

Vue éclatée - accès au boîtier pile / fusibles

SAFETY

This manual contains information and advice which users must follow to ensure the reliability of the multimeter and to keep it in good condition with regard to safety.

USING THE INTRINSICALLY SAFE MULTIMETER IN HAZARDOUS AREAS

The Métrix multimeter MX 51 Ex may be used for short duration measurements of intrinsically safe circuits of category "1" in Zones 1 and 2. "Short duration" means that the meter may not be used as a permanent fixture, nor as a stationary unit.

The MX 51 Ex multimeter can be considered to be a passive electrical apparatus without energy storage, i.e. without inductance or capacitance.

When measuring voltages, in order to avoid voltage overload, an existing intrinsically safe circuit must not be opened.

Maintenance:

Fuses must only be changed outside of hazardous areas. Replacement fuses must be of the appropriate type and rating (see Accessories section 2.3).

The use of makeshift fuses and short-circuiting of the fuseholder contacts are strictly prohibited.

FAULTS AND ABNORMAL CONSTRAINTS:

Should there be any indication that the protection of the instrument has been compromised, it should be taken out of service to prevent it being used unless it has been repaired.

Protection may have been compromised in the following cases:

- The instrument is obviously damaged.
- The instrument is no longer capable of taking accurate measurements.
- The instrument has been stored under unfavourable conditions.
- The instrument has been subject to severe stresses during transport.

SYMBOL

The symbol  refers the user to the Instruction Manual. The user should consult the manual and proceed accordingly.

1 - INTRODUCTION

This intrinsically safe multimeter comply with the harmonized european standard EN50-014 and EN 50-020 (Electrical apparatus for potentially explosive atmospheres).

For the functions and ranges that are specified, the instrument is classified as EEx ib IIc T6 / EEx ib I.

The MX 51 Ex Digital Multimeters is a self-contained, hand-held instruments for professional use, designed for routine electrical and electronic measurements such as AC and DC voltage and current, resistance, and diode and logic checks. It have a memory function capable of storing current or maximum values and of retaining five measured values of the same or different types.

Measurements can also be taken relative to a pre-set reference level, and, when in monitor mode, minimum and maximum levels can be recorded while the display shows the current value.

The 12mm high, 5000 count LCD display is complemented by a linear bargraph which makes trends in the measured variable instantly visible, and provides a field enlargement option (x5 zoom) and a central zero function. Measurement unit and current function are shown in full, and a special ADP function enables display of the measurement unit to be cancelled when an external measurement adapter such as a tachometer probe or a thermometer are used.

The casing is completely sealed (to IP667 standard), and particular attention has been paid to protecting both user and instrument in the event of misuse. Access to the battery and fuse compartment is impossible without first disconnecting the test leads (patented

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ELECTRO-MAGNETIC COMPATIBILITY:

- Electromagnetic compatibility:
 - Radiation: VDE 871 class B
 - Conduction: VDE 871 class B
- Electromagnetic susceptibility:
 - Radiation: IEC 801-3 (10V/m)
 - Conduction: IEC 801-4

POWER SUPPLY

One 9V alkaline battery, 6LF22 (PP3).
 Battery life: typically 500 hours of continuous service.

DIMENSIONS: 189 x 82 x 40 mm

WEIGHT: 400g approx.

DISPLAY: \approx 4999 points

- 7-segment liquid crystal display
- Digit height: 12mm
- 50-count linear bargraph display, with central zero and zoom capability.
- Indicators for measuring function, function mode, and unit of measurement.
- Overshoot indicated by display showing "-- -->"
- "BAT" symbol indicates 50 hours battery life remaining.
- Continuity test: symbol --- and optional buzzer.
- Adapter function: display without unit of measurement, for external adapter on 500mV DC or AC measurement range.

MEASUREMENT RATE:

- Digital display: 2 measurements/s

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- Bargraph: 10 measurements/s

RANGING:

Automatic or manual for voltage measurements, manual for current measurements.

