GOSSEN METRAWATT

METRACAL | MC
Multimeter, Calibrator

3-349-564-03
4/7.11

- **Universal calibrator, simulator and multimeter**
  mA / mV … V / °C (Pt100/1000, Ni100/1000, thermocouples: J, L, T, U, K, E, S, R, B, N) / 30 … 2000 Ω
- Dual mode – simultaneous calibration and measurement (U/I)
- Measuring and encoding in absolute terms and as percentage (scaled)
- Memory for measurement results: 16 MBit
- Frequency and pulse run generators: 1 Hz to 2 kHz
- Ramp and staircase functions
- METRAwin®90-2 interface and calibration software
- Transmitter simulator (sink: 0 … 24 mA)
- DKD calibration certificate included
- Rugged, EMC compliant design
- **Precision multimeter** (V, A, Ω, F, Hz, °C/°F)
  30,000 (60,000) digits and triple display
- TRMS AC measurement to 1 kHz

CE

Deutscher Kalibrierdienst DKD - K - 19701
DKD

Calibration Certificate as Standard Feature

Quality Management System
DQS Certified per DIN EN ISO 9001:2008
Reg.-No.446534QM08 UM

Applications

Process engineers can use the **METRACAL MC** as a calibrator and a multimeter simultaneously, e.g. in order to simulate sensor conditions at the input of a transmitter while measuring and saving the output signal.

If the USB X-TRA plug-in infrared interface adapter (accessory) is attached to the instrument, measurement and calibration results can be uploaded to a PC, where they can be recorded and printed out as a calibration report. The multimeter can also be used as a data logger. METRAwin®10/METRAHit® PC software (accessory) allows for convenient evaluation and display of measurement data, and METRAwin®90-2 (accessory) can be used to create, upload and download calibration procedures, as well as for the generation of calibration certificates.

Calibrator with Loop Current Measuring Instrument

Universal Calibration Standard

Integrated electronics generate mV, V and mA signals. Beyond this, they're capable of simulating thermovoltages for various types of thermocouples for predefined temperatures (°C or °F), as well as for various Pt and Ni temperature sensors.

Frequency and Pulse Run Generator

Continuous frequency signals can be transmitted by the **METRACAL MC** for testing SPCs, energy metering devices, flow rates and more. Amplitude is adjustable for the generated square-wave pulses, which are used to simulate sensor pulses.

Calibration and Simulation

Measuring transducers with a wide variety of input signals (voltage, thermovoltage, RTD and 2-wire resistance sensors etc.) can be directly connected and calibrated. If a multimeter is used (e.g. **METRAHIT** XTRA), respective values can be measured at the measuring transducer's output, transmitted to a PC via an adapter if desired, displayed with the help of METRAwin®90-2 software and compared with the appropriate calibration specifications. Setpoint values and actual values are displayed, or printed as a certificate. When operated in the "mA sink" mode, the **METRACAL MC** simulates a 2-wire transmitter and retrieves the selected current value from the measuring sequence.

Data Storage (16 MBit / 46,000 measured values)

The calibrator is connected to a PC with the attached USB X-TRA interface adapter (accessory). Individual values, intervals and ramps which have been created with the help of METRAwin®90-2 software (accessory) can be saved as data files, uploaded to the calibrator and saved to non-volatile memory.

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Read-Out Modes for Encoding and Sink Functions

Calibration signals can be read out either manually (numerically with key entries), or automatically by means of intervals with intermediate steps, or as a ramp in a stepless fashion.
The **METRACAL MC** can thus be used as a precision pulse generator for dynamic testing.
Depending upon individual needs, desired dynamic response can be derived from, for example, the full-scale value and the number of intermediate steps (intervals), or rise and dwell periods (ramp). This is especially helpful for long-term testing of laboratory and panel recorders, as well as measuring transducers, and for "one-man" control rooms.

Numeric Read-Out

Calibration values are set and read out manually with the help of the instrument's keypad immediately after the calibration function has been selected.

Interval

Calibration values are read out continuously in steps between the minimum and maximum values selected at the device to be calibrated in this read-out mode. The subsequent step can be triggered automatically (time per step: 1 sec. … 60 min.) or manually.

