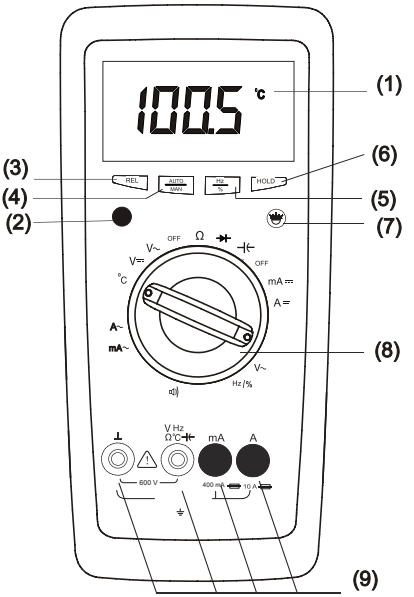
Operating Instructions

GOSSEN METRAWATT

METRALINE DM 41

Digital Multimeter

3-447-024-03
2/3.21


100.5
°C
(1)
(2)
(3)
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(7)
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REL
AUTO
Hz
%
HOLD
OFF
Ω
V~
V⎓
°C
OFF
mA⎓
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A~
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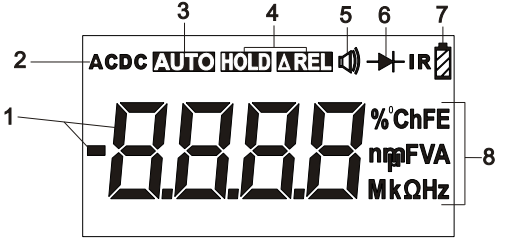
V~
Hz/%
V Hz
Ω°C
mA
A
600 V
400 mA
10 A


1
2
3
4
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7
8
ACDC
AUTO
HOLD
REL
IR
%°ChFE
nmFVA
MkΩHz

Multimeter Operating Elements

1 LCD display
2 Multifunction pushbutton (yellow)
3 Pushbutton for relative value
4 Pushbutton for automatic or manual range selection
5 Hz/% pushbutton for V AC & V DC
6 Pushbutton for Data HOLD function
7 Pushbutton for backlight function (optional)
8 Function selector switch for ON/OFF and measurement function
9 Terminal sockets

LCD Display

1 Digital display with indication of decimal point and polarity
2 Display of selected current/voltage type
3 Display for automatic measuring range selection
4 REL, HOLD display
5 Continuity test display: buzzer indication
6 Diode measurement display
7 Low battery display
8 Display for unit of measured quantity

Standard Equipment

1 Multimeter
1 Protective rubber cover
1 Cable set
2 Batteries, 1.5 V, type AA, installed
1 Operating instructions

Contents Page

1 Safety Features and Safety Precautions

You have selected an instrument which provides you with a high level of safety.
The digital multimeter is manufactured in compliance with safety regulations. In case of incorrect use or careless handling, the safety of both user and multimeter is not assured.

To maintain the safe and proper condition of the multimeters and to ensure their safe operation, it is absolutely necessary to carefully and completely read these operating instructions before using any multimeter. These instructions must be followed in all respects.

Please observe the following safety precautions

- The multimeter must only be operated by persons who understand the danger of shock hazards and know how to apply safety precautions. Shock hazards exist anywhere, where voltages of more than 30 V (TRMS) may occur.
- Do not work alone in shock hazardous environment while carrying out measurement
- The maximum allowable voltage between any terminal sockets (1) and earth is equal to 600 V. Voltages of greater than 500 V may only be applied to sockets „⊥“ and „V“ with the selector switch in the voltage measurement position (selector switch in „V“ position).
- Take into account that unexpected voltages can occur at devices under test (e.g. defective devices), for example, capacitors can be dangerously charged.
- Verify that the test leads are in good condition, e.g. no cracked insulation, no open circuits in the leads or connectors.
- This multimeter must not be used for measurements on circuits with corona discharge (high voltage).
- Be particularly careful when measurements are performed in HF electrical circuits. Dangerous composite voltages may be present.

