



testo 440 – Climate Measuring Instrument

Instruction manual



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1 Safety and disposal

1.1 About this document

- The instruction manual is an integral part of the instrument.
- Pay particular attention to the safety instructions and warning advice in order to prevent injury and damage to the product.
- Keep this documentation on hand so that you can refer to it when necessary.
- Hand this instruction manual on to any subsequent users of the product.

1.2 Security

General safety instructions

- Only operate the product properly, for its intended purpose, and within the parameters specified in the technical data.
- Do not apply any force.
- Do not operate the instrument if there are signs of damage on the housing, power supply or connected cables.
- Dangers may also arise from objects to be measured or the measuring environment. Always comply with the locally valid safety regulations when carrying out measurements.
- Do not store the product together with solvents.
- Do not use any desiccants.
- Only perform maintenance and repair work on this instrument that is described in this documentation. Follow the prescribed steps exactly when doing the work.
- Use only original spare parts from Testo.
- Maintenance work that is not described in this documentation must only be carried out by trained service engineers.
- Temperature information given on probes/sensors relates only to the measuring range of the sensor technology. Do not expose handles and feed lines to temperatures in excess of 70 °C (158 °F), unless they are expressly authorized for use at higher temperatures.

- Do not carry out any contact measurements on uninsulated, live parts.
- Transport and store the instrument only in the associated packaging, in order to prevent any damage to the sensor.

Batteries

- Improper use of batteries may cause the batteries to be destroyed, or lead to injury due to current surges, fire or escaping chemicals.
- Only use the batteries supplied in accordance with the instructions in the instruction manual.
- Do not short-circuit the batteries.
- Do not take the batteries apart and do not modify them.
- Do not expose the batteries to heavy impacts, water, fire or temperatures in excess of 60 °C.
- Do not store the batteries in the proximity of metal objects.
- Do not use any leaky or damaged batteries.
- Take the rechargeable battery out of the instrument immediately if it is not functioning properly or if it shows signs of superheating. Rechargeable battery may be hot!
- In the event of contact with battery acid: rinse affected areas thoroughly with water, and if necessary consult a doctor.
- When not in use for a long period of time, take the rechargeable battery out of the instrument to prevent exhaustive discharge.

1.3 Warning notices

Always pay attention to any information marked with the following warning notices along with warning pictograms. Implement the specified precautionary measures!

 **DANGER**

Risk of death!

 **WARNING**

Indicates possible serious injury.

 **CAUTION**

Indicates possible minor injury.

CAUTION

Indicates possible damage to equipment.

1.4 Disposal

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

2 Description of the instrument

2.1 Use

The testo 440 is used for measuring climate-related parameters. The testo 440 is particularly suitable for comfort level measurements for workplace evaluation and disturbance measurements in and at air conditioning systems.

The instrument is only to be used by qualified personnel and must not be used in potentially explosive atmospheres!

2.2 Overview of testo 440







Element	Element
1 Settings	2 Confirm input/selection
3 Menu	4 Testo Universal Connector (TUC) for connection of cabled probes with corresponding plug

5	Type K thermocouple connection	6	Back
7	Navigation	8	Instrument ON/OFF
9	Micro USB port for data transfers or connection to external power supply	10	Connections for differential pressure measurements (+ / - labelling on rear of instrument, only testo 440 dP)

2.3 Display overview

Element	Element
1 Zero pressure sensor	2 Probe identification
3 Measuring values	4 Measuring Application
5 Status bar	

Symbol	Meaning
	Start measurement
	Stop measurement
	Carry out multi-point measurement

Symbol	Meaning
	Pause measurement
	Save measurement
	New measurement
	Zero pressure sensor

2.4 Magnetic holder

Two magnets are integrated in the testo 440 measuring instrument. These can be used as a holder on magnetic surfaces.



⚠ DANGER**Integrated magnet****Danger: Life threatening to people with pacemakers!**

- Keep a distance of at least 20 cm between your pacemaker and the measuring instrument.

CAUTION**Integrated magnet****Damage to other devices!**

- Keep a safe distance from devices that may be damaged by magnetism (e.g. monitors, computers, credit cards, memory cards, etc.).

2.5 Power supply



Element	Element
1 Power supply connection via micro USB cable (must be connected to the power source). No batteries are required for operation	2 Battery compartment - 3 x AA batteries



When connected to a power supply, the rechargeable batteries used will not be recharged.

2.6 Probe overview



2.6.1 Compatible cable probe

Order number	Name
0635 1032	Hot wire probe including temperature sensor, fixed cable
0635 1572	Hot wire probe including temperature and humidity sensor, fixed cable
0635 9572	Vane probe (Ø 16 mm) including temperature sensor, fixed cable
0635 9372	High-precision vane probe (Ø 100 mm) including temperature sensor, fixed cable
0635 9432	Vane probe (Ø 100 mm) including temperature sensor, fixed cable
0636 9772	High-precision temperature-humidity probe, fixed cable
0636 9775	Robust temperature-humidity probe for temperatures up to +180 °C, fixed cable

Order number	Name
0636 9732	Temperature-humidity probe, fixed cable
0635 0551	Lux probe
0632 1552	CO2 probe including temperature and humidity sensor, fixed cable
0632 1272	CO probe, fixed cable
0628 0152	Turbulence probe, fixed cable
0635 9532	Vane probe (Ø 16 mm) fixed cable
0635 1052	Fume cupboard probe, fixed cable

2.6.2 Compatible Bluetooth® probe

Order number	Name
0635 1571	Hot wire probe with Bluetooth®, including temperature and humidity sensor
0635 9571	Vane probe (Ø 16 mm) with Bluetooth®, including temperature sensor
0635 9431	Vane probe (Ø 100 mm) with Bluetooth®, including temperature sensor
0636 9771	High-precision temperature-humidity probe with Bluetooth®
0636 9731	Temperature-humidity probe with Bluetooth®
0632 1551	CO2 probe with Bluetooth®, including temperature and humidity sensor
0632 1271	CO probe with Bluetooth®

