

# METRAHIT | X-TRA | PRO | BASE TRMS Digital Multimeters

3-349-350-03  
1/11.05

- Digital Hand-Held Multimeter with RMS Measurement  
 $V_{AC\ TRMS}$ ,  $V_{AC+DC\ TRMS}$ ,  $V_{DC}$ , Hz (V), Hz (A),  $\Omega$ ,  $V \rightarrow \leftarrow$ , °C/°F (TC)
- 4½-place display (11,999 digits), with display illumination
- DKD calibration certificate

## METRAHIT | BASE

- Current measurement via clip-on current sensor:  
The transformation ratio is adjustable from 1 mV:1 mA to 1 mV:1 A, and is accounted for by the display.

## METRAHIT | X-TRA and METRAHIT | PRO

- Additional "low-resistance" (1 M $\Omega$ ) alternating voltage measurement
- 1 kHz / -3 dB low-pass filter can be activated
- Direct current measurement from 10 nA to 10 A, and 16 A for short periods

## METRAHIT | X-TRA

- Temperature measurement with Pt100(0) resistance thermometer
- Broad range capacitance measurement
- Frequency and keying ratio measurement at 2 to 5 V signals or up to 1 MHz
- Data memory and internal clock, power pack adapter socket
- Bidirectional infrared interface for exchanging data with a PC

CAT IV



QUALITY MANAGEMENT SYSTEM



DQS Certified per  
DIN EN ISO 9001:2000  
reg. no. 1262



## Applications

The multimeter is suitable for universal use in electrical engineering, electrical installation, laboratory applications, telecommunication, training etc.

The instrument can be used in the field and is equipped with internal, mains-independent supply power.

## Features

### Three Connector Jacks with Automatic Blocking Sockets (ABS) \*

All current ranges are implemented via a single connector jack which prevents any possibility of operator error. Beyond this, the automatic blocking sockets prevent incorrect connection of the measurement cables, as well as selection of the wrong measured quantity. Danger to the user, the instrument and the device under test resulting from operator error is thus ruled out.

\* Patented (patent no. DE 40 27 801 C2 and US 5,166,599)

### Overload Protection

The instrument is safeguarded for up to 1000 V in all measuring functions by overload protection. Voltages of greater than 1000 V and current of greater than 10 or 16 A are indicated acoustically. Dangerous contact voltages are indicated when the 1 kHz low-pass filter is activated.

The FUSE display appears at **METRAHIT | X-TRA** and **METRAHIT | PRO** instruments in order to indicate that the fuse for the current measuring input has blown.

### RMS Value with Distorted Waveshape

The utilized measuring method allows for waveshape independent RMS measurement (TRMS AC and AC+DC) for voltage and current (**METRAHIT | X-TRA** up to 20 kHz).

### Activatable Filter for V AC Measurement

A 1 kHz low-pass filter can be activated if required, for example when measuring motor voltage at electronic frequency converters. The input signal is checked by a voltage comparator for dangerous voltages as long as the low-pass filter is activated.

### Measuring 5 V Square-Wave Signals with the METRAHIT | X-TRA

This function makes it possible to test circuits and transmission cables by measuring the frequency and the keying ratio of pulses with amplitudes of 2 to 5 V and frequencies of 100 Hz to 1 MHz.

### Analog Scale for Quick Trend Display – Bar Graph or Pointer

The analog scale (with additional negative range for zero-frequency quantities) allows for faster recognition of measured value fluctuation than is possible with a digital display. The instrument can be switched back and forth between bar graph and pointer display.

### Automatic or Manual Measuring Range Selection

Measured quantities are selected by means of a rotary switch and a function key. The measuring range is automatically matched to the measured values. The measuring range can also be selected and fixed manually with a key.

# METRAHIT | X-TRA | PRO | BASE

## TRMS Digital Multimeters

### Fast Acoustic Continuity Test

Testing for short circuiting and interruption is possible with the selector switch in the  $\square$ ) position. The threshold value for acoustic signaling can be set to 1, 10, 20, 30, 40 or 90  $\Omega$ .

### 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 from the initial reference value by less or more than 0.1% of the measuring range.

\* 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 can be queried at the display.

### Battery Charging Status – Power Saving Circuit

The battery charging status is indicated by means of four symbols.

The device is switched off automatically if the measured value remains unchanged for a period of between 10 and 59 minutes (adjustable), and if none of the controls are activated during this time.

Automatic shutdown can be deactivated by switching the instrument to continuous operation.

