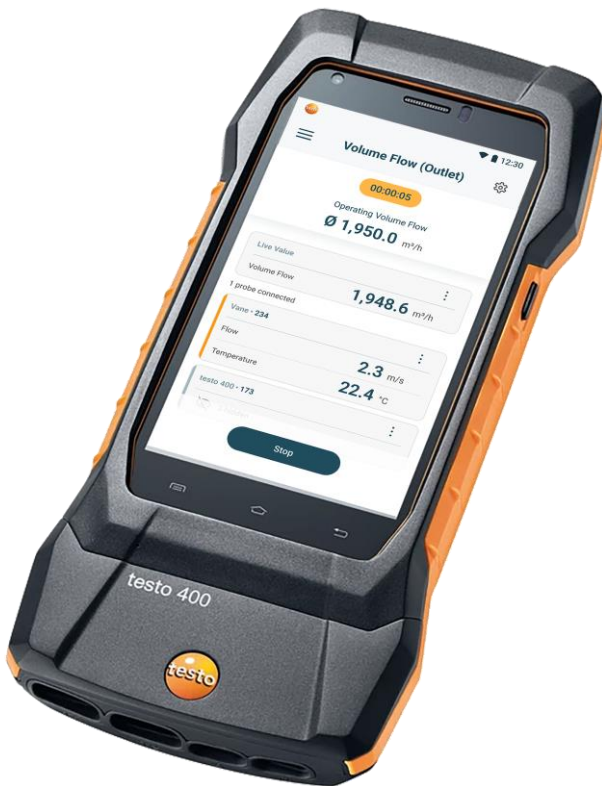




testo 400 - Universal IAQ instrument

0560 0400 01

Instruction manual



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1 About this document

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

2 Safety and disposal

2.1 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 product if there are signs of damage on the housing, mains unit or connected cables.
- Only use the product in closed, dry rooms and protect it from rain and moisture.
- The product must be checked for any visible damage before commissioning.
- 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.
- Only perform maintenance and repair work on this instrument that is described in this documentation. Follow the prescribed steps exactly when doing the work.
- Any additional work must only be carried out by authorized, qualified personnel. Otherwise, Testo will refuse to accept responsibility for the proper functioning of the product after repair and for the validity of approvals.
- Maintenance work that is not described in this documentation must only be carried out by trained service engineers.
- Use only original spare parts from Testo.
- Temperature information given on probes/sensors relates only to the measuring range of the sensor technology. Do not expose handles and supply lines to temperatures above 45°C (113°F), unless they are explicitly approved for higher temperatures.





Risk of burns due to hot probes, probe shafts and sensor tips!

- Do not get hold of hot parts ($> 45^{\circ}\text{C}/113^{\circ}\text{F}$) with bare hands immediately after a measurement.
- In the event of burns, immediately cool the relevant spot with cold water and consult a doctor if necessary.
- Allow probes, probe shafts and sensor tips to cool down.

- The product must not be used in potentially explosive atmospheres, if it is not explicitly approved for these areas.
- Do not expose the product to any extremely high or low temperatures. Avoid temperatures below -5°C or above 45°C . The exception is when a product has been explicitly approved for other temperatures.
- Protect the product from dust and dirt. Make sure that it is not exposed to an environment with dust, dirt, sand, etc.
- Prevent the product from falling.
- If operator safety can no longer be guaranteed, the product is to be taken out of service and secured against inadvertent use. This is the case if the product:
 - is obviously damaged
 - has fractures on the housing
 - has faulty measuring cables
 - has leaking batteries
 - no longer performs the required measurements
 - has been stored for too long in unfavourable conditions
 - has been exposed to mechanical stresses in transit

3 Product-specific safety instructions

DANGER



Integrated magnet Danger to life for persons with pacemakers!

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

ATTENTION




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.).

3.1 Disposal

- Dispose of faulty energy storage units 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.



-  WEEE Reg. no. DE 75334352

3.2 Cleaning

- Clean the product with a dry, soft cloth. Do not use any alcohol, aggressive cleaning agents and solvents or other washing liquids to clean the product.
- Do not use any desiccants.
- Use distilled water, or alternatively mild solvents or degreasers.
- Store solvents and degreasers separately from the product, because leaking solvents and degreasers may cause damage to the product.
- The use of strong or harsh alcohol or brake cleaner may result in damage to the product.

3.3 Products with wireless technology



The camera/ GPS functionality is provided via the plugged-in phone module with model number 0480 0069.

Changes or modifications that have been made without the explicit consent of the competent approval authority may lead to cancellation of the type approval.

Data transfer may be disturbed by equipment that uses the same frequency range (ISM band).

Places where the use of radio communication links is not permitted include aeroplanes and hospitals. For this reason, the following points must be ensured before entering:

- Switch the instrument off.
- Disconnect the instrument from any external power sources (mains cable, external energy storage units, etc.).

3.4 Storage

- Keep the product away from any liquids and do not put it into water. Protect it from rain and humidity.
- Do not store the product together with solvents (e. g. alcohol).

3.5 Approvals

Please find the current country approvals in the attached document.

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



The use of a product with wireless technology 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.

3.6 EU declaration of conformity

Testo SE & Co. KGaA hereby declares that the testo 400 (0440 4000 01) complies with Directive 2014/53/EU.

The full text of the EU Declaration of Conformity can be found on the following website: <https://www.testo.com/eu-conformity>

4 Data protection

The testo 400 measuring instrument makes it possible to input and store personal data such as name, company, customer number, address, telephone number, e-mail address and homepage.

Please be aware that your use of the functions offered here is entirely your own responsibility. This applies in particular to use of the interactive functions (e.g. storing customer data or sharing readings). You are responsible for compliance with the data protection regulations and laws applicable in your country. Therefore it is your responsibility to ensure the legality of the processing of personal data for which you are responsible.

The personal data collected with the measuring instrument is never automatically transferred to Testo SE & Co. KGaA.

You can find the detailed **Privacy Policy – Measuring Instruments** in the testo 400 **Help & Information** main menu in the form of a PDF under **Exclusion of liability -> Data protection information**.

5 Use

The testo 400 is an instrument for measuring climate-related parameters. The testo 400 is particularly suitable for carrying out comfort level measurements for workplace evaluation and flow measurements in and on air conditioning systems.



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

6 Product description

6.1 Front view



6.2 Rear view



1	Camera	2	Differential pressure measurement connections (+/- marking)
3	Magnets	4	Attachment point for carrying strap
5	USB port/mains connection		

⚠ CAUTION




Make sure the pressure tube does not jump away from the connection socket.

Risk of injury!


- Ensure correct connection.

Symbol explanation

	Observe operating instructions
	<p style="text-align: center;">ATTENTION</p> <p>Magnetic field Damage to other devices!</p> <ul style="list-style-type: none"> - Keep a safe distance from products that can be damaged by magnetism (e.g. monitors, computers, credit cards).

	⚠ DANGER
	<p>Magnetic field May be hazardous to the health of pacemaker wearers.</p> <p>- Keep a minimum distance of 20 cm between the pacemaker and the device.</p>
	Declaration of conformity: products marked with this symbol comply with all applicable Community regulations of the European Economic Area.
	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.

6.3 Probe connections

	
1	Thermocouple probe type K connection (T1 and T2)
2	Connection for probes with TUC connector (A and B)

6.4 Probe overview

6.4.1 Compatible cable probes (digital)

Description	Order no.
Hot wire probe, fixed cable, including temperature sensor	0635 1032
Hot wire probe, fixed cable, including temperature and humidity sensor	0635 1572
Hot wire probe (Ø 7.5 mm), fixed cable, including temperature sensor	0635 1026
Hot ball probe (Ø 3 mm), fixed cable, including temperature sensor	0635 1051
Vane probe (Ø 16 mm), fixed cable	0635 9532
Vane probe (Ø 16 mm), fixed cable, including temperature sensor	0635 9572
Fume cupboard probe, fixed cable	0635 1052
Vane probe (Ø 100 mm), fixed cable, including temperature sensor	0635 9432
High-precision vane probe (Ø 100 mm), fixed cable, including temperature sensor	0635 9372
Humidity/temperature probe, fixed cable	0636 9732

Description	Order no.
High-precision humidity/temperature probe, fixed cable	0636 9772
Robust humidity/temperature probe for temperatures up to +180 °C, fixed cable	0636 9775
Turbulence probe, fixed cable	0628 0152
Lux probe, fixed cable	0635 0551
CO ₂ probe including temperature and humidity sensor, fixed cable	0632 1552
CO probe, fixed cable	0632 1272

6.4.2 Compatible Bluetooth® probes (digital)

Description	Order no.
Hot wire probe with Bluetooth®, including temperature and humidity sensor	0635 1571
Vane probe (Ø 16 mm) with Bluetooth®, including temperature sensor	0635 9571
Vane probe (Ø 100 mm) with Bluetooth®, including temperature sensor	0635 9431
High-precision vane probe (Ø 100 mm) with Bluetooth®, including temperature sensor	0635 9371
Temperature/humidity probe with Bluetooth®	0636 9731
High-precision temperature/humidity probe with Bluetooth®	0636 9771
CO ₂ probe with Bluetooth®, including temperature and humidity sensor	0632 1552
CO probe with Bluetooth®	0632 1272

6.4.3 Compatible NTC probes

Description	Order no.
Waterproof immersion/penetration probe – with NTC temperature sensor	0615 1212
Robust air probe – with NTC temperature sensor	0615 1712
Temperature probe with Velcro and NTC temperature sensor	0615 4611
Clamp probe with NTC temperature sensor – for measurements on pipes (Ø 6-35 mm)	0615 5505
Pipe wrap probe with NTC temperature sensor – for measurements on pipes (Ø 5-65 mm)	0615 5605
Stub temperature probe (digital) - with NTC temperature sensor	0572 2162
Stub humidity/temperature probe (digital)	0572 2164
Humidity/temperature cable probe (digital)	0572 2165

6.4.4 Compatible Pt100 probes (digital)

Description	Order no.
High-precision immersion/penetration probe with Pt100 temperature sensor	0618 0275
Immersion/penetration probe with Pt100 temperature sensor	0618 0073
Air temperature probe with Pt100 temperature sensor	0618 0072
Flexible immersion probe with Pt100 temperature sensor and flexible PTFE probe tube	0618 0071
Laboratory probe with Pt100 temperature sensor in glass tube (Duran 50), resistant to aggressive media	0618 7072
WBGT-Pt100 probe for ambient temperature	0618 0070
WBGT-Pt100 probe for wet bulb temperature	0618 0075
Temperature cable probe with Pt100 temperature sensor	0572 2163
Pt100 special probe	0618 9999

6.4.5 Compatible Smart Probes (digital)

Description	Order no.
testo 115i - clamp thermometer with smartphone operation	0560 1115 0560 2115 02 0560 2115 03 (US)
testo 805i - infrared thermometer with smartphone operation	0560 1805
testo 605i - thermohygrometer with smartphone operation	0560 1605 0560 2605 02 0560 2605 03 (US)
testo 405i - thermal anemometer with smartphone operation	0560 1405
testo 410i - vane anemometer with smartphone operation	0560 1410
testo 510i - differential pressure measuring instrument with smartphone operation	0560 1510
testo 549i - high-pressure measuring instrument with smartphone operation	0560 1549 0560 2549 02 0560 2549 03 (US)
testo 915i - thermometer with smartphone operation	0560 1915

6.4.6 Compatible type K thermocouples (analog)

Description	Order no.
Surface paddle probe	0602 0193
TC measuring tip for radio probes	0602 0293
Surface probe	0602 0393
TC surface tip for radio probes	0602 0394
Flexible immersion measuring tip, TC type K	0602 0493
Immersion probe	0602 0593
TE couple with TC plug TC type K	0602 0644
TE couple with TC plug TC type K	0602 0645
TE couple PTFE with TC plug TC type K	0602 0646
Surface probe	0602 0693
Globe probe Ø 150mm	0602 0743
Surface probe	0602 0993
Immersion/penetration probe, waterproof	0602 1293
Air probe, robust	0602 1793
Surface probe	0602 1993
Surface temperature probe TC type K	0602 2394
Immersion/penetration probe	0602 2693
Pipe wrap probe TC type K	0602 4592
Clamp probe with thermoelectric couple.	0602 4692
Magnetic probe	0602 4792
Magnetic probe Tmax 400°C	0602 4892
Plug-in immersion measuring tip, flexible	0602 5693
Measuring tip with TC plug TC type K	0602 5792
Measuring tip with TC plug Type K, class 3	0602 5793
Pipe wrap probe with Velcro strip	0628 0020
Penetration probe type K	0628 0026
Penetration temperature probe	0628 1292
Surface probe	0628 9992

7 Commissioning

7.1 Mains unit/ rechargeable battery

The measuring instrument is supplied with a rechargeable battery.

 **WARNING**

Risk of injury! The instrument may be damaged!

Deformation around the battery!

Regularly check the instrument for deformations or damage around the battery. If you notice any deformation, the instrument must no longer be used. Switch it off to prevent physical injury or damage to the instrument. Dispose of the instrument properly (observe local regulations) or return it to Testo for disposal.



The rechargeable battery is permanently installed and can only be changed by a Testo service centre.

The measuring instrument is supplied with a partially charged rechargeable battery.

- **Charge the rechargeable battery fully before using the measuring instrument.**



The testo 400 may only be used with the original power supply unit supplied or a comparable 5 V / 2 A USB power supply unit.



Only charge the rechargeable battery unit at an ambient temperature of 0 to 45 °C.

7.1.1 Charging the rechargeable battery

- 1 Connect the USB mains unit to the USB interface/mains unit socket of the testo 400 (see Section 5.2).
 - 2 Connect the mains plug of the mains unit to a mains socket.
- ▶ The charging process starts.



If the rechargeable battery has completely discharged, the charging time at room temperature is approx. 5-6 hours. Only charge the instrument at an ambient temperature of 0 to 45 °C.



If the battery level is 6 – 10%, this message is displayed: “Once the battery level reaches 5%, the measuring instrument undergoes a

controlled shut-down. Please charge up your measuring instrument in a timely manner.”



If the battery level is 5% or less, the following message is displayed: “The battery level is very low. The measuring instrument will now shut down.” The instrument should only be switched back on after a brief charging phase. The minimum battery level must be 6%.


7.1.2 Rechargeable battery LED status

LED status	Description
Lit up green	Instrument is supplied with power (battery fully charged)
Flashing green (rapidly)	Instrument is on and being supplied with power (battery is charging)
Flashing green (slowly)	Ready for operation in battery mode
Flashing green/red	Instrument is off and being supplied with power (battery is charging)
Flashing red	Internal error, please restart. If the error has still not been rectified, please carry out a factory reset (see Section 8.3.7). If the problem persists, contact Testo Customer Service.

7.1.3 Mains operation

- 1 Connect the USB mains unit to the USB interface/mains unit socket of the testo 400 (see Section 5.2).
 - 2 Connect the mains plug of the mains unit to a mains socket.
- ▶ The measuring instrument is powered via the mains unit. The battery charges.

7.2 Switching the testo 400 on and off

Current status	Action	Function
Instrument off	Press and hold down the button (> 3 sec)	Instrument is switched on
<p> When the measuring instrument is started for the first time, the setup wizard guides you through the following setting parameters step by step:</p> <ul style="list-style-type: none"> - Language - Country - Units - Date and time - Own company address <p>After the setup wizard, a tutorial can be launched. The tutorial demonstrates the general operation and the most important functions of the measuring instrument using examples.</p>		
Instrument on	Press the button briefly (< 1 sec)	Instrument is switched to standby mode. The instrument is re-activated when the button is pressed again.
Instrument on	Press and hold down the button (> 1 sec)	Choice: press [OK] to switch the instrument off or press [Cancel] to cancel switch-off of the instrument.



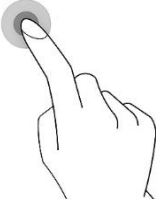
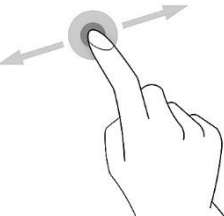
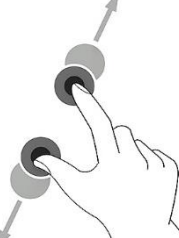
The tutorial can be executed again at any time in the main menu under **Help and Information**.



Measuring values that have not been saved are lost when the measuring instrument is switched off.

7.2.1 Touchscreen

You only need three touchscreen movements to use the testo 400:

Description	
<p>Tapping To open applications, select menu icons, press buttons on the display or enter characters with the keypad, tap these with a finger in each case.</p>	
<p>Swiping Swipe to the right or left on the display to show further views, e.g. to switch from the list view to the graphic view.</p>	
<p>Zooming In order to make a section of the display larger or smaller, touch the display with two fingers and move them apart or together.</p>	

7.3 Setup wizard

When the testo 400 is started up for the first time, the setup wizard is activated and guides you step-by-step through the following setting parameters.



The instrument setup that is implemented can be adapted at any time in the **Settings** menu.

7.3.1 Select language

The first step is to select the language for using the testo 400.

7.3.2 Country settings and units

In this step, you have the option of selecting the country and of deciding whether you want to use the metric or imperial unit system. It is also possible to establish user-defined settings for the units. See Section 8.2.1 and 8.2.2.

7.3.3 Date and time

Click on the **Time** field to set the date and time. The time zone can also be set and you can choose between 12-hour/24-hour mode.

7.3.4 Contact information/company details

On each line, personal details can be entered for the items Company / Technician name / Street, building number / Postcode, city / Country / Telephone / Fax. In principle, company details can also be inserted using the testo DataControl software. The company details will be displayed in all PDF reports at the top right of the document and also listed in the measurement data report. The company details stored in the testo 400 at the time of the measurement cannot be subsequently changed in the PDF report of the measurement. The new company details will only be stored in the PDF report once a new measurement is carried out. Please also see Section 8.2.3.

7.4 Tutorial

At the end of the Setup wizard, the tutorial can be launched.



The tutorial can be executed again at any time via the **Help and Information** menu.

The tutorial demonstrates the general operation and the most important functions of the measuring instrument, using brief examples. The detailed descriptions can be found in the relevant sections.

- Connect cable and Bluetooth® probes (see Section 7.5)
- Display - user interface (see Section 8.1)
- Application menus (see Section 8.4)
- General measurement information (see Section 8.3.1)
- Managing measurement data (see Section 8.6.1)
- Customer management (see Section 8.5)
- Sensor management (see Section 8.7)

7.5 Connecting probes



All probes can be connected or changed while the instrument is switched on. However, the connection must not be interrupted during a probe update.

7.5.1 Connecting a cable probe to the testo 400

- > Connect the testo 400 to the probe via the TUC slot.
- ▶ The cable probe is immediately displayed in the sensor management, in the basic view and in the relevant measurement menu.

Disconnecting

- > Pull the connector out of the instrument.
- ▶ The cable probe is listed in the sensor management in the **Recently connected probes** section.

7.5.2 Connecting a Bluetooth® probe to the testo 400






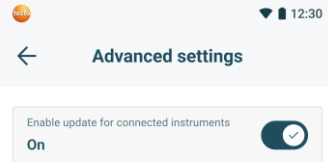
The Bluetooth® connection from the testo 400 for the probes is always activated and cannot be switched on and off manually. It is established automatically, and no special pairing is required.

- 1 Switch on the probe using the button on the Bluetooth® handle and make sure that the probe is located within a maximum distance of 1 m from the testo 400.
 - ▶ The LED on the handle flashes yellow. As soon as the connection is established, the LED flashes green.
 - ▶ The Bluetooth® probe is immediately displayed in the sensor management, in the basic view and in the relevant measurement menu.
- 2 Press the button on the probe handle for at least 3 seconds to switch the probe off.
 - ▶ The Bluetooth® probe is listed in the sensor management in the **Recently connected probes** section.

Probe LED status	Description
Flashing red.	Low battery status
Flashing yellow.	The probe is switched on and searching for the Bluetooth® connection.
Flashing green	The probe is switched on and connected to the testo 400 via Bluetooth®.

7.5.3 Probe update

- 1 Click on .
- ▶ Main menu opens
- 2 Click on  **Settings**.
- ▶ The Settings menu opens.
- 3 Click on  **Advanced settings**.
- 4 Enable update for connected instruments.
- ▶ Update for connected instruments is enabled.



Alternatively, the update can also be carried out manually (section 9.1).



The connection must NOT be interrupted during the probe update. The update must be carried out completely.

- ▶ Update notification appears.



Probe update available. Click on "Start Update" to update the connected probe.

Please never disconnect the probe cable or click the button handle during the update process. Otherwise, the probe may no longer be usable after an interrupted update. The update does not affect the stored calibration and setting information in the probe.

Start Update

- > Click on **Start Update**.

- ▶ Update starts.

- ▶ Update status.



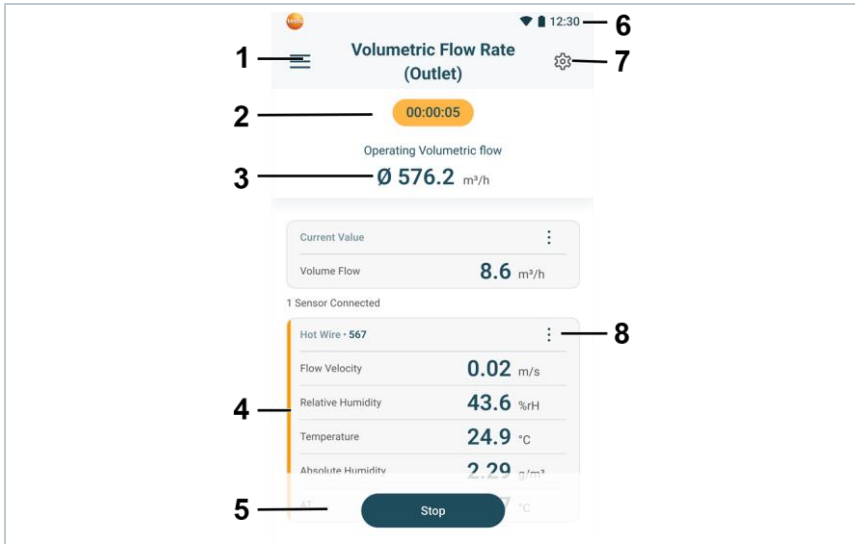
Probe update in progress - please do not disconnect the probe!



Please do not disconnect the probe and do not press the button during the update process to avoid loss of functionality.
(25%)

8 Operation

8.1 Display – user interface




1		Open main menu
2		Display of the measurement period
3		Display of calculated measurement results
4		Reading for each probe
5		Can be controlled with different function keys
6		Instrument status bar
7		Configuration
8		Edit reading display / set alarm values

Further symbols on the user interface (without numbering)









	One level back
	Share report
	Searching
	Favourite
	Deleting
	Further information
	Display report

8.2 Main menu

The **Main menu** can be accessed via the  icon at top left. To exit the main menu, select a menu or right-click on the guided menus. The last screen displayed is shown.

	Measurement Programs (see Section 7.4)	 
	Customer (see Section 7.5)	
	Saved Data & Reports (see Section 7.6)	
	Measurement instruments (see Section 7.7)	
	Settings (see Section 8)	
	Help & Information (see Section 8.3)	
	Other applications (see Section 8.3.4)	

Additional icons on the testo 400:

	One level back		Delete
	Share measurement data/reports		Further information
	Search		Display report
	Favourite		Edit

8.3 Preparing for measurement

8.3.1 General measurement information

All compatible probes are listed in Section 6.4.