2.2 - DETAIL SPECIFICATIONS

Use exclusively on intrinsically safe circuit

TEMPERATURE COEFFICIENT: 0.1 x (accuracy) / K

SERIAL MODE REJECTION RATIO: 60dB at 50 and 60 Hz

COMMON MODE REJECTION RATIO: 120 dB AC/DC typ.
 60 dB AC/AC typ.

DC VOLTAGE - mV + DC and V DC positions

Range	Resolution	Accuracy $\pm (n\%R + mC)^*$	Input resistance	Protection **
500mV	100 μ V	0.1 % \pm 1 C	> 1G Ω	1 100Vp
5V	1mV	0.1 % \pm 3 C	11M Ω	1 100Vp
50V	10mV	0.1 % \pm 3 C	10M Ω	1 100Vp
** 500V	100mV	0.1 % \pm 3 C	10M Ω	1 100Vp
** 1,000V	1V	0.1 % \pm 3 C	10M Ω	1 100Vp

● Automatic ranging (5 to 1000V) or manual ranging (500mV)

● Intermittent audible alarm for V > 1000V**

* R = Reading, C = Counts

** Voltages that may be measured iare limited to $\pm 60V$

AC VOLTAGE - mV + AC and V AC positions

Range	Accuracy $\pm (n\%R + mC)^*$		Input resistance	Protection **
	40-400Hz	400-1 000Hz		
500mV	0,75%R + 3C	2%R + 3C	> 1G Ω	1 100Vp
5V	0,75%R + 3C	1,7%R + 3C	11M Ω	1 100Vp
50V	0,75%R + 3C	1,7%R + 3C	10M Ω	1 100Vp
** 500V	0,75%R + 3C	1,7%R + 3C	10M Ω	1 100Vp
** 750V	1%R + 4C		10M Ω	1 100Vp

- Specifications applicable from 5% to 100% of the range, for a pure sinusoidal signal.
- Resolution and function modes same as for DC voltages
- Intermittent audible alarm for voltage over 750V**
- DC-coupled input circuits

* R = Reading, C = Counts

** Voltages that may be measured are limited to 60V peak

OHMMETER

Range	Resolution	Accuracy $\pm (n\%R + mC)^*$	Measure- ment Volt.	Protection
500 Ω	0,1 Ω	0,3%R + 5C	< 300mV	380V _{AC}
5k Ω	1 Ω	0,3%R + 2C	< 300mV	"
50k Ω	10 Ω	0,3%R + 2C	< 300mV	"
500k Ω	100 Ω	0,3%R + 2C	< 400mV	"
5M Ω	1k Ω	0,5%R + 2C	< 400mV	"
40M Ω	10k Ω	2%R + 2C	< 1,5V	"

- Maximum open circuit voltage: 1.5V
 - Automatic or manual ranging
 - Electronic protection device
- * R = Reading, C = Counts

CONTINUITY TEST

- On the 500 Ω range, 2-threshold checking (300 Ω and 20 Ω).
- Pressing the key marked d activates the test buzzer. For 20 Ω < R \leq 300 Ω , 4kHz signal. For R < 20 Ω , 2kHz signal.

DIODE CHECK \rightarrow setting

- Indication of threshold voltage in the forward direction from 0 to 1.999V.
- Measurement current: 1mA \pm 30% for thresholds between 500mV and 700mV.
- Protection: 380V AC by electronic device.
- Bargraph not enabled.
- Max. open-circuit voltage: +3.5V

LOGIC LEVELS - LOGIC setting

- For static measurement of logic levels
- Display:

OPEN: open circuit or negative input voltage
 LO : logic 0 $V < 1.30V$
 HI : logic 1 $V \geq 1.30V$
 OL : out of limits $V \geq 20.00V$

- Threshold accuracy : $\pm 0.1V$
- Bargraph not in use.
- Audible signal available (two tones, HI 4kHz, LO 2kHz) at the touch of the \uparrow key.
- Response time: ≤ 1 sec.