- Measurements under moist ambient conditions are not permitted.
- Do not exceed the permissible overload limits of the measuring ranges. Limit values can be found in the table „Measuring Ranges“ in chapter 15 „Technical Characteristics“.
- All current ranges are equipped with fuses. The maximum allowable voltage for the measuring current circuit is equal to 600 V~.
- **The instrument may only be used in power installations when the electrical circuit is protected with a 20 A fuse or circuit breaker, and the nominal voltage of the installation does not exceed 600 V.**

Meaning of the symbols on the device

	Warning concerning a source of danger (Attention, refer to the operating instructions)
	Earth (ground) terminal.
	Double or reinforced insulation
CAT II / III / IV	Instrument for measuring category II / III or IV
	EU conformity mark

Opening of Equipment / Repair

The equipment may be opened only by authorized service personnel to ensure the safe and correct operation of the equipment and to keep the warranty valid.

Even original spare parts may be installed only by authorized service personnel.

In case the equipment was opened by unauthorized personnel, no warranty regarding personal safety, measurement accuracy, conformity with applicable safety measures or any consequential damage is granted by the manufacturer.

Repair and Parts Replacement by Authorized Service Personnel

After opening the multimeter, live parts may be exposed. Therefore, the multimeter must be disconnected from the measuring circuit prior to opening its housing for repair, replacement of parts or calibration. If repair or calibration cannot be avoided unless the multimeter is open and live, this work must be performed by a qualified person who understands the dangers involved.

Faults and Extraordinary Stress:

If it has been ascertained that safe operation is no longer possible, take the multimeter out of service and secure it against accidental use. Safe operation may not be possible

- if the multimeter shows obvious signs of damage,
- if the multimeter no longer functions correctly,
- after prolonged storage under adverse conditions,
- on account of severe stress during transport.

2 Initial Start-Up

Batteries

Please refer to chapter 16.1 on page 30 before initial start-up of your instrument or after a lengthy period of storage.

Switching the Multimeter ON

Turn the function selector switch from the OFF position to the desired measuring function.
All segments of the LCD are activated briefly.
A drawing of the LCD can be found on page 2.

Note!

Electric discharge and high-frequency interference may cause incorrect displays and block the measuring sequence. Reset the multimeter by switching it OFF and ON again. If this procedure is unsuccessful, briefly disconnect the battery from the contact terminals.

Attention!

Before opening, disconnect the multimeter from the measuring circuit and observe chapter 16 on page 30.

Automatic Meter-OFF (MoFF)

Your multimeter switches OFF automatically after 15 minutes if no keys or the function selector switch have been activated during this time.

Switching the multimeter back ON

Activate the HOLD key.

Switching the multimeter OFF

Turn the function selector switch to the OFF position.

3 Function and Range Selection

3.1 Measuring Function Selection

The desired measuring function is selected with the function selector switch (white or green print). In order to select the function printed in green color, the yellow multifunction key must also be pressed. If the multifunction key is pressed again, the function printed in white half circle is reactivated.

3.2 Automatic Measuring Range Selection

These multimeters features auto-ranging for all measuring ranges except for the ranges 400 mV~ and 10 A. Automatic selection is functional as soon as the multimeter is switched ON. According to the measured quantity applied, the multimeter automatically selects the measuring range which gives the best resolution.

3.3 Manual Measuring Range Selection

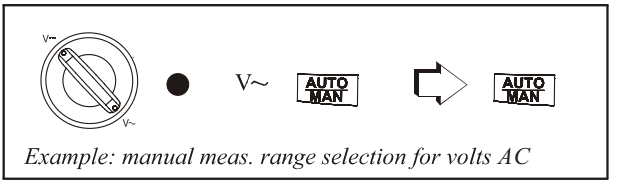
You can switch OFF auto-ranging. Select and fix the ranges manually according to the table given on page 11.

First select the desired measuring function with the function selector switch and, if appropriate, the multifunction key.

Briefly activate the AUTO/MAN key.

Manual mode is switched OFF if you press and hold the AUTO/MAN key until you hear a second acoustic signal, and the display switches to AUTO.

When switching back to automatic operation in the 400 mV~ range, the 4 V~ range is activated.