- Depending on the parameter to be measured, certain probes need to be connected to the instrument (via Bluetooth®, TUC or TC plug).
- Some (thermal) probes require a warming-up phase until they are ready to measure.
- Before every measurement, wait until the adjustment phase is over. The adjustment phase ensures that the readings have stabilized.
- For some measurement parameters, additional calculation parameters need to be set in order to ensure that you get the correct measurement results, see details in the respective application menus.
- To enable reliable data handling, the quantity of measuring values to be saved for each measurement protocol must be restricted to 1 million individual values.



Depending on the measurement period, specific measuring cycles are feasible:

Duration:	Minimum measuring cycle:
1 min to 15 min	1 sec (thermocouple type K: 2 sec)
16 min to 2 hours	10 sec
> 2 hours to 1 day	60 sec
> 1 day to 21 days	5 min.

With the testo 400 (and the IAQ data logger), a maximum 1 million readings (with a maximum of 18 channels) can be recorded with one measurement.

Example 1: Result: 9,216 readings

Duration: 8 days

Measuring cycle: 5 minutes


Measurement channels: Temperature, humidity, CO₂, flow (4 channels)

Example 2: Result: 17,700 readings


Duration: 59 minutes

Measuring cycle: 1 second

Measurement channels: Temperature, humidity, CO₂, flow, pressure (5 channels)

Depending on the connected probe, prior to each measurement, individual parameters for the measurement can be set via the  icon (see Section 8.1 - Point 8), such as the visibility of individual measurement parameters or the units of the measured values.

If a probe's individual readings are hidden, these settings are stored on the testo 400 specifically for each probe and applied to all application menus. Whereas the units set are only stored in the corresponding application menu, but are time-independent.

The measuring mode can be set via the configuration menu . Confirm the selection via **Apply configuration** (see Section 8.3.2).

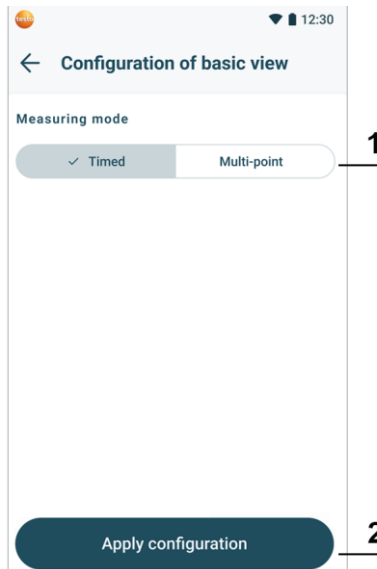
You can choose between the individual application menus:

Application menus	Continuous	Punctual	IAQ data logger
Basic view	X	X	X
Volume flow measurements	X	X	
Comfort level – PMV/PPD	X	X	X
Discomfort level measurements	X		X
Differential temperature	X	X	
Differential pressure	X	X	
Wet Bulb Globe Temperature	X	X	X

8.3.2 Measuring mode

8.3.2.1 Punctual measurement

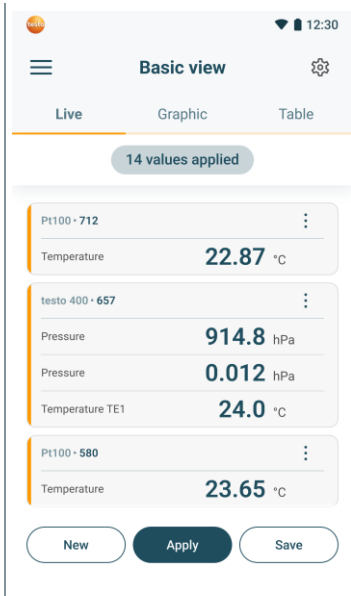
In the first line of the configuration menu, you can choose between **Punctual** and **Continuous** (1). Click on **Apply Configuration** (2) to start the measurement.





The counter in the upper section indicates the number of readings accepted. The measurement does not need to be started explicitly.

1 Press **Apply**.



▶ The first reading was saved. There are 3 options to continue.

2 **Apply**: save a second, third, fourth, etc., reading. The counter shows the number of values that have already been accepted.

Or:

New: launch a new measurement. The current measurement will be deleted along with all readings (a warning is displayed).

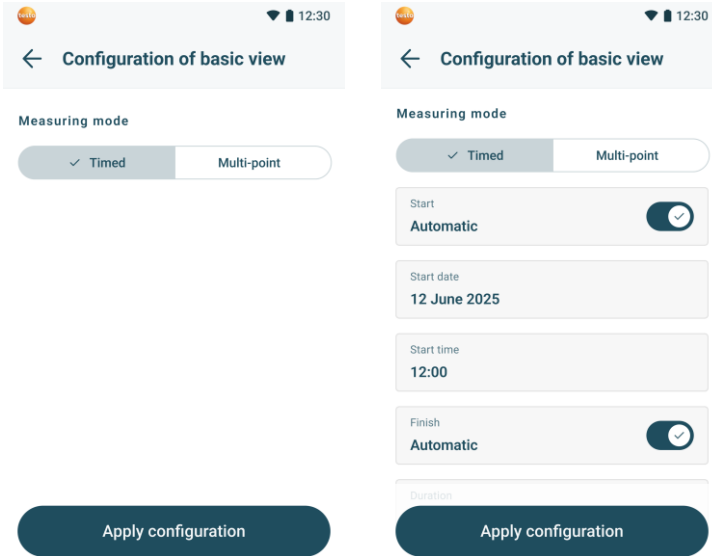
Or:

Save: exit the current measurement and save all readings on the testo 400 (see Section 8.6).

8.3.2.2 Continuous measurement



For the continuous measurement, a start time, a measurement duration and a measuring cycle can be defined or the measurement can be started and finished manually.



- 1 Click on **Apply Configuration** to start the measurement (with a scheduled start time).
- 2 Click on **Start** or the measurement starts automatically at the configured time.
- ▶ The measurement starts, all selected readings are recorded, the counter changes colour from grey to orange and starts running.



Option A: Once the settings have been accepted and the measurement has started, the counter in the upper section turns orange and runs backwards to 00:00:00.

Option B: Once the settings have been accepted and the measurement has started, the counter in the upper section turns orange and starts running from 00:00:00.

- 3 Click on **Stop** to pause or exit the measurement.

- ▶ The measurement pauses. The counter is grey. There are 3 options to continue.

- 4 **Start:** start a second, third, fourth, etc., measurement. The counter changes colour again and displays the current measurement as the first number.

Or:

New: launch a new measurement. The current measurement will be deleted along with all readings (a warning is displayed).

Or:

Save: exit the current measurement and save all readings on the testo 400 (see Section 8.6).



The counter in the upper section turns orange and measures the time (after stopping, the counter turns grey again). To the left of the counter, the number of the current/last measurement is displayed (e.g. 3 | 00:00:07 – the third measurement ran for 7 seconds).

8.4 Application menus

The testo 400 has permanently installed measurement programs. These enable the user to carry out convenient configuration and implementation of specific measuring tasks.

The testo 400 offers the following **Measurement menus**:

Basic view	
Volume flow, duct	
Volume flow rate – grid measurement as per EN 12599	
Volume flow rate – grid measurement as per ASHRAE 111	
Volume flow (outlet)	
Volume flow – funnel	
Volume flow, Pitot tube	
Volume flow – k-factor	
Comfort level – PMV/PPD	
Discomfort – draft rate	
Differential temperature (ΔT)	
Differential pressure (ΔP)	
Wet Bulb Globe Temperature (WBGT)	
Refrigeration	
Target superheat	
Compressor Test (T3)	
Cooling and heating output	
Tightness Test	
Normal Effective Temperature (NET)	

8.4.1 Basic view

In the **Basic view** application menu, the current measuring values can be read, recorded and saved. The Basic view is particularly suitable for fast, uncomplicated measurements without the specific requirements of a standard-compliant measurement. The measuring mode can be selected via the


Configuration menu  (see Section 8.3.2).

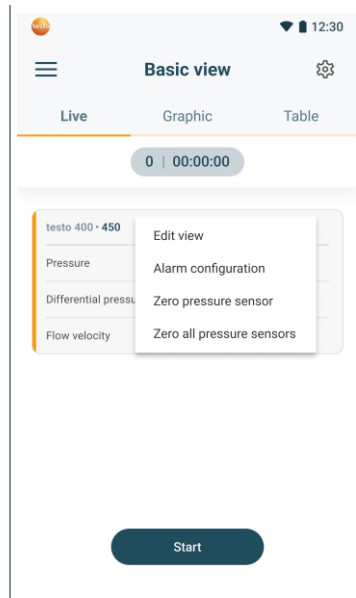
All probes that can be connected to the testo 400 are also displayed in the **Basic view** application menu. As this is not an application menu where only specific probes can be used, all probes are highlighted in orange on the left-hand side.

As of app version 14.51.14, the flow velocity can optionally be displayed in the basic view on the testo 400. This is calculated with a fixed pitot tube factor of 1.00 and the fixed parameters 20.0 °C and 50 %RH.

In all application menus, apart from the volume flow measurement, there are three different screens for the measurement - Live (or also Basic view), Graphic and Table.

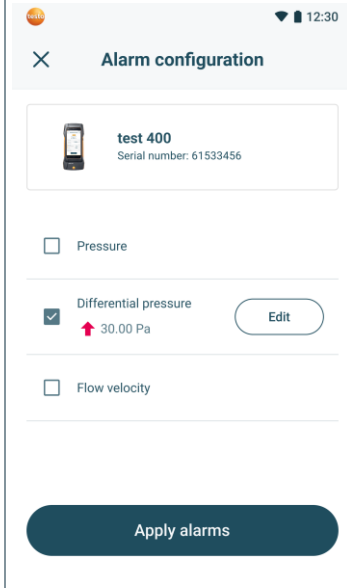
8.4.1.1 Setting alarm values

- 1 Click on  in the Basic View.
- 2 Click on **Alarm configuration**.




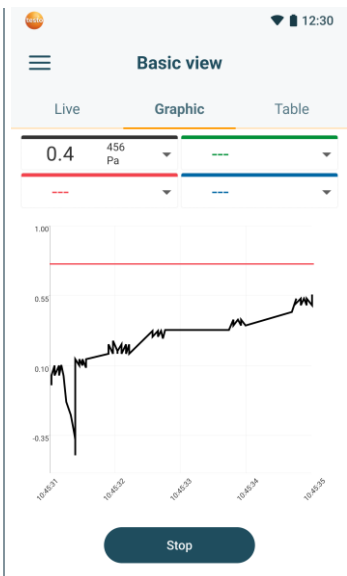
- ▶ Alarm configuration opens.

- 3 Click on **EDIT** and enter the alarm values.



- 4 Click on **Apply Alarms**.

- ▶ In the Graphic view, the alarm values are visible by clicking .




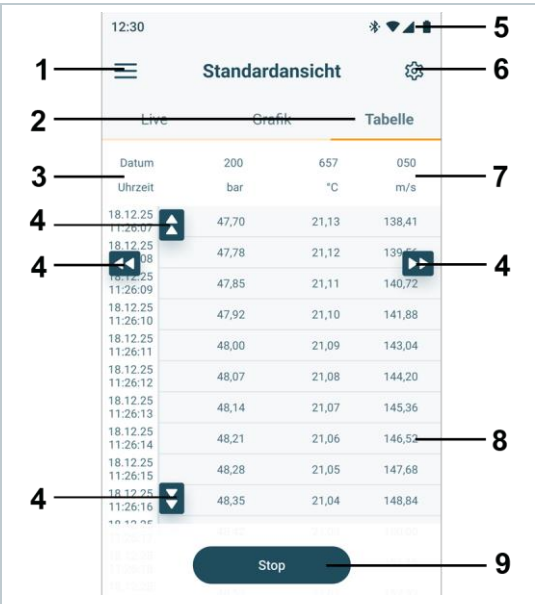

8.4.1.2 Graphic view

In the Graphic view, the values for a maximum 4 channels can be displayed simultaneously in a chronological trend graph. All measured parameters can be displayed in the Graphic view via the channel selection (click on one of the four selection fields). Once a measurement parameter has been selected, the value is updated automatically.

The Zoom touch function allows individual parts of the graphic to be viewed in more detail or time progressions to be displayed compactly.

1	☰ Open the main menu	
2	Change of display	
3	Reading for selected channel	
4	3-digit probe ID and measurement parameter	
5	Graphic with selected channels and 4 Y-axes	
6	Status bar	
7	⚙️ Open the configuration menu	
8	Selection of other channels	
9	Time axis	
10	New/Start/Stop/Save button	




8.4.1.3 Table view

1	 Open the main menu	
2	Change of display	
3	Column with date and time	
4	Arrow keys to go directly to the end of the table	
5	Status bar	
6	 Open the configuration menu	
7	Probe ID - measurement unit	
8	Measuring values	
9	New / Start / Stop / Save button	

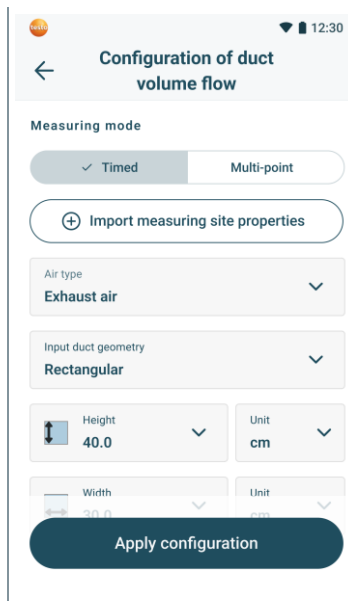
8.4.2 Volume flow, duct

Use this application to measure the volume flow in a ventilation system duct. There are various options for this, which differ mainly in terms of the measuring range and the required probes:

- Thermal flow velocity probes for low flow velocities
- 16 mm vane probe for medium flow velocities
- Pitot tube for measurements at high velocities and in heavily contaminated flows with a high particle content

- 1 | Click on .
 - ▶ Main menu opens
- 2 | Click on  **Measurement Programs**.
- 3 | Click on **Volume flow, duct**.
 - ▶ The Volume flow, duct measurement menu opens.
- 4 | Click on .

- ▶ Configuration menu opens.
- 5 Make the required settings.

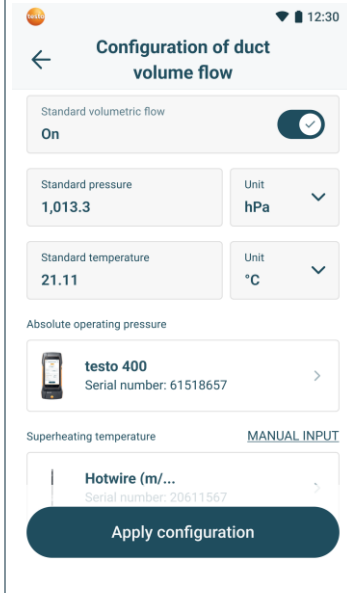


The screenshot shows a mobile application interface for configuring duct volume flow. At the top, there is a status bar with a signal strength icon, a battery icon, and the time 12:30. Below the status bar is a header with a back arrow on the left and the title "Configuration of duct volume flow". The main content area is titled "Measuring mode" and contains two radio buttons: "Timed" (which is selected with a checkmark) and "Multi-point". Below this is a button with a plus sign and the text "Import measuring site properties". There are three dropdown menus: "Air type" set to "Exhaust air", "Input duct geometry" set to "Rectangular", and "Height" set to "40.0". To the right of the "Height" dropdown is another dropdown for "Unit" set to "cm". Below these are partially visible dropdowns for "Width" and "Unit". At the bottom of the form is a dark blue button with the text "Apply configuration".



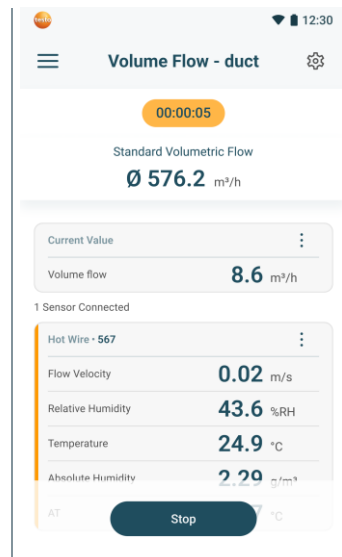
The measurement can be started even without customer data. This can be added following the measurement result.

6 Make further settings accordingly.



7 Click on **Apply Configuration**.

- ▶ Values currently being measured are displayed.




8.4.3 Volume flow rate - grid measurement as per DIN EN 12599

With this application, the volume flow in a ventilation system duct can be measured as per the DIN EN 12599 standard. There are various options for this, which differ mainly in terms of the measuring range and the required probes:

- Thermal probes (including temperature measurement and possibly humidity measurement) for low flow velocities
- 16 mm wheel 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

The main prerequisite for accurate measurement is the suitability of the measuring site. Minimum distances from points of discontinuity must be observed:

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

1 | Click on .

▶ | Main menu opens

2 | Click on  **Measurement Programs.**

3 | Click on **Volume flow rate - grid measurement as per DIN EN 12599.**

▶ | The Volume flow rate - grid measurement as per DIN EN 12599 measurement menu opens.

4 | Click on .

▶ | Configuration menu opens.

- 5 Make the required settings and click on **Next**.

The screenshot shows a configuration screen for volume flow measurement. The title is "Configuration of volume flow - grid measurement as per DIN...". There are three main settings:

- Number of inspection holes (drilled holes):** 4
- Number of measuring points:** 6
- Inspection hole position:** Horizontal (with a dropdown arrow)

Below the settings is a 3x6 grid of dots representing the measurement points. At the bottom, there are two buttons: "Back" and "Next".



For volume flow measurement as per the DIN EN 12599 standard, it is necessary for the measurement to be carried out at different measuring points. The number of measuring points depends on the distance from the point of discontinuity and irregularities in the profile.

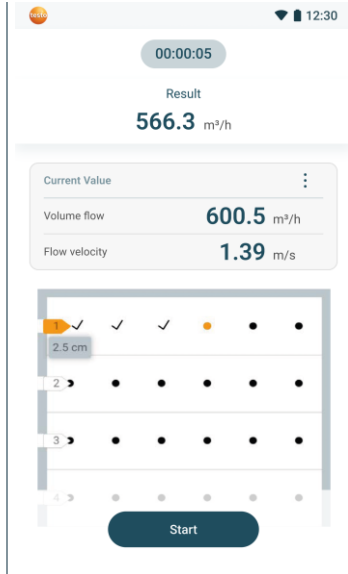
- 6 Configure the measuring interval for each measuring point in the duct.
- 7 Click on **Start**.



The longer a measuring point is measured, the more accurate the result at the end of the volume flow measurement as per DIN EN 12599.

- ▶ During the measurement in the duct, the required immersion depth of the next measuring point is automatically shown on the display. The immersion depth of the probe can be found on the scale of the probe shaft.

- ▶ Following successful measurement of a measuring point, the measurement assistant jumps straight to the next measuring point until all the measuring points are marked with a tick. You now have three options to proceed.



It is also possible to correct and overwrite individual measuring points by selecting the corresponding point on the display and starting a new measurement.



With the update to FW V17.7.11, the formula for calculating the volume flow in accordance with the EN 12599 standard has been expanded to include the uncertainty of the measuring location. The value is set to 2 mm by default and this value is included in the overall calculation of the measurement uncertainty.

8 **Start:** start another measurement.

Or:

New: launch a new measurement. The current measurement will be deleted along with all readings (a warning is displayed).

Or:

Save: exit the current measurement and save all readings on the testo 400 (see Section 8.6).

Standard Volumetric Flow
263.5 m³/h

Current Value

Volume Flow 13.0 m³/h

Flow velocity 0.03 m/s

1 ✓ ✓ ✓ ✓ ✓ ✓

2 ✓ ✓ ✓ ✓ ✓ ✓

3 ✓ ✓ ✓ ✓ ✓ ✓

4 ✓ ✓ ✓ ✓ ✓ ✓

Probe ✓ ✓ ✓ ✓ ✓ ✓

New Start Save



If large differences in flow velocities are ascertained over the cross-section, the number of measuring points must be increased. The number of measuring points is then adequate if the measurement value for each area is representative for its immediate surroundings, i.e. if it can be regarded as a genuine mean value for its portion of the area.

- ▶ At the end of a volume flow measurement in compliance with the standards, the average volume flows are shown on the results display, along with the information about measuring accuracy, which helps to better estimate the measurement result.

Volume flow - grid measurement as per DIN EN 12599

Date: 26.08.2025 12:30

Add customer

Attached images

Write a comment

Measurement data

Volume flow	Ø 320.9 m ³ /h
Standard volume flow	Ø 287.1 m ³ /h
Volume flow accuracy	39.2 m ³ /h
Flow accuracy	0.09 m/s
Accuracy	12.2 %

Actual measurement period

8.4.4 Volume flow rate - grid measurement as per ASHRAE 111



With this application, the volume flow in a ventilation system duct can be measured as per the ASHRAE 111 standard. There are various options for this, which differ mainly in terms of the measuring range and the required probes:

- Thermal probes (including temperature measurement and possibly humidity measurement) for low flow velocities
- 16 mm wheel 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

The main prerequisite for accurate measurement is the suitability of the measuring points. Minimum distances from points of discontinuity must be observed:

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

1 | Click on ☰.

- ▶ Main menu opens
- 2 Click on  **Measurement Programs**.
- 3 Click on **Volume flow rate - grid measurement as per ASHRAE 111**.
- ▶ The Volume flow rate - grid measurement as per ASHRAE 111 measurement menu opens.
- 4 Click on .
- ▶ Configuration menu opens.
- 5 Make the required settings and click on **Next**.

The screenshot shows a mobile application interface for configuring a measurement. At the top, there is a status bar with a signal strength icon, a battery icon, and the time 12:30. Below the status bar is a title bar with a back arrow on the left and the text "Configuration of volume flow - grid measurement as per DIN...". The main content area contains three input fields: "Number of inspection holes (drilled holes)" with the value "4", "Number of measuring points" with the value "6", and "Position of the Inspection hole" with a dropdown menu set to "Horizontal". Below these fields is a diagram of a rectangular duct with a grid of 15 blue dots representing measuring points (3 rows by 5 columns). At the bottom of the screen, there are two buttons: a white "Back" button with a left arrow and a dark blue "Next" button with a right arrow.



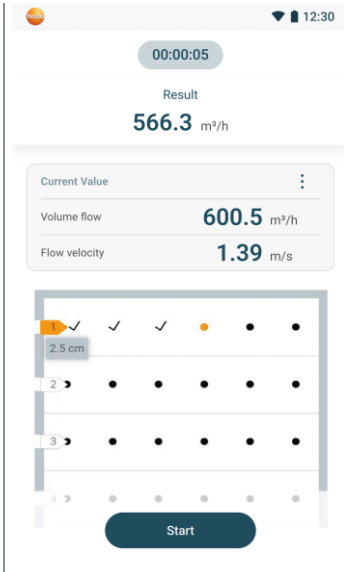
For volume flow measurement as per the ASHRAE 111 standard, it is necessary for the measurement to be carried out at different measuring points. The number of measuring points depends on the distance from the point of discontinuity and irregularities in the profile. In contrast to standard EN 12599, the measurement must be carried out on at least 5 inspection holes (drilled holes) and at 5 measuring points in each case.

- 6 Configure the measuring interval for each measuring point in the duct.
- 7 Click on **Start**.



The longer a measuring point is measured, the more accurate the result at the end of the volume flow measurement as per DIN EN 12599.

- ▶ During the measurement in the duct, the required immersion depth of the next measuring point is automatically shown on the display. (The calculation of the immersion depth varies between the two standards ASHRAE and EN 12599). The immersion depth of the probe can be found on the scale of the probe shaft.
- ▶ Following successful measurement of a measuring point, the measurement assistant jumps straight to the next measuring point until all the measuring points are marked with a tick. You now have three options to proceed.



It is also possible to correct and overwrite individual measuring points by selecting the corresponding point on the display and starting a new measurement.

