

# METRALINE DM 41

## Digital Multimeter

3-447-023-03  
2/6.24

- Voltage: DC / AC 100  $\mu$ V ... 600 V
- Current: DC/AC: 10  $\mu$ A ... 10.00 A
- Resistance: 100 m $\Omega$  ... 40.00 M $\Omega$
- Capacitance: 1 pF... 200.0  $\mu$ F
- Frequency: 0.001 Hz ... 500.0 kHz
- Diode / Continuity
- Duty cycle measurement (%)
- Temperature with type K<sup>1)</sup> thermocouple: -50 ... 1300 °C
- Hold / relative (zero)
- Automatic / manual measuring range selection
- Digital display with background illumination
- Automatic Blocking Sockets (ABS)<sup>2)</sup>
- 3-year Guarantee

<sup>1)</sup> Optionally available:

<sup>2)</sup> 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      | Digital Display Intrinsic Error under Reference Condition + (... % rdg. + ... d) | Overload capacity <sup>3</sup>                                                     |                   |
|-------------------------------------------------------------------------------------|----------------------|----------------|----------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------|
|                                                                                     |                      |                | V (AC) / V (DC)      |                                                                                  | Overload Values                                                                    | Overload Duration |
| <b>V</b> $\equiv$                                                                   | 400.0 mV             | 100 $\mu$ V    | > 20 M $\Omega$      | 0.75 + 2                                                                         | 1050 V DC                                                                          | Cont.             |
|                                                                                     | 4.000 V              | 1 mV           | 11 M $\Omega$        | 0.5 + 2                                                                          |                                                                                    |                   |
|                                                                                     | 40.00 V              | 10 mV          | 10 M $\Omega$        |                                                                                  |                                                                                    |                   |
|                                                                                     | 400.0 V              | 100 mV         | 10 M $\Omega$        |                                                                                  |                                                                                    |                   |
|                                                                                     | 600 V                | 1 V            | 10 M $\Omega$        |                                                                                  |                                                                                    |                   |
| <b>V</b> $\sim$                                                                     | 400.0 mV             | 100 $\mu$ V    | 11 M $\Omega$        | 1.5 + 5                                                                          | 1050 V (AC)<br>rms                                                                 | cont.             |
|                                                                                     | 4.000 V              | 1 mV           | 11 M $\Omega$        | 1 + 5                                                                            |                                                                                    |                   |
|                                                                                     | 40.00 V              | 10 mV          | 10 M $\Omega$        |                                                                                  |                                                                                    |                   |
|                                                                                     | 400.0 V              | 100 mV         | 10 M $\Omega$        |                                                                                  |                                                                                    |                   |
|                                                                                     | 600 V                | 1 V            | 10 M $\Omega$        |                                                                                  |                                                                                    |                   |
|                                                                                     |                      |                | Voltage Drop         |                                                                                  |                                                                                    |                   |
| <b>A</b> $\equiv$                                                                   | 40.00 mA             | 10 $\mu$ A     | 450 mV               | 0.8 + 2                                                                          | 480 mA                                                                             | cont.             |
|                                                                                     | 400.0 mA             | 100 $\mu$ A    | 4.2 V                |                                                                                  |                                                                                    |                   |
|                                                                                     | 10.00 A <sup>1</sup> | 10 mA          | 750 mV               | 1.5 + 5                                                                          |                                                                                    |                   |
| <b>A</b> $\sim$                                                                     | 40.00 mA             | 10 $\mu$ A     | 450 mV               | 1 + 5                                                                            | 480 mA                                                                             | cont.             |
|                                                                                     | 400.0 mA             | 100 $\mu$ A    | 4.2 V                |                                                                                  |                                                                                    |                   |
|                                                                                     | 10.00 A <sup>1</sup> | 10 mA          | 750 mV               | 2 + 5                                                                            |                                                                                    |                   |
