GOSSEN METRAWATT

METRACAL | MC
Multimeter, Calibrator

3-349-564-03
13/2.19

- **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 generator: 1 Hz to 2 kHz
- Ramp and staircase functions
- Transmitter simulator (sink: 0 … 24 mA)
- DAkkS 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 20 kHz
- Bidirectional IR data interface
- Free device driver for LabView® (National Instruments)
- Optional calibration software METRAwin®90-2
- Optional measurement data acquisition and analysis software METRAwin®10/METRAHit®

3 YEARS WARRANTY

MADE IN GERMANY

ilac-MRA

DAkkS Deutsche Akkreditierungsstelle D-K-15080-01-01

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 ramp and interval sequences, to control the **METRACAL MC** online, 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 Generator

Continuous frequency signals can be transmitted by the **METRACAL MC** for testing SPCs, energy metering devices, flow rates and more. Amplitude and frequency are 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.

Measurement Data Memory (16 MBit / 46,000 Measured Values)

The calibrator is connected to a PC with the attached USB X-TRA interface adapter (accessory). The software METRAwin®10/METRAHit®, which is available as an accessory, and the interface adapter USB X-TRA are used to transmit recorded measured values to a PC by means of the multimeter function for convenient subsequent visualization, evaluation and report generation.

METRACAL | MC
Multimeter, Calibrator

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/ DIN 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)		Intrinsic Uncertainty	Overload
Direct Voltage Source			Minimum Load Resistance	±(% S + mV)	I_{max}
V	0…±60mV	1 µV	1 kΩ	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			Minimum Load Resistance	±(% S + Hz)	I_{max}
Hz	1 Hz ...2 kHz	0.1 …1 Hz	1 kΩ	0.05 + 0.2	18 mA
Current Source			Max. load	±(% S + µA)	
mA	4 … 20 mA	1 µA	16 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 (NiCrSi-NiSi)	–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	5 MΩ // < 50 pF	0.08 + 10	0.5 + 30 (> 500 d)		
	3 V	100 µV		11 MΩ	5 MΩ // < 50 pF	0.05 + 10	0.2 + 30 (> 100 d)		
	30 V	1 mV		10 MΩ	5 MΩ // < 50 pF	0.05 + 10	0.2 + 30 (> 100 d)		
	300 V	10 mV		10 MΩ	5 MΩ // < 50 pF	0.05 + 10	0.2 + 30 (> 100 d)		
				Voltage drop at approx. range limit					
				DC	AC	DC	AC [4] [10]		
mA	0.3 mA	10 nA		160 mV	160 mV	0.1 + 15	0.8 + 30 (> 100 d)	0.36 A	Cont.
	3 mA	100 nA		160 mV	160 mV	0.05 + 15	0.5 + 30 (> 100 d)		
	30 mA	1 µA		180 mV	180 mV	0.05 + 15	0.5 + 30 (> 100 d)		
	300 mA	10 µA		380 mV	380 mV	0.05 + 15	0.5 + 30 (> 100 d)		
				Open-circuit voltage	Measuring current at range limit	±(...% rdg. + ... d)			
Ω	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 + 10 [10]			
	30 MΩ	1 Ω		0.6 V	100 nA	2 + 10 [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)	+500.0… +1820.0 °C				
	E (NiCr/CuNi)	−270.0… +1000.0 °C				
	R (Pt13Rh/Pt)	−50.0… +1768.0 °C				
	N (NiCrSi-NiSi)	−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 $TRMS_{AC}$, measured values < 100 digits are suppressed, see page 4 for influences
5) ZERO is displayed for active “zero balancing” function, maximum correction: 50% MR
6) Lowest measurable frequency for sinusoidal measuring signals symmetrical to the zero point
7) Range 300 mV~: $U_E \geq 40\%$ 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

Key

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

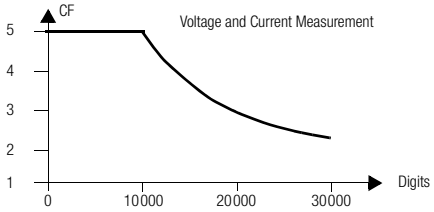
Influencing Quantities and Influence Error