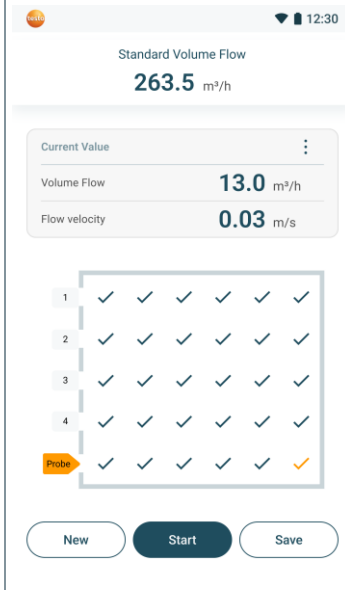
8 **Start:** start another measurement.

Or:

New: launch a new measurement. The current measurement will be deleted along with all readings (a warning is displayed).

Or:

Save: exit the current measurement and save all readings on the testo 400 (see Section 8.6).






If large differences in flow velocities are ascertained over the cross-section, the number of measuring points must be increased. The number of measuring points is then adequate if the measurement value for each area is representative for its immediate surroundings, i.e. if it can be regarded as a genuine mean value for its portion of the area.

- ▶ At the end of a volume flow measurement as per ASHRAE 111, the average volume flows are shown on the results display.

8.4.5 Volume flow, outlet

Use this application to measure the volume flow at outlets of ventilation systems. The 100 mm vane probes (including temperature measurement) are best suited for measuring the volume flow at outlets.

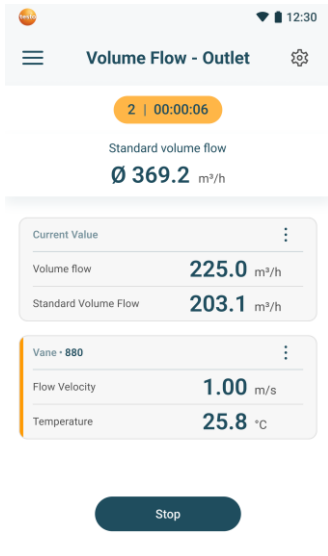
- 1 Click on .
 - ▶ Main menu opens
- 2 Click on  **Measurement Programs.**
- 3 Click on **Volume flow, outlet.**
 - ▶ The Volume flow, outlet measurement menu opens.
- 4 Click on .
 - ▶ Configuration menu opens.
- 5 Make the required settings.



When measuring the volume flow at outlets, it is possible to enter the free area of the outlet as a percentage in order to take possible sources of interference into account.

- 6 Click on **Apply Configuration.**




- ▶ The measurement screen is displayed. The probe relevant to the measurement is marked in orange.

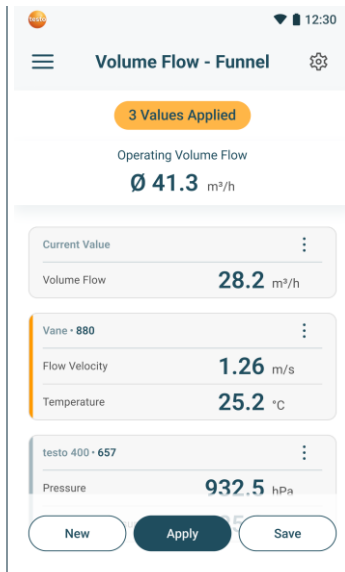


8.4.6 Volume flow - funnel

Use this application to measure the volume flow of ventilation systems with a funnel.

A volume flow rate funnel is required to determine the flow rate on ventilation systems. The measurement can be carried out with a compatible 100 mm vane probe in conjunction with a funnel set. The funnels differ in size. When selecting the funnel, make sure that the opening of the funnel covers the outlet grille completely and tightly.

- 1 Click on .
 - ▶ Main menu opens
- 2 Click on  **Measurement Programs**.
- 3 Click on **Volume flow - funnel**.
 - ▶ The Volume flow - funnel measurement menu opens.
- 4 Click on .
 - ▶ Configuration menu opens.
- 5 Make the required settings.
 - ▶ The measurement screen is displayed. The probe relevant to the measurement is marked in orange. You now have three options to proceed.



6 **Apply:** the current reading is applied.

Or:


New: launch a new measurement. The current measurement will be deleted along with all readings (a warning is displayed).

Or:

Save: exit the current measurement and save all readings on the testo 400 (see Section 8.6).

8.4.7 Volume flow, Pitot tube

Use this application to measure the volume flow in a ventilation system duct. The Pitot volume flow measurement is suitable for high velocities and flows with a high particle content.


1 Click on .

▶ Main menu opens

2 Click on  **Measurement Programs.**

3 Click on **Volume flow, Pitot tube.**

▶ The Volume flow, Pitot tube measurement menu opens.

4 Click on .

▶ Configuration menu opens.

5 Make the required settings.

Configuration Volume Flow
Pitot Tube

Measurement Mode

✓ Timed Multi-point

⊕ Import Measurement site properties

Air Type
Return Air

Enter Duct Geometry
Rectangular

Height 40.0 Unit cm

Width 30.0 Unit cm

Apply Configuration

7 Make further settings accordingly.

Configuration Volume Flow
Pitot Tube

Pitot Tube Factor
1.00

Pitot Tube

testo 400
Serial Number: 61518657

Temperature MANUAL INPUT

testo 400
Serial Number: 61518657
Temperature TC1

Absolute Pressure MANUAL INPUT

testo 400
Serial Number: 61518657

Apply Configuration




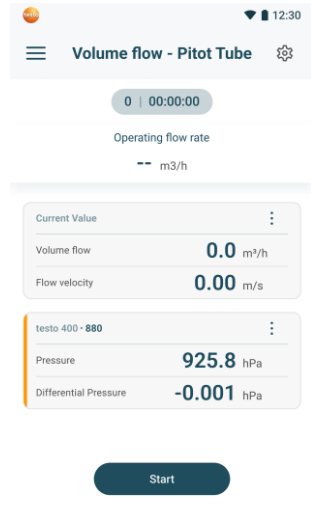
Prandtl Pitot tubes (order no.: 0635 2045, 0635 2145, 0635 2345):
Pitot tube factor: 1.00.

Straight Pitot tubes (order no.: 0635 2043, 0635 2143, 0635 2243):
Pitot tube factor: 0.67.

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

8 Click on **Apply Configuration**.

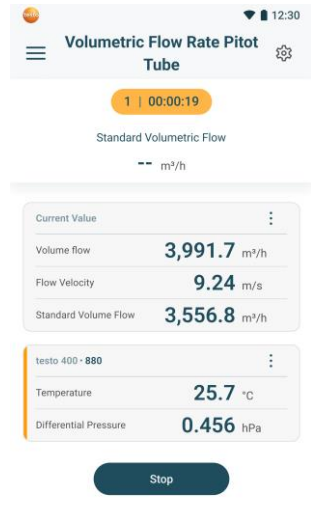
9 Click on  to zero the differential pressure sensor.



▶ A message is displayed, the pressure is zeroed.

10 Click on **Start**.

▶ The measurement starts.



11 Click on **Stop**.

- ▶ Values currently being measured are displayed. You now have three options to proceed.

12 **Start:** start another measurement.

Or:

New: launch a new measurement. The current measurement will be deleted along with all readings (a warning is displayed).

Or:

Save: exit the current measurement and save all readings on the testo 400 (see Section 8.6).




8.4.8 Volume flow - k-factor

The testo 400 can determine the volume flow by measuring the reference resistance and input of the K-factor. This allows the testo 400 to remain connected to the air outlet during adjustment work and the changes in volume flow can be read directly on the display.

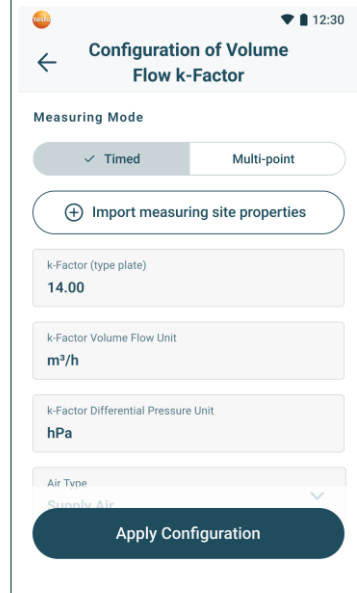
This process for determining volume flow can always be used when there are appropriate specifications available from the component manufacturer. In line with these specifications, the differential pressure is measured at a position specified by the manufacturer or supplier. The volume flow is determined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

$$v = k * \sqrt{\Delta P}$$

v	Volume flow
ΔP	Measured differential pressure in Pa
k	System-specific conversion factor

- 1 Click on .
- ▶ Main menu opens
- 2 Click on  **Measurement Programs**.
- 3 Click on **Volume flow - k-factor**.
- ▶ The Volume flow - k-factor measurement menu opens.
- 4 Click on .
- ▶ Configuration menu opens.

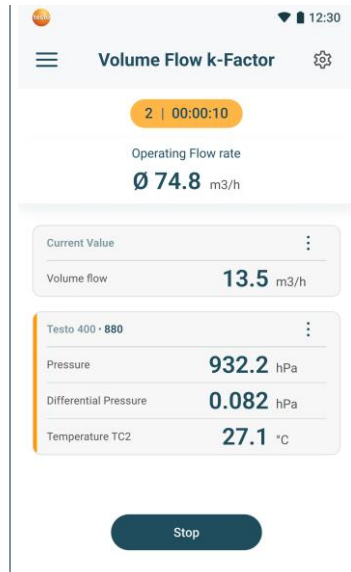
5 Make the required settings.



6 Click on **Apply Configuration**.

7 Click on **Start**.

▶ The measurement starts.



8 Click on **Stop**.

▶ Values currently being measured are displayed. You now have three options to proceed

9 **Start**: start another measurement.

Or:

New: launch a new measurement. The current measurement will be deleted along with all readings (a warning is displayed).

Or:

Save: exit the current measurement and save all readings on the testo 400 (see Section 8.6).

8.4.9 Comfort level – PMV / PPD (EN 7730 / ASHRAE 55)

The PMV/PPD measurement determines the comfort level (PMV = Predicted Mean Vote) and the relative discomfort (PPD = Predicted Percentage Dissatisfied) e.g. at workstations (described in the standard ISO 7730).

The mean radiation temperature required for determining PMV/PPD is calculated in the testo 400 from the measurement parameters of globe temperature, ambient temperature and air velocity. The formula is based on forced convection and applies to standard bulbs 150 mm in diameter in accordance with DIN EN ISO 7726.

Necessary measurement parameters



- Mean radiation temperature in °C = t_r
- Globe temperature in °C = t_g
- Ambient temperature in °C = t_a
- Air velocity in m/s = v_a

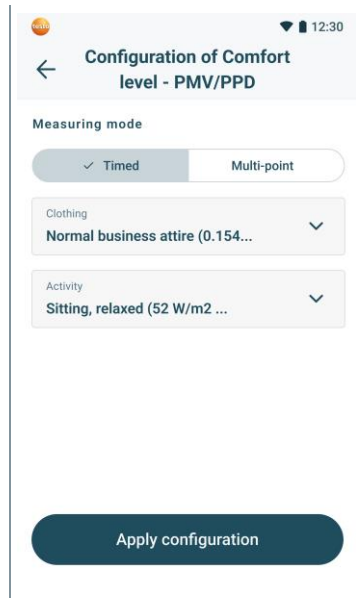
$$t_r = [(t_g + 273)^4 + 2.5 \cdot 10^8 \cdot v_a^{0.6} \cdot (t_g - t_a)]^{1/4} - 273$$



For the PMV/PPD calculation, we use the measured temperature of the humidity probe for the ambient temperature. At low flow velocities < 0.2 m/s, the temperature of the turbulence probe cannot be used because a slightly increased temperature is indicated due to the thermal effect of the hot wire.

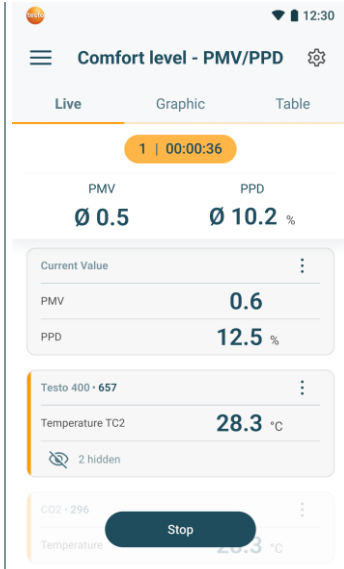
1 Click on

- ▶ Main menu opens
- 2 Click on  **Measurement Programs**.
- 3 Click on **Comfort level – PMV/PPD**.
- ▶ The Comfort level – PMV/PPD measurement menu opens.
- 4 Click on .
- ▶ Configuration menu opens.
- 5 Make the required settings.

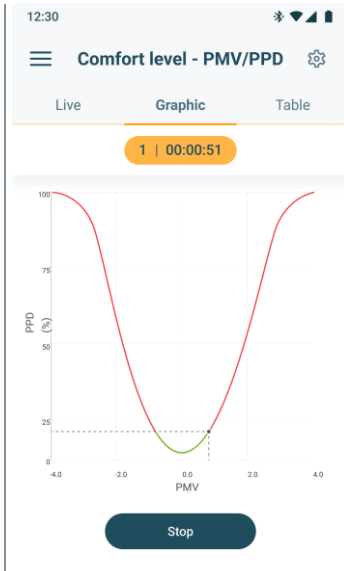


- 6 Determine **Clothing** and **Activity**.
- 7 Click on **Apply Configuration**.

- ▶ Values currently being measured are displayed.



- ▶ Values currently being measured are displayed graphically.



Factors to be entered

Clothing

Clothing reduces body heat losses and is therefore classified based on its insulating value. The insulating effect of clothing is given in the unit clo or m² K/W (1 clo = 0.155 m² K/W). The clo value can be calculated by adding together the values of the individual items of clothing. Insulating values for individual items of clothing can be found in ISO 7730. Alternatively, a range can be selected.

Parameter in clo	Parameter in m ² K/W	Description
0 to 0.02		No clothing
0.03 to 0.29	0.005 to 0.045	Underwear
0.30 to 0.49	0.046 to 0.077	Shorts and T-shirt
0.50 to 0.79	0.078 to 0.122	Trousers and T-shirt
0.80 to 1.29	0.123 to 0.200	Light business wear
1.30 to 1.79	0.201 to 0.277	Warm business wear
1.80 to 2.29	0.278 to 0.355	Jacket or coat
2.30 to 2.79	0.356 to 0.432	Warm winter clothing
2.80 to 3.00	0.433 to 0.465	Extremely warm winter clothing

Activity

The metabolic rate specifies the energy released by oxidation processes in the human body, and depends on muscle activity. The metabolic rate is given in met or W/m² (1 met = 58.2 W/m² body surface area). The average adult has a body surface area of 1.7 m². In a state of thermal comfort, a person with a metabolic rate of 1 met has heat loss of approx. 100 W. When calculating the metabolic rate, a mean value of the activity of the relevant person within the past hour must be used. Met values for various activities can also be found in ISO 7730.

Parameter in met	Parameter in W/m ²	Description
0.1 to 0.7	6 to 45	Lying down, relaxed
0.8 to 0.9	46 to 57	Sitting down, relaxed
1.0 to 1.1	58 to 59	Seated activity
1.2 to 1.5	70 to 92	Standing
1.6 to 1.7	93 to 104	Standing up, light activity
1.8 to 1.9	105 to 115	Standing up, moderate activity
2.0 to 2.3	116 to 139	Slow walking
2.4 to 2.9	140 to 174	Quick walking
3.0 to 3.4	175 to 203	Strenuous activity
3.5 to 4.0	204 - 233	Extremely strenuous activity



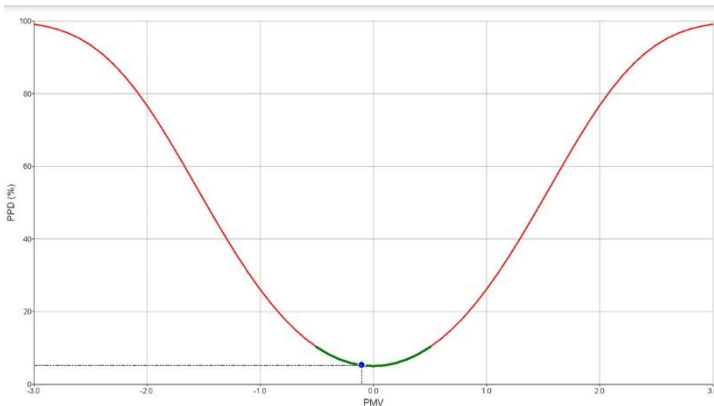
The factors to be entered refer to ISO 7730 Appendix B and C.



We recommend using the following probes:

- Globe thermometer (0602 0743)
- IAQ probe (0632 1551 Bluetooth® / 0632 1552 cable / 0632 1550 probe head)
- Turbulence probe (0628 0152)
- Tripod (0554 1591)

Graphical representation



1	PPD axis, scaling from 0 – 100%	1	Calculated point from PPD and PMV
3	PMV axis scaling from -3 to +3	4	Green section of the curve from - 0.5 to 0.5 PMV
5	Critical section of the curve		



Formula for the display:

$$PPD = 100 - 95 \cdot \exp(-0.03353 \cdot PMV^4 - 0.2179 \cdot PMV^2)$$

8.4.10 Discomfort - draught rate

With the turbulence probe 0628 0152 connected, the turbulence calculation for the flow value is made possible on the basis of DIN EN 13779 and DIN EN 7730, as well as ASHRAE 55. The draught rate measures the air temperature, fluctuation and standard deviation of the air velocity. From these three values, the testo 400 calculates the percentage of dissatisfaction due to draughts.

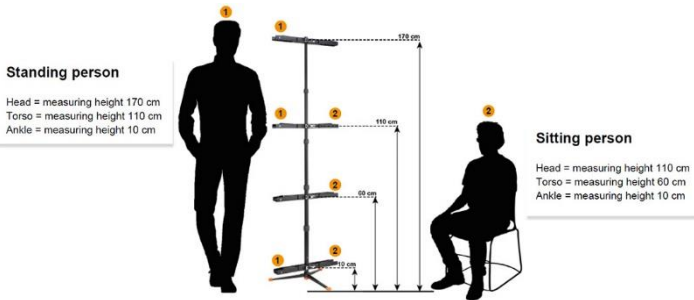





The turbulence probe requires a warm-up period of around 3 seconds after connection to the testo 400. Carry out the measurement after this.



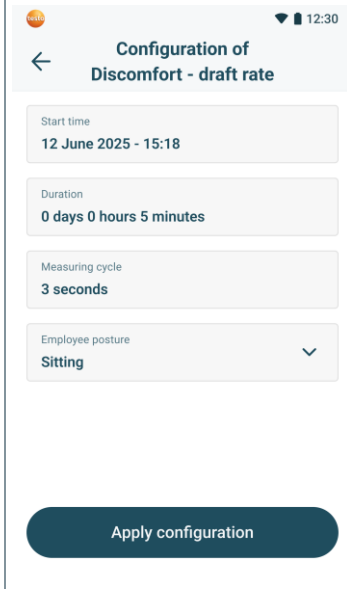
For unimpaired measurement, we recommend attaching the probe(s) to a tripod. In combination with the testo tripod and the IAQ data logger, up to 3 probes can be positioned at the relevant heights in accordance with the standards.

The draught is measured at the level of thermally exposed areas such as the head and ankles, as well as at the level of thermal centre of gravity, at abdominal height. The measurement heights refer to the relevant measuring points in accordance with the standards (EN 7726 and ASHRAE Standard 55), depending on whether the person is standing or sitting.



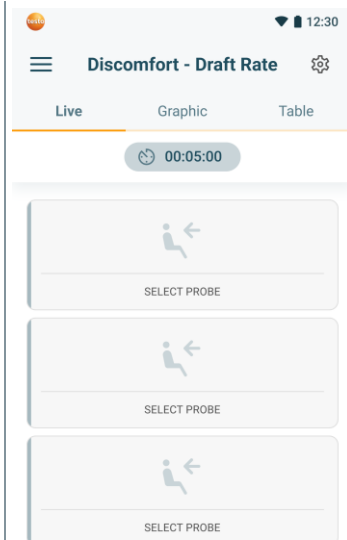
- 1 Click on .
- ▶ Main menu opens
- 2 Click on  **Measurement Programs.**
- 3 Click on **Discomfort - draught rate.**
- ▶ The Discomfort - draught rate measurement menu opens.
- 4 Click on .
- ▶ Configuration menu opens.

5 Make the required settings.

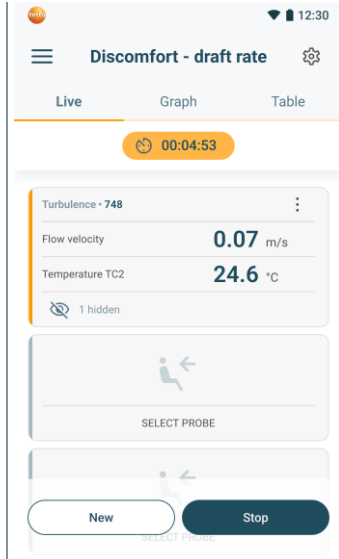


6 Click on **Apply Configuration**.

7 Using the 3-digit probe ID, assign the probes to the respective measuring position. It is possible to connect up to three probes simultaneously (with IAQ data loggers), but also to measure with one probe at three heights in succession.



- ▶ Values currently being measured are displayed. The measuring values can also be called up in the **Graphic** and **Table** views.



If the heights are being measured one after the other, you can click directly on the second height following successful measurement of the first height, and only after completion of the third height can the measurement be saved. This means that all the measurement results are saved in one report and not in three different reports.



The two calculated measurement parameters Turbulence (Tu) and Draught rate (DR) are only calculated on the basis of all measured values. This means that these two values are displayed at the end of the measurement and are not calculated for each time point of the measurement.



8.4.11 Differential temperature (ΔT)

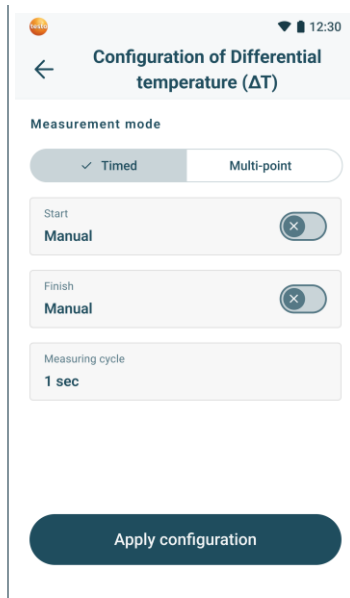
In this application, the temperature span can be measured with two temperature probes. This can be used, for example, to determine whether the temperature span of a HVAC system corresponds to the set values.



Two temperature probes are required for the differential temperature application. If more than two probes are connected to measure the temperature, the selection of the relevant probes can only be influenced by disconnecting and reconnecting them. The two temperature probes connected first are selected for the calculation.

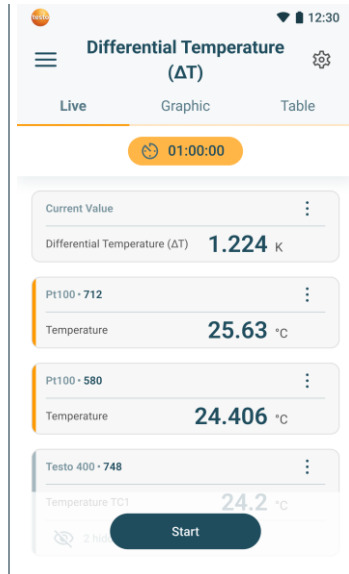
- 1 Click on .

