

metrix

1 00,000-count Graphical Multimeters

MTX 3281

MTX 3282

MTX 3283

User's Manual



metrix

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General instructions

Introduction



You have just acquired a 100,000-count **graphical multimeter**.

Thank you for your trust in our products.

It complies with safety standard EN 61010-1, double insulation, relative to electronic measuring instruments.

For optimum service, read this manual carefully and comply with the operating precautions.

Symbols used on the instrument



Warning: Risk of danger.

Refer to the operating manual to find out the nature of the potential hazards and the action necessary to avoid such hazards.



Earth terminal  Equipment protected throughout by double insulation.




The rubbish bin with a line through it means that in the European Union, the product must undergo selective disposal for the recycling of electric and electronic material, in compliance with Directive WEEE 2002/96/EC.



Attention : Risk of electrical shock

Precautions and safety measures

- Read carefully all the notes preceded by the symbol .
- If you use this instrument in a way which is not specified, the protection which it provides may be compromised, putting you in danger.
- The safety of any system incorporating this instrument is the responsibility of the system assembler.
- This instrument has been designed for use indoors:
 - in an environment with pollution level 2,
 - at an altitude of less than 2000 m,
 - at a temperature between 0° C and 55° C
 - with relative humidity of less than 80% up to 31° C.
- Measurement category III for voltages no higher than 1000 V (AC or DC) in relation to the earth.
- Measurement category IV for voltages no higher than 600 V (AC or DC) in relation to the earth.



Definition of measurement categories

CAT III: Measurement category III corresponds to measurements on building installations.

Example: measurements on distribution panels, cabling, etc.

CAT IV: Measurement category IV corresponds to measurements taken at the source of low-voltage installations

Example: metering and measurements on overvoltage protection devices...

before use


- Comply with environmental and storage conditions.
- For your safety, only use the leads delivered with the instrument: they comply with the norm EN 61010-031.
- The mounted probes must have an assigned measurement category III or IV and a rated voltage rated at least equal to the voltage of the circuit to be measured.
- Before using it, systematically check that it is in perfect condition.

during use

- Never exceed the protection limit values indicated in the specifications for each type of measurement.
- Before changing the function, disconnect the measurement leads from the circuit measured.
- Never measure resistances on a live circuit.
- When the instrument is connected to the measurement circuits, never touch an unused terminal.

General instructions (cont'd)

Safety features

- It is impossible to access the battery or fuse compartment without first disconnecting the measurement leads.
- When measuring voltages greater than 60 VDC or 30 VAC, the  symbol flashes on the display.
- Automatic detection of a connection on the "Ampere" terminal.
- When there is a persistent range overrun, an intermittent buzzer indicates the risk of electric shock.

Maintenance and metrological verification



Any access to the internal circuits for adjustment, servicing or repair of the unit *under power* must be undertaken only by qualified personnel, after reading the instructions in this manual.

A **qualified person** is a person who is familiar with the installation, its construction, its use and the hazards that exist. They are authorized to activate and deactivate the installation and equipment, in compliance with the safety instructions.

For all repairs under or outside of the warranty, return the device to your retailer.

Warranty



This equipment is guaranteed for **3 years** against any defect in materials or workmanship, in accordance with the general terms and conditions of sale, .

During this period, the equipment can only be repaired by the manufacturer. The manufacturer reserves the right to carry out repair or replacement of all or part of the equipment.

If the equipment is returned to the manufacturer, initial transport costs shall be borne by the customer.

The **warranty** does not apply in the event of:

- unsuitable use of the equipment or use with other incompatible equipment
- modification of the equipment without explicit authorization from the manufacturer's technical services
- repair carried out by a person not certified by the manufacturer
- adaptation to a specific application, not provided for in the definition of the equipment or by the operating manual
- an impact, a fall or flooding.

Unpacking - repacking



All the equipment was verified mechanically and electrically before shipping.

When you receive it, carry out a quick check to detect any damage that may have occurred during transport. If necessary, contact our sales department immediately and register any legal reservations with the carrier.

In the event of reshipping, it is preferable to use the original package. Indicate the reasons for the return as clearly as possible in a note attached to the equipment.

Cleaning



- Turn the instrument off.
- Clean it with a damp cloth and soap.
- Never use abrasive products or solvents.
- Allow to dry before any further use.

General instructions (cont'd)

Measurement input protection systems



These multimeters are equipped with several protection systems:

- Varistor protection clips any transient overvoltages on the measurement terminals.
- PTC (positive temperature coefficient) protection protects against permanent overvoltages less than or equal to 1000 V during capacitance or resistance measurements and diode tests.
This protection is reset automatically after the overload.
- A fuse (11 A) provides protection during intensity measurements.

Special functions

Automatic current measurement detection

The number of input terminals is limited to 3: **V**, **COM**, **A**. Connection of the lead to the "Ampere" terminal automatically selects the corresponding function.




When a function modification by the control keyboard is incompatible with the lead connection, it triggers a buzzer and a visual alarm (LEADS).

The current measurement is performed using autorange over the whole range.

Auto power-off




If the function is validated in the Sleep menu: the instrument shuts down automatically after 30 minutes if no action has occurred on the front panel during that time.

The instrument can be powered up again by pressing the  key.



Automatic power-off is inhibited in:

- **Surveillance** mode (SURV)
- **Memorize** mode (MEM)
- **Communication** mode  (optical link - RS232C, USB, Bluetooth)
- when the value measured (Voltage or Current) on the multimeter's inputs exceeds the danger level.

Alert signal



An intermittent buzzer sounds:

- on the "Voltage" position, when the range is exceeded (**MANU**al and **AUTO** mode - last range)
- on the "Current" position, when the range is exceeded (**MANU**al) mode, when 10 Amperes or more is measured
- if the position of the leads and the function selected are incompatible
- when the danger thresholds are exceeded (function activated)

When the range is exceeded, the buzzer is accompanied by display of "O. L".

