

The logo graphic consists of a series of parallel lines that form a stylized 'V' shape on the left, which then transitions into a horizontal line extending to the right.

VOLTcraft®

PL-135 HAN HOT-WIRE ANEMOMETER

Ⓞ OPERATING INSTRUCTIONS

Page 21 – 38

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CE

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1. INTRODUCTION

Dear Customer,

In purchasing this Voltcraft® product, you have made a very good decision for which we would like to thank you.

Voltcraft® - In the field of measuring, charging and network technology, this name stands for high-quality products which perform superbly and which are created by experts whose concern is continuous innovation.

From the ambitious hobby electronics enthusiast to the professional user, products from the Voltcraft® brand family provide the optimum solution even for the most demanding tasks. And the remarkable feature is: we offer you the mature technology and reliable quality of our Voltcraft® products at an almost unbeatable price-performance ratio. In this way, we aim to establish a long, fruitful and successful co-operation with our customers.

We wish you a great deal of enjoyment with your new Voltcraft® product!

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2. INTENDED USE

Use this product to measure air temperature, airflow velocity and volume flow rate via an external, tethered telescopic hot-wire sensor with thermistor. The product is suited for all kinds of applications related to heating, air-conditioning and ventilation. The readings are shown on the LC display. When the product is connected to a computer, the readings can be displayed as a graph and exported as a text document using the included software. Power is supplied via an integrated LiPo rechargeable battery.

It is intended for indoor use only. Do not use it outdoors. Contact with moisture, e.g. in bathrooms, must be avoided under all circumstances.

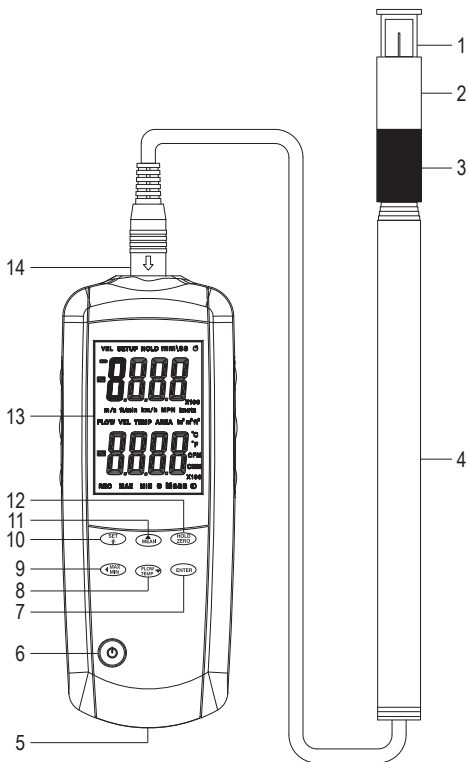
For safety and approval purposes (CE), you must not rebuild and/or modify this product. If you use the product for purposes other than those described above, the product may be damaged. In addition, improper use can cause hazards such as short circuiting, fire, electric shock etc. Read the instructions carefully and keep them. Make this product available to third parties only together with its operating instructions.

This product complies with the statutory national and European requirements.







Observe all safety instructions and information within this operating manual.

3. OPERATING ELEMENTS



- | | |
|------------------------------|----------------------------|
| 1 Sensor head | 8 FLOW TEMP button |
| 2 Protective sleeve | 9 MAX MIN button |
| 3 Gripping area | 10 SET button |
| 4 Telescopic hot-wire sensor | 11 MEAN button |
| 5 Mini-USB port | 12 HOLD ZERO button |
| 6 On/off button | 13 LC display |
| 7 ENTER button | 14 Sensor connection |

4. DISPLAY ELEMENTS

Display element	Meaning
	Battery symbol
VEL	Airflow velocity
SETUP	Settings menu
HOLD	Freeze readings
mm/ss	Time in minutes and seconds
	Automatic shutdown active
m/s, ft/min, km/h, MPH, knots	Units of velocity
FLOW	Volume flow
TEMP	Temperature
AREA	Cross sectional area
in ² , m ² , ft ²	Units of area
°C, °F	Units of temperature
CFM, CMM	Units of volume flow
X10, X100	Multiplier
Mean 	Mean value (period)
 Mean	Mean value (number)
REC MAX, REC MIN	Max./min. reading

5. SYMBOL EXPLANATION



An exclamation mark in a triangle indicates important notes in these operating instructions that must be strictly observed.



The triangle containing a lightning symbol warns against danger of electric shock or impairment of the electrical safety of the device.



