

**ENGLISH**

# **User manual**



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## 1. PRECAUTIONS AND SAFETY MEASURES

The instrument has been designed in compliance with directive IEC/EN61010-1 relevant to electronic measuring instruments. For your safety and in order to prevent damaging the instrument, please carefully follow the procedures described in this manual and read all notes preceded by symbol  with the utmost attention.



### CAUTION

Failure to comply with the caution notes and/or instructions may damage the instrument and/or its components and be a source of danger for the operator.

Before and after carrying out measurements, carefully observe the following instructions:

- Do not carry out any current measurement in humid environments.
- Do not carry out any measurements in case gas, explosive materials or flammables are present, or in dusty environments.
- Avoid any contact with the circuit being measured if no measurements are being carried out.
- Avoid any contact with exposed metal parts, with unused measuring probes, circuits, etc.
- Do not carry out any measurement in case you find anomalies in the instrument such as deformation, breaks, substance leaks, absence of display on the screen, etc.

In this manual, and on the instrument, the following symbols are used:



Warning: observe the instructions given in this manual; improper use could damage the instrument or its components.



Double-insulated meter.



AC current or voltage



DC current or voltage



Connection to earth



This symbol indicates that the clamp can operate on live conductors

### 1.1. PRELIMINARY INSTRUCTIONS

- This instrument has been designed for use in environments of pollution degree 2.
- It can be used together with digital multimeters for **AC** and **DC CURRENT** measurement on installations with overvoltage category CAT III 600V or CAT IV 300V to earth. For a definition of the above-mentioned categories, see § 1.4.
- We recommend following the normal safety rules devised to protect the user against dangerous currents and the instrument against incorrect use.
- Do not test circuits exceeding the specified current and voltage limits.
- Check that the batteries are correctly inserted

## 1.2. DURING USE

Please carefully read the following recommendations and instructions:



### CAUTION

Failure to comply with the caution notes and/or instructions may damage the instrument and/or its components or be a source of danger for the operator.

- Before switching on the clamp, remove the conductor from the clamp jaw.
- During current measurement, any other current near the clamp may affect measurement precision.
- When measuring current, always put the conductor as near as possible to the middle of the clamp jaw in order to obtain the most accurate reading.

## 1.3. AFTER USE

- When measurement is complete, switch off the clamp.
- If the instrument is not to be used for a long time, remove the batteries.

## 1.4. DEFINITION OF MEASUREMENT (OVERVOLTAGE) CATEGORY

Standard "IEC/EN61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use, Part 1: General requirements", defines what measurement category, commonly called overvoltage category, is. § 6.7.4: Measured circuits, circuits are divided into the following measurement categories:

(OMISSIS)

- **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 on installations inside buildings.  
*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 standard requires that the transient withstand capability of the equipment is made known to the user.*

## 2. GENERAL DESCRIPTION

The instrument, clamp transducer HT4006, has the following features:

- Measurement of DC/AC current up to 400A
- NVC sensor for AC voltage detection without contact
- Output for the connection to digital multimeters
- Selection of ranges 40/400A
- Low battery indication

## 3. PREPARATION FOR USE

### 3.1. INITIAL CHECKS

Before shipping, the instrument has been checked from an electric as well as mechanical point of view. All possible precautions have been taken so that the instrument is delivered undamaged. However, we recommend generally checking the instrument in order to detect possible damage suffered during transport. In case anomalies are found, immediately contact the forwarding agent. We also recommend checking that the packaging contains all components indicated in § 7.3.1. In case of discrepancy, please contact the Dealer. In case the instrument should be returned, please follow the instructions given in § 8.