- ▶ Main menu opens
- 2 Click on  **Measurement Programs**.
- 3 Click on **Differential temperature (ΔT)**.
- ▶ The **Differential temperature (ΔT)** measurement menu opens.
- 4 Click on .
- ▶ Configuration menu opens.
- 5 Make the required settings.



- 6 Click on **Apply Configuration**.
- 7 Click on **Start**.
- ▶ The measurement starts.

- ▶ Values currently being measured are displayed.



8.4.12 Differential pressure (ΔP)

The testo 400 has an internal absolute and differential pressure sensor. This sensor can be used, for example, to investigate the differential pressure of two rooms.




- 1 Connect the pressure tubes to the + and - connection sockets.

⚠ CAUTION

Make sure the pressure tube does not jump away from the connection socket.

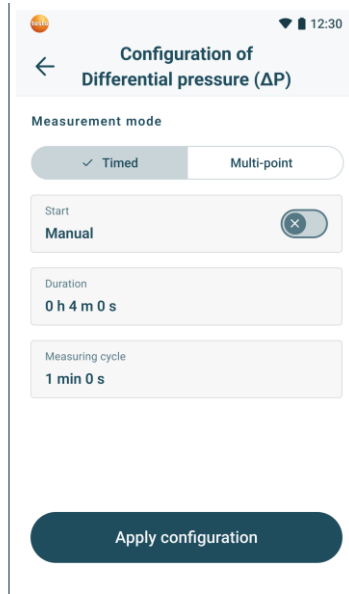
Risk of injury!

- Ensure correct connection.

- 2 Click on .
- ▶ Main menu opens
- 3 Click on  **Measurement Programs.**
- 4 Click on **Differential pressure (ΔP).**
- ▶ The Differential pressure (ΔP) measurement menu opens.
- 5 Click on .

▶ Configuration menu opens.

6 Make the required settings.



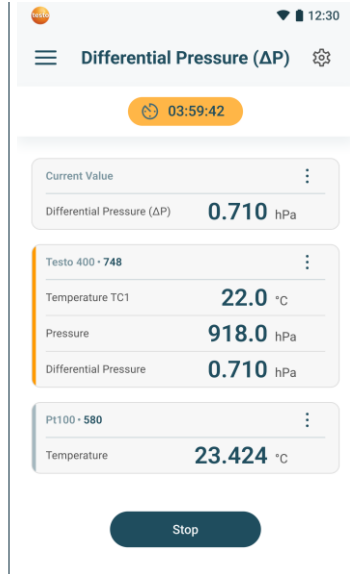
7 Click on **Apply Configuration**.

8 Click on **⋮** to zero the differential pressure sensor.

9 Click on **Start**.

▶ The measurement starts.

- ▶ Values currently being measured are displayed.



If the readings fluctuate wildly, it is advisable to damp the readings (see Section 8.7.5).

8.4.13 Wet Bulb Globe Temperature (WBGT) measurement



Measurement program available from app version 12.4 onwards.



Three temperature probes are required for the **WBGT measurement** application. One globe thermometer (TC type K) and two Pt100 probes (ambient temperature and wet bulb temperature).

With the WBGT kit, the WBGT (Wet Bulb Globe Temperature) climate index is determined as per DIN 33403 or ISO 7243. The WBGT index is used to determine the maximum permissible exposure time at workplaces exposed to heat (e.g. steel industry, foundries, glass industry or blast furnaces).




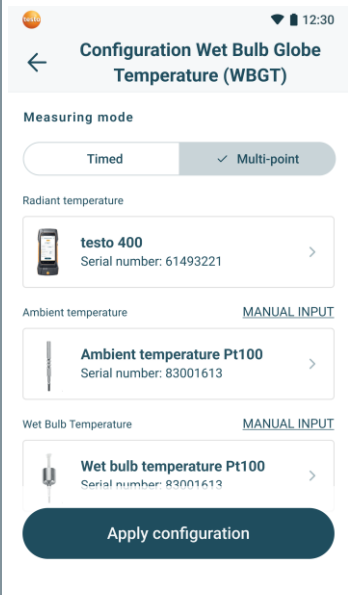
To calculate the WBGT, 3 different temperatures must be measured:

- Radiant temperature T_g (globe thermometer)
- Ambient temperature T_a
- Wet bulb temperature T_{nw} (temperature of a naturally ventilated psychrometer)

The calculation is carried out with the following formulas:

$$WBGT = 0.7 \times T_{nw} + 0.3 \times T_g$$

$$WBGTS = 0.7 \times T_{nw} + 0.2 \times T_g + 0.1 \times T_a$$

- 1 Click on .
 - ▶ Main menu opens
 - 2 Click on  **Measurement Programs.**
 - 3 Click on **Wet Bulb Globe Temperature (WBGT).**
 - ▶ The **Wet Bulb Globe Temperature (WBGT)** measurement menu opens.
 - 4 Click on .
 - ▶ Configuration menu opens.
 - 5 Make the required settings.
- 
- 6 Click on **Apply Configuration.**
 - 7 Click on **Start.**
 - ▶ The measurement starts.

- ▶ Values currently being measured are displayed.



In addition, there is an info button in the measurement menu and in the results view with the reference values of the WBGT index according to ISO 7243 for evaluating the measurement results.

Guidelines values for the WBGT index according to ISO 7243

- The WBGT values are upper limits. If exceeded, long-term exposure should be avoided and countermeasures initiated.
- Guideline values for the WBGT index depending on energy conversion for long-term exposure with a clothing insulation of $I_{cl} = 0.6$ according to EN 27243 - 1993

Guidelines for the maximum value of the WBGT index

Energy conversion level 0 (<100 W)

- Example: Resting

For heat-acclimatised individuals 33 °C	For non-heat-acclimatised individuals 32 °C
--------------------------------------------	------------------------------------------------




Close

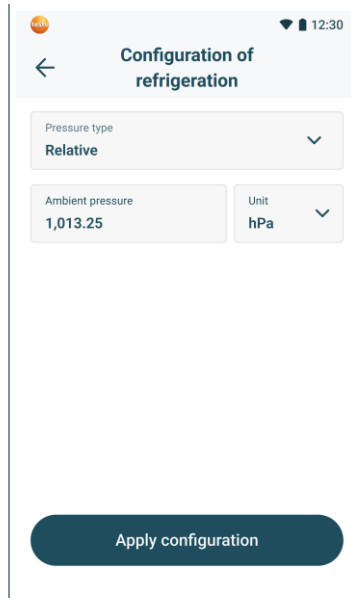
8.4.14 AC + Refrigeration

Use this application to determine the superheating and subcooling of refrigeration systems with different refrigerants. The measured values are displayed in a digital manifold.



Four probes are required for the AC + Refrigeration measurement application. Two clamp thermometers and two high-pressure gauges.

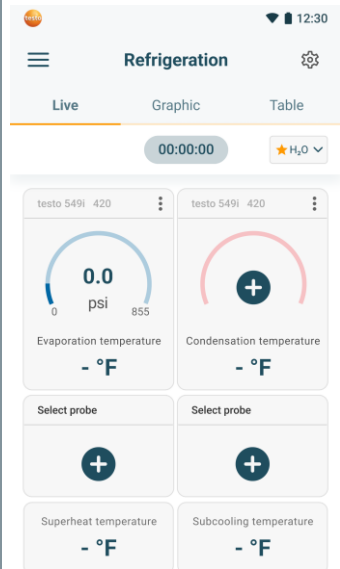
- 1 Click on .
 - ▶ Main menu opens
- 2 Click on  **Measurement Programs**.
- 3 Click on **AC + Refrigeration**.
 - ▶ The **AC + Refrigeration** measurement menu opens.
- 4 Click on .
 - ▶ Configuration menu opens.
- 5 Make the required settings.



- 6 Click on **Apply Configuration**.

▶ The measurement screen is displayed.

7 Click on **+** to assign the connected probes to the locations.

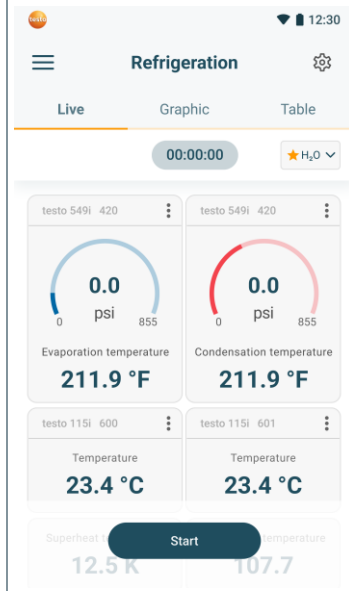


8 Select refrigerant.

9 Click on **⋮** (549i) to zero the high-pressure gauge.

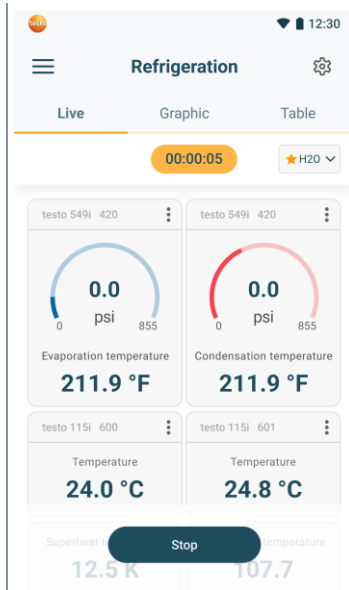
▶ A message is displayed, the pressure is zeroed.

10 Click on **Start**.



▶ The measurement starts.

11 Click on **Stop**.



- ▶ Values currently being measured are displayed. You have two options to proceed.

12 **New:** start a new measurement.



The current measurement will be deleted along with all readings (a warning is displayed).

Or




Save: exit the current measurement and save all readings on the testo 400 (see Section 8.6).

8.4.15 Target superheat

Use this application to calculate the target superheat and subsequently display it as a trend line. Important parameters such as ODDB and RAWB can be determined either manually or via a probe. This application can only be used for split air conditioning systems/heat pumps with fixed expansion valve.



Four probes are required for the target superheat application. Two clamp thermometers and two high-pressure gauges.

- 1 Click on .
- ▶ Main menu opens
- 2 Click on  **Measurement Programs.**
- 3 Click on **Target superheat.**
- ▶ The **Target superheat** measurement menu opens.
- 4 Click on .
- ▶ Configuration menu opens.

- 5 Make the required settings. The ODDDB and RAWB values can be set manually or measured with a probe.

Configuration of target superheat

Outdoor dry bulb temp. (ODDB) [SELECT PROBE](#)

Manual input: 12.8 Unit: °C

Return air wet bulb temp. (RAWB) [SELECT PROBE](#)

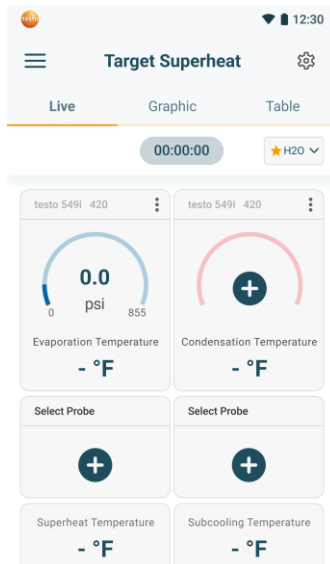
Manual input: 10.0 Unit: °C

Pressure type: Relative


Ambient pressure: 1,013.25 Unit: hPa

Apply configuration

- 6 Click on **Apply Configuration**.
- ▶ The measurement screen is displayed.
- 7 Click on **+** to assign the connected probes to the locations.

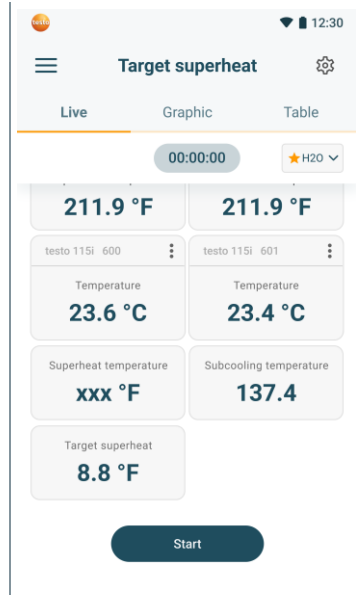


8 Select refrigerant.

9 Click on  (549i) to zero the high-pressure gauge.

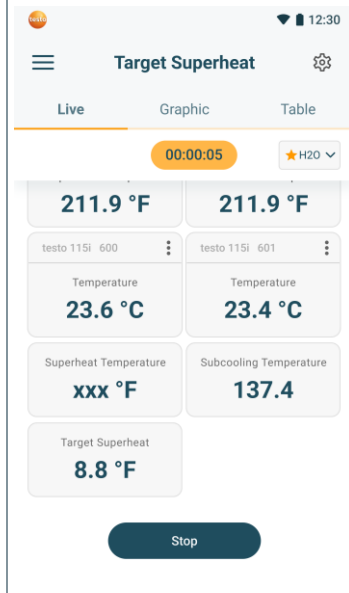
▶ A message is displayed, the pressure is zeroed.

10 Click on **Start**.



▶ The measurement starts.

11 Click on **Stop**.



- ▶ Values currently being measured are displayed. You have two options to proceed.

12 **New:** start a new measurement.



The current measurement will be deleted along with all readings (a warning is displayed).

Or

Save: exit the current measurement and save all readings on the testo 400 (see Section 8.6).

8.4.16 Compressor Test (T3)

For this mode, 3 temperature probes and two testo 549i high pressure probes are used. In addition to the conventional temperature sensors for superheating and subcooling, an additional temperature probe must be connected.






The testo 115i (clamp thermometer) or fixed cable probes are used to carry out the measurement.

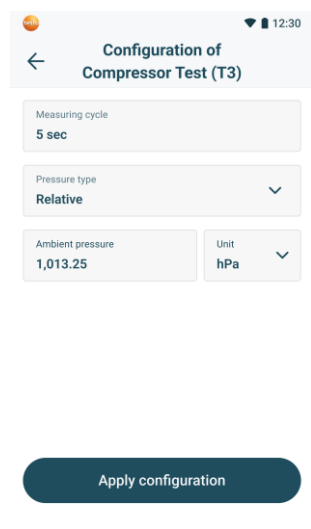


Before each measurement, check that the refrigerant hoses are in flawless condition.

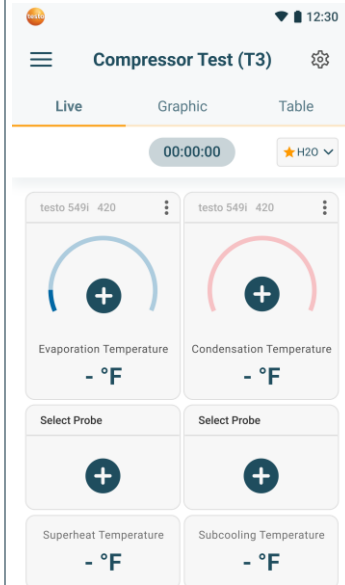


Before each measurement, zero the pressure sensors.

- 1 Click on .
- ▶ Main menu opens
- 2 Click on  **Measurement Programs**.
- 3 Click on **Compressor Test (T3)**.
- ▶ The **Compressor Test (T3)** measurement menu opens.
- 4 Click on .
- ▶ Configuration menu opens.
- 5 Make the required settings.



- 6 Click on **Apply Configuration**.
- ▶ The measurement screen is displayed.
- 7 Click on **+** to assign the connected probes to the locations.



- 8 Click on **Start**.
- ▶ The measurement starts.
- 9 Click on **Stop**.
- ▶ Values currently being measured are displayed. You have two options to proceed.
- 10 **New:** start a new measurement.




The current measurement will be deleted along with all readings (a warning is displayed).




Or


Save: exit the current measurement and save all readings on the testo 400 (see Section 8.6).

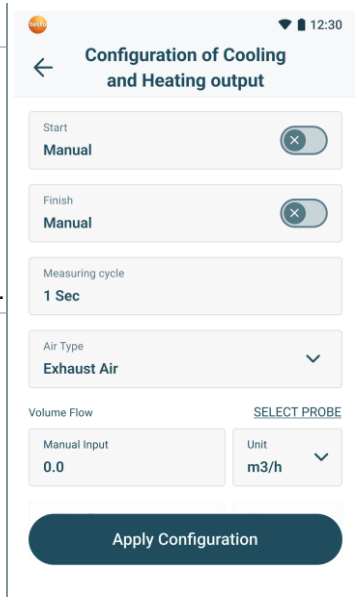
8.4.17 Cooling/heating output

You can use this application to determine the cooling and heating output of a system. Use two humidity measuring instruments to calculate the enthalpy automatically. For the BTU/h (British Thermal Unit per hour) calculation, the volume flow can be entered manually.

 Two thermohygrometers are required for the cooling/heating output application (e.g. 0636 9731, 0636 9771, 0636 9775 or 0560 2605 02).

- 1 Click on .
- ▶ Main menu opens
- 2 Click on  **Measurement Programs.**
- 3 Click on **Cooling/heating output.**
- ▶ The **Cooling/heating output** measurement menu opens.
- 4 Click on .
- ▶ Configuration menu opens.
- 5 Make the required settings.

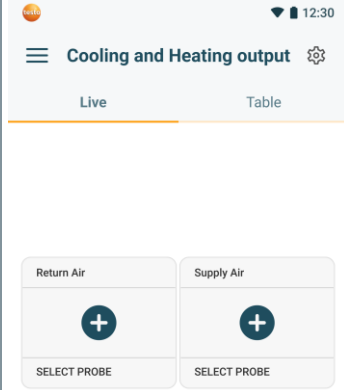
 The volume flow is an important component for calculating the BTU/h value. The volume flow plays a key role here along with the temperature. The volume flow can be set manually or determined using a probe. Please also see Section 8.3.2.



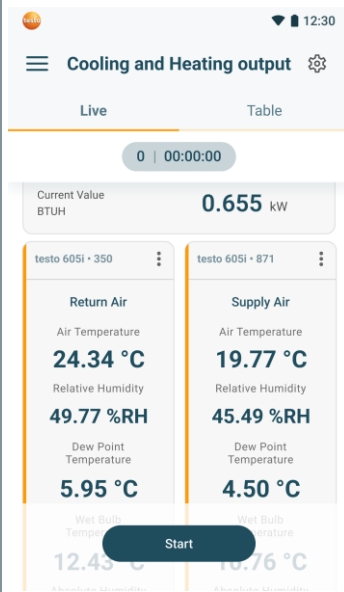
- 6 Click on **Apply Configuration.**

▶ The measurement screen is displayed.

7 Click on **+** to assign the connected probes to the locations.

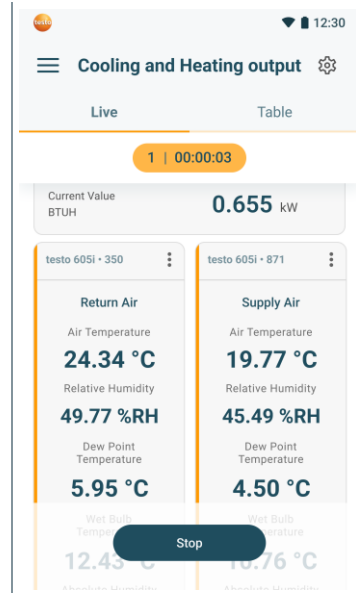


8 Click on **Start**.



▶ The measurement starts.

9 Click on **Stop**.



▶ Values currently being measured are displayed. You have two options to proceed.

10 **New**: start a new measurement.






The current measurement will be deleted along with all readings (a warning is displayed).

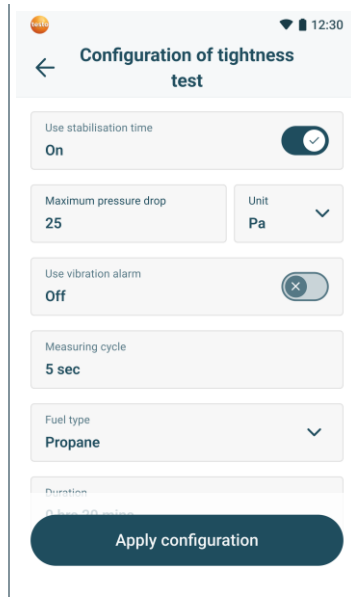
Or

Save: exit the current measurement and save all readings on the testo 400 (see Section 8.6).

8.4.18 Tightness Test

The main test (using air, natural gas, LPG or propane) is a tightness test for pipes including fittings, but without gas appliances and associated control and safety equipment. The tightness test is carried out after a load test has been successfully completed on newly laid gas pipes, or after renovation of existing gas pipes, and is used for the acceptance of these pipes. It shows up even the smallest leaks in gas pipes.

- 1 Click on .
- ▶ Main menu opens
- 2 Click on  **Measurement Programs**.
- 3 Click on **Tightness test**.
- ▶ The **Tightness test** measurement menu opens.
- 4 Click on .
- ▶ Configuration menu opens.
- 5 Make the required settings.

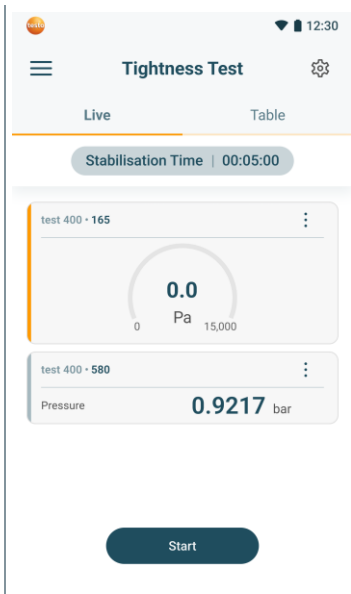


- 6 Click on **Apply Configuration**.
- ▶ The measurement screen is displayed.
- 7 Click on **+** to assign the connected probes to the locations.



Once the pressure has built up, a stabilisation time must be observed to ensure that any possible pressure fluctuations are not included in the measurement.

- 8 Click on **Start**.



- ▶ Stability time starts.
- ▶ Reading is displayed.
- ▶ Stabilization time is finished.
- ▶ Measuring time starts.
- ▶ The readings are automatically saved and displayed after the measurement has been completed.
- ▶ The measuring value result can be assessed.

8.4.19 NET measurement (Normal Effective Temperature)



Measurement program available from app version 14.51.14



For the **NET measurement** application, a humidity temperature probe (alternatively a CO2 probe), as well as a turbulence probe and optionally (CET measurement) a globe thermometer (TC type K) are required.

The Normal Effective Temperature NET (and the Corrected Effective Temperature CET) are climate indices and are typically used in workplaces exposed to heat, where the influence of thermal radiation may be disregarded and long-sleeved clothing worn. NET and CET are calculated according to DIN EN 33403-3:2011.



Required measurement parameters are:

Air temperature in °C = T_a

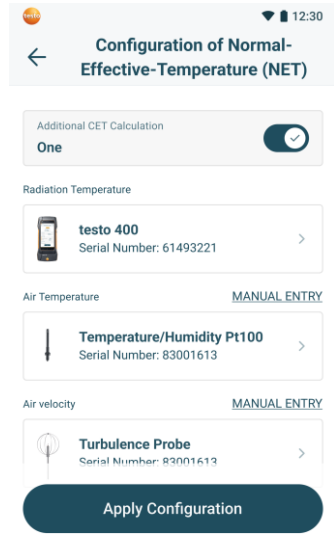
Wet bulb temperature in °C = T_{nw}

Flow velocity in m/s = V_a

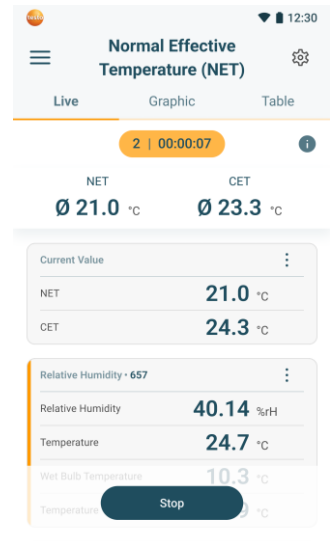
Radiant temperature in °C = t_g (optional)

- 1 | Click on .
- ▶ | Main menu opens
- 2 | Click on  **Measurement Programs**.
- 3 | Click on **Normal Effective Temperature**.
- ▶ | The **Normal Effective Temperature** measurement menu opens.
- 4 | Click on .
- ▶ | Configuration menu opens.

