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.

**SAFETY**

The Metrix multimeter MX 51 Ex may be used for short duration measurements in intrinsically safe circuitry category 1 or 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 EN 50014 and EN 50020 (Electrical apparatus for potentially explosive atmospheres).

For the functions and ranges that are specified, the instrument is classified as EEx 0b I T6 / EEx ib I.

The MX 51 Ex Digital Multimeter 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.
ELECTROMAGNETIC COMPATIBILITY:
- Electromagnetic compatibility:
  - Radiation: VDE 0811 class B
  - Conduction: VDE 0813
- 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:
- 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.
- Overload 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
- 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 Y DC positions

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy ± (0.1% x R + mC)</th>
<th>Input resistance</th>
<th>Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>500mV</td>
<td>10mV</td>
<td>0.1 % x 2 C</td>
<td>&gt; 10MΩ</td>
<td>1000p</td>
</tr>
<tr>
<td>5V</td>
<td>100mV</td>
<td>0.1 % x 3 C</td>
<td>10MΩ</td>
<td>1000p</td>
</tr>
<tr>
<td>*500V</td>
<td>100mV</td>
<td>0.1 % x 3 C</td>
<td>10MΩ</td>
<td>1000p</td>
</tr>
<tr>
<td>*1000V</td>
<td>1V</td>
<td>0.1 % x 3 C</td>
<td>10MΩ</td>
<td>1000p</td>
</tr>
</tbody>
</table>

* Automatic ranging (5 to 1000V) or manual ranging (500mV)
* Intermittent audible alarm for V > 1000V***
* R = Reading, C = Counts

** Voltages that may be measured are limited to ±50V

* * *
AC VOLTAGE: mV + AC and V AC positions:

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy ±%</th>
<th>Input resistance</th>
<th>Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>400-1000Hz</td>
<td>400-1000Hz</td>
<td>±0.75% + 3C</td>
<td>10MP</td>
<td>1100Vp</td>
</tr>
<tr>
<td>±750V</td>
<td>1% + 4C</td>
<td>±0.75% + 3C</td>
<td>10MP</td>
<td>1100Vp</td>
</tr>
<tr>
<td>±750V</td>
<td>0.75% + 3C</td>
<td>±0.75% + 3C</td>
<td>10MP</td>
<td>1100Vp</td>
</tr>
<tr>
<td>±750V</td>
<td>0.75% + 3C</td>
<td>±0.75% + 3C</td>
<td>10MP</td>
<td>1100Vp</td>
</tr>
<tr>
<td>±750V</td>
<td>0.75% + 3C</td>
<td>±0.75% + 3C</td>
<td>10MP</td>
<td>1100Vp</td>
</tr>
</tbody>
</table>

- 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

CONTINUITY TEST
- On the 500Ω range, 2-threshold checking (300Ω and 20Ω).
  Pressing the key marked "C" activates the test buzzer. For 20Ω < R ≤ 300Ω, 4kHz signal. For R < 20Ω, 2kHz signal.

DIODE CHECK + setting
- Indication of threshold voltage in the forward direction from 0 to 1.999V
- Measurement current: 1mA ± 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 ≥ 1.30V
  - OL: out of limits V ≥ 20.00 V

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

ADAPTER - AGP setting

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

DC CURRENT

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy ± (n%R + mC)*</th>
<th>V (typ.)</th>
<th>Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>500µA</td>
<td>100µA</td>
<td>1.2%R + 2C</td>
<td>60mV</td>
<td>F1 + F2</td>
</tr>
<tr>
<td>500µA</td>
<td>50µA</td>
<td>1%R + 1C</td>
<td>500mV</td>
<td></td>
</tr>
<tr>
<td>50µA</td>
<td>10µA</td>
<td>0.1%R + 3C</td>
<td>60mV</td>
<td></td>
</tr>
<tr>
<td>50µA</td>
<td>1µA</td>
<td>0%R + 1C</td>
<td>1.2V</td>
<td></td>
</tr>
</tbody>
</table>

F1: 500mA intrinsically safe fuse (special type).
F2: 8.5mm x 32mm HRC 10A fuse (440V AC/18kA)

• Automatic or manual operation in ranges 500µA-500µA, 50mA, 500mA.