Danger threshold

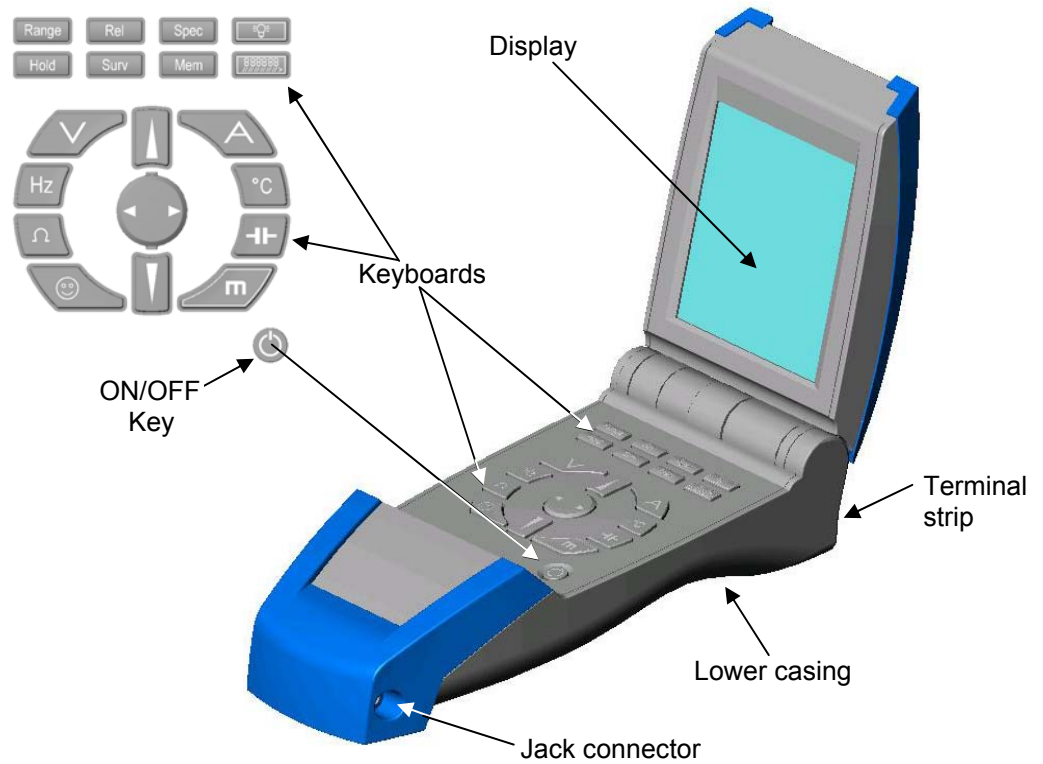


When this symbol is activated:

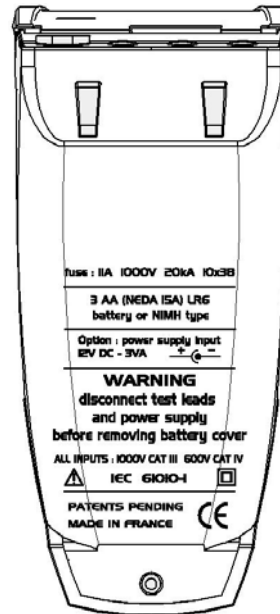
- the voltage on the "Volt" input exceeds **60 VDC** or **30 VAC**
- the current injected between the "Ampere" and **COM** exceeds **10 A**
- the range is exceeded (voltage or current) in **MANU**al mode

Description of the instrument

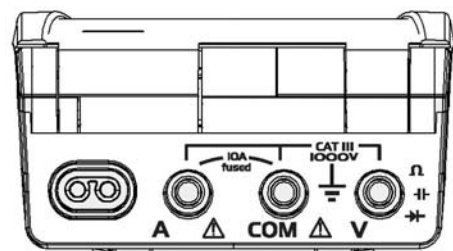
Front panel + keyboards (illustration)



Rear (illustration + markings)



Measurement terminal block (illustration + markings)



Description of the instrument (cont'd)

Front (description)

1 power on/off key



- Starting the multimeter.
 - Stopping the multimeter.
- 👉 **If there is a multimeter malfunction, a long press (> 1 s) on this key can be used to return to normal operation.**

8 keys for selecting the main functions



Voltage measurement or access to the measurement type: AC, DC or AC+DC

- Selection using this key or the keys.
- Validation using the key or after 2 s.



Current measurement or access to the measurement type: AC, DC or AC+DC

- Selection using this key or the keys.
- Validation using the key or after 2 s.



Measurement of **Frequency** (Hz) on a VAC voltage or access to the manual frequency range < 900 kHz (default) or > 900 kHz.

A long press opens the menu for changing the voltage range.

- Selection using the keys.
- Validation using the or keys.

👉 **Voltage range quick change using the keys.**

The selected range is recalled in the help line (i), see page 9.



Measurement of **Resistance** (Ohm)

By pressing again:

- Access to the **Continuity** test (🎵)
- Access to **Diode** test (→|)



Measurement of **Temperature** or access to the types of temperature measurements: ° C, ° F or K.

- Selection using the keys.
- Validation using the key or after 2 s.
- By pressing this key during measurement type selection, you can access the sensor type:
 - **platinum probes**: Pt 100, Pt 1000 only on **MTX 3282** and **MTX 3283**
 - **thermocouples**: J (TC J), K (TC K)
- Selection using the keys.
- Validation using the key or after 2 s.

The selected scale is recalled in the help line (i), see page 9.



Measurement of **Capacitance**



"Favourite" measurement configurable by the user.

A long press opens the "favourite" function configuration menu.

👉 **For the menu's configuration, see §. 😊 Function.**

Description of the instrument (cont'd)



Instrument **Configuration** menu.

This key can also be used to exit from a menu or submenu after validating it.

3 keys for navigation and modification of the menus



- Selection of a **menu** or **function** (up/down navigation).
- Increase or decrease of the variable selected.





- Selection of a **function** (left/right navigation).
- Modification of a function.
- Movement within sub-menus.

6 keys for activating the instrument's various modes




Selection of the operating mode:

AUTO, **AUTO PEAK** (**MTX 3282**, **MTX 3283**), **MANU**.

- Selection using this key or the  keys.
- Validation using the  key or after 2 s.

If the measurement is single range, the range defined is forced and there is no effect if this key is pressed.

Example: Diode test, continuity test and temperature measurement.

By pressing one of the  keys, you can switch directly to **MANU**al mode and then modify the range.



Activation, deactivation of the **REL** (relative) mode.



When it is active, a long press opens a window for setting the reference.



Activation, deactivation of the display of the **specifications** for the function and range selected.



Activation of **HOLD** or **AUTO HOLD mode**, deactivation **NO HOLD**.

