ENGLISH

User manual

Version EN 1.00 - 19/03/2018

Table of contents

1. PRECAUTIONS AND SAFETY MEASURES

The instrument has been designed in compliance with the safety directive relevant to electronic measuring instruments. 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.

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

- Do not carry out any measurements in case gas, explosive materials or flammables are present, or in humid or dusty environments.
- Do not expose the measuring sensors found on the internal part of the telescopic probe to mechanical shocks.
- **To prevent damaging them, do not touch the measuring sensors found on the internal part of the telescopic probe.**
- **When not in use, always cover the measuring sensors found on the internal part of the telescopic probe with the available sliding metal protection.**
- Do not carry out any measurement in case you find anomalies in the instrument such as deformation, 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.

1.1. PRELIMINARY INSTRUCTIONS

- We recommend following the normal safety rules devised to protect the user against dangerous situations and the instrument against incorrect use.
- Only the accessories provided together with the instrument will guarantee safety standards. They must be used only if in good conditions and replaced with identical models, when necessary.
- Do not test circuits exceeding the specified limits.
- Check that the battery is correctly inserted.
- Check that the LCD display gives indications consistent with the function selected.

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.

- Use the instrument only in the measuring ranges indicated in this manual.
- Avoid measuring in case external voltages are present, which could cause malfunctions of the instrument.
- While measuring, if the value or the sign of the quantity being measured remain unchanged, check if the HOLD function is enabled.

1.3. AFTER USE

- When measurement is complete, switch off the instrument.
- If you expect not to use the instrument for a long period, remove the battery.

2. GENERAL DESCRIPTION

The instrument has the following features:

- Measurement of air speed through hot-wire sensor
- Measurement of volumetric flow rate of air in m^3/min (CMM) and ft^3/min (CFM)
- Measurement of air temperature in °C/°F with internal sensor
- Measurement of relative humidity %RH with internal sensor
- Measurement of Maximum and Minimum value
- Calculation of average over time and by spots
- Data HOLD
- Display backlight
- Auto Power OFF

Each of these functions can be selected by means of the corresponding key. The selected quantity appears on the display with the indication of the measuring unit and of the enabled functions. Function keys are also available; for their use, please refer to § 4.3.

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. 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

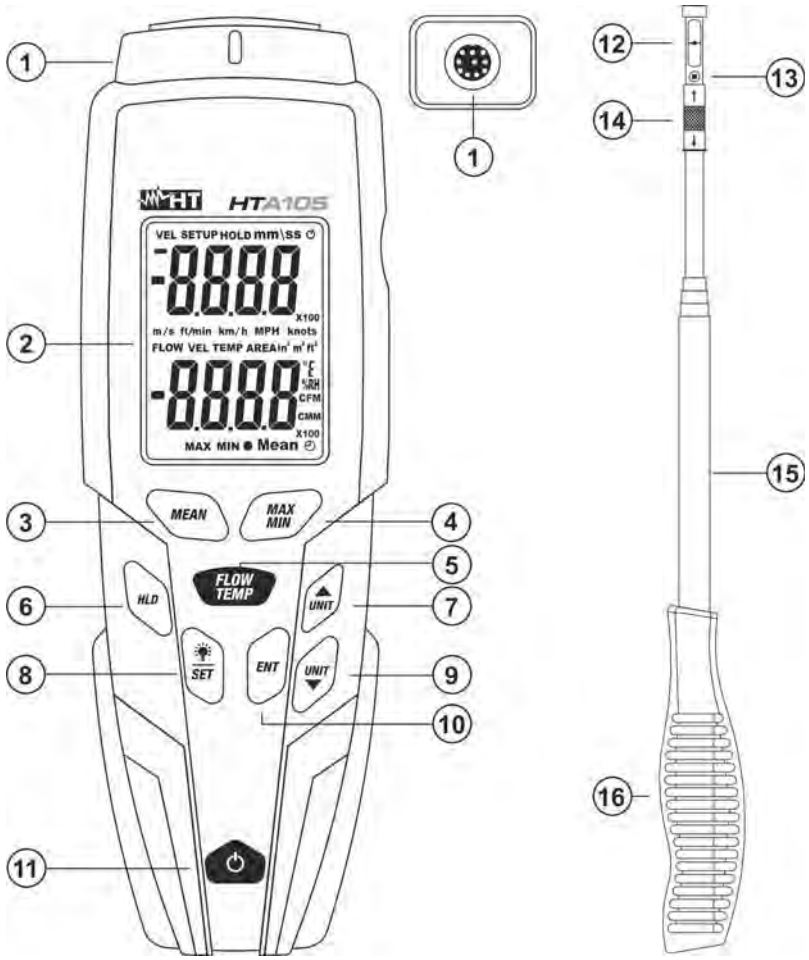
The instrument is supplied with 1x9V alkaline battery type NEDA 1604 IEC 6F22, included in the package. When battery is nearly flat, symbol "  " appears on the display. Replace the battery by following the instructions given in § 6.2.