ADAPTER - ADP setting

- Specifications as for 500mV AC and DC functions; unit of measurement not displayed.

DC CURRENT

Range	Resolution	Accuracy $\pm (n\%R + mC)^*$	V (typ.)	Protection
500 μ A	100nA	1,2%R + 2C	60mV	F1 + F2
5000 μ A	1 μ A	1%R + 1C	500mV	*
50mA	10 μ A	0.1%R + 3C	60mV	*
500mA	100 μ A	1%R + 1C	1.2V	*

- F1: 500mA intrinsically safe fuse (special type).
- F2: 8.5mm X 32mm HRC 10A fuse (440V_{AC} / 18kA)
- Automatic or manual operation in ranges 500 μ A-5000 μ A, 50mA-500mA.

AC CURRENT

Range	Accuracy $\pm (n\%R + mC)^*$		Protection
	40Hz-400Hz	400Hz-1kHz	
500 μ A	1,5%R + 2C	2,5%R + 3C	F1 + F2
5000 μ A	1,5%R + 2C	2,5%R + 3C	*
50mA	1,5%R + 2C	2%R + 3C	*
500mA	1,5%R + 2C	2,5%R + 3C	*

- Specifications applicable from 5% to 100% of the range
- Other parameters : as for DC current.

* R= reading, C= Count

PEAK MEASUREMENT AND MEMORY:

- The first touch of the MAX/MEM key freezes the digital display at the value being measured, and the bargraph remains active.
- A second touch of this key selects MAX mode in which the maximum digital value recorded during a series of measurements is displayed while the bargraph continues to display the measured signal trend. MAX appears on the display.
- Selecting one of these modes locks the multimeter on to the measurement range currently being used.
- A third touch of the MEM/MAX key returns the multimeter to normal mode.

In these modes bargraph operation is in LIVE TREND MODE™.

RANGING

- In voltage and resistance measurements, the multimeter normally operates in automatic ranging mode. Ranges can be selected manually by pressing the RANGE/AUTO key.
- Pressing the key once fixes the current range. Each brief touch of the key increments the range, and if the key is held down for more than two seconds, the multimeter returns to automatic ranging mode.

RELATIVE REFERENCE MEASUREMENTS

- Measurements can be taken relative to a pre-set value. The digital readout indicates the instantaneous deviation between this reference value and the current value, but the bargraph continues to show the measured signal trend. (-LIVE TREND MODE-)

LIMIT MONITORING

- In monitor mode, the instrument records the highest and lowest readings (MIN and MAX) taken on the signal being measured. Measurement continues uninterrupted while these readings are taken, and the multimeter stops measuring only when switched off, (there is no half-hour automatic cut-out).

STORE

- Up to five readings, with their unit of measurement (and polarity, if applicable) can be stored in the multimeter at a time. Readings are memorised in the order they are taken and are stored in a FIFO (First In, First Out) stack, so if more than five readings are stored, the sixth replaces the first, and so on.

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2.3 - ACCESSORIES

Supplied with the multimeter:

One carrying case	AE0193
One set of test leads and safety prods	AG0475
One 9 V 6LF22 (PP3) size battery	AL0020
One 10A fuse, 8.5 x 32 mm, 440 V/18 kA AC (Part #A13/10 GI from CEHESS, 41 bis Rue d'Antony, 94533 RUNGIS Cedex - France)	AT0055
One 0.5A intrinsically safe fuse, 5 x 20 mm, (LITTLE FUSE 125V/ 500mA n° 259 500)	
One users Manual	IM0863

Optional:

 NEVER USE THESE PARTS INSIDE HAZARDOUS
AREAS AND WITH THE MX 51 Ex *

* Probes:

HT0203	EHT 3 kV AC/DC
HT0212	EHT 30 kV DC
HT0208	RF 100 kHz to 750MHz
HA0902	TV (HT transient suppressor)
HA1159	Thermometer, 1 mV/°C, -50°C to +150°C
HK0210	Type K thermocouple, 1mV/°C, general purpose and surface type, -25°C to +350°C.
HA1237	Optical tachometer, 100 rpm to 60000 rpm

* Transformer clamps:

AM0012	1A to 400 A AC, aperture 15 x 17 mm
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AM0014	5A to 400A AC, 1mV / A aperture 15 x 17mm
AM0015	1A to 1000 A AC, opens to 50 mm
HA0768	1A to 1000 A AC, opens to 100 mm
AM1000	1A to 1000 A DC, 600 A AC to 600 Hz

* Shunts:

HA0170	30A DC / 300mV, ± 0.5%
HA0512	50A DC / 50mV, ± 0.5%
HA0300	300A DC / 30mV, ± 0.5%

Miscellaneous:

Protective elastomer case

Other applications: consult METRIX

3 - OPERATING INSTRUCTIONS

3.1 - SAFETY PRECAUTIONS

Use of this multimeter implies respect for the usual safety rules designed to protect the user against electrical hazards and to protect the instrument against damage resulting from misuse.

The test leads and mains supply lead must be in good condition and should be changed if there is any evidence of deterioration (insulation burnt or split etc.). Only the leads supplied with the instrument are guaranteed to meet safety standards. If necessary they should be replaced by identical leads.

The maximum values indicated in these specifications should not under any circumstances be exceeded.

This instrument should only be used on an intrinsically safe circuit.

Before opening up the instrument to replace the battery or fuses, users must check that the test leads are disconnected from all electrical current sources. Replacement fuses must be of the same type and rating as the original fuses (see Specifications, section 2.3).

Caution: If the display continues to read zero when measuring a non-zero voltage, check the 10A HRC fuse immediately (see section 4).

If the order of magnitude of the quantity being measured is unknown, begin with the highest range or select autoranging mode.

Disconnect the test leads from the circuit under test before changing the measurement function. When measuring currents, the range should not be changed and the leads should not be plugged in or unplugged without first switching off the current. Otherwise current surges may arise when the circuit is made or broken and these could blow the fuses or damage the switch or the sockets and terminals.

Never carry out resistance measurements on a live circuit.

3.2 - TEST LEAD LATCHING

The MX 51 Ex multimeter features the patented SECUR'X system which prevents inadvertent unplugging of the test leads, and adds to the degree of protection already provided by the leads themselves. The SECUR'X system is not an integral part of the instrument and can be removed if necessary, particularly for access to the battery and fuses.

The system, which is extremely simple to use, permits effortless insertion of the banana plug. The latching effect is obtained by means of grooves on the plug body.

To unlatch a lead push the tab forwards and pull on the plug.

3.3 - BATTERY INSTALLATION - FUSE REPLACEMENT



WORK OUTSIDE HAZARDOUS AREAS

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The sealed compartment (sealed from both inside and outside of the instrument) is located under the removable protective cover.

To access the compartment:

- Unlatch the SECUR'X system by inserting a blade (screwdriver) in the sides and then remove it. This ensures that the test leads are disconnected.
- Release the protective cover by inserting a suitable tool (preferably the instrument support strut which is designed for the purpose) into the sides of the instrument (at the places marked by the arrows) and by applying moderate pressure.

See exploded view at the end of the manual

- Insert the battery, ensuring correct polarity by matching + and - signs, and replace the cover making sure that the watertight seal remains clean (no solid particles, grit or other particulates) and is positioned correctly. Finally snap the SECUR'X system in place. For replacement of fuses, see also sections 2.3 and 4.2 and the safety precautions in this manual.