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	0.3 mA 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,0
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	31mA	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	230 mA	10 h

If voltage drops below 2.0 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):
F2: FF0.63A/400V, 5 mm x 20 mm
Breaking capacity ≥ 10 kA at 400 V AC
(article number: Z109M)
Calibrator:
F1: FF0.16A/400V, 5 mm x 20 mm
Breaking capacity ≥ 10 kA at 400 V AC
(article number: Z109N as from 06.2016)

Multimeter Electrical Safety

Protection Class — II per DIN EN 61010-1:2011/VDE 0411-1:2011
Measuring category — II
Operating voltage — 300 V
Pollution degree — 2
Test Voltage — 2.2 kV~ per DIN EN 61010-1:2011/ VDE 0411-1:2011

Electromagnetic Compatibility (EMC)

Interference emission — EN 61326-1:2013 class B
Interference immunity — EN 61326-1:2013
EN 61326-2-1:2013

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 and parameter DMM
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 safety measurement cable set consisting of 3 measuring cables (1 black, 1 blue, 1 red) with 90° offset safety plugs, test probes and 3 safety caps for CAT IV, 1000 V CAT II 16 A / 600 V CAT IV 1 A
1 GH-XTRA rubber holster
1 DAkkS calibration certificate
1 Abbreviated instructions*

* Detailed operating instructions are available for download on the Internet at www.gossenmetrawatt.com

Accessories

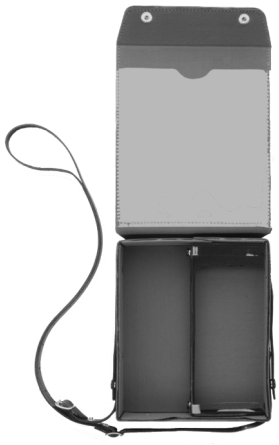
HitBag Cordura Belt Pouch (Z115A)
for METRAHIT multimeters (with/without rubber holster)

HC20 hard case (Z113A)
for METRAHIT multimeters (with/without rubber holster) and accessories

HitBag L Cordura Belt Pouch (Z115B) (without contents)
For METRAHIT multimeters (with and without rubber holster) and accessories

Example Placement

F836 ever-ready case (without contents)
For METRAHIT multimeters (with and without rubber holster) and accessories



Example Placement

F829 carrying pouch
For METRAHIT multimeters (with and without rubber holster) and accessories

Interface Adapter for USB Connection (Z216C)

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

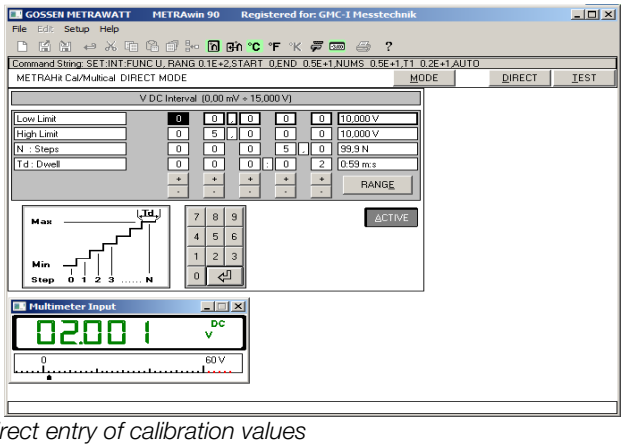
- Configure the **METRACAL MC** from a PC.
- Transmit live measurement data to a PC.
- Read data out of memory from the **METRACAL MC**.

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.

Accessory Calibration Software METRAwin®90-2

The calibration software METRAwin®90-2 is a multilingual Windows-based software program for the PC-aided control of various calibrators from our product range (**METRACAL MC**, METRAHIT CAL, METRAHIT 28C, METRAHIT 28C light and METRAHit 18C) as well as for the documentation of calibration results.

