ENGLISH

User’s manual

CONTENTS:

1. SAFETY PRECAUTIONS AND PROCEDURES

This instrument is 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**, **VOLTAGE** and **FREQUENCY** 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. Please refer to chapter 1.4 for information regard on overvoltage categories.
- 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

No compliance to the warnings and/or the instructions for use may damage the meter 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.

1.4. DEFINITION OF MEASURING (OVERVOLTAGE) CATEGORY

The norm EN 61010: Safety requirements for electrical equipment for measurement, control and laboratory use, Part 1: General requirements, defines what a measuring category, usually called overvoltage category, is.

Circuits are divided into the following measurement categories:

- **Measurement category IV** is for measurements performed at the source of the low-voltage installation.

  Examples are electricity meters and measurements on primary overcurrent protection devices and ripple control units.
- **Measurement category III** is for measurements performed in the building installation.

  Examples are measurements on distribution boards, circuit breakers, wiring, including cables, bus-bars, junction boxes, switches, socket-outlets in the fixed installation, and equipment for industrial use and some other equipment, for example, stationary motors with permanent connection to fixed installation.
- **Measurement category II** is for measurements performed on circuits directly connected to the low voltage installation.

  Examples are measurements on household appliances, portable tools and similar equipment.
- **Measurement category I** is for measurements performed on circuits not directly connected to MAINS.

  Examples are measurements on circuits not derived from MAINS, and specially protected (internal) MAINS-derived circuits. In the latter case, transient stresses are variable; for that reason, the norm requires that the transient withstand capability of the equipment is made known to the user.

2. GENERAL DESCRIPTION

This manual is referred to two models: HT4014 and HT4016; the difference between the models is fundamentally the capacity of the first to measure the frequency and of the latter to measure DC current and to perform relative measurements using the ZERO function. Where not expressly indicated the characteristics are common for both models.

The apparatus can perform the following measurements:

- AC current.
- AC voltage.
- DC voltage.
- DC current (HT4016 only).
- Resistance.
- Frequency (HT4014 only).
- Continuity Test.
- Diode test (HT4014 only).

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**", "**R-H** /☼", "**MAX/MIN**", "☼", "**Ω/** ·))" and "**ZERO**". For their use please see paragraph 4.2. The selected quantity appears on a high-contrast display with indication of measurement units and functions.

Instrument have the possibility to show measurement values with an analogical bargraph.

3. PREPARATION FOR USE

3.1. INITIAL

This instrument has been checked mechanically and electrically before shipment. All precautions have been taken to assure that the instrument reaches you in perfect condition.

However, it is advisable to carry out a rapid check in order to detect any possible damage, which might have occurred in transit.

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 50 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.

