

- Pince Multimètre
- Multimeter Clamp
- Multimeterzange
- Pinza Multimetro
- Pinza Multímetro

## MX 670 / 675



ENGLISH

User's manual

**mettix**®

## TABLE OF CONTENTS

<b>1</b>	<b>GENERAL INSTRUCTIONS</b> .....	<b>21</b>
1.1	UNPACKING – PACKING.....	21
1.2	PRECAUTIONS AND SAFETY IN MEASUREMENTS.....	21
<b>2</b>	<b>DESCRIPTION OF THE INSTRUMENT</b> .....	<b>23</b>
2.1	DESCRIPTION OF THE FRONT PANEL.....	23
2.2	DESCRIPTION OF LCD DISPLAY.....	24
<b>3</b>	<b>GENERAL DESCRIPTION</b> .....	<b>25</b>
3.1	CORRECTION OF ZERO IN DC MEASUREMENT.....	25
3.2	HOLD FUNCTION - FREEZE DISPLAY.....	25
3.3	AUTOMATIC RANGES.....	25
3.4	AUTO POWER-OFF.....	25
3.5	PEAK FUNCTION (1 MS).....	25
3.6	MAX MIN FUNCTION (500 MS).....	26
3.7	BACKLIGHT FUNCTION.....	26
3.8	DISPLAY FUNCTION.....	26
<b>4</b>	<b>OPERATION</b> .....	<b>26</b>
4.1	AC VOLTAGE MEASUREMENT.....	26
4.2	DC VOLTAGE MEASUREMENT.....	27
4.3	MEASURING AC CURRENT.....	27
4.4	DC CURRENT MEASUREMENT (MX675 ONLY).....	28
4.5	RESISTANCE MEASUREMENT AND AUDIO CONTINUITY TEST.....	28
4.6	°C/°F TEMPERATURE MEASUREMENT.....	29
4.7	MEASUREMENT OF VOLTAGE FREQUENCY.....	30
4.8	MEASUREMENT OF AC CURRENT FREQUENCY.....	30
<b>5</b>	<b>TECHNICAL SPECIFICATIONS</b> .....	<b>31</b>
5.1	GENERAL.....	31
5.2	CHARACTERISTICS.....	31
5.3	ELECTRICAL SAFETY (AS PER NF EN 61010):.....	32
5.4	GENERAL INFORMATION.....	33
5.5	ENVIRONMENTAL CONDITIONS.....	33
<b>6</b>	<b>MAINTENANCE</b> .....	<b>34</b>
6.1	REPLACING THE BATTERY.....	34
6.2	CLEANING.....	35
6.3	STORAGE.....	35
6.4	METROLOGICAL VERIFICATION.....	35
6.5	REPAIRS UNDER GUARANTEE AND OUTSIDE GUARANTEE.....	35
<b>7</b>	<b>WARRANTY</b> .....	<b>35</b>

Thank you for purchasing this MX670 or MX675 series multimeter clamp.

To obtain the best service from your unit:

- read these operating instructions carefully,
- comply with the precautions for use.

## 1 GENERAL INSTRUCTIONS

If the device is used in a manner unspecified in these instructions, the protection provided by the device may be compromised.

### 1.1 Unpacking – Packing

All instruments are checked mechanically and electronically before shipment. All precautions are taken to be sure you receive an undamaged instrument. If there is damage, notify the carrier immediately.

### 1.2 Precautions and safety in measurements

#### 1.2.1 Before any use

The MX670 & MX675 are dual display multimeter clamps. These multimeter clamps are compliant with electrical standard IEC 61010 concerning measuring instruments. For your own safety and to prevent any damage to your measuring instrument, you must follow the instructions in this manual.

- \* This instrument can be used for measurement on category IV electrical installations, in a degree 2 pollution environment, indoors at an altitude lower than 2000 m and with a voltage in relation to ground lower than or equal to 600 V.

- \* Definition of installation categories (see IEC 61010-1):

CAT I: Circuits not directly connected to network and specially protected

Example: *protected electronic circuits*

CAT II: Circuits connected directly to low-voltage installation

Example: *power supply for domestic electrical appliances and portable tools*

CAT III: Power supply circuits in the building installation

Example: *Electrical panel, circuit breakers, fixed industrial machines or devices*













CAT IV: Source circuits of building low-voltage installation.

Example: *Power feeders, counters and protection systems*

For safety reasons, you must use only measuring leads, of voltage and category at least equal to those of the instrument and compliant with standard IEC 61010.