3.4 - SWITCHING ON

- Set the rotary switch to the required measurement function and press the ON/OFF button.
- The multimeter tests the display, and all the symbols appear for a few seconds. The instrument is then ready for use.
- Pressing the ON/OFF button a second time switches the instrument off.

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CAUTION: allow about two seconds before switching the multimeter back on.

- If the multimeter is left used for more than half an hour (rotary switch and keys unoperated) it automatically switches itself off.

3.4.1 - AUTOMATIC/MANUAL RANGING

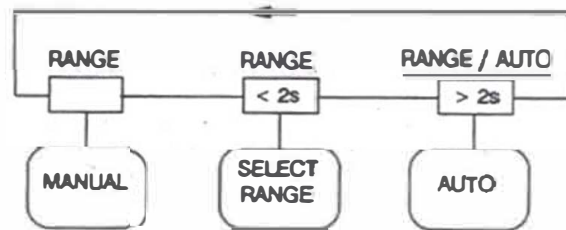
- When used as a voltmeter (500mV excepted), ohmmeter, and ammeter covering two ranges, the instrument is in autoranging mode when first switched on. Manual ranging is not recommended unless the order of magnitude of the quantity to be measured has first been determined in autoranging mode.

- Pressing the RANGE/AUTO key changes to the manual ranging mode, and the range selected can then be incremented by briefly pressing the same key. (Hold it down for not more than two seconds.)

- Holding the RANGE/AUTO key down for more than two seconds re-activates autoranging mode.

- Engaging MAX, MEM, REL and MAX/MIN (monitor) functions locks the instrument onto the range currently being used. The RANGE/AUTO key is then disabled.

- See the label on the back of the instrument -



3.4.2 - DC VOLTAGE MEASUREMENT

- Connect the black lead to the terminal marked COM, and the red lead to the terminal marked VΩ.
- Set the rotary switch to the mV position for the 500mV range in manual mode or to the VΩ DC position for all other ranges.
- Apply the test prods to the points across which the voltage is to be measured, and read the result directly from the display. This shows the measurement units (mV or V) and the polarity (- for negative polarity and nothing for positive polarity).
- Accuracy, resolution, and input resistance: see detail specifications section 2.2.
- In manual ranging mode, if the display shows ←→, the range selected is too low. Switch to the next higher range by pressing the RANGE/AUTO key (press once for less than 2 seconds)

INTRINSIC SAFETY

In hazardous areas:

- Never exceed a Voltage of 60V
- Existing intrinsically safe circuit must not be open during measurement.

3.4.3 - RMS AC VOLTAGE MEASUREMENT

- Connect the black lead to the terminal marked COM and the red lead to the terminal marked V Ω .
- Set the rotary switch to the AC volts position, or if necessary, the mV position to use the 500mV range. If the 500mV range it to be used, press the AC/DC key to display the AC symbol.
- Apply the test prods to the points across which the voltage is to be measured and read the result directly from the display. The display also shows the unit of measurement (mV or V).
- Accuracy, resolution, and input resistance: see detail specifications.

INTRINSIC SAFETY

In hazardous areas:

- Never exceed a Voltage of 60Vpeak
- Existing intrinsically safe circuit must not be open during measurement.

- In manual ranging mode, if the display shows \leftarrow the range selected is too low. Switch to the next higher range by pressing the RANGE/AUTO key (press once for less than 2 seconds.)

3.4.4 - RESISTANCE MEASUREMENT AND DIODE CHECKS

- Measuring resistance, like measuring voltage, can be carried out in autoranging or manual ranging modes (see use of the RANGE/AUTO key in section 3.4.1)

- Connect the black lead to the terminal marked COM and the red lead to the terminal marked V Ω on the multimeter and set the rotary

switch to Ω .

- If the leads are not short-circuited or connected to a resistance, the display indicates an out of limits condition \leftarrow .

- Under no circumstances should resistance be measured on a live circuit.