### 3.2. INSTRUMENT POWER SUPPLY

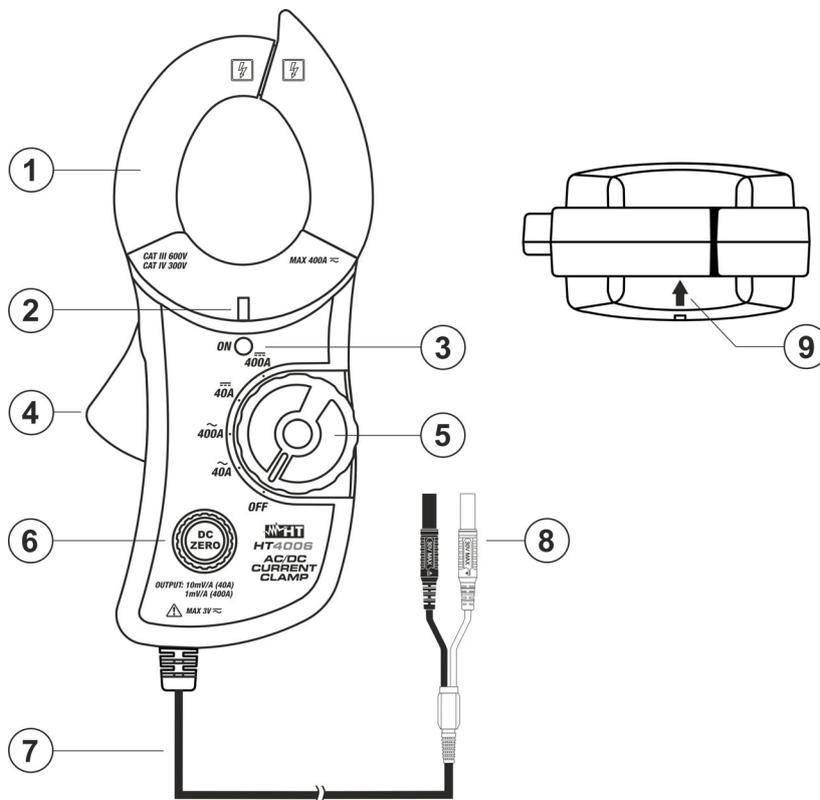
The instrument is supplied with 2x1.5V batteries type AAA IEC LR03, included in the package. When batteries are almost flat, the red LED indicator "ON" turns on and signals that replacement is necessary. For battery replacement, please refer to § 6.2.

### 3.3. STORAGE

In order to guarantee precise measurement, after a long storage time under extreme environmental conditions, wait for the instrument to come back to normal operating conditions (see § 7.2.1).

## 4. NOMENCLATURE

### 4.1. DESCRIPTION OF THE INSTRUMENT



#### CAPTION:

1. Open jaws
2. NCV sensor
3. LED indicator of power/low batteries
4. Lever for open/close jaws
5. Function selector
6. DC ZERO adjustment knob
7. Output cable
8. Terminals for connection to multimeters
9. Arrow for DC current direction

Fig. 1: Description of the instrument

### 4.2. DESCRIPTION OF FUNCTION KEYS

#### 4.2.1. DC ZERO adjustment knob

The **DC ZERO** adjustment knob allows to zeroed the residual magnetization in the **DC current** measurement with instrument connected to a digital multimeter

#### 4.2.2. Range selector

The function selector (see Fig. 1 – part 5) allows to power on/off the instrument and to select the measurement ranges. The green LED “ON” (see Fig. 1 – part 3) turn on in fixed mode. The LED “ON” becomes fixed red when the battery level is low. In this case, replace the batteries (see § 6.2). Move the range selector to position **40 $\tilde{A}$** , **400 $\tilde{A}$**  or **40 $\bar{A}$** , **400 $\bar{A}$**  according to the value of AC or DC current you want to measure. The output transformation ratio in AC or DC voltage of the clamp transducer (indicated on the front part) is the following:

Range	Output ratio
40A	10mV/A
400A	1mV/A

## 5. OPERATING INSTRUCTIONS

### 5.1. MEASURING AC/DC CURRENT IN COMBINATION WITH MULTIMETER HT63

#### CAUTION



- Instrument HT4006 has been specifically designed for **direct A** measurements of AC, DC and AC+DC currents (**selector on “DC” position**) up to 400A in combination with models **HT63, HT64, HT65, JUPITER, NEPTUNE, MERCURY, ECLIPSE** and **HT9025**. Please refer to these models' user manuals for the relevant instructions for use.
- Instrument HT4006 can also be used in combination with precision multimeters with an **AC/DC voltage** range with a resolution of **at least 1mV** in their lowest range and input resistance  $\geq 10k\Omega$