Before use, always check the integrity of the instrument casing and cable insulation.

## 1.2.2 Meaning of symbols used

Symbol	Meaning	Symbol	Meaning
	Instrument protected by double isolation.		Ground.
	Alternating current.		Battery.
	Direct current.		The CE marking guarantees conformity with European directives and with regulations covering EMC.
	CAUTION - DANGER! Refer to the operating manual.		Selective sorting of waste for recycling electrical and electronic equipment within the European Union.
	Caution, risk of electrical shock		In accordance with the WEEE 2002/96/EC directive: This equipment must not be processed as household waste.
	Audible continuity test		
	Clamp: Application or withdrawal authorized on conductors under dangerous voltage		

## 1.2.3 When using the instrument

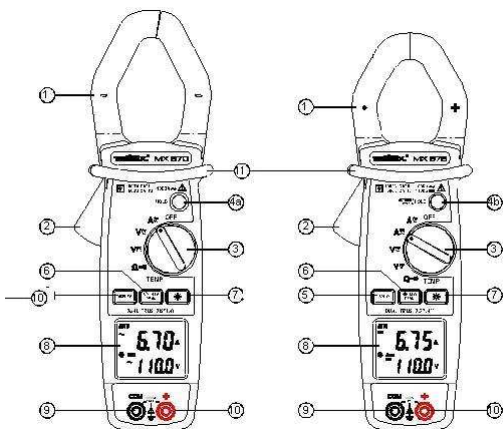
**To prevent electrical discharge, injury or damage to the device, and to ensure you use the multimeter without risk, follow the safety recommendations below:**

- Read the operating instructions fully before using this device and observe all safety instructions.
- This device must be used indoors, up to 2000 m altitude.
- Never exceed the protection limit values indicated in the specifications for each type of measurement.
- When the multimeter clamp is inserted into the measurement circuits, do not touch the unused measurement cables or terminals.
- Before changing the function, disconnect the measurement leads from the circuit measured.
- Never measure resistances on a live circuit. Disconnect the power and discharge all high voltage condensers before performing a resistance or continuity measurement.
- Avoid working alone.
- Use the device only as specified in this manual; otherwise, the protection provided by this multimeter may be altered.
- Do not use this device if it appears damaged.
- Inspect the integrity of lead insulation. Replace damaged leads.
- Be careful when working with voltages higher than 70 VDC or 33 Vrms and 46.7 Vpp, such voltages can pose a risk of electrocution. Depending on conditions, the use of individual protection is recommended.
- Always keep hands behind the physical protection of the tips or the clamp during a measurement.

- Always use the type of battery specified.
- **Before opening the instrument**, disconnect it from the measurement circuits, switch off and make sure you are not charged with static electricity, which would irreversibly damage the internal components of the instrument.

## 2 DESCRIPTION OF THE INSTRUMENT

### 2.1 Description of the front panel



1	Jaws
2	Trigger
3	Selector switch
4a	HOLD Button
4b	ADC Zero&HOLD Button
5	DISPLAY Key
6	MIN MAX PEAK Key
7	BACKLIGHT Key
8	LCD display
9	COM Socket Input
10	Socket input +
11	Physical protection

## 2.2 Description of LCD display



●	●		Auto power-off
●	●	MAX	Max. value
●	●	MIN	MIN value
●	●		Continuity Test
●	●	HOLD	Freeze display
●	●	Ω	Resistance measurement
●	●	V	Voltage measurement
●	●	A	Current measurement
●	●	Hz	Frequency measurement
●	●		Battery low
●	●		Direct current
●	●		Negative value
●	●	ZERO	Abc zero function
●	●		Alternating current
●	●	PEAK	Peak Value
●	●	AUTO	Automatic ranges
●	●	°C	Degrees Celsius
●	●	°F	Degrees Fahrenheit

### 3 GENERAL DESCRIPTION

#### 3.1 Correction of zero in DC measurement

This function is present only on model MX675 to return to zero the display of the remanent magnetization of the clamp in DC measurement. When the switch is positioned on ADC and with no conductor inserted into the clamp, press the ADC ZERO & HOLD key (about 2 seconds) until display a of zero current appears. This reset to zero is also indicated by an audio beep and the display of the symbol ZERO.

This operation must usually be renewed after each high amplitude current measurement.

Elimination of zero correction is possible only by changing the function using the switch.