AC CURRENT

<table>
<thead>
<tr>
<th>Range</th>
<th>Accuracy ± (n%R + mC)*</th>
<th>Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>400µA</td>
<td>400µA</td>
<td>2.5%R + 3C</td>
</tr>
<tr>
<td>400µA</td>
<td>100µA</td>
<td>2.5%R + 3C</td>
</tr>
<tr>
<td>50µA</td>
<td>50µA</td>
<td>2%R + 3C</td>
</tr>
<tr>
<td>50µA</td>
<td>1µA</td>
<td>2%R + 3C</td>
</tr>
<tr>
<td>50µA</td>
<td>1µA</td>
<td>2%R + 3C</td>
</tr>
</tbody>
</table>

• 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 bar graph 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 bar graph 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 bar graph 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 bar graph 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.
2.3 - ACCESSORIES

Supplied with the multimeter:

- One carrying case
- One set of test leads and safety probes
- One 9 V (6LF20) type battery
- One 10A fuse, 8.5 x 32 mm, 440 V/18 kA AC
- One 5A Intrinsically safe fuse, 5 x 20 mm, (LITTLE FUSE 125V / 500mA n° 259 500)
- One users Manual

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 750 MHz
    - HA0902: TV (HT transient suppressor)
    - HA1159: Thermocouple, 1 mV/°C, -50°C to +150°C
    - HK0210: Type K thermocouple, 1 mV/°C, general purpose and surface type, -20°C to +350°C
    - HA1237: Optical tachometer, 100 rpm to 90000 rpm

  * Transformer clamps:
    - AM0012: 1A to 400 A AC, aperture 15 x 17 mm

  * Shunts:
    - HA0170: 300A DC / 300 mV, ± 0.5%
    - HA0212: 50A DC / 50 mV, ± 0.5%
    - HA0300: 30A DC / 30 mV, ± 0.5%

  Miscellaneous:
  - Protective elastomter case

Other applications: consult METRIX

MX 51 Ex

AM0014: 5A to 400A AC, 1mV / A aperture 15 x 17 mm
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

51
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 prevent 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 auto-ranging mode.

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

- Unlock the SECURX 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 SECURX system in place.

For replacement of fuses, see also sections 2.3 and 4.2 and the safety precautions in this manual.

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
- Ensuring 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 VΩ.
- Set the rotary switch to the AC volts position, or if necessary, the mV position to use the 500mV range. If the 500mV range is too low, press the AC/DC key to display the AC symbol.
- Apply the test probes 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 60V peak.
- Existing intrinsically safe circuit must not be open during measurement.
- 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.)

3.4.4 • RESISTANCE MEASUREMENT AND DIODE CHECKS

- Measuring resistance, like measuring voltage, can be carried out in autoringing 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 VΩ on the multimeter and set the rotary switch to Q.

Quick continuity check (buzzier):
- On the 300Ω range, the symbol N appears top left on the display if the measured resistance value is below 300Ω. Pressing once on the AC/DC/A key enables the audible signal (buzzier). Pressing this key a second time disables it.
- If the circuit resistance less than 300Ω and the buzzier tone high, the tone is low (3kHz).
- 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 VΩ terminal and then set the rotary switch to the mV position.
The display will indicate an out of limits condition if the diode junction is reverse biased or if the voltage is greater than \( V \).

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 MX51 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 VO 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
  - 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

- When the rotary switch is set to ADP, the multimeter locks onto the 500mV range. Only the mV 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 HA-1237 tachometer, and H50210-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 VO terminals of the multimeter, and the safety precautions for voltage measurement should be applied.
3.4.1 • 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 μA/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.

Note: some indications are not used by the MX 51Ex
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 this enlarged window is displayed in figures above the bargraph and the window moves automatically with the value measured.

DISPLAY IN NORMAL MODE

345.0 mV

30 40 50

DISPLAY IN ZOOM MODE

345.0 mV

300 400

The Auto-ranging 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 (auto-ranging function is disabled).
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 as 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.

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 memorizes 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.
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 (‘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 contact 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.

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 — and short-circuit the VΩ and 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 — and short-circuit the VΩ and COM terminals. The display should read 0.001V. If the display indicates out of limits (OL), the fuse is blown.