2.6.3 Compatible NTC probe

Order number	Name
0615 1212	Waterproof immersion/penetration probe – with NTC temperature sensor
0615 1712	Robust air probe – with NTC temperature sensor
0615 4611	Temperature probe with Velcro and NTC temperature sensor
0615 5505	Clamp probe with NTC temperature sensor – for measurements on pipes (Ø 6-35 mm)
0615 5605	Pipe wrap probe with NTC temperature sensor – for measurements on pipes (Ø 5-65 mm)

2.6.4 Compatible Smart Probes

Order number	Name
0560 1115	testo 115i - clamp thermometer operated by smartphone
0560 1805	testo 805i - infrared thermometer operated by smartphone
0560 1605	testo 605i - thermohygrometer operated by smartphone
0560 1405	testo 405i - thermal anemometer operated by smartphone
0560 1410	testo 410i - vane anemometer operated by smartphone
0560 1510	testo 510i - differential pressure measuring instrument operated by smartphone
0560 1549	testo 549i - high-pressure measuring instrument operated by smartphone

3 Operation

3.1 Commissioning



The testo 440 is supplied with inserted batteries. The batteries are secured by a battery safety strip.

- 1 Open the battery compartment cover.



- 2 Remove the battery safety strip.
 - 3 Close the battery compartment cover.
- ▶ The testo 440 is ready for use.

3.2 Switching the testo 440 on/off

Initial activation



For initial commissioning or after a factory reset, the **Initial Operation** menu is opened automatically. In normal mode, the last menu used is displayed after switching it on.




- 1 Press .
 - ▶ The **Initial Operation** menu is displayed.
- 2 Make the following settings in sequence:
 - Language [**Language**]
 - Date (year/month/day) and time (format, time) [**Date/Time**]
 - Unit system (ISO/US) [**Units**]
 - ▶ The basic settings have been set. They can be adjusted any time in Settings.

Switching on

- 1 Press .
 - ▶ The last active menu when the instrument was switched off is displayed.

Switching off




- 1 Press and hold  for at least 3 seconds.
- ▶ The testo 440 switches itself off.

3.3 Making basic settings


Use the menu key to go to the testo 440 Settings menu. The following settings are available in this menu:





Menu item	Function/Settings
Basic View	Show current measuring values
Select Application	Select required application for the measurement
Memory	Show and manage saved measurements
Settings	Making basic settings: <ul style="list-style-type: none">- Bluetooth- Power Management Ambient Conditions- Units- Date/time- Languages- General (instrument and probe status, reset)

3.3.1 Establishing a Bluetooth® connection

- ✓ testo 440 is switched on.
- 1 Press  and  at the same time for at least 3 seconds.
- ▶ Bluetooth® is activated or deactivated and  either appears or disappears from the display.

or

- ✓ You need to go to menu screen first and then select **Settings**.
- 1 Use  to select **Bluetooth**.





- 2 Use  to enable **Bluetooth**.
 - ▶ Bluetooth® is activated or deactivated and  either appears or disappears from the display.
- 3 Press  or  to exit the menu.

3.3.2 Setting power options

You can manage the energy consumption for your testo 440. The following functions are available for this purpose:

- Auto Off: testo 440 switches off automatically after 5 minutes of inactivity
- Power Saving: the screen brightness is reduced to 10% after a minute; the set brightness is restored by pressing any button
- Brightness: setting the screen brightness from 10% to 100%

✓ You need to go to menu screen first and then select **Settings**.

- 1 Use  to select **Power Management**.
- 2 Press  or  on the navigation key.
- 3 Use  to select the required setting and make changes.



If the Auto Off function is enabled, the testo 440 automatically switches itself off after 5 minutes of inactivity.




If the testo 440 is in logger mode, the Auto Off function is automatically deactivated during an active measurement.

- 4 Press  or  to exit the menu.

Setting Auto Off

✓ You are in the **Power Management** menu.

- 1 Use  to select **Auto Off**.

2 Use  to switch the **On** or **Off** function on or off.

3 Press  or  to exit the menu.

Setting power saving

✓ You are in the **Power Management** menu.

1 Use  to select **Power Saving**.


2 Use  to switch the **On** or **Off** function on or off.

3 Press  or  to exit the menu.

Setting brightness

✓ You are in the **Power Management** menu.

1 Use  to select **Brightness**.

2 Use  to set the brightness.

3 Press  or  to exit the menu.



3.3.3 Setting the ambient conditions





In the **Ambient Conditions** menu, you can configure the following parameters:

- Ambient Pressure
Pressure unit: Pa/mbar/hPa/mmH₂O/inH₂O/Torr/inHg/kPa/psi
- Ambient temperature
Unit of temperature: °C/°F

✓ You need to go to menu screen first and then select **Settings**.

1 Use  to select **Ambient Conditions**.

2 Press  or  on the navigation key.

- 3 Use  to select the parameters to be modified.
- 4 Use  to configure the parameters to be modified.
- 5 Press  or  to exit the menu.

3.3.4 Configuring the unit system




In the **Units** menu, you can switch between the European ISO and American US unit system.

- ✓ You need to go to menu screen first and then select **Settings**.

- 1 Use  to select the **ISO/US**.

The following units are used depending on what has been selected:

ISO unit	US unit
m/s	fpm
m ³ /h	cfm
°C	°F
wb °C	wb °C
dp °C	dp °F

- 2 Use  to select the required setting.
- 3 Press  or  to exit the menu.









When the unit system is changed, the units specified in the Basic View are overwritten.






