

MX 5006 MX 5060



Benchtop multimeters 6,000 and 60,000 counts

Thank you for purchasing this **Metrix MX 5006 or MX 5060** multimeter.

For best results from your instrument:

- read this user's manual carefully,
- comply with the precautions for use.



WARNING, risk of electric shock. The voltage on the parts marked with this symbol may be dangerous.



WARNING, risk of DANGER! The operator must refer to this user's manual whenever this warning symbol appears.



Equipment protected throughout by double or reinforced insulation.



USB



The CE marking certifies the product's compliance with the European Low Voltage Directive (2014/35/EU), Electromagnetic Compatibility Directive (2014/30/EU), and Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU and 2015/863/EU).



The rubbish bin with a line through it indicates that, in the European Union, the product must undergo selective disposal in compliance with Directive WEEE 2012/19/EU. This equipment must not be treated as household waste.

Definitions of the measurement categories

- Measurement category IV corresponds to measurements taken at the source of low-voltage installations.
Example: power feeders, meters and protection devices.
- Measurement category III corresponds to measurements on building installations.
Example: distribution panel, circuit-breakers, machines or fixed industrial devices.
- Measurement category II corresponds to measurements taken on circuits directly connected to low-voltage installations.
Example: power supply to domestic electrical appliances and portable tools.

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1. PRECAUTIONS FOR USE

This device is compliant with safety standard IEC/EN 61010-2-033, the leads are compliant with IEC/EN 61010-031, for voltages up to 600 V in category IV or 1,000 V in category III.

Failure to comply with the safety instructions may result in electric shock, fire, explosion, or destruction of the instrument and of the installations.

- The operator and/or the responsible authority must carefully read and clearly understand the various precautions to be taken for use. Sound knowledge and a keen awareness of electrical hazards are essential when using this instrument.
- If you use this instrument other than as specified, the protection provided may be compromised, thereby endangering you.
- Do not use the instrument on networks whose voltage or category exceeds those mentioned.
- Do not use the instrument if it seems to be damaged, incomplete, or incorrectly closed.
- Before each use, check the condition of the insulation on the leads, housing, and accessories. Any item whose insulation has deteriorated (even partially) must be set aside for repair or scrapping.
- Before using your device, check that it is perfectly dry. If it is wet, it must be thoroughly dried before being connected or being operated in any way.
- Use only the leads and accessories supplied. Using leads (or accessories) of a lower voltage or category reduces the voltage or category of the combined instrument + leads (or accessories) to that of the leads (or accessories).
- Use only the supplied or specified accessories (voltage leads, current sensors, mains adapter, etc.).
- When assembling an instrument with leads, crocodile clips or a mains adapter, the rated voltage for a single measurement category is the lowest of the rated voltages assigned to the individual components.

2. FIRST USE

2.1. STATE AT DELIVERY

- EU line power cord
- Lead, 1.5m, straight/straight, red
- Lead, 1.5m, straight/straight, black
- Test probe, CAT IV, 1kV, red
- Test probe, CAT IV, 1kV, black
- Getting started guide

For MX 5060 :

- USB cord

2.2. ACCESSORIES

- K thermocouple, wire + adapter
- SX-DMM BT software

2.3. SPARE

- Fuse 1,000 V 11 A > 20 kA 10 x 38 mm

For the accessories and spares, consult our web site:

www.chauvin-arnoux.com

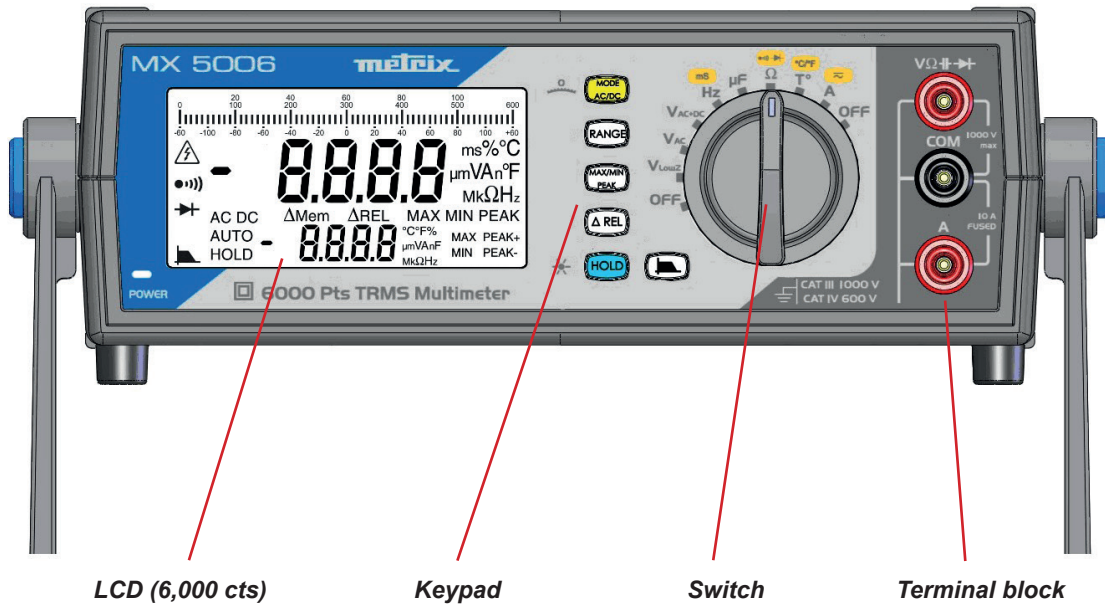
3. DESCRIPTION OF THE INSTRUMENTS

The range comprises two models:

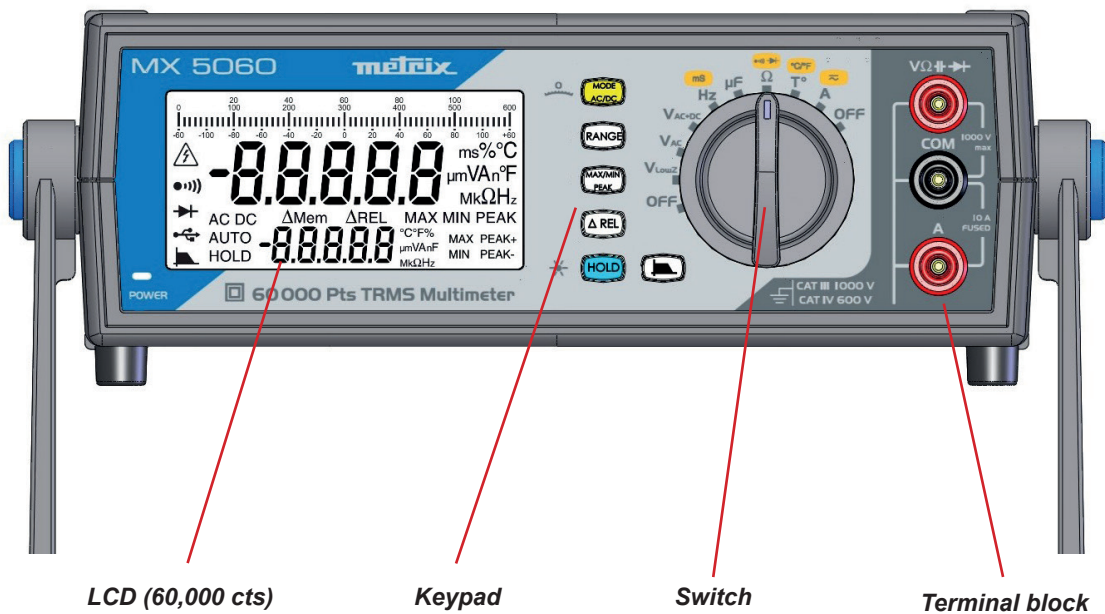
MX 5006	6 000 cts	TRMS		
MX 5060	60 000 cts	TRMS	USB	Range 60 mV

