



# HT4012

**Manuale d'Uso**  
**User manual**  
**Manual de instrucciones**  
**Bedienungsanleitung**



# ENGLISH


## User's manual



**CONTENTS:**

|  |    |
|--|----|
| 1. SAFETY PRECAUTIONS AND PROCEDURES .....       | 2  |
| 1.1. Preliminary .....                           | 3  |
| 1.2. During Use .....                            | 3  |
| 1.3. After Use .....                             | 3  |
| 2. GENERAL DESCRIPTION .....                     | 4  |
| 3. PREPARATION FOR USE .....                     | 5  |
| 3.1. Initial .....                               | 5  |
| 3.2. Supply Voltage .....                        | 5  |
| 3.3. Calibration .....                           | 5  |
| 3.4. Storage .....                               | 5  |
| 4. OPERATING INSTRUCTIONS .....                  | 6  |
| 4.1. Instrument Description .....                | 6  |
| 4.1.1. Commands description .....                | 6  |
| 4.1.2. Alignment marks .....                     | 6  |
| 4.1.3. Use of rubber test leads holster .....    | 7  |
| 4.2. Function key description .....              | 8  |
| 4.2.1. R-H key: range selection .....            | 8  |
| 4.2.2. D-H key: HOLD function .....              | 8  |
| 4.2.3. AUTO POWER OFF function .....             | 8  |
| 4.3. Description of Rotary Switch Function ..... | 9  |
| 4.3.1. AC Voltage measurement .....              | 9  |
| 4.3.2. DC Voltage measurement .....              | 10 |
| 4.3.3. AC Current measurement .....              | 11 |
| 4.3.4. Resistance measurement .....              | 12 |
| 4.3.5. Continuity Test .....                     | 13 |
| 4.3.6. Diode test .....                          | 14 |
| 5. PREVENTIVE MAINTENANCE .....                  | 15 |
| 5.1. General information .....                   | 15 |
| 5.2. Battery replacement .....                   | 15 |
| 5.3. Cleaning .....                              | 15 |
| 5.4. End of life .....                           | 15 |
| 6. TECHNICAL SPECIFICATIONS .....                | 16 |
| 6.1. Characteristics .....                       | 16 |
| 6.1.1. Safety .....                              | 17 |
| 6.1.2. General data .....                        | 17 |
| 6.2. Environmental conditions .....              | 17 |
| 6.2.1. Climatic conditions .....                 | 17 |
| 6.2.2. EMC and LVD .....                         | 17 |
| 6.3. Accessories .....                           | 17 |
| 6.3.1. Standard accessories .....                | 17 |
| 6.3.2. Optional accessories .....                | 17 |
| 7. SERVICE .....                                 | 18 |
| 7.1. Warranty conditions .....                   | 18 |
| 7.2. Service .....                               | 18 |

## 1. SAFETY PRECAUTIONS AND PROCEDURES

This apparatus conforms to safety standard EN 61010, relating to electronic measuring instruments. For your own safety and that of the apparatus, you must follow the procedures described in this instruction manual and especially read all the notes preceded by the symbol  carefully.



### WARNING

If instrument is used in way don't conform to prescriptions of this user's manual, all considered safety protection maybe damaged.

Take extreme care for the following conditions when measuring:

- Do not measure voltage, current under humid or wet environment.
- Do not operate the meter under the environment with explosive gas (material), combustible gas (material), steam or filled with dust.
- Keep you insulated from the object waiting for measuring.
- Do not contact any exposed metal (conductive) parts such as end of test lead, socket, fixing object, circuit, etc.
- If any unusual condition of testing end (metal part) and attachment of the meter such as breakage, deformation, fracture, foreign substance, no display, etc., do not conduct any measuring.
- Measuring voltage over 20V as it might cause human body electricity conduction.
- Take care not to allow your hand to pass over the Safety Guard (see Fig. 1, pos.2) on current measurements and voltage measurements using the holster.

The followings symbols are used:



Caution: Refer to the instruction manual. Incorrect use may damage the apparatus or its components.