3.3.5 Setting the date and time

You can set the date and time in the **Date/Time** menu. You can set the time in the formats 24 h, PM and AM.

- ✓ You need to go to menu screen first and then select **Settings**.

- 1 Use  to select the **Date/Time**.
- 2 Press  or  on the navigation key.
- 3 Use  to select the required settings.
- 4 Press  or  to exit the menu.

3.3.6 Setting the language




- ✓ You need to go to menu screen first and then select **Settings**.
- 4 Use  to select **Language**.
 - 5 Press  or  on the navigation key.
 - 6 Use  to select the required **Language**.
 - 7 Confirm by clicking .
- ▶ Exit from the menu is automatic and the language is applied.



When the unit system is changed, the units specified in the Basic View are overwritten.

3.3.7 Showing general device information

Under the **General** menu item, you will find all of the information about the testo 440 and connected probes. You can also reset the instrument to default settings.

- ✓ You need to go to menu screen first and then select **Settings**.
- 1 Use  to select **General**.
 - 2 Press  or  on the navigation key.

The following information can be viewed:

About Device	- Name - Serial Number - Firmware Version - Battery - Memory
About Probe (visible once probe is connected)	- Probe Name - Serial Number - Firmware Version - Battery
Humidity Adjustment	See Section 3.3.8


3.3.8 Humidity adjustment




For humidity adjustment, the measurement parameter of the connected probe is adjusted to the reference value at the two standard adjustment points 11.3% RH and 75.3% RH; any deviations between the measuring value and the nominal value are minimised across the entire measuring range.

The Testo calibration set provides a reference value to calculate the offset for a humidity adjustment.

Humidity adjustment is possible with the following probes:

Order number	Name
0636 9771	High-precision temperature-humidity probe with Bluetooth®
0636 9772	High-precision temperature-humidity probe, fixed cable
0636 9731	Temperature-humidity probe with Bluetooth®
0636 9732	Temperature-humidity probe, fixed cable
0636 9775	Robust temperature-humidity probe for temperatures up to +180 °C, fixed cable






- ✓ testo 440 is switched on and the corresponding probe is connected. Probe is already exposed to reference conditions (e.g. salt pot) for an adequate adjustment time.
Adjustment time for humidity probe: at least 30 minutes.
- ✓ - You need to go to menu screen first then select Settings and then clicking on **Humidity Adjustment**.
- 1 Select the relevant reference point of 11.3 or 75.3% RH with .

- 2 Select the probe to be adjusted.
- 3 Use  to select **Adjust** and confirm with **OK**.
 - ▶ An information window displays the remaining adjustment time and the adjustment is carried out.
 - ▶ An information window displays the text **Adjustment successful!**
- 4 Press  or  to exit the menu.



After performance of a probe reset, the probe uses the calibration data set by the factory.

3.3.9 Resetting the instrument or probe to default settings

- ✓ You need to go to menu screen first and then select **Settings**.
- 4 Use  to select **General**.
 - 5 Press **OK** or  on the navigation key.
 - 6 Use  to select **Reset Device** or **Reset Probe**.
 - 7 Press **OK**.
 - 8 Use  to select **Confirm**.
 - 9 Press **OK** or  on the navigation key.
 - ▶ When the instrument is restarted, it will be reset to default settings.

3.4 Managing saved measurement data

In the **Memory** [**Memory**] menu item, all measurements from the application menu are saved with the time and date.

Measurements are saved in the last folder set up. If there is no folder available, one will automatically be set up. Every day, a new folder is automatically set up on the measuring instrument.








Showing saved measurements

This function can be used to retrieve saved measurement results.



✓ You need to go to menu screen first and then select **Memory**.



- 3 Press **OK** or  on the navigation key.
- 4 Use  to select the required folder.
- 5 Press **OK** or  on the navigation key.
- 6 Use  to select the required measurement.
- 7 Press **OK** or  on the navigation key to display measurement results.

Creating and deleting folders

This function can be used to create and delete folders for your measurements.



If you delete a folder, you will also delete the measurements it contains.





- ✓ You are in the **Memory** menu [**Memory**].
- 1 Press  in the folder view.
 - ▶ The drop-down menu is displayed.
- 2 Use  to select either **Create Folder** or **Delete Folder**.

3 Press **OK**.

Deleting saved measurement data

This function can be used to delete saved measurements.



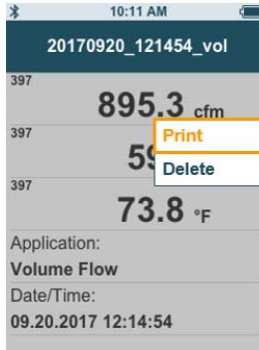
- ✓ You need to go to menu screen first.
- ✓ You have selected a folder containing measurement data or selected a measurement file with .
- 1 Use  to select the required folder.
- 2 Press **OK**.
- 3 Use  to select the required measurement.
- 4 Press .
- ▶ The drop-down menu is displayed.
- 5 Press **OK** to delete the selected measurement data.


3.4.1 Printing

You can print out your measurement protocols directly on site using the Bluetooth® printer (order no. 0554 0621).



Please refer to the relevant instruction manual for details on operating the printer.



- ✓ The Bluetooth® printer is connected to the testo 440.
- 1 Select the required measurement in the memory.
- 2 Press .
- 3 Select **Print [Print]**.
 - ▶ The Bluetooth® connection to the printer is automatically established. This process may take a few seconds.
 - ▶ The protocol is printed.

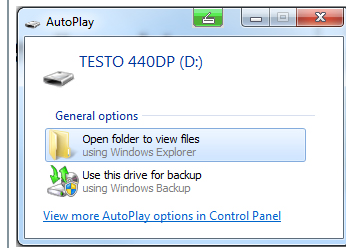


During printing, the testo 440 interrupts the Bluetooth® connection to the connected probe. The connection is automatically restored after printing has finished.