**METRAHIT | X-TRA:** The infrared interface can be switched off in the standby mode.

### 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 and test probe holder. The rubber material also assures that the instrument does not wander if it is set up on a vibrating surface.

### Infrared Data Interface with METRAHIT | X-TRA

The device can be remote configured, and momentary and stored measurement data can be read out via the bidirectional infrared interface. The USB | X-TRA interface adapter and METRA | VIEW software are required to this end (see accessories). Interface protocol and device driver software for LabVIEW® (National Instruments™) are available upon request.

### DKD Calibration Certificate

The multimeters are furnished with an internationally valid DKD calibration certificate (recognized by EA and ILAC). After the specified calibration interval has elapsed (recommended interval: 1 to 3 years), the multimeters can be inexpensively recalibrated in our own DKD calibration laboratory.

## Applicable Regulations and Standards

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

## Selection List

Function	METRAHIT   X-TRA	METRAHIT   PRO	METRAHIT   BASE
V AC / Hz (Ri = 10 M $\Omega$ ) TRMS	•	•	•
V AC / 1 kHz low-pass filter (Ri = 1 M $\Omega$ ) TRMS	•	•	—
V AC+DC TRMS	•	•	•
V DC (Ri = 10 M $\Omega$ )	•	•	•
MHz 5 V AC	•	—	—
Keying ratio as %	•	—	—
Bandwidth, V AC	15 Hz ... 20 kHz	15 Hz ... 10 kHz	15 Hz ... 1 kHz
A AC / Hz TRMS	100 $\mu$ A 1/10/100 mA 1 A / 10 (16) A	1 A / 10 (16) A	—
A AC+DC TRMS	100 $\mu$ A 1/10/100 mA 1 A / 10 (16) A	1 A / 10 (16) A	—
A DC	100 $\mu$ A 1/10/100 mA 1 A / 10 (16) A	1 A / 10 (16) A	—
Fuses	10 A / 1000 V	10 A / 1000 V	—
A AC $\curvearrowright$ / Hz TRMS	—	—	•
A AC+DC $\curvearrowright$ TRMS	—	—	•
A DC $\curvearrowright$	—	—	•
Clip factor	—	—	•
Resistance $\Omega$	•	•	•
Continuity $\square$ )	•	•	•
Diode $\rightarrow $	•	•	•
Temperature TC (K)	•	•	•
Temperature RTD	•	—	—
Capacitance $\dashv$	•	—	—
Min-Max / data hold	•	•	•
4 MBit memory <sup>1)</sup>	•	—	—
IR Interface	•	—	—
Power pack socket	•	—	—
Protection	IP 52 <sup>2)</sup>	IP 52 <sup>2)</sup>	IP 52
Measuring category	1000 V CAT III 600 V CAT IV	1000 V CAT III 600 V CAT IV	1000 V CAT III 600 V CAT IV

<sup>1)</sup> For 15,400 measured values, sampling rate adjustable from 0.1 second to 9 hours  
<sup>2)</sup> IP 65 in preparation

## Included

- 1 multimeter
- 1 pair of safety measurement cables (1.5 m) with 4 mm test probes, 1000 V CAT III, 600 V CAT IV (KS17-2)
- 2 batteries, 1.5 V, type AA
- 1 condensed operating instructions, English/German
- 1 CD ROM (operating instructions in English and German), METRA | VIEW demo software in preparation
- 1 DKD calibration certificate
- 1 protective rubber cover (METRAHIT | X-TRA only)

## Voluntary Manufacturer's Guarantee

- 24 months for materials and workmanship
- 1 to 3 years for calibration (depending upon application)

