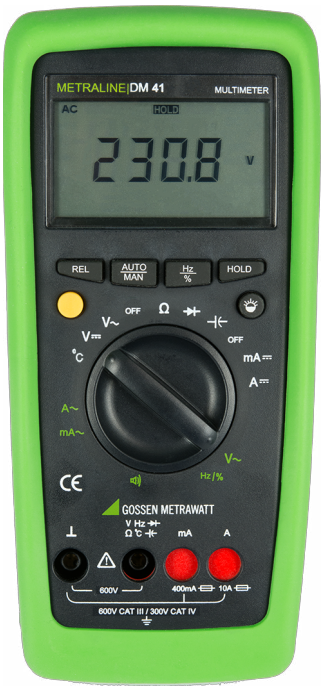
GOSSEN METRAWATT
GMC-INSTRUMENTS GROUP

METRALINE DM 41
Digital Multimeter

3-447-023-03
2/6.24

- Voltage: DC / AC 100 µV … 600 V
- Current: DC/AC: 10 µA … 10.00 A
- Resistance: 100 mΩ … 40.00 MΩ
- Capacitance: 1 pF… 200.0 µF
- Frequency: 0.001 Hz … 500.0 kHz
- Diode / Continuity
- Duty cycle measurement (%)
- Temperature with type K[1)] thermocouple: -50 … 1300 °C
- Hold / relative (zero)
- Automatic / manual measuring range selection
- Digital display with background illumination
- Automatic Blocking Sockets (ABS)[2)]
- 3-year Guarantee



3 YEARS WARRANTY

1) Optionally available:
2) Patented (EP 1801 598, US 7,439,725)

Features

Automatic Blocking Sockets (ABS)

The automatic blocking sockets prevent incorrect connection of the measurement cables, as well as accidentally incorrect selection of the measured quantity. This significantly reduces danger to the user, the instrument and the system under test, and in many cases eliminates it entirely.

Automatic / Manual Measuring Range Selection

Measured quantities are selected with the rotary switch.
The measuring range is automatically matched to the measured values. The measuring range can be selected manually as well with the help of the AUTO/MAN key.

Storage of Measured Values

By pressing the HOLD key, the currently displayed measurement value can be „frozen“ in the display.

Relative Measurement

By pressing the REL key, the zero correction is made and relative value is measured.. All functions can measure relative value except Hz/Duty.

Continuity Test

Allows for the detection of short-circuits and interrupted conductors. In addition to displaying test results, an acoustic signal can also be generated if desired.

Power saving circuit

The device is switched off automatically if the measured value remains unchanged for a period of approximately 15 minutes, and if none of the controls are activated during this time. Automatic shutdown can be deactivated.

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

Duty Cycle Measurement – Measurement of Square-Wave Signals

This function makes it possible to test circuits and transmission cables by measuring the frequency and the duty cycle of pulses.

Voluntary Manufacturer's Guarantee

36 months for materials and workmanship (in case of free of charge product registration)

