



## testo 420 · Flow Hood

Instruction manual





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## 2 Safety and the environment

### 2.1. About this document

#### Use

- > Please read this documentation through carefully and familiarize yourself with the product before putting it to use. Pay particular attention to the safety instructions and warning advice in order to prevent injuries and damage to the products.
- > Keep this document to hand so that you can refer to it when necessary.
- > Hand this documentation on to any subsequent users of the product.

#### Symbols and writing standards

Representation	Explanation
	Warning advice, risk level according to the signal word: <b>Warning!</b> Serious physical injury may occur. <b>Caution!</b> Slight physical injury or damage to the equipment may occur. > Implement the specified precautionary measures.
	Note: Basic or further information.
1. ...	Action: more steps, the sequence must be followed.
2. ...	
> ...	Action: a step or an optional step.
- ...	Result of an action.
<b>Menu</b>	Elements of the instrument, the instrument display or the program interface.
<b>[OK]</b>	Control keys of the instrument or buttons of the program interface.
...   ...	Functions/paths within a menu.
“...”	Example entries

## 2.2. Ensure safety

- > Do not operate the instrument if there are signs of damage at the housing, mains unit or feed lines.
- > Do not perform contact measurements on non-insulated, live parts.
- > Do not store the product together with solvents. Do not use any desiccants.
- > Carry out only the maintenance and repair work on this instrument that is described in the documentation. Follow the prescribed steps exactly. Use only original spare parts from Testo.
- > Dangers may also arise from the systems being measured or the measuring environment: Note the safety regulations valid in your area when performing the measurements.

## 2.3. Protecting the environment

- > Dispose of faulty rechargeable batteries/spent batteries in accordance with the valid legal specifications.
- > At the end of its useful life, send the product to the separate collection for electric and electronic devices (observe local regulations) or return the product to Testo for disposal.

## 3 Specifications

The testo 420 is used for volume flow measurements (main application), Pitot tube measurements and pressure measurements for air conditioning and ventilation systems. Thanks to its interchangeable flow hoods, the testo 420 can be used for air inlets and outlets of various sizes.

The testo 420 can be connected to the additional testo Smart App (Android/iOS) or the testo 400 via Bluetooth. This allows the readings to be conveniently displayed on a tablet/smartphone or the testo 400. Moreover, a measurement can be configured, started, stopped and saved via the app/the testo 400.

## 4 Technical data



The use of the wireless module is subject to the regulations and stipulations of the respective country of use, and the module may only be used in countries for which a country certification has been granted. The user and every owner has the obligation to adhere to these regulations and prerequisites for use, and acknowledges that the re-sale, export, import etc. in particular in countries without wireless permits, is his responsibility.

Feature	Values
Measurement parameters	Temperature: °C / °F Humidity: %RH / %rF / td°C / WB°C Flow velocity : m/s / ft/min Volume flow: m <sup>3</sup> /h / cfm / l/s Pressure (absolute pressure): hPa / mbar / kPa Pressure (differential pressure): Pa / hPa / mbar / mmH <sub>2</sub> O / inH <sub>2</sub> O
Measuring cycle	1/sec
Interfaces	Probe interface Mini DIN Micro USB
Measuring ranges	Temperature: -20 to +60 °C / -4 to 140 °F Humidity: 0 to 100% RH (Not for condensing atmospheres. For continuous application in high humidity (> 80 %RH at ≤ 30 °C for > 12 h, > 60 %RH at > 30 °C for > 12 h), contact us via <a href="http://www.testo.com.">www.testo.com.</a> ) Wet bulb temperature: -20 to +60 WB°C Dew point: -76 to +60 td°C Flow velocity: 0 to 14 m/s / 0 to 2750 ft/min Volume flow: 50 to 4000 m <sup>3</sup> /h / 30 to 2350 cfm / 11 to 1100 l/s Pressure (absolute pressure): 700 to 1100 hPa Pressure (differential pressure): -120 to +120 Pa