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 condition (see § 7.2.1).

4. NOMENCLATURE

4.1. DESCRIPTION OF THE INSTRUMENT

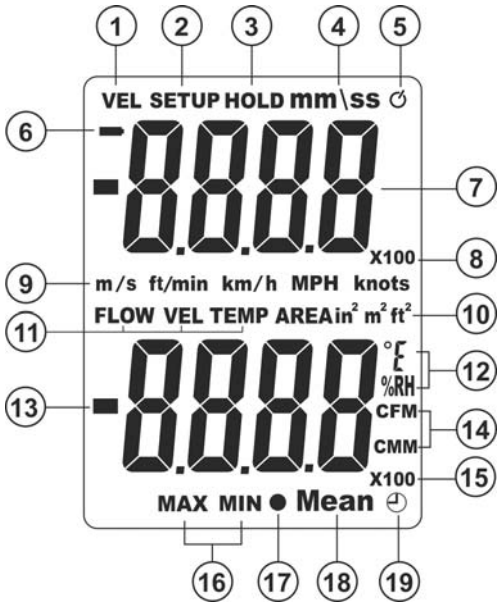


CAPTION:

1. Input terminal for telescopic probe
2. LCD display
3. Key **MEAN**
4. Key **MAXMIN**
5. Key **FLOW/TEMP**
6. Key **HLD**
7. Key **▲UNIT**
8. Key **☀/SET**
9. Key **UNIT▼**
10. Key **ENT**
11. Key **ON/OFF**
12. Hot-wire sensor
13. Temperature sensor
14. Sliding sensor protection
15. Extensible telescopic probe
16. Handle of telescopic probe

Fig. 1: Description of the instrument

4.2. DESCRIPTION OF THE DISPLAY



CAPTION:

1. Speed measurement icon
2. Active Settings
3. Active Data HOLD
4. Indication of minutes/seconds
5. Indication of active Auto Power OFF
6. Low battery symbol
7. Main display
8. Main display multiple
9. Speed measuring unit
10. Area measuring unit
11. Secondary display data
12. Temp/Humidity meas. unit
13. Secondary display
14. Flow rate measuring unit
15. Secondary display multiple
16. Activation of MAX and MIN measurements
17. Activation of average calculation
18. Active Average calculation function
19. Indication of active calculation of average over time

Fig. 2: Display description

4.3. DESCRIPTION OF FUNCTION KEYS

4.3.1. ON/OFF key

Pressing key **ON/OFF** allows turning on/off the instrument. Upon start-up, the instrument carries out a countdown of 3s before displaying the measuring screen, in order to allow for the internal sensors' heating.

4.3.2. Key HLD

Pressing key **HLD** activates/deactivates function **HOLD**, i.e. the value of the quantities measured on both displays is frozen on the main display. The symbol "HOLD" is shown on the top of the display.

4.3.3. Key /SET

Pressing key **/SET** allows activating/deactivating the display's backlight.
Pressing and holding (>2s) key **/SET** allows accessing section Settings (see § 4.4). A new long pressing of the key allows quitting and going back to measuring screen.

4.3.4. Key ENT

Key **ENT** (ENTER) allows confirming the value of the programmed parameters in section Settings (see § 4.4).

4.3.5. Key ▲UNIT

Pressing key **▲UNIT** allows selecting the measuring unit of air speed shown in the main display among the options: **m/s**, **ft/min**, **km/h**, **MPH**, **knots**. The same key allows selecting parameters within section Settings (see §4.4).

4.3.6. Key UNIT▼

Pressing key **UNIT▼** allows selecting the measuring unit of air temperature shown on the secondary display between the options: **°C** (Celsius) and **°F** (Fahrenheit), selecting the measuring unit of air volumetric flow rate between the options: **CPM** and **CMM** (see §). The same key allows selecting parameters within section Settings (see § 4.4).