Ramp

Calibration values are read out in a stepless fashion between the minimum and maximum values selected at the device to be calibrated in this read-out mode.
Ramp duration for rising and falling ramps, as well as dwell time at minimum and maximum values, can be set within a range of 1 second to 60 minutes.

Temperature Simulation

The ten most common sensor types are available for the simulation of thermovoltages. Thermovoltages can be read out with reference to an internal (socket temperature) or an external reference junction.
Temperature for the external reference junction can be set at the calibrator or with a PC. This eliminates the need to connect the device to be calibrated with the calibrator via the respectively required compensating lead. A copper conductor between the calibrator and the device to be calibrated is sufficient in this case.

Applicable Regulations and Standards

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

Guarantee

3 years material and workmanship
1 year for calibration

Characteristic Values

Calibrator Section

Calibration Function	Simulation Range	Resolution: 30,000 Digits (4¾ places)	With a Load of	Intrinsic Uncertainty	Overload
Direct Voltage Source				±(% S + mV)	I_{max}
V	0…±60mV	1 µV	15 mA	0.1 + 0.01	18 mA
	0…±300mV	0.01 mV		0.05 + 0.02	
	0 … 3 V	0.1 mV		0.05 + 0.2	
	0 …10 V	1 mV		0.05 + 2	
	0 …15 V	1 mV		0.05 + 2	
Pulse / Frequency Generator Duty cycle (pulse-no-pulse ratio): 50%, amplitude: 10 mV… 15 V				±(% S + Hz)	I_{max}
Hz	1 Hz ...2 kHz	0.1 …1 Hz	15 mA	0.05 + 0.2	18 mA
Current Source			Max. load	±(% S + µA)	
mA	4 … 20 mA	1 µA	17 V	0.05 + 2	
	0 … 20 mA				
	0 … 24 mA				
Current Sink				±(% S + µA)	U_{max}
mA	4 … 20 mA	1 µA	V_{in} = 4 ... 27 V	0.05 + 2	27 V
	0 … 20 mA				
	0 … 24 mA				
Resistance Simulation			Sensor Current [mA]	±(% S + Ω)	I_{max}
ς	5…2000 Ω	0.1 Ω	0.05...0.1..4...5	0.05 + 0.2	5 mA

Simulator for Temperature Sensors (resolution: 0.1 K)

	Sensor Type	Simulation Range in °C	Simulation Range in °F	Intrinsic Uncertainty	Over-load
°C / °F	**Resistance Thermometer per IEC 751**			±(% S + K)	I_{max}
	Pt100	–200 …+850	–328…+1562	0.1 + 0.5	5 mA
	Pt1000	–200 …+300	–328 …+572	0.1 + 0.2	
	Resistance Thermometer per DIN 43760			±(% S + K)	I_{max}
	Ni100	–60 …+180	–76 …+356	0.1 + 0.5	5 mA
	Ni1000	–60 …+180	–76 …+356	0.1 + 0.2	
	RTD sensor current 0.05 ... 0.1 ... 4 ... 5 mA				
	Thermocouples per DIN and IEC 584-1			ΔU in mV [1]	I_{max}
	K (NiCr/Ni)	–250…+1372	–418…+2501	±(0.05% r |Setting| + 0.02)	18 mA
	J (Fe/CuNi)	–210…+1200	–346…+2192		
	T (Cu/CuNi)	–270…+400	–454…+ 752		
	B (Pt30Rh/Pt6Rh)	+500...+1820	+932…+3308		
	E (NiCr/CuNi)	–270…+1000	–454…+1832		
	R (Pt13Rh/Pt)	–50…+1768	–58…+3214		
	N (CU/Cu10)	–270…+1300	–454…+2372		
	S (Pt10Rh/Pt)	–50…+1768	–58…+3214		
	J (Fe/CuNi)	–200…+900	–328…+1652		
	U (Cu/CuNi)	–200…+600	–328…+1112		

[1] Without internal reference junction, relative to fixed external reference temperature and thermovoltage of the thermocouple, internal reference junction: intrinsic error of 2 K, external reference junction: entry of –30 … 60 °C