3.1. FRONT PANEL

MX 5006

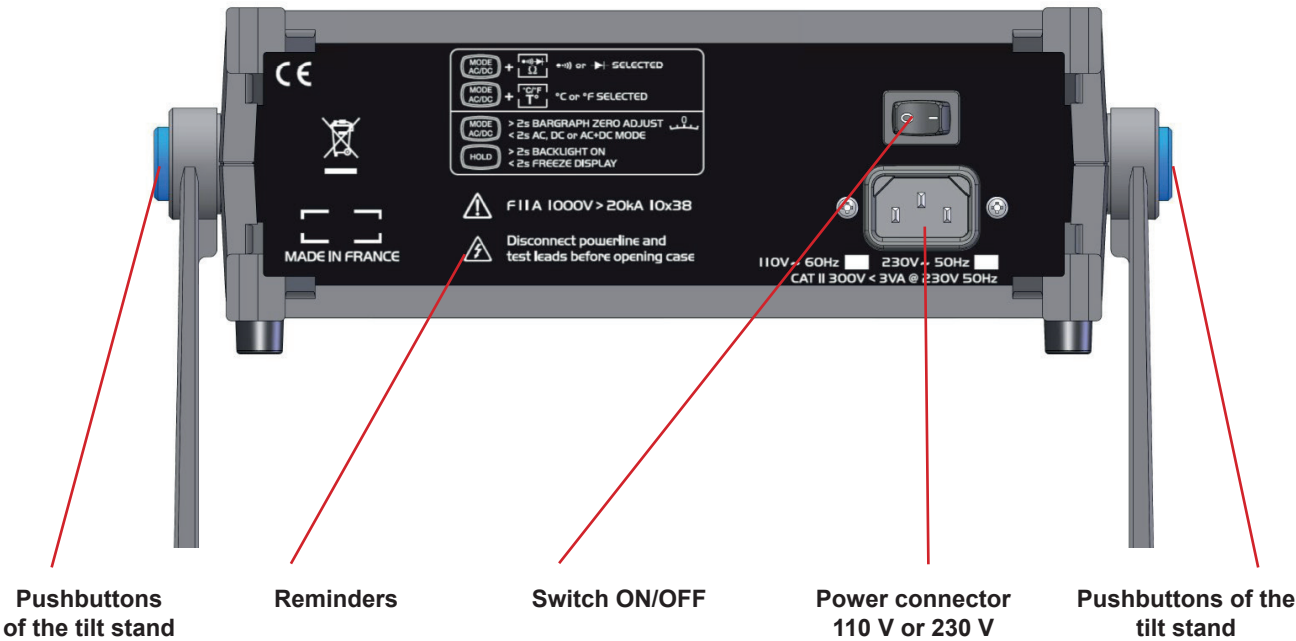


MX 5060

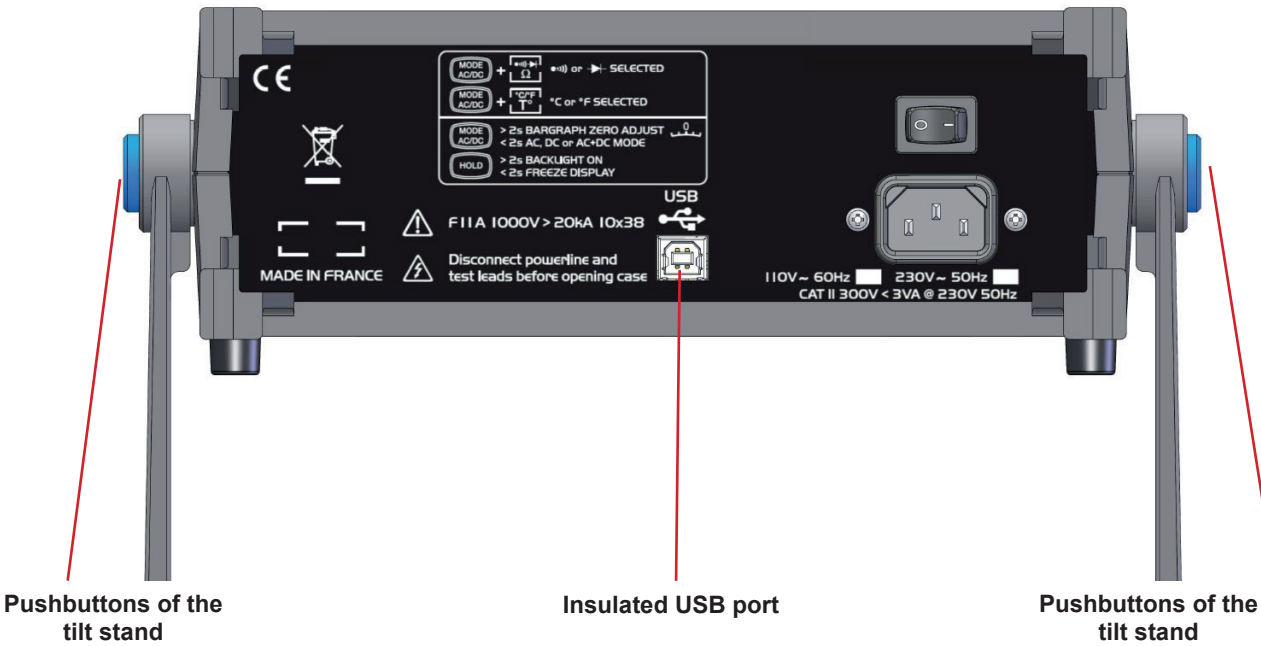


3.2. REAR PANEL

MX 5006



MX 5060



3.3. TILT STAND

The tilt stand/handle has 2 blue pushbuttons on the sides that are used to unlock it:

Press the pushbuttons simultaneously

- Adjust the tilt stand to the desired position
- Release the 2 pushbuttons to lock the handle in position

3.4. COMMUNICATION INTERFACE

The MX 5060 has a USB communication interface, used :

- to configure and read the data measured by the instrument (using SX-DMM software),
- to recalibrate the instrument.

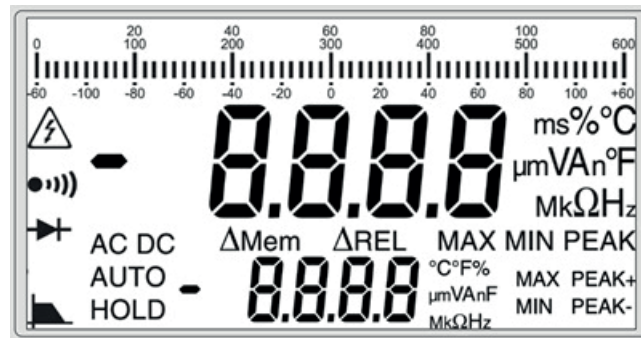


The MX5006 does not have a USB communication port. Only an RS link is available to calibrate the instrument (after opening it).

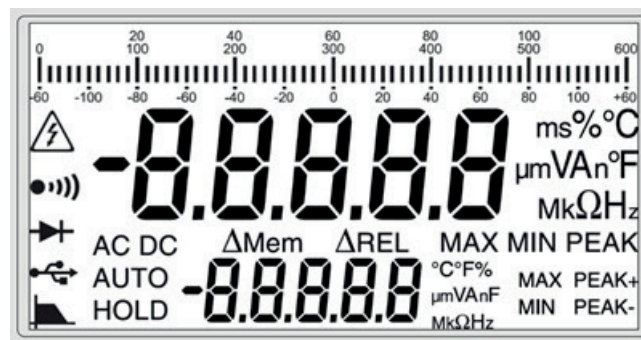
4. FUNCTIONAL DESCRIPTION

4.1. DISPLAY UNIT

4.1.1. MX 5006 DOUBLE DISPLAY 6,000 CTS



4.1.2. MX 5060 DOUBLE DISPLAY 60,000 CTS



4.1.3. QUANTITIES MEASURED

- VLowZ AC voltage measurement at low impedance (VLowZ)
- VAC AC voltage measurement
- VAc/dc DC or AC+DC voltage measurement at high impedance (V)
- A Current measurement A
- Hz Frequency measurement
- Ω Resistance measurement
- μF Capacitance measurement
- T° Temperature measurement
- ms Measurement of the period
- % Measurement of relative value

4.1.4. UNITS

- V Volt
- A Ampere
- Hz Hertz
- Ω Ohm
- F Farad
- °F Degree Fahrenheit
- °C Degree Celsius
- ms millisecond
- k kilo (kΩ - kHz)
- M Méga (MΩ - MHz)
- n nano (nF)
- μ micro (μV - μA - μF)
- m milli (mV - mA - mF)
- % Percentage

4.1.5. SYMBOLS

AC	Measurement of the RMS AC signal
DC	Measurement of the DC signal
AC + DC	Measurement of the TRMS AC and DC signal
AUTO	Automatic range switching
ΔREL	Values relative to a reference
ΔMem	Presence of a reference value in memory
HOLD	Storage and display of stored values
MAX	Maximum value
MIN	Minimum value
PEAK+	Maximum peak value
PEAK-	Minimum peak value
.run r.un ru.n	Capacitance meter, acquisition in progress
----	Frequency measurement impossible
O.L	Overshoot of the measurement capacities
V	Volt
Hz	Hertz
F	Farad
°C °F	Degree Celsius, degree Fahrenheit
A	Ampere
%	Percentage
Ω	Ohm
ms	millisecond
n	Symbol of the nano- prefix
μ	Symbol of the micro- prefix
m	Symbol of the milli- prefix
k	Symbol of the kilo- prefix
M	Symbol of the mega- prefix
	Symbol of the continuity measurement
	Symbol of the measurement and testing of a semiconductor junction
	Warning, possibility of electric shock (*)
	USB communication
	300 Hz MLI filter

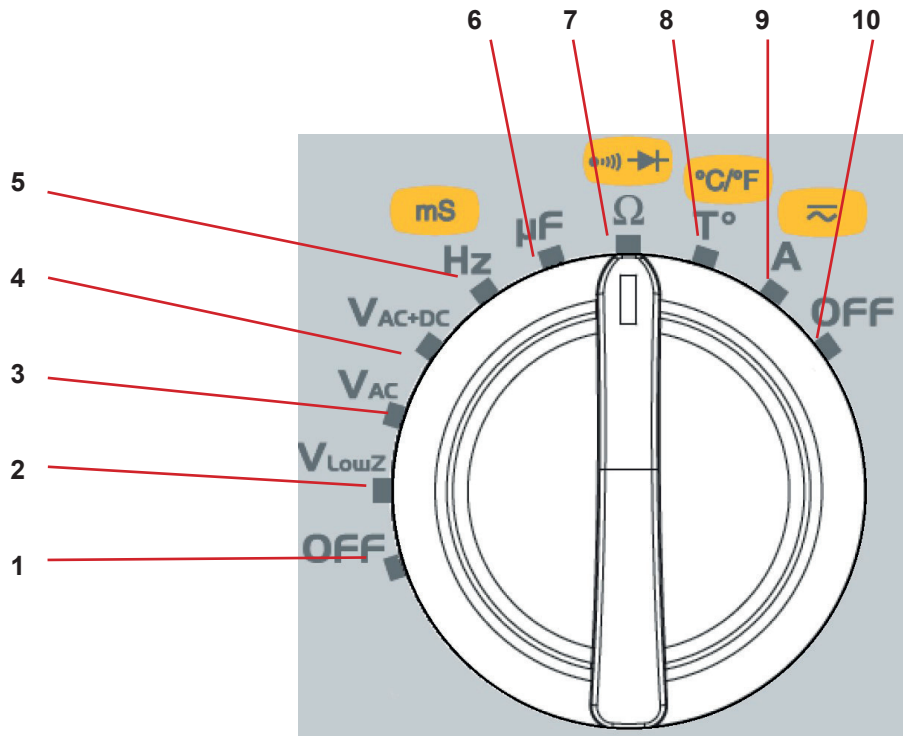
(*) When voltages exceeding 60 VDC or 25 VAC are measured, the symbol flashes on the display unit.

4.2. SWITCH

The switch setting determines the measurement function chosen. The rotation of the switch has priority over key presses. The change from one position to another resets the configuration of the measurement mode.

The change from one measurement function to another deactivates the **HOLD** key, if the HOLD mode was selected.

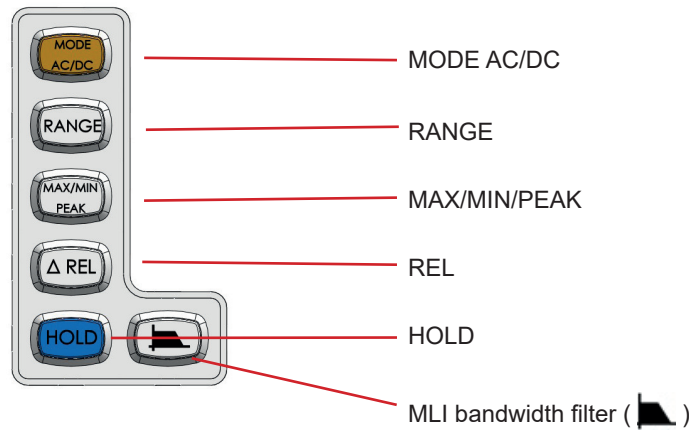
The switch has 10 positions:



1. OFF mode - Switches the multimeter off
2. AC voltage measurement at low impedance (V_{LowZ})
3. RMS AC voltage measurement
4. DC or AC+DC voltage measurement at high impedance (V)
5. Frequency measurement
6. Capacitance measurement
7. Resistance measurement, continuity measurement, diode test
8. Temperature measurement T, K
9. Current measurement A (AC, DC, or AC+DC)
10. OFF mode - Switches the multimeter off

4.3. KEYPAD

The keypad has the following function keys:



The keys are taken into account and applied when pressed. If the key press is validated, the instrument beeps.