4.3.7. Key FLOW/TEMP

Pressing key **FLOW/TEMP** allows selecting measuring units for air temperature (TEMP), air volumetric flow rate (FLOW) (see § 5.2) and air humidity (%RH) displayed in the secondary display.

4.3.8. Key MAXMIN

Cyclically pressing key **MAXMIN** activates the detection of Maximum and Minimum value of the selected quantities (air speed, temperature, humidity and volumetric flow rate). Upon each pressing of the key, the secondary display shows the maximum and minimum value of the quantity, which is dynamically updated and shown together with the symbol associated to the selected function: "MAX" for maximum value and "MIN" for minimum value. Pressing and holding (>2s) key **MAXMIN** allows quitting the function. The key is not active in the instrument's programming.

4.3.9. Key MEAN

Pressing key **MEAN** allows activating the function for calculating the average over time and by spots of the values of the quantities measured by the instrument (air speed, temperature, humidity and volumetric flow rate) (see § 5.3).

4.4. INSTRUMENT SETTINGS

The instrument allows programming the following functions:

- Measuring unit of the area of the duct in volumetric flow rate measurements
- Size of the duct in volumetric flow rate measurements
- Disabling the Auto Power OFF function

1. Turning on the instrument by means of key **ON/OFF**
2. Press and hold (>2s) key **/SET** to enter the setting mode. The screen with the indication of the currently set measuring unit of the area of the duct is shown on the display (see Fig. 3)

Fig. 3: Setting the measuring unit of the area of the duct

3. Press key **ENT**. The unit flashes on the display
4. Press keys ▲**UNIT** or **UNIT**▼ to select the desired measuring unit among the options: **in²**, **m²** or **ft²**
5. Press key **ENT** to confirm. The screen in Fig. 4 – left side is shown on the display

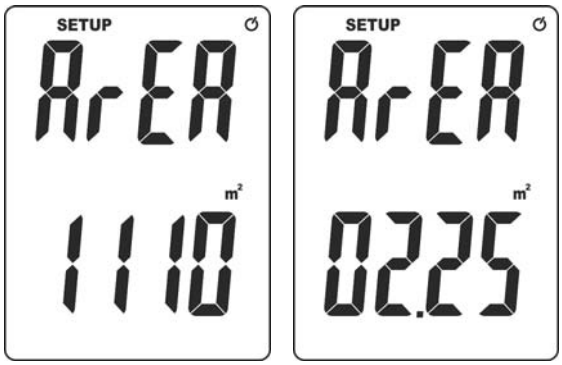


Fig. 4: Setting of the value of duct area

6. Press key **ENT**. The value of area flashes on the display. Press keys ▲**UNIT** or **UNIT**▼ to move the decimal point to the desired position and confirm with **ENT**. The value of the last digit set flashes on the display
7. Press keys ▲**UNIT** or **UNIT**▼ to set the value of duct area in the range: **0.001 ÷ 9999** by proceeding from right to left and pressing key **ENT** to confirm each digit (see Fig. 4 – right side) relevant, for example, to a square duct with a side of 1.5m x1.5m)
8. Press key **ENT** at the end, to confirm the value of duct area. The following screen (see Fig. 5) is displayed.

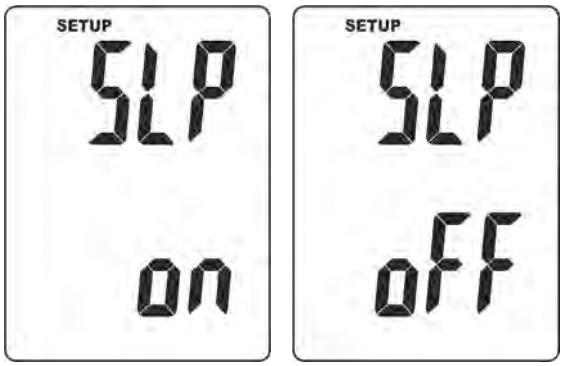


Fig. 5: Enabling/disabling the Auto Power Off function

9. Press keys ▲**UNIT** or **UNIT**▼ to select options: "**on**" (activation of Auto Power Off function) or "**oFF**" (deactivation of Auto Power Off function)
10. With activated Auto Power Off function, symbol "⏲" is shown on the display and the instrument automatically turns off after approx. 20 minutes' idling
11. Press key **ENT** to confirm. The following screen (which allows to set the value of atmospheric pressure expressed in **hPA = mbar** (**not measured by the instrument**) is displayed

