5
	> 5 kHz ... 10 kHz		5 + 5

[1] With zero balancing
[2] Indicated error applies as of display of 10% of measurement value

Influence Variable	Sphere of Influence		Meas. Quantity / Meas. Range [1]	Influence Error [2]
Measuring Quantity Waveform	Crest factor CF	1 ... 3	V ∼, A ∼	± 1 % of rdg.
		> 3 ... 5		± 3 % of rdg.
	The allowable crest factor, CF, for the alternating magnitude to be measured is dependent upon the displayed value: 			

Influence Variable	Sphere of Influence	Meas. Quantity / Meas. Range [1]	Influence Error
Relative Humidity	75 % 3 days instrument OFF	V, A, Ω F, Hz °C	1 x inherent deviation

Influence Variable	Sphere of Influence	Meas. Range	Damping ±dB
Common Mode Interference Voltage	Interference magnitude max. 1000 V ∼	V ⎓	> 90 dB
	Interference magnitude max. 1000 V ∼ 50 Hz, 60 Hz sine	300 mV ... 30 V ∼	> 80 dB
		300 V ∼	> 70 dB
		1000 V ∼	> 60 dB
Series Mode Interference Voltage	Interference magnitude V ∼ , per nominal measuring range value, max. 1000 V ∼ , 50 Hz, 60 Hz sine	V ⎓	> 60 dB
	Interference magnitude max. 1000 V ⎓	V ∼	> 60 dB

[1] With zero balancing
[2] Except for sinusoidal waveshape

Reference Conditions

Ambient Temperature	+23 °C ±2 K
Relative Humidity	45 ... 55%
Meas. Quantity Frequency	45 ... 65 Hz
Meas. Quantity Waveform	sine
Battery Voltage	3 V ±0.1 V
Adapter Voltage	4.5 V ±0.2 V

Response Time

Response Time (after manual range selection)

Meas. Quantity/ Measuring Range	Digital Display Response Time	Meas. Quantity Step Function
V ⎓ , V ∼, A ⎓ , A ∼	1.5 s	from 0 to 80 % of measuring range upper limit
300 Ω ... 3 MΩ	2 s	from ∞ to 50 % of measuring range upper limit
30 MΩ	5 s	
Continuity	< 50 ms	
⊣▸⊢	1.5 s	
3 nF ... 300 µF	max. 2 s	from 0 to 50 % of measuring range upper limit
3 000 µF	max. 7 s	
30 000 µF	max. 14 s	
>10 Hz	max. 1.5 s	
°C	max. 3 s	

Power Supply

Battery	2 ea. 1.5 V mignon cell alkali manganese cell per IEC LR6 zinc carbon battery per IEC R6
Service Life	with alkali manganese cell: approx. 100 hr. with zinc carbon battery: approx. 50 hr.
Battery Test	automatic display of " ⊣⊢ " symbol when battery voltage drops below approx. 2.3 V

Economy Circuit

The instrument is switched off automatically, if the measurement value remains unchanged for about 10 minutes, and if no activation of the operating elements occurs during this time. This function can be deactivated. This does not apply to the following functions: events counting, counting of zero crossings, stopwatch, power measurement, power disturbance recording, transmission and menu modes, and "continuous on".

Ambient Conditions

Operating Temperature	−20 °C ... +50 °C
Storage Temperature	−25 °C ... +70 °C (without batteries)
Relative Humidity	max. 75%, without condensation
Climatic Category	2z/−20/50/70/75% in compliance with VDI/VDE 3540
Elevation	to 2000 m

Mechanical Design

Protection	Devices: IP 50, Connector jacks: IP 20
Dimensions	84 mm x 195 mm x 35 mm
Weight	METRA*Hit*®28S: approx. 350 gr. with batteries METRA*Hit*®29S: approx. 405 gr. with batteries