- Selection using this key or the  keys.
- Validation using the  key or after 2 s.



Activation, deactivation of the **SURV** (surveillance) mode.

A long press opens a window for viewing the most recent records. Closed by a short press.



Activation, deactivation of the **MEM** (automatic recording) mode.

A long press opens the **MEM Function menu**.

2 utility keys



Back-lighting of the display in dark environments.

A long press opens the menu for adjusting the **contrast** on the LCD.



Selection of the functions for the **3 secondary displays**.

- Selection by successive presses on this key.
- A long press can be used to exit from this mode.

Description of the instrument (cont'd)

Inputs



Input for voltage and frequency measurements, diode tests, resistance measurements, continuity tests, and capacitance or temperature measurements.



Input for current measurements.



Reference input.

Display

- The multimeters in this range are equipped with a graphical LCD screen (58 mm x 58 mm) with 160 x 160 resolution for comfortable reading.
- Reading of the LCD can be optimized by varying the orientation of the display, the adjustment of contrast and, if necessary, using the backlighting.
- The modes, the functions selected, the electrical or physical values measured and the alert symbols are clearly shown on the display.
- The user can call up help (i) regarding the function selected.
- The main display is accompanied by its sign and the unit.

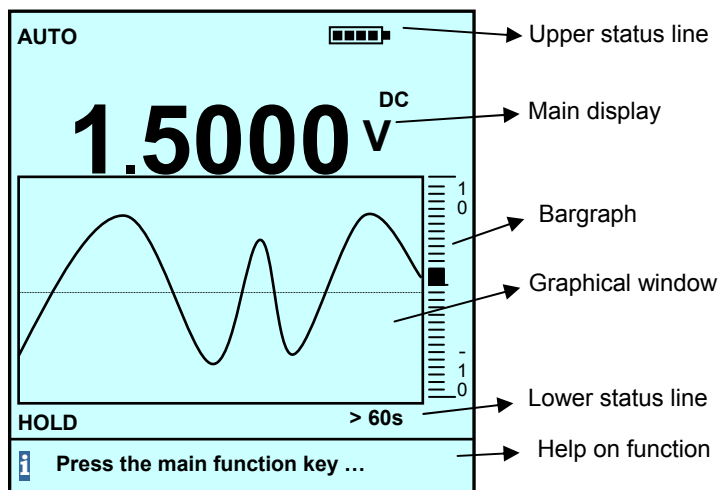
(foot of the screen)

Depending on the current selections, the display may be graphical or digital:

Graphical display

The graphical window can be used to monitor the evolution of the principal measurement.

Example

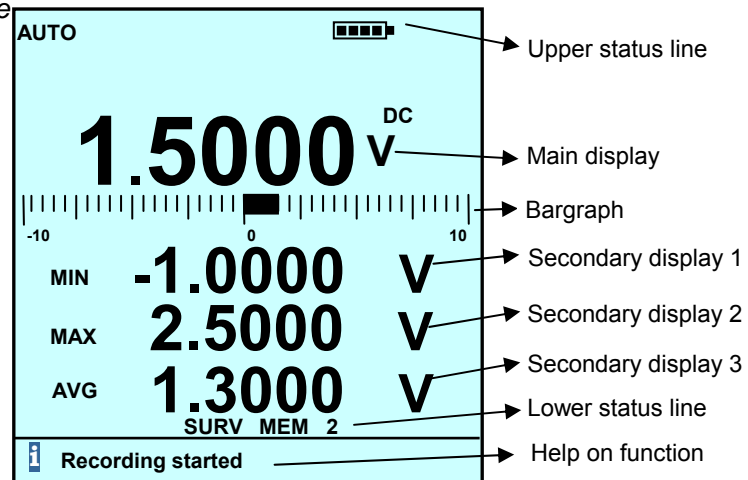


The graphical window and the bargraph constantly track the evolution of the measurement in the range selected.

Display of secondary functions

The secondary displays are intended for the SPEC, REL, MEM, SURV and **888888** functions:

Example



The main display and the bargraph constantly track the evolution of the measurement.

Functional description

Preparation for use

Instructions before activation

To use this instrument, you must comply with the usual safety rules in order:

- to protect you against the dangers of the electric current,
- to protect the multimeter against incorrect operations.

For your safety, only use the leads delivered with the instrument. Before using it, systematically check that it is in perfect condition.

Instrument power supply




- The 3 multimeters in this range operate with three 1.5 V alkaline batteries (LR6-AM3 AA) or three 1.2 V Ni-MH rechargeable batteries (accumulators) of the same type:
 - ↪ The **MTX 3281** is delivered with three 1.5 V alkaline batteries (LR6-AM3 AA). It can operate with accumulators, but does not allow in situ recharging (see §. Accessories delivered as options).
 - ↪ The **MTX 3282** and **MTX 3283** multimeters are delivered with three 1.2 V Ni-MH accumulators and charger (12 VDC 7.2 VA) for mains operation whilst simultaneously charging the batteries.
 - When the charger is connected directly to the instrument, the accumulators can be recharged without removing them from the multimeter.
 - The multimeter can only operate if the accu./batteries are in place.


Power on

Using the key *opposite*.

Charge indicator

A charge status indicator for the batteries or accumulators is constantly shown on the display:

-  : Batteries or accumulators > 75 % charged
-  : Batteries or accumulators > 25 % charged
-  : minimum charge level < 25 %

The  symbol flashes on the display and a buzzer sounds if the power voltage is insufficient (only 30 min charge life).

As the specifications will no longer be guaranteed, you must then replace the batteries or recharge the accumulators (see next page).



There can be differences between the display of the charge level (symbol) and the real charge level of the accumulators, according to the quality and the performances of those.




To avoid this risk, we recommend to use same accumulators (HX0051) as those delivered by the manufacturer (see p. 43).

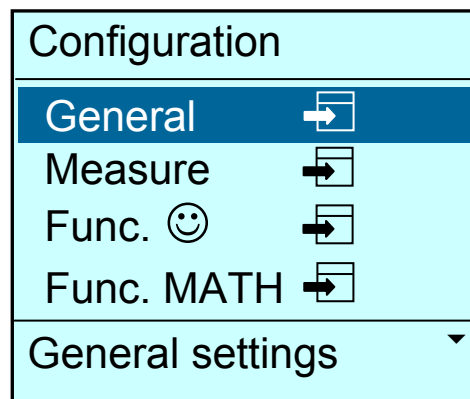
When getting started, the apparatus needs a few seconds to display a correct level of charge (symbol).