Danger high voltage: risk of electric shock.



Meter double insulated.



AC Voltage or Current.



DC Voltage or Current.

### 1.1. PRELIMINARY

- This apparatus has been designed for use in an environment of pollution degree 2.
- It can be used for **CURRENT** and **VOLTAGE** measurements on installations of surge voltage category III up to 600 V, voltage between Phase and Earth (fixed installations) and for current measures up to 400A.
- This meter is not available for non-sine wave AC signal.
- You must comply with the usual safety regulations aimed at:
  - ◆ Protecting you against the dangerous electric current.
  - ◆ Protecting the instrument against an incorrect operation.
- Only the leads supplied with the instrument guarantee compliance with the safety standard. They must be in a good condition and they must be replaced, if necessary with an identical model.
- Do not test or connect to any circuit with voltage or current exceeding the specified overload protection.
- Do not perform any test with environmental condition exceeding the limits indicated in paragraphs 6.2.1.
- Check if the batteries are installed correctly.
- Prior to connecting the test probes to the installation, check that the function selector is positioned on the required measurement.
- Check if the LCD and the range indicator show the same as the function desired.

### 1.2. DURING USE

Read the recommendation which follow and the instruction in this manual:



#### WARNING

Non compliance with the warnings and/or the instructions for use may damage the apparatus and/or its components or injure the operator.

- When changing range, first remove the tested conductor or electrical circuit from the clamp jaw in order to avoid any accident.
- When the apparatus is connected to the measuring circuits, never touch an unused terminal.
- When measuring resistor, please do not add any voltage. Though there is a protection circuit, excessive voltage will still cause malfunction.
- When measuring current, first remove the test leads of common and voltage-resistance.
- When measuring current, any strong current nears or closes to the clamp jaw will affect the accuracy.
- When measuring current, always put the tested conductor in the center of the clamp jaw so as to obtain a more accurate reading as referred into paragraph 4.1.2.
- During measuring, if the value of reading or indication of sign remain unchanged, check if the HOLD function is active.

### 1.3. AFTER USE

- Once the measurements are completed, turn the rotary switch to OFF.
- If the instruments is not be used for a long period, remove the battery.

## 2. GENERAL DESCRIPTION

The meter can perform the following measurements:

- AC current.
- AC voltage.
- DC voltage.
- Resistance.
- Continuity Test.
- Diode test.

Each of these parameters can be selected by means of an 7-position rotary switch, including an OFF position. There are also the following keys: “**D-H**” and “**R-H**”. For their use please see paragraph 4.2.

The selected quantity appears on a high-contrast display with indication of measurement units and functions.

### 3. PREPARATION FOR USE

#### 3.1. INITIAL

All the equipment has been checked mechanically and electrically prior to shipment. Every care has been taken to ensure that the instrument reaches you undamaged.


However, it is wise to carry out a rapid check in order to detect any possible damage which might have been caused during transport. Should this be the case, immediately enter the usual claims with courier.

Check the packaging contained according to packaging list reported in paragraph 6.3.1. In case of discrepancies contact the dealer.

In the event of re-shipment of the equipment please follow the instructions reported in paragraph 7.

#### 3.2. SUPPLY VOLTAGE

The instrument is battery supplied; it use two batteries model 1.5V LR03 AAA UM-4 included in packaging. The batteries autonomy is about 100 hours.

The symbol "" appears when the batteries are nearly discharged. In case replace them following the instructions in paragraph 5.2.

#### 3.3. CALIBRATION

The instrument fulfils the technical characteristics listed in this manual. The performance of the specifications are guaranteed for one year.