#### 3.2 HOLD function - Freeze display

In model MX670, it is possible to freeze the value displayed by pressing the "HOLD" button. To deactivate this function, press the "HOLD" button a second time.

In model MX675, it is possible to freeze the value displayed by pressing the "A<sub>DC</sub> ZERO & HOLD" button. To deactivate this function, press the "A<sub>DC</sub> ZERO & HOLD" button a second time.


#### 3.3 Automatic ranges

Depending on the function and nature of the input signals, the instrument uses automatically the best suited measurement range. The manual choice of a range is therefore not possible.

#### 3.4 Auto power-off

The clamp will stop automatically after 10 minutes (The symbol  is displayed).

To deactivate this function, hold down the A<sub>DC</sub> ZERO & HOLD button (for MX675) or the HOLD button (for MX670). Activate the clamp while turning the switch from the "OFF" position towards any position.

Release the button when the audio signal confirms the operation (the symbol  is no longer displayed).

#### 3.5 PEAK Function (1 ms)

This function is used for measuring 1-ms peak values in voltage or current.

To activate the function, press the MIN MAX PEAK key for at least 2 seconds, until "PEAK" is displayed.

To exit this function, press the MIN MAX PEAK key for at least 2 seconds or press the A<sub>DC</sub> ZERO & HOLD button (MX675) twice or press the HOLD (MX670) button twice; the clamp returns to normal mode.

### 3.6 MAX MIN function (500 ms)

To activate the MAX MIN function, press on the **MIN MAX PEAK** button. The MIN value is then displayed. (the MIN symbol is displayed steady; the MAX symbol is displayed flashing)

By pressing again on the key, the MAX value will be displayed (the MIN symbol is displayed flashing; the MAX symbol is displayed and steady).

By pressing the key again, the clamp returns to normal mode.

### 3.7 BACKLIGHT Function

By pressing the ☀ button, the backlight of the display goes on, press again, it goes off.

The "auto power off" function activates after 3 minutes.

### 3.8 DISPLAY Function

When measuring voltage or AC current, pressing the **DISPLAY** key replaces the nature of the secondary display by the signal frequency of the main display. Pressing again returns to the previous display.

In temperature measurement, pressing the **DISPLAY** key switches the displays in degrees Celsius and degrees Fahrenheit of the measured temperature.

## 4 OPERATION

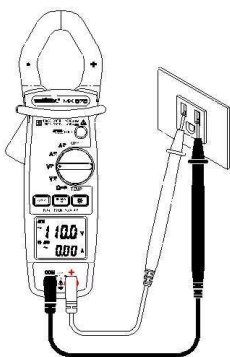
### 4.1 AC voltage measurement

- Position the switch on  $V_{\tilde{C}}$ .

Connect the red test lead to the "+" terminal and the black test lead to the "COM" terminal.

Put the touch prods in contact with the measurement points under AC voltage.

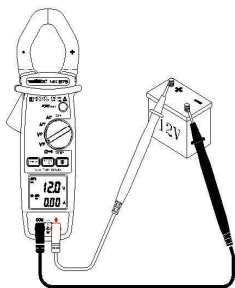
Read the result of the measurement on the display.





## 4.2 DC voltage measurement

- Position the switch on  $V_{DC}$ .

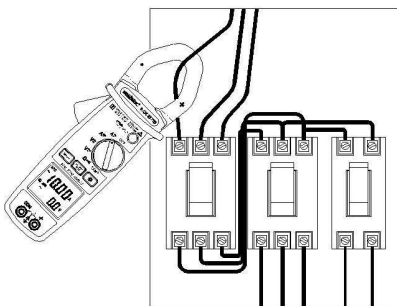


Connect the red test lead to the "+" terminal and the black test lead to the "COM" terminal.

Put the touch prods in contact with the measurement points under DC voltage.

Read the result of the measurement on the display. There is no secondary current display for model MX670.

## 4.3 Measuring AC current



- Set the switch to  $A_{AC}$ .

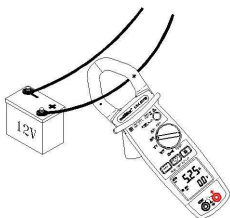
**Safety reminder:** The technology of this instrument allows the application or withdrawal of the clamp on bare conductors under dangerous voltage. Always... the instrument while never going past the physical safety protection. Open the jaws by pressing the trigger. Position the clamp around the single conductor to be measured.

Release the trigger. Check that the clamp is properly closed. Read the result of the measurement on the display.