- Certain precautions may be necessary to measure high resistances (40M Ω range): use of screened cables, screening of the resistance to be measured, etc. Because of the acquisition speed of the multimeter, the measurement may be disturbed and made unstable by electrical or electrostatic interference.

Quick continuity check (buzzer):

- On the 500 Ω range, the symbol \leftarrow appears top left on the display if the measured resistance value is below 300 Ω .

Pressing once on the AC/DC key enables the audible signal (buzzer). Pressing this key a second time disables it.

- If the circuit resistance lies between 300 Ω and 20 Ω , the buzzer tone is high (4kHz). If the resistance is lower than 20 Ω , the tone is low (2kHz).

Diode check:

- The diode check entails injecting a current of about 1mA into the diode junction to be tested and reading the voltage drop across the diode (000 to 1.999V).

- Connect the black lead to the COM terminal and the red lead to the V Ω terminal and then set the rotary switch to the \rightarrow position.

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- The display will indicate an out of limits condition if the diode junction is reverse biased or if the voltage is greater than 2V.
- Like resistance measurements, the diode check function must not be used on a circuit that is live.

3.4.5 - TEMPERATURE MEASUREMENT

- Temperature is measured by probes converting temperature into DC voltage. For the types of probes available, see the accessory list, section 2.3 or contact METRIX.
- The rotary switch should be set in the ADP position which selects the 500mV range but does not display the mV unit.



THESE PROBES MUST NEVER BE USED IN HAZARDOUS AREAS AND WITH THE MX 51 Ex

3.4.6 - LOGIC LEVEL CHECK

- Set the rotary switch to LOGIC.
- Connect the black lead to the COM terminal and the red lead to the V Ω terminal.
- This test can be carried out under steady state conditions (response time about 1 second).
- The logic state of the circuit tested is shown in full on the display:
OPEN: Open circuit or negative voltage

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LO :	Logic 0	$V < 1.3V$
HI :	Logic 1	$V \geq 1.3V$ (and $< 20V$)
OL :	Out of limits	$V \geq 20V$

- Pressing the AC/DC/⚡ key once enables the audible indication function which provides different tones to indicate the different logic levels: 2kHz for logic 0 and 4kHz for logic 1.

3.4.7 - ADAPTER

OUTSIDE HAZARDOUS AREA

- When the rotary switch is set to ADP, the multimeter locks onto the 500mV range. Only the V unit is omitted from the display and this allows for the use of all external measurement devices delivering voltages of under 500mV such as the HA1237 tachometer, and HK0210-type compensated thermocouples.

Note: If the AC/DC key is pressed (AC symbol displayed), the range used is 500mV AC.

- The test leads should be connected to the COM and V Ω terminals of the multimeter, and the safety precautions for voltage measurement should be applied.

3.4.8 - DC CURRENT MEASUREMENT

• When DC current is measured, the multimeter switches automatically between two ranges for each setting of the rotary switch. For example, when the rotary switch is set to mA, the multimeter switches automatically between the 50mA and the 500mA ranges. It works in the same way as in voltage measurement.

• Connect the black lead to the COM terminal and the red lead to the mA terminal.

• If necessary, press the AC/DC key to display the DC symbol.

• Do not connect the multimeter in series with the circuit to be measured until the last possible moment. Then switch on the circuit to be measured.

• Do not under any circumstances change the range or disconnect the leads while measuring. This may give rise to switching current spikes and overvoltages which can damage the multimeter or blow the fuses unnecessarily.

3.4.9 - AC CURRENT MEASUREMENT

• Ranges are selected in the same manner as for DC current measurement.

• Connect the black lead to the COM terminal and the red lead to the $\mu\text{A}/\text{mA}$ terminal to measure currents up to 500mA

• Press the AC/DC key once to select the AC function. The AC symbol should appear on the display. Pressing this key again reselects the DC function.

