GOSSEN METRAWATT

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

3-349-350-03
3/2.07

- Digital Hand-Held Multimeters with RMS Measurement $V_{AC\ TRMS}$, $V_{AC+DC\ TRMS}$, V_{DC}, Hz (V), Hz (A), Ω, V⊣, °C/°F (TC)
- 4½-place display (11,999 digits), with display illumination

METRAHIT | BASE

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

METRAHIT | TECH

- Direct Current measurement with increased accuracy and Current measurement, via clip-on current transformer and sensors
- Broad range capacitance measurement

METRAHIT | X-TRA and METRAHIT | PRO

- Additional "low-resistance" (1 MΩ) alternating voltage measurement
- 1 kHz / -3 dB low-pass filter can be activated

METRAHIT | X-TRA

- Direct current measurement from 10 nA to 10 A, 16 A for short periods
- 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 bidirectional infrared interface

CAT IV

Deutscher Kalibrierdienst DKD - K - 19701
DKD
Calibration Certificate included

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**, **METRAHIT | TECH** 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 | TECH | PRO | BASE
TRMS Digital Multimeters

Fast Acoustic Continuity Test

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

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 | TECH	METRAHIT | PRO	METRAHIT | BASE
V AC / Hz TRMS (Ri ≥ 9 MΩ)	1kHz Filter	1kHz Filter	1kHz Filter	•
V AC TRMS (Ri = 1 MΩ)	1kHz Filter	1kHz Filter	1kHz Filter	—
V AC+DC TRMS (Ri ≥ 9 MΩ)	•	•	•	•
V DC (Ri ≥ 9 MΩ)	•	•	•	•
... 1 MHz 5 V AC⊓	•	—	—	—
Keying ratio as %	•	—	—	—
Hz (V AC)	... 100 kHz	... 100 kHz	... 100 kHz	... 100 kHz
Bandwidth, V AC	15 Hz ... 20 kHz	15 Hz ... 10 kHz	15 Hz ... 10 kHz	15 Hz ... 1 kHz
A AC / Hz TRMS	100 µA 1/10/100 mA 1 A / 10 (16) A	10/100 mA 1 A / 10 (16) A	1 A / 10 (16) A	—
A AC+DC TRMS				—
A DC				—
Fuse	10 A/1000 V	10 A/1000 V	10 A/1000 V	—
Transformation factor ⊃⊂	—	•	—	•
A AC ⊃⊂ / Hz TRMS	—	mV/A mA/A	—	mV/A Ri = 1 MΩ
A AC+DC ⊃⊂ TRMS	—	mV/A mA/A	—	mV/A Ri = 1 MΩ
A DC ⊃⊂	—	mV/A mA/A	—	mV/A Ri = 1 MΩ
Hz (A AC)	... 30 kHz	... 30 kHz	... 30 kHz	... 30 kHz
Resistance Ω	•	•	•	•
Continuity	•	•	•	•
Diode ... 5,1 V	•	•	•	•
Temperature TC (K)	•	•	•	•
Temperature RTD	•	—	—	—
Capacitance	•	•	—	—
MIN/MAX / data hold	•	•	•	•
4 MBit memory [1]	•	—	—	—
IR Interface	•	—	—	—
Power pack adapter socket	•	—	—	—
Protection	IP52 [2]	IP52 [2]	IP52 [2]	IP52
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	1000 V CAT III 600 V CAT IV

[1] For 15,400 measured values, sampling rate adjustable from 0.1 second to 9 hours
[2] 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, content: operating instructions in English and German), **METRA | VIEW** demo software
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)