Functional description (cont'd)

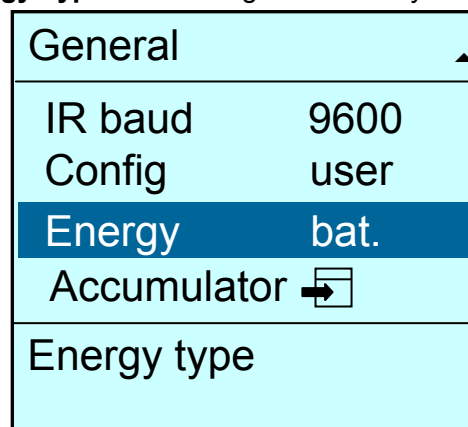
Selection of energy type



For correct management of the battery or accumulator charge status indicator, the type of power must be selected:

- Opening of the **Configuration** menu with the  key.
- Selection of the "**General**" function using the  keys.
- Validation of **General settings** using the  key.



- Selection of **Energy Type** menu using the  keys.



- Modification of the Energy Type (battery or acc.) using the  key.
- Validation and exit from the successive menus using the  key.

Recharging the accumulators

Before carrying out this operation, check that the accumulators are fitted in the instrument ; they do not need to be removed from the multimeter to be recharged.

Recharging is only possible if "Accumulator" has been selected in the Energy Type menu (see above).



If you try to recharge the accumulators when the batteries are fitted in the multimeter, it could damage it.



For safety reasons, the accumulators should only be loaded at between 0 and 40°C.

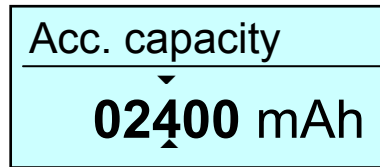





Caution *High internal temperature due to a current measurement may trigger the thermal security mechanism.*

Functional description (cont'd)


Recharging the accumulators (cont'd)

- Before carrying out this operation, select the capacity of the accumulators (2400 mAh by default) fitted in the instrument:
- Selection: Accumulator in the using the  keys.
- Validation: Accumulator using the  key, opens a menu for setting the accumulator capacity (in mAh):




- Selection of the digit to be modified using the  key.
- Modification of the value using the  key.
- Validation of the accumulator capacity and exit from the successive menus using the key .



To maintain the accumulators in good condition, run the accumulators down to the minimum charge level  before recharging.

- Then connect the power pack (12 VDC, 7.2 VAC) to the jack connector (see front panel illustration).
- Connect the power pack (12 VDC, 7.2 VAC) to the mains supply.



The symbol opposite on the display allows you to monitor the charge status. The accumulators are fully charged when the symbol is full .

The **MTX 3282** and **MTX 3283** multimeters contain Ni-MH accumulators. These accumulators must be disposed of by a recycling firm or a company specialized in the treatment of dangerous waste materials.



Never dispose of these accumulators with other solid waste. For further information, contact your MANUMESURE dealer.




When the multimeter is delivered, the accumulators may be discharged, requiring a complete recharge.

Recharging the accumulators with multimeter off

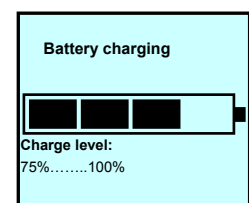


Do not connect the wall plug when there are disposable batteries in the instrument.

Connection of the wall plug starts recharging the accumulators.

The  scrolling symbol shows the progress of recharging.

Once the accumulators have been fully recharged, the instrument shuts down automatically.



Functional description (cont'd)



Wall plug power unit

Use only the charger that is delivered with this device, which is a 2nd generation multimeter. The charger from the previous generation is not compatible.



Recharging totally discharged accumulators or new batteries

1. Fit the batteries into the multimeter, then connect the charger.
 2. Wait approximately 30 minutes, then press the ON button to switch on the multimeter and follow the progress of the charge.
- Average charging period : 7h30 (with 2400 mAh accumulators)

☞ *After one effective hour of recharging, the multimeter can be used for measurements, by pressing again on the ON button.*

"A measurement" protection fuse

A fuse provides protection up to 11 A for current measurements. It must be replaced only with an identical fuse:

11 A, 20 kA, 1000 V, 10 x 38 mm (High Interrupting Capacity).

Checking of current measurement fuse

Test the current measurement as follows:

1. Select the Ampere function using the A key.
2. Connect a lead to the A terminal.
3. Check that the LEADS indication disappears from the display (presence of lead). If this is not the case, replace the fuse.

Replacement of the fuse or the batteries

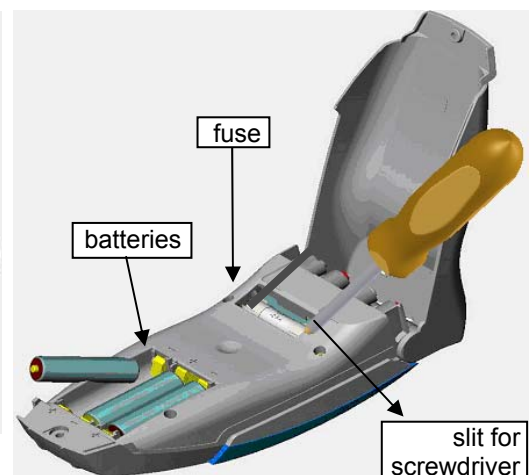
Before replacing the fuse or batteries, comply with the safety instructions given at the beginning of this manual. Then:

1. Disconnect the test leads from the measurement circuits and the instrument.
2. Disconnect the power lead from the **MTX 3282** or **MTX 3283** 12 VDC power pack.
3. Switch off the power to the instrument.
4. Undo the screw on the back of the instrument.
5. Pivot the rear cover of the casing to access the battery/fuse compartment.
6. Remove the fuse or batteries and replace them with identical models.
7. Replace the cover and retighten the screw.

☞ ***Without batteries, the date and time are kept for ca. 1 min in the instrument.***

The measurements recorded are kept for an unlimited time.




Dismantling of multimeter and access to battery/fuse compartment





Functional description (cont'd)

Initial settings

The general menu configures the parameters of the multimeter according to the conditions of use and the user's preferences.