Feature	Values
Resolution	<p>Temperature: 0.1 °C / 0.1°F</p> <p>Humidity: 0.1% RH</p> <p>Flow velocity: 0.01 m/s</p> <p>Volume flow: 1 m<sup>3</sup>/h / 1 cfm</p> <p>Pressure (absolute pressure): 0.1 hPa / 0.1 mbar / 0.01 kPa</p> <p>Pressure (differential pressure): 0.001 Pa / 0.00001 hPa / 0.00001 mbar / 0.0001 mm H<sub>2</sub>O / 0.000001 inH<sub>2</sub>O</p>
Accuracy	<p>Temperature: ±0.5 °C (0 to +60 °C) / ±0.8 °C (-20 to 0 °C)</p> <p>Humidity: ±1.8% RH +3% of m.v. at +25 °C (5 to 80% RH)</p> <p>±0.03 %RH/K (at 0 ... 60 °C)</p> <p>±1 %RH hysteresis</p> <p>±1 %RH/year drift</p> <p>Flow velocity: no accuracy specification since calculated variable</p> <p>Volume flow 1: ±3% of m.v. +12 m<sup>3</sup>/h at +22 °C, 1013 hPa (85 to 3500 m<sup>3</sup>/h)</p> <p>±3% of m.v. +7 cfm at +72 °F, 405 inH<sub>2</sub>O (50 to 2,060 cfm)</p> <p>Error absolute pressure compensation: ±0.04% of m.v. / hPa deviating from 1013 hPa</p> <p>Pressure (absolute pressure): ± 3 hPa</p> <p>Pressure (differential pressure): ±2% of m.v. + 0.5 Pa (at 22°C, 1013 hPa)</p> <p>Error absolute pressure compensation: ±0.04% of m.v. / hPa deviating from 1013 hPa</p>



Minimum outlet size:

335 x 335 mm.

For smaller outlet sizes, the accuracy specifications may vary.

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<sup>1</sup> All accuracy specifications apply under laboratory conditions or with necessary compensation (correction factor) with the standard hood 610x610 mm. Minimum outlet size of 360x360 mm

Feature	Values
	<p><b>i</b> Please ensure that the volume flow hood is situated at the minimum distance from the floor.          Incoming air (air flows from the outlet into the room): 1 x height of the flow hood.          Outgoing air (air flows from the room into the duct): 0.5 x height of the flow hood.</p>
Temperature coefficient	<p>Humidity: <math>\pm 0.03\%</math> RH / K (deviating from 22 °C, in the range 0 to 60 °C)</p> <p>Volume flow: <math>\pm 0.02\%</math> of m.v. / K (deviating from 22 °C, in the range 0 to 60 °C)</p> <p>Pressure (absolute pressure): <math>\pm 0.02\%</math> of m.v. / K (deviating from 22 °C, in the range 0 to 60 °C)</p> <p>Pressure (differential pressure): <math>\pm 0.02\%</math> of m.v. / K (deviating from 22 °C, in the range 0 to 60 °C)</p>
Response time t90	<p>Temperature: approx. 45 s</p> <p>Humidity: approx. 15 s</p> <p>Flow velocity: approx. 1 s</p> <p>Volume flow: approx. 1 s</p> <p>Pressure (absolute pressure): approx. 1 s</p> <p>Pressure (differential pressure): approx. 1 s</p>
Operating and ambient conditions	<p>Storage temperature: -20 to +60 °C / -4 to 140 °F</p> <p>Operating temperature: -5 to +50 °C/+23 - +122°F</p> <p>Humidity: 0 to 100% RH</p> <p>Pressure range: 800 to 1100 hPa</p>