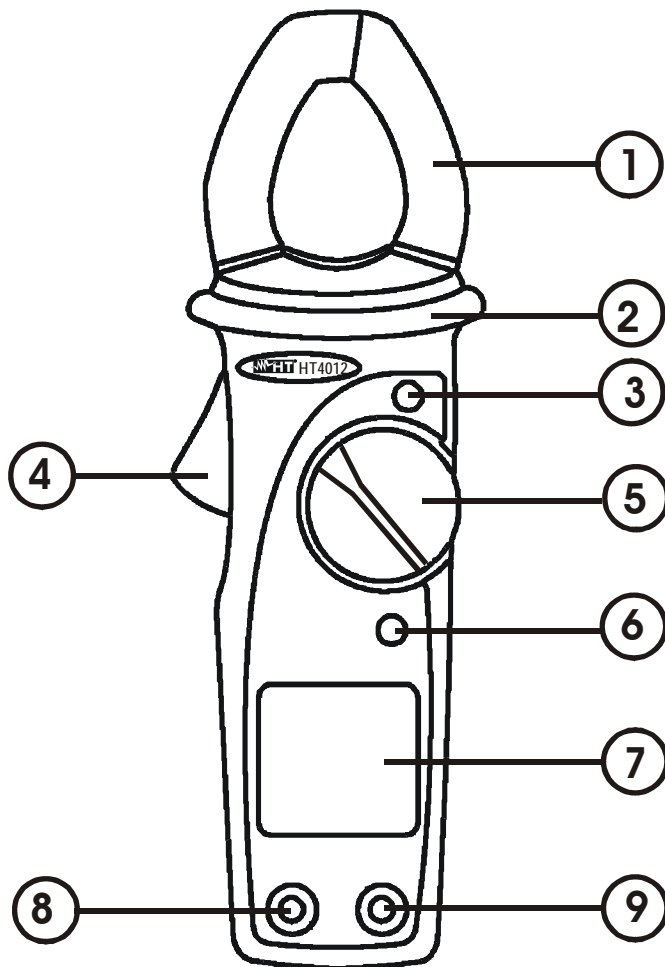
#### 3.4. STORAGE

In order to guarantee the accuracy of the measurements, after a period of storage in extreme environment condition, wait for the time necessary so that the apparatus returns to normal measuring conditions (see environments specifications paragraph 6.2.1).

## 4. OPERATING INSTRUCTIONS

### 4.1. INSTRUMENT DESCRIPTION

#### 4.1.1. Commands description



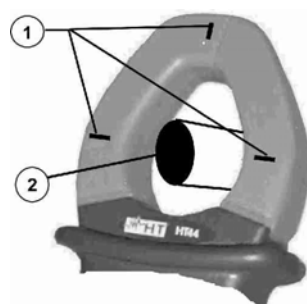
#### LEGEND:

1. Inductive clamp jaw.
2. Safety guard.
3. Data HOLD key (D-H).
4. Jaw trigger.
5. Rotary selector functions.
6. RANGE key (R-H).
7. LCD display.
8. COM jack.
9. V/Ω jack.

Fig. 1: Instrument description

#### 4.1.2. Alignment marks

Put the conductor within the jaws on intersection of the indicated marks as much as possible (see Fig. 2) in order to meet the meter accuracy specifications.



#### LEGEND:

1. Alignment marks.
2. Conductor.

Fig. 2: Alignment marks



#### 4.1.3. Use of rubber test leads holster

In standard accessories of instrument there is a rubber holster that, inserted on clamp, can bring one of two test leads, like showed in Fig. 3.



Fig. 3: Use of rubber test lead holster

This rubber holster has a very practical use. It allows the user to perform the measurements with both test leads while, more easily, observing the value on the display at the same time.

## 4.2. FUNCTION KEY DESCRIPTION


### 4.2.1. R-H key: range selection

Pressing the R-H key you can switch between the Automatic or Manual Range selection. In particular the "MANU" symbol point out the Manual range selection while the "AUTO" symbol point out the Automatic Range selection.

The Manual Range selection will be disable if:

- The R-H key is pressed more than 2 second.
- The position of the rotary switch is changed.

### 4.2.2. D-H key: HOLD function


Press of D-H key active HOLD function which allows to hold the displayed digital values. When this function is enabled the display shows the "  "symbol.

The HOLD function will be disabled if:

- The D-H key is pressed again.
- The position of the rotary switch is changed.