TRMS Digital Multimeters

Characteristic Values

Meas. Function	Measuring Range	Resolution at Upper Range Limit 11,999	Resolution at Upper Range Limit 1199	Input Impedance ⎓	Input Impedance ~ / ≂	Intrinsic Errorunder Reference Conditions ±(... % rdg. + ... d) ⎓	±(... % rdg. + ... d) ~ 10)	±(... % rdg. + ... d) ≂ 10)	Overload Capacity 2) Value	Overload Capacity 2) Time
V	100 mV	10 µV		≥ 9 MΩ	≥ 9 MΩ // < 50 pF	0.09 + 5 with ZERO	1 + 30 (> 300 d) 1)	1 + 30 (> 300 d) 1)	1000 V DC AC RMS sine 6)	Continuous
	1 V	100 µV		≥ 9 MΩ	≥ 9 MΩ // < 50 pF	0.05 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)		
	10 V	1 mV		≥ 9 MΩ	≥ 9 MΩ // < 50 pF	0.05 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)		
	100 V	10 mV		≥ 9 MΩ	≥ 9 MΩ // < 50 pF	0.05 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)		
	1000 V	100 mV		≥ 9 MΩ	≥ 9 MΩ // < 50 pF	0.09 + 3	0.5 + 9 (> 200 d)	1 + 30 (> 300 d)		
				Voltage drop, approx. at upper range limit		⎓	~ 10)	≂ 10)		
A X-TRA PRO	100 µA	10 nA		12 mV	12 mV	0.5 + 5	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)	0,2 A	dauernd
	1 mA	100 nA		120 mV	120 mV	0.5 + 3	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)		
	10 mA	1 µA		16 mV	16 mV	0.5 + 3	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)		
	100 mA	10 µA		160 mV	160 mV	0.5 + 3	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)		
	1 A	100 µA		40 mV	40 mV	0.9 + 10	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)	10 A: 5 min 16 A: 30 s	
	10 A	1 mA		600 mV	600 mV	0.9 + 10	1.5 + 10 (> 200 d)	1.5 + 30 (> 200 d)		
A TECH	10 mA	1 µA		16 mV	16 mV	0.1 + 5	1 + 10 (> 200 d)	1.5 + 30 (> 200 d)	0,2 A	dauernd
	100 mA	10 µA		160 mV	160 mV	0.1 + 5	1 + 10 (> 200 d)	1.5 + 30 (> 200 d)		
	1 A	100 µA		40 mV	40 mV	0.9 + 10	1 + 10 (> 200 d)	1.5 + 30 (> 200 d)	10 A: 5 min 16 A: 30 s	
	10 A	1 mA		600 mV	600 mV	0.9 + 10	1 + 10 (> 200 d)	1.5 + 30 (> 200 d)		
	Factor: 1:1/10/100/1000	**Input**		**Input impedance**						
A TECH	0,1/1/10/100 A	100 mA		Current measuring input (A socket)		Specification see current ranges A (TECH) plus clip-on current sensor error			Measuring input 0,2 A continuous 10 A: 5 min	
	1/10/100/1000 A	1 A								
	10/100/1000/10000A	10 A								
A TECH BASE	0.1/1/10/100 A	100 mV		Voltage measurement input TECH: (V socket) Ri =1 MΩ/9 MΩ BASE: (A V socket) Ri ~1 MΩ		±(0.5% rdg. + 10 d)	±(1 % rdg. + 30 d) > 300 d	±(1 % rdg. + 30 d) > 300 d	Measurement input 1000 V RMS	Max. 10 s
	1/10/100/1000 A	1 V				Plus clip-on current sensor error				
	10/100/1000/10000A	10 V								
				Open-circuit voltage	Meas. curr. @ range limit	±(... % rdg. + ... d)				
Ω	100 Ω	10 mΩ		< 1.4 V	Approx. 300 µA	0.2 + 5 with active ZERO function			1000 V DC AC RMS sine	Max. 10 s
	1 kΩ	100 mΩ		< 1.4 V	Approx. 250 µA	0.2 + 5				
	10 kΩ	1 Ω		< 1.4 V	Approx. 100 µA	0.2 + 5				
	100 kΩ	10 Ω		< 1.4 V	Approx. 12 µA	0.2 + 5				
	1 MΩ	100 Ω		< 1.4 V	Approx. 1.2 µA	0.2 + 5				
	10 MΩ	1 kΩ		< 1.4 V	Approx. 125 nA	0.5 + 10				
	40 MΩ	10 kΩ		< 1.4 V	Approx. 20 nA	2.0 + 10				
	100 Ω	—	0.1 Ω	Approx. 8 V	Approx. 1 mA const.	1 + 5				
	5,1 V 3)	—	1 mV	Approx. 8 V	Approx. 1 mA const.	0.5 + 3				
				Discharge resist.	$U_{0\ max}$	±(... % rdg. + ... d)				
F X-TRA TECH	10 nF		10 pF	10 MΩ	0.7 V	1 + 6 4) with ZERO function active			1000 V DC AC RMS sine	Max. 10 s
	100 nF		100 pF	1 MΩ	0.7 V	1 + 6 4)				
	1 µF		1 nF	100 kΩ	0.7 V	1 + 6 4)				
	10 µF		10 nF	12 kΩ	0.7 V	1 + 6 4)				
	100 µF		100 nF	3 kΩ	0.7 V	5 + 6 4)				
	1000 µF		1 µF	3 kΩ	0.7 V	5 + 6 4)				
					f_{min} 5)	±(... % rdg. + ... d)				
Hz (V)	100.00 Hz	0.01 Hz			1 Hz	0.05 + 3 8)			Hz (V) 6): Hz (A): 6): 1000 V Hz (A): 7)	Max. 10 s
Hz (A)	1.0000 kHz	0.1 Hz								
Hz (A)	10.000 kHz	1 Hz								
Hz (V)	100.00 kHz	10 Hz			10 Hz					
Hz (A)	30.00 kHz	10 Hz			10 Hz					
MHz X-TRA	100 Hz ... 1 MHz	100 Hz		100 Hz		0.05 + 3	> 2 V ... 5 V		1000 V	Max. 10 s
% X-TRA	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 per kHz	> 2 V ... 5 V			
	10 .... 90 %	—	0.01%	...100 kHz	1 Hz	0.1 R per kHz	> 2 V ... 5 V			
						±(... % rdg. + ... d)				
°C/°F	Pt100 X-TRA – 200.0 ... +850.0° C	0.1 °C				0.3 + 15 9)			1000 V DC/AC RMS Sine	Max. 10 s
	Pt1000 X-TRA – 150.0 ... +850.0° C					0.3 + 15 9)				
	K (NiCr-Ni) – 250.0 ... +1372.0° C					1% + 5 K 9)				