Example: manual meas. range selection for volts AC

⇓ AUTO / MAN	Function	Acknowledge-ment	
		Display	Acoust. Signal
brief	Manual mode **ON**: utilized measuring range is fixed		1 x
brief	V ⎓: 400 mV → 4 V → 40 V → 400 V → 600 V → 400 mV → 4 V → ... V ∼/: 4 V → 40 V→ 400 V → 600 V → 400 mV → ... mA ⎓: 40 mA → 400 mA → 40 mA ... mA ∼/:40 mA → 400 mA → 40 mA ... Ω: 40 mΩ → 400 mΩ → 4 kΩ → 40 kΩ → 400 kΩ 4 mΩ → 40 mΩ ...		1 x
long	Return to automatic range selection	AUTO	2 x

Note: For temperature (°C), frequency (Hz), duty cycle (%) and capacitance (F) measuring range is always Auto. No manual range selection is possible.

4 Liquid Crystal Display (LCD)

4.1 Digital Display

The main digital display shows the measured value, decimal point and sign. The selected measuring unit and function are displayed.

When measuring DC quantities, a minus sign appears in front of the digits, when the positive pole of the measured quantity is applied to the „⊥“ input terminal.

„**0L**“ is displayed if the measuring range upper limit is exceeded.

The digital display is updated three times per second for V, A, Ω, Cap., Freq. and duty cycle measurements.

4.2 Display with Backlight (Optional)

By pressing the ☼ key, the backlight can be switched ON or OFF to enable the user to take measurements in poor lighting conditions.

5 Buzzer

The following steps are acknowledged ba an acoustic signal:

- Activation or deactivation of the following functions: AUTO/MAN, REL or HOLD, Hz / %, Backlight.
- When AC voltage > 750 V is applied, DC voltage > 1000 V, AC/DC mA > 400.0 mA, AC/DC A > 10 A, the buzzer sounds as an overload warning.
- Approximately 1 minute before the multimeter is switched Auto Power OFF, the buzzer issues constantly 5 acoustic signals as a sign of warning. Before the multimeter switches off, the buzzer generates one long acoustic signal to warn the user.

6 Measurement Value Storage „HOLD“

By pressing the HOLD key, the currently displayed measured value can be „held“, and „HOLD“ is displayed at the same time on the LCD.

The HOLD display is switched off if:

- the HOLD key is reactivated,
- the function selector switch is operated,
- the yellow multifunction key is activated for a change of function, e.g. AC → DC,
- the REL key is activated,
- the AUTO/MAN key is activated.

7 REL – Relative Value Measurement

The REL key serves to measure relative values and acts in activation. All functions can be used for relative value measurement except Hz / duty.

8 Voltage Measurement

- Turn the function selector switch to V ⎓.
- Connect the measurement cable as shown. Terminal „⊥“ should be grounded and the second measurement cable with a higher potential connected to Terminal „V“.

Note!

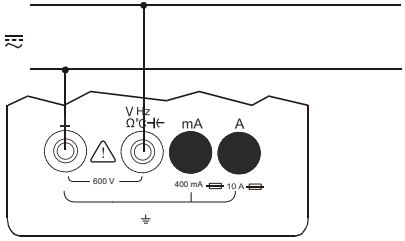
The 400 mV~ measuring range can only be selected manually with the „AUTO/MAN“ key!

Attention!

Ensure that the current ranges („mA“ or „A“) are deactivated and that the measurement cables are connected with the correct terminals „V“ and „⊥“ before connecting your multimeter for voltage measurement! If the limit values for fuse tripping are exceeded due to an operating error, both the operator and the instrument are in danger! Observe the voltage limit values printed on the multimeter!

- Select the respective voltage type (AC or DC) which corresponds to the measuring value by briefly pressing the yellow multifunction key. Each activation of the key causes alternate switching between AC and DC, as well as acknowledgment by means of an acoustic signal.

The symbols DC and AC indicate the selected voltage type on the LCD display. **After selection of this function with the selector switch, the voltage type DC is always activated.**



9 Current Measurement

Attention!

First of all, disconnect the power supply from the measuring circuit and/or the load and discharge any capacitors that might be present.

1 Select function A with the function selector switch for currents > 400 mA or function mA for currents < 400 mA.
For measuring currents of an unknown quantity, select the highest measuring range first.