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Characteristic Values

Measuring Function	Measuring Range	Resolution	Input Impedance V (AC) / V (DC)	Digital Display Intrinsic Error under Reference Condition +(… % rdg. + … d)	Overload capacity [3] Overload Values	Overload Duration
V ⎓	400.0 mV	100 µV	> 20 MΩ	0.75 + 2	1050 V DC	Cont.
	4.000 V	1 mV	11 MΩ	0.5 + 2		
	40.00 V	10 mV	10 MΩ			
	400.0 V	100 mV	10 MΩ			
	600 V	1 V	10 MΩ			
V ∼	400.0 mV	100 µV	11 MΩ	1.5 + 5	1050 V (AC) rms	cont.
	4.000 V	1 mV	11 MΩ	1 + 5		
	40.00 V	10 mV	10 MΩ			
	400.0 V	100 mV	10 MΩ			
	600 V	1 V	10 MΩ	1 + 10		
			Voltage Drop			
A ⎓	40.00 mA	10 µA	450 mV	0.8 + 2	480 mA	cont.
	400.0 mA	100 µA	4.2 V			
	10.00 A [1]	10 mA	750 mV	1.5 + 5	—	—
A ∼	40.00 mA	10 µA	450 mV	1 + 5	480 mA	cont.
	400.0 mA	100 µA	4.2 V			
	10.00 A [1]	10 mA	750 mV	2 + 5	—	—
			Open-Circuit Voltage			
Ω	400.0 Ω	100 mΩ	approx. 0.45 V	0.8 + 5	500 V DC/AC rms	10 min
	4.000 kΩ	1 Ω		0.8 + 2		
	40.00 kΩ	10 Ω				
	400.0 kΩ	100 Ω				
	4.000 MΩ	1 kΩ		1 + 5		
	40.00 MΩ	10 kΩ		2 + 5		
🔊	400.0 Ω	100 mΩ		Acoustic signal for 0…< 75 Ω (approx.)		
⭲⭰	1.000 V	1 mV	approx. 1 V	2 + 10		
⊣⊢	5.000 nF	1 pF	—	3 + 40 [4]	500 V DC/AC rms	10 min
	50.00 nF	10 pF		2 + 10 [4]		
	500.0 nF	100 pF		0.5 + 3 [4]		
	5.000 µF	1 nF		1 + 2 [4]		
	50.00 µF	10 nF		1.5 + 2 [4]		
	200.0 µF	100 nF		5 + 10 [5]		
			f min			
Hz [2]	10.000 Hz	0.001 Hz	1 Hz	0.2 + 2	≤ 1kHz : 1000 V ≤ 10kHz : 400 V ≤ 500kHz : 40 V except 400 mV	cont.
	100.00 Hz	0.01 Hz				
	1.0000 kHz	0.1 Hz				
	10.000 kHz	1 Hz				
	100.00 kHz	10 Hz				
	500.0 kHz	100 Hz				
%	2.0 to 98.0%	0.1%	—	10 Hz … 1 kHz : ± 5D 1 kHz … 10 kHz : ± 5D/ kHz		
			Sensor			
°C	0 … + 1300 °C	1 °C	Type K NiCr-Ni	2.0+ 3	500 V DC / AC rms	10 min
	–50 … 0 °C	1 °C		2.0 ±10		

1) Limited by 10 A fuse
2) Indication for frequency measurement expanded to 9999 digits
3) At 0 °C… + 40 °C
4) without zero adjustment „REL“.
5) Time required for measurement approximately 60 seconds.

Influencing Quantities and Influence Error

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range	Influence Error
Temperature	0 °C … +21 °C and +25 °C … +50 °C	V ⎓	0.1 × Intrinsic error/K
		V ∼	
		mA/A ⎓	
		mA/A ∼	
		Ω	
		F	
		Hz	
		Duty (%)	
		°C	

Influencing Quantity	Sphere of Influence (max. resolution)	Frequency	Influence Error ±(… % rdg. +… digit)
Frequency V_{AC}	4, 40, 400 V	20 Hz … < 50 Hz > 50 Hz … 1 kHz	2 + 3
	400 mV, 600 V	20 Hz … < 50 Hz > 50 Hz … 500 Hz	2 + 3

Influencing Quantity	Sphere of Influence	Measured Quantity / Measuring Range	Influence Error
Relative humidity	55 to 75%	V AC / DC mA / A AC / DC Ω F Hz (%) °C	1 × Intrinsic uncertainty

Influencing Quantity	Interference Quantity	Measuring Range	Damping
Common mode interference voltage	1000 V DC/AC 50 Hz sine	all V DC	> 100 dB
	1000 V DC	all V AC	> 100 dB
	1000 V AC 50 Hz sine	400 mV/4 V AC	> 55 dB
		40 V AC	> 55 dB
		400 V AC	> 43 dB
		600 V AC	> 23 dB
Series mode interference voltage	max. 1000 V AC 50/60 Hz Sinusoidal	V DC	> 43 dB
	max. 1000 V DC	V AC	> 55 dB

Auxiliary voltage influence:
(without 🔋 display) – all ranges except capacitance F: ±8 D
Capacitance range F: ±20 D

Display

LCD display field (58 mm x 31.4 mm) with digital display and display of unit of measure, current type and various special functions.