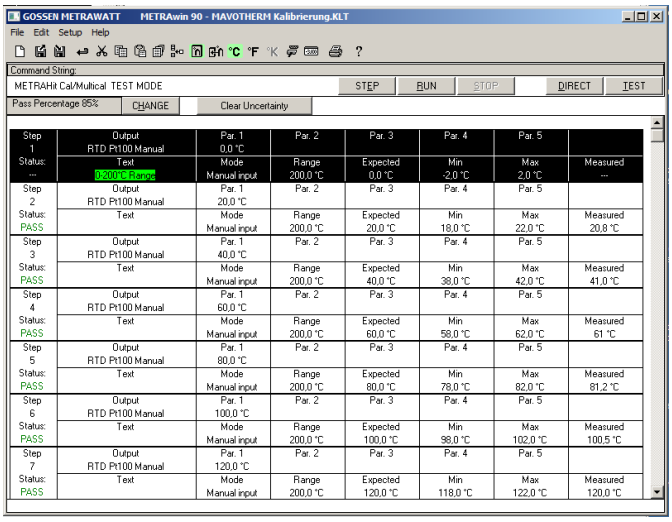
- Convenient and interactive control of the calibrator which is connected with the PC by direct data entry as individual value
- Straightforward and fast generation, testing and execution of calibration procedures
- Simple operation: even semi-skilled personnel is enabled to perform qualified calibration tasks
- Displaying of automatically created or user-defined operating instructions before performing a sequence step
- With connected multimeter: displaying and continuous updating of the measured value which is transmitted via interface
- High application flexibility due to tracking of the calibration signal (for analog measured value indicators, recorders, etc.), entry of a read-out measured value via keyboard or querying measured values via interface from a multimeter
- ISO-9000 compliant documentation of the calibration in the form of a standardized or user-definable protocol, including the required details on calibration object and system and schedule of the calibration values and their evaluation for each calibration point
- Dynamic data transfer to the report templates edited by the user in Microsoft®Excel™ or Microsoft®Word™ (e. g. with their own company logo)
- Safe storage of procedures and protocols on data carrier.



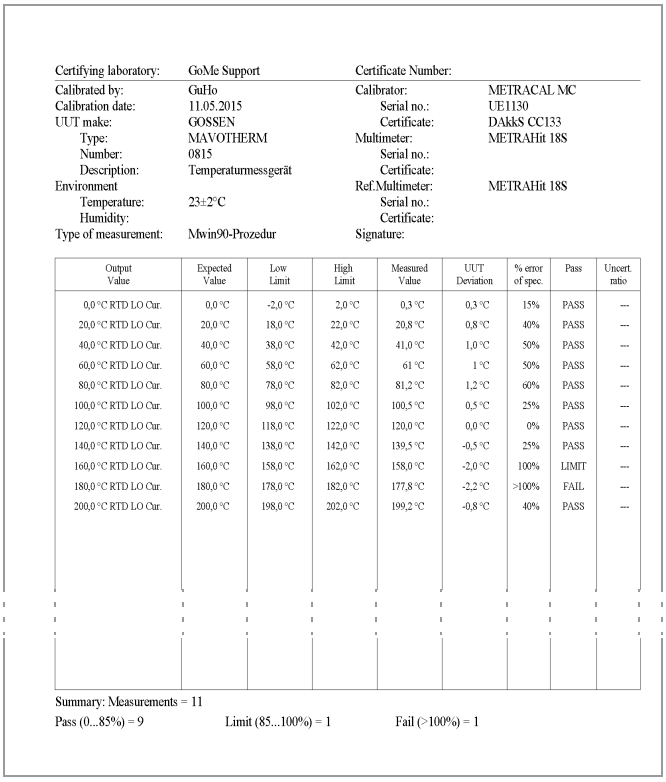
Direct entry of calibration values

The software performs the interactive (in operating mode DIRECT) or sequence-controlled (in operating mode TEST) adjustment of the calibrator by means of a PC via the IR interface (by using the interface adapter USB-XTRA), the automatic evaluation of the measured values which are either manually entered or transmitted from a multimeter via the interface as well as the documentation and storage of the calibration results in a calibration report.