### 4.2.3. AUTO POWER OFF function

In order to save the battery the clamp will be switched off 10 minutes later last selecting function or changing range operation.

If this function is enabled the symbol is  displayed.

To disable this function select OFF position then rotate the selector in any position while the R-H key is pressed.

Turning OFF and ON the clamp the AUTO POWER OFF will be re-enabled.

### 4.3. DESCRIPTION OF ROTARY SWITCH FUNCTION

#### 4.3.1. AC Voltage measurement



#### WARNING

Maximum input for AC Voltage measurements is 600V. Do not attempt to take any voltage measurement that exceeds the limits. Exceeding the limits could cause electrical shock and damage the clamp meter.

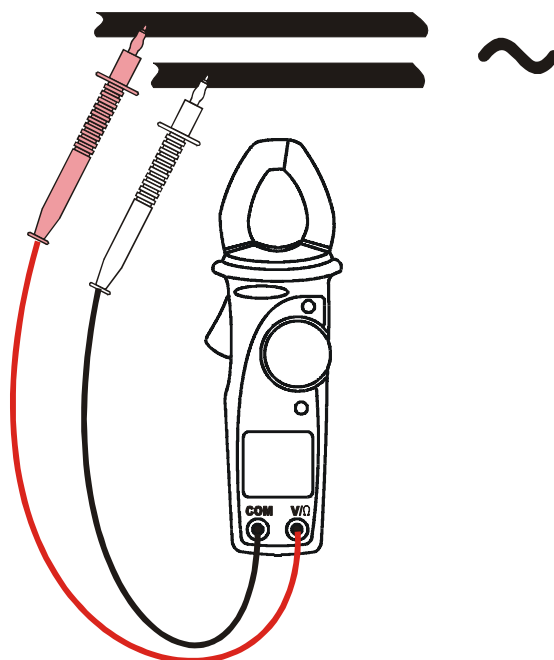


Fig. 4: Use of clamp for AC voltage measures

1. Select the "**V~**" position of selector functions.
2. Insert the test leads into the jack, the red plug into V/Ω jack, and black plug into COM jack, like showed in Fig. 4.
3. Insert the two long ends of test leads to the desired circuit, then reading will be displayed with automatic detection of the appropriate range.
4. Pressing the **R-H** key you can select manually the measurement ranges in cyclic order. Press the **R-H** key 2 seconds at least to come back to AUTOMATIC range selection.
5. The "**O.L**" symbol means that the measured quantity is higher than the selected range. Press the R-H key to select a higher range.
6. If the reading is difficult, press the **D-H** key to hold the obtained value. To exit from this function press **D-H** key again.



#### WARNING

As the clamp has high input impedance, it could happen that the meter shows a continuous digits oscillation at display with missed signals on inputs which is the result of the amplification of external noise. This is not a defect, indeed the user can proceed with a test as the temporary displayed value will not be added to the measured value.

### 4.3.2. DC Voltage measurement



#### WARNING

Maximum input for DC Voltage measurements is 600V.  
Do not attempt to take any voltage measurement that exceeds the limits.  
Exceeding the limits could cause electrical shock and damage the clamp meter.