## 4 Technical data

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Feature	Values
Housing / measurement setup	Measuring instrument housing material: ABS Body material: PP Standard hood material: Nylon Measuring instrument dimensions: 150x85x35 mm Body dimensions: 510x456x148 mm Dimensions of measurement setup with standard hood: 610x970x610 mm Weight of entire measurement setup approx. 2900 g
Power supply	4 x 1.5 V rechargeable/non-rechargeable batteries Type AA / alkaline manganese, mignon Battery lifetime: approx. 40h (eroing interval 10 seconds, display illumination off, Bluetooth off)
Display	Type: Dot matrix Dimensions: 3.5 inches
Directives, standards and tests	EU guideline: 2014/30/EU

## 5 Product description

### 5.1. Overview

#### 5.1.1. Measurement setup



- 1 Volume flow hood (standard hood 610x610 mm)
- 2 Actuator for manual measurement
- 3 Measuring instrument testo 420
- 4 Measurement base with differential pressure cross
- 5 Integrated flow straightener

### 5.1.2. Overview of testo 420



- 1 Battery compartment, on rear of the instrument
- 2 Display
- 3 Control keys
- 4 Probe socket Mini-DIN (only for use on the measurement base)
- 5 Micro-USB port
- 6 Connection for pressure measurement

#### Instrument status icons:

Icon	Meaning
	Battery capacity
	Bluetooth
	Measuring mode: Pressure measurement, Pitot tube, volume flow (air pressure from above into the hood / suction outlet)
<b>Actual</b>	Actual volume flow: The current ambient conditions are used to calculate the volume flow. The actual barometric pressure is measured with the internal sensor. In applications with volume flow hood, the temperature is measured by the integrated temperature/humidity sensor, with Pitot tube measurement the actual temperature needs to be input manually.

Icon	Meaning
<b>Standard</b>	Standard volumetric flow: The standard settings for temperature and barometric pressure (21 °C / 1013 hPa in accordance with the standard conditions of the NIST, National Institute of Standards and Technology) are used to calculate the volume flow.
<b>K-factor</b>	Factor by which the current reading is multiplied. Depends on which outlet measurements are being taken at.
<b>Pitot Tube factor (P-factor)</b>	The Pitot tube factor for Pitot tubes is generally the same and must be entered: <ul style="list-style-type: none"> <li>• Pitot tubes from Testo: 1.00</li> <li>• Pitot tubes from other manufacturers: the Pitot tube factor can be found in the instruction manual or you should ask your supplier.</li> </ul>

### Control keys

Key	Function
	Menu
	Holds / starts / stops a measurement
	Switches to the previous view / to the measurement view
	Saves the measured values
	Navigation within the menu
	Confirms a selection
	Switch instrument on/off (press and hold down) Switch illumination on/off (press briefly)

## 6 First steps

### Inserting batteries/rechargeable batteries

1. Open the battery compartment.
2. Insert the batteries or rechargeable batteries (scope of delivery includes 4x 1.5V Type AA/ LR6).
3. Close the battery compartment.



When not in use for a long period of time, take the batteries/rechargeable batteries out.

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### Implementing settings

1. Press  to access the menu.
2. Select the menu item you require using , , , .

### Key functions

Display	Explanation
 ,  ,  , 	Change parameter, select unit
	Confirm input

1. Menu Level	2. Menu Level	3. Menu Level
Application	Flow Hood	K-factor
		Actual/Standard
	Pitot tube	Duct
		Pitot tube factor
		Pitot Temperature
		Actual/Standard
	Pressure only	--
Measuring Program	Single Measurement	--

1. Menu Level	2. Menu Level	3. Menu Level
	Continuous Measurement <sup>2</sup>	--
	Continuous/Punctual measurement (nur für Staurohr)	measuring duration <sup>3</sup>
Memory	New Folder	--
	T420 folder	--
Display	Volume Flow	on/off
	Diff. Pressure	on/off
	Temperature	on/off
	Velocity	on/off
	Humidity	on/off
	Abs. Pressure	on/off
Device Settings	Language	English/German/Italian/French/Spanish
	Backlight Auto Off	On/Off
	Auto Off	On/Of
	Bluetooth	On/Off
	Date&Time	Date Format
		Time Format
		Set Date&Time
	Gliding average	5 – 20 sec
	Hood adjustment	Supply Air
		Exhaust Air
	Zeroing int	1-20 sec

<sup>2</sup> Maximum of 15 minutes, measuring cycle 1 second

<sup>3</sup> Maximum of 25 points and 1 minute per point.