1) Values of less than 200 digits are suppressed in the mV range.
15 (20) ... 45 ... 65 Hz ... 20 (1) kHz sinusoidal. See influence error on page 4.
2) At 0° ... + 40° 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 x 10^6 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
10) Residual value deviates within 1 ... 30 d from the zero point due to TRMS converter when probe tips are short-circuited

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

METRAHIT | X-TRA | TECH | 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 [1]	Influence Error (...% rdg. + ... d) / 10 K
Temperature	–10° C ... +21° C and +25° C ... +50° C	V ⎓	0.2 + 10
		V ∼	0.4 + 10
		100 Ω ... 1 MΩ	0.5 + 10
		> 1 MΩ	1 + 10
		mA/A ⎓	0.5 + 10
		mA/A ≂	0.8 + 10
		10 nF ... 100 µF	1 + 5
		Hz	0.2 + 10
		°C/°F (Pt100/Pt1000)	0.5 + 10
		°C/°F thermocouple K	0.2 + 10

[1] With zero balancing

Influencing Qty.	Meas. Qty. / Meas. Range		Sphere of Influence	Intrinsic Error [3] ±(... % rdg. + ... d) METRAHIT | X-TRA METRAHIT | TECH METRAHIT | PRO	Intrinsic Error [3] ±(... % rdg. + ... d) METRAHIT | BASE
Frequency	V_{AC}	100.00 mV	> 15 Hz ... 45 Hz	3 + 30	3 + 30
			> 65 Hz ... 1 kHz	2 + 30	3 + 30
			> 1 kHz ... 10 kHz	3 + 30	—
		1.0000 V ... 100.00 V	> 15 Hz ... 45 Hz	2 + 9	3 + 9
			> 65 Hz ... 1 kHz	1 + 9	3 + 9
			> 1 kHz ...10/20kHz [4]	3 + 9	—
		1000.0 V [2]	> 15 Hz ... 45 Hz	2 + 9	3 + 9
			> 65 Hz ... 1 kHz	2 + 9	3 + 9
			> 1 kHz ... 10 kHz	3 + 30	—
	A_{AC}	100.00 µA ... 10.0000 A	> 15 Hz ... 45 Hz	3 + 10	—
			> 65 Hz ... 10 kHz		
	A_{AC} ⫘	100 mV / 1 V / 10 V	>65 Hz ... 1 kHz	—	3 + 10

[2] Power limiting: frequency x voltage max. 3×10^6 V x Hz for U > 100 V

[3] The accuracy specification for frequency response is valid within a display value range of 10% to 100% of the measuring range for both measuring modes with the TRMS converter in the AC and (AC+DC) ranges.