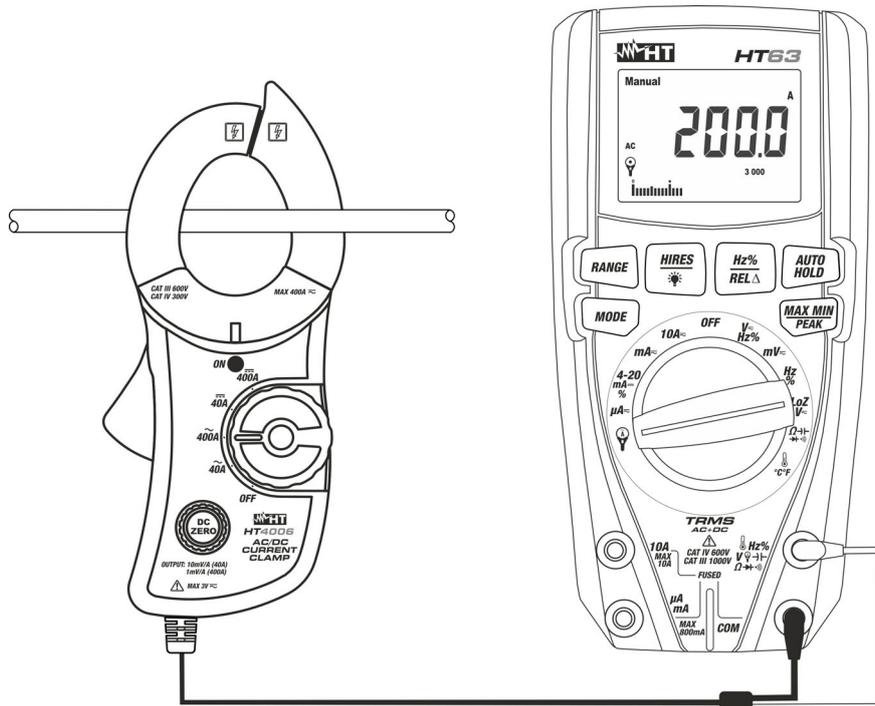


Fig. 2: Use of the instrument for measuring AC/DC current in combination with HT63

- Insert the black and red connection leads (see Fig. 1 – part 8) of the instrument respectively into inputs **COM** and **mA** (Hz% V V- Ω → +) of the multimeter.
- Switch on the instrument and select the desired range among the options **40A**, **400A** or **40A**, **400A**. Note the green LED “ON”
- For AC current measurement preliminary move the instrument close to the source.** The turn on of NCV red LED (see Fig. 1 – part 2) indicate voltage presence
- Select the position **A** on the multimeter.
- Press the **MODE** key on the multimeter to select “AC” or “DC” measurement.
- Press the **RANGE** key on the multimeter to select the **same range** set on the instrument. This value appears for 2s on the display
- For DC current measurement** adjust the “DC ZERO” knob (see § 4.2.1) up to zeroed the value at display
- Open the jaws and insert the phase cable in the middle of it (see Fig. 2). **For DC current measurement** consider the arrow on the top part (see Fig. 1 – part 9) which indicate the positive direction of the current. The display of the multimeter shows the value of current **expressed in A**.