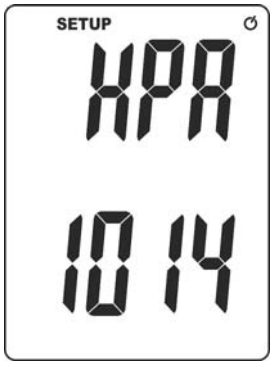


Fig. 6: Setting of atmospheric pressure value

CAUTION

- The atmospheric pressure value is important for the necessary compensation in order to obtain accurate air velocity measurements
- The measurement of atmospheric pressure can be obtained with other instruments or from local weather stations

12. Press key **ENT**. The value of last digit flashes on the display
13. Press key **MEAN** to move the decimal point to the desired position and the ▲**UNIT** or **UNIT**▼ keys to set the desired value of atmospheric pressure and confirm with key **ENT**
14. Press and hold (>2s) key ☀/**SET** to quit section Settings and go back to measuring screen.

5. OPERATING INSTRUCTIONS

5.1. MEASUREMENT OF AIR SPEED AND TEMPERATURE

CAUTION

Do not touch not expose the internal sensors found on the top side of the telescopic probe to mechanical shocks, in order to prevent damaging them.

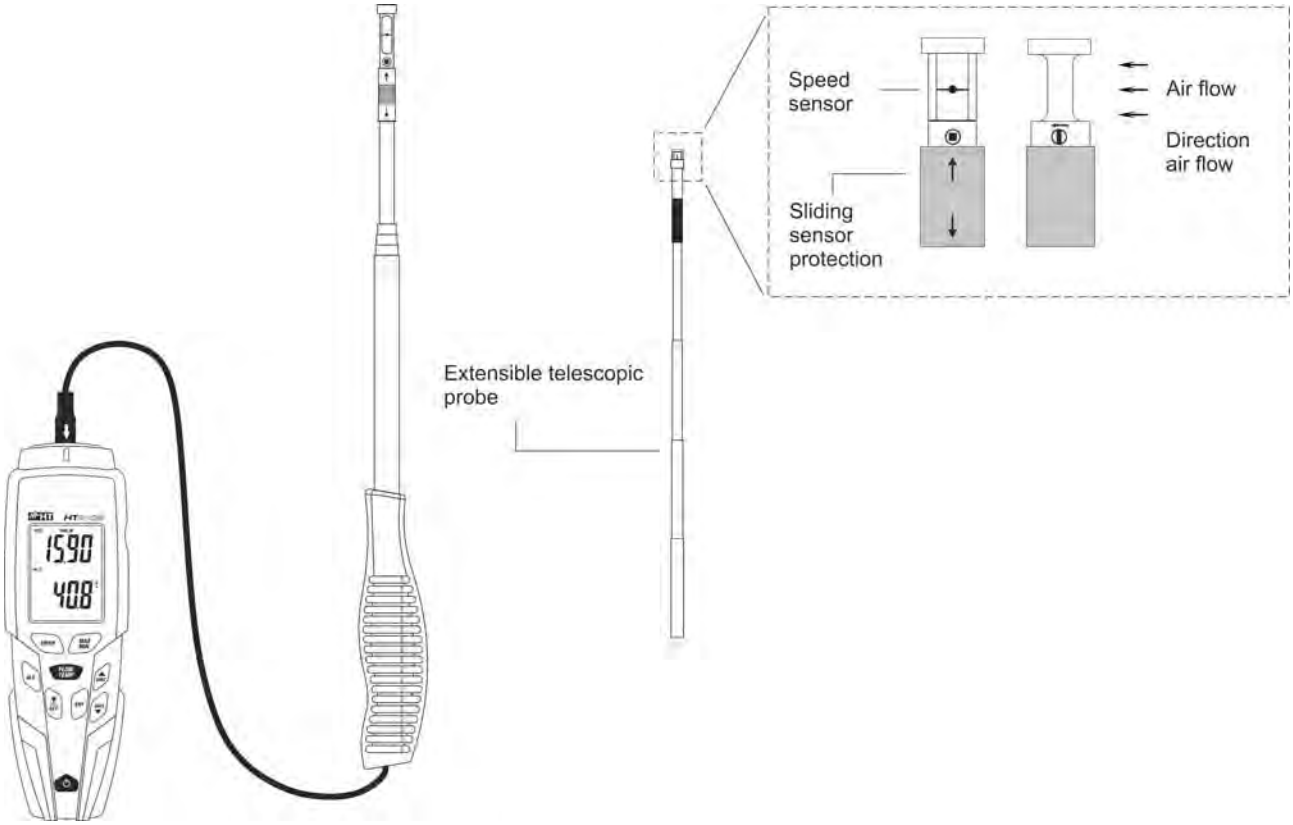


Fig. 7: Measurement of air speed and temperature

1. Insert the external probe on the top side by means of the relevant terminal (see Fig. 1 – part 1). Pay attention to the arrow found on the connector of the probe (see Fig. 7), which must be directed towards the front side of the instrument
2. Switch on the instrument using key **ON/OFF**.
3. Press key **▲UNIT** to set the measuring unit of air speed (see § 4.3.5) and key **UNIT▼** to set the measuring unit of air temperature (see § 4.3.6) on the secondary display after press key **FLOW/TEMP**
4. Let the protection slide (see Fig. 1 – part 15) until the sensors are covered and check that the indication on the main display is "0.00". In case it is not, please carry out the zeroing procedure (see § 4.3.2)
5. If necessary, expand the telescopic probe and position the air speed sensor in a parallel direction to the air flow as indicated by the arrow found on the top of the probe itself (see Fig. 7).
6. The value of air speed is indicated on the main display, while air temperature is shown on the secondary display.
7. Press key **HLD** to freeze the reading on the display.
8. To use MAX, MIN functions, see § 4.3.8.

5.2. MEASURING VOLUMETRIC FLOW RATE AND AIR HUMIDITY

CAUTION

Do not touch not expose the internal sensors found on the top side of the telescopic probe to mechanical shocks, in order to prevent damaging them.

1. Insert the external probe on the top side by means of the relevant terminal (see Fig. 1 – part 1). Pay attention to the arrow found on the connector of the probe (see Fig. 7), which must be directed towards the front side of the instrument