3.4.2 CSV export

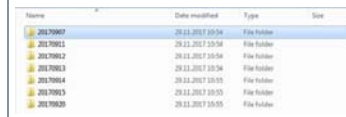
- 1 Connect the testo 440 to your computer using the micro USB cable.
 - ▶ The **AutoPlay** window opens automatically on your screen.

- 2 Click on **Open folder to view files**
[Open folder to view files].



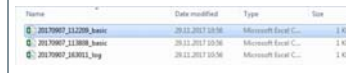
- ▶ The window with available file folders opens.

- 3 Click on the required folder.



- ▶ The window with available files opens.

- 4 Drag the file from the folder to the target folder on your computer.



If your file format is not displayed correctly, this is probably because the language version of your operating system and your device are different.

In this case, please open Excel and the relevant measurement data document on the testo 440 from within Excel. A corresponding Excel wizard enables modification of the file format.

You can add other details about the project to the CSV file.

3 Operation

Protocol Volume Flow

Project	_____	Date:	_____
	_____		_____
Installation	_____		

Contact	_____	Job Number	_____
	_____		_____

Measurement Information



Application:	Volume Flow	
Date/Time:	10/28/2017	15:32:51
Measuring Type:	Multi-Point	
Measured Points:	4	
Geometry:	Round	
Diameter:	500.0	mm
Area:	250000	mm ²
Correction Factor:	100%	
Ambient Pressure:	1013.00	hPa



3.5 Carrying out measurements

3.5.1 Connecting the cable probe with testo 440

- 1 | Connect the testo 440 to the probe using the TUC slot.
- 2 | Remove the connector from the instrument to disconnect it.

3.5.2 Connecting the Bluetooth® probe with testo 440

- 1 | Activate Bluetooth® using fast activation (press  and  at the same time for a minimum of 3 seconds) or the **Settings** menu (see Section 3.3.1).

- ▶  is displayed.
- ▶  is shown top left on the display, as soon as the probe and testo 440 are connected to each other.



A connection to compatible Bluetooth® probes is automatically searched for and established. Only one probe can be connected to the testo 440 by Bluetooth®.

Please observe the relevant instructions for the probe when commissioning it.

- 2 Press the button on the probe handle.
 - ▶ The LED on the handle flashes yellow. The LED flashes green while the connection is being established.
- 3 Press the button on the probe handle a minimum of 3 seconds to switch the probe off.

LED status

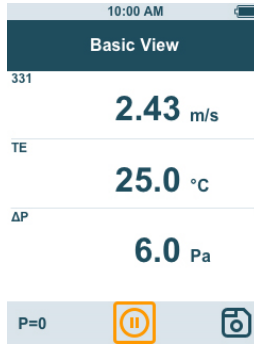
LED status	Description
Flashing red	Low battery status
Flashing yellow	Probe is switched on and searching for the Bluetooth® connection.
Flashing green	The probe is switched on and connected via Bluetooth® to the testo 440.

3.5.3 Basic View


In the **Basic View** [**Basic View**], both current and minimum and maximum measuring values can be read and saved. All compatible probes can be used. For a list of all compatible probes see Section 2.6.

The **maximum** of following probes can be connected at the same time:

- 1x TC
- 1x Bluetooth® probe
- 1x cable probe



Depending on the connected probe, parameters can be configured for the measurement, for example, visibility of individual values or units.

- 1 Press  to open the **Configuration menu** [Configure measurement].



Individual values being hidden does not affect the application, only the Basic View and long-term measurement. The configured units, on the other hand, are also taken up in the application menus.



For the instrument model testo 440 dP, zeroing can also be undertaken in the Basic View.

3.5.4 Selecting application menus

The testo 440 has permanently installed application menus. These enable the user to carry out convenient configuration and implementation of specific measuring tasks.



Available application menus are enabled as soon as a probe is connected. Unavailable application menus are greyed out on the display. More than one probe has to be connected to make some application menus accessible.

The units for the measuring values depend on the ISO/US setting and configuration in the **Basic View**.

3.5.5 Volume flow application [Volume Flow]

Use this application to measure the volume flow at the outlet or in a ventilation system duct. There are different options for this. These mainly differ in the measuring range and require corresponding probes:

- Thermal probes (including temperature measurement and possibly humidity measurement) for low flow velocities
- 16 mm vane measuring head (including temperature measurement) for average flow velocities
- Pitot tube for measurements at high velocities and in heavily contaminated flows with a high particle content

This application menu is accessed by one of the following probes:

Order number	Name
0635 1032	Hot wire probe including temperature sensor, fixed cable
0635 1571	Hot wire probe with Bluetooth®, including temperature and humidity sensor
0635 1572	Hot wire probe with Bluetooth®, including temperature and humidity sensor
0635 9571	Vane probe (Ø 16 mm) with Bluetooth®, including temperature sensor
0635 9572	Vane probe (Ø 16 mm) including temperature sensor, fixed cable
0635 9371	High-precision vane probe (Ø 100 mm) with Bluetooth®, including temperature sensor
0635 9372	High-precision vane probe (Ø 100 mm) including temperature sensor, fixed cable
0635 9431	Vane probe (Ø 100 mm) with Bluetooth®, including temperature sensor
0635 9432	Vane probe (Ø 100 mm) including temperature sensor, fixed cable
0635 1052	Fume cupboard probe, fixed cable
0560 1405	testo 405i - thermal anemometer operated by smartphone and also connected to testo 440
0560 1410	testo 410i - vane anemometer operated by smartphone and also connected to testo 440



A maximum of 1 Bluetooth® probe and one cable probe can be connected. If two flow probes are connected, the cable probe is used

for the volume flow measurement.