4.3.1. GENERAL RULES

For the keys, 2 types of possible action are distinguished:

- Short press: key press lasting less than 2 seconds, validated by a beep as soon as the key press is detected.
- Long press: key press lasting more than 2 seconds, validated by a beep as soon as the key press is detected.



Choice of coupling, AC, DC, AC+DC, of the bargraph style, or of the secondary function key of the keypad (yellow).



Manual selection of the measurement range. The range defines the maximum measurement span the instrument can cover.



The Auto Range mode is activated as default



Display of the MAX, MIN, PEAK+, or PEAK- mode:

- MAX and MIN display the highest and lowest value of the RMS measurement.
- PEAK+ displays the maximum peak instantaneous value of the measurement.
- PEAK- displays the minimum peak instantaneous value of the measurement.



Storage of the measurements and quantities at a given time.

Freezes the display without stopping acquisition. The bargraph continues to operate normally. The key is used to deactivate back-lighting of the instrument.



Display and storage of the reference value of the differential value in the unit of the quantity measured.



This key is used to limit the bandwidth to ≈ 300 Hz.

Thanks to the low-pass filter (4th order), it is possible to measure the RMS voltage delivered by an MLI type speed variator (for asynchronous motor).

See curves p. 28 and 36.

4.4. SUMMARY TABLE OF THE KEYS

	Successive short presses	Long press
	- Choice of AC, DC, or AC+DC coupling - Access to the second function (yellow marking on the front panel) - In the ΔREL or MAX/MIN PEAK plus ΔREL mode, the key is used to go from (present value - reference value) to $[(\text{present value} - \text{reference value}) / \text{reference value}] \times 100$. The value is displayed in %.	Choice of bargraph style:  Bargraph graduated from zero to full scale or with central zero
	Manual selection of the measurement range Exit from the MAX/MIN, PEAK mode	Exit from the manual mode to return to auto range (the default)
	1st press: recording of MAX, MIN, PEAK+, PEAK- (on the 2nd display unit). The max. value is displayed as default. - Subsequent presses: look-up of recorded values	Exit from the MAX/MIN PEAK mode
	Activation/deactivation of freezing of the display. Acquisition continues as a background task. In the MAX/MIN PEAK mode, when HOLD is active, the blinking of the «MAX MIN PEAK» symbol indicates that acquisition continues as a background task.	On/off switching of the backlight 
	1st press: activates the relative mode ΔREL (present value - reference value) and stores the measured value, which will be used as reference. “ΔMem” indicates storage of the reference. - Subsequent presses: toggles the display between measured value, reference, and relative measurement ΔREL, reference for look-up.	Exit from the Δ REL mode and erasure of the reference value (the Δ Mem symbol goes off)
	Activation of the 300 Hz bandwidth filter	Activation/deactivation of the key-press beep

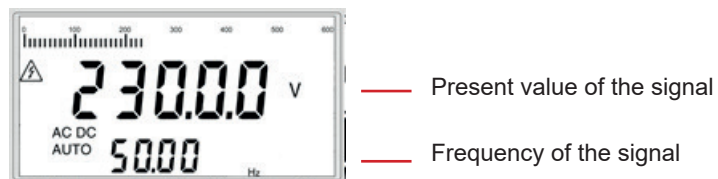
All these functions can be accessed by successive short or long presses on a key (see table above). The functions are not mutually exclusive; they can be combined.

It is therefore possible to implement mAX/MIN PEAK in relative or pure relative only. Similarly, the HOLD mode applies to all functions and does not interfere with mAX/MIN PEAK surveillance; all it does is freeze the display. Each press is validated by an audible signal.

4.5. MAX/MIN/PEAK MODE

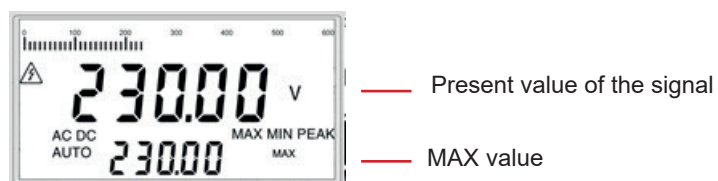
4.5.1. EXAMPLES OF DISPLAY IN THE V_{AC}+DC FUNCTION

Measured signal : 230 V, 50 Hz

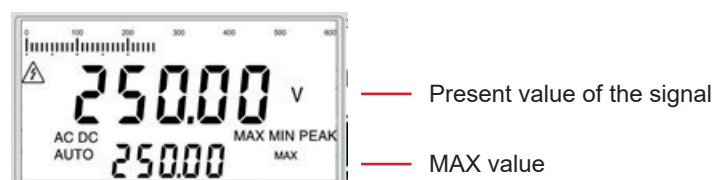


4.5.2. FOR THE MAX VALUE

First press on the  key

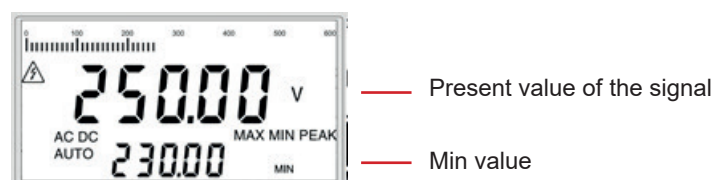


The measured signal changes to 250 V, 50 Hz



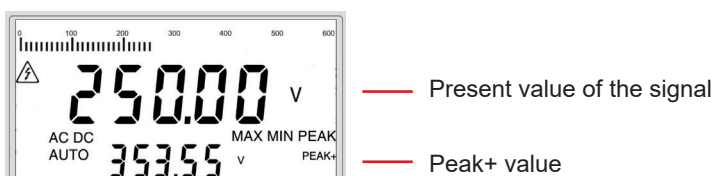
4.5.3. FOR THE MIN VALUE:

Second press on the  key



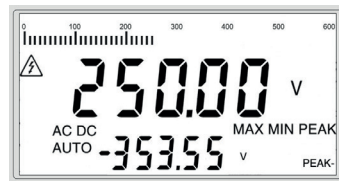
4.5.4. FOR THE PEAK+ VALUE:

Third press on the  key



4.5.5. FOR THE PEAK- VALUE- :

Fourth press on the  key



— Present value of the signal

— PEAK- value

4.6. Δ REL MODE

4.6.1. EXAMPLES OF DISPLAY IN THE V_{AC+DC} FUNCTION

Measured signal : 1 V, 100 Hz

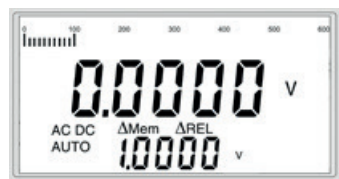


— Present value of the signal

— Frequency of the signal

4.6.2. ACTIVATION OF THE Δ REL MODE BY

a short press on the  key :



— Δ REL = (present value - reference value)

— Reference value

The signal changes to 1.5 V (Δ REL = 1.5 V- 1 V = 0.5 V)



— Δ REL = (present value - reference value)

— Reference value

4.6.3. DE-ACTIVATION OF THE Δ REL MODE BY

a press on the  key :



— Present value of the signal

— Reference value

A long press on the  key erases the reference value and exits from the Δ REL mode.

Short press, in the Δ REL mode, on the  key :



$$\Delta\text{REL} (\%) = \frac{\text{Present value} - \text{Ref value}}{\text{Reference value}} \times 100$$

— Reference value

4.6.4. FUNCTIONS OF THE SWITCH AND KEYS

To access the **V_{LowZ}**, **V_{AC}**, **V_{AC+DC}**, **Hz**, **Ω**, **μF**, **T°**, **A** functions, set the switch to the function chosen.

Here are the possible combinations according to the type of measurement :

Type of measurement	Max/ Min	Peak ±	ΔREL		Range		HOLD	
					Auto.	Manu.		
Voltage V _{LowZ} Voltage V _{AC} Voltage V _{AC+DC} Current A _{AC} , A _{AC+DC}	✓	✓	✓	en ΔREL only	✓	✓	✓	✓
Voltage V _{DC} Current A _{DC}	✓	-	✓	✓	✓	✓	✓	-
Voltage 60 mV _{DC}	✓	-	✓	✓	-	✓	✓	-
Voltage 60 mV _{AC} Voltage 60 mV _{AC+DC}	✓	✓	✓	in ΔREL only	-	✓	✓	✓
Temperature	✓	-	✓		✓	✓	✓	-
Ohmmeter	✓	-	✓		✓	✓	✓	-
Capacitance	✓	-	✓		✓	✓	✓	-
Frequency	✓	-	✓		✓	-	✓	-
Period (1/F)	-	-	-	-	✓	-	✓	-
Continuity	-	-	-	-	✓	-	-	-
Diode	-	-	-	-	✓	-	✓	-

4.7. PREPARATION FOR USE

4.7.1. POWER SUPPLY

line power at 230 V ±10% (US version, 110 V ±10%) ; 45 Hz to 65 Hz

The power connector is on the back of the instrument. (The earth connection serves to carry currents to earth).

4.7.2. POWERING UP, DOWN

Use the power On/Off switch on the back of the instrument to power it up.

A check light on the front of the instrument indicates that it is powered up.

4.7.3. SWITCHING ON

The switch is set to «OFF». Turn the switch to the function of your choice. All segments of the display unit light for a few seconds, then the screen of the function selected is displayed.

The multimeter is then ready to perform measurements.

- Starting up accompanied by a simultaneous sustained press on the HOLD key (until it beeps) lights all segments of the display unit
- A second, short, press displays:
 - the hardware version (A, B, C, etc.),
 - the software version
 - the instrument model (MX 5006 or MX 5060).
- A third short press is used to exit from the mode.

4.7.4. SWITCHING TO STANDBY

Set the switch to “OFF”.

5. VARIOUS QUANTITIES MEASUREMENTS

5.1. VOLTAGE MEASUREMENT

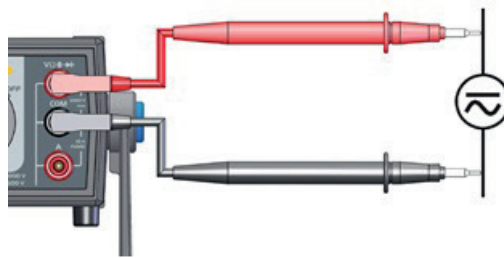
V_{AC+DC} AC voltage measurement, or measurement of an AC voltage superposed on a DC voltage, or DC voltage measurement at high impedance.

V_{AC} AC voltage measurement at high impedance

V_{LowZ} This position is provided to allow measurements in electrical installations. The input impedance $<1\text{ M}\Omega$ serves to avoid measuring "phantom" voltages due to couplings between the lines.

In all cases, "O.L." is displayed above 1050V and a beep sounds when the measurement exceeds 600 V.