[4] **METRAHIT** | X-TRA: frequency response up to 20 kHz,
METRAHIT | TECH: frequency response up to 10 kHz,
METRAHIT | PRO: frequency response up to 10 kHz,
METRAHIT | BASE: frequency response up to 1 kHz

Influencing Quantity	Sphere of Influence	Measured Quantity/ Measuring Range	Influence Error [5]
Crest factor CF	1 ... 3	V ∼, A ∼	± 1 % rdg.
	> 3 ... 5		± 3 % rdg.

[5] Except for sinusoidal waveshape

Influencing Quantity	Sphere of Influence	Measured Quantity	Influence Error
Relative humidity	75% 3 days instrument off	V, A, Ω, F, Hz, °C	1 x intrinsic error
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 ∼	V ⎓	> 120 dB
	Interference quantity max. 1000 V ∼ 50 Hz ... 60 Hz, sine	1 V ∼, 10 V ∼	> 80 dB
		100 V ∼	> 70 dB
		1000 V ∼	> 60 dB
Series Mode Interference Voltage	Interference quantity: V ∼ , respective nominal value of the measuring range, max. 1000 V ∼ , 50 Hz ... 60 Hz, sine	V ⎓	> 50 dB
	Interference quantity max. 1000 V ⎓	V ∼	> 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 ⎓ , V ∼ AV ⎓ , A ∼	1.5 s	From 0 to 80% of upper range limit value
100 Ω ... 1 MΩ	2 s	From ∞ to 50% of upper range limit value
10/40 MΩ	5 s	
Continuity	< 50 ms	
°C (Pt 100)	Max. 3 s	
⇻	1.5 s	
10 nF ... 100 µF	Max. 2 s	From 0 to 50% of upper range limit value
1 000 µF	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

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 ≙ 11,999 steps
Overflow display	"OL" is displayed for ≥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 | TECH | 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 µA through 10 A ranges

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

Accuracy range	0 °C ... +40 °C
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 (1st digit X)	Protection against penetration of solid particles	IP XY (2nd digit Y)	Protection against penetration by water
5	Dust protected	2	Dripping (15° inclination)
6	Dust-proof	5	Jet-water

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 baud rate is 38,400 baud.
A CD ROM is included which contains current drivers for Windows operating systems.

SoftwareMETRA | 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)

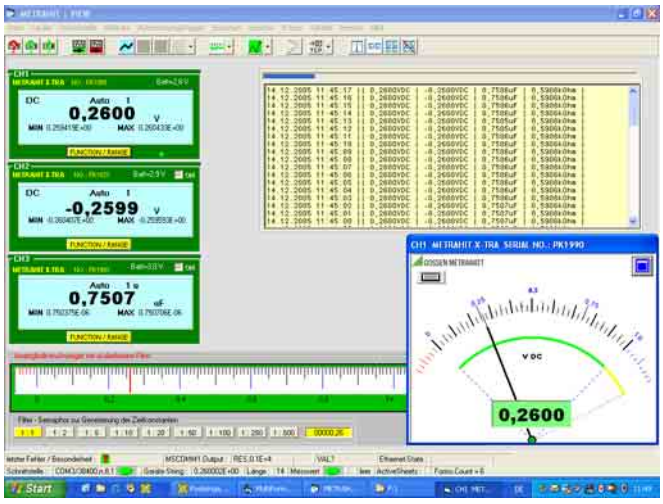

Figure 1: 3-Channel Representation with Table and Pointer Display

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.