Preparing for measurement

- 1 Press  to configure the measurement.

You can set the following parameters:




- Geometry: round, rectangular, area
- Measuring Type: multi-point/timed avg.
- Volume Flow Unit: m³/h, cfm, l/s, m³/s
- Correction Factor: 1% to 200%



In a multi-point measurement, a mean value is calculated from the individual measuring values.

In a timed average measurement, a mean value is calculated over a certain period.

Several points can be measured. This generates a timed average/multi-point total mean value.

- 2 Use  to select the required parameter and make settings.
- 3 Press  or  to exit the menu.

Carrying out the measurement

- ✓ A suitable probe is connected to the testo 440.
- 1 Remove the protective cap from the probe head.



For measurements in flows with a known direction, the arrow mark on the probe head must point in the direction of flow.

- 2 | Move the probe into the flow.
- 3 | Align the probe with the assumed flow axis.
- 4 | Read off the readings.



Low flow velocities may result in greater measurement uncertainty during temperature and humidity measurement.

- 5 | Carry out the measurement and save the measuring values.

3.5.6 Funnel volume flow application [Funnel Volume Flow]

A volume flow rate funnel is required to determine the flow rate on ventilation systems. The measurement can be carried out with a compatible vane probe in conjunction with a funnel set. Alternatively, a thermal anemometer can also be used in conjunction with a funnel.

The funnels differ in size. When selecting the funnel, make sure that the opening of the funnel covers the grille completely and tightly.

The application menu is enabled by one of the following probes:

Order number	Name
0635 1032	Hot wire probe including temperature sensor, fixed cable
0635 1571	Hot wire probe with Bluetooth®, including temperature and humidity sensor
0635 1572	Hot wire probe including temperature and humidity sensor, fixed cable
0635 9571	Vane probe (Ø 16 mm) with Bluetooth®, including temperature sensor
0635 9572	Vane probe (Ø 16 mm) including temperature sensor, fixed cable
0635 9371	High-precision vane probe (Ø 100 mm) with Bluetooth®, including temperature sensor

3 Operation

Order number	Name
0635 9372	High-precision vane probe (Ø 100 mm) including temperature sensor, fixed cable
0635 9431	Vane probe (Ø 100 mm) with Bluetooth®, including temperature sensor
0635 9432	Vane probe (Ø 100 mm) including temperature sensor, fixed cable
0635 1052	Fume cupboard probe, fixed cable
0560 1405	testo 405 i - thermal anemometer operated by smartphone



A maximum of 1 Bluetooth® probe and one cable probe can be connected. If two flow probes are connected, a cable probe is used for the funnel volume flow.



Preparing for measurement

1 Press  to configure the measurement.

You can set the following parameters:




- Measuring Type: multi-point/timed avg.
- Volume Flow Unit: m³/h, cfm, l/s, m³/s
- Correction Factor: 1% to 200%



In a multi-point measurement, a mean value is calculated from the individual measuring values.

In a timed average measurement, a mean value is calculated over a certain period.

Several points can be measured. This generates a timed average/multi-point total mean value.

- 2 Use  to select the required parameter and make settings.
- 3 Press  or  to exit the menu.

Carrying out the measurement

- ✓ A suitable probe is connected to the measuring instrument.
- 1 Place the flow hood tightly on the air outlet. The flow hood must fully cover the air outlet.
 - 2 Carry out the measurement and save the measuring values.

3.5.7 Pitot volume flow application [Pitot Volume Flow]


The Pitot volume flow measurement is suitable for high velocities and flows with a high particle content.



The application menu can only be accessed with testo 440 dP or used in combination with a testo 510i with Bluetooth®.



Preparing for measurement

- 1 You must be in the correct measurement application before pressing the gear symbol ().

You can set the following parameters:

- Geometry: round, rectangular or area
- Measuring Type: multi-point/timed avg.

- Units: mm or cm, mm² or cm²
- Pitot Tube Factor: 0.00 to 1.00
- Correction Factor: 1% to 200%
- Volume Flow Unit: m³/h, cfm, l/s, m³/s



The Pitot tube factor for Pitot tubes is generally the same and must be entered prior to starting measurement:

- Prandtl Pitot tubes (0635 2045, 0635 2145, 0635 2345): Pitot tube factor: 1.00
- Straight Pitot tubes (0635 2043, 0635 2143, 0635 2243): 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.




In a multi-point measurement, a mean value is calculated from the individual measuring values.

In a timed average measurement, a mean value is calculated over a certain period.

Several points can be measured. This generates a timed average/multi-point total mean value.

2

Use  to select the required parameter and make settings.

3

Press  or  to exit the menu.

Carrying out the measurement



A suitable probe is connected to the measuring instrument.

1

Define the channel parameters in the application menu.



Observe the minimum clearances to points of discontinuity:

- From points of discontinuity upstream of the flow, observe a clearance of at least six times the hydraulic diameter $D_h = 4A/U$ (A: channel cross-section, U: channel circumference).
 - From points of discontinuity downstream of the flow, observe a clearance of at least twice the hydraulic diameter $D_h = 4A/U$ (A: channel cross-section, U: channel circumference).
-

2

Insert the Pitot tube in the channel.

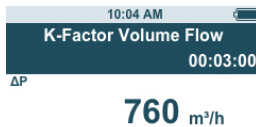
- 3 Carry out the measurement and save the measuring values.

3.5.8 K-factor volume flow application [K-Factor Volume Flow]

The testo 440 can determine the volume flow by measuring the reference resistance and input of the K-factor. This allows the testo 440 to remain connected to the air outlet during adjustment work and the changes in volume flow can be read directly on the display.



The application menu can only be accessed with testo 440 dP or used in combination with a testo 510i with Bluetooth®.