1. Set the switch to **V_{LowZ}** or **V_{AC+DC}** or **V_{AC}**.
2. Select AC+DC or DC coupling of the signal by pressing **MODE AC/DC** (the default coupling is AC+DC). Depending on what you select, the screen displays DC or AC+DC.
3. Connect the black lead to the "COM" terminal and the red lead to "+".
4. Place the test probes on the terminals of the circuit to be measured:



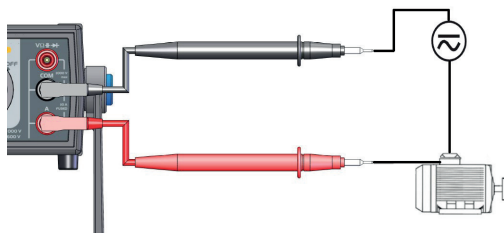
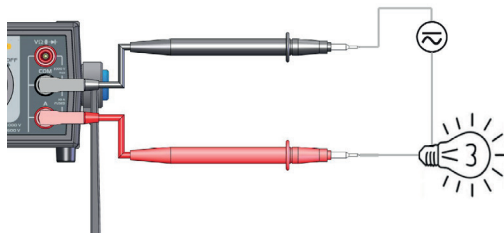
5. Read the measurement value indicated on the display unit.
6. As default, the 2nd display unit indicates the frequency, except in DC.



It is possible to activate the  filter in V_{LowZ}, V_{AC+DC}, V_{AC}. The cutoff frequency of the filter is $\leq 300\text{ Hz}$. When a voltage having a frequency above 150Hz is measured, it is heavily attenuated, and so a large error may be observed. It is necessary in this case to deactivate the filter to have the full bandwidth.

5.2. CURRENT MEASUREMENT

1. Set the switch to **A**.
2. Select the type of signal, AC+DC, AC, or DC, by pressing **MODE AC/DC**. Depending on what you select, the screen displays AC, DC, or AC+DC.
3. Connect the black lead to the "COM" terminal and the red lead to "A".



4. Place the test probes in series between the source and the load::
5. Read the measurement value indicated on the display unit.
“O.L” is displayed, if $I > 20 \text{ A}$.
6. As default, the 2nd display unit indicates the frequency, except in DC.



It is possible to activate the filter in AAC+DC, AAC. The cutoff frequency of the filter is $\leq 300 \text{ Hz}$. When a voltage having a frequency above 150 Hz is measured, it is heavily attenuated, and so a large error may be observed. It is necessary in this case to deactivate the filter to have the full bandwidth.

5.3. FREQUENCY MEASUREMENT

1. Set the switch to **Hz**.
2. Connect the black lead to the “COM” terminal and the red lead to “+”.
3. Place the test probes on the terminals of the circuit to be measured..



Connect the instrument as for a voltage measurement.

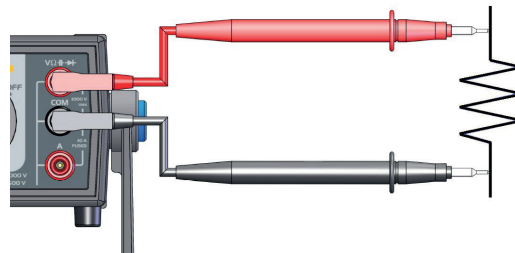
4. Read the measurement value indicated on the display unit.
5. Press **MODE AC/DC** to obtain the period of the $1/F$ signal (ms).

5.4. RESISTANCE MEASUREMENT

1. Set the switch to **Ω** .
2. Connect the black lead to the “COM” terminal and the red lead to “+”.
3. Place the test probes on the terminals of the component.



Resistance measurements must be made with power off. However, while the presence of a voltage will prevent or throw off the measurement, it will not damage the instrument.



4. Read the measurement value indicated on the display unit.
5. “O.L” is displayed, the circuit is open.

5.5. CONTINUITY MEASUREMENT

1. Set the switch to **$\rightarrow$** .
2. Press **MODE AC/DC**; the « **$\bullet$** » symbol is displayed.
3. Connect the black lead to the “COM” terminal and the red lead to “+”.
4. Place the test probes on the terminals of the circuit to be measured.

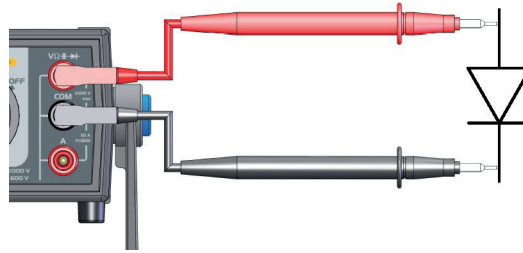


Connect the instrument as for a voltage measurement.

5. Read the measurement value indicated on the display unit.
6. The continuity beep sounds when $R < 30 \Omega \pm 3 \Omega$.
7. “O.L” is displayed, if the circuit is open.

5.6. DIODE TEST

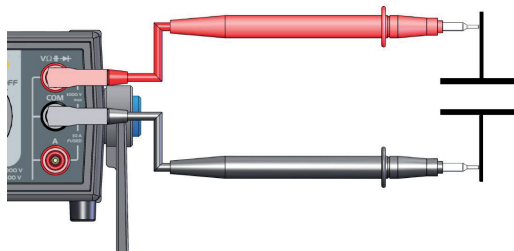
1. Set the switch to .
2. Press ; twice; the “” symbol is displayed.
3. Connect the black lead to the “COM” terminal and the red lead to “+”.
4. Place the test probes on the terminals of the component:



5. Read the measured threshold voltage of the junction indicated on the display unit.
6. “O.L.” is displayed, if the circuit is open or the threshold of the diode >3 V.

5.7. CAPACITANCE MEASUREMENT

1. Set the switch to .
2. Connect the black lead to the “COM” terminal and the red lead to “+”.
3. Place the test probes on the terminals of the component:



4. Read the measurement value indicated on the display unit.
“O.L.” is displayed, if the value to be measured exceeds the capacitance of the range.
“O.L.” is displayed, if the capacitor is short-circuited.
- For high values, the measurement cycle includes the display of “run” with a “chaser” decimal point. This means that acquisition is in progress; wait for the display of the digital result.



“Run” is displayed immediately, if the previous measurement was in a small range.

- The prior discharge of very high capacitances helps shorten the measurement time.

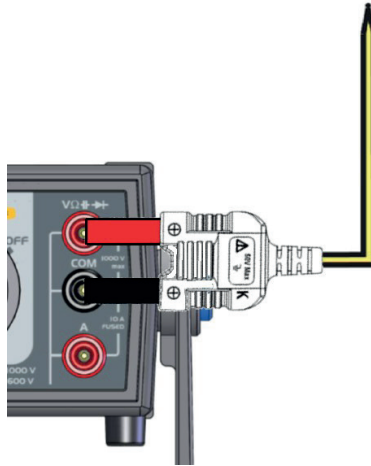
5.8. TEMPERATURE MEASUREMENT

1. Set the switch to **T°**.
2. Press **MODE/HOLD** to switch the temperature unit (°C or °F) between the two display units.



The unit displayed as default on the main display unit is °C.

3. Connect the temperature probe (K thermocouple) to the “COM” and “+” terminals, bearing the polarity in mind:



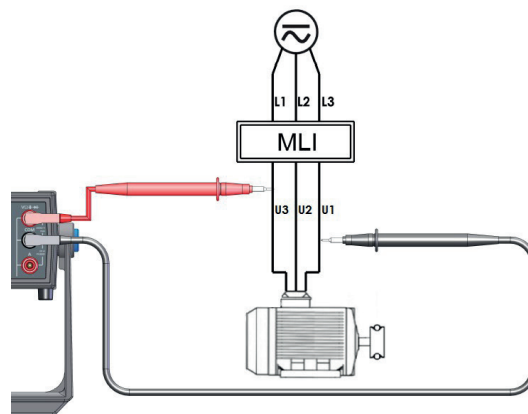
4. Read the measurement value indicated on the display unit.
 - If “O.L.” is displayed, the thermocouple is open-circuit or the value to be measured exceeds the capacitance of the range.
 - If the inputs are short-circuited, the instrument displays the ambient temperature.



For greater accuracy, avoid exposing the instrument to sudden changes of temperature.

5.9. MEASUREMENT ON AN MLI TYPE SPEED VARIATOR

1. Set the switch to **V_{LowZ}**.
2. Select the filter by pressing
3. Connect the black lead to the “COM” terminal and the red lead to “+”.
4. Place the test probes between two phases of the circuit to be measured:



5. Read the measurement values indicated on the display unit (voltage and frequency):
“O.L.” is displayed above 1050 V and a beep sounds when the measurement exceeds 600 V.

The presence of the symbol indicates that the filter is active.



It is very important to leave the filter activated to measure the voltage and frequency of the signal without being perturbed by the MLI.

6. TECHNICAL CHARACTERISTICS

6.1. REFERENCE CONDITIONS

Quantity of influence	Reference values
Temperature	20 ± 3°C
Relative humidity	45 to 55 % RH
Supply voltage	9 to 11.2 V
Frequency range	DC and 15.3 to 65 Hz
Electric field	< 1 V/m
Magnetic field	< 40 A/m

The intrinsic uncertainty is the error defined under the reference conditions.

The operating uncertainty includes the intrinsic uncertainty plus the effects of variation of the quantities of influence (supply voltage, temperature, interference, etc.) as defined in standard IEC 61557-5.

The uncertainties are expressed in % of the reading (R) and in number of display counts (ct):
 $\pm (a\% R + b \text{ ct})$

6.2. TECHNICAL CHARACTERISTICS OF THE MX 5006

Protection : 1,414 Vpk

6.2.1. DC VOLTAGE V_{dc}

Specified measurement range	Resolution	Intrinsic error
0 to 600.0 mV	0,1 mV	0.5 % L + 2 D
0 to 6.000 V	0,001 V	0.09 % L + 2 D
0 to 60.00 V	0,01 V	
0 to 600.0 V	0,1 V	
0 to 1,000 V	1 V	

* The display indicates "+OL" above +1050 V and "-OL" below -1050 V

6.2.2. AC VOLTAGE

V_{LowZ} AC RMS

The bandwidth is reduced to 300 Hz if the filter is activated. The frequency measurement is made like a measurement in a 300 Hz PB.

Specified measurement range ³⁾	Resolution	Uncertainty (±)	Additional uncertainty F (Hz) ¹⁾	Input impedance // < 50 pF	Peak factor
60.0 to 600.0 mV	0.1 mV	1.2 % L + 0.25 % x [F(kHz)-1] L ± 5 D	45<F<65 Hz 0.3% L typ.	~ 520 kΩ	3 to 500 mV
0.600 to 6.000 V	0.001 mV	1.2 % L + 0.18 % x [F(kHz)-1] L ± 3 D	at 100 Hz 0.7% L typ.		3 to 5 V
6.00 to 60.00 V	0.01 V		at 150 Hz 1.8% L typ.		3 to 50 V
60.0 to 600.0 V	0.1 V		at 300 Hz 30% L typ.		3 to 500 V
60 to 1,000 V ²⁾	1 V				1.42 to 1,000 V

1) See the typical curve of the 300 Hz filter on p. 28.