1. Menu Level	2. Menu Level	3. Menu Level
Reset Device	--	--

# 7 Using the product

## 7.1. Switching Bluetooth® on and off

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**i** To establish a connection via Bluetooth, you need the testo 400 (App version 14.31 or later) or a tablet/smartphone with the **testo Smart App** already installed on it.

The app is available for iOS devices in the App Store or for Android devices in the Play Store.

Information about compatibility can be found in the relevant App Store.

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**i** Measurements can be configured and carried out using the testo 400 or the app and saved in the testo 420 instrument memory or directly on the testo 400 or the testo Smart App. During Bluetooth connection to your testo 400/mobile device, the measuring mode and memory function are not available on the testo 420.

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### Switching on Bluetooth

#### 1. Hold ▲ down for 3 seconds.

- Once the Bluetooth icon is shown on the display, Bluetooth is switched on.
- If no connection is established, Bluetooth switches off after 10 mins.

or

#### 1. Press -> **Instrument settings** -> **Bluetooth**, press **►** and **▲/▼** to select -> On. Confirm with .

- Once the Bluetooth icon is shown on the display, Bluetooth is switched on.
- If no connection is established, Bluetooth switches off after 10 mins.

Display	Explanation
 flashes	There is no Bluetooth connection, or a potential connection is being searched for.
 is permanently displayed	There is a Bluetooth connection.
 is not displayed	Bluetooth is disabled.

## 7.2. Settings for the measurement

 The sensor must not be exposed to volatile chemicals such as solvents (e.g. ketene, ethanol, isopropyl alcohol, toluene) or organic compounds, especially in high concentrations and corresponding gases, over a prolonged period of time.

### 7.2.1. Damping (Gliding Average)

If the readings fluctuate widely, it is advisable to damp the readings. The time range for the damping can be set manually between 5-20 seconds.

1. Press , then select **Device settings** and **Gliding average**.
  - The damping can be set between 5-20 seconds.

### 7.2.2. Hood Calibration

This input is provided for the filing of calibration data by the relevant calibration laboratory. The flow hood-specific adjustment data can be input manually for supply air and exhaust air and has a direct effect on the measurement results. Input option of 0.001-9.999.

1. Press , then select **Device settings** and **Hood adjustment**.
  - Calibration of the hood can be set for supply air and exhaust air.

### 7.2.3. Zeroing Interval (Automatic Zeroing)

The pressure sensor carries out automatic zeroing at regular intervals. These intervals can be set via the automatic zeroing.

1. Press , then select **Device settings** and **Zeroing int.**
  - The zeroing interval can be set between 1-20 seconds.

## 7.3. Volume flow measurement setup

### Standard hood

(610x610 mm, scope of delivery; 360x360 mm, accessories)



1. Pull the lower end of the hood over the measurement base.
2. Attach the hood at two corners using the snap fasteners.
3. Tighten the closure.
4. Screw together a short and long section of the support rods (4x) at the silver ends.
5. Push the support rods (4x) through the hood, along the markings and into the funnel in the measurement base.
6. Push the support rods (4x) on the top of the hood into the bracket  
- The hood is installed.

**Large hood**  
(1220x610 mm, 1220x305 mm and 915x915 mm, accessories)



1. Install the aluminium frame and stretch the fabric hood over the framework, so that the elastic band lies in the recess of the frame. Make sure that the elastic band fits correctly, especially at the corners.
2. Pull the lower end of the hood over the measurement base.
3. Attach the hood at two corners using the snap fasteners.
4. Tighten the closure.
5. Screw together a short and long section of the support rods (4x) at the silver ends.
6. Push the support rods (4x) through the hood, along the markings and into the funnel in the measurement base.
7. Push the support rods (4x) on the top of the hood into the bracket  
- The hood is installed.