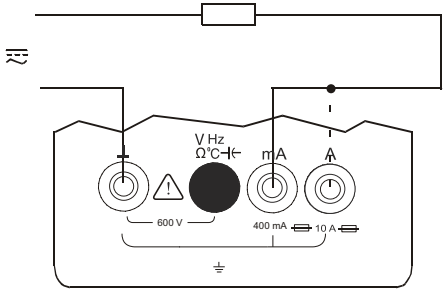
2 Select the function corresponding to the measured quantity by briefly pressing the yellow multifunction key. Each time the key is pressed, alternate switching takes place between AC and DC, and changeover is acknowledged by an acoustic signal. The symbols DC and AC indicate the selected current type on the LCD.
After selection of this function with the selector switch, the current type DC is always activated.

3 Connect the measuring instrument in series to the load as shown (without contact resistance).

Notes on Current Measurement:

- The multimeter must be used only in the power systems, where the current circuit is protected by a fuse or a circuit breaker of 20 A, and when the nominal voltage of the system does not exceed 600 V.
- Carefully secure the measuring circuit connections by mechanical means so that they do not accidentally open. The conductor cross sections and connection points should be designed so as to avoid excessive heating.
- Current ranges up to 400 mA are protected with a FF1.6 A / 1000 V fuse.
- In the 400 mA measuring range an intermittent acoustic signal warns you if the measured value has exceeded the measuring range upper limit value.

- The 10 A current measuring range is protected by a 10 A / 600 V fuse.
- If a fuse blows, eliminate the cause of the overload before placing the multimeter back into operation!
- Replacement of the fuses is described in chapter 16.2 on page 32.



9.1 AC Current Measurement with (Clip-on) Current Transformer

9.1.1 Transformer Output mA/A

Attention!

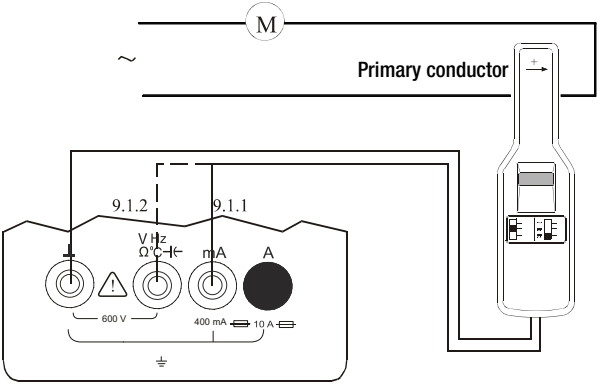
If current transformers are operated with an open circuit on the secondary side, e. g. due to defective or disconnected leads, a blown fuse in the multimeter, or a wrong connection, dangerously high voltages may occur at the connectors. Therefore, make sure that the current circuit of the multimeter and secondary winding of the transformer connected to the multimeter form an intact circuit. Connect the transformer to the ⊥ and mA or A sockets.

Some current transformers include safety devices which prevent dangerous voltage increases at open electrical circuits.

The maximum allowable operating voltage at the primary conductor is equal to the nominal voltage of the current transformer. When reading the measured value, consider the transformation ratio of the transformer as well as the additional display error.

9.1.2 Transformer Output mV/A

Some transformers have a voltage output (referred to as mV/A). The secondary output must therefore be connected to the connection sockets „⊥“ and „V“.



When reading the measured values in V, consider the transformation ratio of the transformer and the fact that the display shows current values as well as the additional display error.

10 Diode Testing and Continuity Measurement

10.1 Diode Testing

Attention!

Verify that the device under test is electrially dead. External voltages would falsify the measurement results!

- Set the function selector switch to „⊣◀⊢“.
- Connect the device under test as shown.

Conducting Direction and Short-Circuit

The measuring instrument displays the forward voltage in volts. As long as the voltage drop does not exceed the maximum display value of 1.000 V you can test several elements connected in series.

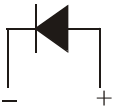
Reverse Direction or Interruption

The measuring instrument displays a voltage of „**OL**“.

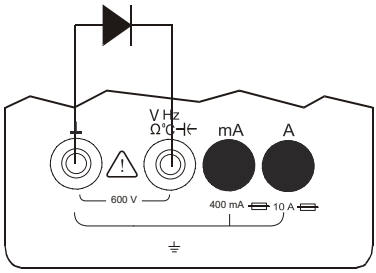
Note!

Resistors and semiconductor paths in parallel to the diode distort the measurement results!