2) The LCD indicates "+OL" above +1050 V, "-OL" below -1050 V or above 1050 VRMS.

3) From 1 kHz, the measurement must exceed 15% of the range

Secondary measurements and displays: FREQ (AC coupling), MAX, MIN, PEAK

V_{ac} RMS

Specified measurement range ²⁾	Resolution	Uncertainty (±)	Additional Uncertainty F (Hz) ¹⁾	Bandwidth	@ 1 kHz Input impedance // < 50 pF	Peak factor
60.0 to 600.0 mV	0.1 mV	1.2 % L + 0.25 % x [F(kHz)-1] L ± 5 D	45<F<65 Hz 0.3 % L typ.	10 Hz to 50 kHz	10.9 MΩ	3 to 500 mV
0.600 to 6,000 V	0.001 mV	1.2 % L + 0.18 % x [F(kHz)-1] L ± 3 D	to 100 Hz 0.7 % L typ.	10 Hz to 100 kHz	10.9 MΩ	3 to 5 V
6.00 to 60.00 V	0.01 V		to 150 Hz 1.8 % L typ.		10.082 MΩ	3 to 50 V
60.0 to 600.0 V	0.1 V		to 300 Hz 30 % L typ.		10.008 MΩ	3 to 500 V
60 to 1,000 V	1 V				10.008 MΩ	1.42 to 1,000 V

1) See the typical curve of the 300 Hz filter on p. 28.

2) From 1 kHz, the measurement must exceed 15% of the range

Secondary measurements and displays: FREQ (AC coupling), MAX, MIN, PEAK

6.2.3. AC AND DC VOLTAGE AC+DC TRMS

Specified measurement range ²⁾	Resolution	Uncertainty DC (±)	Uncertainty AC (±)	Additional uncertainty F (Hz) ¹⁾	Bandwidth	Input impedance // < 50 pF	Peak factor
60.0 to 600.0 mV	0.1 mV	0.8 % L ± 10 D	0.8 % L + 0.18 % x [F(kHz)-1] L ± 5 D	45<F<65 Hz 0.3 % L typ. to 100 Hz 0.7 % L typ. to 150 Hz 1.8 % L typ. to 300 Hz 30 % L typ.	10 Hz to 50 kHz	10.9 MΩ	3 to 500 mV
0.600 to 6.000 V	0.001 V		0.8 % L + 0.18 % x [F(kHz)-1] L ± 3 D		10 Hz to 100 kHz	10.9 MΩ	3 to 5 V
6.00 to 60.00 V	0.01 V					10.082 MΩ	3 to 50 V
60.0 to 600.0 V	0.1 V					10.008 MΩ	3 to 500 V
60 to 1,000 V	1 V					10.008 MΩ	1.42 to 1,000 V

1) See the typical curve of the 300 Hz filter on p. 28.

2) From 1 kHz, the measurement must exceed 15% of the range

Secondary measurements and displays: FREQ (AC coupling), MAX, MIN, PEAK

6.2.4. DC CURRENT

Particular reference conditions:

μ A range: Measuring a strong current for a long time can cause a temperature rise in some components. In this case, it is necessary to wait some time for the metrological characteristics specified in μ A to be restored.

Adc RMS

Specified measurement range (*)	Resolution	Uncertainty ($\pm$)	Voltage drop	Protection
2 to 6,000 μ A	1 μ A	0.8 % L $\pm$ 5 D	25 mV / mA	Fuse 11 A/1,000 V > 20 kA
0.02 to 60.00 mA	0.01 mA	0.8 % L $\pm$ 2 D	3 mV / mA	
0.2 to 600.0 mA	0.1 mA	0.8 % L $\pm$ 2 D	0.58 mV / mA	
0.200 to 6.000 A	0.001 A	0.8 % L $\pm$ 3 D	0.05 V / A	
0.20 to 20.00 A	0.01 A	0.8 % L $\pm$ 2 D	0.05 V / A	

The display indicates "OL" above 19.99 A. The  symbol blinks and a beep sounds above 10 A.

(*) Acceptable overload: 10 A to 20 A for 30 s max. with a pause of 5min between 2 measurements. Ambient temp. 35 °C max.

6.2.5. AC CURRENT

Aac RMS current

Specified measurement range (*)	Resolution	Uncertainty ($\pm$) 40 Hz to 20 kHz (**)	Peak factor	Voltage drop	Protection
60 to 6,000 μ A	1 μ A	1.2 % L $\pm$ 5 D	2.6 to 5 mA	25 mV / mA	Fuse 11 A/1,000 V > 20 kA
6.00 to 60.00 mA	0.01 mA	1 % L $\pm$ 3 D	2.6 to 50 mA	3 mV / mA	
60.0 to 600.0 mA	0.1 mA		2.6 to 500 mA	0.58 mV / mA	
0.600 to 6.000 A	0.001 A	1.2 % L $\pm$ 5 D	2.8 to 5 A	0.05 V / A	
1.00 to 10.00 A	0.01 A	1 % L $\pm$ 3 D	3.7 to 8 A	0.05 V / A	

The display indicates "OL" above 19.99 A. The  symbol blinks and a beep sounds above 10 A.

Secondary measurements and displays: FREQ (AC coupling) MAX, MIN, PEAK

(*) Acceptable overload: 10 A to 20 A for 30s max. with a pause of 5min between 2 measurements. Ambient temp. 35 °C max.

(**) Additional uncertainty with the 300 Hz filter: see curve on p.28.

6.2.6. AC AND DC CURRENT

Warning: the sum AC+DC must never exceed the range, 600 mA, or 60 mA, or 6000 μ A, or 6 A, or 10 A, as the case may be.

The AC component must represent at least 5% of the amplitude of the AC+DC total for it to be possible to measure it.

AAC+DC TRMS

Specified measurement range (*)	Resolution	Uncertainty AC 40 Hz to 20 kHz ($\pm$) (**)	Additional uncertainty DC ($\pm$)	Peak factor	Voltage drop	Protection
60 to 6000 μ A	1 μ A	1.2 % L + 0.08 % x [F(kHz)-1]L $\pm$ 5 D	$\pm$ 15 D	2.6 to 5 mA	25 mV / mA	Fusible 11 A/1,000 V > 20 kA
6.00 to 60.00 mA	0.01 mA	1 % L + 0.08 % x [F(kHz)-1]L $\pm$ 3 D	$\pm$ 13 D	2.6 to 50 mA	3 mV / mA	
60.0 to 600.0 mA	0.1 mA			2.6 to 500 mA	0.58 mV / mA	
0.600 to 6.000 A	0.001 A	1.2 % L + 0.08 % x [F(kHz)-1]L $\pm$ 5 D	$\pm$ 10 D	2.8 to 5 A	0.05 V / A	
1.00 to 10.00 A	0.01 A	1 % L + 0.08 % x [F(kHz)-1]L $\pm$ 3 D	$\pm$ 10 D	3.7 to 8 A	0.05 V / A	

The display indicates "OL" above 19.99 A. The symbol  blinks and a beep sounds above 10 A.

Secondary measurements and displays: FREQ (AC coupling) MAX, MIN, PEAK

(*) Acceptable overload: 10 A to 20 A for 30 s max. with a pause of 5min between 2 measurements. Ambient temp. 35 °C max.

(**) Additional uncertainty with the 300 Hz filter: see curve on p.28.

6.2.7. FREQUENCY

Particular reference conditions: 150 mV<U<600 V

When the switch is set to Hz, the 300 Hz filter is not in service.

Switch set to "Hz", measurement of the frequency of a voltage

Specified measurement range	Resolution	Intrinsic error
10.00 to 60.00 Hz	0.01 Hz	0.1 % L $\pm$ 1 D
10.0 to 600.0 Hz	0.1 Hz	
0.010 to 6.000 kHz	0.001 kHz	
0.01 to 60.00 kHz	0.01 kHz	

Below 10 Hz, or if the signal detection level is inadequate, the reading is forced to 0.



Measurement of the period in ms can be accessed using the  key.

Frequency voltage or frequency current simultaneously, (secondary display)

Particular reference conditions:

150 mV < U < 600 V

0.15 A < I < 10 A

Max. frequency measurable in volts : 60 kHz

Max. frequency measurable in amperes : 60 kHz

When the switch is set to V_{LowZ}, Volts or Ampere, if the 300 Hz filter is activated, the measurable frequency remains within the limits of the PB of the filter.

Below 10 Hz, or if the signal detection level is inadequate, the reading is forced to « ---- ».

6.2.8. RESISTANCE

Particular reference conditions:

The (+COM) input must not have been overloaded following the accidental application of a voltage to the input terminals with the switch set to Ω or T° .

If this happens, the return to normal may take about ten minutes.

Specified measurement range	Resolution	Uncertainty	Measurement current	Open-circuit voltage
0 to 600.0 Ω *	0.1 Ω	0.4 % L $\pm$ 2 D	$\approx$ 1 mA	< 5 V
0 to 6.000 k Ω	0.001 k Ω	0.4 % L $\pm$ 2 D	$\approx$ 126.6 μ A	
0 to 60.00 k Ω	0.01 k Ω		$\approx$ 12.6 μ A	
0 to 600.0 k Ω	0.1 k Ω		$\approx$ 1.26 μ A	
0 to 6.000 M Ω	0.001 M Ω	1.5 % L $\pm$ 3 D	$\approx$ 240 nA	
0 to 60.00 M Ω	0.01 M Ω	3 % L $\pm$ 3 D	$\approx$ 29 nA	

(*) REL measurement

6.2.9. CONTINUITY

Response time < 100 ms

Range	Resolution	Uncertainty	Open-circuit voltage	Measurement current
600 Ω	0.1 Ω	Audible signal triggered < 30 Ω $\pm$ 5 Ω	< 5 V	< 1.1 mA

6.2.10. DIODE TEST

Range	Resolution	Uncertainty	Open-circuit voltage	Measurement current
3 V	1 mV	Audible signal triggered < 40 mV $\pm$ 10 mV	< 5 V	< 1.1 mA

6.2.11. CAPACITANCE

Specified measurement range	Resolution	Intrinsic error	Measurement current	Measurement time
0.100 to 6.000 nF	0.001 nF	2 % L $\pm$ 15 D	$\approx$ 1.26 μ A	$\approx$ 400 ms
0 to 60.00 nF	0.01 nF	1 % L $\pm$ 8 D	$\approx$ 1.26 μ A	$\approx$ 400 ms
0 to 600.0 nF	0.1 nF	1 % L $\pm$ 5 D	$\approx$ 1.26 μ A	$\approx$ 400 ms
0 to 6.000 μ F	0.001 μ F	1 % L $\pm$ 5 D	$\approx$ 12.6 μ A	$\approx$ 0.125 s/ μ F
0 to 60.00 μ F	0.01 μ F	1 % L $\pm$ 5 D	$\approx$ 126.6 μ A	$\approx$ 0.125 s/ μ F
0 to 600.0 μ F	0.1 μ F	3 % L $\pm$ 5 D	$\approx$ 1 mA	$\approx$ 0.125 s/ μ F
0 to 6.000 mF	1 μ F	4 % L $\pm$ 5 D	$\approx$ 1 mA	$\approx$ 17 s/mF
0 to 60.00 mF	10 μ F	6 % L $\pm$ 5 D	$\approx$ 1 mA	$\approx$ 17 s/mF

The use of wires that are very short and shielded is strongly recommended.