### Attaching the measuring instrument



1. Push the testo 420 completely into the instrument holder, pay attention to the catch on the right-hand and left-hand side in the bracket.

## 7.4. Measuring

### 7.4.1. Volume flow measurement

- ✓ The volume flow hood is fitted.

1. Switch on the instrument.
2. In the instrument settings, set the application volume flow hood and also the required measurement program:  
Single measurement or Continuous measurement.

3. Press , on the testo 420, or the trigger on the measurement base to hold or start and stop the measurement.
4. Press to save the measurement data. Unsaved measurement data is lost once you carry out the next measurement.
  - The target folder and file name are displayed, confirm with to save the measurement data under this name and in the selected folder.

#### 7.4.2. Pitot tube measurement

1. Remove the testo 420 from the measurement base.
2. Connect the hoses to the testo 420 and to the Pitot tube.
3. Press -> **Application** -> **Pitot tube** and there set the duct geometry, the Pitot tube factor and the temperature, and choose between actual and standard.
4. Select the required measurement program.



With a timed/multi-point measurement program, the required number of measuring points can be recorded using , . To end the measurement, press and hold down , for at least 3 s. At least one measuring point must be recorded before the measurement can be terminated.

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5. Carry out the measurement.
6. Press to save the measurement data. Unsaved measurement data is lost once you carry out the next measurement.
  - The target folder and file name are displayed, confirm with to save the measurement data under this name and in the selected folder.



The Pitot tube factor for Pitot tubes is generally the same and must be entered:

Pitot tubes from Testo, Pitot tube factor: 1.00

Straight Pitot tubes from Testo, Pitot tube factor: 0.67

Air flow velocity matrix 0699.7077, Pitot tube factor: 0.82

For Pitot tubes from other manufacturers, refer to the instruction manual for the Pitot tube factor or ask your supplier.

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#### 7.4.3. Differential pressure measurement

1. Remove the testo 420 from the measurement base.

2. Connect the hoses to the testo 420 at + and -.
3. Press  -> **Application** -> **Pressure only**.
4. Carry out the measurement.
5. Press  to save the measurement data. Unsaved measurement data is lost once you carry out the next measurement.
  - The target folder and file name are displayed, confirm with  to save the measurement data under this name and in the selected folder.

## 7.5. Saving

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A maximum of 99 measurements can be saved in one folder.

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>  -> **Memory** -> 

- The folder overview is shown on the display. Create a new folder via **New Folder**.

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A maximum 100 folders can be created.

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### Open folder

> Using the arrow keys, navigate to the required folder and press .

- The selected folder is opened and the individual files are displayed.

### Delete folder

1. Using the arrow keys, navigate to the required folder and press .
2. Select the menu item **Delete Folder** and confirm with .
- The folder that you want to delete is shown on the display.
3. Confirm once again with  in order to delete the folder, or cancel by pressing **Esc**.

### Set as Logging Folder

This setting establishes which folder is to be specified as the standard storage location for saving the measurements.

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The folder which is set as the standard storage location is marked in black.

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1. Using the arrow keys, navigate to the required folder and press .

2. Select the menu item **Set as Logging Folder** and confirm with .
  - The selected folder is set as the standard storage location.
  - The stored location can be changed during the saving process.

### Total Volume Flow

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**i** If data from single measurements is saved within a folder, the total volume flow of all measurements can be displayed using this function.

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1. Using the arrow keys, navigate to the required folder and press .
2. Select the menu item **Total Volume Flow** and confirm with .
  - The single measurements and the total volume flow are displayed.
3. Press .
- The result of the total volume flow is saved.