If difficult access makes reading the display impossible, press briefly on the **HOLD** button (MX670) or on the **ADC ZERO & HOLD** button (MX675) to freeze the display and read the result after withdrawal of the clamp.

**Note:** The measurement results are most accurate when the conductor is centred in the middle of the jaws.

#### 4.4 DC Current measurement (MX675 only)



Set the switch to **A<sup>DC</sup>**.

Once the display is stabilised, press the **A<sup>DC</sup> ZERO & HOLD** button to reset the display to zero.

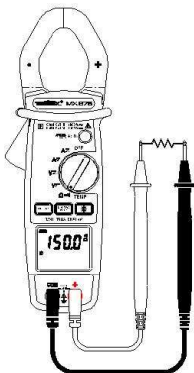
The operating procedure is then identical to that of AC measurement.

See previous paragraph.

**Note:** The correct display of current direction is the result of observing the positioning of the "+" indication on the clamp arm, in relation to the source.

#### 4.5 Resistance measurement and Audio Continuity Test

Set the switch to  **$\Omega$** .



##### 4.5.1 Resistance measurement:

Connect the red test lead to the "+" terminal and the black test lead to the "COM" terminal.

Put the touch prods into contact with the points to be measured.

Read the result of the measurement on the display.

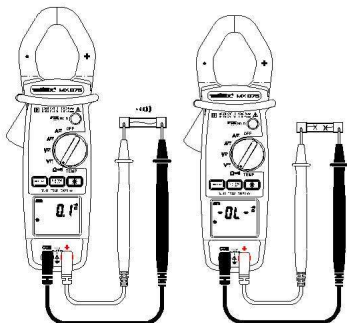
**Note:** Always check that the circuit is disconnected from the power supply before measuring resistance!

#### 4.5.2 Audio Continuity Test :

Connect the red test lead to the "+" terminal and the black test lead to the "COM" terminal.

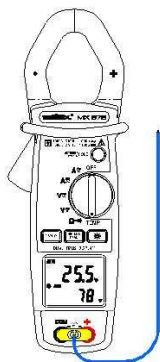
Put the touch prods into contact with the circuit to be tested.  
If the resistance value of circuit  $R < 35 \Omega$  , the buzzer sounds continuously.

**Note:** Always check that the circuit is disconnected from the power supply before measuring continuity!



#### 4.6 °C/F Temperature Measurement

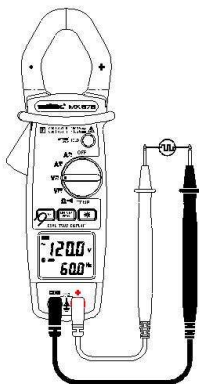
Set the switch to **TEMP.**



To measure the temperature, connect the type K thermocouple probe to the input terminals, observing the polarity.

The main display is in degrees Celsius (°C) by default, and the secondary display in degrees Fahrenheit (°F). The user can change the main display to degrees Fahrenheit (°F) and the secondary display to degrees Celsius (°C) by pressing the **DISPLAY** key.

#### 4.7 Measurement of voltage frequency



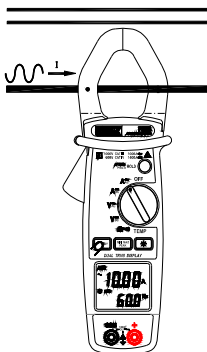
Position the switch on  $V_{\tilde{A}C}$ , and press the **DISPLAY** key.

Connect the red test lead to the "+" terminal and the black test lead to the "COM" terminal.

Place the touch prods in contact with the points whose frequency is to be measured.

Read the frequency value on the secondary display. The main display indicates the value of the measured TRMS voltage.

#### 4.8 Measurement of AC current frequency



Position the switch on  $A_{\tilde{A}C}$ , and press the **DISPLAY** key.


Open the jaws by pressing the trigger. Position the clamp around the conductor to be measured. Release the trigger. Check that the clamp is properly closed. Read the result of the measurement on the secondary display.


The main display indicates the value of the measured TRMS current.

## 5 TECHNICAL SPECIFICATIONS

### 5.1 General

The tolerances assigned to the values, or declared limits, constitute only the values guaranteed by the manufacturer. Values without a tolerance are for information only.

The symbol  is displayed when the input signals exceed the limit values possible in each measurement range.

The symbol  is displayed in °C/°F measurement when there is no input signal (open circuit).