# METRAHIT | X-TRA | PRO | BASE TRMS Digital Multimeters

## Characteristic Values

Meas. Function	Measuring Range	Resolution at Upper Range Limit		Input Impedance		Intrinsic Error under Reference Conditions			Overload Capacity <sup>2)</sup>	
		11,999	1199	$\equiv$	$\sim / \approx$	$\pm(\dots \% \text{ rdg.} + \dots \text{ d})$	$\pm(\dots \% \text{ rdg.} + \dots \text{ d})$	$\pm(\dots \% \text{ rdg.} + \dots \text{ d})$	Value	Time
<b>V</b>	100 mV	10 $\mu$ V		11 M $\Omega$	11 M $\Omega$ // < 50 pF	0.09 + 5 with ZERO	1 + 30 (> 300 d) <sup>1)</sup>	1 + 30 (> 300 d) <sup>1)</sup>	1000 V DC AC RMS sine <sup>6)</sup>	Continu-ous
	1 V	100 $\mu$ V		11 M $\Omega$	11 M $\Omega$ // < 50 pF	0.05 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)		
	10 V	1 mV		10 M $\Omega$	10 M $\Omega$ // < 50 pF	0.05 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)		
	100 V	10 mV		10 M $\Omega$	10 M $\Omega$ // < 50 pF	0.05 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)		
	1000 V	100 mV		10 M $\Omega$	10 M $\Omega$ // < 50 pF	0.09 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)		
				Voltage drop, approx. at upper range limit		$\equiv$	$\sim$	$\approx$		
<b>A</b> X-TRA PRO	100 $\mu$ A	10 nA		12 mV	12 mV	0.5 + 5	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)	0.2 A	Continu-ous
	1 mA	100 nA		120 mV	120 mV	0.5 + 3	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)		
	10 mA	1 $\mu$ A		16 mV	16 mV	0.5 + 3	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)		
	100 mA	10 $\mu$ A		160 mV	160 mV	0.5 + 3	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)		
	1 A	100 $\mu$ A		40 mV	40 mV	0.9 + 10	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)		
	10 A	1 mA		600 mV	600 mV	0.9 + 10	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)	10 A: continuous 16 A: 30 s	
	Factor: 1:1/10/100/1000	Input		Input impedance						
<b>A</b> BASE	0.1/1/10/100 A	100 mV		Voltage measurement input approx. 1 M $\Omega$ ( $\times$ V socket)		$\pm(0.5\% \text{ rdg.} + 10 \text{ d})$	$\pm(1\% \text{ rdg.} + 10 \text{ d})$	$\pm(1\% \text{ rdg.} + 10 \text{ d})$	Measurement input	
	1/10/100/1000 A	1 V				Plus clip-on current sensor error			1000 V RMS	Max. 10 s
	10/100/1000/10000 A	10 V								
				Open-circuit voltage	Meas. current at range limit	$\pm(\dots \% \text{ rdg.} + \dots \text{ d})$				
<b><math>\Omega</math></b>	100 $\Omega$	10 m $\Omega$		< 1.4 V	Approx. 300 $\mu$ A	0.2 + 5 with active ZERO function			1000 V DC AC RMS sine	Max. 10 s
	1 k $\Omega$	100 m $\Omega$		< 1.4 V	Approx. 250 $\mu$ A	0.2 + 5				
	10 k $\Omega$	1 $\Omega$		< 1.4 V	Approx. 100 $\mu$ A	0.2 + 5				
	100 k $\Omega$	10 $\Omega$		< 1.4 V	Approx. 12 $\mu$ A	0.2 + 5				
	1 M $\Omega$	100 $\Omega$		< 1.4 V	Approx. 1.2 $\mu$ A	0.2 + 5				
	10 M $\Omega$	1 k $\Omega$		< 1.4 V	Approx. 125 nA	0.5 + 10				
	40 M $\Omega$	10 k $\Omega$		< 1.4 V	Approx. 20 nA	2.0 + 10				
$\rightarrow$ )	100 $\Omega$	—	0.1 $\Omega$	Approx. 8 V	Approx. 1 mA const.	1 + 5				
$\rightarrow$ )	5,1 V <sup>3)</sup>	—	1 mV	Approx. 8 V	Approx. 1 mA const.	0.5 + 3				
				Discharge resist.	$U_{0 \text{ max}}$	$\pm(\dots \% \text{ rdg.} + \dots \text{ d})$				
<b>F</b> X-TRA	10 nF	10 pF		10 M $\Omega$	0.7 V	1 + 6 <sup>4)</sup> with ZERO function active			1000 V DC AC RMS sine	Max. 10 s
	100 nF	100 pF		1 M $\Omega$	0.7 V	1 + 6 <sup>4)</sup>				
	1 $\mu$ F	1 nF		100 k $\Omega$	0.7 V	1 + 6 <sup>4)</sup>				
	10 $\mu$ F	10 nF		12 k $\Omega$	0.7 V	1 + 6 <sup>4)</sup>				
	100 $\mu$ F	100 nF		3 k $\Omega$	0.7 V	5 + 6 <sup>4)</sup>				
	1000 $\mu$ F	1 $\mu$ F		3 k $\Omega$	0.7 V	5 + 6 <sup>4)</sup>				
				$f_{\text{min}}$ <sup>5)</sup>		$\pm(\dots \% \text{ rdg.} + \dots \text{ d})$				
<b>Hz (V)</b>	100.00 Hz	0.01 Hz							Hz (V) <sup>6)</sup> ; Hz (A $\rightarrow$ ) <sup>6)</sup> ; 1000 V Hz (A): <sup>7)</sup>	Max. 10 s
<b>Hz (A)</b>	1.0000 kHz	0.1 Hz			1 Hz					
<b>Hz (A <math>\rightarrow</math>)</b>	10.000 kHz	1 Hz				0.05 + 3 <sup>8)</sup>				
<b>Hz (V)</b>	100.00 kHz	10 Hz			10 Hz					
<b>Hz (A)</b>	30.00 kHz	10 Hz			10 Hz					
<b>MHz</b> X-TRA	100 Hz ... 1 MHz	100 Hz		100 Hz		0.05 + 3	> 2 V ... 5 V		1000 V	Max. 10 s
<b>%</b>	2.0 ... 98%	—	0.01%	100 Hz ... 1 kHz	1 Hz	0.1 R	> 2 V ... 5 V			
	5.0 ... 95%	—	0.01%	... 10 kHz	1 Hz	0.1 R	> 2 V ... 5 V			
	10 ... 90%	—	0.01%	... 100 kHz	1 Hz	0.1 R	> 2 V ... 5 V			
						$\pm(\dots \% \text{ rdg.} + \dots \text{ d})$				
<b><math>^{\circ}</math>C/<math>^{\circ}</math>F</b>	Pt100 X-TRA	-200.0 ... +850.0 $^{\circ}$ C	0.1 $^{\circ}$ C				0.3 + 15 <sup>9)</sup>		1000 V DC/AC RMS Sine	Max. 10 s
	Pt1000 X-TRA	-150.0 ... +850.0 $^{\circ}$ C					0.3 + 15 <sup>9)</sup>			
	K (NiCr-Ni)	-250.0 ... +1372.0 $^{\circ}$ C					1% + 5 K <sup>9)</sup>			