2. Switch on the instrument using key **ON/OFF**.
3. Press key ▲**UNIT** to set air speed measuring unit (see § 4.3.5).
4. Set the measuring unit and the size of the area of the duct to be tested (see § 4.4).
5. Press key **FLOW/TEMP** to select measurement of volumetric flow rate. The symbol "FLOW" is shown on the display.
6. Press key **UNIT**▼ to select measuring unit "CMM" or "CFM" on the secondary display (see § 4.3.6).
7. Let the protection slide (see Fig. 1 – part 15) until the sensors are covered and check that the indication on the main display is "0.00". In case it is not, please carry out the zeroing procedure (see § 4.3.2)
8. If necessary, expand the telescopic probe and position the air speed sensor in a parallel direction to the air flow as indicated by the arrow found on the top of the probe itself (see Fig. 7).
9. The value of air speed is indicated on the instrument's main display.
10. The value of air flow rate is indicated on the instrument's secondary display.
11. Press key **FLOW/TEMP** to select measurement of air humidity. The symbol "%RH" is shown on the display.
12. The value of air humidity is indicated on the instrument's secondary display.
13. Press key **HLD** to freeze the reading on the display.
14. To use MAX, MIN functions, see § 4.3.8.

5.3. CALCULATING AVERAGE VALUES OF QUANTITIES

5.3.1. Average value calculated by spots

CAUTION

Do not touch not expose the internal sensors found on the top side of the telescopic probe to mechanical shocks, in order to prevent damaging them.

1. Insert the external probe on the top side by means of the relevant terminal (see Fig. 1 – part 1). Pay attention to the arrow found on the connector of the probe (see Fig. 7), which must be directed towards the front side of the instrument
2. Switch on the instrument using key **ON/OFF**.
3. Press key **▲UNIT** to set air speed measuring unit (see § 4.3.5).
4. Press key **FLOW/TEMP** to select average values of measurements of volumetric flow rate, air temperature or humidity to be carried out with the same procedure as for air speed.
5. Press key **MEAN**. Symbols "•" and "Mean" are shown in the bottom part of the display, while the number of the measuring spots are show on the main display.
6. Carry out the first measurement of air speed as described in § 5.1 and press key **ENT**. The value of the first spot is shown on the secondary display (see Fig. 8 – left part).