### 5.2 Characteristics

Accuracy is to within  $\pm$  [% of the reading (L) + number of counts (cts)] in the reference conditions indicated in the appendix.

#### 5.2.1 DC voltage

Range	Measuring range	Resolution	Accuracy
1000 V	0.0 to 999.9 V	0.1 V	1% $\pm$ 2 cts
1400 V	1000 to 1400 V	1 V	1% $\pm$ 2 cts

Input resistance: 1 M $\Omega$

Overload indication: 1400 VDC

#### 5.2.2 AC voltage

Range	Measuring range	Resolution	Accuracy
1000 V	0.0 to 999.9 V	0.1 V	1.0% $\pm$ 5 cts (50 – 60Hz) 1.2% $\pm$ 5 cts (60 -500Hz) 2.5% $\pm$ 5 cts (500Hz – 3kHz)

Input resistance: 1 M $\Omega$

Overload indication: 1000 Vrms

#### 5.2.3 DC current (MX675 only)

Range	Measuring range	Resolution	Accuracy
100 A	0.00 to 99.99 A	0.01 A	1.2% $\pm$ 5 cts
1000 A	100.0 to 999.9 A	0.1 A	2.5% $\pm$ 5 cts
1400 A	1000 to 1400 A	1 A	2.5% $\pm$ 5 cts

Overload indication: 1400 A<sub>DC</sub>

#### 5.2.4 AC current

Range	Measuring range	Resolution	Accuracy
100 A	0.00 to 99.99 A	0.01 A	1.5% $\pm$ 5 cts (50 -60Hz) 2.0% $\pm$ 5 cts (60 -500Hz) 4.5% $\pm$ 5 cts (500Hz – 3kHz)
1000 A	100 to 1000 A	0.1 A	

Overload indication: 1000 A Rms

#### 5.2.5 Resistance ( $\Omega$ )

Range	Measuring range	Resolution	Accuracy
1000 $\Omega$	0.0 to 999.9 $\Omega$	0,1 $\Omega$	1% $\pm$ 3cts
10000 $\Omega$	1000 to 9999 $\Omega$	1 $\Omega$	3.3 VDC (V <sub>max</sub> )

Protection: 1 000 V rms

#### 5.2.6 Continuity

Range	Measuring range	Accuracy
Continuity	Ohm Function Buzzer < 35Ω	1% ± 3 cts 3.3 Vdc (Vmax)

Protection: 1,000 Vrms

### 5.2.7 Frequency Hz

- For currents

Range	Measuring range	Resolution	Accuracy	Sensitivity
1,000H z	0.0 to 999.9 Hz	0.1 Hz	1.0% ± 2 cts	3 A Rms
10,000H z	1000 to 9999 Hz	1 Hz		

- For voltages

Range	Measuring range	Resolution	Accuracy	Sensitivity
1,000H z	0.0 to 999.9 Hz	0.1 Hz	1.0% ± 2 cts	5 Vrms
10,000H z	1000 to 9999 Hz	1 Hz		

### 5.2.8 Temperature (°C/°F)

°C

Range	Measuring range	Resolution	Accuracy
1,000°C	-40 to +999.5°C	0.5°C	1.0% ± 2°C
1,200°C	1000 to 1,200°C	1 °C	

°F

Range	Measuring range	Resolution	Accuracy
2192	-40 to +2192°F	1°F	1.0% ± 4°F

### **APPENDIX:**

#### **Reference Conditions:**

Measuring range: 10 to 100 % of the range.

Applied AC Signal:

- frequency between 48 and 65 Hz
- no DC component
- sinusoidal,  $F_c = \sqrt{2}$

Temperature 23°C ± 3°C

No external alternative magnetic field

No electrical field

Conductor centred in jaws (in A)

### **5.3 Electrical safety (as per NF EN 61010):**

Compliant with safety standards NF EN 61010-1 Ed.2001 and NF EN 61010-2-032 Ed.2002 for 600 V CAT IV or 1000V CAT III, Pollution degree 2 and altitude < 2000 m.

## 5.4 General information


### **Digital display:**

LCD dual display, 4 digits with max. indication of 9999 points.

### **Polarity:**

When a negative signal is applied, the sign  appears.

### **Low Battery Indicator:**

 is displayed when the voltage supplied by the battery is lower than the operating voltage. The measurements are then guaranteed for only a short period.

### **Power supply:**

Battery: 9 V, NEDA 1604, 6F22 alkaline

Typical autonomy: 35 hours (MX670)

30 hours (MX675)

with alkaline battery, no buzzer or backlight.