• Do not connect the multimeter in series with the circuit to be measured until the last possible moment. Then switch on the circuit to be measured.

• Do not under any circumstances change the range or disconnect the test leads while measuring: this may give rise to switching current spikes and overvoltages which can damage the multimeter or blow the fuses unnecessarily.

3.4.10 - PEAK MEASUREMENT AND MEMORY

• The MAX/MEM key operates the peak (MAX) memory mode first and then peak measurement mode for conventional multimeter functions.

• Pressing the key once freezes the value displayed while the linear bargraph continues registering the measured signal trend at 10 measurements per second (LIVE TREND MODE). The MEM symbol appears on the display.

● Pressing the key a second time selects MAX mode and the MAX symbol appears on the display. In this mode, the value displayed is the highest positive value registered since activation of the MAX mode. Here again, the bargraph continues showing the measured signal trend.

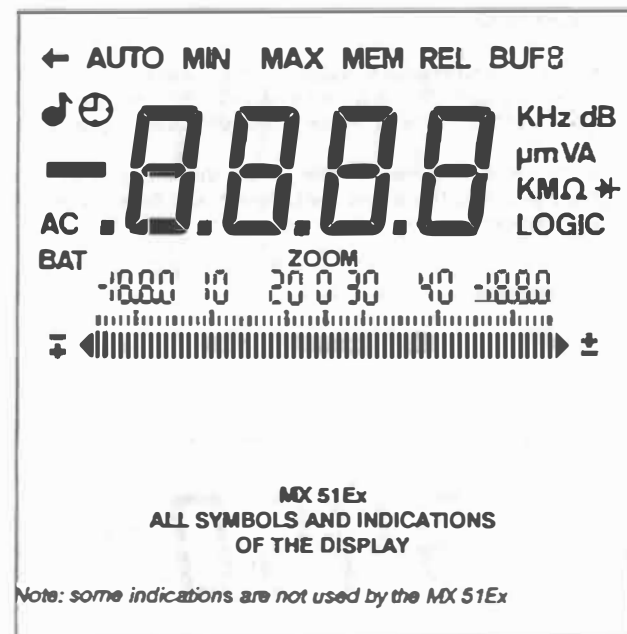
3.4.11 - BARGRAPH FUNCTION

● The linear bargraph scale operates in all the multimeter's conventional functions (voltmeter, ammeter, ohmmeter, ADP) but is disabled for the extended functions (diode check, LOGIC).

● In normal operation, the bargraph directly reflects, in 50-count resolution, the digital readout, and makes it easy to follow trends in the value being measured. Note that the bargraph display reacts more quickly than the digital display: it registers ten measurements per second compared to two per second by the seven-segment display. In practice, this rate makes for more rapid reading than on a conventional analogue multimeter which takes more than 1/10th second to settle.

● The measurement scale is indicated by a seven-segment display above the linear scale.

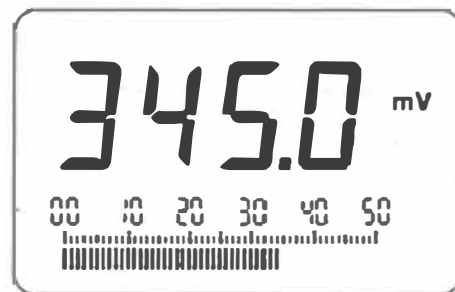
● The capabilities of this analogue display can be extended by the use of two function keys. Operation of each of these is identical: press the key once to enable the function, then press it again to disable the function.



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ZOOM MODE:

- When this function is enabled, the linear scale is enlarged. That is, the bargraph displays along its whole length a segment one fifth the size of the original scale (or 1000 counts of the digital display).
- The value of the extremities of the this enlarged window is displayed in figures above the bargraph and the window moves automatically with the value measured.