This process for determining volume flow can always be used when there are appropriate specifications available from the component manufacturer. In line with these specifications, the differential pressure is measured at a position specified by the manufacturer or supplier. The volume flow is determined from the differential pressure via a component-specific K-factor using a mathematical equation.

Preparing for measurement

- 1 First select the K-Factor Volume Flow Application.

You can make the following settings:




- Measuring Type: multi-point/timed avg.
- K-Factor: from 0.01 to 999.99
- Unit k-Factor: Pa, kPa, hPa, mbar, psi, mmH₂O, mmHg, inH₂O, inHg, Torr
- Volume Flow Unit: m³/h, cfm, l/s, m³/s



In a multi-point measurement, a mean value is calculated from the individual measuring values.

In a timed average measurement, a mean value is calculated over a certain period.

Several points can be measured. This generates a timed average/multi-point total mean value.

- 2 | Use  to select the required parameter and make settings.
- 3 | Press  or  to exit the menu.

Carrying out the measurement

- 1 | Position the testo 440 and make sure it is secure before you begin to take your measurement.
- 2 | Carry out the measurement and save the measurement results.

3.5.9 Heating/cooling load application

[Heating/Cooling Load]

Use this application to calculate the heating/cooling load of a thermal installation.

The Application menu is enabled by two of the following probes:

Order number	Name
0636 9771	High-precision temperature-humidity probe with Bluetooth®
0636 9772	High-precision temperature-humidity probe, fixed cable
0636 9775	Robust temperature-humidity probe for temperatures up to +180 °C, fixed cable
0636 9731	Temperature-humidity probe with Bluetooth®
0636 9732	Temperature-humidity probe, fixed cable
0632 1551	CO2 probe with Bluetooth®, including temperature and humidity sensor
0632 1552	CO2 probe including temperature and humidity sensor, fixed cable

Order number	Name
0560 1605	testo 605 i - a thermohygrometer operated by smartphone



A minimum of two probes are to be connected in each combination via Bluetooth® and cable.



Preparing for measurement

- 1 You must first select the measurement application that you wish to take.

You can set the following parameters:




- SA Probe ID
- RA Probe ID
- Measuring Type: multi-point/timed avg.
- Volume Flow Unit: m³/h, cfm, l/s, m³/s
- Volume flow: 0.0 to 99999.0
- Heating/Cooling Load Unit: kW, BTU/h



In a multi-point measurement, a mean value is calculated from the individual measuring values.

In a timed average measurement, a mean value is calculated over a certain period.

Several points can be measured. This generates a timed average/multi-point total mean value.

- 2 Use  to select the required parameter and make settings.
- 3 Press  or  to exit the menu.

Carrying out the measurement

- ✓ Two suitable probes are connected to the measuring instrument.
- 1 Place the SA-configured probes in the supply air of your system.
- 2 Place the RA-configured probes in the exhaust air of your system.
- 3 The humidity and temperature values for supply air and exhaust air are shown on the display with the heating/cooling load calculated from these.
- 4 Carry out the measurement and save the measuring values.

3.5.10 Mold indication application [Mold Indication]

Use this application to measure the risk of mold in rooms.

The application menu is enabled by the following probes:

Order number	Name
0636 9771	High-precision temperature-humidity probe with Bluetooth®
0636 9772	High-precision temperature-humidity probe, fixed cable
0636 9731	Temperature-humidity probe with Bluetooth®
0636 9732	Temperature-humidity probe, fixed cable
0632 1551	CO2 probe with Bluetooth®, including temperature and humidity sensor
0632 1552	CO2 probe including temperature and humidity sensor, fixed cable
0615 1712	Robust air probe – with NTC temperature sensor
0615 4611	Temperature probe with Velcro and NTC temperature sensor
0560 1805	testo 805i - infrared thermometer operated by smartphone

Order number	Name
TE (independent of manufacturers)	



A minimum of 1 temperature probe (TE, NTC, 805i) and 1 humidity probe is to be connected via Bluetooth® and cable.

Only one probe can be connected to the testo 440 by Bluetooth®.

The display shows the risk of mold using the traffic light system.

Display	Meaning
Green	Low risk
Yellow	Medium risk
Red	High risk



Preparing for measurement

- 1 Make sure that you select the Mold Indication screen first.
If a testo 805i is used, the following settings can be made:
- Emissivity



Please refer to the testo 805i instruction manual for detailed information on emissivity.

- 2 Use to select the required parameter and make settings.
- 3 Press or to exit the menu.

Carrying out the measurement

- ✓ A suitable probe is connected to the measuring instrument.
- 1 Take a humidity measurement in the room.
- 2 Take a temperature measurement at the spot where there is a presumed risk of mold.
 - ▶ The risk of mold is indicated by a colour indicator on the display.
- 3 Save the measurement.

3.5.11 Turbulence measurement application [Draft Rate]

With this application menu, the measurement of the degree of turbulence and draft can be determined in accordance with DIN EN 13779 or DIN EN ISO 7730.

The measurement is carried out automatically over a period of 3 minutes. For ideal implementation, we recommend the use of:

Order number	Name
0554 1590	Measuring tripod for comfort level measurements with standard-compliant positioning of probes (including case)

The application menu is enabled by the following probe:

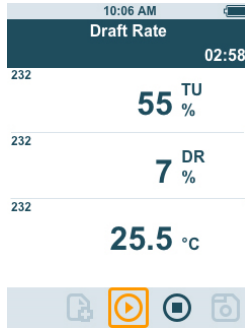
Order number	Name
0628 0152	Turbulence probe, fixed cable



The probe requires a warm-up period of around 3 seconds after connection to the testo 440. Carry out the measurement after this.

The display shows the draft rate using the traffic light system.