- Opening of the **Configuration** menu with the  key.
- Selection of the **General** menu using the  keys and then the  key.




General		General	
Language	En	Contrast	
Date/Time		Back-light	10 s
Beep	on	Comm.	IR
Sleep	off	IR baud	9600
Set language Choix langue		Back-light auto-off delay	

Choice of language

Selection of the language for the multimeter's menus.
Two options are available: French (**Fr**) or English (**En**, default).

Setting the date and time


Date and time
08 : 03 : 2005
10 : 03 : 45

- Selection of the variables using the  key.
- Modification of the value using  keys.
- Clock validation and start-up when menu is closed using  key.

Activation of the buzzer (Beep)

Validation (default), or not, of audio signal (beep) when:

- a key is pressed,
- there is a voltage of more than 60 VDC or 30 VAC on the "V" input,
- a stable measurement is acquired in AUTO HOLD mode,
- the power supply voltage (battery) is insufficient.

 *The audio signal is maintained even when the buzzer is deactivated :*

- * during continuity testing,
- * when the range is exceeded (voltage or current),
- * on a 10 A measurement,
- * if the position of the leads and the function selected are incompatible.

Automatic shutdown (sleep)


Validation (default), or not, of automatic shutdown (**sleep**) after 30 min if there has been no action on the multimeter's front panel during that time.



In **SURV**, **MEM** and **Communication modes**, automatic shutdown is not validated.

For your safety, automatic shutdown is inhibited when the values measured (voltage, current) on the inputs exceed the danger thresholds (*indicator opposite displayed*).



Display contrast

Contrast


- Modification of the value (default: 50 %) using the  key.
- Validation of setting using  key.

 A long press on  directly opens the menu,  validates the setting.

Functional description (cont'd)

Adjustment of back-lighting

Selection of the **back-lighting** deactivation time to limit the multimeter's energy consumption.
 6 times are possible: **10 s, 30 s, 1 min, 2 min, 10 min** or **infinite** (no deactivation).
 ☞ **By default, the back-lighting deactivation time is 2 min.**




Start-up configuration (Config)

- In **user mode**, the instrument restarts with the user's personal configuration and the main function selected when it was switched off.
 - In **basic** mode, by default, the multimeter restarts with its elementary configuration and the Volt (AC+DC) function.
- ☞ **Restart configuration indicated without leads connected. If the leads are connected, they will be taken into account for function selection.**

Specific configurations of the instrument

Using the Measure menu, you can adapt the instrument's configuration to the measurement environment:

Measure	
Filter	yes
Impedance	1G
dBm REF	→
W REF	→
Filter activation	

- Opening of the **Configuration** menu with the  key.
- Selection of the **Measure** menu using the  keys and then the  key.

Filter

Activation of a **filter** to improve frequency rejection for measurements in low VDC mode.
 ☞ **By default, filter active.**




Impedance

Choice of the required input **impedance** on the 100 and 1000 mV (1 V) ranges.
 - 100 mVDC and AC+DC range: 2 possible impedances: 1 GΩ or 10 MΩ
 - 1000 mV mVDC range: 2 possible impedances: 1 GΩ or 20 MΩ
 ☞ **By default, 100 mV range = 10 MΩ, 1000 mV range = 20 MΩ**

dBm REF MTX 3283

Adjustment of the reference resistance value (dBm REF) between 1 Ω and 10,000 Ω, for measurements in dBm on VAC or VAC+VDC voltages:

Set dBm ref
00600 ohm

- Selection of the digit to be modified using the  key.
 - Modification of the value using the  keys.
 - Validation of the reference resistance in dBm and exit from the menu using the  key.
- ☞ **Default value 600 Ω.**

Reminder

A 0 dBm measurement with a 600 Ω reference resistance is given on a voltage of 0.7746 VAC.

Functional description (cont'd)

W REF
MTX 3283

Adjustment of the reference resistance value (**W REF**) between 1 Ω and 10,000 Ω for resistive power measurements:

The calculation performed is: $(\text{voltage measured})^2 / \mathbf{W REF}$ (unit W)
 $(\text{current measured})^2 * \mathbf{W REF}$ (unit W)

The adjustment procedure is the same as for the dBm reference resistance.

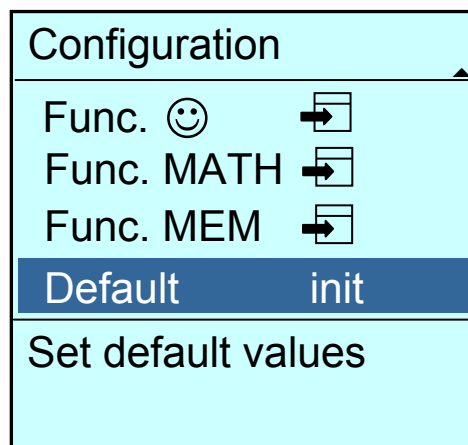
☞ **Default value 50 Ω.**



W REF is used to calculate the resistive power (W) with
REF = W REF and to calculate the power (V * A) when V (Ref) = W REF

Initialization of the values

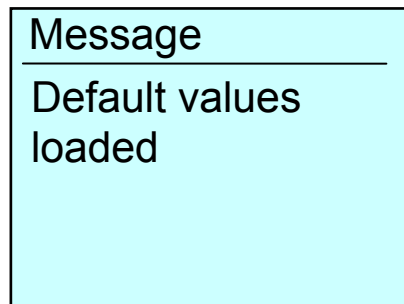
The parameters of the configuration can be reinitialized to the default settings in a single operation:


- Opening of the **Configuration** menu with the  key.



- Selection of the "**Default init**" function using the  keys.
- Validation of initialization using the  key.

Loading of the default values is confirmed by the following message:



Exit from the successive menus using the  key.