**5.2. MEASURING AC/DC CURRENT IN COMBINATION WITH MULTIMETER HT64**
**CAUTION**


- Instrument HT4006 has been specifically designed for **direct A** measurements of AC, DC and AC+DC currents (**selector on “DC” position**) up to 400A in combination with models **HT63, HT64, HT65, JUPITER, NEPTUNE, MERCURY, ECLIPSE** and **HT9025**. Please refer to these models' user manuals for the relevant instructions for use
- Instrument HT4006 can also be used in combination with precision multimeters with an **AC/DC voltage** range with a resolution of **at least 1mV** in their lowest range and input resistance  $\geq 10k\Omega$

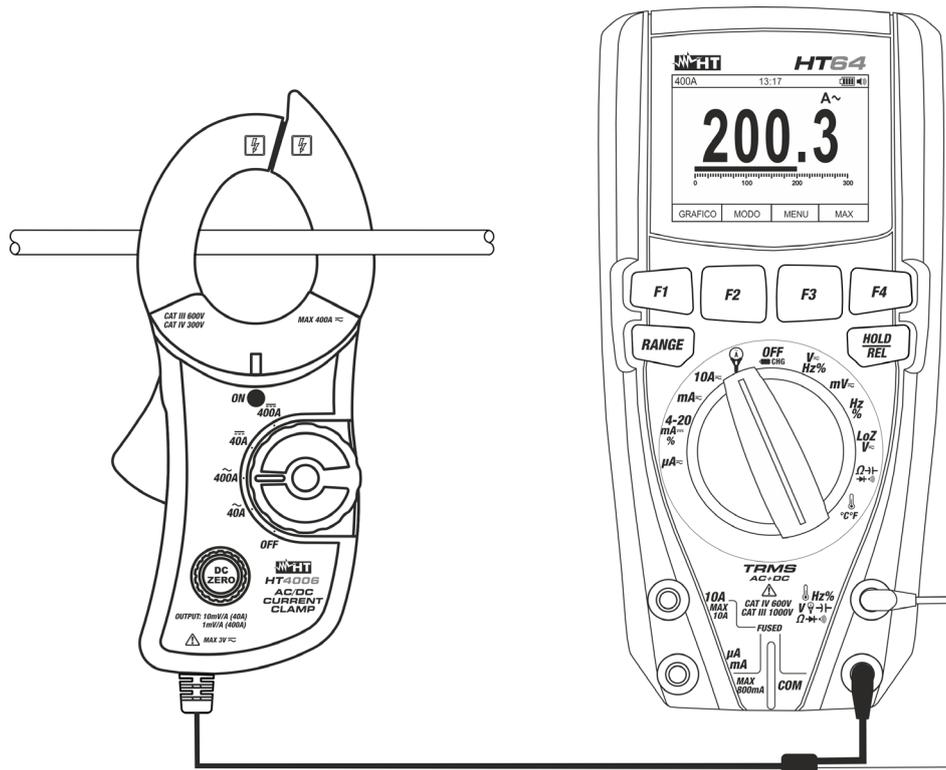


Fig. 3: Use of the instrument for measuring AC/DC current in combination with HT64

1. Insert the black and red connection leads (see Fig. 1 – part 6) of the instrument respectively into inputs **COM** and **V Hz %  $\sqrt{V} \rightarrow \Omega \rightarrow \mu A$**  of the multimeter.
2. Switch on the instrument and select the desired range among the options **40A $\tilde{A}$** , **400A $\tilde{A}$**  or **40A $\tilde{A}$** , **400A $\tilde{A}$** . Note the green LED “ON”
3. **For AC current measurement preliminary move the instrument close to the source.** The turn on of NCV red LED (see Fig. 1 – part 2) indicate voltage presence
4. Select the position **A** on the multimeter.
5. Press the **F2(MODE)** key on the multimeter to select “AC” or “DC” measurement.
6. Press the **RANGE** key on the multimeter to select the **same range** set on the instrument. This value is shown in the top left-hand part of the display
7. **For DC current measurement** adjust the “DC ZERO” knob (see § 4.2.1) up to zeroed the value at display
8. Open the jaws and insert the phase cable in the middle of it (see Fig. 3). **For DC current measurement** consider the arrow on the top part (see Fig. 1 – part 9) which indicate the positive direction of the current. The display of the multimeter shows the value of current **expressed in A**