6.2.12. TEMPERATURE

Particular reference conditions:

An internal temperature rise may have been caused by:

- measurement of a strong current for a long time,
- overload of the +COM input with the switch set to T° or Ω .

In this case, it is necessary to wait some time to recover the specified metrological characteristics.

The multimeter must be at the temperature of the room. If not, recovering the metrological characteristics may take up to 2h. Otherwise, there may be a temperature offset, because the cold junction temperature reference is a little off.



If there is any doubt, it is possible to check by measuring a known temperature (example: ambient temperature) with the thermocouple.

Range	Operating range	Specified measurement range	Resolution	Uncertainty ($\pm$)
low	- 200.0 °C to 200.0 °C	- 60.0 °C to 200.0 °C	0.1°C	0.5 % L $\pm$ 2 °C
	- 328.0 °F to 392.0 °F	- 76.0 °F to 392.0 °F	0.1°F	0.5 % L $\pm$ 4 °F
high	- 200 °C to 1,200 °C	- 60 °C to 1,200 °C	1°C	0.5 % L $\pm$ 2 °C
	- 328 °F to 2,192 °F	- 76 °F to 2,192 °F	1°F	0.5 % L $\pm$ 4 °F

The stated accuracy in temperature measurement does not take into account the accuracy of the K thermocouple.

There is no upper limit on the temperature display, other than the 6000 D of the display unit.

6.2.13. PEAK+ PEAK-

Add 1%L + 30D to obtain the accuracy corresponding to the function and the range.

Fmax = 1 kHz (1ms)

6.2.14. MAX / MIN

Add 0.2%L + 2D to obtain the accuracy corresponding to the function and the range.

Acquisition time of the extrema: approximately 100 ms.

6.2.15. OPERATION OF THE AUDIBLE BEEP

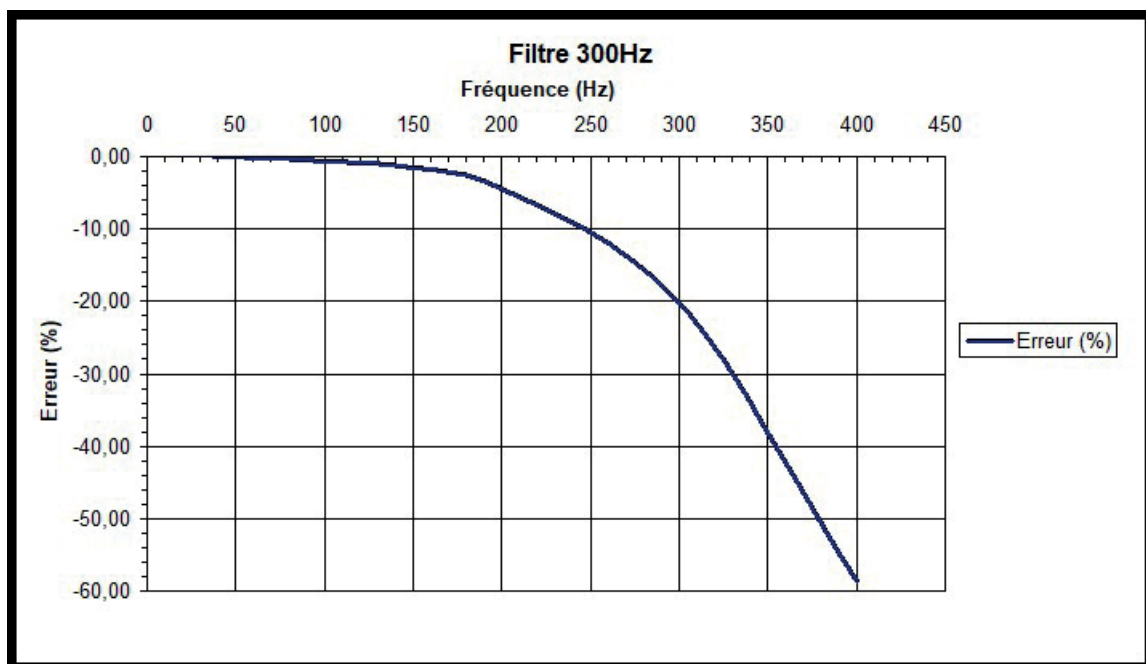
Beep reporting a valid key → high-pitched sound	4 kHz, 100 ms
Beep reporting an invalid key → low-pitched sound	1 kHz, 100 ms
Bursts of 3 beeps separated by 5-second gaps (beep beep beep - gap - beep beep beep) reporting an overshoot of the danger threshold (600 V) → medium-pitched sound	2 kHz, 100 ms
2 successive beeps (beep beep) reporting recording of the MAX, MIN, PEAK: → medium-pitched sound	2 kHz, 100 ms
Current > 10 A	4 kHz, 100 ms

6.2.16. VARIATION IN THE NOMINAL RANGE OF USE

Quantity of influence	Range of influence	Quantity influenced	Influence	
			typical	MAX
Temperature	0 °C... 18 28 ... 40 °C	V _{DC} mV	0.01 % L ± 0.2 D / 1 °C	0.02 % L ± 0.25 D / 1 °C
		V _{AC} mV, V _{LowZ} mV	0.08 % L ± 0.2 D / 1 °C	0.15 % L ± 0.25 D / 1 °C
		V _{DC}	0.01 % L ± 0.1 D / 1 °C	0.05 % L ± 0.1 D / 1 °C
		V _{AC} , V _{AC} +D _{CC} V _{LowZ}		0.15 % L ± 0.1 D / 1 °C
		A _{DC}	0.05 % L ± 0.1 D / 1 °C	0.1 % L ± 0.1 D / 1 °C
		A _{AC} et A _{AC} +D _C	0.08 % L ± 0.1 D / 1 °C	0.12 % L ± 0.1 D / 1 °C
			0.01 % L ± 0.1 D / 1 °C	0.1 % L / 1 °C
		Ω	0.05 % L / 1 °C	0.1 % L / 1 °C
		60 MΩ		0.3 % L / 1 °C
		nF, μF		0.2 % L ± 0.1 D / 1 °C
		mF		0.6 % L ± 0.1 D / 1 °C
		Hz		0.01 % L / 1 °C
		Temperature		± 2 °C + 0.05 % L / 1 °C
		Stabilization time	≈ 90 min	2 h
Humidity (without condensation)	10 % ... 80 % RH	V	0	0
		A		
				
		Ω (*)		
		Hz		
Frequency	1 kHz ... 3 kHz	V _{AC}		4 % L
	3 kHz ... 10 kHz			6 % L

(*) excluding the 60 MΩ range

6.2.17. RESPONSE OF THE FILTER



6.3. TECHNICAL CHARACTERISTICS OF THE MX 5060

Protection : 1414 Vpk

6.3.1. DC VOLTAGE V_{DC}

60 mV range: Measuring a strong current or measuring a current for a long time may cause a temperature rise of some components.

Specified measurement range	Resolution	Intrinsic error
0 to 60.000 mV	0.001 mV	0.5 % L + 35 D
0 to 600.00 mV	0.01 mV	0.5 % L + 25 D
0 to 6.0000 V	0.0001 V	0.05 % L + 25 D
0 to 60.000 V	0.001 V	
0 to 600.00 V	0.01 V	
0 to 1,000.0 V	0.1 V	0.07 % L + 25 D

- 1) This range is accessible only with the  key.
Input impedance : approx. 10.6 MΩ // 50 pF
- 2) The display indicates "+OL" above +1,050 V and "-OL" below -1,050 V.

6.3.2. AC VOLTAGE

V_{LowZ} AC RMS

The PB is reduced to 300 Hz. In V_{LowZ}, there is no 60 mV range. The frequency measurement is made like a measurement in a 300 Hz bandwidth.

Specified measurement range ³⁾	Resolution	Uncertainty (±)	Additional uncertainty F (Hz) ¹⁾	Input impedance // < 50 pF	Peak factor
60.00 to 600.00 mV	0.01 mV	1 % L + 0.25 % x [F(kHz)-1] L ± 30 D	45 < F < 65 Hz 0.3 % L typ.	≈ 520 kΩ	3 to 500.0 mV
0.6 to 6.0000 V	0.0001 V	0.5 % L + 0.18 % x [F(kHz)-1] L ± 25 D	to 100 Hz 0.7 % L typ.		3 to 5.0 V
6.000 to 60.000 V	0.001 V		to 150 Hz 1.8 % L typ.		3 to 50.0 V
60.00 to 600.00 V	0.01 V		to 300 Hz 30 % L typ		3 to 500.0 V
60 to 1,000.0 V	0.1 V				1.42 to 1,000.0 V

- 1) See the typical curve of the 300 Hz filter on p. 36.
- 2) The LCD indicates "+OL" above +1050 V, "-OL" below -1050 V or above 1050 VRMS.
- 3) From 1 kHz, the measurement must exceed 15% of the range
- Secondary measurements and displays: FREQ (AC coupling) MAX, MIN, PEAK

VAC RMS

60 mV range: Measuring a strong current or measuring a current for a long time may cause a temperature rise of some components.

Specified measurement range ⁴⁾	Resolution	Uncertainty (±)	Uncertainty supplémentaire F(Hz) ¹⁾	Bandwidth	@ 1 kHz Input impedance // < 50 pF	Peak factor
6.000 to 60.000 mV ²⁾	0.001 mV	1.5 % L ± 35 D	45<F<65 Hz 0.3 % L typ. to 100 Hz 0.7 % L typ.	≈ 400 Hz	10.612 MΩ	3 to 50.0 mV
60.00 to 600.00 mV	0.01 mV	1 % L + 0.25 % x [F(kHz)-1] L ± 30 D		10 Hz to 50 kHz (≈ 23 % @100 kHz)	10.9 MΩ	3 to 500.0 mV
0.6 to 6.0000 V	0.0001 V	0.5 % L + 0.18 % x [F(kHz)-1] L ± 25 D	to 150 Hz 1.8 % L typ. to 300 Hz 30 % L typ.	10 Hz to 100 kHz	10.9 MΩ	3 to 5.0 V
6.000 to 60.000 V	0.001 V				10.082 MΩ	3 to 50.0 V
60.00 to 600.00 V	0.01 V				10.008 MΩ	3 to 500.0 V
60 to 1,000.0 V ⁴⁾	0.1 V				10.008 MΩ	1.42 to 1,000.0 V

1) See the typical curve of the 300Hz filter on p. 36.