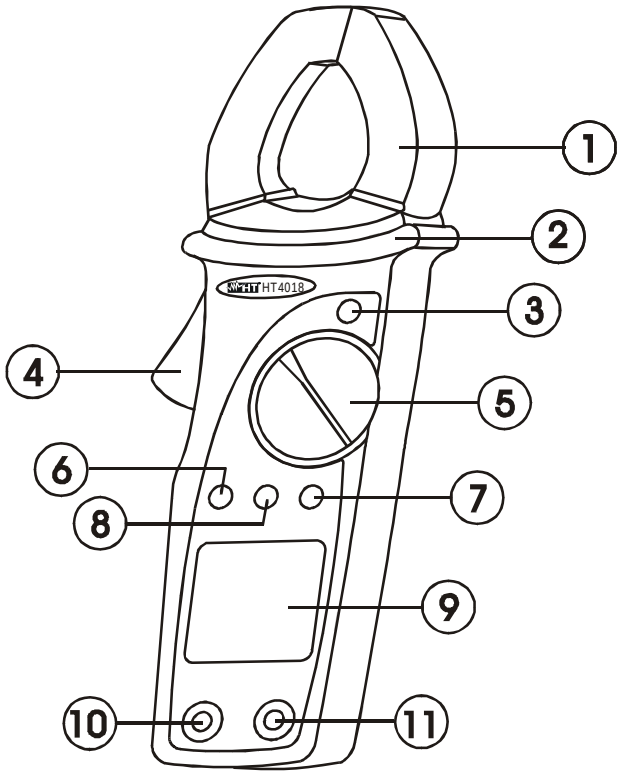
3.4. STORAGE

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

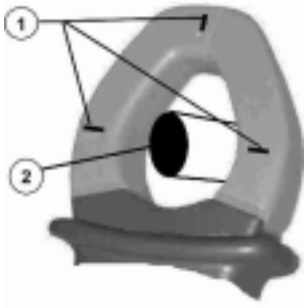


LEGEND:
1. Inductive clamp jaw.
2. Safety guard.
3. Data HOLD key.
4. Jaw trigger.
5. Rotary selector functions.
6. Selection key Ω/ (HT4014); ZERO key (HT4016).
7. MAX/MIN key (HT4014); RANGE R-H / key (HT4016).
8. key (HT4014); MAX/MIN key (HT4016).
9. LCD display.
10. COM jack.
11. V/Ω jack.

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.

4.1.4. AUTO POWER OFF function

In order to extend the battery life, the clamp switches off 30 minutes after the last rotary switch or button actuation.
When 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 / , ZERO or MAX/MIN key (HT4016 only), or MAX/MIN key (HT4014 only) is pressed.
Turning OFF and ON the clamp the AUTO POWER OFF will be re-enabled.

4.2. FUNCTION KEY DESCRIPTION

4.2.1. R-H / key: range selection / backlight function (HT4016 only)

For R-H function:

1. Press R-H / key less than 1 second, Manual range is activated.
2. Press R-H / key more than 1 second, Manual range is disabled and Backlight is ON.
3. Press R-H / key for more than 1 second, Backlight is OFF and Manual range is activated.

For function:

1. Press R-H / key more than 1 second, Backlight is ON;
2. Press R-H / key more than 1 second, Backlight is OFF.

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 1 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 " **H** "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. ZERO key: zeroing display function (HT4016 only)

The read value can be zeroing (0) when you press ZERO key. The symbol “ZERO” is showed at display when this function is enabled. Press the key a second time zeroing value is showed and “ZERO” symbol start to blinking.
Press ZERO key more than 1 second to disable the function.

4.2.4. key: enable/disable backlight (HT4014 only)

Press this key you enable the display backlight to easy readings in dark environments. Press more than 1 second to disable backlight, which, however, it automatically OFF after 60 seconds.

4.2.5. MAX/MIN key: store Maximum and Minimum values

With this function its possible to store MAX and MIN value of parameters selected with rotary switch. Operate in following way:

- Press the key to activate function. “MAX” symbol appear at display and instrument measures and show the Maximum value of parameter which automatically update itself when a bigger value occurs.
- Press the key again “MIN” symbol appear to display and instrument measures and show the Minimum value of parameter which automatically update itself when a lower value occurs.
- Press again the key a blinking message “MAX MIN” appear at display. In this mode the instrument measures and store the minimum and the maximum value of selected parameter. Another press of MAX/MIN key showed the recording values.
- Press more than 1 second to exit from MAX/MIN function.

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.