1) Values of less than 200 digits are suppressed.  
15 (20) ... 45 ... 65 Hz ... 20 (1) kHz sinusoidal. See influence error on page 4.

2) At 0 $^{\circ}$  ... + 40 $^{\circ}$  C

3) Displays up to max. 5.1 V, "OL" in excess of 5.1 V.

4) Applies to measurements at film capacitors

5) Lowest measurable frequency for sinusoidal measuring signals symmetrical to the zero point

6) Overload capacity of the voltage measurement input:  
power limiting: frequency x voltage max.  $3 \times 10^5$  V x Hz for  $U > 100$  V

7) Overload capacity of the current measurement input:

See current measuring ranges for maximum current values.

8) Input sensitivity, sinusoidal signal, 10% to 100% of the measuring range

9) Plus sensor deviation

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

# METRAHIT | X-TRA | PRO | BASE

## TRMS Digital Multimeters

### Internal Clock

Time format DD.MM.YYYY hh:mm:ss  
 Resolution 0.1 s  
 Accuracy ±1 min. per month  
 Temperature Influence 50 ppm/K

### Influencing Quantities and Influence Error

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range <sup>1)</sup>	Influence Error (...% + ... d) / 10 K
Temperature	-10° C ... +21° C and +25° C ... +50° C	V $\overline{\overline{=}}$	0.2 + 10
		V $\sim$	0.4 + 10
		100 $\Omega$ ... 1 M $\Omega$	0.5 + 10
		> 1 M $\Omega$	1 + 10
		mA/A $\overline{\overline{=}}$	0.5 + 10
		mA/A $\overline{\overline{\neq}}$	0.8 + 10
		10 nF ... 100 $\mu$ F	1 + 5
		Hz	0.2 + 10
		°C/°F (Pt100/Pt1000)	0.5 + 10
		°C/°F thermocouple K	0.2 + 10

<sup>1)</sup> With zero balancing

Influencing Qty.	Meas. Qty. / Meas. Range	Sphere of Influence	Intrinsic Error $\pm$ (... % rdg. + ... d)		
			METRAHIT METRAHIT	X-TRA PRO	METRAHIT BASE
Fre- quency	100.00 mV	> 15 Hz ... 45 Hz	3 + 30	3 + 30	3 + 30
		> 65 Hz ... 1 kHz	2 + 30	3 + 30	3 + 30
		> 1 kHz ... 10 kHz	3 + 30	—	—
	1.0000 V ... 100.00 V	> 15 Hz ... 45 Hz	2 + 9	3 + 9	3 + 9
		> 65 Hz ... 1 kHz	1 + 9	3 + 9	3 + 9
		> 1 kHz ... 20 kHz	3 + 9	—	—
	1000.0 V <sup>3)</sup>	> 15 Hz ... 45 Hz	2 + 9	3 + 9	3 + 9
		> 65 Hz ... 1 kHz	1 + 9	3 + 9	3 + 9
		> 1 kHz ... 10 kHz	3 + 9	—	—
	A <sub>AC</sub> <sup>3)</sup>	100.00 $\mu$ A ... 10.0000 A	> 65 Hz ... 10 kHz	3 + 3	—
A <sub>AC</sub> <sup>3)</sup>		100 mV / 1 V / 10 V	> 65 Hz ... 1 kHz	—	3 + 10