### 5.3. MEASURING AC/DC CURRENT WITH MULTIMETER MERCURY

#### CAUTION



- Instrument HT4006 has been specifically designed for **direct A** measurements of AC, DC and AC+DC currents (**selector on “DC” position**) up to 400A in combination with models **HT63, HT64, HT65, JUPITER, NEPTUNE, MERCURY, ECLIPSE** and **HT9025**. Please refer to these models' user manuals for the relevant instructions for use
- Instrument HT4006 can also be used in combination with precision multimeters with an **AC/DC voltage** range with a resolution of **at least 1mV** in their lowest range and input resistance  $\geq 10k\Omega$

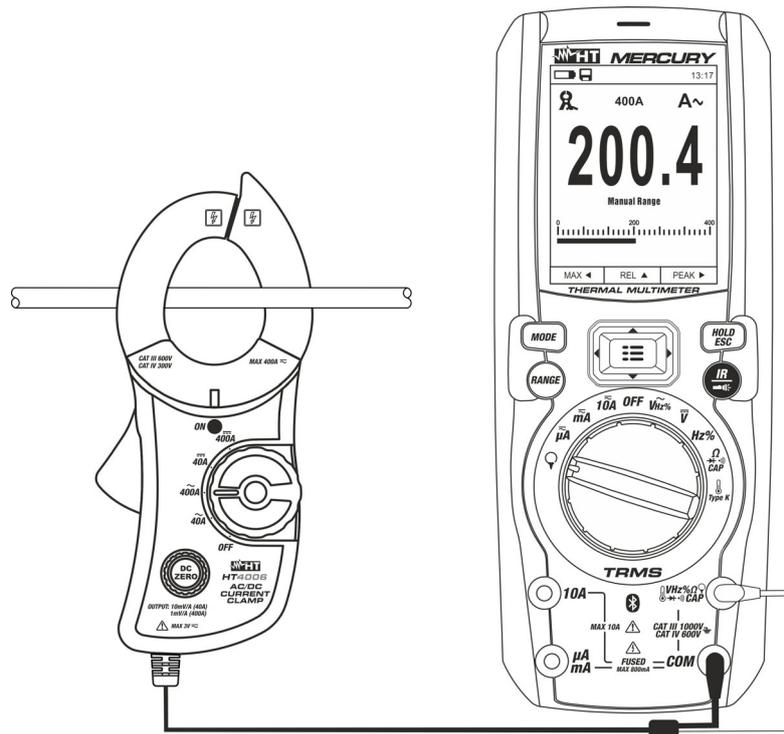


Fig. 4: Use of the instrument for measuring AC/DC current in combination with MERCURY

- Insert the black and red connection leads (see Fig. 1 – part 6) of the instrument respectively into inputs **COM** and **VHz% CAP Ω** of the multimeter.
- Switch on the instrument and select the desired range among the options **40A**, **400A** or **40A**, **400A**. Note the green LED “ON”
- For AC current measurement preliminary move the instrument close to the source.** The turn on of NCV red LED (see Fig. 1 – part 2) indicate voltage presence
- Select the position **V** on the multimeter.
- Press and hold (>2s) key MODE** to select clamp type between the options “**A**”
- Press key **MODE** to select the type of measurement “DC”, “AC” or “AC+DC”
- Press key **RANGE** to select on the instrument the **same range** set on the clamp. This value is shown in the top left-hand part of the display
- For DC current measurement** adjust the “DC ZERO” knob (see § 4.2.1) up to zeroed the value at display
- Open the jaws and insert the phase cable in the middle of it (see Fig.4). **For DC current measurement** consider the arrow on the top part (see Fig. 1 – part 9) which indicate the positive direction of the current. The display of the multimeter shows the value of current **expressed in A**

**5.4. MEASURING AC/DC CURRENT WITH MULTIMETER JUPITER / NEPTUNE**
**CAUTION**


- Instrument HT4006 has been specifically designed for **direct A** measurements of AC, DC and AC+DC currents (**selector on “DC” position**) up to 400A in combination with models **HT63, HT64, HT65, JUPITER, NEPTUNE, MERCURY, ECLIPSE** and **HT9025**. Please refer to these models' user manuals for the relevant instructions for use
- Instrument HT4006 can also be used in combination with precision multimeters with an **AC/DC voltage** range with a resolution of **at least 1mV** in their lowest range and input resistance  $\geq 10k\Omega$