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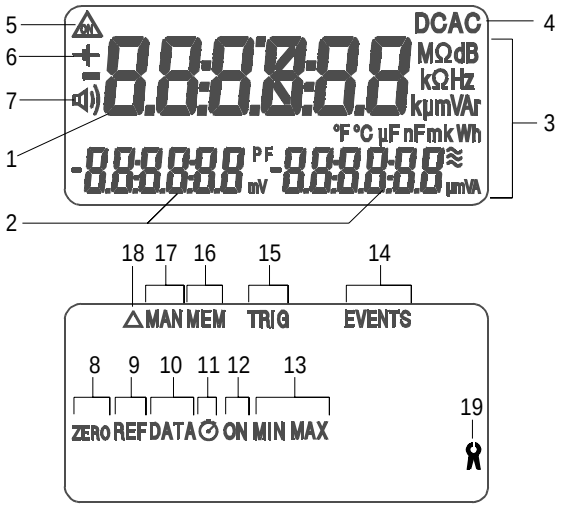
Display

LCD display field (65 mm x 30 mm) with display of max. 3 measurement values, unit of measure, current type and various special functions.

Display/Character Height	7 segment characters main display: 12 mm auxiliary displays: 7 mm
Number of Places	5¾ places ≙ 309999 steps
Overflow Display	"OL" appears in display
Polarity Display	"–" sign is displayed when plus pole is connected to "⊥" jack
Defective Fuse	"FUSE" appears in display



Digital Display Symbols

1 Main display with decimal point and polarity display
2 Auxiliary displays with decimal point and polarity display
3 Unit of measure
4 Selected current type
5 Continuous operation, symbol blinks for data transmission
6 Low battery
7 Acoustic signal on, buzzer sounds for corresponding function
8 Zero balancing
9 Reference value
10 Display memory, "save measurement value"
11 Stopwatch on, or elapsed time since start of measurement
12 Together with symbol 11:
Elapsed time since activation of corresponding function, counter, number of events if trigger threshold is exceeded
13 MIN/MAX storage
14 Event duration
15 Synchronized storage, *METRAHit*®29S *only*
16 Memory mode, *METRAHit*®29S *only*
17 Manual measuring range selection
18 Relative value
19 Measurement with (clip-on) current transformer is active:
Transformation ratio of 1000:1 or 10000:1 is taken into consideration.

Display Refresh

V (DC, AC+DC), A, Ω, →|←, EVENTS AC+DC, Count	2 per second
V AC, EVENTS AC	1 per second
W, VA, VAr, Wh	1 v second
Hz, °C (Pt100/1000)	1 to 2 per second
°C (J ,K)	0,5 per second

Fusing

Fuse for ranges

up 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 AC/DC with resistive load; protects all current measuring ranges up to 300 mA in combination with power diodes
up to 10 A	FF (UR) 16 A / 1000 V AC/DC; 10 mm x 38 mm; 30 kA switching capacity at 1000 V AC/DC with resistive load; protects 3 A and 10 A ranges

Electrical Safety

Protection Class	II per IEC 61010-1/EN 61010-1/ VDE 0411-1	
Overvoltage Category	II	III
Operating Voltage	1000 V	600 V
Contamination Level	2	2
Test Voltage	5.55 kV~ per IEC 61010-1/ EN 61010-1/VDE 0411-1	

Electromagnetic Compatibility, EMC

Interference Emission	EN 50081-1: 1992 / EN 55022: 1987 Class B
Interference Immunity	EN 50082-1: 1992 / IEC 801-2: 1991 8 kV atmospheric discharge / IEC 801-3: 1984 3 V/m / IEC 801-4: 1988 0.5 kV

Data Interface

Data Transmission	Optical transmission through housing with infrared light

With accessory interface adapter

Type	RS232C, serial, per DIN 19241
Baud Rate	METRA*Hit*®SI232-II: all baud rates METRA*Hit*®BD232: 9600 bauds

Accessories

Ever-Ready Case F836
for multimeters (without protective rubber cover) and accessories

Carrying Case F829
for multimeters (with or without protective rubber cover GH18) or accessories

METRA*Hit*®BD232 Interface Adapter

Parameters can be configured for METRA*Hit*®28S and 29S multimeters, and measurement data can be uploaded to a PC with the METRA*Hit*®BD232 bidirectional adapter. The adapter is not itself equipped with a memory, but it can be used to read out data from the memory at the METRA*Hit*®29S.
It supports all measuring functions and data formats available with the METRA*Hit*®20 series, and is included in the user-friendly BD Pack 1.