## 7.6. Transferring measurement data to the PC

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**i** No Bluetooth connection is possible while there is a connection to the PC. The existing Bluetooth connection is aborted.

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**i** The PC identifies the testo 420 as a removable medium. In the event of any formatting, please make sure that the FAT format is always selected under the file system.

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1. Connect the testo 420 to your PC using the USB cable.
- The testo 420 switches on automatically, a window appears on the PC, select **Open folder** here. The folders and files saved on your testo 420 are displayed. The files are available in the file format \*.txt.

## 8 Maintaining the product

### 8.1. Cleaning the instrument

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**i** Do not use any aggressive cleaning agents or solvents! Mild household cleaning agents or soap suds may be used.

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> If the housing of the instrument is dirty, clean it with a damp cloth.

## 9 Tips and assistance

### 9.1. Questions and answers

Question	Possible causes/solution
For selected parameters, no values are shown on the instrument display (-----)	<ul style="list-style-type: none"> <li>No temperature/humidity probe is connected, for instance.</li> <li>The measurement results are outside the measuring range. Volume flow rate -40 to 40m<sup>3</sup>/h.</li> </ul>
Warning message <b>Not available</b> when selecting certain parameters in the Display menu.	<ul style="list-style-type: none"> <li>This parameter is not available for the application currently selected.</li> <li>Four parameters are already displayed. Disable the display of one parameter to enable another one.</li> </ul>
<ul style="list-style-type: none"> <li>[▶, □] on the instrument does not work.</li> <li>Warning message <b>Function not available in Bluetooth mode.</b></li> </ul>	<ul style="list-style-type: none"> <li>Bluetooth connection is active, the instrument is connected to a testo 400, tablet or smartphone via Bluetooth and the app is active.</li> <li>Close the app completely, disconnect the testo 420 from the testo 400 or end the Bluetooth connection.</li> </ul>

### 9.2. Accessories and spare parts

Description	Article no.
testo 420 differential pressure measuring instrument (stand-alone device)	0560 0420
Flow hood 360 x 360 mm with bag	0554 4200
Flow hood 305 x 1220 mm with bag	0554 4201
Flow hood 610 x 1220 mm with bag	0554 4202
Flow hood 915 x 915 mm with bag	0554 4203
Flow hood 1200 x 1200 mm with bag	0554 4204
Customised flow hood	8723 9079

Description	Article no.
Fabric cover for the hood 610 x 610	0400 4200
Aluminium frame for the hood 610 x 610	0440 4204
Tripod, extendable to 3.3 m	0554 4209
Connection hose, silicone, length 5 m, maximum load capacity 700 hPa (mbar)	0554 0440
Connection hose, silicone-free, for differential pressure measurement, length 5 m, maximum load capacity 700 hPa (mbar)	0554 0453
Pitot tube, length 500 mm, Ø 7 mm, stainless steel, for measuring flow velocity (Connection hose required)	0635 2045
Pitot tube, length 350 mm, Ø 7 mm, stainless steel, for measuring flow velocity (Connection hose required)	0635 2145
Pitot tube, 1,000 mm long, stainless steel, measures flow velocity (Connection hose required)	0635 2345
Connection hose	0554 0453
Tension rod	0440 4201
Air flow velocity matrix, telescope with spherical head, length 1.8 m, with 2 x 2 m connection hose, silicone-free, with Velcro fastening on the telescope	0635 8888 Testo ID no. 0699.7077/1
Air flow velocity matrix, telescope with spherical head, length 1.8 m, with 2 x 2 m connection hose, silicone-free, with Velcro fastening on the telescope and testo 420 measuring instrument	0635 8888 Testo ID no. 0699.7077/2

For a complete list of all accessories and spare parts, please refer to the product catalogues and brochures or visit our website [www.testo.com](http://www.testo.com)

If you have any questions, please contact your dealer or Testo Customer Service. The contact details can be found on the back of this document or on the Internet at [www.testo.com/service-contact](http://www.testo.com/service-contact).



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