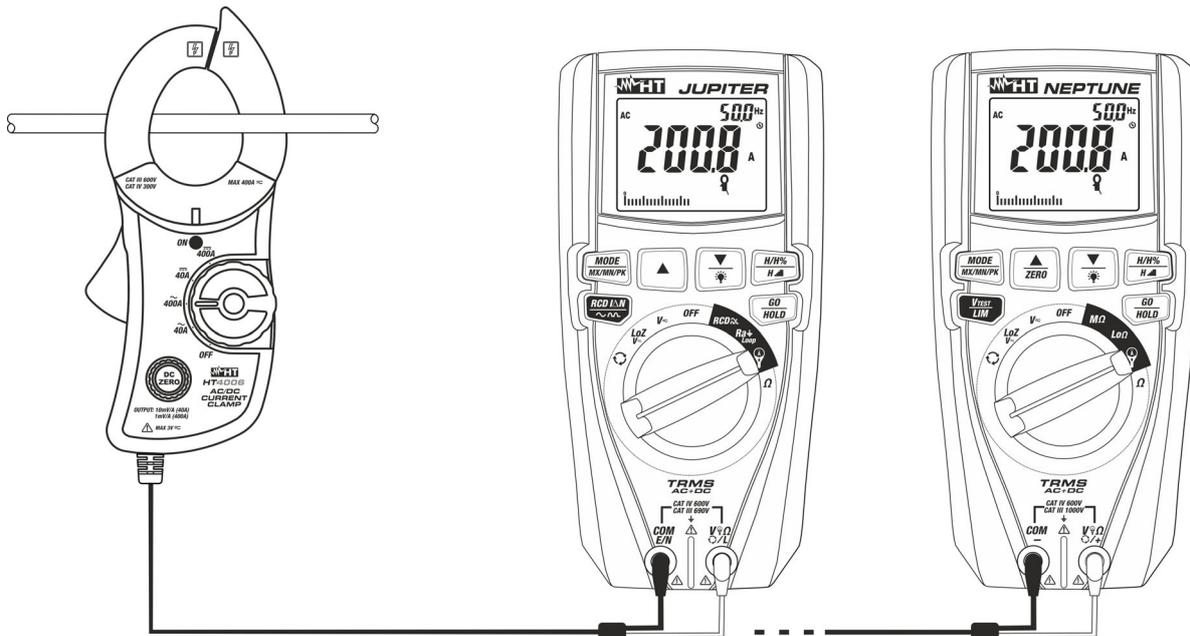


Fig. 5: Use of the instrument for measuring AC/DC current with JUPITER / NEPTUNE

- Insert the black and red connection leads (see Fig. 1 – part 6) of the instrument respectively into inputs **COM/E/N** e **V $\Omega$ ΩL** of the JUPITER multimeter or into inputs **COM/-** and **V $\Omega$ Ω/+** of the NEPTUNE multimeter
- Switch on the instrument and select the desired range among the options **40 $\tilde{A}$** , **400 $\tilde{A}$**  o **40 $\bar{A}$** , **400 $\bar{A}$** . Note the green LED “ON”
- For AC current measurement preliminary move the instrument close to the source.** The turn on of NCV red LED (see Fig. 1 – part 2) indicate voltage presence
- Select the position on the multimeter.
- Press key **MODE/MXMNPK** to select the clamp type “”
- Press key **GO/HOLD** to confirm settings
- Press key **MODE/MXMNPK** to select the type of measurement “DC”, “AC” or “AC+DC”
- Press key **▼/⚡** or **▲** (JUPITER) or key **▲/ZERO** or **▼/⚡** (NEPTUNE) to select on the instrument the **same range** set on the clamp. This value is shown in the top left-hand part of the display
- For DC current measurement** adjust the “DC ZERO” knob (see § 4.2.1) up to zeroed the value at display
- Open the jaws and insert the phase cable in the middle of it (see Fig.5). **For DC current measurement** consider the arrow on the top part (see Fig. 1 – part 9) which indicate the positive direction of the current. The display of the multimeter shows the value of current **expressed in A**