METRA*Hit*®SI232-II Memory Adapter *(for METRAHit®28S)*

The METRA*Hit*®SI232-II memory adapter can be attached to the METRA*Hit*®28S hand-held multimeter and allows for on-site storage of measurement data without the use of a PC, and uploading to a PC at a later point in time. Data are synchronized with an integrated clock. The data format is limited to a maximum of 30,000 digits for storage to memory.

Memory:
128 kB *(Equivalent to approx. 100,000 measurement values. Can be increased by a factor of 10 to 20 if data compression is used.)*

Adjustable Sampling Rate:
50 ms ... 1 min

METRAwin®10/METRA*Hit*® Software

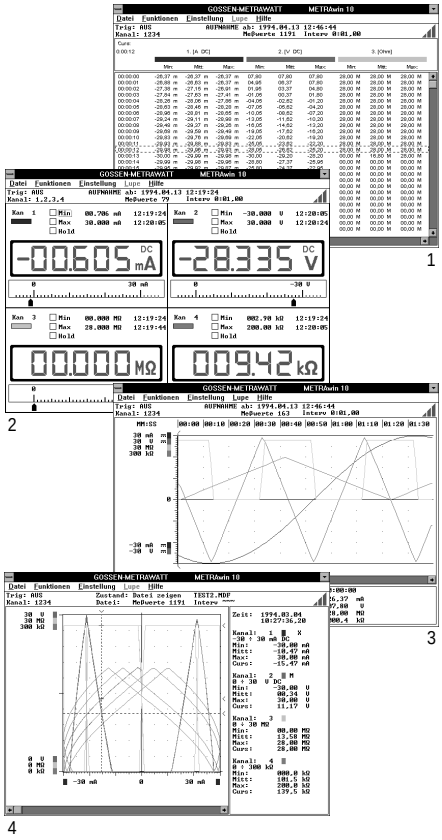
METRAwin®10/METRA*Hit*® software (runs under WINDOWS 3.11 or higher) provides for the processing and representation of measurement data at the PC. Sampling in the on-line mode can be accomplished manually with the adjustable sampling interval, or signal dependent (with adjustable signal hysteresis). Storage in ASCII format is controlled with two trigger thresholds per channel, as well as via system time.

Data Logger (1)

Acquired measurement data from up to 10 channels are displayed at the monitor in an easy to read table in numeric format.

Multimeter (2)

Transmitted measurement data from up to 4 freely selectable channels appear at the monitor in digital format with an additional analog scale display in online operation, or as an analog pointer instrument with optional digital display.



Y(t) Recorder (3)

Recorded measurement values from up to 4 freely selectable channels are displayed as a line diagram at the monitor with a horizontal time axis, and are measured off with two cursors. Stored signals can be zoomed in or out along the amplitude and time axes. The time scale can be displayed in absolute clock time or relative measuring time.

XY Recorder (4)

Recorded data from 2 to 4 freely selectable channels are displayed at the monitor as an XY graph and are measured off with the cursor. As is also the case with all other display formats, all of the scales are freely adjustable.

High performance arithmetic functions allow for both off-line and online analysis, linking and graphic representation of measurement data.

Sampling (on-line)

On-line sampling is accomplished manually (mouse click), automatically with an adjustable interval (50 ms ... 60 min) or signal-dependent with adjustable signal hysteresis (0 ... 500 digits). Data can be controlled with timing or trigger windows, and automatically stored as multiple data files.

Measurement Data Processing

Measurement data can be processed by means of computing and linearization functions. For example, mA signals from sensors or transducers can be directly represented as pressure values, as active power, or in many other units of measure.