Key

S = setting value

Multimeter Section

Meas. Function	Measuring Range	Resolution at Upper Range Limit 30,000 [1] (60,000)	Resolution at Upper Range Limit 3000 [1]	Input impedance DC	Input impedance AC	Intrinsic Uncertainty at Highest Resolution under Reference Conditions ±(...% rdg. + ... d) DC	Intrinsic Uncertainty at Highest Resolution under Reference Conditions ±(...% rdg. + ... d) AC [4] [10]	Overload Capacity [3] Value	Overload Capacity [3] Time
V	60 mV [2]	1 µV		> 20 MΩ	—	0.1 + 10	—	300 V DC AC TRMS sine	Cont.
	300 mV	10 µV		> 20 MΩ	9 MΩ // < 50 pF	0.08 + 10	0.5 + 30 (> 500 d)		
	3 V	100 µV		11 MΩ	9 MΩ // < 50 pF	0.05 + 10	0.2 + 30 (> 100 d)		
	30 V	1 mV		10 MΩ	9 MΩ // < 50 pF	0.05 + 10	0.2 + 30 (> 100 d)		
	300 V	10 mV		10 MΩ	9 MΩ // < 50 pF	0.05 + 10	0.2 + 30 (> 100 d)		
				Voltage drop at approx. range limit					
				DC	AC	DC	AC [4] [10]		
mA	300 µA	10 nA		150 mV	150 mV	0.1 + 15	0.8 + 30 (> 100 d)	0.36 A	Cont.
	3 mA	100 nA		150 mV	150 mV	0.05 + 15	0.5 + 30 (> 100 d)		
	30 mA	1 µA		150 mV	150 mV	0.05 + 15	0.5 + 30 (> 100 d)		
	300 mA	10 µA		150 mV	150 mV	0.05 + 15	0.5 + 30 (> 100 d)		
				Open-circuit voltage	Measuring current at range limit	±(...% rdg. + ... d)			
ς	300 Ω	10 mΩ		0.6 V	250 µA	0.1 + 5 [5]		300 V DC AC TRMS sine	5 minutes
	3 kΩ	0.1 Ω		0.6 V	150 µA	0.1 + 5 [5]			
	30 kΩ	1 Ω		0.6 V	30 µA	0.1 + 5			
	300 kΩ	10 Ω		0.6 V	3 µA	0.2 + 5			
	3 MΩ	100 Ω		0.6 V	360 nA	0.5 + 5			
	30 MΩ	1 Ω		0.6 V	100 nA	2 + 10			
Ω 🔊	300 Ω		0.1 Ω	3.2 V	1 mA	2 + 5			Max. 10 s
→|←	6 V	1 mV		7 V	Approx. 1 mA	0.5 + 3		300 V	Max. 10 s
				Discharge resistance	$U_{0\ max}$	±(...% rdg. + ... d)			
F	30 nF		10 pF	1 MΩ	3 V	1 + 10 [5] [10]		300 V DC AC TRMS sine	5 minutes
	300 nF		100 pF	100 kΩ	3 V	1 + 6 [5] [10]			
	3 µF		1 nF	12 kΩ	3 V	1 + 6 [10]			
	30 µF		10 nF	12 kΩ	3 V	1 + 6 [10]			
	300 µF		100 nF	3 kΩ	3 V	5 + 6 [10]			
				f_{min} [6]		±(...% rdg. + ... d)			
Hz	300 Hz	0.01 Hz		1 Hz		0.05 + 5 [7] [10]		300 V	Cont.
	3 kHz	0.1 Hz						300 V	
	30 kHz	1 Hz						200 V	
	300 kHz	10 Hz		10 Hz				20 V	