☞ *The language and the active main function are not modified.*

☞ **Default values**

General	<u>Language</u> :	Fr	<u>Beep</u> :	on
	<u>Sleep</u> :	on	<u>Contrast</u> :	50 %
	<u>Lighting</u> :	2 min	<u>Communication</u> :	IR
	<u>IR baud</u> :	9600	<u>Configuration</u> :	basic
	<u>Energy</u> 3281 :	battery	<u>Energy</u> 3282, 3283 :	accu.
	<u>Accu. capacity</u> :	2400 mAh	<u>Communication protocol</u> :	MODBUS
Measure	<u>Filter</u> :	active	<u>Impedance</u> :	10 / 20 M
	<u>dBm REF</u> :	600 Ω	<u>W REF</u> :	50 Ω
Favourite func. MATH func.	<u>Function</u> :	V	<u>Unit</u> :	none
	<u>Coef. A</u> :	1	<u>Coef. B</u> :	0
MEM func.	<u>Recording freq.</u> :	1 s	<u>No. of rec.</u> 3282, 3283 :	1000
	<u>No. of rec.</u> 3281 :	158		
Main func.	<u>V, A</u> :	AUTO, AC+DC	<u>Hz</u> :	10 V range
	<u>Ω, Capacity</u> :	AUTO	<u>° C</u> :	° C, Pt 100

Functional description (cont'd)

Access to main functions

Connection of leads The input terminals are limited to 3 : **COM**, **V**, Ω , \rightarrow and **A**.
Connect the black lead to the **COM** socket (for all measurements).

Functions authorized when connected on the V Ω \rightarrow terminal



Voltage measurement (Volt).
PEAK is displayed when a peak (Pk+ Pk-measurement) of voltage is detected and when it is higher than the range of active voltage.



Measurement of **Frequency** (Hz) on a VAC voltage.



A 1st press gives access to **Resistance** measurements (Ohm).
A 2nd press gives access to **Continuity** measurements (🎵).
A 3rd press gives access to **Diode** measurements (\rightarrow).



A 1st press gives access to **Temperature** measurements (according to the last configuration of the function).
A 2nd press gives access to the **type of temperature measurement: °C, °F, K.**

Selection using the keys, validation using the key or after 2 s.

Another press on this key while selecting the measurement type gives access to **the type of sensors:**

- **platinum probes:** Pt100 or Pt1000 *only on* MTX 3282, MTX 3283
- **thermocouples:** J or K (TC J, TC K)

Selection using the keys, validation using the key or after 2 s.



Measurement of **Capacitance**.



"**Favourite**" measurement configurable by the user.
👉 **For the menu's configuration, see §. 😊 Function.**



Instrument **Configuration** menu.

Functions authorized when connected to the A terminal



When the red lead is connected to the **A** terminal, it automatically selects **Current** (AC + DC) measurement.
If current measurement is selected without connection of a lead to terminal A or without a protection fuse, the **LEADS** symbol flashes on the display.

Current measurement (Ampere)
👉 **The current measurement may be performed using autorange (AUTO PEAK) over the whole scope of the ranges (µA, mA, A).**

PEAK is displayed when a peak (Pk+ Pk- measurement) of current is detected and when it is higher than the range of active current.




"**Favourite**" measurement configurable by the user.
👉 **For the menu's configuration, see §. 😊 Function.**






Instrument **Configuration** menu.


Functional description (cont'd)


Range management

The  key gives access to three operating modes:

- **AUTO** mode
- **AUTO PEAK** mode , 
- **MANU** mode

- Selection using this key or the   keys.
- Validation using the  key or after 2 s.



If the measurement is single range, the range defined is forced and there is no effect if the  key is pressed.

 *Example:* Diode test, continuity test and temperature measurement.


“AUTO” mode

On the input for a measurement, **AUTO** mode is active by default and range selection is managed automatically by the multimeter.



“AUTO PEAK” mode




In **AUTO PEAK mode**, the range changes are performed on the basis of rapid acquisition of peaks, either upward or downward.

 **AUTO PEAK mode is only accessible for AC, AC+DC in V and A measurements. It prevents untimely overruns of the peak factor specified for the instrument.**

“MANUal” mode

When this mode is selected and is valid for the function concerned, the   keys can be used to modify the measurement range.




Measurements concerned: voltage, current, resistance, capacitance.

 **By pressing one of the   keys, you can switch directly to MANUal mode and then modify the range.**

Display hold management

The  key gives access to two operating modes:

- **HOLD** mode
- **AUTO HOLD** mode
- **NO HOLD** deactivates the mode.

- Selection using this key or the   keys.
- Validation using the  key or after 2 s.

HOLD

HOLD mode freezes on the screen the current main measurement at the time when the key is pressed. The instrument continues to manage the measurements and display them in the graphical window or on the secondary display (**REL mode**).


 **The range selection remains unchanged: AUTO or MANUal depending on the configuration when you enter this mode.**

AUTO HOLD

AUTO HOLD mode automatically freezes on the screen the current main measurement whenever a stable measurement is detected. It is confirmed by a beep (unless the configuration "Beep no" has been selected in the Configuration menu).

The values memorized remain displayed until the next stable measurement taken (measurement different from ± 100 digits) or until deactivation of **AUTO HOLD mode**.

The instrument continues to manage the measurements and display them in the graphical window or on the secondary display (**REL mode**).

 **The range selection remains unchanged (AUTO or MANUal) depending on the configuration when you enter this mode. AUTO HOLD mode is only accessible for V and A measurements.**

Functional description (cont'd)

REL REL mode takes the current main measurement as its reference. It is indicated on the secondary display: **REF**.

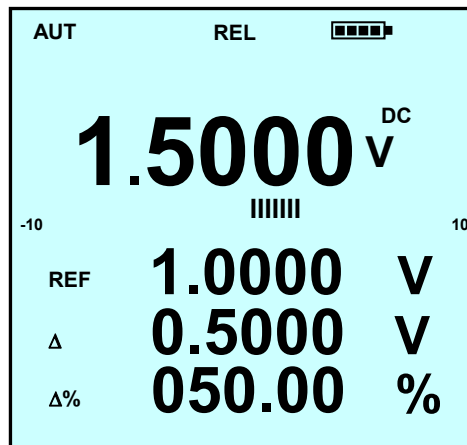
- The main display continues to indicate the instantaneous value measured and the bargraph.
- The secondary display Δ indicates the absolute deviation between the instantaneous value measured and the reference recorded.
- The secondary display $\Delta\%$ indicates the relative deviation in % between the instantaneous value measured and the reference recorded.

 **Range management may be "AUTOMATIC" or "MANUAL, depending on the configuration when entering this mode.**


 **The Δ and $\Delta\%$ displays are managed in the same range.**




In "AUTO" mode, they cannot fall below the reference range when the REL mode was activated.