<sup>2)</sup> Power limiting: frequency x voltage max.  $3 \times 10^6$  V x Hz

<sup>3)</sup> The accuracy specification is valid as of 2% of the measuring range for both measuring modes with the TRMS converter in the A AC and A (AC+DC) ranges, and for frequency response within a display value range of 10% to 100% of the measuring range.

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range	Influence Error <sup>4)</sup>
Measured Quantity Waveshape	Crest Factor CF	1 ... 3	± 1% rdg.
		> 3 ... 5	± 3% rdg.

Allowable crest factor CF of the periodic quantity to be measured is dependent upon the displayed value:

<sup>4)</sup> Except for sinusoidal waveshape

Influencing Quantity	Sphere of Influence	Measured Quantity	Influence Error
Relative humidity	75%	V, A, $\Omega$ , F, Hz, °C	1 x intrinsic error
	3 days instrument off		
Battery voltage	1.8 to 3.6 V	ditto	Included in intrinsic error

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range	Damping
Common Mode Interference Voltage	Interference quantity max. 1000 V $\sim$	V $\overline{\overline{=}}$	> 120 dB
		1 V $\sim$ , 10 V $\sim$	> 80 dB
	Interference quantity max. 1000 V $\sim$ 50 Hz ... 60 Hz, sine	100 V $\sim$	> 70 dB
		1000 V $\sim$	> 60 dB
Series Mode Interference Voltage	Interference quantity: V $\sim$ , respective nominal value of the measuring range, max. 1000 V $\sim$ , 50 Hz ... 60 Hz, sine	V $\overline{\overline{=}}$	> 50 dB
		Interference quantity max. 1000 V $\sim$	V $\sim$ > 110 dB

### Reference Conditions

Ambient temperature +23 °C ± 2 K  
 Relative humidity 40 ... 75%  
 Measured qty. frequency 45 ... 65 Hz  
 Measured qty. waveshape Sine  
 Battery voltage 3 V ± 0.1 V

### Response Time (after manual range selection)

Measured Quantity / Measuring Range	Response Time Digital Display	Measured Quantity waveshape
V $\overline{\overline{=}}$ , V $\sim$ AV $\overline{\overline{=}}$ , A $\sim$	1.5 s	From 0 to 80% of upper range limit value
100 $\Omega$ ... 1 M $\Omega$	2 s	From $\infty$ to 50% of upper range limit value
10/40 M $\Omega$	5 s	
Continuity	< 50 ms	
°C (Pt 100)	Max. 3 s	
$\rightarrow$	1.5 s	From 0 to 50% of upper range limit value
10 nF ... 100 $\mu$ F	Max. 2 s	
1 000 $\mu$ F	Max. 7 s	
> 10 Hz	1.5 s	

### Data Interface (METRAHIT | X-TRA only)

Type Optical via infrared light through the housing  
 Data transmission Serial, bidirectional (not IrDa compatible)  
 Protocol Device specific  
 Baud rate 38,400 baud  
 Functions – Select/query measuring functions and parameters  
 – Query momentary measurement data  
 – Read out stored measurement data


The USB | X-TRA plug-in interface adapter (see accessories) is used for adaptation to the PC's USB port.

### Internal Measured Value Storage (METRAHIT | X-TRA only)

Memory capacity 4 MBit / 540 kB for approx. 15,400 measured values with date and time stamp

# METRAHIT | X-TRA | PRO | BASE TRMS Digital Multimeters

## Power Supply

Battery	2 ea. 1.5 V mignon cell (2 ea. size AA), alkaline manganese per IEC LR6 (2 ea. 1.2 V NiMH rechargeable battery also possible)
Service life	with alkaline manganese: approx. 200 hours
Battery test	Battery capacity display with battery symbol in 4 segments:  . Querying of momentary battery voltage via menu function.
Power OFF function	Multimeter is switched off automatically: – If battery voltage drops to below prox. 1.8 V – If none of the keys or the rotary switch are activated for an adjustable duration of 10 to 59 minutes, and the multimeter is not in the continuous operation mode
Power pack socket (METRAHIT   X-TRA)	If the NA   X-TRA power pack has been plugged into the instrument, the batteries are disconnected automatically. Rechargeable batteries can only be recharged externally.