Display	Meaning
Green	Draft rate 0-20%
Yellow	Draft rate 21-30%
Red	Draft rate 31-100%



Carrying out the measurement

- ✓ A suitable probe is connected to the measuring instrument.
- 1 Attach the probe to the tripod for the best measuring task result.
- 2 Carry out the measurement and save the measuring values.

3.5.12 Performing long-term measurement application [Logger Mode]

This application menu allows you to record measurement data over a user-defined period of time at a specified interval.

All compatible probes can be used.

The **maximum** of following probes can be active at the same time:




- 1x TC
- 1x Bluetooth® probe
- 1x cable probe



- 1 Make sure that you have first selected the measurement application.

You can make the following settings:

- Measuring interval: in s
- Measurement duration: in hrs and min

- 2 Use  to select the required parameter and make settings.
- 3 Press  or  to exit the menu.



The maximum measurement period depends on the condition of the battery, how much free memory there is and the probe used. This is displayed during configuration.



testo recommends using an external power supply for each micro USB in the case of particularly long measurements. It is then possible to record significantly longer measurement series.
0554 1105 - USB power supply including cable

4 Maintenance

4.1 Battery replacement

- 1 Open the battery compartment cover.



- 2 Replace the batteries. Observe the polarity!



Only use new branded batteries. If a partially exhausted battery is inserted, the battery capacity will not be calculated correctly.

- 3 Close the battery compartment cover.

- ▶ The testo 440 is ready for use.

4.2 Cleaning testo 440



Never use abrasive cleaning agents or solvents; instead use household detergent or soapy water.



Always keep the connections clean and free of grease and other deposits.

- 1 Clean the unit with a damp cloth and dry it.
- 2 If necessary, clean all the connections using a damp cloth.

4.3 Calibration



The probe and the handle are supplied with a factory calibration certificate as standard.

In many applications, it is recommended that you recalibrate the probe with the handle and the testo 440 once a year.

This can be carried out by Testo Industrial Services (TIS) or other certified service providers.

Please contact Testo for further information.

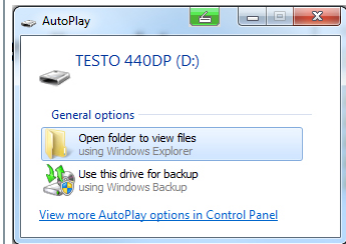
4.4 Carrying out a firmware update



Information on current firmware for testo 440 can be found at www.testo.com on the product page.

- ✓ You have downloaded the firmware file to your computer.
- 1 Connect the testo 440 to your computer using the micro USB cable.
- ▶ The **AutoPlay** window opens automatically.

- 2 Click on **Open folder [Open folder to view files]** to view files.



- ▶ The window with available file folders opens.
- 3 Drag the firmware file to the open window.

Name	Date modified	Type	Size
2017F0007	28.11.2017 15:54	File folder	
2017F0011	28.11.2017 15:54	File folder	
2017F0012	28.11.2017 15:54	File folder	
2017F0013	28.11.2017 15:54	File folder	
2017F0014	28.11.2017 15:55	File folder	
2017F0015	28.11.2017 15:55	File folder	
2017F0020	28.11.2017 15:55	File folder	

- ▶ The copying process is completed.
- 4 Disconnect the testo 440 from the computer.
- 5 Switch the testo 440 off and then on again.
- ▶ The firmware is automatically installed.

5 Technical data

Temperature (NTC)	testo 440	testo 440 dP
Measuring range	-40 to +150 °C	
Accuracy (± 1 digit) at 22 °C	± 0.4 °C (-40 to -25.1 °C) ± 0.3 °C (-25 to +74.9 °C) ± 0.4 °C (+75 to +99.9 °C) $\pm 0.5\%$ of m.v. (remaining meas. range)	
Resolution	0.1 °C	

Temperature (TE)	testo 440	testo 440 dP
Measuring range	-200 to +1370 °C	
Accuracy (± 1 digit)	$\pm (0.3$ °C + 0.3% of m.v.) ± 0.5 °C for cold junction	
Resolution	0.1 °C	

Pressure	testo 440	testo 440 dP*
Measuring range	-	-150 to +150 hPa
Accuracy (± 1 digit) at 22 °C		± 0.05 hPa (0 to +1.00 hPa) ± 0.2 hPa + 1.5% of m.v. (1.01 to 150 hPa)
Resolution		0.01 hPa

* Change in position or attachment to magnetic surfaces affects the sensor. Therefore, first zero the sensor in the end position of the instrument.

Probe connections	testo 440	testo 440 dP
Type K thermocouple connection		1x
Testo Universal Connector (TUC) for connection of cabled probes with corresponding plug		1x
Bluetooth® probe	1x digital Bluetooth® probe or testo Smart Probe	
Differential pressure	-	+

Technical data	testo 440	testo 440 dP
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5 Technical data

Technical data	testo 440	testo 440 dP
Operating temperature	-20 to +50 °C	
Storage temperature	-20 to +50 °C	
Bluetooth® range (latest generation testo climate probes with Bluetooth®)	20 m free field	
Bluetooth® range (Smart Probes)	3 m free field	
Battery type	3 x AA batteries	
Battery life	12 hours	
Weight	250 g	
Dimensions	154 x 65 x 32 mm	

Connected probe (order no.)	Name	Battery life*
0635 1032	Hot wire probe including temperature sensor, fixed cable	8 hrs
0635 1572	Hot wire probe including temperature and humidity sensor, fixed cable	8 hrs
0635 9532	Vane probe (Ø 16 mm) fixed cable	11 hrs
0635 9372	High-precision vane probe (Ø 100 mm) including temperature sensor, fixed cable	10 hrs
0635 9432	Vane probe (Ø 100 mm) including temperature sensor, fixed cable	10 hrs
0636 9772	High-precision temperature-humidity probe, fixed cable	12 hrs
0636 9775	Robust temperature-humidity probe for temperatures up to +180 °C, fixed cable	12 hrs
0636 9732	Temperature-humidity probe, fixed cable	12 hrs
0635 0551	Lux probe	11 hrs
0632 1552	CO ₂ probes including temperature and humidity sensor, fixed cable	8 hrs
0632 1272	CO probe, fixed cable	11 hrs
0628 0152	Turbulence probe, fixed cable	9 hrs

Connected probe (order no.)	Name	Battery life*
0635 1052	Fume cupboard probe, fixed cable	9 hrs

* All information at 22 °C, 50% screen brightness, power saving mode ON, Auto-Off off.