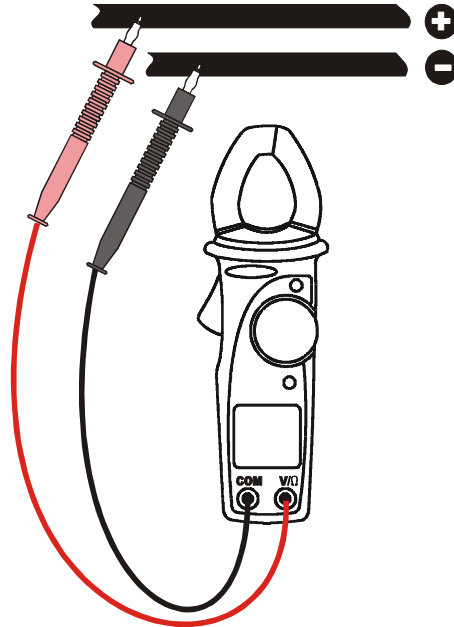


Fig. 5: Use of clamps for DC voltage measures

1. Select the "**V**" position of selector functions.
2. Insert the test leads into the jack, the red plug into V/ $\Omega$  jack, and black plug into COM jack, like showed in Fig. 5.
3. Insert the two long ends of test leads to the desired circuit, then reading will be displayed with automatic detection of the appropriate range.
4. If the reading is preceded by the "-" sign check this indicate that Voltage polarity its reversed. Invert terminal leads for correct indication.
5. Press **R-H** key you can select manually the measurement ranges in cyclic order. Press **R-H** key 2 seconds at least to come back to AUTOMATIC range selection.
6. The "**O.L**" symbol means that the measured quantity is higher than the selected range. Press **R-H** key to select a higher range.
7. If the reading is difficult, press the **D-H** key to hold the obtained value. To exit from this function press **D-H** key again.



#### WARNING

As the clamp has high input impedance, it could happen that the meter shows a continuous digits oscillation at display with missed signals on inputs which is the result of the amplification of external noise. This is not a defect, indeed the user can proceed with a test as the temporary displayed value will not be added to the measured value.

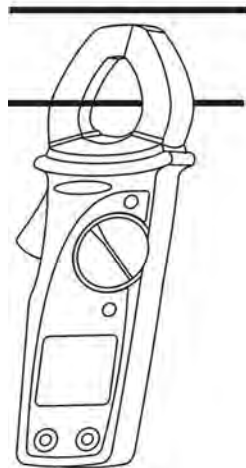
### 4.3.3. AC Current measurement



#### WARNING

- Make sure that all the test leads are disconnected from the meter's terminals for current measurement.
- When measuring current, any strong current nears or closes to the clamp jaws will affect the accuracy.
- The instrument is not available for non-sine wave AC signal.

#### Correct



#### Incorrect

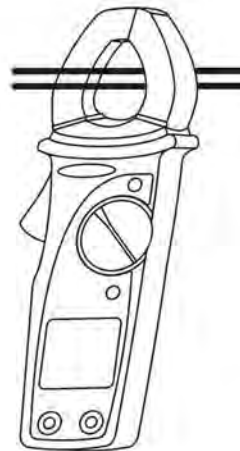


Fig. 6: Use of clamp during AC current measurement

1. Select "**~A**" position.
2. Open the clamp and put the tested conductor in the center of the clamp jaw (see paragraph 4.1.2), considering the connection showed in Fig. 6.
3. The current value will be indicate on the display with automatic detection of the appropriate range.
4. Pressing the **R-H** key you can select manually the measurement ranges the measurement ranges in cyclic order. Press the **R-H** key 2 seconds at least to come back to AUTOMATIC range selection.
5. The "**O.L**" symbol means that the measured quantity is higher than the selected range. Press the **R-H** key to select a higher range.
6. If the reading is difficult, press the D-H key to hold the obtained value. To exit from this function press **D-H** key again.



#### WARNING

As the clamp has internal filter it could happen that the meter takes few seconds to reach 0 value on the display. This is not a defect, indeed the user can proceed with a test as the temporary displayed value will not be added to the measured value.

#### 4.3.4. Resistance measurement



#### WARNING

Before taking any in circuit resistance measurement, remove power from the circuit being tested and discharge all the capacitors.