|                                                                                     |                      |                | Open-Circuit Voltage |                                                                                  |                                                                                    |                   |
| <b><math>\Omega</math></b>                                                          | 400.0 $\Omega$       | 100 m $\Omega$ | approx. 0.45 V       | 0.8 + 5                                                                          | 500 V DC/AC rms                                                                    | 10 min            |
|                                                                                     | 4.000 k $\Omega$     | 1 $\Omega$     |                      | 0.8 + 2                                                                          |                                                                                    |                   |
|                                                                                     | 40.00 k $\Omega$     | 10 $\Omega$    |                      |                                                                                  |                                                                                    |                   |
|                                                                                     | 400.0 k $\Omega$     | 100 $\Omega$   |                      | 1 + 5                                                                            |                                                                                    |                   |
|                                                                                     | 4.000 M $\Omega$     | 1 k $\Omega$   |                      | 2 + 5                                                                            |                                                                                    |                   |
|                                                                                     | 40.00 M $\Omega$     | 10 k $\Omega$  |                      | Acoustic signal for 0...< 75 $\Omega$ (approx.)                                  |                                                                                    |                   |
|  | 400.0 $\Omega$       | 100 m $\Omega$ |                      |                                                                                  |                                                                                    |                   |
|  | 1.000 V              | 1 mV           | approx. 1 V          | 2 + 10                                                                           |                                                                                    |                   |
|  | 5.000 nF             | 1 pF           | —                    | 3 + 40 <sup>4)</sup>                                                             | 500 V DC/AC rms                                                                    | 10 min            |
|                                                                                     | 50.00 nF             | 10 pF          |                      | 2 + 10 <sup>4)</sup>                                                             |                                                                                    |                   |
|                                                                                     | 500.0 nF             | 100 pF         |                      | 0.5 + 3 <sup>4)</sup>                                                            |                                                                                    |                   |
|                                                                                     | 5.000 $\mu$ F        | 1 nF           |                      | 1 + 2 <sup>4)</sup>                                                              |                                                                                    |                   |
|                                                                                     | 50.00 $\mu$ F        | 10 nF          |                      | 1.5 + 2 <sup>4)</sup>                                                            |                                                                                    |                   |
|                                                                                     | 200.0 $\mu$ F        | 100 nF         |                      | 5 + 10 <sup>5)</sup>                                                             |                                                                                    |                   |
|                                                                                     |                      |                | f min                |                                                                                  |                                                                                    |                   |
| <b>Hz</b> <sup>2)</sup>                                                             | 10.000 Hz            | 0.001 Hz       | 1 Hz                 | 0.2 + 2                                                                          | $\leq$ 1kHz : 1000 V<br>$\leq$ 10kHz : 400 V<br>$\leq$ 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          |                      |                                                                                  |                                                                                    |                   |
| <b>%</b>                                                                            | 2.0 to 98.0%         | 0.1%           | —                    | 10 Hz ... 1 kHz : $\pm$ 5D<br>1 kHz ... 10 kHz : $\pm$ 5D/kHz                    |                                                                                    |                   |
|                                                                                     |                      |                |                      |                                                                                  |                                                                                    |                   |
|                                                                                     |                      |                | Sensor               |                                                                                  |                                                                                    |                   |
| <b>°C</b>                                                                           | 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 $\pm$ 10                                                                     |                                                                                    |                   |

<sup>1)</sup> Limited by 10 A fuse

<sup>2)</sup> Indication for frequency measurement expanded to 9999 digits

<sup>3)</sup> At 0 °C... + 40 °C

<sup>4)</sup> without zero adjustment „REL“.