The arrow symbol alerts the user to the presence of important tips and notes on using the device.



This device is CE compliant and fulfills all applicable European guidelines.

6. SAFETY INSTRUCTIONS



Read the operating instructions carefully and especially observe the safety information. If you do not follow the safety instructions and information on proper handling in this manual, we assume no liability for any resulting personal injury or damage to property. Such cases will invalidate the warranty/guarantee.



a) Persons / Product

- The device is not a toy. Keep it out of the reach of children and pets.
- Do not leave packaging material lying around carelessly. These may become dangerous playing material for children.
- Protect the product from extreme temperatures, direct sunlight, strong jolts, high humidity, moisture, flammable gases, vapours and solvents.
- Do not place the product under any mechanical stress.

- If it is no longer possible to operate the product safely, take it out of operation and protect it from any accidental use. Safe operation can no longer be guaranteed if the product:
 - is visibly damaged,
 - is no longer working properly,
 - has been stored for extended periods in poor ambient conditions or
 - has been subjected to any serious transport-related stresses.
- Please handle the product carefully. Jolts, impacts or a fall even from a low height can damage the product.
- Also observe the safety and operating instructions of any other devices which are connected to the product.
- Make sure the cables do not get crimped, bent or damaged by sharp edges.
- Never use the product immediately after it has been brought from a cold room into a warm one. The condensation generated could destroy the product. Allow the device to reach room temperature before connecting and using it. This may take several hours.
- In schools, educational establishments, hobby and self-help workshops, the operation of this product must be monitored by trained personnel.
- For installations in industrial facilities, follow the accident prevention regulations for electrical systems and equipment of the government safety organization or the corresponding authority for your country.

b) Rechargeable batteries

- The rechargeable battery is permanently built into the product and cannot be replaced.
- Never damage the rechargeable battery. Damaging the casing of the rechargeable battery might cause an explosion or a fire! Unlike conventional batteries/rechargeable batteries (e.g. AA or AAA type), the casing of the LiPo rechargeable battery does not consist of a thin sheet but rather a sensitive plastic film only.
- Never short-circuit the contacts of the rechargeable battery. Do not throw the battery or the product into fire. There is a danger of fire and explosion!
- Charge the rechargeable battery regularly, even if you do not use the product. Due to the rechargeable battery technology being used, you do not need to discharge the rechargeable battery first.
- Never charge the rechargeable battery of the product unattended.
- When charging, place the product on a surface that is not heat-sensitive. It is normal that a certain amount of heat is generated during charging.

c) Miscellaneous

- Consult an expert when in doubt about operation, safety or connection of the device.
- Maintenance, modifications and repairs are to be performed exclusively by an expert or at a qualified shop.

If you are not sure about the correct connection or use, or if questions arise which are not covered by these operating instructions, please do not hesitate to contact our technical support or another qualified specialist.

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7. DELIVERY CONTENT

- Meter
- Telescopic hot-wire sensor
- USB cable
- Software CD
- Case
- Operating instructions

8. CHARGING THE RECHARGEABLE BATTERY

1. Connect the USB cable's Mini-USB plug to the Mini-USB port (5) on the meter.
2. Connect the USB cable's USB A plug to a USB port of a USB power source (i.e. computer, USB power adaptor, etc.).
3. The battery symbol blinks in the upper left of the display (13) to signalize that the rechargeable battery is charging.
4. When the battery symbol remains lit, charging is complete. Disconnect the USB cable from the meter and the power source.

➔ Charging takes approx. 4 – 5 hours.

Charge the rechargeable battery as soon as the battery symbol appears on the display during use.

9. OPERATION

a) Basic function

1. Connect the telescopic hot-wire sensor's (4) plug to the meter's sensor connection (14). The plug can only be plugged in one way. Do not exert any force. The arrow on the plug must point to the arrow above the display (13).
2. Push down the metallic protective sleeve (2) on the sensor head (1) to expose the hot-wire sensor and the thermistor.
3. Pull the telescopic rod apart to the required length. Hold the rod by the black gripping area (3).