Conducting Direction



Reverse Direction



10.2 Continuity Testing

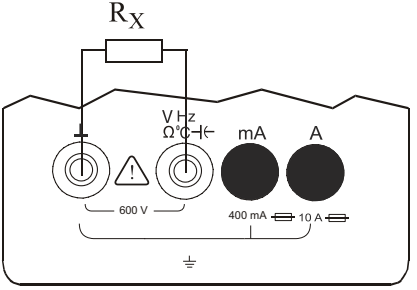
Attention!

Verify that the device under test is electrially dead. External voltages would falsify the measurement results!

- ➪ Set the function selector switch to „⊣▶⊢“.
- ➪ Press the yellow multifunction key to switch to the continuity measuring range.

Display of the 🔊 symbol is activated.
The instrument generates a continuous acoustic signal at a measured resistance of 0 to approx. < 75 Ω.

- ➪ Connect the device under test as shown below.

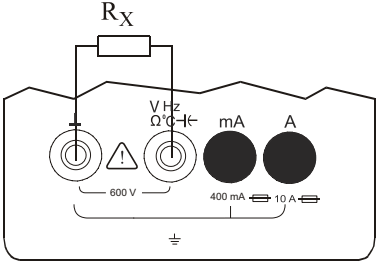


11 Resistance Measurement

Attention!

Verify that the device under test is electrically dead. External voltages would falsify the measurement results!

- Set the function selector switch to „Ω“.
- Connect the device under test as shown below.



Zero Adjustment (Relative Mode)

In the measurement of resistance, the inherent error of the multimeter and the resistance of leads can be eliminated by zero adjustment.

- Short-circuit the leads connected with the multimeter.
- Press the REL key.

The instrument acknowledges zero adjustment with an acoustic signal and values close to 00 and REL are displayed on LCD.

The resistance measured at the time the REL key is pressed serves as a reference value. This value is then automatically deducted from all measured values.

Deleting Zero Adjustment

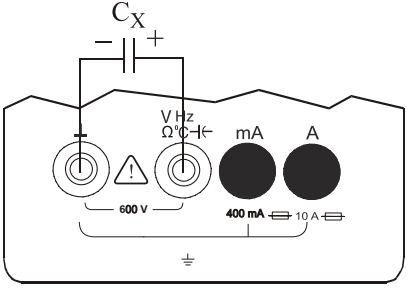
- Short-circuit the leads connected with the multimeter and press the REL key afterwards
  or activate the function selector switch
  or switch the multimeter off.

Attention!

Absolutely verify that the device under test is electrically dead. External voltages would falsify the measurement results!

- Set the function selector switch to „F“.

Connect the (discharged!) device under test to sockets „⊥“ and „F“ with measurement cables. Polarized capacitors must be connected to the „⊥“ socket at the „–“ pole.



Note!

Resistors and semiconductor paths in parallel to the capacitor falsify the measurement results!
To measure small value capacitors, please use short measurement cables!
If the ◣ symbol is displayed, the measured values are not valid.

Zero Adjustment (Relative Mode)

For the measurement of small capacitance values in the 5 nF and 50 nF ranges, the inherent error of the multimeter and the capacitance of the leads can be eliminated by zero adjustment.

- ➪ Connect the leads with the multimeter without device under test.
- ➪ Briefly Press the REL key.

The instrument acknowledges zero adjustment with an acoustic signal, and a value close to „00.00“ and REL are displayed on the LCD. The capacitance measured at the moment the key is activated serves as a reference value. This value is then automatically deducted from all measured values.

Deleting Zero adjustment

- ➪ Press REL key. Clearance is acknowledged by buzzer sound

or

- ➪ activate the function selector switch

or

- ➪ switch the multimeter off.

13 Frequency and Duty Cycle Measurement

13.1 Frequency Measurement

1 Set the function selector switch to V~ (V AC) (letter white) and press the Hz/% key, as shown on page 23.
The frequency measurement mode is activated. „Hz“ symbol is displayed on the LCD. The digital display is expanded to 9999 digits. Only the auto mode, no manual range is possible.

2 Connections are established in the same way as for voltage measurement.

3 The lowest measurable frequencies and the maximum allowable voltages are specified in chapter 15 „Technical Characteristics“.