Meas. Function	Temperature Sensor	Measuring Range	Resolution	Intrinsic Uncertainty at highest Resolution under Ref. Conditions ±(...% rdg. + ... d) [8]	OL Capacity [3] Value	OL Capacity [3] Time
°C/°F	Pt100	−200.0 … −100.0 °C	0.1 K	0.3 + 10	300 V DC RMS sine	5 min
		−100.0 … +100.0° C				
		+100.0 … +850.0° C				
	Pt1000	−200.0 … +100.0° C				
		+100.0 … +850.0° C				
	Ni 100	−60.0 … +180.0° C				
	Ni 1000	−60.0 … +180.0 °C				
	K (NiCr-Ni)	−250.0… +1372.0° C		0.2 + 10 [9]		
	J (Fe-CuNi)	−210.0… +1200.0° C				
	T (Cu-CuNi)	−270.0… +400.0° C				
	B (Pt30Rh/ Pt6Rh)	+0… +1820.0 °C				
	E (NiCr/CuNi)	−270.0… +1000.0 °C				
	R (Pt13Rh/Pt)	−50.0… +1768.0 °C				
	N (CU/Cu10)	−270.0… +1300.0 °C				
	S (Pt10Rh/Pt)	-50.0… +1768.0 °C				
	J (Fe/CuNi)	−200.0… +900.0 °C				
	U (Cu/CuNi)	−200.0… +600.0 °C				

1) Display: 3¾ places for capacitance measurement; a different sampling rate can be selected in the rAtE menu for saving and transmitting measured values.
2) Only manually adjustable
3) At 0° ... + 40° C
4) 20 … 45 … 65 Hz … 1 kHz sine, for alternating voltage $TRMS_{AC}$, see page 4 for influences
5) ZERO is displayed for active “zero balancing” function, maximum correction: 50% rdg.
6) Lowest measurable frequency for sinusoidal measuring signals symmetrical to the zero point
7) Range 60/300 mV~: $U_E \geq 30\%$ of upper range limit
   3/30/300 V~: $U_E \geq 10\%$ of upper range limit
8) Plus sensor deviation
9) Without integrated reference junction; with internal reference temperature plus error of ±2 K
10) The limits only apply for battery operation (mains adapter Z218K for multimeter operation in preparation)

Key

d = digit(s)
MR = measuring range
rdg. = reading (measured value)

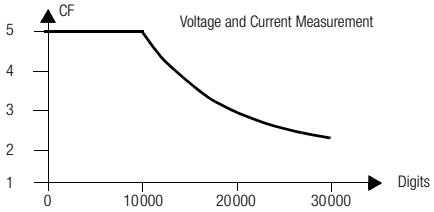
Influencing Quantities and Influence Error

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range [1]	Influence Error ± (... % rdg. + d)/10 K
Temperature	0 … +21 °C and +25...+40° C	V DC, °C (TC)	0.1 + 10
		V AC	0.5 + 10
		3/30 mA DC	0.1 + 10
		3/30 mA AC	0.5 + 10
		300 mA DC, AC	0.5 + 10
		300Ω/3/30/300 kΩ 2L	0.2 + 10
		3 MΩ 2L	0.5 + 10
		30 MΩ 2L	1 + 10
		30/300 nF/3/30/300 µF	0.5 + 10
		Hz	0.1 + 10
		°C (RTD)	0.2 + 10
		Simulator quantity	
		mV/V, °C (TC)	0.1 + 10
		Ω, °C (RTD)	0.2 + 10
		mA source	0.1 + 10
		mA sink	0.1 + 10

[1] With zero balancing

Influencing Quantity	Frequency	Measured Qty. / Meas. Range	Influence Error [2] ± (... % rdg. + d)
Frequency V_{AC}	> 20 Hz ... 45 Hz	300.00 mV … 300.0 V	2 + 30
	> 65 Hz ... 1 kHz		
	> 1 kHz ... 20 kHz		3 + 30

Influencing Quantity	Frequency	Measured Qty. / Meas. Range	Influence Error [2] ±(... % rdg. +... d)
Frequency I_{AC}	> 20 Hz ... 45 Hz	300 µA 3 mA 30 mA 300 mA	2 + 30
	> 65 Hz ... 10 kHz		3 + 30

Influencing Quantity	Sphere of Influence		Measured Quantity / Measuring Range	Influence Error [2]
Measured Quantity Waveform	Crest Factor CF	1 … 2	V AC, A AC	±1 % rdg.
		2 … 4		±5 % rdg.
		4 … 5		±7 % rdg.
	Allowable crest factor CF of the periodic quantity to be measured is dependent upon the displayed value: 			

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

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range	Influence Error
Relative Humidity	75% 3 days Instrument off	V, A, Ω F, Hz °C	1 x intrinsic uncertainty