### **Protection index of the housing:**

IP30 according to EN 60529 Ed. 92

### **Maximum jaw opening:**

MX670:  $\varnothing$  42 mm

MX675:  $\varnothing$  40 mm

### **Dimensions:**

MX670: 272 x 80 x 43 mm

MX675: 257 x 80 x 43 mm

### **Weight:**

MX670: 480 g (with battery)

MX675: 440 g (with battery)

## 5.5 Environmental conditions

### 5.5.1 Temperature

Operation: 0°C to 40°C, < 70% RH

Storage: -10°C to 60°C, < 80% RH

### 5.5.2 Altitude

Operation: < 2000 m

Storage: < 12,000 m

### 5.5.3 Electromagnetic Compatibility (as per NF EN 61326)


Compliant with electromagnetic compatibility standard NF EN 61326-1 (07/97) + A1 (10/98) + A2 (09/2001)

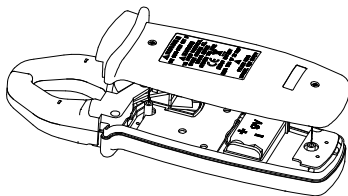
- Radiated and conducted emission (NF EN 55022)
- Radiated Immunity, criterion B (NF EN 61000-4-3)
- Conducted Immunity, criterion A (NF EN 61000-4-6)
- Electrostatic discharges, criterion A (NF EN 61000-4-2)
- Transients, criterion B (NF EN 61000-4-4)
- Shock waves, criterion A (NF EN 61000-4-5)

Note: Certain high power radioelectric frequencies are, in specific conditions, capable of interfering with the metrological integrity of the multimeter.

## 6 MAINTENANCE

### 6.1 Replacing the Battery

1. The symbol  appears when the battery is run down and its voltage is becoming insufficient for proper operation. It must then be replaced.
2. Before changing the battery, the clamp must be disconnected from any external electrical source and must not be holding cables, set the switch to the "OFF" position.
3. Unscrew the 2 screws on the lower casing.
4. Replace the used battery with a new 9V battery, making sure of the correct positioning of the wires to prevent any pinching at closing.
5. Refit the lower casing and close using the 2 attaching screws.





## 6.2 Cleaning

Keep the gap between the jaws in a state of perfect cleanliness.

Set the instrument to the OFF position. Clean the unit with a cloth and a little soapy water. Wipe over with a damp cloth. Never use abrasive products or solvents. Dry carefully before any further use.

## 6.3 Storage

If the instrument is not used for a period exceeding 60 days, remove the battery and store it separately.

## 6.4 Metrological verification

Regular checks must be carried out as for all measurement or test devices.

To have your devices checked and calibrated, please contact our COFRAC approved metrology laboratories or MANUMESURE centres.

Information and address details available on request:

Tel.: 02 31 64 51 43 Fax: 02 31 64 51 09

## 6.5 Repairs under guarantee and outside guarantee

Send your devices to one of the Chauvin-Arnoux Metrix-approved Manumasure regional technical centres.

Information and address details available on request:

Tel.: 02 31 64 51 43 Fax: 02 31 64 51 09

Or return the instrument to your distributor for any intervention required during and after the guarantee period.

If you ship the instrument, use preferably the original packaging and specify the reasons for the return as clearly as possible in a note included with your instrument.

## 7 WARRANTY

This instrument is guaranteed against any defect in materials or workmanship, in accordance with the general terms and conditions of sale.

During the guarantee period (1 year), the instrument must be repaired only by the manufacturer, who reserves the right to repair the instrument or to exchange all or part of it. If the instrument is returned to the manufacturer, the transport costs are the customer's responsibility.

The guarantee is not applicable in the following cases:

1. misuse of the instrument or use with incompatible equipment;
2. modifications of the instrument without explicit authorisation of the manufacturer's engineering department;
3. work carried out on the instrument by a person not approved by the manufacturer;
4. adaptation for a specific application, not included in the definition of the instrument or the operating instructions
5. impacts, falls or immersion.

## TO ORDER

MX 670 Multimeter Clamp ..... MX0670

MX 675 Multimeter Clamp ..... MX0675

Delivered with :

- 1 set of leads with probe tip (red and black),
- 1 user manual 5 languages,
- 1 9V alkaline battery.
- 1 supple carrying case .
- 1 K thermocouple câble.



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