13.2 Duty Cycle Measurement

With duty cycle measurement, we can determine the ratio of pulse duration to cycle time of recurring square wave signals. The duty cycle, which is the percentage pulse duration of a signal, is displayed on the LCD as follows:

$$\text{Duty cycle (\%)} = \frac{\text{Pulse duration}}{\text{Cycle duration}} \times 100$$

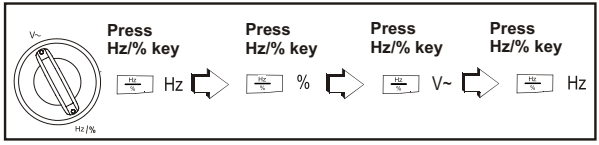
Note!
The applied frequency must remain constant during the duty cycle measurement.

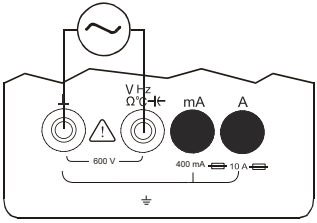
1 Set the function selector switch to V~ (letter white) and press the Hz/% key twice as shown on page 23.
The duty cycle (%) mode is activated. The „%“ symbol is displayed on the LCD.

Note!
The Hz/% key is only applicable for V~ (letter white).

2 Connections are made the same way as for voltage measurement.

3 Measuring range for duty cycle and maximum allowable voltage can be found in chapter 15 „Technical Characteristics“.



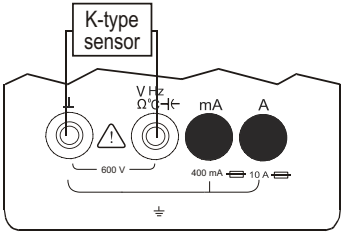


14 Temperature Measurement

The multimeter allows you to measure temperature with a K-type thermocouple (NiCr-Ni) in the range of –50 °C to +1300 °C.

➪ Set the function selector switch to „°C“.

➪ Connect the sensor as shown below.



15 Technical Characteristics

Meas. Function	Measuring Range	Resolution	Input Impedance V (AC) / V (DC)	Digital display inherent deviation at reference condition +(...% rdg. +...digits)	Overload Capacity [3] Overload Values	Overload Duration
V ⎓	400.0 mV	100 µV	> 20 MΩ	0.75 + 2	1050 V (DC)	Continuous
	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	Continuous
	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		
			approx. voltage drop at max. meas. current			
A ⎓	40.00 mA	10 µA	450 mV	0.8 + 2	480 mA	Continuous
	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	Continuous
	400.0 mA	100 µA	4.2 V			
	10.00 A [1]	10 mA	750 mV	2 + 5	—	—
			Open-circuit volt.			
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		

Meas. Function	Measuring Range	Resolution	Input Impedance V (AC) / V (DC)	Digital display inherent deviation at reference condition +(...% rdg. +...digits)	Overload Capacity [3] Overload Values	Overload Duration
F	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 ≤ 10 kHz : 400 V ≤ 500 kHz : 40 V except 400 mV	Continuous
	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 ... 98.0%	0.1 %	—	10 Hz ... 1 kHz : ± 5D 1 kHz ... 10 kHz : ± 5D/ kHz		
			Sensor			
°C	0 ... + 1300 °C	1 °C	K-type NiCr-Ni	2 + 3	500 V DC/AC rms	10 min
	–50 ... 0 °C	1 °C		2,0 ±10		

1) Limited by a 10 A fuse
2) Indication for frequency measurement expanded to 9999 digits
3) At 0 °C... + 40 °C
4) With zero adjustment „REL“.
5) Time required for measurement approximately 60 seconds.