METRA*Hit*®28S and 29S
Precision Digital Multimeter, Power Meter

Order Information

Designation	Type	ID Number
Precision digital multimeter including KS17 cable set, battery, GH18 and DKD calibration certificate	METRA*Hit*®28S [D]	M228A
Precision digital multimeter and power meter incl. KS17 cable set, battery, GH18 and DKD calibration certificate	METRA*Hit*®29S [D]	M229A
Accessories		
Power pack 230 V~/4,5 V, 600 mA	NA4/500	Z218A
Cable set for multimeter	KS17	GTY 3620 034 P0002
Safety cable set for power meters	KS29	Z229A
Single channel memory pack including: METRA*Hit*®BD232 bidirectional interface adapter, cable, METRAwin®10/ METRA*Hit*® software and installation instructions	BD-Pack 1 [2]	Z215A
Single channel memory pack including: METRA*Hit*®SI232-II memory adapter, cable, *METRAwin*®10/METRA*Hit*® software and installation instructions	1-CH. Pack [1]	GTZ 3231 020 R0001
Four channel memory pack including: 4 METRA*Hit*®SI232-II memory adapters, cable, *METRAwin*®10/METRA*Hit*® software and installation instructions	4-CH. Pack [1]	GTZ 3234 020 R0001
Memory adapter for METRA*Hit*®28S	SI232 [D]	GTZ 3242 020 R0001
Bidirectional interface adapter for METRA*Hit*®29S	BD232 [2]	GTZ 3242 100 R0001
Single channel pack including cable, METRAwin®10/METRA*Hit*® software and installation instructions	Z3231	GTZ 3231 000 R0001
RS232 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
Electric set including: F829 carrying case, WZ11 clip-on current transformer (15 ... 180 A~, 1 mA/1 A~) and measuring cables	Electric-Set	GTZ 3236 000 R0001
Clip-on current transformer 30 mA … 150 A, 1000:1 Frequency range 50 … 500 Hz Clip jaw opening: cable diameter max. 15 mm	WZ12D [D]	Z219D
Clip-on current transformer, 4 … 500 A~, 1 mA~/A~ with cable and protective circuit Clip jaw opening: cable diam. max. 30 mm	Z3511	GTZ 3511 000 R0001
Clip-on current transformer, 0,5 … 1000 A~, 1 mA~/A~ with cable and protective circuit Clip jaw opening: cable diam. max. 54 mm	Z3512	GTZ 3512 000 R0001
Clip-on current transformer, 1 … 2000 A~, 1 mA~/A~ with cable and protective circuit Clip jaw opening: cable diam. max. 64 mm	Z3514	GTZ 3514 000 R0001

Designation	Type	ID Number
Clip-on current/voltage transformer, active, with battery (service life 30 hr.) Measuring ranges AC 20 A Measuring ranges DC 30 A Frequency range DC ... 20 kHz Output 10 mV/A Clip jaw opening: cable diameter max. 19 mm	Z201A [1]	Z201A
Clip-on current/voltage transformer, active, with battery (service life 50 hr.) Measuring ranges AC 20 A/200 A Measuring ranges DC 30 A/300 A Frequency range DC ... 10 kHz Output 10 mV/A or 1 mV/A Clip jaw opening: cable diameter max. 19 mm	Z202A [1]	Z202A
Clip-on current/voltage transformer, active, with battery (service life 50 hr.) Measuring ranges AC 200 A/1000 A Measuring ranges DC 300 A/1000 A Frequency range DC ... 10 kHz Output 1 mV/A Clip jaw opening: cable diameter max. 32 mm	Z203A [1]	Z203A
Amp*FLEX* current transformer [D] 30/300 A; 3 V 300/3000 A; 3 V 1000 A; 1 V 1/10 kA; 1 V	AF033A [1] AF33A [1] AF11A [1] AF101A [1]	Z207A Z207B Z207D Z207C
Energy measurement adapter for Ferraris meters [D]	EMA1	Z112A
Pt100 temperature sensor for surface and immersion measurements, –40 ... +600 °C	Z3409A	GTZ 3409 000 R0002
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, from –50 .. +550 °C	TS-Chipset	GTZ 3406 000 R0001
Carrying case	F829	GTZ 3301 000 R0003
Ever-ready case	F836	GTZ 3302 000 R0001
Ever-ready case for 2 METRA*Hit*®S with METRA*Hit*®SI232-II and accessories	F840	GTZ 3302 001 R0001
Fuse link (10 ea.)	FF (UR) 1,6 A / 1000 V AC/DC	GTY 3578 136 P0001
Fuse link (10 ea.)	FF (UR) 16 A / 1000 V AC/DC	GTY 3578 176 P0001

[1] For METRA*Hit*®28S (with limited functionality)
[2] Highly recommended for METRA*Hit*®29S
[D] Data sheet available

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

An overview of all multimeters from the METRAHit® series is included in the METRAHit® and METRAwin® brochures.

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