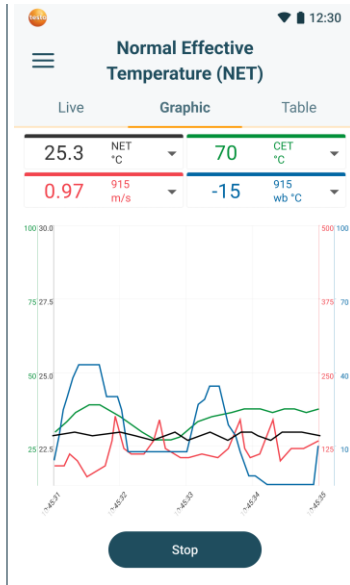
- 5 Make the necessary settings and assign probes.



- 6 Click on **Apply Configuration**.
 - ▶ The measurement screen is displayed.
- 7 Click on **Start**.
 - ▶ Measuring time starts.



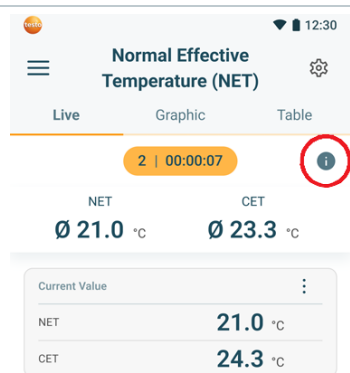
- ▶ The readings can be viewed during the measurement in the live, graphic and table view.



- ▶ The readings are automatically saved and displayed after the measurement has been completed.
- ▶ The measuring value result can be assessed.



The table of NET guide values according to DIN 33403-3 can be called up for assessment of the measurement result via the Info button.



8.5 Customer management

In the **Customer** menu, all customer and measuring site information can be created, edited and deleted. Fields marked with * are mandatory. Without any information in this field, no customers or measuring sites can be stored.



8.5.1 Creating and editing a customer

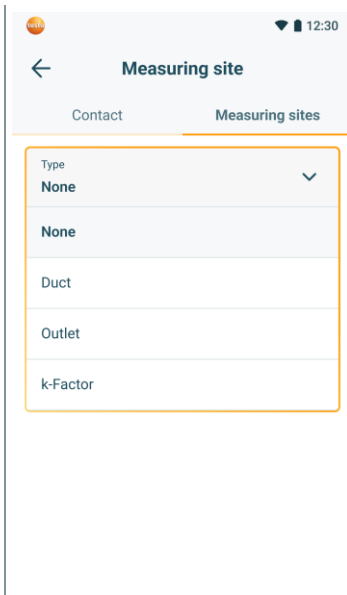
- 1 Click on ☰.
- ▶ Main menu opens
- 2 Click on 👤 **Customer**.
- ▶ The Customer menu opens.
- 3 Click on + **New customer**.
- ▶ A new customer can be created.
- 4 Store all relevant customer data.

The screenshot shows a mobile application interface for creating a new customer. At the top, there is a status bar with signal strength, Wi-Fi, and the time 12:30. Below that is a title bar with a back arrow, the text "New Customer", and two tabs: "Contact" (selected) and "Measuring sites". The form contains several input fields: "Company / Customer Name *", "Street, House Number", "Postcode, City", "Country", "Telephone", "Email", and "Contact Person".

- 5 Click on **Save**.
- ▶ The new customer was saved.

8.5.2 Creating and editing measuring sites

- 1 Click on .
- ▶ Main menu opens
- 2 Click on  **Customer**.
- ▶ The Customer menu opens.
- 3 Click on **+ New customer**.
- # Click on right tab **Measuring site**.
- 5 Click on **+ New measuring site**.
- ▶ A new measuring site can be created.
- 6 Store all relevant measuring site information.
- 7 Click on right tab **Parameters**.



The screenshot shows a mobile application interface for creating a measuring site. At the top, there is a status bar with a signal strength icon, a battery icon, and the time 12:30. Below the status bar is a header with a back arrow on the left, the title "Measuring site" in the center, and two tabs: "Contact" and "Measuring sites". The "Measuring sites" tab is selected and highlighted with an orange underline. Below the tabs is a form with a dropdown menu for "Type". The dropdown menu is open, showing four options: "None", "Duct", "Outlet", and "k-Factor". The "None" option is currently selected, and a small downward arrow is visible to its right. The form is outlined with an orange border.

- 8 Select further parameters.



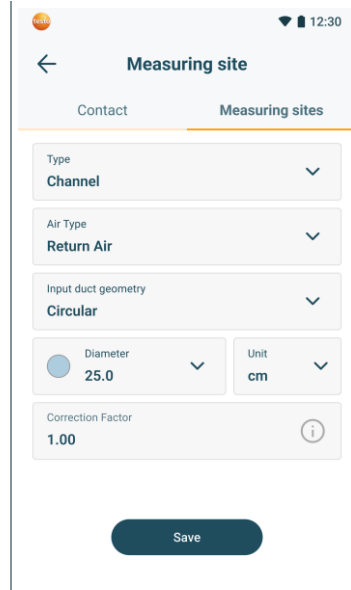
For the duct, outlet or duct with k-factor measuring sites, further parameter settings can be implemented.

9 Click on **Save**.

▶ The new measuring site has been saved.

8.5.2.1 Duct measuring site

1 Click on **Duct**.



▶ Other characteristics are displayed.

2 Input the characteristics accordingly: Duct geometry, air type, duct dimensions (different measurement units can be selected) and correction factor.



The correction factor is preset to 1.0 by default. The setting can be between 0.01 and 9.99.



Due to pressure drops in the system, the measured volume flow may be smaller than the actual volume flow. The measured volume flow can be corrected via the flow rate correction factor. The flow rate correction factor has a directly proportional effect on the measurement result and is usually set at 1.00. Once the factor is changed, the result is multiplied by the flow rate correction factor.

3 Click on **Save**.

▶ Settings have been saved.

HVAC grid measurement

- 1 Activate **HVAC grid measurement** using the slider.

The screenshot displays the 'Measuring site' interface. At the top, there is a back arrow and the title 'Measuring site'. Below the title are two tabs: 'Contact' and 'Measuring sites', with 'Measuring sites' being the active tab. The main content area contains three input fields: 'Number of Inspection Holes (Drilled Holes)' with the value '4', 'Number of Measurement Points' with the value '6', and 'Position of Inspection Hole' with a dropdown menu showing 'Horizontal'. Below these fields is a grid visualization consisting of a 5x5 grid of dots. A 'Save' button is located at the bottom center of the grid.

- ▶ Detailed information about a standard-compliant measurement can be stored in order to have the measurement assistant determine the optimum immersion depth of the probe in the duct.
- 2 Determine the **Number of inspection holes (drilled holes)**.
- 3 Determine the **Number of measuring points**.
- 4 Determine the **Inspection hole position**.
- ▶ A graphic with the number of inspection holes and measuring points is displayed.
- 5 Click on **Save**.

8.5.2.2 Outlet measuring site

- 1 Click on **Outlet**.

The screenshot shows the 'Measuring site' configuration screen. The form is titled 'Measuring site' and has a toggle for 'Measuring sites'. The form fields are: Type (Outlet), Air Type (Return air), Enter Duct Geometry (Rectangular), Height (15.7 cm), Width (25.0 cm), and Correction Factor (1.00). A 'Save' button is at the bottom.

- ▶ Other characteristics are displayed.
- 2 Input the characteristics accordingly: Duct geometry, air type, duct dimensions (different measurement units can be selected) and correction factor.



The correction factor is preset to 1.0 by default. The setting can be between 0.01 and 9.99.

- 3 Click on **Save**.
- ▶ Settings have been saved.

8.5.2.3 k-factor measuring site

- 1 Click on **k-factor**.

The screenshot shows the 'Measuring site' configuration screen. The title is 'Measuring site' with a back arrow on the left. There are two tabs: 'Contact' and 'Measuring sites', with 'Measuring sites' selected. The form contains the following fields:




- Type: **k-factor**
- k-factor (type plate): **1.00**
- k-factor volume flow unit: **m³/h**
- k-factor differential pressure unit: **hPa**
- Air type: **Return air**

A **Save** button is located at the bottom of the screen.



- ▶ Other characteristics are displayed.
- 2 Enter the relevant characteristics: specific k-factor, volume flow, differential pressure and air type.
- 3 Click on **Save**.
- ▶ Settings have been saved.

8.5.3 Searching for and managing customers and measuring sites




Searching for a customer


- 1 | Click on .
- ▶ | Main menu opens.
- 2 | Click on  **Customer**.
- ▶ | The Customer menu opens.
- 3 | Click on .
- ▶ | The input window appears.
- 4 | Enter the name.
- ▶ | The selected customer appears in the overview.

Deleting a customer



- 1 | Click on the required customer.
- ▶ |  is displayed at top right.
- 2 | Click on .
- 3 | Acknowledge the warning.

Searching for a customer's measuring site


- 1 | Click on .
- ▶ | Main menu opens.
- 2 | Click on  **Customer**.
- ▶ | The Customer menu opens.
- 3 | Click on .

-
- ▶ The input window appears.
 - 4 Enter the name.
 - ▶ The selected customer appears in the overview.
 - 5 Click on the Measuring site tab.
 - ▶ The Measuring site menu opens.
 - 6 Click on .
 - ▶ The input window appears.
 - 7 Enter the name.
 - ▶ The selected measuring site appears in the overview.


Deleting a customer's measuring site

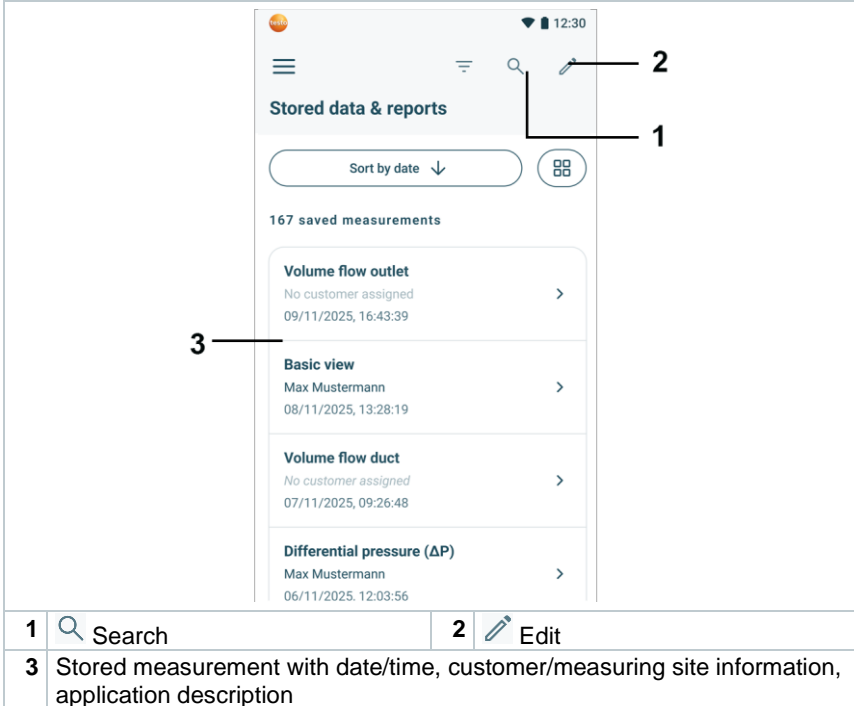
- 1 Click on the required measuring site.
- ▶  is displayed at top right.
- 2 Click on .
- 3 Acknowledge the warning.





If you are in the Measuring site tab (and no measuring site has been selected) and you click on the  icon at top right, you will not delete the measuring site(s) but the customer with all the data. Therefore please always pay heed to the warnings.

8.6 Measurement data management



All measurements stored on the testo 400 can be found in the  **Stored data & reports** menu. You can store customer and measuring site information, add images and comments, create PDF reports, CSV and JSON data, and export via Bluetooth.



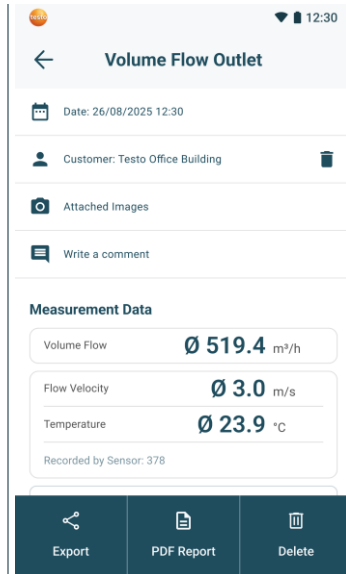
1	 Search	2	 Edit
3	Stored measurement with date/time, customer/measuring site information, application description		

8.6.1 Managing measurement data

After clicking on a saved measurement, the corresponding results screen is displayed. All properties for the measurement are listed there. Customer and measuring site information can be stored, images and comments can be added and PDF reports, CSV and JSON data can be created and exported via Bluetooth.

- 1 | Click on .
- ▶ | Main menu opens.
- 2 | Click on  **Stored data & reports**.

- ▶ The menu opens.
- 3 Click on the required measurement.
- ▶ The measurement opens.



- 4 If required, click on **Add a customer** (see Section 8.5).
- 5 If required, click on **Attached images**.
- ▶ Image can be added from the **Directory** or taken with the **Camera**.
- 6 If required, **Write comment**, up to 1000 characters.
- ▶ The customer, the attached images and the comments are displayed in the results view.

- ▶ The calculated result of the measurement is displayed under the Customer data, Images and Comments.

Volume flow outlet

Volume flow **Ø 519.4** m³/h

Flow velocity **Ø 3.0** m/s

Temperature **Ø 23.9** °C

Recorded by sensor: 378

Actual measuring period

Start 26.08.2025, 12:15:15

End 26.08.2025, 12:15:30

Duration 0 Min. 15 Sec.

Measurement parameters >

Export PDF report Delete



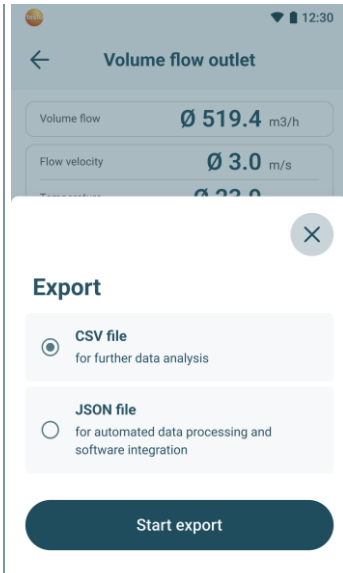
The other measuring values are assigned to the corresponding probes. The probes relevant to the application menu are highlighted in orange, while the other probes, which have stored additional measuring values during the measurement, are highlighted in grey. After the probes, the **Actual measuring period** is displayed. This always starts at the time of the first recorded measuring value and ends with the last recorded measuring value. If, for example, a 60-minute measurement were terminated prematurely, the measurement properties would indicate that the measurement period is 60 minutes, but in the case of the **Actual measuring period**, the correct measurement period will be calculated and displayed.

At the bottom of the screen, following all the listed measuring values, the **Display Properties** and **Show Values** tabs are listed, in all the measurement menus. In addition, the **Graphic** tab is displayed for PMV/PPD measurements. The graphic progression of the individual measurements can be called up at any time in the testo DataControl software (see Section 12.8.2). For HVAC grid measurements in accordance with EN 12599 or ASHRAE, the gauged **Measuring Points** and not the measuring values are listed generally.

Properties lists the settings that the measurement was carried out with, along with all the individual elements (measuring mode, duct dimensions, correction factor, etc.). In the second menu item, all measuring values of the various measurement parameters are listed with a time allocation.

Sending a report

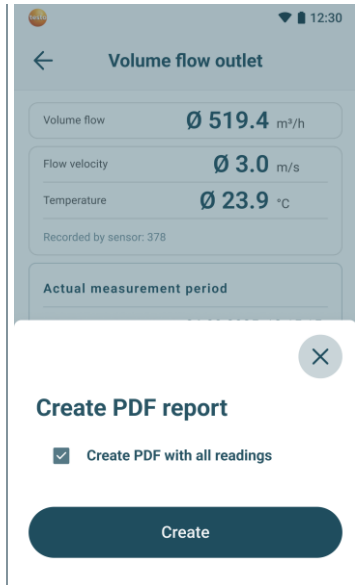
- 1 Click on  **Export**.
 - ▶ A selection window is displayed, and the measurement report can be exported as a CSV or JSON file.



- 2 Select **CSV file** or **JSON file** and click on **Start export**. If necessary, activate the **Add Attach Images** button.

Converting a report to a PDF file

- 1 Click on  **PDF Report**.
- ▶ A selection window is displayed



- 2 If required, activate the **Create PDF with all readings** button.
- 3 Click on **Create**.

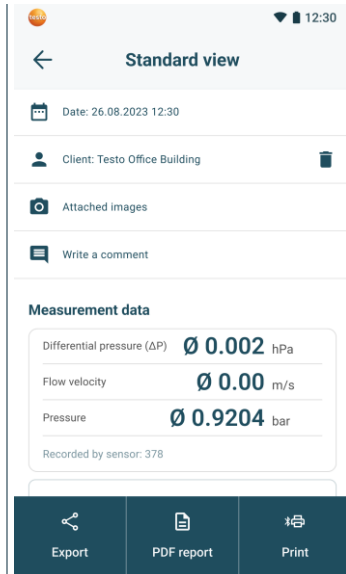


For measurements, please be aware that the option **Create PDF with all readings** is only possible up to 30 pages in the testo 400, due to the resulting file size and number of pages. In the testo DataControl software, however, PDF reports can be created for all measurements without any restrictions.

- ▶ A report containing all the information is created.



Print report

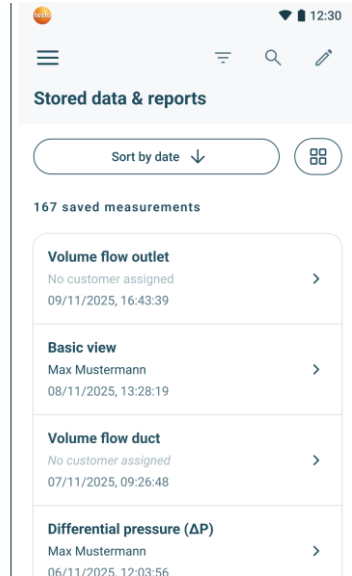
- 1 Click on  **PDF Report**.
 - ▶ A selection window is displayed.




- 2 Click on **Print**.
 - ▶ The report is printed.

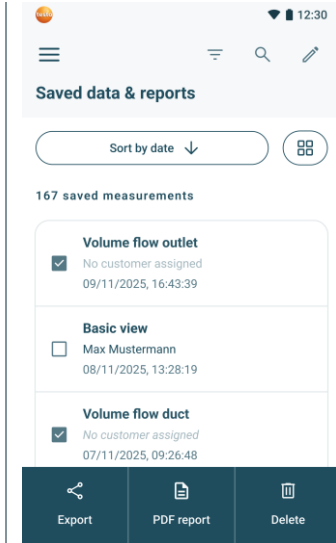
8.6.2 Editing measurement data

- 1 Click on .
- ▶ Main menu opens.
- 2 Click on  **Stored data & reports**.
- ▶ The menu opens.



- 3 Click on .
- ▶ Selection fields appear next to each stored measurement.
- 4 Click on the selection fields for the required measurements.

- ▶ The measurements are marked with a tick.



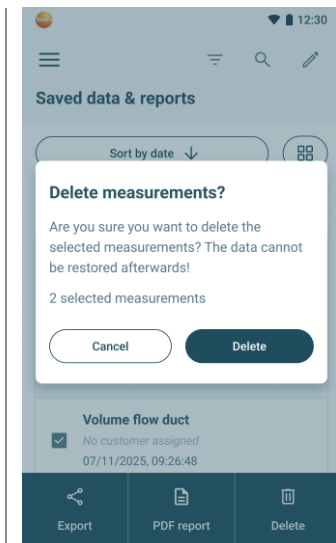
- 5 Click on  **Export** or  **PDF Report**.

- ▶ All marked measurements are sent as CSV or JSON files or as PDF reports via Bluetooth®.

or

- 6 Click on  **Delete**.



- ▶ A selection window is displayed and the selected measurement reports can be deleted.

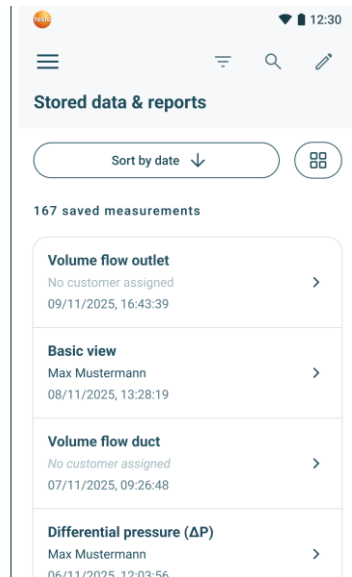


- 7 Click on **Delete** or **Cancel**.

8.6.3 Searching for measurement data

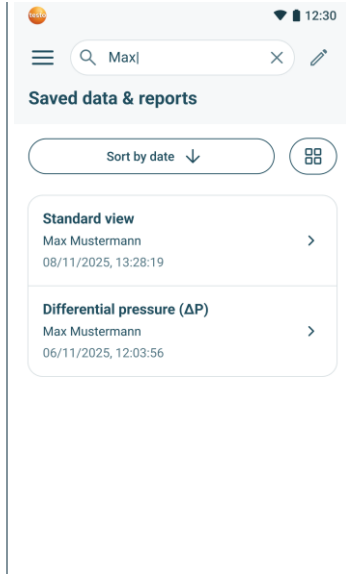
The search function allows you to quickly and easily filter the measurements you are searching for according to certain search terms. Both the customer and measuring site names as well as the descriptions of the applications are included in the search. This makes it possible, for example, to filter by customer name or the term PMV or draught rate.

- 1 Click on .
- ▶ Main menu opens.
- 2 Click on  **Stored data & reports**.
- ▶ The menu opens.



- 3 Click on .

- ▶ The text box for the search is displayed.




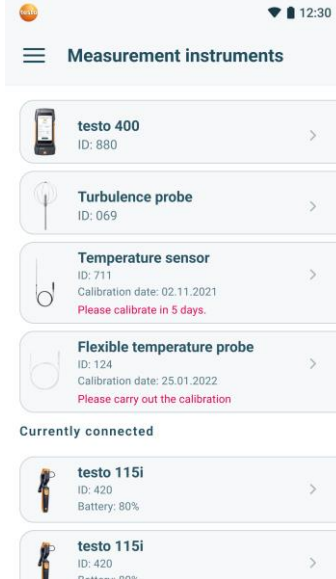
- 4 The search term can be entered.



Upper and lower case letters do not have to be taken into account when entering text.



8.7 Sensor management

All sensors that the testo 400 uses can be found in the  **Measurement instruments** menu. There, you can view general information about currently connected probes as well as recently connected probes. In addition, you can enter and call up calibration information, activate damping and carry out adjustment and humidity calibration.



8.7.1 General information about the probes


Information is stored for each probe.