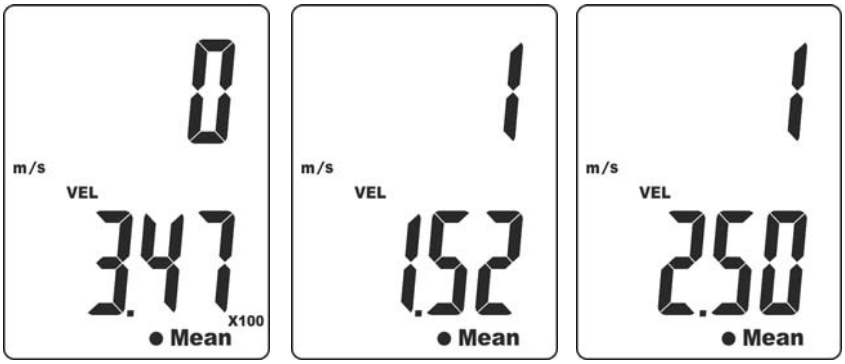


Fig. 8: Calculation of the average value of speed by spots

7. Carry out the second measurement of air speed as described in § 5.1 and press key **ENT**. The value of the second spot is shown on the secondary display (see Fig. 8 – middle)
8. Carry out other possible air speed measurements following the same procedures and, at the end, press key **MEAN**. Symbols "•" and "Mean" flash on the display and the value of the arithmetic mean is shown on the secondary display (see Fig. 8 – right side).
9. Press key **MEAN** again to go back to the normal measuring screen.

5.3.2. Average value calculated over time

CAUTION

Do not touch not expose the internal sensors found on the top side of the telescopic probe to mechanical shocks, in order to prevent damaging them.

1. Insert the external probe on the top side by means of the relevant terminal (see Fig. 1 – part 1). Pay attention to the arrow found on the connector of the probe (see Fig. 7), which must be directed towards the front side of the instrument
2. Switch on the instrument using key **ON/OFF**.
3. Press key ▲**UNIT** to set air speed measuring unit (see § 4.3.5).
4. Press key **FLOW/TEMP** to select average values of measurements of volumetric flow rate, air temperature or humidity to be carried out with the same procedure as for air speed.
5. Press and hold (>2s) key **MEAN**. Symbols "Mean" and "🕘" and air speed are shown respectively in the bottom part of the display and on the secondary display, while symbols "0000" and "mm/ss" (timer expressed in minutes/seconds) are shown on the main display (see Fig. 9 – left part).

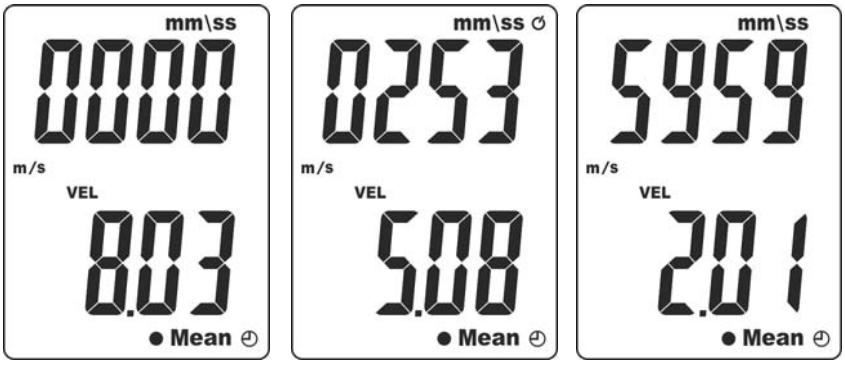


Fig. 9: Average value of speed calculated over time

6. Press key **ENT** to activate the measuring time (range: **1s ÷ 59min, 59sec**) indicated on the main display, while air speed measurement is running (see Fig. 9 – middle, referred to a measuring time of 2min e 53s)
7. Press key **ENT** key again to stop and/or extend measuring time
8. Press key **MEAN** to stop measurement. Symbols "Mean" and "🕘" flash on the display and the Average value calculated over time with sample rate of 1s is shown on the secondary display (see Fig. 9 – right side)
9. For measuring time over **20 minutes** (see Fig. 9 – right side) is necessary to disable the Auto Power OFF feature (see § 4.4)

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. Do not expose to direct sunlight.
3. Always switch off the instrument after use. In case the instrument is not to be used for a long time, remove the battery to avoid liquid leaks that could damage the instrument's internal circuits.