4. Push the on/off button (6) to turn on the product. All display elements will light up briefly. An eight second countdown follows, after which the device is operational.
5. Hold the sensor head (1) into the area you wish to measure. The real-time measurement readings appear on the display (13):
 - Upper half of display: airflow velocity (**VEL**)
 - Lower half of display: volume flow (**FLOW**) or temperature (**TEMP**)
- ➔ Two arrows are imprinted on the sensor head at the level of the hot-wire sensor. During measurement, hold the sensor head so that the arrows point in the direction of airflow.
6. Push the **FLOW TEMP** button (8) to switch between displaying volume flow and temperature in the lower half of the display.
- ➔ The airflow's cross sectional area must be entered in order for the meter to correctly calculate volume flow. Refer to the chapter "Settings".
Should one of the multipliers (**X10** or **X100**) appear beneath the reading, multiply the reading by this multiplier to receive the correct measurement value.
7. After use, push the metallic protective sleeve (2) back over the sensor head to protect the hot-wire sensor and the thermistor.
8. Turn off the meter, disconnect the telescopic hot-wire sensor (4) from the meter and collapse the telescopic rod.

b) **MAX/MIN** function

- Repeatedly push the **MAX/MIN** button (9) during measuring to switch between displaying the maximum and minimum measured values. The corresponding indicator (**REC MAX** or **REC MIN**) is shown at the bottom of the display (13).
- Push and hold the **MAX/MIN** button for approx. one second to return to displaying the real-time measured value.

c) MEAN function (average value)

You can determine the average value using the number of readings or the measuring period.

Number of readings

1. During measuring, push the **MEAN** button (11). The indicator ● **Mean** appears at the bottom of the display (13).
2. The real-time measured value appears in the lower half of the display. Repeatedly push the **FLOW TEMP** button (8) to switch between displaying the temperature, airflow velocity and volume flow.
3. Push the **ENTER** button (7) to register the reading. This registered reading will appear in the upper half of the display. Repeat this process until you have registered the desired number of readings.
4. Push the **MEAN** button. The indicator ● **Mean** flashes and the calculated average value of the registered readings is shown in the lower half of the display.
5. Push the **MEAN** button to return to normal measurement mode.

Measuring period

1. During measuring, push and hold the **MEAN** button (11) for approx. one second. The indicator **Mean** ⊖ appears at the bottom of the display (13). The indicator **mm/ss** and four horizontal lines appear in the upper half of the display.
2. The real-time measured value appears in the lower half of the display. Repeatedly push the **FLOW TEMP** button (8) to switch between displaying the temperature, airflow velocity and volume flow.
3. Push the **ENTER** button (7) to begin calculating the average value based on the measuring period. The time lapsed appears in the upper half of the display.
4. If necessary, push the **ENTER** button to interrupt/continue time measurement.
5. Push the **MEAN** button. The indicator **Mean** ⊖ flashes and the calculated average value of the measuring period is shown in the lower half of the display.
6. Push the **MEAN** button to return to normal measurement mode.

d) **HOLD function**

- During measuring, push the **HOLD ZERO** button (12) to freeze the current readings on the display (13). The indicator **HOLD** appears at the top of the display.
- Push the **HOLD ZERO** button again to return to displaying the real-time readings. The **HOLD** indicator vanishes.

e) **ZERO function (zero setting)**

During measuring, push and hold the **HOLD ZERO** button (12) for approx. one second. The airflow reading will be set to the value zero.

f) **Backlight**

Push the **SET** button (10) to activate/deactivate the backlight.

- ➔ The backlight will not turn off automatically after a time, it must be manually deactivated.

10. SETTINGS

a) **General**

1. While in normal measurement mode, push and hold the **SET** button (10) for approx. one second to enter the settings menu. The display (13) shows the indicators **SETUP**, **unit** and **TEMP**.
2. Use the **MEAN** (11) and **FLOW TEMP** (8) buttons to navigate through the menu.
3. Push the **ENTER** button (7) to select the desired menu item.
4. Make your selection using the **MEAN** and **FLOW TEMP** buttons and confirm using the **ENTER** button.
5. Push and hold the **SET** button for approx. one second to exit the settings menu.

Menu item	Options
unit TEMP (unit of temperature)	°C (degree Celsius) °F (degree Fahrenheit)
unit VEL (unit of airflow velocity)	m/s (meters per second) ft/min (feet per minute) km/h (kilometers per hour) MPH (miles per hour) knots
unit FLOW (unit of volume flow)	CFM (cubic feet per minute) CMM (cubic meter per minute)
unit AREA (unit of airflow cross sectional area)	in ² (square inches) m ² (square meters) ft ² (square feet)
AREA (airflow cross sectional area)	see "b) Airflow cross sectional area"
SLP (automatic shutdown)	ON (activated) OFF (deactivated)

➔ When the automatic shutdown function is activated, the meter will turn off automatically after 20 minutes of inactivity.

b) Airflow cross sectional area

1. Navigate to the menu item **AREA** and push the **ENTER** button (7). The four digits in the lower half of the display (13) begin to flash.
2. Repeatedly push the **MAX MIN** button (9) to set the number of decimal places.
3. Confirm your selection with the **ENTER** button. The last digit flashes.
4. Change the value with the **MEAN** (11) and **FLOW TEMP** (8) buttons.
5. Confirm your selection with the **MAX MIN** button. The second last digit flashes.
6. Set the airflow cross sectional area value as described above and confirm the selection with the **ENTER** button.