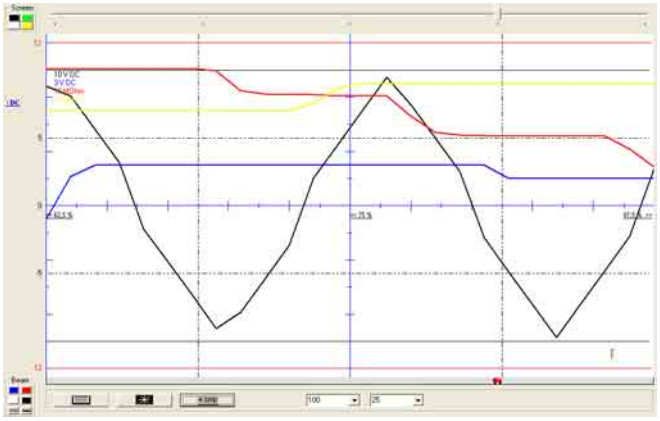

Figure 2: 4-Channel Graphic Representation

Order Information

Designation	Type	Article Number
METRAHIT | X-TRA, METRAHIT | TECH, METRAHIT | PRO and METRAHIT | BASE Multimeters		
4½-place (12,000 digits) TRMS multimeter with direct, alternating and pulsating voltage measurement (TRMS values), frequency measurement, resistance measurement, continuity test, diode measurement andtemperature 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 (TRMS 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	**METRAHIT | X-TRA**	M240A
Same as above but with direct, alternating and pulsating current measurement (TRMS values), additional broad range capacitance measurement, with additional current measurement via clip-on current transformers or sensors with current or voltage output, each with adjustable transformation factors	**METRAHIT | TECH**	M243A
Same as above but with additional direct, alternating and pulsating current measurement (RMS values),	**METRAHIT | PRO**	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 transformation factors.	**METRAHIT | BASE**	M241A
Accessories for operation at a PC (for METRAHIT | X-TRA only)		
IR-USB bidirectional interface adapter	USB | X-TRA	Z216C
METRA | VIEW software	**METRA | VIEW**	Z211G
Voltage measuring accessories		
High-voltage probe, 3 kV/3 V	HV3	GTZ 3431 011 R0001
Accessories for temp. measurement with resistance thermometer (METRAHIT | X-TRA only)		
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
Replacement fuse (METRAHIT | X-TRA, METRAHIT | TECH and METRAHIT | PRO only)		
Fuses (pack of 10)	FF (UR) 10 A / 1000 V AC/DC	Z109L
Power pack (for **METRAHIT | X-TRA** only)	NA | X-TRA	Z218G
Protective rubber cover and carrying strap	GH | X-TRA	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 **METRAHIT** | and METRAmax	F829	GTZ 3301 000 R0003
Cordura belt pouch for **METRAHIT** | multimeters and METRAport	HitBag	Z115A
Imitation leather ever-ready case with cable compartment	F836	GTZ 3302 000 R0001
Ever-ready case for 2 **METRAHIT** |, 2 adapters and accessories	F840	GTZ 3302 001 R0001
Hard case for one **METRAHIT** | and accessories	HC20	Z113A
Hard case for two **METRAHIT** | and accessories	HC30	Z113A

For additional information regarding accessories please refer to:

- *our Measuring Instruments and Testers catalog.*
- *our website www.gossenmetrawatt.com*

METRA**HIT** | X-TRA | TECH | PRO | BASE
TRMS Digital Multimeters

Current Measuring Accessories All current sensors and transformers are equipped with a connector cable (1.2 to 1.5 m long) with 4 mm safety banana plugs									Suitable for METRA**HIT**		
Type	**Designation**	**Measuring Range**	**Meas. Category**	**Max. Wire Dia.**	**Transformation Factor**	**Frequency Range**	**Intrinsic Error ±(% rdg. + ...)**	**Article Number**	BASE	TECH X-TRA PRO	X-TRA PRO
DC/AC Current Sensors with Voltage Output											
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~/600A–	300 V / CAT IV	50 mm	10 mV/A, 1 mV/A	DC ... 65 Hz ... 10 kHz	1.5% + 0.5 A 2.5%	Z13B	●	●	♦
AC Current Sensors with Voltage Output											
WZ12B	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	Amp*FLEX* 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	Amp*FLEX* 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	Amp*FLEX* 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	Amp*FLEX* 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	●	●	♦
AC Current Transformer with Current Output											
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	—	●	♦
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	●	●	♦

● with adjustable transformation factor 1: 1 / 10 / 100 / 1000

♦ without adjustable transformation factor

Prepared in Germany • Subject to change without notice • PDF version available on the Internet

GMC-I GOSSEN METRAWATT

GMC-I Gossen-Metrawatt GmbH
Thomas-Mann-Str. 16-20
90471 Nürnberg • Germany

Phone +49 911 8602-111
Fax +49 911 8602-777
E-Mail info@gossenmetrawatt.com
www.gossenmetrawatt.com