Reference Conditions

Ambient Temperature	+ 23 °C ±2 K
Relative Humidity	45% ... 55%
Measuring Magnitude Frequency	Sine, 50 Hz
Measuring Magnitude Waveform	Sine
Battery Voltage	3 V ±0.1 V

Ambient Conditions

Working Temperature Range	–10 °C ... + 50 °C
Storage Temperature Range	–25 °C ... + 70 °C
Relative Humidity	45 ... 75%
Elevation	up to 2000 m

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/Char. Height	7 segment digits / 15 mm
Number of Places	3¾ place equals 3999 steps
Overflow Display	„OL“
Polarity Display	„–“ sign is displayed when plus pole is at „⊥“
Measuring Rate	3 measurements/s for V, A, Ω, Capacitance, Frequency and Duty cycle measurement

Influencing Quantities and Effects

Influencing Variable	Range of Influence	Measured Quantity/ Measuring Range	Influence Effect
Temperature	0 °C ... +21 °C and +25 °C ... +50 °C	V ⎓, V ∼	1 x intrinsic error/K
		mA/A ⎓, mA/A ∼	
		Ω	
		F	
		Hz	
		Duty (%)	
		°C	

Influence Variable	Range of Influence (max. resolution)	Frequency	Intrinsic Error at Ref. ± (... % of rdg + ... D)
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

Influence Variable	Range of Influence	Measured Quantity/ Measuring Range	Influence Effect
Relative Humidtiy	55 ... 75 %	V AC / DC mA / A AC / DC Ω F Hz(%) °C	1 x intrinsic error

Influencing Variable	Interference Quantity	Measuring Range	Attenuation
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 sine	V DC	> 43 dB
	max. 1000 V DC	V AC	> 55 dB

Auxiliary voltage influence:
(without ▭ display) – all ranges except cap.: ±8 D
cap. range: ±20 D

Power supply

Battery	2 x 1.5 V mignon cell (2x AA-Size) alkaline-manganese cell per IEC LR6.
Service life	with alkaline-manganese cell: approx. 600 hours
Battery test	Automatic display of „ ▭ “ symbol when battery voltage falls below approx. 2.4 V.

Fuses

Fuse for ranges up to 400 mA	FF 1.6A/1000V; 6.3 mm x 32 mm; protects all current measuring ranges up to 400 mA
Fuse for 10 A range	FF 10A/600V; 6.3 mm x 32 mm; protects all measuring ranges up to 10 A

Electromagnetic compatibility (EMC)

Emission	EN 61326: 2013 Class B
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.

Electrical Safety	IEC 61010-1-2010
Installation category	600 V CAT III / 300 V CAT IV
Pollution degree	2
High Voltage Test	3.5 kV ~ (IEC 61010-1-2010)

Mechanical Design

Protection	for multimeter: IP50 for terminals: IP20
Dimensions	W x H x D: with holster: 86 mm x 188 mm x 53 mm without holster: 79 mm x 174 mm x 38 mm
Weight	approx. 480 g with battery

Attention!

Disconnect the multimeter from the measuring circuit before you open it to replace the battery or the fuse!

16.1 Battery

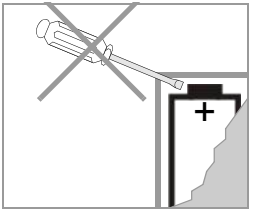
Prior to initial start-up or after storage of multimeter, verify that the batteries inserted in the multimeter do not leak. Repeat this check at regular brief intervals.
If battery leakage has occurred, the electrolyte from the battery must be carefully and completely removed and new batteries must be installed before putting the multimeter back into operation.
When the symbol appears on the LCD, replace the batteries as soon as possible. Although measurements can still be performed, a reduced measuring accuracy must be taken into account in this case.

Replacing the Battery

- Unscrew the battery compartment cover from the base housing. There is no need to remove the entire base of the housing.

Attention!

Remove the batteries by levering out the **negative pole** of the batteries with a screw driver **first**. Otherwise, the contacts of the positive pole in the battery compartment might be damaged and the battery lead severed.



- Remove the batteries from the battery compartment. Insert two new 1.5 V mignon cells in accordance with the polarity symbols in the battery compartment.

Attention!

When inserting the batteries, begin with the positive pole of the battery and fit the negative pole into place afterwards, in order to avoid damage to the contacts of the positive pole.

- ➪ Tighten the battery compartment cover with the screw.
- ➪ Dispose of the dead batteries in an environmentally sound fashion.

16.2 Fuses

The 10 A fuse interrupts the 10 A current range, and the 1.6 A fuse protects the mA current measuring ranges. All other measuring ranges continue to function.
When a fuse blows, eliminate the cause of the overload before putting the instrument back into operation!