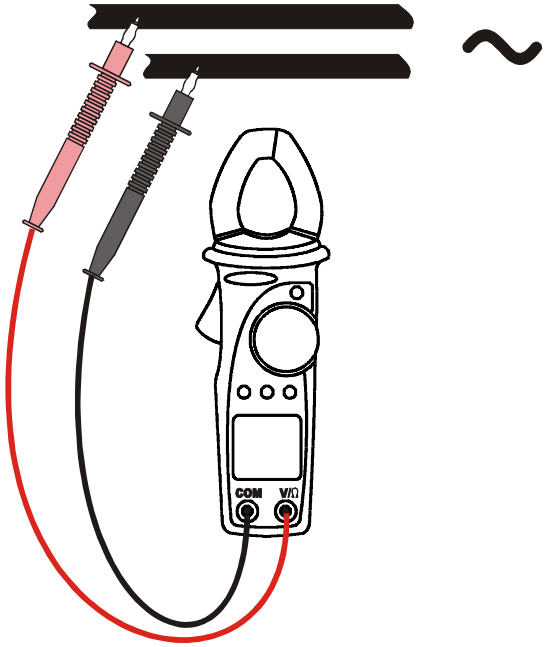


Fig. 4: Use of clamp for AC voltage measures

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 (HT4016 only) you can select manually the measurement ranges in cyclic order. Press the R-H / more than 1 second 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.
7. Press MAX/MIN key to activate the saving of Maximum and/or Minimum values of parameters. Press MAX/MIN key more than 1 second to exit function (see chapter 4.2.5. for details).

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.

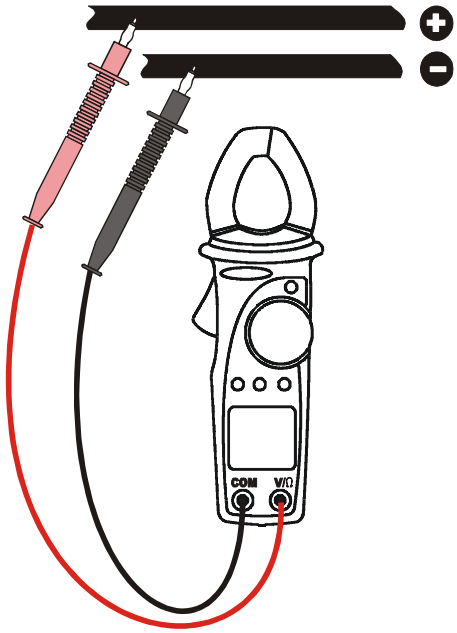


Fig. 5: Use of clamp for DC voltage measures

1. Select the ""⎓V"position of selector functions.
2. Insert the test leads into the jack, the red plug into V/Ω 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. Pressing the R-H /☼ key (HT4016 only) you can select manually the measurement ranges in cyclic order. Press the R-H /☼ key more than 1 second to come back to AUTOMATIC range selection.
6. 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.
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.
8. Press MAX/MIN key to activate the saving of Maximum and/or Minimum values of parameters. Press MAX/MIN key more than 1 second to exit function (see chapter 4.2.5. for details).

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.

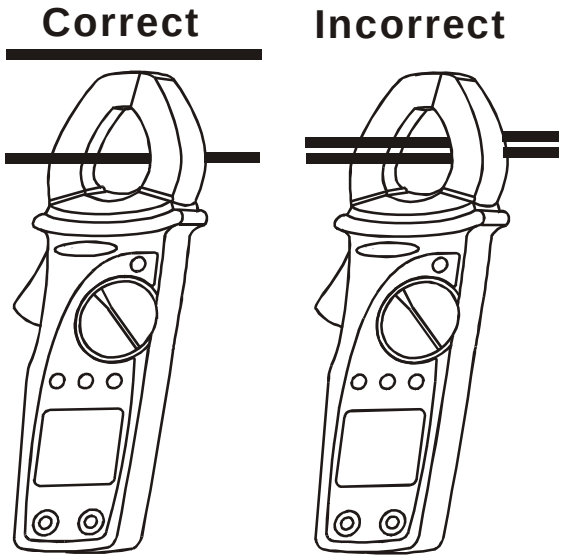


Fig. 6: Use of clamp during AC current measurement

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 (HT4016 only) you can select manually the measurement ranges the measurement ranges in cyclic order. Press the R-H /☼ key more than 1 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.
7. Press MAX/MIN key to activate the saving of Maximum and/or Minimum values of parameters. Press MAX/MIN key more than 1 second to exit function (see chapter 4.2.5. for details).

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. DC Current measurement (HT4016 only)

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.