- ✓ The probe is connected to the testo 400.
- 1 Click on .
- ▶ Main menu opens.
- 2 Click on  **Measurement instruments**.
- ▶ The menu opens.
- 3 Click on one of the displayed probes.
- ▶ Information is displayed about the model, order number, serial number and firmware version.

8.7.2 Calibration

For all sensors, calibration data can be stored under the **Measurement parameter** tab for individual measurement parameters.

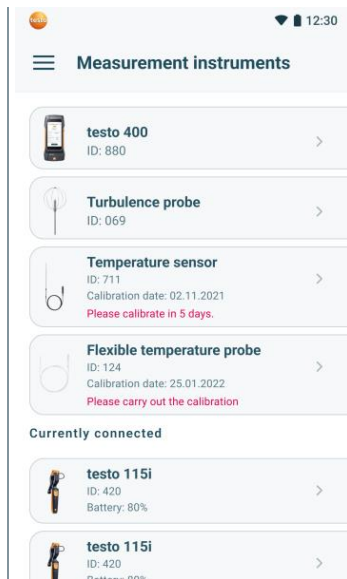
- ✓ The probe is connected to the testo 400.

1 Click on .

▶ Main menu opens.

2 Click on  **Measurement instruments**.

▶ The menu opens.



From 14 days preceding expiry of the calibration reminder, a notice is displayed in the sensor management for the relevant probe – **Please calibrate in x day**.



If the calibration reminder has already expired, the notice changes to **Please carry out the calibration**.

3 Click on one of the displayed probes.

▶ Information is displayed about the model, order number, serial number and firmware version.

4 Click on the **Measurement parameters** tab.

- 5 Click on the required measurement parameter.
- 6 Store or edit the relevant data.
 - ▶ All changes are automatically stored in the respective probe.

8.7.3 Surface increment



Surface probes withdraw heat from the measured surface immediately after the initial contact. This makes the measurement result lower than the true surface temperature without the probe (or the reverse if the surface is colder than the environment). This effect can be corrected by an increment in % of the reading.

- ✓ The probe is connected to the testo 400.
 - 1 Click on .
 - ▶ Main menu opens.
 - 2 Click on **Measurement instruments**.
 - ▶ The menu opens.
 - 3 Click on the testo 400.
-



The TC type K probes are not displayed as separate probes, but always on the instrument itself.

- ▶ Information is displayed about the model, order number, serial number and firmware version.
- 4 Click on the **Measurement parameters** tab.
 - ▶ Window with measurement parameters opens.
- 5 Click on the required **Temperature TE1** or **Temperature TE2**.
 - ▶ Window for surface increment opens.
- 6 Click on **Activate surface increment**.
- 7 Click on **Set surface increment**.
 - ▶ Window for Use surface increment opens.

8 Enter the percentage.

9 Click on **Save**.



The surface increment, related to a measuring problem, is a probe constant and must therefore be determined anew for each design.


8.7.4 Adjustment



The digital probes allow direct measurement and signal conversion in the probe. This technology means that measurement uncertainty caused by the instrument is no longer an issue. The probe can be calibrated without a handheld instrument. Entering the adjustment/calibration data generates a zero-error display.



The probe is connected to the testo 400.

1 Click on .

▶ Main menu opens.

2 Click on  **Measurement instruments**.

▶ The menu opens.

3 Click on the required sensor.

▶ Information is displayed about the model, order number, serial number and firmware version.

4 Click on the **Measurement parameters** tab.

▶ Window with measurement parameters opens.

5 Click on the required measurement parameters.

▶ The measurement parameter opens.

6 Click on **Adjustment**.



A total of six different adjustment values can be stored.

7 Input **Current**, **Target SH** and the **Unit**.


No.	IS	SHOULD	UNIT
1	0.00	0.20	°C
2	100	101	°C
3	0.00	0.00	°C

⊕ Here you can add new values

Adjust

8 Click on **Adjust**.





The adjustment data entered can be deleted at any time in the sensor management via the  icon.

8.7.5 Damping



If the readings fluctuate wildly, it is advisable to damp the readings.

- ✓ The probe is connected to the testo 400.
- 1 Click on .
- ▶ Main menu opens.
- 2 Click on  **Measurement instruments**.
- ▶ The menu opens.
- 3 Click on the required sensor.
- ▶ Information is displayed about the model, order number, serial number and firmware version.
- 4 Click on the **Measurement parameters** tab.
- ▶ Window with measurement parameters opens.
- 5 Enable **Activate damping** using the slider.
- 6 Click on **Average of the measured values**.
- ▶ Window for Average of the measured values opens.
- 7 Enter a value between 2 and 20 seconds.

8.7.6 Humidity calibration



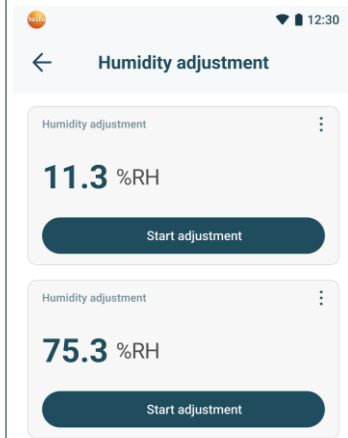
For humidity calibration, the measurement parameter of the connected probe is adjusted to the reference value at the two standard adjustment points 11.3 %RH and 75.3 %RH; any measuring value deviations from the nominal value are minimized across the entire measuring range. The Testo calibration set provides a reference value to calculate the offset for a humidity calibration.

Humidity calibration is possible with the following probes:

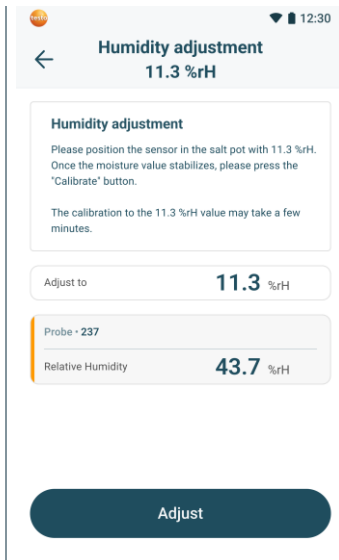
Order no.	Designation
0636 9771	High-precision temperature/humidity probe with Bluetooth®
0636 9772	High-precision temperature-humidity probe, fixed cable
0636 9731	Temperature/humidity probe with Bluetooth®
0636 9732	Temperature/humidity probe, fixed cable
0636 9775	Robust temperature/humidity probe for temperatures up to +180 °C, fixed cable

- ✓ The probe is connected to the testo 400.
- 1 Click on .
- ▶ Main menu opens.
- 2 Click on **Measurement instruments**.
- ▶ The menu opens.
- 3 Click on the required sensor.
- ▶ Information is displayed about the model, order number, serial number and firmware version.
- 4 Click on the **Measurement parameters** tab.
- ▶ Window with measurement parameters opens.
- 5 Click on **Relative humidity**.
- ▶ The Relative humidity window opens.

6 Click on **Start Adjustment**.



▶ Humidity calibration is started.



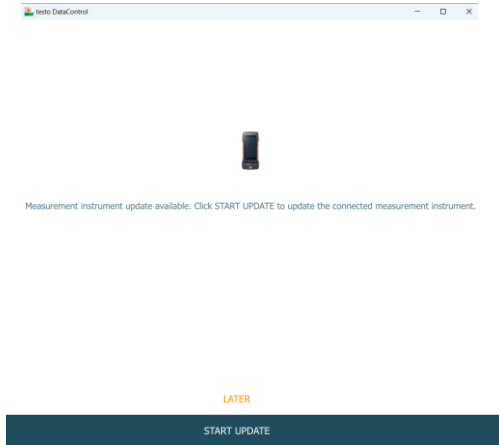
9 Settings

9.1 Carrying out a testo 400 update

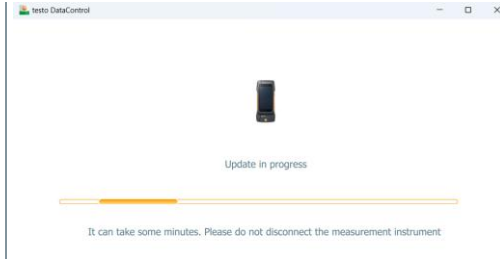


With the update to FW V17.7.11, a new database structure was implemented. The first time that the new app version 17.7 is launched, all stored readings are transferred to the new and more powerful database. The new database improves the transfer performance to the PC software and reduces the memory capacity requirement for measurements

- ✓ Testo DataControl ist started (see chapter 12.5).
- 1 Switch testo 400 on.
- 2 Connect testo 400 to the computer using a USB cable.
 - ▶ The connection is established.
 - ▶ As soon as the testo 400 is connected via a USB cable to a computer, **Connected to testo 400 – Retrieve data now** is displayed at bottom left.
 - ▶ If an update is available, a message window appears.
- 3 Click **Start Update**, if an update is available.
or
Click **Later** to do this at a later date.



- ▶ The update process takes a few minutes. After the update, the testo 400 restarts and installs the update.



If a cable probe with older firmware is connected to the testo 400, the probe can be updated or removed (see Section 7.6.3).





We always recommend carrying out the probe update, since the introduction of new firmware always serves a purpose or solves an existing problem on the market.

9.2 Making basic settings

Basic settings contains all the general settings for the testo 400. Configurations implemented in the Setup wizard can be changed here:

- Regional settings
- Safety settings
- Measurement settings
- My company address
- Flashlight
- Display settings
- Factory reset
- Privacy settings
- Advanced settings

9.2.1 Regional settings

- 1 | Click on .
- ▶ | Main menu opens.
- 2 | Click on  **Settings**.
- ▶ | The **Settings** menu opens.
- 3 | Click on **Regional settings**.
- ▶ | The **Regional settings** menu opens.


- 4 Click on **Language**.
- ▶ The **Language** window opens.
- 5 Click on **Country**.
- ▶ Information window is displayed.
- 6 Click on **OK**.
- 7 Select **Country**.
- 8 Click on **Time**.
- ▶ Information window is displayed.
- 9 Click on **OK**.
- 10 Set the **Date & Time**.

9.2.2 Measurement settings



- 1 Click on ☰.
- ▶ Main menu opens.
- 2 Click on ⚙️ **Settings**.
- ▶ The **Settings** menu opens.
- 3 Click on **Measurement settings**.
- ▶ The **Measurement settings** menu opens.
- 4 Click on required unit.
- ▶ Window with corresponding units opens.
- 5 Click on unit.

9.2.3 Company details

- 1 Click on ☰.
- ▶ Main menu opens.

- 2 Click on  **Settings**.
- ▶ The **Settings** menu opens.
- 3 Click on **Company details**.
- ▶ The **Company details** menu opens.
- 4 Click on required fields.
- 5 Enter information.



9.2.4 Torch

- 1 Click on .
- ▶ Main menu opens.
- 2 Click on  **Settings**.
- ▶ The **Settings** menu opens.
- 3 Click on **Torch**.
- ▶ The torch switches on.
- 4 Click on **Torch** again.
- ▶ The torch switches off.

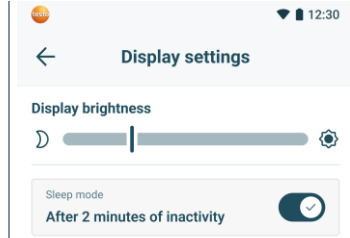


Please note that constant activation of the torch will result in higher battery consumption.

9.2.5 Display settings

- 1 Click on .
- ▶ Main menu opens.
- 2 Click on  **Settings**.
- ▶ The **Settings** menu opens.
- 3 Click on **Display Settings**.

- ▶ The **Display Settings** menu opens.



- 4 For the **Display Brightness**, move the controller to the left or right.
- ▶ The display becomes brighter or darker.
- 5 Enable **Sleep** using the slider.
- ▶ **Sleep** is enabled (or disabled).

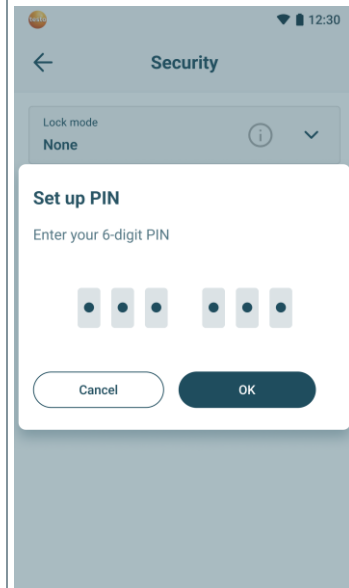


When clicking on **Sleep**, you can select whether the display switches to sleep mode after 2 minutes and becomes inactive. The display is activated again by briefly pressing the On/Off switch.

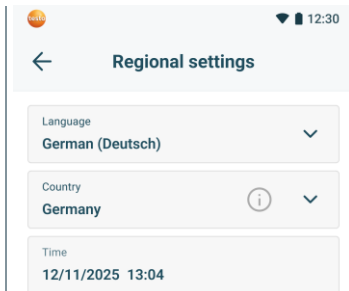
9.2.6 PIN lock

- 1 Click on ☰.
- ▶ Main menu opens.
- 2 Click on ⚙️ **Settings**.
- ▶ The **Settings** menu opens.
- 3 Click on **Security**.



4 Enter 6-digit PIN

5 Click on **OK**.

- ▶ When the security function is activated, a factory reset and setting the date and time is only possible by entering the 6-digit PIN.



9.2.7 Resetting the testo 400 to factory settings

- 1 Click on .
- ▶ Main menu opens.
- 2 Click on  **Settings**.
- ▶ The **Settings** menu opens.
- 3 Click on **Restore factory settings**.
- ▶ Information window opens.





After clicking on the **Restore factory settings** field, you will be asked whether you are sure that you want to carry out a reset. All relevant measurement data should be stored on an external instrument. The testo 400 must then be reconfigured and all collected measurement data deleted.

-
- 4 Click **OK** or **Cancel**.



9.3 General information

Under General Information, you will find information about the testo 400, and the tutorial can once again be called up and implemented. There you will also find the Quick Start Guide, the detailed instructions and the legal information.



9.3.1 General instrument information

- 1 Click on .
- ▶ Main menu opens.
- 2 Click on  **Help and Information**.
- ▶ The **Help and Information** menu opens.
- 3 Click on **Instrument information**.
- ▶ The current serial and display numbers are displayed. The current app and firmware version is also displayed.

9.3.2 Calling up the tutorial



- 1 Click on .
- ▶ Main menu opens.
- 2 Click on  **Help and Information**.
- ▶ The **Help and Information** menu opens.
- 3 Click on **Tutorial**.
- ▶ The tutorial shows you the most important steps prior to commissioning.

9.3.3 Calling up legal information








- 1 Click on .
- ▶ Main menu opens.
- 2 Click on  **Help & Information**.
- ▶ The **Help and Information** menu opens.
- 3 Click on **Exclusion of liability**.


- ▶ The data protection information and licence usage information is displayed.

9.3.4 Other applications

- 1 Click on .
- ▶ Main menu opens.
- 2 Click on  **Other applications**.
- ▶ The **Other applications** menu opens.

In the **Other applications** menu, you will find the following applications:

 Camera	 Calendar
 Clock	 Computer
 Gallery	 File manager
 Bluetooth®	

- 1 Click on .
- ▶ Information window opens.
- 2 Click **Next** or **Cancel**.
- ▶ Individual apps and additionally installed apps can be closed manually.



If **always** has been selected for the data export, the setting can be undone in this menu. This means that both export options will be available again in the future.

10 Maintenance

10.1 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 400 once a year.

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

Please contact Testo for further information.

10.2 Rechargeable battery care



Battery replacement may only be carried out by Testo Service.

- At low ambient temperatures, rechargeable battery performance decreases. This reduces the available useful life.
- Do not store the rechargeable battery for long periods when discharged. (Best storage conditions at 50-80% battery level, 10-20 °C ambient temperature.) Fully charge before using again.
- The available useful life of the rechargeable battery reduces more and more with frequent use. If the useful life is significantly shortened, the rechargeable battery should be replaced.

10.3 Notifications



In the main menu, notifications are marked with an orange dot next to the menu entry. Depending on the menu entry, these notifications contain different information.

Menu entry	Information
Sensors	Calibration reminder: The reminder date of a stored calibration certificate has been exceeded (see Section 8.7.2).

11 Technical data

General information

Feature	Value
Probe connections	<ul style="list-style-type: none"> - 2x type K thermocouple - 2x Testo Universal Connector (TUC) for connecting cable probes to the corresponding plug - 1x differential pressure - 1x absolute pressure (integrated) - 4x Bluetooth® probe or testo Smart Probe
Interfaces	<ul style="list-style-type: none"> - Micro USB for connection to PC or for battery charging with mains unit - Bluetooth® 4.0
Internal memory capacity	2 GB (corresponds to 1,000,000 readings)
Rechargeable battery life	approx. 10 hours of continuous operation / 3200 mAh
Measuring cycle	0.5 sec / display update 1 sec (thermocouple type K: 2 sec)
Operating temperature	-5 to +45 °C
Storage temperature	-20 to +50 °C
Charging temperature	0 to +45 °C
Dimensions in mm	210 x 95 x 39 (L x W x H)
Housing material	PC, ABS, TPE
Weight	500 g
Protection class	IP 40 (with probe connected)
Display	5.0 inch HD display (1280*720 pixels)
Camera	<ul style="list-style-type: none"> - Front camera 5.0 MP - Rear camera 8.0 MP

Integrated sensors (at 22 °C, ±1 digit)

Characteristics	Measuring range	Accuracy	Resolution
Temperature (TC type K) ¹	-200 to +1370 °C	±(0.3 °C + 0.1% of m.v.) Internal cold junction measurement: ±0.5 °C	0.1 °C
Temperature (NTC)	-40 to +150 °C	±0.2 °C (-25.0 to +74.9 °C) ±0.4 °C (-40.0 to -25.1 °C) ±0.4 °C (+75.0 to +99.9 °C) ±0.5% of m.v. (rest)	0.1 °C
Differential pressure ²	0 to +200 hPa	±(0.3 Pa + 1% of m.v.) (0 to 25 hPa) ±(0.1 hPa + 1.5% of m.v.) (25.001 to 200 hPa)	0.001 hPa
Absolute pressure	+700 to +1100 hPa	±3 hPa	0.1 hPa

¹ The accuracy information applies in an adjusted, stable temperature state. Plugging in the mains unit, charging the battery or adding digital probes can distort this temporarily, and additional errors may occur.

² The accuracy specification applies immediately after zeroing the sensor for the positive measuring range. For long-term measurements, mains operation with fully-charged battery is recommended.

12 testo DataControl PC software

12.1 General information

The testo 400 has a USB port, via which the measuring instrument can be connected to the PC.



Knowledge of Windows® operating systems is required to work with the software.

12.2 Purpose

The testo DataControl measurement data management and analysis software enhances the functionality of the testo 400 measuring instrument by adding lots of useful functions:

- Manage and archive customer data and measuring site information
- Read out, evaluate and archive measurement data
- Presenting readings in graphic form
- Create professional measurement reports from the existing measurement data
- Conveniently add pictures and comments to measurement reports
- Data import from and data export to the measuring instrument

12.3 System requirements



Administrator rights are required for installation.

Operating system

The software can be run on the following operating systems:

- Windows® 10
- Windows® 11

Computer

The computer must meet the requirements of the operating system in each case. The following requirements must also be met:

- Interface USB 2 or higher
- DualCore processor with minimum 1 GHz
- Minimum 2 GB RAM
- Minimum 5 GB available hard disk space
- Screen with a resolution of at least 800 x 600 pixels

12.4 Installing drivers and software

- 1 Insert the program CD into the CD-ROM drive of the computer.
or
Download testo DataControl software (www.testo.com/download-center)
- 2 Launch the **DataControl.exe** file.
- 3 Follow the instructions of the installation wizard.
- 4 Click on **Finish** to complete the software installation.
- 5 Use the USB cable to connect the testo 400 to the PC.
 - ▶ The connection will be established.

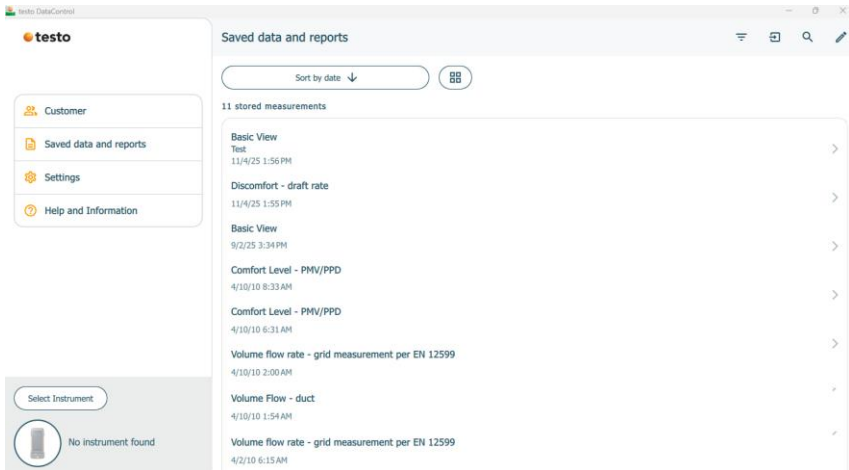
12.5 Launching testo DataControl



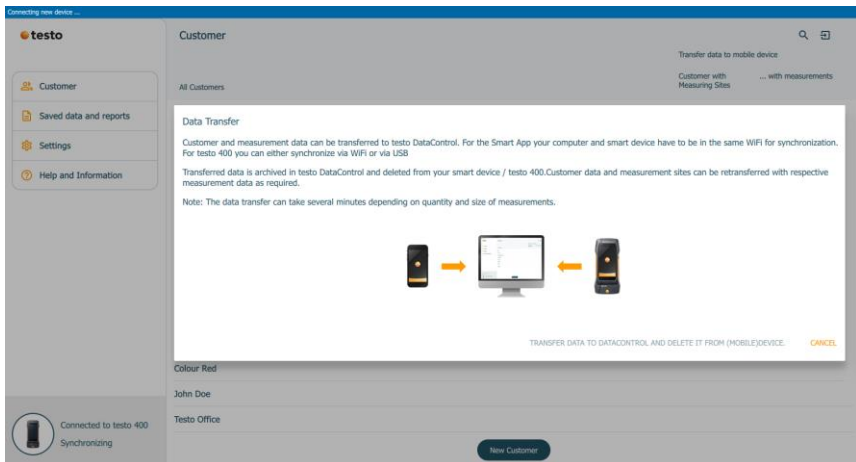
The user interface of the software is opened in the language of the operating system, if it is supported. If the operating system language is not supported, the user interface will be in English.

- > Click on [**Start**] | **All Apps** | **Testo** | **testo DataControl** (double-click on left mouse button).
- ▶ testo DataControl launches automatically.

12.6 Connecting the testo 400

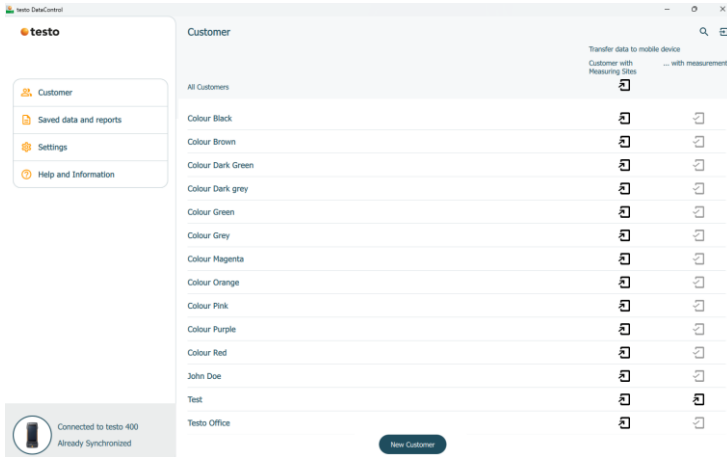



As long as the testo 400 is not connected to the computer, **No Instrument found** is displayed at bottom left. All customers are listed in **all customers**.