## 6. MAINTENANCE

### 6.1. GENERAL INFORMATION

1. While using and storing the instrument, carefully observe the recommendations listed in this manual in order to prevent possible damage or danger during use.
2. Do not use the instrument in environments with high humidity levels or high temperatures.
3. Always switch off the instrument after use. In case the instrument is not to be used for a long time, remove the batteries to avoid liquid leaks that could damage the instrument's internal circuits.

### 6.2. REPLACING THE BATTERIES

When the LED indicator “ON” becomes red, the batteries must be replaced.



#### CAUTION

Only expert technicians should perform this operation. Before carrying out this operation, make sure you have removed the cable being tested from inside the clamp jaw.

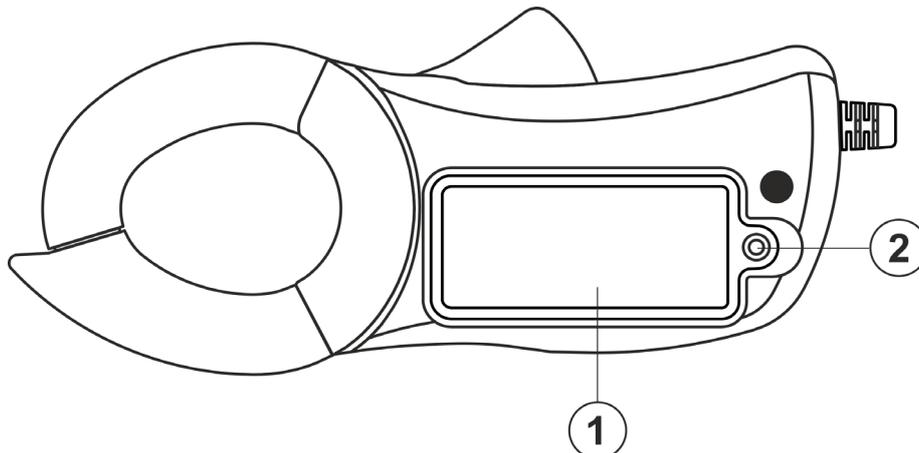


Fig. 6: Battery replacement

1. Switch off the instrument and remove the cable to be tested from inside the jaws.
2. Loosen the fastening screw (see Fig. 6 – part 2) of the battery compartment cover (see Fig. 6 – part 1), remove the cover and remove the batteries.
3. Insert new batteries of the same type (see § 7.1.3), respecting the indicated polarity.
4. Restore the battery compartment cover to its position.
5. Do not scatter old batteries into the environment. Use the relevant containers for disposal.

### 6.3. CLEANING THE INSTRUMENT

Use a soft and dry cloth to clean the instrument. Never use wet cloths, solvents, water, etc.

### 6.4. END OF LIFE



**WARNING:** the symbol on the instrument indicates that the appliance and its accessories must be collected separately and correctly disposed of.

## 7. TECHNICAL SPECIFICATIONS

### 7.1. TECHNICAL CHARACTERISTICS

Accuracy indicated as  $\pm[\% \text{reading} + A]$  at a temperature of  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ,  $<70\% \text{RH}$

#### DC Current

Range	Measuring range	Output ratio	Accuracy (*)
40.0A	0.1A ÷ 40.0A	10mV/A	$\pm(2.5\% \text{reading} + 0.1A)$
400.0A	0.5A ÷ 400.0A	1mV/A	$\pm(2.8\% \text{reading} + 0.5A)$

(\*) For use with models HT63 and HT64 the accuracy is:  $\pm(1.5\% \text{reading} + 26 \text{dgt})$