 **Example:** Measurement of a 1.5 VDC voltage with a reference set to 1 V:

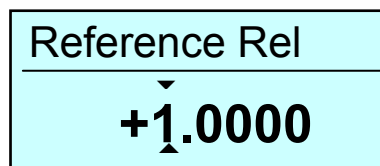


Adjustment of the reference

When the mode is active, a long press on the  key opens a window for setting the **REF reference**.

- The  key selects the digit to be modified.
- The  keys modify the digit selected.
- The  key can be used to exit from the menu after validating the new reference.

 **Example:**



Functional description (cont'd)

SURV


- The **SURV** mode monitors the variations of a signal by recording the extreme values (**MIN** and **MAX**) of the main measurement and calculating the average (**AVG**). For each value memorized the multimeter records the corresponding date and time.


 **When it is started up, the MTX 3281 reinitializes the date and time (01:01:2000, 00:00:00).**

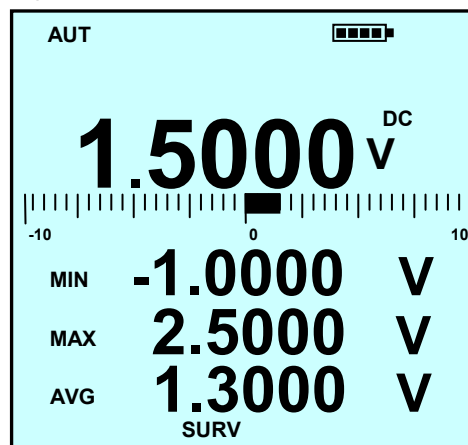
Before starting work, set the correct date and time to "date-stamp" the records see §. Setting the date and time).

- When you enter **SURV** mode by a short press on the key, the last **MIN** and **MAX** measurements are erased and then initialized with the current measurement.

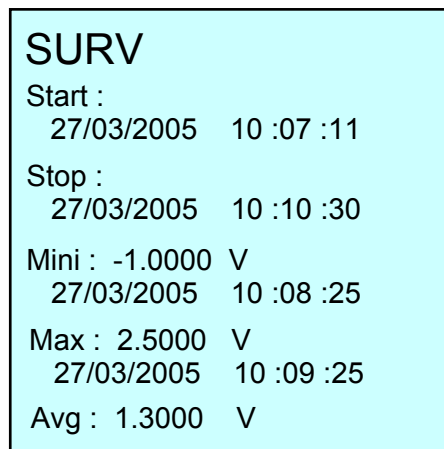
 **SURV flashes when the mode is active.**



- AVG** shows the average of all the measurements recorded since **SURV** mode was activated.
- The data recorded can be viewed by a long press on the  key during surveillance or after exiting from the mode.
- In SURV mode:**
 - MANU or AUTO range management cannot be selected.
 - the current measurement, the MIN value and the MAX value are presented in the most suitable range for each of them.

 Example:







- Consultation of recorded data by a long press on the key . The data recorded is accompanied by the date, time and surveillance range.
- Exit from consultation by a short press on the .

Functional description (cont'd)

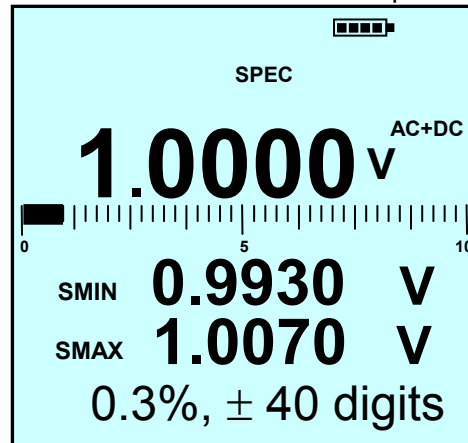
SPEC

On the basis of the technical specifications, the **SPEC** mode directly displays the tolerance of the measurement in progress, so that there is no need to search for it and calculate it.

On the basis of the main measurement, the display:

- indicates the specifications (x % of reading ± n digit) according to the type of measurement, the range selected and the frequency (in AC and AC+DC)
- calculates the interval containing the true value, if the instrument is within its tolerance:
SMIN value → minimum specification
SMAX value → maximum specification

Example:



In AC+DC, the specifications are calculated only if the frequency can be measured (see §. secondary Functions) and is > 45 Hz.

MEM

- **MEM** mode records the contents of the digital display(s) in the memory of the instrument at a pre-programmed rate.
- A short press on **Mem** starts a series of recordings.
- The **MEM** symbol flashes throughout the recording period; it is accompanied by the number of recordings made.
- Memorization of the measurements can be stopped by another short press.
- The number of values to be memorized for a measurement run is programmable: it therefore stops recording automatically.

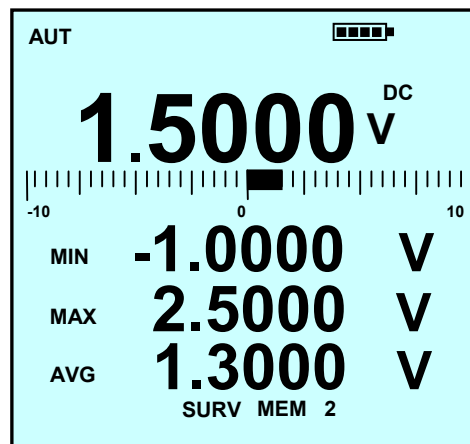
Another press on **Mem** starts a new series of recordings.

MTX 3281

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Recording capacity	158 measurements per sequence	1 to 10 sequences
	6500 measurements maximum	1 to 10 sequences (depending on available memory)

Example: activation of **MEM** mode during surveillance mode





- Furthermore, the **MEM** mode may be activated during the **SURV** mode or during display of the secondary functions. The parameters set are saved. It will then be possible to select them and display them as the main function.

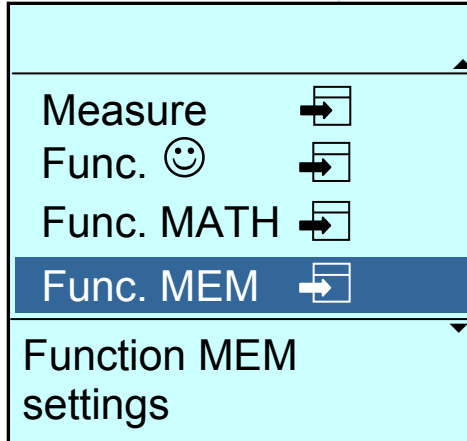
(When it is started up, the **MTX 3281** reinitializes the date and time (01:01:2000, 00:00:00). Before starting work, set the correct date and time to "date-stamp" the records. See §. Setting the date and time).