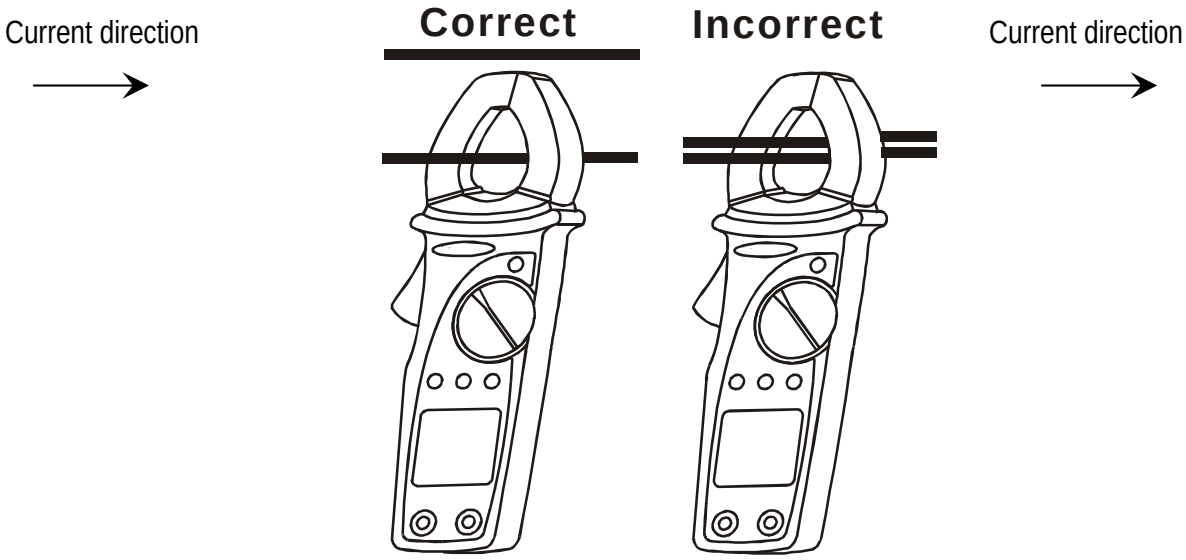


Fig. 7: Use of clamp during DC current measurement (HT4016 only).

1. Select "⎓**A**" position.
2. Check if the display shows zero in advance. If the display doesn't show zero, press ZERO key. If current value is over 40A press R-H / key to select 400A range before zeroing operation.
3. Open the clamp and put the tested conductor in the center of the clamp jaw (ref. paragraph 4.1.2.) taking care to comply with the current flow shown in the label placed inside the Inductive clamp jaw and indicates in Fig. 7.
4. The current value will be indicate on the display with automatic detection of the appropriate range.
5. Pressing the R-H / key you can select manually one of the following ranges. Press the R-H / key more than 1second 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 the 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.
8. Press MAX/MIN key to activate the saving of Maximum and/or Minimum values of parameters. Press MAX/MIN key more than 1 second to exit function (see chapter 4.2.5. for details).

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.

4.3.5. Resistance measurement

WARNING

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

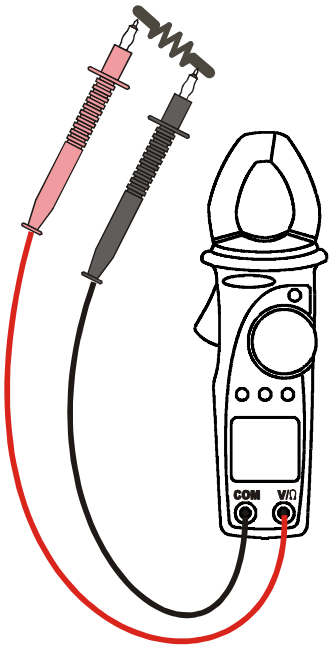


Fig. 8: Use of clamp for resistance measures.