## Display

LCD panel (65 mm x 36 mm) with analog and digital display including unit of measure, type of current and various special functions

### Background illumination

Background illumination is switched off approximately 1 minute after it has been activated.

### Analog

Display	LCD scale with bar graph or pointer, depending on the selected parameter setting
Scaling	With 4 division lines each, 1 bar/pointer corresponds to 500 digits at the digital display
Polarity display	With automatic switching
Overflow display	With the ► symbol
Measuring rate	40 measurements per second and display refresh

### Digital

Display / char. height	7-segment characters / 15 mm
Number of places	4½ place $\triangleq$ 11,999 steps
Overflow display	“OL” is displayed for $\geq 12,000$ digits
Polarity display	“–” (minus sign) is displayed if plus pole is connected to “⊥”
Measuring rate	10 and 40 measurements per second with the Min-Max function except for the capacitance, frequency and keying ratio measuring functions
Refresh rate	2 times per sec., every 500 ms

## Acoustic Signals

For voltage	Intermittent signal at above 1000 V
For current	Intermittent signal at above 10 A continuous signal at above 16 A

## Fuse for METRAHIT | X-TRA/METRAHIT | PRO

Fuse	FF (UR) 10 A/1000 V AC/DC; 10 mm x 38 mm, Switching capacity: 30 kA at 1000 V AC/DC, protects the current measurement input in the 100 $\mu$ A through 10 A ranges
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## Electrical Safety

Per IEC 61010-1:2001/VDE 0411-1:2002

Safety class	II	
Measuring category	III	IV
Operating voltage	1000 V	600 V
Fouling factor	2	
Test voltage	6.7 kV~	

## Electromagnetic Compatibility (EMC)

Interference emission	EN 61326: May 2004, class B
Interference immunity	EN 61326: May 2004, appendix E IEC 61000-4-2: Dec. 2001 Feature B
	8 kV atmos. discharge 4 kV contact discharge
	IEC 61000-4-3: Dec. 2001 Feature A
	3 V/m

## Ambient Conditions

Operating temp. range	–10° C ... +50° C
Storage temp. range	–25° C ... +70° C (without batteries)
Relative humidity	Max. 75%, no condensation allowed
Elevation	To 2000 m
Deployment	Indoors, except within specified ambient conditions

## Mechanical Design

Housing	Impact resistant plastic (ABS)
Dimensions	200 x 87 x 45 mm (without protective rubber cover)
Weight	Approx. 0.35 kg with batteries
Protection	Housing: IP 52 (pressure equalization by means of the housing)

Table excerpt regarding significance of the IP code

IP XY (1 <sup>st</sup> digit X)	Protection against penetration of solid particles	IP XY (2 <sup>nd</sup> digit Y)	Protection against penetration by water
5	Dust protected	2	Dripping (15° inclination)
6	Dust-proof	5	Jet-water

# METRAHIT | X-TRA | PRO | BASE TRMS Digital Multimeters

## Accessories for Operation at a PC (METRAHIT | X-TRA only)

### Interface Adapter for USB Connection

The USB | X-TRA bidirectional interface adapter includes the following functions:

- Configure the METRAHIT | X-TRA from a PC.
- Transmit live measurement data to the PC.
- Read out data from memory at the METRAHIT | X-TRA.

The adapter does not require a separate power supply. Its maximum baud rate is 38,400 baud. A CD ROM is included which contains current drivers for Windows operating systems.



## Software METRA | VIEW

METRA | VIEW PC software is a multilingual, measurement data logging program for recording, visualizing, evaluating and documenting measured values from METRAHIT | multimeters.

Communications between the PC and the measuring instrument(s) is established via the bidirectional IR-USB interface adapter.

Depending upon device type, one or several of the following operating modes are possible:

*Demo software with limited functions is included with the instrument, or can be downloaded via the Internet.*

### Configuring Measuring Instrument Parameters

Remote configuration and querying of device-specific functions and parameters, for example measuring function, measuring range and memory parameters:

- Start/stop recording
  - Clear memory
  - Display memory occupancy
  - Adjust recording speed in 3 groups
    - 0.1 ... 50 seconds
    - 1 ... 50 minutes
    - 1 ... 9 hours
- as time per measured value.