Digital

Display	7-segment characters, 15 mm
Number of places	3¾ digits: 3999 steps
Overflow display	“OL” appears
Polarity display	“–” (minus sign) is displayed if plus pole is connected to “⊥”
Sampling rate	3 measurements/s for V, A, Ω, F and %

Power Supply

Battery	2×. 1.5 V mignon cell (2 x size AA) Alkaline manganese per IEC LR6
Operating time	approx. 600 hours
Battery indicator	is displayed automatically if battery voltage drops to below approx. 2.4 V.

Electromagnetic Compatibility (EMC)

Interference emission	EN 61326, class B
Interference immunity	IEC 61000-4-2: 8 kV atmospheric discharge 4 kV contact discharge IEC 61000-4-3: 3 V/m

Short-term measured value deviation may occur during electromagnetic interference thus reducing the specified operating quality.

Safety	IEC 61010-1
Measuring category	600 V CAT III / 300 V CAT IV
High-voltage test	3.5 kV (IEC 61010-1)

Fuses

Fuse for up to 400 mA ranges:

FF 315 mA/1000 V; 6.3 mm × 32 mm; 30 kA switching capacity at 1000 $V_{AC/DC}$ and ohmic load;
Protects all current measuring ranges up to 400 mA in combination with power diodes.

Fuse for up to 10 A ranges:

FF 10 A/600 V; 6.3 mm × 32 mm;
10 kA switching capacity at 600 $V_{AC/DC}$ and ohmic load;
Protects the 10 A ranges up to 600 $V_{AC/DC}$.

Defective fuses are not displayed. Current measurement is not possible with a defective fuse.

Reference Conditions

Ambient temperature	+23 °C ±2 K
Relative humidity	45 % … 55 % RH
Frequency of measured quantity	50 or 60 Hz ±2 %
Waveform of measured quantity	Sinusoidal
Battery voltage	3 V ± 0.1 V

Ambient Conditions

Operating temperature	0 °C … +50 °C
Storage temperature	-25° C … +70° C (without batteries)
Relative humidity	45 to 75%
Elevation	To 2000 m

Mechanical Design

Protection	per DIN EN 60529 / IEC 60529 for multimeters: IP 50 (protection against ingress of solid foreign objects: protected against harmful amounts of dust; protection against ingress of water: not protected) for terminals: IP 20 (protection against ingress of solid foreign objects: ≥ 12.5 mm, ∅; protection against ingress of water: not protected)
Pollution degree	2
Dimensions	with holster: 86 mm × 188 mm × 53 mm without holster: 79 mm × 174 mm × 38 mm
Weight	Approx. 480 g, with batteries and rubber holster

Applicable Regulations and Standards

IEC 61010-1 EN 61010-1 VDE 0411-1	Safety requirements for electrical equipment for measurement, control and laboratory use
DIN EN 61326-2-1 VDE 0843-02-2-1	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 2-1: Special requirements for sensitive test and measuring instruments
DIN EN 60529 DIN VDE 0470-1	Test instruments and test procedures Degrees of protection provided by enclosures (IP code)

Scope of Delivery

1 Multimeter METRALINE DM41
1 Rubber holster with carrying strap
1 Cable set
1 Set of batteries
1 Set of operating instructions
1 Test report

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Accessories

Case

Type	Description	Article Number
HC20	Hard case for 1 METRAHIT multimeter and accessories, 275 × 229 × 83 mm	Z113A

Test Probes

Type	Description	Article Number
KS 17-2	Two measurement cables with fixed test probes and contact protected angled plugs, 1,30 m, max. 16 A, CAT III 1000 V	GTY3620034P0002
KY 95-3	1 pair of alligator clips for KS17-2, max. 16 A, CAT III 1000 V / CAT IV 600 V	Z110J
KS17-S	Two measurement cables in red and black with fixed stainless steel test probes (2 mm dia.) and contact protected 4-mm angled plugs, 150 cm long, CAT II 1000 V	Z110P
KS-NTS	Cable set with different test probes, max. 20 A, 600 V /1000 V, CAT IV / CAT III	Z110W
KY-2	1 pair of pincer clips in red and black, long, thin and flexible shaft for good contact in confined spaces, CAT II 1000 V	Z110Y
Measuring probes, 4 mm plug	Touch-guarded magnetic test probes, with magnetic holder (approx. 1200 g perpendicular to the contact surface), insulated measuring contacts, 5.5 mm dia., angled multilam plugs as measurement instrument connection, CAT III 1000 V, 4 A	Z502U