6 Tips and assistance

6.1 Questions and answers

6.1.1 LED status Bluetooth® probe

LED status	Description
Flashing red	Low battery status
Flashing yellow	Probe is switched on and searching for the Bluetooth® connection.
Flashing green	Probe is switched on and connected with Bluetooth®.

6.1.2 Hot wire measurement not possible

Before measurement, the cap must be opened on the hot wire probe.

6.2 Accessories and spare parts

Bluetooth® probe

Order number	Name
0635 1571	Hot wire probe with Bluetooth®, including temperature and humidity sensor
0635 9571	Vane probe (Ø 16 mm) with Bluetooth®, including temperature sensor
0635 9371	High-precision vane probe (Ø 100 mm) with Bluetooth®, including temperature sensor
0635 9431	Vane probe (Ø 100 mm) with Bluetooth®, including temperature sensor

Order number	Name
0636 9771	High-precision temperature-humidity probe with Bluetooth®
0636 9731	Temperature-humidity probe with Bluetooth®
0632 1551	CO2 probe with Bluetooth®, including temperature and humidity sensor
0632 1271	CO probe with Bluetooth®

Cable probe

Order number	Name
0635 1032	Hot wire probe including temperature sensor, fixed cable
0635 1572	Hot wire probe including temperature and humidity sensor, fixed cable
0635 9572	Vane probe (Ø 16 mm) including temperature sensor, fixed cable
0635 9372	High-precision vane probe (Ø 100 mm) including temperature sensor, fixed cable
0635 9432	Vane probe (Ø 100 mm) including temperature sensor, fixed cable
0636 9772	High-precision temperature-humidity probe, fixed cable
0636 9775	Robust temperature-humidity probe for temperatures up to +180 °C, fixed cable
0636 9732	Temperature-humidity probe, fixed cable
0635 0551	Lux probe
0632 1552	CO2 probe including temperature and humidity sensor, fixed cable
0632 1272	CO probe, fixed cable
0628 0152	Turbulence probe, fixed cable
0635 9532	Vane probe (Ø 16 mm) fixed cable
0635 1052	Fume cupboard probe, fixed cable

For more accessories, please visit the testo 440 product page at:
www.testo.com/testo440.

7 Authorisations and certification


Please note the following country-specific information for the product authorization.



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 national 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, to or from countries without wireless authorization, is their responsibility.

Product	Mat.-No.	Date
testo 440	0560 4401	18.12.2017
testo 440dP	0560 4402	
Country	Comments	
Australia		E 1561
Canada	Contains IC: 21461-LSD4BTS25A Product IC: 6127B-0560440X IC Warnings	
Europa + EFTA	 The EU Declaration of Conformity can be found on the testo homepage www.testo.com under the product specific downloads.	
	EU countries: Belgium (BE), Bulgaria (BG), Denmark (DK), Germany (DE), Estonia (EE), Finland (FI), France (FR), Greece (GR), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Sweden (SE), Slovakia (SK), Slovenia (SI), Spain (ES), Czech Republic (CZ), Hungary (HU), United Kingdom (GB), Republic of Cyprus (CY).	
	EFTA countries: Iceland, Liechtenstein, Norway, Switzerland	
Turkey	Approved	

7 Authorisations and certification

Product	Mat.-No.	Date
Japan	 204-840001 Japan Information	
USA	Contains FCC ID: N8NLS4BTS25A Product FCC ID: WAF-0560440X FCC Warnings	
Bluetooth SIG List	Qualified Design ID	D037513
	Bluetooth radio class	Class 1
	Bluetooth company	Testo SE & Co. KGaA
Bluetooth-Module	Feature	Values
	Bluetooth®-range (Newest generation of testo climate-probes with Bluetooth®)	< 20 m (free field)
	Bluetooth®-range (Smart Probes)	< 3 m (free field)
	Bluetooth® type	S25 Series BLE module , based on TI CC2640 chip
	RF Band	2402-2480MHz
	Output power	5 dBm

IC Warnings

This instrument complies with Part 15B of the FCC Rules and Industry Canada RSS-210 (revision 8). Commissioning is subject to the following two conditions:

- (1) This instrument must not cause any harmful interference and
- (2) this instrument must be able to cope with interference, even if this has undesirable effects on operation.

Cet appareil satisfait à la partie 15B des directives FCC et au standard Industrie Canada RSS-210 (révision 8). Sa mise en service est soumise aux deux conditions suivantes :

- (1) cet appareil ne doit causer aucune interférence dangereuse et
- (2) cet appareil doit supporter toute interférence, y compris des interférences qui provoquerait des opérations indésirables.

FCC Warnings

Information from the FCC (Federal Communications Commission)

For your own safety

Shielded cables should be used for a composite interface. This is to ensure continued protection against radio frequency interference.

FCC warning statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or

television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Shielded interface cable must be used in order to comply with the emission limits.

Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

the receiving antenna.

- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Shielded interface cable must be used in order to comply with the emission limits.

Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Japan Information

当該機器には電波法に基づく、技術基準適合証明等を受けた特定無線設備を装着している