### Online Recording of Measurement Data

Read in, display and record currently measured live measurement data from the interconnected measuring instruments.

- No. of meas. channels Up to 4 (additional channels in preparation)
  - Start recording
    - Manual or triggered by measured value, 0.1 sec. to 5 min. per measurement, max. 2000 measurements per channel
- Recording:** consecutive number, measuring time, measured value and measured quantity, recording as text file, or alternatively as Excel file.

### Reading Out Data from Memory

Read-out and display of recorded measured values from device memory and storage as a text file.

## Measured Value Display

- Display of measured value, measured quantity and range as a numeric decimal value (simulation of a device display, see left half of figure 1)
- Scalable pointer display with 1, 2 or 4 indicators (see bottom right portion of figure 1). Each pointer can also be displayed as a full screen image. Graphic read-out of the pointer to a printer.
- Measured value display as a digital indicator
- Parallel representation and recording of 4 measuring channels as a storable data table (see upper right portion of figure 1) (date, time of measurement, measured value and quantity, measuring range)

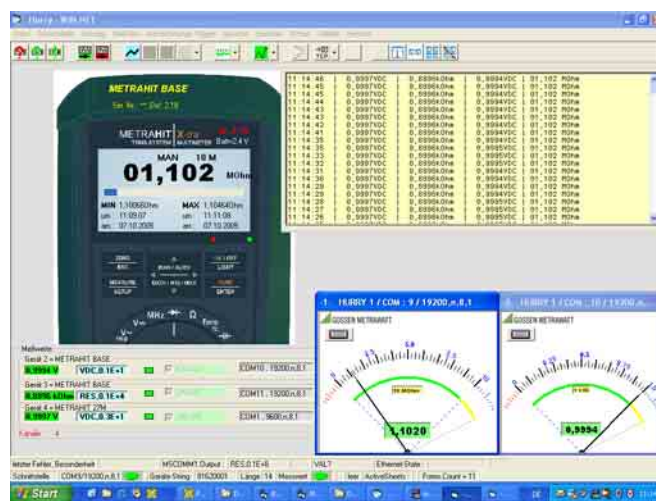


Figure 1: 2-Channel Representation with Table and Pointer Display

## Graphic Representation

A data table which has been saved to memory can be converted into a curve diagram with the following characteristics by simply pressing a key:

- Scalable scope display with up to 4 channels
- Selectable sampling rate and scaling
- Selectable background and characteristic curve colors, selection of normal of heavy line thickness

The display can be subsequently saved as a BMP file, or read out to a printer.