→ The value remains set even after shutdown.

11. SOFTWARE

a) Installation

1. Insert the CD into the corresponding drive of a computer.
2. Should the installation program not open automatically, open the file **INSTALLER.exe** from the CD.
3. Follow the instructions on your screen.

→ Click the button **Software** to install the software.

Find out whether your operating system is 32 or 64 Bit. Then click either **Driver 32** or **Driver 64** accordingly to install the USB driver.

b) Connecting the meter to a PC

1. Connect the USB cable's Mini-USB plug to the meter's Mini-USB port (5).
2. Connect the USB cable's USB A plug to a free USB port on the computer.
3. Push the on/off button (6) to turn on the product.
4. Open the software.
5. You can find more information on the software and its functions in the instructions for use, which you can access via the software help menu.

12. MAINTENANCE AND CLEANING



Do not use any aggressive cleaning agents, rubbing alcohol or other chemical solutions as they can cause damage to the housing and malfunctioning.

- Before cleaning, disconnect the USB cable from the product and push the metallic protective sleeve (2) over the sensor head (1).
- Never submerge the product in water.
- There are no components located inside the product you need to maintain. Never open/dismantle the product.
- To clean the product, a dry, soft and clean cloth is sufficient. Do not apply too much pressure to the housing to prevent scratching.
- Use a longhaired, soft and clean brush and a vacuum cleaner to easily remove dust.

13. DISPOSAL

a) Product



Electronic devices are recyclable waste and must not be disposed of in the household waste.

At the end of its service life, dispose of the product according to the relevant statutory regulations.

The built-in battery must be disposed of by a specialist.

b) (Rechargeable) batteries

You as the end user are required by law (Battery Ordinance) to return all used batteries/rechargeable batteries. Disposing of them in the household waste is prohibited.



Contaminated (rechargeable) batteries are labelled with this symbol to indicate that disposal in the domestic waste is forbidden. The designations for the heavy metals involved are: Cd = Cadmium, Hg = Mercury, Pb = Lead (name on (rechargeable) batteries, e.g. below the trash icon on the left).

Used (rechargeable) batteries can be returned to collection points in your municipality, our stores or wherever (rechargeable) batteries are sold.

You thus fulfil your statutory obligations and contribute to the protection of the environment.

14. TECHNICAL DATA

a) General

Internal battery.....	LiPo / 3.7 V / 1000 mAh
Current consumption	approx. 60 – 120 mA (operation)
Measuring interval	approx. 0.8 s
Operating conditions.....	0 to +50 °C, <80 % RH
Storage conditions.....	-10 to +60 °C, <80 % RH
Telescope length.....	32 – 115 cm
Cable length	1.75 m
Display dimensions (W x H)	41 x 60 mm
Dimensions (W x H x D)	62 x 160 x 21 mm
Weight	280 g (incl. telescopic hot-wire sensor + cable) 142 g (telescopic hot-wire sensor + cable)

b) Airflow velocity

Unit	Measurement range	Resolution	Accuracy
m/s	0.1 – 25	0.01	±(5 % + 1 d) of the displayed value
km/h	0.3 – 90.0	0.1	
ft/min	20 – 4925	1	or
MPH	0.2 – 55.8	0.1	±(1 % + 1 d) of the entire measuring range
knots	0.2 – 48.5	0.1	

- m/s = meters per second
km/h = kilometers per hour
ft/min = feet per minute
MPH = miles per hour

c) Temperature

Unit	Measurement range	Resolution	Accuracy
°C	0 to +50	0.1	±1
°F	+32 to +122		±1.8

d) Volume flow

Unit	Measurement range	Resolution
CFM	0 – 99999	0.001 – 100
CMM		

→ Calculation of volume flow:

CFM = Airflow velocity (ft/min) x airflow cross sectional area (ft²)

CMM = Airflow velocity (m/s) x airflow cross sectional area (m²) x 60