<sup>5)</sup> 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 $\equiv$                          | 0.1 $\times$ Intrinsic error/K |
|                      |                                       | V $\sim$                            |                                |
|                      |                                       | mA/A $\equiv$                       |                                |
|                      |                                       | mA/A $\sim$                         |                                |
|                      |                                       | $\Omega$                            |                                |
|                      |                                       | F                                   |                                |
|                      |                                       | Hz                                  |                                |
|                      |                                       | Duty (%)                            |                                |
|                      |                                       | °C                                  |                                |

| Influencing Quantity      | Sphere of Influence (max. resolution) | Frequency                               | Influence Error $\pm$ (... % rdg. +... digit) |
|---------------------------|---------------------------------------|-----------------------------------------|-----------------------------------------------|
| Frequency V <sub>AC</sub> | 4, 40, 400 V                          | 20 Hz ... < 50 Hz<br>> 50 Hz ... 1 kHz  | 2 + 3                                         |
|                           | 400 mV, 600 V                         | 20 Hz ... < 50 Hz<br>> 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<br>mA / A AC / DC<br>$\Omega$<br>F<br>Hz<br>(%)<br>°C | 1 $\times$ 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:  $\pm$ 8 D

Capacitance range F:  $\pm$ 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 3½ 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,  $\Omega$ , F and %

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### Power Supply

|                   |                                                                                                                                                               |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Battery           | 2x. 1.5 V mignon cell (2 x size AA)<br>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:<br>8 kV atmospheric discharge<br>4 kV contact discharge<br>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<sub>AC/DC</sub> 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<sub>AC/DC</sub> and ohmic load;  
Protects the 10 A ranges up to 600 V<sub>AC/DC</sub>.

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<br>for multimeters: IP 50<br>(protection against ingress of solid foreign objects: protected against harmful amounts of dust; protection against ingress of water: not protected)<br>for terminals: IP 20<br>(protection against ingress of solid foreign objects: ≥ 12.5 mm, Ø; protection against ingress of water: not protected) |
| Pollution degree | 2                                                                                                                                                                                                                                                                                                                                                                 |
| Dimensions       | with holster: 86 mm × 188 mm × 53 mm<br>without holster: 79 mm × 174 mm × 38 mm                                                                                                                                                                                                                                                                                   |
| Weight           | Approx. 480 g, with batteries and rubber holster                                                                                                                                                                                                                                                                                                                  |

### Applicable Regulations and Standards

|                                         |                                                                                                                                                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IEC 61010-1<br>EN 61010-1<br>VDE 0411-1 | Safety requirements for electrical equipment for measurement, control and laboratory use                                                                          |
| DIN EN 61326-2-1<br>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<br>DIN VDE 0470-1          | Test instruments and test procedures<br>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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## Digital Multimeter

### 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 <sub>pk</sub> ) | 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          |

| Type           | Description                                                                                                                                                                                                                                   | Article Number  |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 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 <sub>AC</sub> , 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 <sub>AC</sub> , switchable, clamp opening 20 mm dia., CAT II 1000 V / CAT III 600 V                                                                                                             | Z208B           |
| WZ12A          | Current clamp transformer 15 ... 180 A <sub>AC</sub> , 1 mA/A, clamp opening 12 mm dia., CAT II 600 V                                                                                                                                         | Z219A           |
| WZ12B          | Current clamp sensor 10 ... 100 A <sub>AC</sub> , 100mV/A, clamp opening 12 mm dia., CAT II 600 V                                                                                                                                             | Z219B           |
| WZ12C          | Current clamp sensor 1 ... 15 A / 1...150 A <sub>AC</sub> , clamp opening 12 mm dia., CAT II 600 V                                                                                                                                            | WZ12C           |
| WZ12D          | Current clamp transformer 30 ... 150 A <sub>AC</sub> , 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 <sub>AC</sub> , 1 mA/A                                                                                                                                                                                  | GTZ3511000R0001 |
| Z3512          | Current clamp transformer 0.5... 1000 A <sub>AC</sub> , 1 mA/A <sub>AC</sub>                                                                                                                                                                  | GTZ3512000R0001 |
| Z3512A         | Current clamp sensor 1/10/100/1000 A <sub>AC</sub> , switchable, transformation 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](http://www.gossenmetrawatt.com)

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