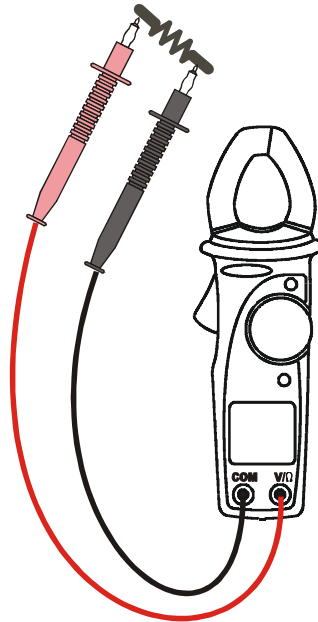


Fig. 7: Use of clamps for resistance measures

1. Select the function " $\Omega$ ".
2. Insert the test leads into the jack, the red plug into V/ $\Omega$  jack, and black plug into COM jack.
3. Insert the two long ends of test leads to the desired circuit (see Fig. 7); the reading will be displayed with automatic detection of the appropriate range.
4. Pressing the **R-H** key you can select manually the measurement ranges the measurement ranges in cyclic order. Press the **R-H** key 2 seconds at least to come back to AUTOMATIC range selection.
5. The "**O.L**" symbol means that the measured quantity is higher than the selected range. Press the **R-H** key to select a higher range.
6. If the reading is difficult, press the **D-H** key to hold the obtained value. To exit from this function press **D-H** key again.

#### 4.3.5. Continuity Test



#### WARNING

Before taking any in circuit resistance measurement, remove power from the circuit being tested and discharge all the capacitors.

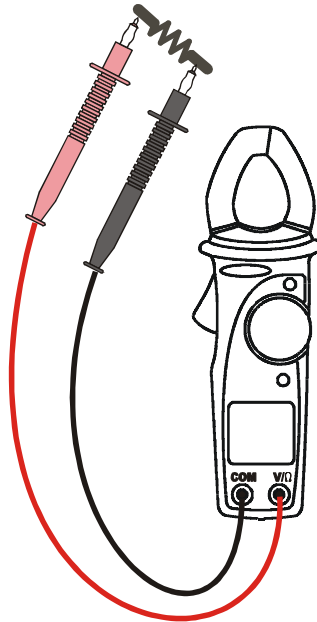



Fig. 8: Use of clamps for continuity measures

1. Select the “” function.
2. Insert the test leads into the jack, the red plug into V/Ω jack, and black plug into COM jack, like showed in Fig. 8.
3. Insert the two long ends of test leads to the desired circuit. The reading will be displayed while the buzzer sounds when the resistance value is lower then 25Ω approximately.

#### 4.3.6. Diode test



#### WARNING

Before taking any in circuit resistance measurement, remove power from the circuit being tested and discharge all the capacitors.

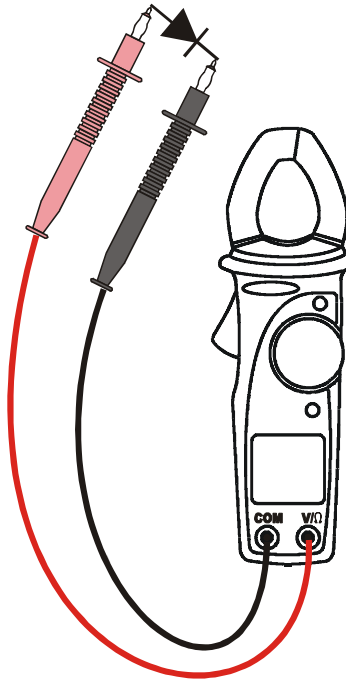



Fig. 9: Use of clamp for diode test

1. Select the “” function.
2. Insert the test leads into the jack, the red plug into V/Ω jack, and black plug into COM jack, like showed in Fig. 9.
3. Insert the red lead on the anode of diode and black lead on the cathode ones.
4. The correspondent threshold voltage of P-N junction is showed on display.



## 5. PREVENTIVE MAINTENANCE

### 5.1. GENERAL INFORMATION

1. This digital clamp meter is a precision instrument. Whether in use or in storage, please do not exceed the specification requirements to avoid any possible damage or danger during use.
2. Do not place this meter in high temperature or humidity or expose to direct sunlight.
3. Be sure to turn the meter off after use. For long time storage, remove the battery to avoid leakage of battery liquid that would damage the interior parts.

### 5.2. BATTERY REPLACEMENT

When LCD displays the symbol "", replace battery.