#### AC Current

Range	Measuring range	Output ratio	Bandwidth	Accuracy (*)
40.0A	0.1A ÷ 40.0A	10mV/A	50Hz ÷ 60Hz	$\pm(2.5\% \text{reading} + 0.1A)$
400.0A	0.5A ÷ 400.0A	1mV/A		$\pm(2.8\% \text{reading} + 0.5A)$

(\*) For use with models HT63 and HT64 the accuracy is:  $\pm(3.5\% \text{reading} + 30 \text{dgt})$

#### 7.1.1. Electrical characteristics

Max output voltage: 3VAC/DC

#### 7.1.2. Reference standards

Safety: IEC/EN61010-1, IEC/EN61010-2-032

EMC: IEC/EN61326-1

Insulation: double insulation

Pollution level: 2

Measurement category: CAT III 600V, CAT IV 300V to ground

Max operating altitude: 2000m (6562ft)

#### 7.1.3. General characteristics

##### Mechanical characteristics

Dimensions (L x W x H): 155 x 65 x 40mm (6 x 3 x 2in)

Weight (batteries included): 220g (7ounces)

Max. cable diameter for clamp: 30mm (1in)

Connection cable length: 1m (3ft)

Mechanical protection: IP20

##### Power supply

Battery type: 2x1.5V batteries type AAA LR03

Low battery indication: Red LED indicator "ON"

Battery duration: approx. 7 days

## 7.2. ENVIRONMENT

### 7.2.1. Environmental conditions for use

Reference temperature:  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$  ( $73^{\circ}\text{F} \pm 41^{\circ}\text{F}$ )

Operating temperature:  $0^{\circ}\text{C} \div 50^{\circ}\text{C}$  ( $32^{\circ}\text{F} \div 122^{\circ}\text{F}$ )

Operating humidity:  $<80\% \text{RH}$

Storage temperature:  $-20^{\circ}\text{C} \div 70^{\circ}\text{C}$  ( $-4^{\circ}\text{F} \div 158^{\circ}\text{F}$ )

Storage humidity:  $<80\% \text{RH}$

**This instrument satisfies the requirements of Low Voltage Directive 2014/35/EU (LVD) and of EMC Directive 2014/30/EU**

**This instrument satisfies the requirements of European Directive 2011/65/EU (RoHS) and 2012/19/EU (WEEE)**

## 7.3. ACCESSORIES

### 7.3.1. Standard accessories

- Batteries (not inserted)
- User manual

## 8. ASSISTANCE

### 8.1. WARRANTY CONDITIONS

This instrument is warranted against any material or manufacturing defect, in compliance with the general sales conditions. During the warranty period, defective parts may be replaced. However, the manufacturer reserves the right to repair or replace the product. The manufacturer declines any responsibility for injury to people or damage to property.

The warranty shall not apply in the following cases:

- Repair and/or replacement of accessories and battery (not covered by warranty).
- Repairs that may become necessary as a consequence of an incorrect use of the instrument or due to its use together with non-compatible appliances.
- Repairs that may become necessary as a consequence of improper packaging.
- Repairs which may become necessary as a consequence of interventions performed by unauthorized personnel.
- Modifications to the instrument performed without the manufacturer's explicit authorization.
- Use not provided for in the instrument's specifications or in the instruction manual.

The content of this manual cannot be reproduced in any form without the manufacturer's authorization.

**Our products are patented and our trademarks are registered. The manufacturer reserves the right to make changes in the specifications and prices if this is due to improvements in technology.**

### 8.2. ASSISTANCE

If the instrument does not operate properly, before contacting the After-sales Service, please check the conditions of the batteries and replace them, if necessary. Should the instrument still operate improperly, check that the product is operated according to the instructions given in this manual. Should the instrument be returned to the After-sales Service or to a Dealer, transport will be at the Customer's charge. However, shipment will be agreed in advance. A report will always be enclosed to a shipment, stating the reasons for the product's return. Only use original packaging for shipment; any damage due to the use of non-original packaging material will be charged to the Customer.