Functional description (cont'd)

Configuration of MEM mode

The **MEM** mode is configured in the **Func. MEM** function of the **Configuration Menu**.


- Opening of the **Configuration** menu with the  key.
- Selection of the "**Func. MEM**" function using the  keys.

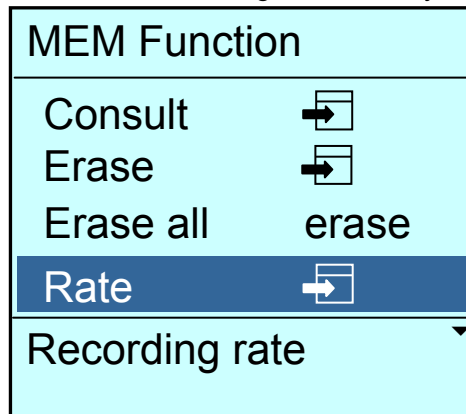



- Validation of **Func. MEM** using the  key.

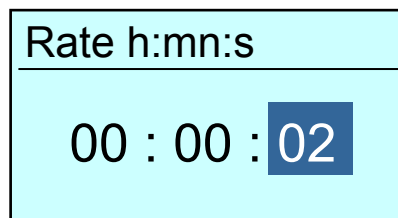
 **A long press on  opens the MEM Function menu.**




Programming the recording frequency

- Selection of the "**RATE**" function using the  keys.



- Validation of Rate with the  key opens a menu for setting the required recording rate in hours, minutes and seconds:





- **Selection of the variables**, hour, minute, second, using the  key.
- Modification of the value using the  keys.
- Validation of the measurement recording rate and exit from the successive menus using the key .

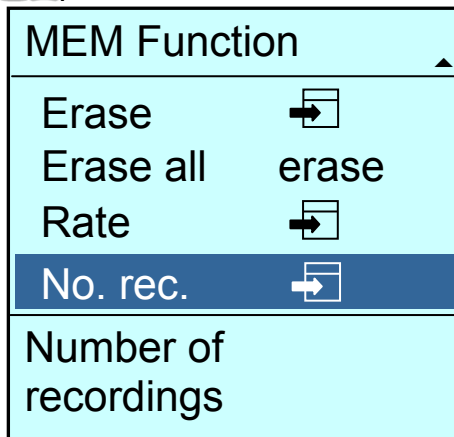
 **The minimum recording rate is 23 h, 59 min, 59 s. Default recording rate 1s.**

Functional description (cont'd)

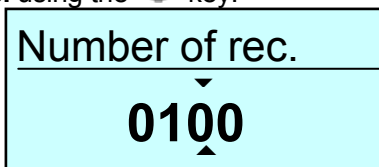
Programming of the number of records





By defining a number of records for a measurement campaign, it is possible to stop recording automatically.

- Selection of the number of records (**No. rec.**) in the **MEM Function** menu using the keys  .



- Validation of **No. rec.** using the  key.



- Selection of the digit to be modified using the  key.
- Modification of the value using the   keys.
- Validation of the number of records and exit from the successive menus using the  key.

Reminder The recording capacity is limited to 6,500 measurements (158 for **MTX 3281**)




 **Number of records by default : 1,000.**


Reading the recorded data

Recordings	
28/03/05	10:40:40
28/03/05	10:41:08
29/03/05	11:05:20
30/03/05	15:30:42
5 val. (2 s), V	

- Select the **Consult** menu in the **MEM Function** to view the list or successive records.

Each recording is identified by its start date and time.

- Selection of a recording using the   keys.
- Validation the selection using the  key.

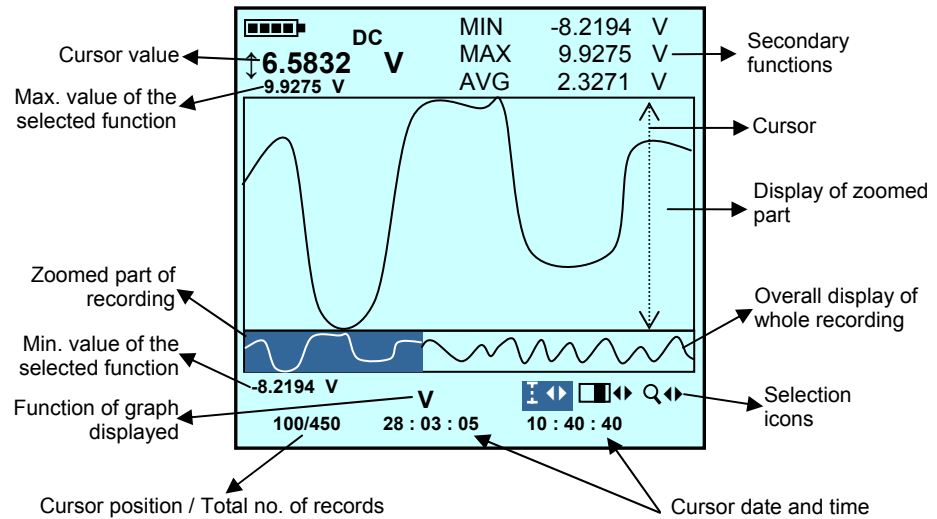
-  **When selected, a recording is accompanied by :**
- the number of values recorded,
 - the recording rate,
 - the function in which they were recorded,
 - the secondary functions present during recording, if relevant.

Reminder The number of recording sequences is limited to 10.

Functional description (cont'd)

Viewing the data in a recording

The curve displayed is adapted to the graphical window according to its min. and max. values and the number of recordings.



- Selection of the function (principal or secondary) to be displayed or of the selection icon using the keys, modification using the key.
- Selection of the function to be displayed

Example: Main function: **V**

secondary function: **MIN, MAX, AVG** for **SURV** mode

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	moves the cursor
	moves the zoomed part (icon present, if a zoom is active)
	activates/deactivates a zoom (icon present, if a zoom is possible)

MTX 3282, MTX 3283

- Exit from viewing a recording by using the key.

Complete erasure of memory

All recordings in the memory of the device may be erased in a single operation.

- Selection of **Erase all** menu in the **MEM Function**.
- Validation of erasure using the key.

Complete erasure of the memory is confirmed by the following message →

Message

erased