#### WARNING

Only expert and trained technicians must perform this operation.  
Remove the test leads or the conductor under test before performing of battery replacement.

1. Set range switch to OFF position.
2. Remove the test leads or the objects to be tested.
3. Remove the screw from the battery cover, and detach the battery covers from the bottom cover.
4. Remove the low batteries.
5. Replace batteries with new of then same type (1.5V LR 03 AAA). Make attention to the correct polarity.
6. Replace the battery cover and screw.
7. Don't disperse used battery in the environment. Use apposite container only.

### 5.3. CLEANING

For cleaning the instrument use a soft dry cloth. Never use a wet cloth, solvents or water, etc.

### 5.4. END OF LIFE



**CAUTION:** this symbol indicates that equipment and its accessories shall be subject to a separate collection and correct disposal.

## 6. TECHNICAL SPECIFICATIONS

### 6.1. CHARACTERISTICS

Accuracy is indicated as [% of reading + digit number]. It is referred to the following reference conditions: 23°C ± 5°C with RH <75%.

#### DC Voltage

| Range | Resolution | Accuracy                        | Input impedance |
|-------|------------|---------------------------------|-----------------|
| 2V    | 1mV        | $\pm(0.8\%rdg + 2 \text{ dgt})$ | 11M $\Omega$    |
| 20V   | 10mV       |                                 | 10M $\Omega$    |
| 200V  | 100mV      |                                 |                 |
| 600V  | 1V         | $\pm(1.0\%rdg + 2 \text{ dgt})$ |                 |

#### AC voltage

| Range | Resolution | Accuracy<br>(45 ÷ 500Hz)                 | Input impedance |
|-------|------------|--|-----------------|
| 2V    | 1mV        | $\pm(1.0\%rdg + 3 \text{ dgt})$          | 11M $\Omega$    |
| 20V   | 10mV       |  | 10M $\Omega$    |
| 200V  | 100mV      |  |                 |
| 600V  | 1V         | $\pm(1.2\% \text{ rdg} + 2 \text{ dgt})$ |                 |


#### AC Current

| Range | Resolution | Accuracy<br>(45 ÷ 66Hz)          | Overload protection      |
|-------|------------|----------------------------------|--------------------------|
| 200A  | 0.1A       | $\pm(2.0\%rdg + 10 \text{ dgt})$ | 600A RMS<br>(60 seconds) |
| 400A  | 1A         |                                  |                          |


#### Resistance

| Range | Resolution | Accuracy            | Max. Open Loop voltage | Overload protection |
|-------|------------|---------------------|------------------------|---------------------|
| 200Ω  | 0.1Ω       | ±(1.0% rdg + 5 dgt) | about 1.5VDC           | 600V rms            |
| 2kΩ   | 1Ω         | ±(1.0% rdg + 3 dgt) | about 0.45 VDC         |                     |
| 20kΩ  | 10Ω        |                     |                        |                     |
| 200kΩ | 100Ω       |                     |                        |                     |
| 2MΩ   | 1kΩ        |                     |                        |                     |
| 20MΩ  | 10kΩ       | ±(3.0% rdg + 3 dgt) |                        |                     |

#### Continuity test

| Range   | Buzzer                      | Max. Open Loop voltage | Overload protection |
|---|-----------------------------|------------------------|---------------------|
|  | Activated for R<25 $\Omega$ | about 1.5VDC           | 600A rms            |

#### Diode test

| Range   | Resolution | Accuracy                                 | Max. Open Loop voltage | Overload protection |
|---|------------|--|------------------------|---------------------|
|  | 10mV       | $\pm(0.5\% \text{ rdg} + 3 \text{ dgt})$ | about 3VDC             | 600A rms            |

### 6.1.1. Safety


|                             |  |
|-----------------------------|--|
| Comply with:                | EN 61010   |
| Insulation:                 | Class 2, double reinforced insulation            |
| Pollution:                  | Level 2  |
| For inside use, max height: | 2000m  |
| Over voltage:               | CAT III 600V (between ground and input terminal) |