DISPLAY IN NORMAL MODE

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DISPLAY IN ZOOM MODE

- The Autoranging mode is kept in use when the ZOOM is active

ZERO MODE

ZERO mode converts the multimeter to a galvanometer with a centre zero position so that it can be used as a zero detector for adjusting FM discriminators, balanced measurement bridges and so on.

The resolution of the bargraph display is ± 25 counts or 4% of the current range.

Use of the ZERO mode freezes the range being used (autoranging function is disabled).

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DISPLAY IN ZERO MODE

3.4.12 - RELATIVE REFERENCE MEASUREMENT

- To take a measurement, not in absolute value but in terms of derivation from a reference value, proceed as follows:
- Set the multimeter for normal operation on the required function (DC or AC voltmeter, ammeter, ohmmeter etc.) in manual or autoranging mode.
- Take the measurement to be used for reference.
- When the reference value has been displayed, press the REL key once. From now onwards, the digital display will show the instantaneous variance between the measured value and the reference value registered. The measurement range is then frozen.

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Only the bargraph will continue to show the absolute instantaneous value (LIFE TREND MODE).

- Press the REL key a second time to return to normal operation.

3.4.13 - LIMIT MONITORING

- To record the minimum and maximum limits of the value being monitored, press the yellow 2nd key (a «beep» is emitted), and then press the LIM/REL key. The measurement range is then frozen, and while this function is enabled, the multimeter continues to operate and memorises the limits. The display shows MAX MIN.

- To read the limit values, press the EXTR key. When pressed for the first time, the MAX value is displayed; when pressed again the MIN value is displayed, and when pressed for a third time the multimeter returns to monitor mode displaying instantaneous values.

- To exit from this mode, press the 2nd and LIM/REL keys once more.

3.4.14 - STORE FUNCTION

- For all conventional measurement functions (voltmeter, ammeter, ohmmeter), five readings can be stored with their unit of measurement and polarity if appropriate.


- Each time the STO key is pressed the reading currently displayed is stored in sequence in one of the five buffers. BUF(x) (x being from 1 to 5) appears on the display for two seconds so that the user can take note of the buffer number under which the measurement has been stored.

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• When the multimeter is first switched on, the buffer memory is empty. The first depression of the STO key will fill memory BUfFer 1, the second depression will fill buffer 2, and so on. When buffer 5 is full, the next depression of the key will fill buffer 1 again. Be aware, therefore, that information can be lost once all five buffers have been filled.

• To recall the contents of the buffers, press the yellow 2nd key (a «beep» is emitted), and then press the RCL/STO key. Each time the 2nd and RCL/STO keys are depressed, the display shows for two seconds the contents of the buffers in turn. Wait until the BUF (x) symbol and one set of memorised data has cleared from the display before calling up the next buffer.

4 - MAINTENANCE

 ALL INTERNAL INTERVENTION FOR REPAIR, TRIMMING OR ADJUSTMENT MUST BE PERFORMED ONLY AT METRIX (ANNECY) FACTORY. OTHERWISE, METRIX WILL NOT ASSUME ANY LIABILITY. ANNUAL CHECKING OF THE ELECTRICAL SPECIFICATIONS IS RECOMMENDED.

4.1 - BATTERY

If the instrument is not to be used for a long time, the battery should be removed from its sealed compartment. Otherwise, the battery connector contacts may become corroded and damaged.

The symbol BAT appears on the display when the battery has a remaining service life of only 50 hours. See section 3.3 for instructions on changing the battery.

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4.2 - FUSES SELF-CHECK

This check can be carried out while the multimeter is in use without opening up the casing.

• 500mA fuse (F1): set the rotary switch to the diode test position \rightarrow and short-circuit the V Ω and μ A mA terminals. The display should read 1V. If the display indicates out of limits (OL) the fuse is blown.

• 10A fuse (F2): set the rotary switch to the diode test position \rightarrow and short-circuit the V Ω and COM terminals. The display should read 0.001V. If the display indicates out of limits (OL), the fuse is blown.