As soon as the testo 400 is connected via a USB cable to a computer, **Connected to testo 400 – Synchronizing** is displayed at bottom left. A message about data transfer is displayed. Confirm by pressing **OK** to transfer all customer and measurement data from the testo 400 to the software. The testo 400 memory is then empty. Depending on requirements, customer and measurement data as well as measuring site information can be transmitted back.

Click on **Close** to use the software normally, however no data will be transferred from the software to the testo 400. To start the data transfer manually, click on **Synchronizing** at bottom left. No message about the data transfer from the instrument is displayed, and the synchronization starts immediately.



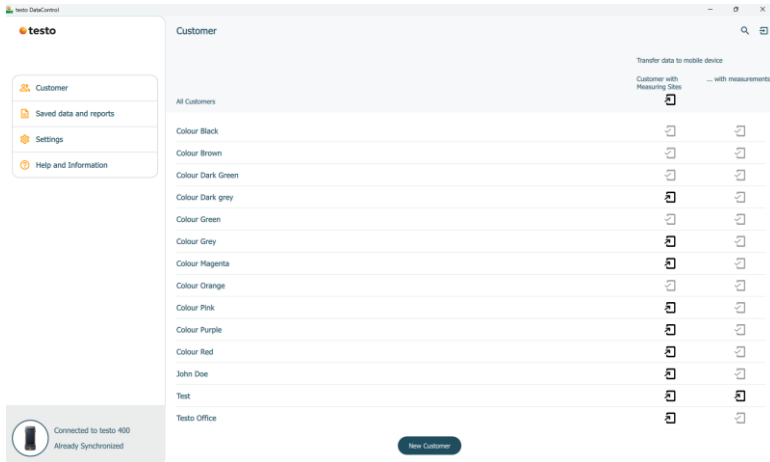
Following successful synchronization, for each customer two icons  are displayed relating to the data transfer.


In order to have the relevant customer data available in the instrument for measurements on site and to assign new measurements on site to measuring sites, all customer data and measuring site information is transferred to these customers by clicking the left .

In order to be able to view the customer's already recorded measurement results on site for comparison purposes, all data belonging to the customer is transferred to the testo 400 by clicking the right .

Moreover, there is the option of transferring customer data and measuring site information from all customers by simply clicking on **Customer with measuring sites**.

12 testo DataControl PC software



If the data transfer to the testo 400 was successful, the icon changes to .

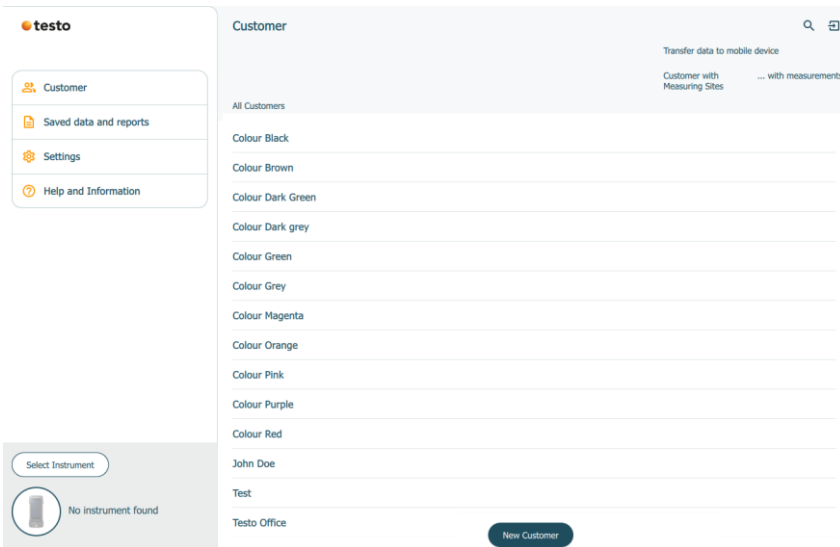
12.7 Customer management

In the **Customer** menu, all customer and measuring site information can be created, edited, deleted and transferred to the testo 400. All customer and measuring site information created on the testo 400 is also displayed following successful transfer to the software.

12.7.1 Creating and editing customers and measuring sites

12.7.1.1 Customer

✓ The **Customer** menu is open.



- > Click on **New customer**.
- ▶ A new customer can be created in testo DataControl.

Editing existing customer data

- > Click on existing customer name.
- ▶ Separate customer view is opened.
- ▶ The customer can be edited.

The following customer information can be saved and/or changed:

Company/customer name	Street, building number
Postcode, city	Country
Telephone	E-mail
Contact person	Customer number



Only the field **Company/customer name** is mandatory. Other fields may remain blank.

12.7.1.2 Measuring site

Search for customer's measuring site

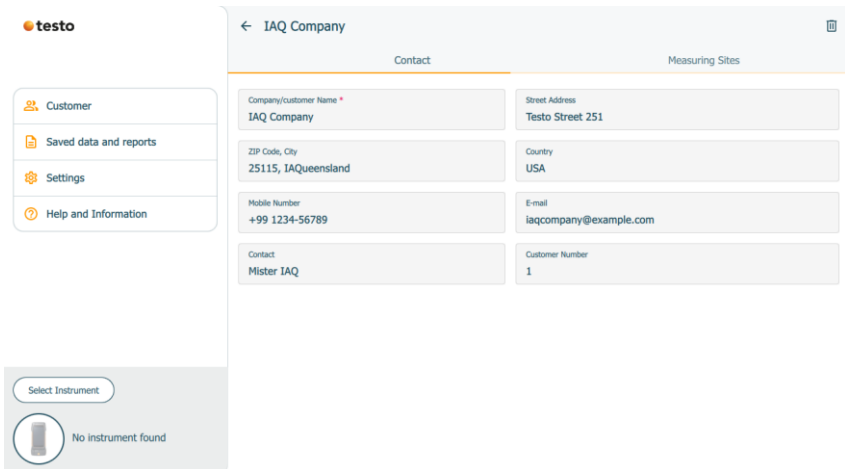
- ✓ Several measuring sites are stored.
- > Click on .
- ▶ Search field opens.

Add measuring site



Any number of measuring sites can be created for the selected customer.

- ✓ Required customer is open.



The screenshot shows the testo DataControl PC software interface. On the left is a navigation menu with options: Customer, Saved data and reports, Settings, and Help and Information. The main area displays the profile for 'IAQ Company'. The profile is divided into two sections: 'Contact' and 'Measuring Sites'. The 'Contact' section contains fields for Company/customer Name (IAQ Company), ZIP Code, City (25115, IAQueensland), Mobile Number (+99 1234-56789), and Contact (Mister IAQ). The 'Measuring Sites' section contains fields for Street Address (Testo Street 251), Country (USA), E-mail (iaqcompany@example.com), and Customer Number (1). At the bottom left, there is a 'Select Instrument' button and a message 'No instrument found' with a camera icon.

- 1 Click on **New measuring site**.
- ▶ Measuring site can be added.

The following measuring site information can be saved and/or changed:

Measuring site name	System number
System type	Manufacturer
Year of construction	System serial number
Annotation	

The following characteristics can be assigned to the respective measuring site:

None	Duct
Outlet	k-factor
Funnel	



Only the field **Measuring site name** is mandatory. Other fields may remain blank.

2 | Click on **Save**.



If duct, outlet or k-factor was selected as a measuring site feature, the specific information for the measuring sites must be inserted. In addition, for the Channel feature there is the option to configure HVAC grid measurement.

HVAC grid measurement (optional)

1 | Activate HVAC grid measurement using the slider.

The screenshot shows the 'Office 4th floor' configuration page. On the left is a navigation menu with 'Customer', 'Saved data and reports', 'Settings', and 'Help and Information'. The main area has tabs for 'Measuring Site' and 'Measurements'. Under 'Measuring Site', there are fields for 'Year of construction', 'System serial number', and 'Note'. The 'Parameters' section includes: 'Type' (Duct), 'Air Type' (Return Air), 'Input Geometry' (Rectangular), 'Height' (40,0 cm), 'Width' (30,0 cm), and 'Correction Factor' (1,00). At the bottom, the 'HVAC grid measurement' toggle is set to 'No alignment of the duct aperture' (off). A 'Sub-measurement sites' button is visible at the bottom right.

▶ Additional fields expand.

This screenshot shows the same configuration page, but with the 'HVAC grid measurement' toggle turned on. This has expanded the 'Measurements' section to include: 'Alignment of duct aperture' (set to 'Horizontal'), 'Number of Inspection Holes (drilled holes)' (6), 'Number of Measuring Points' (6), and 'Inspection hole position' (Horizontal). A grid diagram below these fields shows a 6x6 array of points. The 'Reference Volume Flow' is shown as 3.000,00 m³/h. The 'Sub-measurement sites' button remains at the bottom right.

▶ The following data can be stored: Duct geometry, air type, duct dimensions and the correction factor, number of inspection holes and measuring points as well as the inspection hole position and the reference volume flow for the respective measuring site.

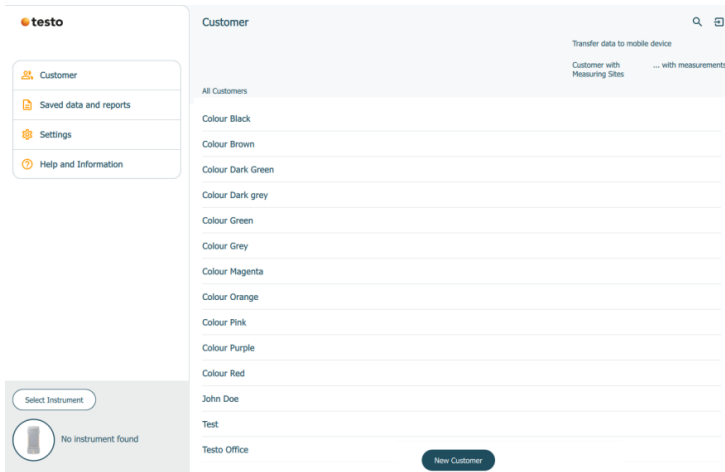
2 | Click on **Save**.


Calling up stored measurements of a selected measuring site

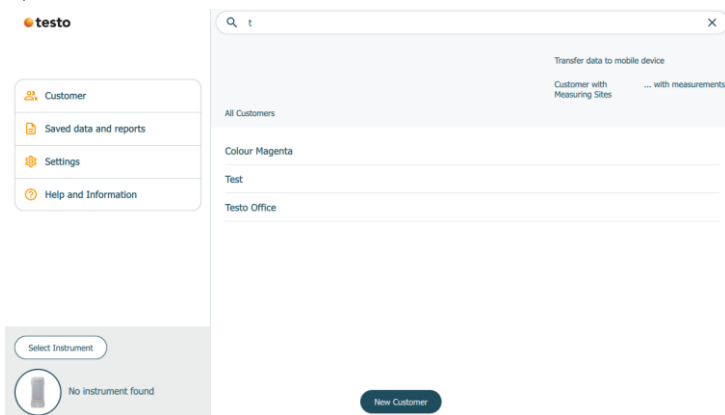
- > Click on the **Measurements** tab.
- ▶ Measurements assigned to the selected measuring sites are displayed.

12.7.2 Search function

- ✓ The **Customer** menu is open.



- 1 Click on .
- ▶ Search field with customer list opens.




- 2 | Enter customer name in the search field.
 - ▶ | Customer is displayed.

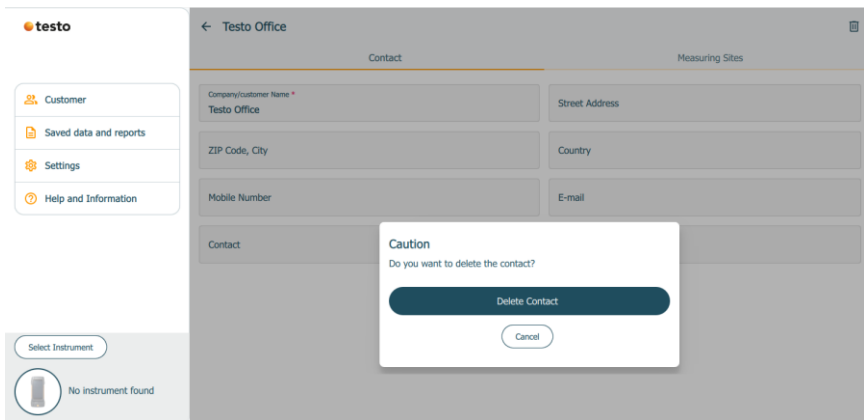
12.7.3 Delete function

- ✓ | The **Customer** menu is open.
- 1 | Click on the required customer (or measuring site).



The stored customer plus all measuring site information are deleted. All measurements carried out must be deleted separately in the Memory menu.

- 2 | Click on .
- ▶ | Information window is displayed.



- 3 | Click on **Delete Contact** (or measuring site).
 - ▶ | The customer (or measuring site) was deleted.

12.8 Memory management

In the **Saved data and reports** menu, you can call up all the measurement results stored with the testo 400 and transferred to the software, analyze them in detail and also create and save csv data and PDF reports.



In principle, stored measurements **CANNOT** be edited. The stored measurement data recorded with the testo 400 cannot be changed. (The only exceptions are the clo and met values for PMV/PPD measurement).

When clicking on a measurement, an overview of the measurement results is displayed. For all measurements, except for HVAC grid measurements as per EN 12599 and ASHRAE 111, three windows are displayed under the name of the measurement.

- Measuring parameters
- Graphic
- Display values

12.8.1 Saved Data & Reports view

Saved Data & Reports displays the date and time of the measurement.

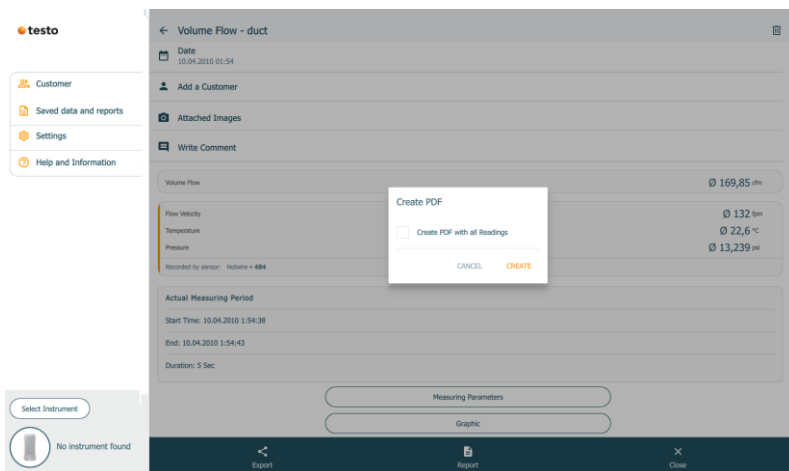
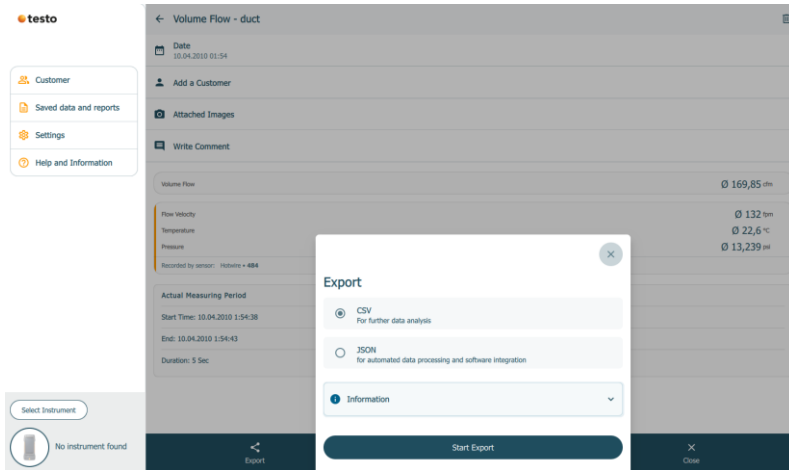
In addition, the measurement's customer and measuring site data, images and comments can be viewed and added. The measurement settings are listed under **Measurement parameters** (Measuring mode, Measuring cycle, Measurement period, Duct geometry, Reference volume flow, etc.).

The screenshot displays the 'testo' application interface. On the left is a navigation menu with options: Customer, Saved data and reports, Settings, and Help and Information. The main area shows a measurement overview for 'Volume Flow - duct' recorded on 10.04.2010 at 01:54. Key data points are highlighted in orange: Volume Flow (169,85 dm³), Flow Velocity (132 fpm), Temperature (22,6 °C), and Pressure (13,239 psi). The 'Actual Measuring Period' is shown as 10.04.2010 1:54:38 to 10.04.2010 1:54:43 with a duration of 5 seconds. At the bottom, there are buttons for 'Export', 'Report', and 'Close'.

The measurement results listed are divided into three areas.

- Display of the calculated results of the application menu
- Probes relevant to the measurement, shown in orange

- All connected probes with the average measuring values in each case, shown in grey.



Via the icons in the footer, the measurement results can be saved as a .csv / .json file or as a PDF report on the computer.

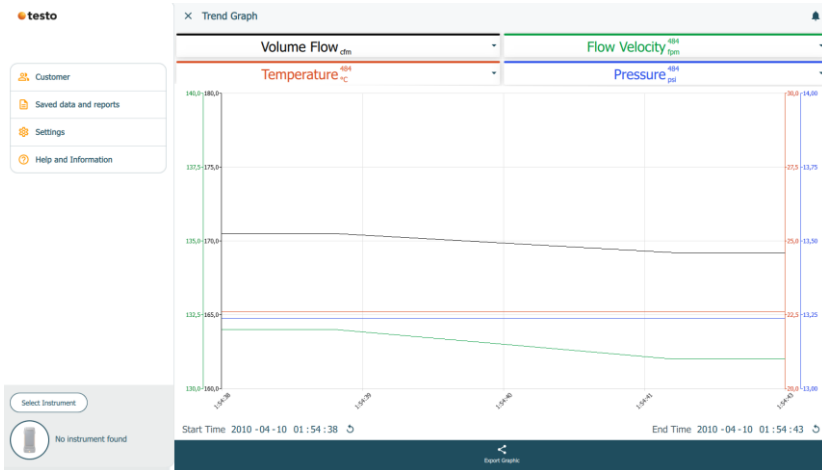


When creating a PDF report, there is the option, as on the testo 400, to include only the average measuring values or to integrate all measured values in the report.

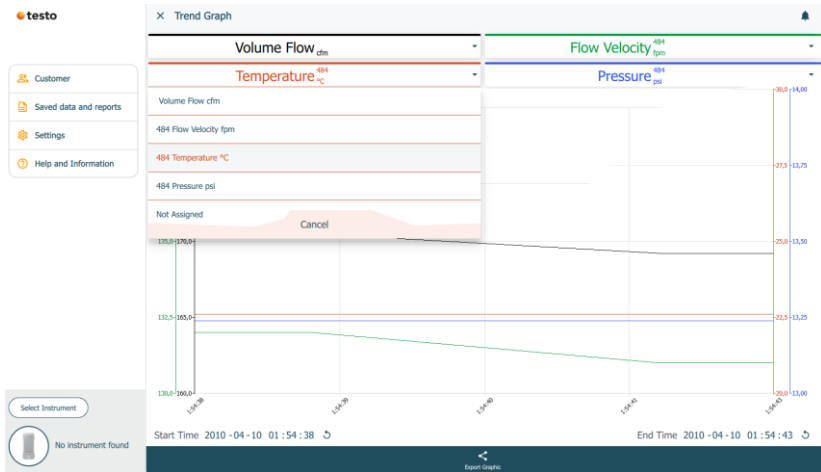
Creating large PDF reports (with over 100,000 readings) can take a few minutes. The time may vary depending on PC performance.

12.8.2 Graphic view

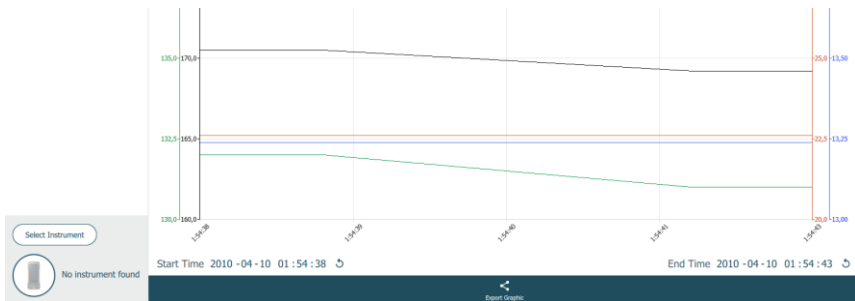
In the **Graphic** tab, corresponding values are located along the chronological trend graph of the measurement for up to four selected measurement parameters. Each of the four channels contains the three-digit probe ID and the unit of the selected measurement parameter. The colour of the individual channels is reflected in the corresponding Y-axes and trend graphs in each case. If you move the mouse pointer along the graphic, the exact time and measuring values of all channels will be displayed for the corresponding time point.




Clicking on one of the four channels opens the selection of measurement parameters recorded during the measurement. The measuring parameters can easily be assigned to the individual channels via the probe ID and measuring unit or selected as **not assigned**.



Below the graphic, both the start and end time of the measurement are listed. The information can be changed by clicking on the individual fields with the mouse. The trend graph immediately adapts to the new time selection.

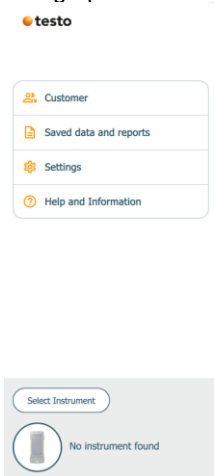


The total measurement period in the example in the figure above is 60 minutes. After changing the start time, only the last 10 minutes of the measurement are displayed in the graphic in accordance with the selection. Adjusting the time enables the measuring values to be analyzed in detail. To display the complete measurement period in the graphic once again, click on the icon  next to the start and end time.




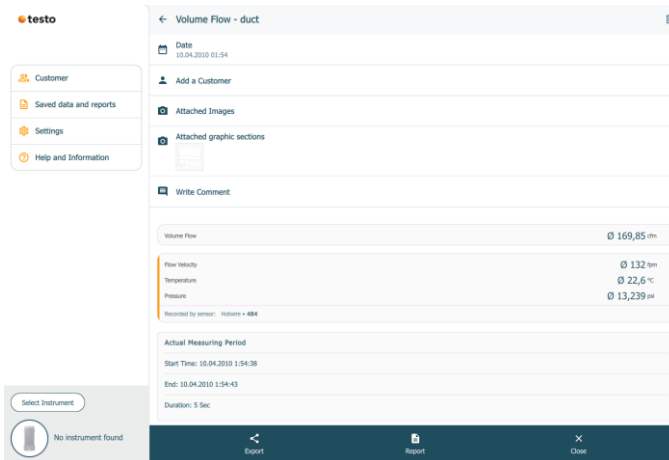
You can use the mouse wheel to zoom in and out within the graphic in order to have a closer look at individual measuring values.


The graphic can be saved on the computer as an image file (.png).



Graphic section is saved ...

- 1 Click on  to save the graphic to your computer.
- 2 Enter file name, select the storage location.