6.2. REPLACING THE BATTERY

When the LCD display shows symbol "▬", it is necessary to replace the battery.

CAUTION

- Only expert technicians should perform this operation. Before carrying out this operation, make sure you have removed the probe from the input terminal.
- When symbol "▬" is shown on the display, air speed indication is flashing and, in these conditions, the measured value does not comply with the declared accuracy indications.

1. Switch off the instrument
2. Remove the probe from the input terminal
3. Remove the battery compartment cover
4. Disconnect the battery from the connector.
5. Connect the new battery to the connector, and pay attention to correct polarity
6. Restore the battery compartment cover to its position.
7. Do not scatter old batteries into the environment. Use the relevant containers for battery 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: this symbol found on the instrument indicates that the appliance, its accessories and the battery must be collected separately and correctly disposed of.

7. TECHNICAL SPECIFICATIONS

7.1. TECHNICAL CHARACTERISTICS

Accuracy is calculated as ±[%reading + value] at 25°C, <80%RH

Measurement of air speed through hot-wire sensor

Measuring unit	Range	Resolution	Accuracy
m/s	0.10 ÷ 20.00	0.01m/s	±(5%rdg+ 0.03)
km/h	0.4 ÷ 72.0	0.1km/h	
ft/min	20 ÷ 3937	1ft/min	
MPH	0.3 ÷ 44.7	0.1MPH	
knots	0.2 ÷ 39.0	0.1knots	

m/s = meters/second ; **km/h** = kilometers/hour ; **ft/min** = feet/minute ; **MPH** = miles/hour ; **knots** = nautical miles/hour

Measurement of air volumetric flow rate

Measuring unit	Range	Resolution	Description
CMM	0 ÷ 99999	0.001 ÷ 100	CMM = m^3/min
CFM			CMM = ft^3/min

CMM = air speed (m/s) * Area (m^2) * 60 ; CFM = air speed (ft/min) * Area (ft^2)

Measurement of air temperature

Measuring unit	Range	Resolution	Accuracy
°C	0.0°C ÷ 50.0°C	0.1°C	±1°C
°F	32.0°F ÷ 122.0°F	0.1°F	±1.8°F

Measurement of air relative humidity

Range	Resolution	Accuracy
0%RH ÷ 100%RH	0.1%RH	±5%RH

7.1.1. General characteristics

Mechanical characteristics

Size (L x W x H):	190 x 65 x 45mm (7 x 3 x 2in)
Length of telescopic probe:	from 13cm to 1m (from 5in to 3ft)
Length of telescopic probe cable:	170cm (6ft)
Diameter of telescopic probe:	12mm (0.4in)
Weight (battery included):	240g (8ounces)
Weight of telescopic probe:	165g (6ouces)
Air speed sensor:	hot-wire
Air temperature sensor:	digital sensor
Mechanical protection:	IP40

Power supply

Battery type:	1x9V alkaline battery type NEDA 1604 IEC 6FL22
Low battery indication:	symbol "▬" on the display
Battery life:	approx. 15hours (backlight ON), approx. 20 hours (backlight OFF)
Out-of-range indication:	"**OL.**" symbol on the display
Auto Power OFF:	after 20 minutes' idling

Display

Main display:	4 LCD plus decimal point, sign, backlit
Secondary display:	4 LCD plus decimal point, sign, backlit
Updating speed:	approx. 0.8s

7.2. ENVIRONMENT

7.2.1. Environmental conditions for use

Reference temperature:	25°C (77°F)
Operating temperature:	0°C ÷ 50°C (32°F ÷ 122°C)
Allowable relative humidity:	<80%RH
Storage temperature:	-10°C ÷ 60°C (14°F ÷ 140°F)
Storage humidity:	<80%RH
Max operating altitude:	2000m (6562ft)

This instrument complies with European Directive EMC 2014/30/EU
This instrument satisfies the requirements of European Directive 2011/65/EU (RoHS) and 2012/19/EU (WEEE).

7.3. ACCESSORIES

- External telescopic probe
- Battery
- User manual
- Transport case

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. 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. 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 batteries (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 battery and replace it, 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.