1. Select the function "Ω/ ·)) " (HT4014 only) or the function "Ω" (HT4016 only).
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 with automatic detection of the appropriate range.
4. Pressing the R-H /☼ key (HT4016 only) you can select manually the measurement ranges the measurement ranges in cyclic order. Press the R-H /☼ more than 1 second 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.
7. Press MAX/MIN key to activate the saving of Maximum and/or Minimum values of parameters. Press MAX/MIN key more than 1 second to exit function (see chapter 4.2.5. for details).

4.3.6. Continuity Test

WARNING

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

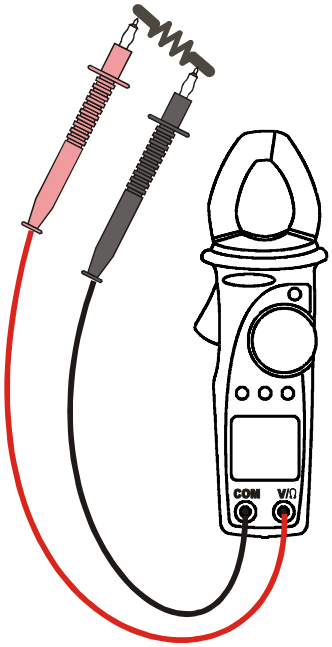


Fig. 9: use of clamp for continuity measure

1. Select the Ω/ •)) function (HT4014 only) or the "•))" function (HT4016 only).
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 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 40Ω approximately.

4.3.7. Diode test (HT4014 only)

WARNING

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

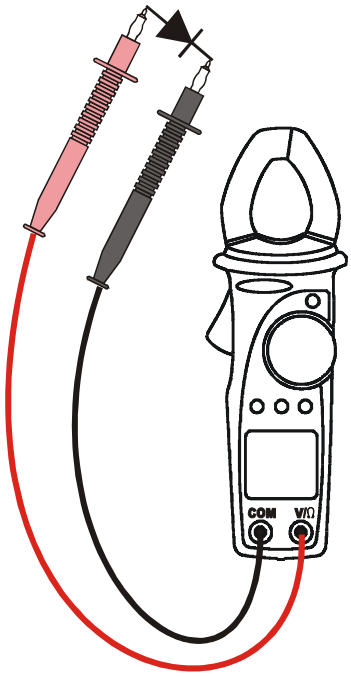


Fig. 10: Use of clamp for diode test

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. 10.
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.

4.3.8. Frequency measurement (HT4014 only)

WARNING

Maximum input voltage of AC VOLT Range is 600Vrms.
Do not attempt to take any voltage measurement that exceeds 600Vrms to avoid electrical shock hazard or damage the instrument.

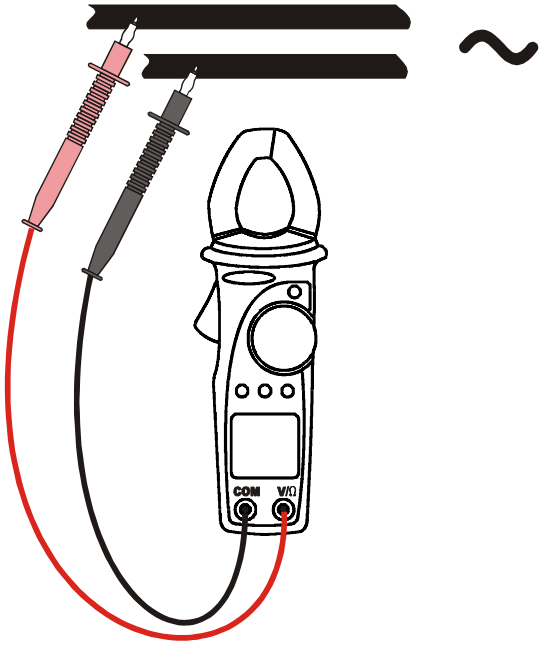


Fig. 11: Use of clamp for frequency measures

1. Select the "**Hz**" range.
2. Inset the test leads into the jack, the red plug into V/Ω jack, and black plug into COM jack, like showed in Fig. 11.
3. Insert the two long ends of test leads to the desired circuit. The reading will be displayed with automatic detection of the appropriate range.
4. The "**O.L**" symbol means that the measured quantity is higher than the maximum range of instrument.
5. 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.
6. Press MAX/MIN key to activate the saving of Maximum and/or Minimum values of parameters. Press MAX/MIN key more than 1 second to exit function (see chapter 4.2.5. for details).