2) This range is accessible only with the **key**.

Input impedance: approx. 10.6 MΩ // 50 pF

3) The LCD indicates "+OL" above +1,050 V, "-OL" below -1,050 V or above 1,050 VRMS.

4) From 1 kHz, the measurement must exceed 15% of the range.

Secondary measurements and displays: FREQ (AC coupling) MAX, MIN, PEAK

6.3.3. AC AND DC VOLTAGE AC+DC TRMS

60 mV range: Measuring a strong current or measuring a current for a long time may cause a temperature rise of some components.

Specified measurement range ⁴⁾	Resolution	Additional uncertainty DC (±)	Uncertainty AC (±)	Additional uncertainty F(Hz) ¹⁾	Bandwidth	Input impedance // < 50 pF	Peak factor
6,000 to 60,000 mV ²⁾	0,001 mV	± 15 D	1,5 % L ± 35 D	45<F<65 Hz 0,3 % L typ. to 100 Hz 0,7 % L typ.	≈ 400 Hz	10,612 MΩ	3 to 50 mV
60,00 to 600,00 mV	0,01 mV		0,8 % L + 0,18 % x [F(kHz)-1]L ± 30 D		10 Hz to 50 kHz	10,9 MΩ	3 to 500 mV
0,6 to 6,0000 V	0,0001 V		0,5 % L + 0,18 % x [F(kHz)-1]L ± 25 D	to 150 Hz 1,8 % L typ. to 300 Hz 30 % L typ.	10 Hz to 100 kHz	10,9 MΩ	3 to 5 V
6,000 to 60,000 V	0,001 V					10,082 MΩ	3 to 50 V
60,00 to 600,00 V	0,01 V					10,008 MΩ	3 to 500 V
60 to 1000,0 V ³⁾	0,1 V					10,008 MΩ	1,42 to 1000 V

1) See the typical curve of the 300 Hz filter on p. 36.

2) This range is accessible only with the **RANGE** key.

Input impedance: approx. 10.6 MΩ // 50 pF

3) The LCD indicates "+OL" above +1,050 V, "-OL" below -1,050 V or above 1,050 VRMS.

4) From 1 kHz, the measurement must exceed 15% of the range.

Secondary measurements and displays: FREQ (AC coupling) MAX, MIN, PEAK

6.3.4. DC CURRENT Adc

Particular reference conditions:

μ A range: Measuring a strong current for a long time may cause a temperature rise of some components. In this case, it is necessary to wait some time for the metrological characteristics specified in μ A to be restored.

Specified measurement range	Resolution	Uncertainty ($\pm$)	Voltage drop	Protection
2.0 to 6,000.0 μ A	0.1 μ A	0.8 % L $\pm$ 25 D	25 mV / mA	Fuse 11 A/1,000 V > 20 kA
0.020 to 60.000 mA	0.001 mA	0.8 % L $\pm$ 20 D	3 mV / mA	
0.20 to 600.00 mA	0.01 mA	0.8 % L $\pm$ 20 D	0.58 mV / mA	
0.2000 to 6.0000 A	0.0001 A	0.8 % L $\pm$ 20 D	0.05 V / A	
0.200 to 20.000 A (*)	0.001 A	0.8 % L $\pm$ 20 D	0.05 V / A	

The display indicates "OL" above 19.99 A. The  symbol blinks and a beep sounds above 10 A.

(*) Acceptable overload: 10 A to 20 A for 30 s max. with a pause of 5 min between 2 measurements. Ambient temp. 35 °C max.

6.3.5. AC CURRENT

AC RMS

Specified measurement range	Resolution	Uncertainty ($\pm$) 40 Hz to 20 kHz (**)	Peak factor	Voltage drop	Protection
60 to 6000.0 μ A	0.1 μ A	1.2 % L + 0.08 % x [F(kHz)-1]L $\pm$ 25 D	2.6 to 5 mA	25 mV / mA	Fuse 11 A/1,000 V > 20 kA
6.000 to 60.000 mA	0.001 mA	1 % L + 0.08 % x [F(kHz)-1]L $\pm$ 25 D	2.6 to 50 mA	3 mV / mA	
60.00 to 600.00 mA	0.01 mA		2.6 to 500 mA	0.58 mV / mA	
0.6000 to 6.000 A	0.0001 A	1 % L + 0.1 % x [F(kHz)-1]L $\pm$ 25 D	2.8 to 5 A	0.05 V / mA	
1.000 to 20.000 A (*)	0.001 A	1.2 % L + 0.1 % x [F(kHz)-1]L $\pm$ 25 D	3.7 to 8 A	0.05 V / mA	

The display indicates "OL" above 19.99 A. The  symbol blinks and a beep sounds above 10 A.

Secondary measurements and displays: FREQ (AC coupling) MAX, MIN, PEAK

(*) Acceptable overload: 10 A to 20 A for 30 s max. with a pause of 5min between 2 measurements. Ambient temp. 35 °C max.

(**) Additional uncertainty with the 300 Hz filter: see curve on p.36

6.3.6. AC AND DC CURRENT

AC+DC TRMS

Warning: the sum AC+DC must never exceed the range, 600 mA, or 60 mA, or 6000 μ A, or 6 A, or 10 A, as the case may be. The AC component must represent at least 5% of the amplitude of the AC+DC total for it to be possible to measure it.

Specified measurement range	Resolution	Uncertainty AC 40 Hz - 20 kHz ($\pm$) (**)	Additional uncertainty DC ($\pm$)	Peak factor	Voltage drop	Protection
60 to 6000.0 μ A	0.1 μ A	1 % L + 0.08 % x [F(kHz)-1]L $\pm$ 25 D	$\pm$ 15 D	2.6 to 5 mA	25 mV / mA	Fuse 11 A/1,000 V > 20 kA
6.000 to 60.000 mA	0.001 mA	1 % L + 0.08 % x [F(kHz)-1]L $\pm$ 25 D		2.6 to 50 mA	3 mV / mA	
60.00 to 600.00 mA	0.01 mA	1 % L + 0.08 % x [F(kHz)-1]L $\pm$ 25 D		2.6 to 500 mA	0.58 mV / mA	
0.6000 to 6.0000 A	0.0001 A	1 % L + 0.1 % x [F(kHz)-1]L $\pm$ 25 D		2.8 to 5 A	0.05 V / mA	
0.600 to 20.000 A (*)	0.001 A	1.2 % L + 0.1 % x [F(kHz)-1]L $\pm$ 25 D		3.7 to 8 A	0.05 V / mA	

The display indicates "OL" above 19.99 A. The  symbol blinks and a beep sounds above 10 A.

Secondary measurements and displays: FREQ (AC coupling) MAX, MIN, PEAK

(*) Acceptable overload: 10 A to 20 A for 30 s max. with a pause of 5min between 2 measurements. Ambient temp. 35 °C max.

(**) Additional uncertainty with the 300 Hz filter: see curve on p.36.

6.3.7. FREQUENCY

Switch set to "Hz", measurement of the frequency of a voltage

Particular reference conditions: 150 mV < U < 600 V

When the switch is set to Hz, the 300 Hz filter is not in service.

Specified measurement range	Resolution	Erreur intrinsèque
10.00 to 60.00 Hz	0.01 Hz	0.1 % L $\pm$ 1 D
10.00 to 600.0 Hz	0.1 Hz	
0.010 to 6.000 kHz	0.001 kHz	
0.01 to 60.00 kHz	0.01 kHz	

Below 10 Hz, or if the signal detection level is inadequate, the reading is forced to 0.



Measurement of the period in ms can be accessed using the  key.

Freq. voltage or Freq. current simultaneously, (secondary display)

Particular reference conditions :

- 150 mV < U < 600 V
- 0.15 A < I < 10 A

Max. frequency measurable in volts: 60 kHz

Max. frequency measurable in amperes : 60 kHz

When the switch is set to V_{LowZ}, Volts or Ampere, if the 300 Hz filter is activated, the measurable frequency remains within the limits of the PB of the filter.

Below 10 Hz, or if the signal detection level is inadequate, the reading is forced: « ---- ».

6.3.8. RESISTANCE

Particular reference conditions:

The (+COM) input must not have been overloaded following the accidental application of a voltage to the input terminals with the switch set to Ω or T° .

If this happens, the return to normal may take about ten minutes.

Specified measurement range	Resolution	Uncertainty	Measurement current	Open-circuit voltage
0 to 600.00 Ω *	0.01 Ω	0.2 % L $\pm$ 20 D		< 5 V
0 to 6.0000 k Ω	0.0001 k Ω	0.2 % L $\pm$ 20 D	$\approx$ 126.6 μ A	
0 to 60.000 k Ω	0.001 k Ω		$\approx$ 12.6 μ A	
0 to 600.00 k Ω	0.01 k Ω		$\approx$ 1.26 μ A	
0 to 6.0000 M Ω	0.0001 M Ω	1.5 % L $\pm$ 30 D	$\approx$ 240 nA	
0 to 60.000 M Ω	0.001 M Ω	3 % L $\pm$ 30 D	$\approx$ 29 nA	

(*) REL measurement

6.3.9. CONTINUITY

Response time < 100 ms

Range	Resolution	Uncertainty	Open-circuit voltage	Measurement current
600 Ω	0.01 Ω	Audible signal triggered < 30 $\Omega \pm 5 \Omega$	< 5 V	< 1.1 mA

6.3.10. DIODE TEST

Range	Resolution	Uncertainty	Open-circuit voltage	Measurement current
3 mV	0.01 Ω	Audible signal triggered < 40 mV $\pm$ 10 mV	< 5 V	< 1.1 mA

6.3.11. CAPACITANCE

Specified measurement range	Resolution	Intrinsic error	Measurement current	Measurement time
0.100 to 6.000 nF	0.001 nF	2 % L $\pm$ 15 D	$\approx$ 1.26 μ A	$\approx$ 400 ms
0 to 60.00 nF	0.01 nF	1 % L $\pm$ 8 D	$\approx$ 1.26 μ A	$\approx$ 400 ms
0 to 600.0 nF	0.1 nF	1 % L $\pm$ 5 D	$\approx$ 1.26 μ A	$\approx$ 400 ms
0 to 6.000 μ F	0.001 μ F	1 % L $\pm$ 5 D	$\approx$ 12.6 μ A	$\approx$ 0.125 s/ μ F
0 to 60.00 μ F	0.01 μ F	1 % L $\pm$ 5 D	$\approx$ 126.6 μ A	$\approx$ 0.125 s/ μ F
0 to 600.0 μ F	0.1 μ F	3 % L $\pm$ 5 D	$\approx$ 1 mA	$\approx$ 0.125 s/ μ F
0 to 6.000 mF	1 μ F	4 % L $\pm$ 5 D	$\approx$ 1 mA	$\approx$ 17 s/mF
0 to 60.00 mF	10 μ F	6 % L $\pm$ 5 D	$\approx$ 1 mA	$\approx$ 17 s/mF

The use of wires that are very short and shielded is strongly recommended.