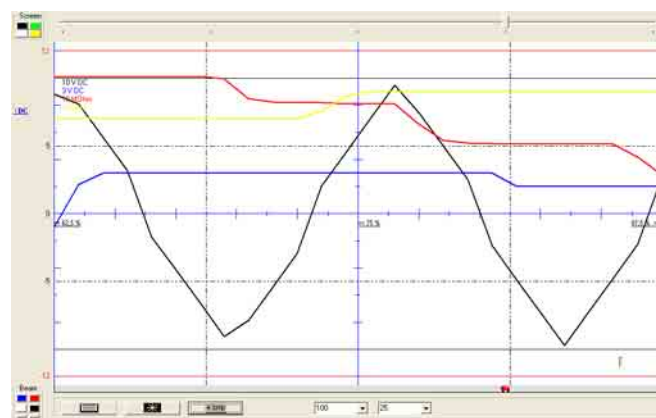


Figure 2: 4-Channel Graphic Representation

# METRAHIT | X-TRA | PRO | BASE TRMS Digital Multimeters

## Order Information

Designation	Type	Article Number
<b>METRAHIT   X-TRA, METRAHIT   PRO and METRAHIT   BASE Multimeters</b>		
4½-place (12,000 digits) TRMS multimeter with direct, alternating and pulsating voltage measurement (TRMS values), frequency measurement, resistance measurement, continuity test, diode measurement and temperature measurement with type K thermocouples LCD with 15 mm characters, analog bar graph and background illumination Measuring categories: 600 V/CAT IV, 1000 V/CAT III		
All multimeters include the KS17-2 measurement cable set, two mignon batteries, condensed operating instructions, CD ROM, DKD calibration certificate		
Same as above but with direct, alternating and pulsating current measurement (RMS values), additional broad range capacitance measurement, precision temperature measurement with Pt100 or Pt1000 platinum resistance thermometers, frequency and keying ratio measurement, with power pack socket and IR interface, 4 MB data memory, protective rubber cover	<b>METRAHIT   X-TRA</b>	M240A
Same as above but with additional direct, alternating and pulsating current measurement (RMS values),	<b>METRAHIT   PRO</b>	M242A
Same as above but with current measurement via clip-on current sensor with voltage output (see accessories) instead of direct current measurement, and adjustable clip parameters.	<b>METRAHIT   BASE</b>	M241A
<b>Accessories for operation at a PC (for METRAHIT   X-TRA only)</b>		
IR-USB bidirectional interface adapter	USB   <b>X-TRA</b>	Z216C
METRA   <b>VIEW</b> software	METRA   <b>VIEW</b>	Z211G
<b>Voltage measuring accessories</b>		
Probe for voltage measurement in power installations 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
<b>Accessories for temp. measurement with resistance thermometer (METRAHIT   X-TRA only)</b>		
Pt100 temperature sensor for surface and immersion measurement, -40 to +600° C	Z3409	GTZ 3409 000 R0001
Pt1000 temperature sensor for measurement in gases and liquids, -50 to +220° C	TF220	Z102A
Pt100 oven sensor, -50 to +550° C	TF550	GTZ 3408 000 R0001
Ten adhesive Pt100 temperature sensors, -50 to +550° C	TS Chipset	GTZ 3406 000 R0001
<b>Replacement fuse (METRAHIT   X-TRA and METRAHIT   PRO only)</b>		
Fuses (pack of 10)	FF (UR) 10 A / 1000 V AC/DC	Z109L
Power pack (for <b>METRAHIT   X-TRA</b> only)	NA   <b>X-TRA</b>	Z218G
Protective rubber cover and carrying strap	GH   <b>X-TRA</b>	Z104C

## Transport Accessories

### HitBag Cordura Belt Pouch

For METRAHIT | multimeters (with/without protective rubber cover) and METRAport



### HC20 Hard Case

For multimeter (with/without protective rubber cover) and accessories



### F836 Ever-Ready Case

For multimeter (without protective rubber cover) and accessories



### F829 Carrying Pouch

For multimeters (with/without protective rubber cover) and accessories



Designation	Type	Article Number
Protective rubber cover and carrying strap		
Imitation leather without protective rubber cover for <b>METRAHIT  </b> and METRAmax	F829	GTZ 3301 000 R0003
Cordura belt pouch for <b>METRAHIT  </b> multimeters and METRAport	HitBag	Z115A
Imitation leather ever-ready case with cable compartment	F836	GTZ 3302 000 R0001
Ever-ready case for 2 <b>METRAHIT  </b> , 2 adapters and accessories	F840	GTZ 3302 001 R0001
Hard case for one <b>METRAHIT  </b> and accessories	HC20	Z113A
Hard case for two <b>METRAHIT  </b> and accessories	HC30	Z113A

For additional information regarding accessories please refer to our Measuring Instruments and Testers catalog.



# METRAHIT | X-TRA | PRO | BASE

## TRMS Digital Multimeters

Current Measuring Accessories									Suitable for METRAHIT	
All current sensors and transformers are equipped with a connector cable (1.2 to 1.5 m long) with 4 mm safety banana plugs									BASE	X-TRA PRO
Type	Designation	Measuring Range	Meas. Category	Max. Wire Dia.	Transformation Ratio	Frequency Range	Intrinsic Error $\pm$ (% rdg. + ...)	Article Number		
<b>DC/AC Current Sensors with Voltage Output</b>										
Z201A	DC/AC 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	DC/AC 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	DC/AC 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	DC/AC 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	●	●
<b>AC Current Sensors with Voltage Output</b>										
WZ12B	AC clip-on current sensor	10 mA~ ... 100 A~	300 V / CAT III	15 mm	100 mV/A	45 ... 65 ... 500 Hz	1.5% + 0.1 mA	Z219B	●	●
WZ12C	AC 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	AC 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	AC clip-on current sensor, with 4 measuring ranges	1 mA ... 1/10/100/ 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 AC 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 AC 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 AC 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 AC 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	●	●
<b>AC Current Transformer with Current Output</b>										
WZ12A	AC clip-on current transformer	15 ... 180 A~	300 V / CAT III	15 mm	1 mA/A	45 ... 65 ... 400 Hz	3%	Z219A	—	●
WZ12D	AC 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	AC clip-on current transformer	1 ... 200 A~	600 V / CAT III	20 mm	1 mA/A	48 ... 65 ... 400 Hz	1 ... 3%	Z208A	—	●
Z3511	AC 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	AC 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	AC 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	—	●
<b>Shunt Resistors for Multimeters without Current Measuring Function</b>										
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

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