5. 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 specifications to avoid any possible damage or danger during use.
2. Do not place this meter in high temperature and/or humidity or expose to direct sunlight.
3. Be sure to turn the meter off after use. For long term storage, remove the batteries to avoid leakage of battery fluid that can damage the internal components.

5.2. BATTERY REPLACEMENT

When LCD displays the symbol "  " replace battery.

WARNING

Only experts and trained technicians should perform this operation. Remove the test leads or the conductor under test before replacing the batteries.

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 them with new of then same type (1.5V LR 03 AAA).
6. Replace the battery cover and screw.
7. Use the appropriate battery disposal methods for your area.

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
400mV	0.1mV	±(0.8%rdg + 2 dgt)	100MΩ
4V	1mV		11MΩ
40V	10mV		10MΩ
400V	100mV		
600V	1V		

AC Voltage

Range	Resolution	Accuracy (45 ÷ 500Hz)	Input impedance
400mV	0.1mV	±(1.0%rdg + 50 dgt) (at 40Hz - 60Hz)	100MΩ
4V	1mV	±(1.0%rdg+ 3 dgt)	11MΩ
40V	10mV		10MΩ
400V	100mV		
600V	1V	±(1.2% rdg + 3 dgt)	

AC Current

Range	Resolution	Accuracy (45 ÷ 66Hz)	Overload protection
40A	0.01A	±(2.0%rdg + 10 dgt)	600A rms (60 seconds)
400A	0.1A		

DC Current (HT4016 only)

Range	Resolution	Accuracy	Overload protection
40A	0.01A	±(2.0%rdg + 10 dgt)	600A rms (60 seconds)
400A	0.1A		

Resistance

Range	Resolution	Accuracy	Max. Open Loop voltage	Overload protection
400Ω	0.1Ω	±(1.0% rdg + 5 dgt)	about 1.5VDC	600V rms (60 seconds)
4kΩ	1Ω	±(1.0% rdg + 3 dgt)	about 0.45 VDC	
40kΩ	10Ω			
400kΩ	100Ω			
4MΩ	1kΩ			
40MΩ	10kΩ	±(3.0% rdg + 3 dgt)		

Continuity test

Range	Buzzer	Max. Open Loop voltage	Overload protection
•))	Activated for R<40Ω	about 1.5VDC	600V rms

Diode test (HT4014 only)

Range	Resolution	Max. Open Loop voltage	Overload protection
	1mV	about 3.3VDC	600V rms

Frequency (HT4014 only)

Range	Resolution	Accuracy	Voltage range
4kHz	1Hz	±(0.8%rdg + 3 dgt)	3V ÷ 600V rms
40kHz	10Hz		
400kHz	100Hz		

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
Weight (including battery): about 280g
Jaws opening: 30mm
Max conductor size: 30mm

Supply

Batteries type: 2 batteries 1.5V LR03 AAA.
Low battery indication: Symbol "  " is displayed when battery level is too low
Battery life: About 50 hours

Display

Characteristics: 3 ¾ LCD with maximum reading 3999 units plus decimal point signs plus backlight
Sample rate: 2 times/sec
20 times/sec. for analogical bargraph

6.2. ENVIRONMENTAL CONDITIONS

6.2.1. Climatic conditions

Reference temperature: 23° ± 5° C
Operating temperature: 5° ÷ 40° C
Operating humidity: <80% RH
Storage temperature: -10° ÷ 60° C
Storage humidity: <80% RH

6.2.2. EMC

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 HT4016 or HT4016.
- Test leads.
- Rubber test lead holster.
- Instruction manual.
- Carrying case.
- 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.