Replacing the Fuses

- ➪ Unscrew the cover of the housing base from the top housing.
- ➪ Remove the defective fuse from the fuse holders, e.g. with the help of a probe and replace it with a new one.
- ➪ Screw the cover of the base housing onto the top again.
- ➪ Make sure that the new fuse makes good contact.

The following fuses are admissible:

– for current measuring ranges up to 400 mA:
type FF 1.6 A/1000 V ~; 6.3 mm x 32 mm
– for the 10 A current measuring range:
type FF 10 A/600 V ~; 6.3 mm x 32 mm

Attention!

It is imperative to ensure that only the fuses specified above are installed!
If a fuse with different specifications is used, it may put the operator, the system and the multimeter at risk.
The use of repaired fuses or the short-circuiting of the fuse holder is not permissible.

Fuse Testing

- ➪ Take out the fuse to be tested.
- ➪ Set the function selector switch to ⊣►⊢.
- ➪ Press the yellow function key to select 🔊.
- ➪ Connect the measurement cable with the „V, Ω, ⊣►⊢, F“ socket.
- ➪ Measure the resistance of the fuse.
- ➪ A continuous acoustic signal and the display of approx. 10.2 Ω indicate that the fuse for the mA current range is OK.
- ➪ A continuous acoustic signal and the display of approx. 0.0 Ω indicate that the fuse for the A current range is OK.

Note!

If a value other than those indicated above or the overflow symbol „OL“ is indicated, the corresponding fuse must be replaced.

16.3 Housing

No special maintenance is required for the housing.

Excessive contamination has an adverse effect on isolation and reduces input resistance.

Keep outside surfaces clean. Use a slightly dampened cloth for cleaning. Avoid the use of cleansers, abrasives or solvents.

16.4 Returns and Environmentally Sound Disposal

The instrument is a category 9 product (monitoring and control instrument) in accordance with ElektroG (German Electrical and Electronic Device Law). This device is subject to the RoHS directive. Furthermore, we make reference to the fact that the current status in this regard can be accessed on the Internet at www.gossenmetrawatt.com by entering the search term WEEE.

We identify our electrical and electronic devices in accordance with WEEE 2012/19/EU and ElektroG using the symbol shown at the right per DIN EN 50419.

These devices may not be disposed of with the trash. Please contact our service department regarding the return of old devices (see address in Section 18).

If you use **batteries** or **rechargeable batteries** in your instrument or accessories which no longer function properly, they must be duly disposed of in accordance with the applicable national regulations.

Batteries or rechargeable batteries may contain harmful substances or heavy metals such as lead (Pb), cadmium (Cd) or mercury (Hg).

The symbol shown at the right indicates that batteries or rechargeable batteries may not be disposed of with the trash, but must be delivered to collection points specially provided for this purpose.

17 Product Support

If required please contact:

Gossen Metrawatt GmbH
Product Support Hotline
Phone: +49 911 8602-0
Fax: +49 911 8602-709
E-mail support@gossenmetrawatt.com

18 Repair and Replacement Parts Service Calibration Center* and Rental Instrument Service

If required please contact:

GMC-I Service GmbH
Service Center
Beuthener Str. 41
90471 Nürnberg, Germany
Phone: +49 911 817718-0
Fax: +49 911 817718-253
E-mail service@gossenmetrawatt.com
www.gmci-service.com

This address is only valid in Germany.
Please contact our representatives or subsidiaries for service in other countries.

* **DAkkS Calibration Laboratory for Measured Electrical Quantities D-K-15080-01-01 accredited per DIN EN ISO/IEC 17025**
Accredited quantities: direct voltage, direct current value, direct current resistance, alternating voltage, alternating current value, AC active power, AC apparent power, DC power, capacitance, frequency, temperature

19 Manufacturer‘s Warranty

Digital multimeters of the METRALINE DM series are guaranteed for a period of 3 years after shipment. The manufacturer’s warranty covers materials and workmanship. Damage resulting from use for any other than the intended purpose or operating errors, as well as any and all consequential damages are excluded.

Kindly register each device at myGMC after purchase in order to benefit from the 3 year warranty.

20 Registration

Register your device at **www.gossenmetrawatt.com → myGMC**

Your Benefits for your digital multimeter

- Backup for serial number
- Free downloads
- Info hotline
- Update information
- Application notes

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