Calibration procedures for the respective calibration objects can be easily created and tested with the software.



Calibration procedure for measuring transducers (Function „TEST“)



Certifying laboratory:	GoMe Support	Certificate Number:	
Calibrated by:	GuHo	Calibrator:	METRACAL MC
Calibration date:	11.05.2015	Serial no.:	UE1130
UUT make:	GOSSEN	Certificate:	DAkkS CC133
Type:	MAVOTHERM	Multimeter:	METRAHit 18S
Number:	0815	Serial no.:	
Description:	Temperaturmessgerät	Certificate:	
Environment		Ref.Multimeter:	METRAHit 18S
Temperature:	23±2°C	Serial no.:	
Humidity:		Certificate:	
Type of measurement:	Mwin90-Prozedur	Signature:	

Output Value	Expected Value	Low Limit	High Limit	Measured Value	UUT Deviation	% error of spec.	Pass	Uncert. ratio
0,0 °C RTD LO Cur.	0,0 °C	-2,0 °C	2,0 °C	0,3 °C	0,3 °C	15%	PASS	---
20,0 °C RTD LO Cur.	20,0 °C	18,0 °C	22,0 °C	20,8 °C	0,8 °C	40%	PASS	---
40,0 °C RTD LO Cur.	40,0 °C	38,0 °C	42,0 °C	41,0 °C	1,0 °C	50%	PASS	---
60,0 °C RTD LO Cur.	60,0 °C	58,0 °C	62,0 °C	61 °C	1 °C	50%	PASS	---
80,0 °C RTD LO Cur.	80,0 °C	78,0 °C	82,0 °C	81,2 °C	1,2 °C	60%	PASS	---
100,0 °C RTD LO Cur.	100,0 °C	98,0 °C	102,0 °C	100,5 °C	0,5 °C	25%	PASS	---
120,0 °C RTD LO Cur.	120,0 °C	118,0 °C	122,0 °C	120,0 °C	0,0 °C	0%	PASS	---
140,0 °C RTD LO Cur.	140,0 °C	138,0 °C	142,0 °C	139,5 °C	-0,5 °C	25%	PASS	---
160,0 °C RTD LO Cur.	160,0 °C	158,0 °C	162,0 °C	158,0 °C	-2,0 °C	100%	LIMIT	---
180,0 °C RTD LO Cur.	180,0 °C	178,0 °C	182,0 °C	177,8 °C	-2,2 °C	>100%	FAIL	---
200,0 °C RTD LO Cur.	200,0 °C	198,0 °C	202,0 °C	199,2 °C	-0,8 °C	40%	PASS	---

Summary: Measurements = 11

Pass (0...85%) = 9 Limit (85...100%) = 1 Fail (>100%) = 1

Print-out of a calibration report in accordance with ISO 9001, indicating traceability (4.11b), calibration method (4.11c), measuring uncertainty (4.11d), Pass/Fail (4.11g) as well as ambient conditions (4.11h).

METRA**CAL** | MC
Multimeter, Calibrator

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
Microprocessor-controlled fast charger for 1 to 4 NiMH or NiCd rechargeable batteries, model AA or AAA, including a 100 to 240 V AC mains adapter and a 10 ... 15 V DC car adapter	Z206D	Z206D
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
Imitation leather carrying pouch for **METRAHIT**	F829	GTZ3301000R0003
Cordura belt pouch for **METRAHIT** multimeters	HitBag	Z115A
Soft belt pouch large for one **METRAHIT** or METRAport Multimeter. Made of rugged and water repellent Cordura, three separate cases for leads, clips, manual, CD, etc.	HitBag L	Z115B
Imitation leather ever-ready case with cable compartment	F836	GTZ3302000R0001
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 (to 06.2016)	FF0,63A/400V	Z109M
Fuse link for calibrator (as from 06.2016)	FF0,16A/400V	Z109N
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	Z211A
Software METRAwin®10/METRA*HIT*®	METRAwin10	GTZ3240000R0001

Description	Type	Article Number
Current Clamp Transformers and Sensors as Accessories [1)]		
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)] 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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