6.3.12. TEMPERATURE

Particular reference conditions:

An internal temperature rise may have been caused by:

- measurement of a strong current for a long time,
- overload of the +COM input with the switch set to T° or Ω .

In this case, it is necessary to wait some time to recover the specified metrological characteristics.

The multimeter must be at the temperature of the room. If not, recovering the metrological characteristics may take up to 2h.

Otherwise, there may be a temperature offset, because the cold junction temperature reference is a little off.

If there is any doubt, it is possible to check by measuring a known temperature (example: ambient temperature) with the thermocouple.

Range	Operating range	Specified measurement range	Resolution	Uncertainty ($\pm$)
low	- 200.0 °C to 200.0°C	- 60.0°C to 200.0°C	0.1°C	0.5 % L $\pm$ 2°C
	- 328.0°F to 392.0°F	- 76.0°F to 392.0°F	0.1°F	0.5 % L $\pm$ 4°F
high	- 200°C to 1,200°C	- 60°C to 1,200°C	1°C	0.5 % L $\pm$ 2°C
	- 328°F to 2,192°F	- 76°F to 2,192°F	1°F	0.5 % L $\pm$ 4°F

The stated accuracy in temperature measurement does not take into account the accuracy of the K thermocouple.

There is no upper limit on the temperature display, other than the 6000 D of the display unit.

6.3.13. PEAK+ PEAK-

Add 1% L + 30 D to obtain the accuracy corresponding to the function and the range.

Fmax = 1 kHz (1ms)

6.3.14. MAX / MIN

Add 0.2% L + 2 D to obtain the accuracy corresponding to the function and the range.

Acquisition time of the extrema: approximately 100 ms.

6.3.15. OPERATION OF THE AUDIBLE BEEP

Beep reporting a valid key → high-pitched sound	4 kHz, 100 ms
Beep reporting an invalid key → low-pitched sound	1 kHz, 100 ms
bursts of 3 beeps separated by 5-second gaps (beep beep beep - gap - beep beep beep) reporting an overshoot of the danger threshold (600V) □ medium-pitched sound	2 kHz, 100 ms
2 successive beeps (beep beep) reporting recording of the MAX, MIN, PEAK: → medium-pitched sound	2 kHz, 100 ms
Current 10 A	4 kHz, 100 ms

6.3.16. VARIATION IN THE NOMINAL RANGE OF USE

Quantity of influence	Range of influence	Quantity influenced	Influence	
			typical	MAX
Temperature	0 °C... 18 28 ... 40 °C	V _{DC} mV	0.01 % L ± 0.2 D / 1°C	0.02 % L ± 0.25 D / 1°C
		V _{AC} mV, V _{LowZ} mV	0.08 % L ± 0.2 D / 1°C	0.15 % L ± 0.25 D / 1°C
		V _{DC}	0.01 % L ± 0.1 D / 1°C	0.05 % L ± 0.1 D / 1°C
		V _{AC} , V _{AC} +DC, V _{LowZ}		0.15 % L ± 0.1 D / 1°C
		A _{DC}	0.05 % L ± 0.1 D / 1°C	0.1 % L ± 0.1 D / 1°C
		A _{AC} et A _{AC} +DC	0.08 % L ± 0.1 D / 1°C	0.12 % L ± 0.1 D / 1°C
			0.01 % L ± 0.1 D / 1°C	0.1 % L / 1°C
		Ω	0.05 % L / 1°C	0.1 % L / 1°C
		60 MΩ		0.3 % L / 1°C
		nF, μF		0.2 % L ± 0.1 D / 1°C
		mF		0.6 % L ± 0.1 D / 1°C
		Hz		0.01 % L / 1°C
		Temperature		± 2°C + 0.05 % L / 1°C
		Stabilization time	≈ 90 min	2 h
Humidity (without condensation)	10 % ... 80 % RH	V	0	0
		A		
				
		Ω (*)		
		Hz		
Frequency	1 kHz ... 3 kHz	V _{AC}		4 % L
	3 kHz ... 10 kHz			6 % L

6.3.17. RESPONSE OF THE FILTER



6.4. OTHER FEATURES

6.4.1. ENVIRONMENTAL CONDITIONS

Indoor use	
Altitude	< 2,000 m
Specified range of use	0 °C to 40 °C
Influence of temperature	see §. Influences
Insulation	class 2
Degree of pollution	2
Storage range	-20 °C to 70 °C

6.4.2. ALIMENTATION

Network	230 V $\pm$ 10 % to 50 Hz
Switchable	110 V $\pm$ 10 % to 60 Hz (version US)

6.4.3. DISPLAY

The refresh rate of the display unit is 200 ms.

6.4.4. MECHANICAL CHARACTERISTICS

Dimensions	295 x 270 x 95 mm
Mass	1.85 kg
Materials	ABS V0
Étanchéité	IP 67, according to IEC 60529

6.4.5. COMPLIANCE WITH STANDARDS

This device complies with the IEC/EN 61010-2-033 safety standard, and the cables comply with IEC/EN 61010-031 for voltages up to 600 V in Category IV or 1,000 V in Category III.

Input measurement category: 1,000 V CAT III and 600 V CAT IV relative to earth.

6.4.6. ELECTROMAGNETIC COMPATIBILITY (EMC)

The instrument complies with standard IEC/EN 61326-1.

7. MAINTENANCE



Except for the fuse and the batteries, the instrument contains no parts that can be replaced by personnel who have not been specially trained and accredited. Any unauthorized repair or replacement of a part by an “equivalent” may seriously impair safety.

7.1. CLEANING

Disconnect the instrument completely and switch it OFF.

Use a soft cloth, dampened with soapy water. Rinse with a damp cloth and dry rapidly with a dry cloth or forced air. Do not use alcohol, solvents, or hydrocarbons.

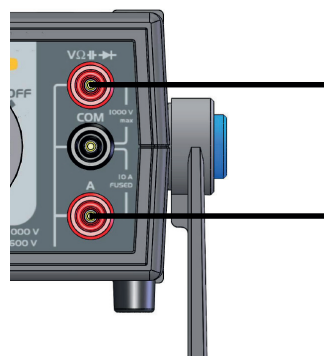
Please ensure that no foreign objects interfere with the operation of the cord locking mechanism.

7.2. REPLACEMENT OF THE FUSE

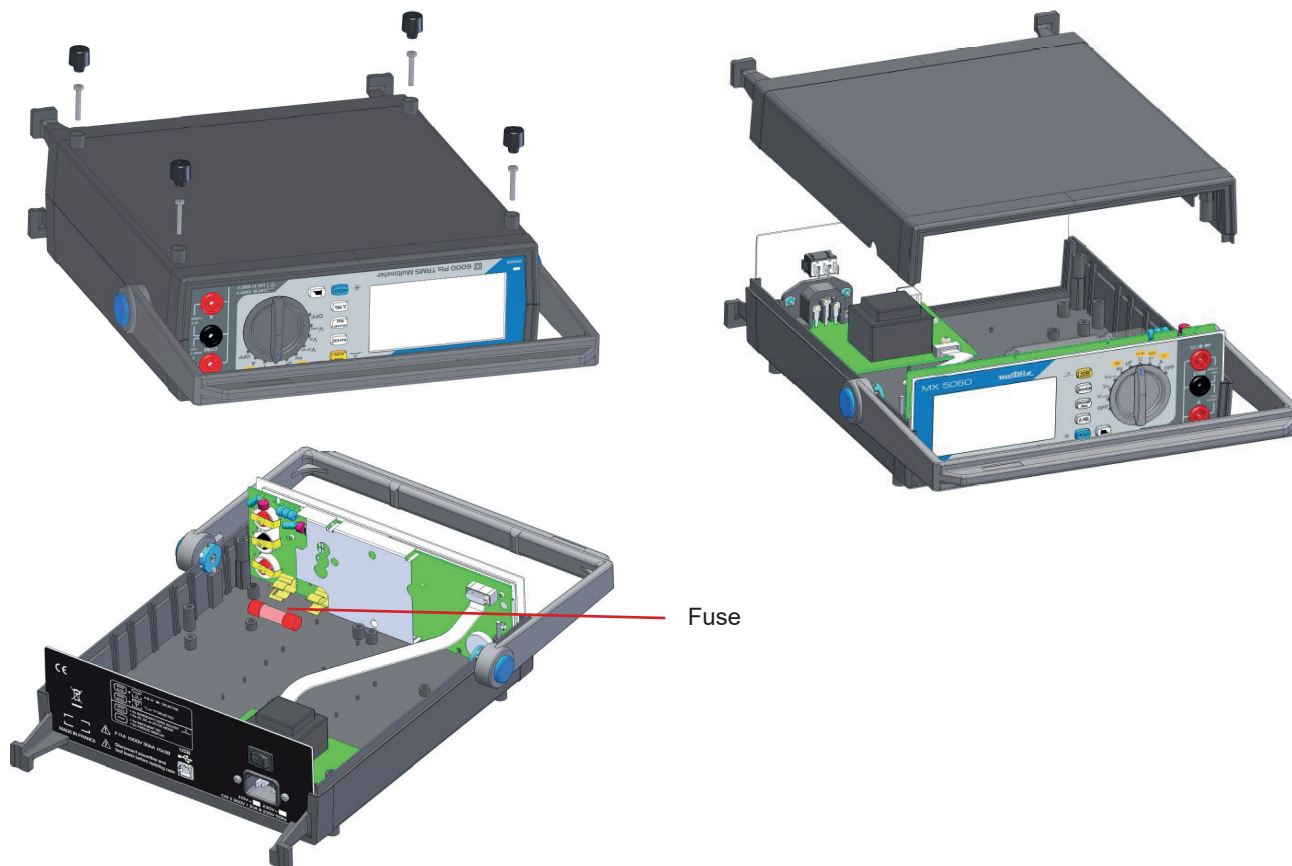
Before replacing the fuse, disconnect the instrument from any source of current.

Checking the current fuse:

- Set the switch to Ω .
- Connect the V Ω socket to the 1A socket; leave the “COM” socket open.
- The display unit must indicate a result $< 2 \Omega$, if not, replace the fuse.



- Access to and location of the fuse, by opening the housing: :



- Current protection: fuse, 11 A, 1,000 V > 20 kA (10 x 38)
- Power supply protection: PTC

8. WARRANTY

Except as otherwise stated, our warranty is valid for 24 months starting from the date on which the equipment was sold. The extract from our General Conditions of Sale is available on our website.

www.chauvin-arnoux.com/en/general-terms-of-sale

The warranty does not apply in the following cases:

- Inappropriate use of the equipment or use with incompatible equipment;
- Modifications made to the equipment without the explicit permission of the manufacturer's technical staff;
- Work done on the device by a person not approved by the manufacturer;
- Adaptation to a particular application not anticipated in the definition of the equipment or not indicated in the user's manual;
- Damage caused by shocks, falls, or floods



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