Influencing Quantity	Sphere of Influence	Measuring Range	Attenuation ±dB
Common mode interference voltage	Interference quantity max. 250 V ~	V ⎓	> 90 dB
	Interference quantity max. 250 V ~ 50 Hz, 60 Hz sine	300 mV ... 30 V ~	> 80 dB
		300 V ~	> 70 dB
Series-mode interference voltage	Interference quantity V ~ , respective nominal value of the measuring range max. 250 V ~ , 50 Hz, 60 Hz, sine	V ⎓	> 60 dB
	Interference quantity max. 250 V ⎓	V ~	> 60 dB

Real-Time Clock

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

Reference Conditions

Ambient temp.	+23° C ±2 K
Relative humidity	40 … 60%
Measured quantity frequency for AC	45 … 65 Hz
Measured quantity waveform for AC	Sinusoidal, deviation between RMS and rectified value < 0.1%
Battery Voltage	3.0 V ±0.1 V

Response Time (multimeter functions)

Response Time (after manual range selection)

Measured Quantity / Measuring Range	Digital Display Response Time	Measured Quantity Jump Function
V DC, V AC A DC, A AC	1.5 s	From 0 to 80% of upper range limit value
300 Ω ... 3 MΩ	2 s	From ∞ to 50% of upper range limit value
30 MΩ	5 s	
Continuity	< 50 ms	
⇻	1.5 s	
°C Pt100	Max. 3 s	
3 nF ... 30 µF	Max. 2 s	From 0 to 50% of upper range limit value
> 10 Hz	Max. 1.5 s	

Display

LCD panel (65 x 35 mm) with display of up to 3 measured values, unit of measure, type of current and various special functions.

Display / char. height	7-segment characters Main display: 12 mm Auxiliary displays: 7 mm
Number of places	4¾ places ≙ 30,999 steps
Overflow display	"OL" or "-OL" appears
Polarity display	"–" sign is displayed if plus pole is connected to "⊥"

LCD Test — All display segments available during operation of the **METRACAL MC** are activated after the instrument is switched on.

Power Supply

Battery — 2 ea. 1.5 V mignon cell (AA), alkaline manganese per IEC LR6 or equivalent rechargeable battery

Service life — With alkaline manganese (2600 mAh)

Measuring Function	Current	Service Life
V, Hz, mA, Ω_2, F, °C	25 mA	70 h
Standby (MEM + clock)	350 µA	Approx. 1 year
Calibration Function		**Service Life**
mV, thermocouple	80 mA	25 h
15 V	200 mA	10 h
Ω, RTD	130 mA	15 h
Sink, 20 mA (25 V)	300 mA	5 h
Source, 20 mA max. load < 5V	200 mA	10 h

If voltage drops below 1.8 V, the instrument is switched off automatically.

Battery test — Battery capacity display with battery symbol in 4 segments: "▭". Querying of momentary battery voltage via menu function.

Mains Power — With NA X-TRA power pack

Power Saving Circuit

The device is switched off automatically if the measured value remains unchanged for a long period of time, and if none of the controls are activated before a selected period of time in minutes elapses. In the case of the simulator, the output is switched off first, followed by the display one minute later, if no controls have been activated.
Automatic shutdown can be deactivated **(APoFF = ON)**.

Fuses

Fuse links — **DMM** (mA current measuring ranges):
FF0.63A/400V, 5 mm x 20 mm
Breaking capacity ≥ 1.5 kA at 380 V AC with ohmic load
Calibrator:
FF0.63A/400V, 5 mm x 20 mm
Breaking capacity ≥ 1.5 kA at 380 V AC with ohmic load

Multimeter Electrical Safety

Protection Class	II per EN 61010-1:2001/VDE 0411-1:2002
Measuring category	II
Operating voltage	300 V
Pollution degree	2
Test Voltage	2.2 kV~ per EN 61010-1:2001/ VDE 0411-1:2002

Electromagnetic Compatibility (EMC)

Interference emission	EN 61326-1:2006 class B
Interference immunity	EN 61326-1:2006 EN 61326-2-1:2006

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	40% … 75%, no condensation allowed
Elevation	To 2000 meters

Mechanical Design

Protection — IP 65,

Table Excerpt Regarding Significance of IP Codes

IP XY (1st digit X)	Protection against foreign object entry	IP XY (2nd digit Y)	Protection against the penetration of water
6	Dust-proof	5	Jet-water