### 6.1.2. General data

#### Mechanical characteristics

|                             |  |
|-----------------------------|--|
| Size:                       | 205(L) x 64 (W) x 39(H)mm; 8.04 x 2.52 x 1.54 in |
| Weight (including battery): | About 280g; 9.88 ounce                           |
| Jaws opening:               | 30mm; 1.18 in                                    |
| Max conductor size:         | 30mm; 1.18 in                                    |

#### Supply

|                         |   |
|-------------------------|---|
| Batteries type:         | 2 batteries 1.5V LR03 AAA.  |
| Low battery indication: | Symbol "  " is displayed when battery level is too low |
| Battery life:           | About 100 hours   |

#### Display

|                  |   |
|------------------|---|
| Characteristics: | 3 ½ LCD with maximum reading 1999 units plus decimal point signs. |
| Sample rate:     | 2 times/sec.  |
| Conversion mode: | Mean value  |

## 6.2. ENVIRONMENTAL CONDITIONS

### 6.2.1. Climatic conditions

|                        |                           |
|------------------------|---------------------------|
| Reference temperature: | 23° ± 5° C; 73° ± 41°F    |
| Operating temperature: | 5° ÷ 40° C; 41° ÷ 104°F   |
| Operating humidity:    | <80% RH                   |
| Storage temperature:   | -10° ÷ 60° C; 14° ÷ 140°F |
| Storage humidity:      | <80% RH                   |

### 6.2.2. EMC and LVD

This apparatus was designed in accordance with EMC standards in force and its compatibility has been tested in accordance EN61326 (1997) + A1 (1998) + A2 (2001).

**This product conforms to the prescriptions of the European directive on low voltage 2006/95/EEC (LVD) and to EMC directive 2004/108/EEC**

## 6.3. ACCESSORIES

### 6.3.1. Standard accessories

The accessories contained inside the packaging are the following:

- Instrument HT4012.
- Couple of test leads.
- Rubber test lead holster.
- User's manual.
- Carrying bag.
- Batteries.

### 6.3.2. Optional accessories

- 4413-2: couple of 4mm test leads.

## 7. SERVICE

### 7.1. WARRANTY CONDITIONS

This equipment is guaranteed against any material fault or manufacturer's defect, in accordance with the general conditions of sale. During the warranty period (one year), faulty parts may be replaced, with the manufacturer reserving the right to decide either to repair or replace the product.

In the event of returning the equipment to the after-sales service or to a regional branch, the outward transport is payable by the customer. The delivery must be agreed in advance with consignee.

For delivery indicate by means a note enclosed with the equipment, as clear as possible, the reasons for returning it use only the original packing.

Any damaging caused by shipment using NOT original packaging will be charged in any case to the consignor.

The manufacturer will not be responsible for any damage against persons or things.

The warranty doesn't apply to the following cases:

- Accessories and battery aren't include in warranty.
- Repairs following unsuitable use of the equipment or by combining the latter with incompatible equipment.
- Repairs resulting from a not correct shipping.
- Repairs resulting from servicing carried out by a person not approved by the company.
- Modifications to the equipment without explicit authorisation from our technical departments.
- Adaptation to a particular application not provided for by the definition of the equipment or by the instruction manual.

The contents of this manual may not be reproduced in any form whatsoever without our agreement.

**Our product are patented. The logotypes are registered. We reserve the right to modify characteristics and prices as part of technological developments which might require them.**

### 7.2. SERVICE

If the equipment shouldn't work correctly, before contacting the SERVICE, test the battery condition, the test leads, etc., and change them if necessary.

If the equipment still doesn't work check if your operating procedure agrees with the latter described in this manual.

In the event of returning the equipment it must be re-sent to the after-sales service (at address or to a regional branch), the outward transport is payable by the customer. The delivery must be agreed in advance with consignee.

For delivery indicate by means a note enclosed with the equipment, as clear as possible, the reasons for returning it use only the original packing.

Any damage caused by delivery with NO original packaging will be charged in any case to the consignor.