Temperature Sensor

Type	Description	Article Number
TF400 SURFACE	Surface temperature sensor, type K thermocouple (NiCr-Ni), temperature range –50 … +400°C, length: sensor element 280 mm / sensor 130 mm	Z102E
Z3431-8	Temperature sensor, up to 250°C, flexible and insulated, plug-in (requires adapter Z3431-TA (Z102T) for direct connection to a multimeter with function temperature measurement TC thermocouple).	GTZ3431008R0001
Z3431-TA	Adapter mini-socket to 4mm plug for the connection of type K sensors with mini-plug to multimeters with TC temperature measurement and 4 mm plugs	Z102T

Current clamp meters

Type	Description	Article Number
CP30	AC/DC current clamp sensor with voltage output for multimeters, clamp opening 25 mm diameter, resolution 1 mA, transformation ratio 100 mV/A, measuring range 0 … 30 A (DC or AC_{pk})	Z201B
CP330	AC/DC current clamp sensor with voltage output for multimeters, clamp opening 25 mm diameter, resolution 50 mA/100 mA, transformation ratio 10/1 mV/A, measuring range 0…30/300 A	Z202B
CP1100	AC/DC current clamp sensor with voltage output for multimeters, clamp opening 32 mm diameter, resolution 100 mA/500 mA, transformation ratio 10/1 mV/A, measuring range 0…100/ 1000 A	Z203B
CP1800	AC/DC current clamp sensor with voltage output for multimeters, clamp opening 32 mm diameter, automatic shutdown for extended battery service life, resolution 100 mA/500 mA, transformation ratio 10/1 mV/A, measuring range 0 …125/1250 A	Z204A
WZ11A	Current clamp transformer 1 … 200 A_{AC}, 1 mA/A, clamp opening 20 mm dia., CAT II 1000 V / CAT III 600 V	Z208A
WZ11B	Current clamp sensor 0,5 … 20 / 5 … 200 A_{AC}, switchable, clamp opening 20 mm dia., CAT II 1000 V / CAT III 600 V	Z208B
WZ12A	Current clamp transformer 15 … 180 A_{AC}, 1 mA/A, clamp opening 12 mm dia., CAT II 600 V	Z219A
WZ12B	Current clamp sensor 10 … 100 A_{AC}, 100mV/A, clamp opening 12 mm dia., CAT II 600 V	Z219B
WZ12C	Current clamp sensor 1 … 15 A / 1...150 A_{AC}, clamp opening 12 mm dia., CAT II 600 V	WZ12C
WZ12D	Current clamp transformer 30 … 150 A_{AC}, 1000:1, 1 mA/A, clamp opening 12 mm dia., CAT II 600 V / CAT III 300 V	Z219D
Z3511	Current clamp transformer 4 … 500 A_{AC}, 1 mA/A	GTZ3511000R0001
Z3512	Current clamp transformer 0.5… 1000 A_{AC}, 1 mA/A_{AC}	GTZ3512000R0001
Z3512A	Current clamp sensor 1/10/100/1000 A_{AC}, switchable, transfromation ratio 1000/100/10/ 1 mV/A, CAT III 600 V	Z225A
METRAFLEX 3000	Flexible current sensor 30/300/3000 A, 100/10/1 mV/A, 610 mm loop circumference	Z207E
METRAFLEX 300M	Flexible current sensor 3/30/300 A, 1000 … 10mV/A, scaling factor 1 /10 /100, sensor length: 160 mm	Z207M

Order Information

Designation	Type	Article Number
Digital Multimeter	METRALINE DM 41	M192A

For additional information regarding accessories please refer to:

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

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