Dimensions	200 x 87 x 45 mm
Weight	Approx. 430 g with batteries

Data Interface

Type	Optical via infrared light through the housing
Data transmission	Serial, bidirectional (not IrDa compatible)
Protocol	Device specific
Baud rate	38,400 baud
Functions	**DMM**: read data **Calibrator:** set/query calibration functions and parameters

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

Scope of Delivery

1 **METRACAL MC** calibrator with **2** batteries per IEC LR6
1 KS29 cable set, consisting of 3 measurement cables (1 black, 1 blue, 1 red) with angle plugs / safety plug, test probes and 3 safety caps
1 Abbreviated instructions
1 CD ROM with operating instructions in English and German, as well as other available languages
1 GH-XTRA rubber holster
1 DKD calibration certificate

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Accessories

HitBag Cordura Belt Pouch

for **METRAHIT** multimeters (with/ without rubber holster) and METRAport

HC20 hard case

for multimeter (with/without GH18 rubber holster) and accessories

Interface Adapter for USB Connection

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

- Configure the **METRACAL MC** from a PC.
- Read data out of memory from the **METRACAL MC**.

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.

Order Information

Description	Type	Article Number
Calibrator, see standard equipment for **METRACAL MC**	**METRACAL MC**	M245A
Hardware Accessories		
Power pack with broad range input: AC 90 ... 253 V / DC 5 V, 600 V CAT IV	NA X-TRA	Z218G
Power pack with broad range input: AC 90 ... 264 V / DC 5,1 V, 1000 V CAT III low capacitive coupling	NA MULTI [1)]	Z218K
Battery set (4 ea. rechargeable NiMH batteries, 1600 mAh) and charger	1ASi battery set	Z206B
Probe for voltage measurement in power installations to 1000 V	KS30	GTZ3204000R0001
Pt100 temperature sensor for surface and immersion measurements, −40 … +600° C	Z3409	GTZ3409000R0001
Pt1000 temperature sensor for measurement in gases and liquids, −50 … +220° C	TF220	Z102A
Pt100 oven sensor, −50 … +550° C	TF550	GTZ3408000R0001
Ten adhesive Pt100 temperature sensors, −50 … +550° C	TS Chipset	GTZ3406000R0001
Imitation leather carrying pouch for **METRAHIT**	F829	GTZ3301000R0003
Cordura belt pouch for **METRAHIT** multimeters	HitBag	Z115A
Imitation leather ever-ready case with cable compartment	F836	GTZ3302000R0001
Ever-ready case for 2 **METRAHIT** instruments, 2 adapters and accessories	F840	GTZ3302001R0001
Hard case for one **METRAHIT** and accessories	HC20	Z113A
Hard case for two **METRAHIT** instruments and accessories	HC30	Z113A
Fuse link for mA current measuring ranges	FF0,63A/400V	Z109M
Fuse link for calibrator	FF0,63A/400V	Z109M
Software Accessories		
Bidirectional interface adapter, IR-USB	USB X-TRA	Z216C
Calibration software for controlling the **METRACAL MC** and for analysis of calibration results	METRAwin90-2 [1)]	Z211A
Current Clamp Transformers and Sensors as Accessories [2)]		
Current clamp transformer, 1 … 200 A~, 1000:1, 48…65…400 Hz	WZ11A [D)]	Z208A
WZ12A current clamp transformers and sensors ... D [D)] Frequency range: 45…65 …500 Hz, clamp opening: max cable diameter of 15 mm		
Current clamp transformer 15 A … 180 A, 1000:1	WZ12A	Z219A
Current clamp sensor 10 mA … 100 A; 100 mV/A	WZ12B	Z219B
Switchable current clamp sensor, 1 mA … 15 A; 1 mV/mA and 1 A … 150 A; 1 mV/A	WZ12C	Z219C
Current clamp transformer 30 mA … 150 A, 1000:1	WZ12D	Z219D

[D)] Data sheet available
[1)] in preparation
[2)] Refer to our Measuring Instruments and Testers catalog for more current clamp transformers and sensors.

For additional information regarding accessories please refer to

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

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