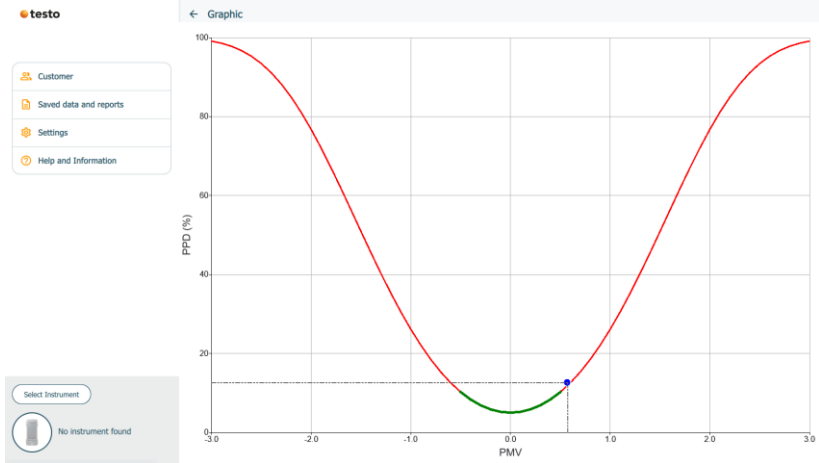
Then click on  **Attached images** during the measurement to select and add the saved graphic.



The selected image will automatically be attached to the report.




No graphic is displayed for HVAC grid measurements in accordance with the standards. There are only two tabs to choose from. In the Comfort level - PMV/PPD measurement menu, the PMV/PPD graphic is displayed instead of the chronological trend graph.



Via the first tab **Characteristics** and the field **Display properties**, you can change the clothing and activity parameters in the next window. This recalculates the PMV/PPD values and also the graphic. In order to be able to compare different calculations/graphics with each other, you need to save the respective CSV and PDF files. The calculations are overwritten in each case - it is therefore not possible to view different results of a measurement at the same time.

12.8.3 View Show values

Under **Show values**, you can see all the measurement parameters and the corresponding measuring values for each point in time of the measurement, depending on the measuring cycle, are displayed. All measuring values can be viewed using the mouse wheel, the arrow keys on the keyboard or the scroll bars in the footer or at the right-hand margin.


At the bottom of the table are the average and min/max values of the measurement for all measurement parameters. The individual measurement parameters to be displayed in the table can be selected via the icon . This choice also has an effect on the ducts available for selection in the Graphic view (see Section 12.8.2). Only the measurement parameters visible in the table can be selected there.

The screenshot shows the 'Measuring Values' window in the testo DataControl PC software. On the left is a sidebar menu with options: Customer, Saved data and reports, Settings, and Help and Information. Below the menu is a 'Select Instrument' button and a message 'No instrument found'. The main window displays a table of measurement data for three different instruments (484, 484, 484) across two dates (10.04.2010 01:54:38 and 10.04.2010 01:54:43). The table columns are Date, Time, Volume Flow (cfm, fpm), 484 (fpm, °C, psi), and 484 (°C, psi). The data includes individual readings, minimum and maximum values, and overall averages.

Date	Time	Volume Flow	484	484	484
		cfm	fpm	°C	psi
10.04.2010	01:54:38	170,50	132	22,6	13,239
10.04.2010	01:54:39	170,50	132	22,6	13,239
	Ø	170,50	132	22,6	13,239
	Minimum	170,50	132	22,6	13,239
	Maximum	170,50	132	22,6	13,239
10.04.2010	01:54:42	169,21	131	22,6	13,239
10.04.2010	01:54:43	169,21	131	22,6	13,239
	Ø	169,21	131	22,6	13,239
	Minimum	169,21	131	22,6	13,239
	Maximum	169,21	131	22,6	13,239
	Overall Average	169,85	132	22,6	13,239
	Minimum Total	169,21	131	22,6	13,239
	Maximum Total	170,50	132	22,6	13,239

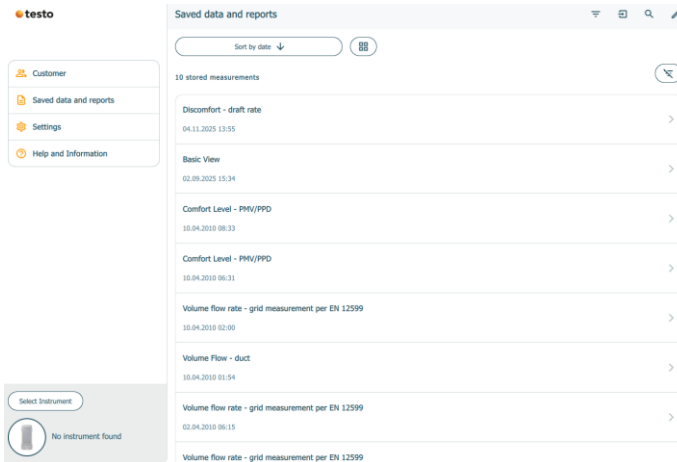
All measurement parameters can either be selected, deselected or selectively selected using a check mark in the box, to obtain a clear view of the measurement.


This screenshot shows the 'Measuring Values' window with a selection menu open. The menu allows users to 'Select All', 'Deselect All', or individually check/uncheck measurement parameters: Volume Flow cfm, 484 Flow Velocity fpm, 484 Temperature °C, and 484 Pressure psi. The background table shows the same data as the previous screenshot, but with a grey overlay indicating the selection menu is active. A 'CLOSE' button is visible at the bottom of the menu.

 For future measurements, the required measurement parameters can be selected in the testo 400 prior to the measurement (see Section 8.1 - point 8 Edit reading display).


12.8.4 Searching for and deleting measurement results

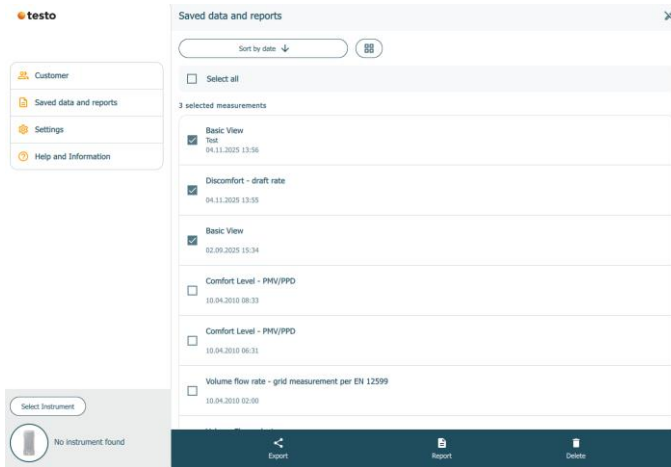
In the **Saved data and reports** menu, all stored measurements are sorted by date and time.




- ✓ The **Saved data and reports** menu is open.
- 1 Click on .
- ▶ Search field with measurements opens.
- 2 Enter the customer name or measuring site or date/time in the search field.
- ▶ The result is displayed.

Deleting

- 1 Click on .
- ▶ A check box is displayed in front of each measurement.
- 2 Click on the required measurement.
- ▶ A tick is displayed in the respective box.



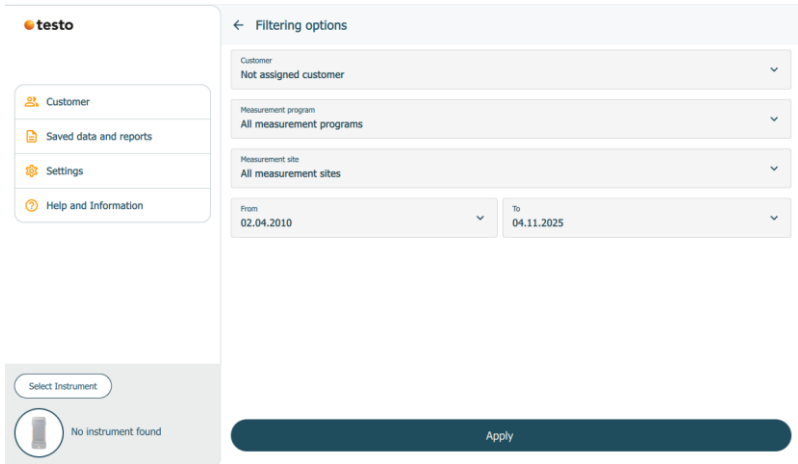
- 3 Click on .
- ▶ Information window is displayed.
- 4 Acknowledge the information.
- ▶ Selected measurements were deleted.

Assigning measurements



Measurements that have not been assigned to a customer/measuring site can be subsequently assigned.

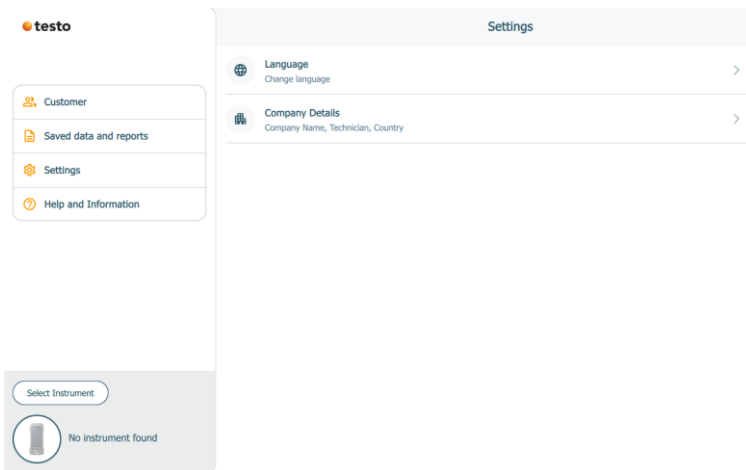
- > Under Filter Options, select **Not assigned customer**.
- ▶ All measurements are displayed without customer or measuring site information.



12.8.5 Settings

Under Settings, the company details can be saved and the language selected.

- ✓ The **Settings** menu is open.



- 1 Click on **Language**.
- ▶ Selection window opens.
- 2 Select language.

3 Click on **Company details**.

4 Fill in the following fields:

Company	Telephone
Technician	Fax
Street, building number	E-mail
Postcode, city	Website
Country	

5 If necessary, upload logo



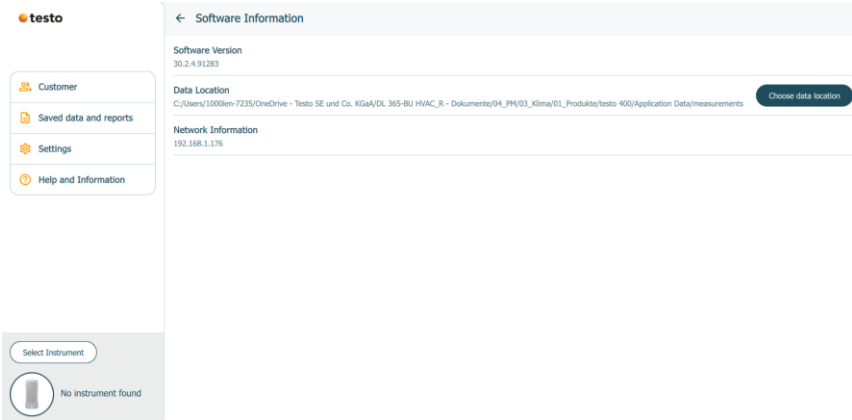
By default, the company logo and company details are displayed below the measurement results in all csv files (without company logo) and in the PDF reports on the letterhead.

12.8.6 Help and Information

The screenshot shows the testo DataControl software interface. On the left, there is a navigation menu with the following items: Customer, Saved data and reports, Settings, and Help and Information. The 'Help and Information' menu item is selected. Below the navigation menu, there is a 'Select Instrument' button and a message 'No instrument found'. The main content area displays the 'Help and Information' menu with the following items: Software Information (Software Version, Location, ...), Instruction Manual (https://www.testo.com/en/services/download-manuals), License Usage (Display Licence Information), and System Report (Create system information).

In the **Help and Information** menu, the current testo DataControl version is displayed under **Software information**.

In the **Software information** tab, click on **Show Data Location** to open an Explorer window for the data directory.



To copy the saved data on another computer or to save it externally, copy the **DataControl** folder.

Click on the **Instruction Manual** button to call up the complete instruction manual for the testo 400 including IAQ data logger and testo DataControl software as a PDF file.

The software licences used by the testo DataControl software are listed under **Licence usage**.

13 IAQ data logger

The IAQ data logger is used in conjunction with the testo 400 universal IAQ instrument to carry out long-term measurements of climatic and comfort level conditions independently of the measuring instrument.

The IAQ data logger with connected cable probes is configured with the aid of the testo 400 universal IAQ instrument. The measurement period and measurement interval can be set in this way. The IAQ data logger then records all the measurement parameters of the connected probes in accordance with the preset configuration, independently of the testo 400 measuring instrument. The IAQ data logger and the connected probes can be positioned directly on the testo measuring stand.

13.1 IAQ data logger front view



Element	Element
1 Connection for type K thermocouples (2 off)	2 Connection for cable probes with TUC connector (4 off)
3 Status LED	4 Connection for USB plug

13.2 IAQ data logger rear view



Element	Element
1 USB connection cable for connecting to the testo 400	2 Bracket for measuring stand
3 Cable storage	

13.3 Mains unit cable

The IAQ data logger is supplied with a USB mains unit. No recording of measurement data occurs without power supply via the mains unit cable. The Testo USB mains unit has the specification 5V / 2A.

⚠ CAUTION

**Power supply via a mains unit cable!
Tripping hazard!**

- Take care when routing the mains unit cable.
- Remove any trailing mains unit cable.



Do not use any other mains unit cable for the IAQ data logger. It may only be used with the supplied original mains unit or a comparable 5V / 2A USB mains unit, since the charging electronics in the battery and the mains unit are coordinated with each other.

13.4 Switching the IAQ data logger on and off

As soon as the IAQ data logger is supplied with power, it can be used. Separate activation is not necessary. To ensure reliable instrument detection on the testo 400, first connect the IAQ data logger to the power via the USB port and then connect it to the testo 400 using the cable attached to the rear.

It will automatically check whether a firmware update is available and if so, this will be installed straight away.

If the power supply is interrupted while a measurement is ongoing, there will be a gap in the measurement data recording process. As soon as the power supply is restored, the IAQ data logger will continue to record measurement data.

13.5 IAQ data loggers – General information



Depending on the measurement period, specific measuring cycles are feasible:

Duration	Minimum measuring cycle
1 min to 15 min	1 sec (thermocouple type K: 2 sec)
16 min to 2 hours	10 sec
> 2 hours to 1 day	60 sec
> 1 day to 21 days	5 min.

With the testo 400 (and the IAQ data logger), a maximum 1 million readings (with a maximum of 18 channels) can be recorded with one measurement.

Example 1 (timed measurement):

Result: 9,216 readings

Duration: 8 days

Measuring cycle: 5 minutes

Measurement channels: Temperature, humidity, CO₂, flow (4 channels)

Example 2 (manually launched measurement):

Result: 17,700 readings


Duration: 59 minutes


Measuring cycle: 1 second

Measurement channels: Temperature, humidity, CO₂, flow, pressure (5 channels)

13.6 Measuring with the IAQ data logger

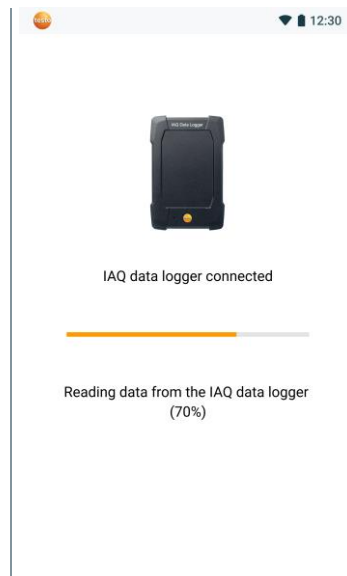
13.6.1 General

The IAQ data logger can be used in two ways. There is the option of selecting **Stand-alone** in the configuration  of the measurement. In this variant, you set up the IAQ data logger, which carries out the planned measurement with the connected probes. The testo 400 is only required for the pre-settings and can be used elsewhere following successful configuration.

However, the IAQ data logger can also be used as a probe hub and can carry out measurements with the testo 400 with up to five connected cable probes. To do this, select  **Measure with testo 400** in the configuration. In this variant, the IAQ data logger no longer records measurement data, but simply transmits it to the testo 400, which records the entire measurement.


- 1 | Connect the IAQ data logger to the power supply.
- 2 | Connect the IAQ data logger to the testo 400 via the TUC connector.


- ▶ Checks are made to ascertain whether a firmware update is available for the IAQ data logger. If so, the update will be implemented automatically.

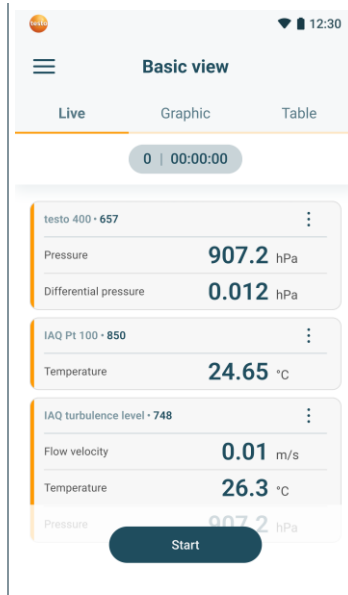


- ▶ The Basic view shows the probes connected to the testo 400. Where the probes are connected via the IAQ data logger, the abbreviation IAQ appears in front of the measurement parameter and the three-digit probe ID. Example: IAQ: Pt100 738.

13.6.2 Carrying out a measurement with the IAQ data logger

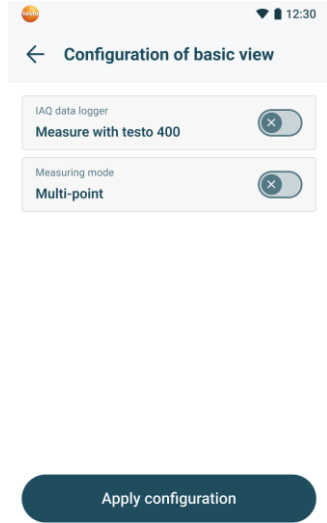
- 1 Click on  **Measurement programs**.
- ▶ Measurement programs are displayed.
- 2 Select the measurement program in conjunction with the IAQ data logger. (Basic view, Comfort level – PMV/PPD or Discomfort - draught rate)
- ▶ The measurement menu opens.

- 3 Click on  .

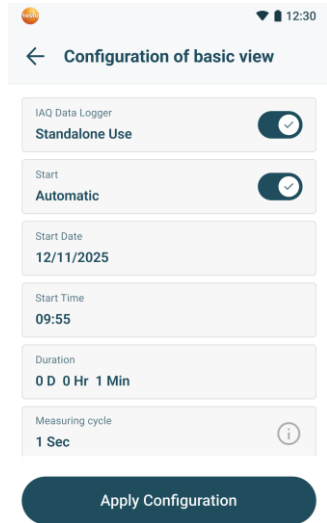


- ▶ Configuration menu opens.
- 4 Make the required settings.

5 Enable IAQ Data Logger – Measure with testo 400 using the slider.



6 Configure measurement for standalone use.



7 Click on **Apply Configuration**.

▶ The selected measurement program is displayed.

8 Click on **Transfer to IAQ**.

The screenshot shows the 'Basic view' of the app. At the top, there is a status bar with the time 12:30 and a battery icon. Below the status bar is a hamburger menu icon and the text 'Basic view'. There are three tabs: 'Live' (selected), 'Graphic', and 'Table'. A counter shows '0 | 00:00:00'. Below this, it says '4 probes connected'. There are three sensor cards:

- testo 400 · 657: Pressure 907.2 hPa, Differential pressure 0.012 hPa.
- IAQ Pt 100 · 850: Temperature 24.65 °C.
- IAQ turbulence level · 748: Flow velocity 0.01 m/s, Temperature (partially obscured), Pressure 907.2 hPa.

 A dark blue button labeled 'Transfer to IAQ' is overlaid on the temperature reading of the IAQ turbulence level card. At the bottom, a dark green bar indicates 'MEASUREMENT STARTS IN: 2 hrs 4 mins'.

▶ IAQ data logger is configured.

The screenshot shows a configuration confirmation dialog. At the top, there is a status bar with the time 12:30 and a battery icon. Below the status bar is a hamburger menu icon. In the center, there is an image of the IAQ data logger device. Below the image, the text reads 'IAQ data logger configuration'. A horizontal orange line separates this from the next section, which contains the text 'IAQ data logger configured. Ready for measurement.' At the bottom, there is a dark blue button labeled 'Close'.

- ▶ Following successful configuration, the testo 400 can be disconnected from the IAQ data logger. The measurement starts at the defined time or as soon as the setup has been completed (if the start time has been set to manual). The green LED on the IAQ data logger flashes rapidly at short intervals.

13.7 Reading the IAQ data logger



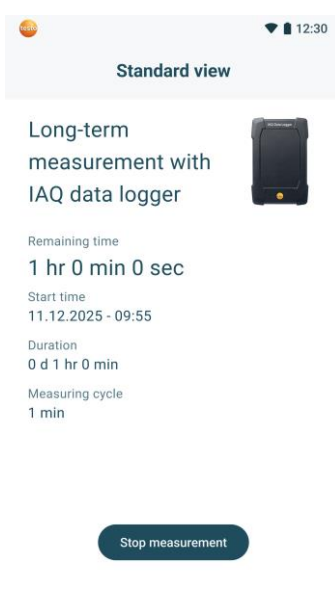
Since the IAQ data logger is a standalone instrument, the testo 400 can be used for other measuring tasks following configuration of the IAQ data logger, while the measurement is ongoing.



The time for storing the measurement data can easily be delayed if the measurement involves a huge amount of data.

13.7.1 With testo 400 connected

- ✓ testo 400 and the IAQ data logger are connected to each other. The testo 400 displays an overview of the current measurement with the configured settings.



- 1 Click on **Stop Measurement**.
 - ▶ Measurement results are saved automatically.
- 2 Disconnect the testo 400 from the IAQ data logger.
 - ▶ testo 400 can be used for other measurements.

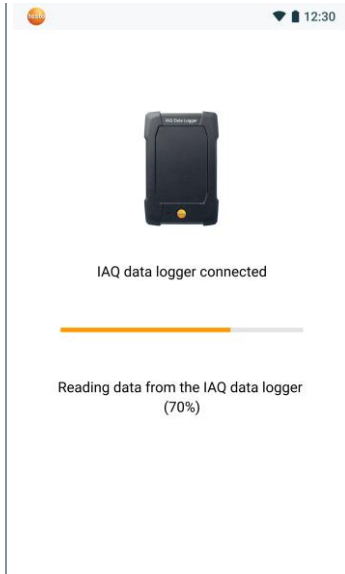


If the testo 400 was connected to the IAQ data logger for the measurement procedure, then the measurement is automatically stored on the measuring instrument.

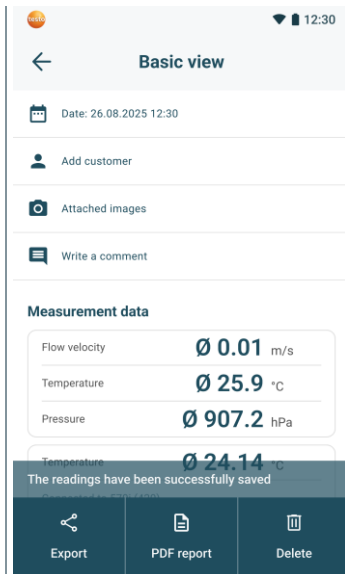
13.7.2 With the testo 400 disconnected

- 1 Connect the testo 400 to the IAQ data logger via the TUC connector.

- ▶ Once connected successfully, a message appears on the screen. The measurement data is transmitted. Data transmission may take some time.



- ▶ Following successful transmission of data, the measurement results are displayed. A confirmation to save appears.



- 2 | The measurement can be managed accordingly (see Section 8.6).



It is not possible to display the measuring values of an ongoing measurement in the graphic/table. Only the current measuring values of the probes can be viewed in the Basic view.

13.8 LED status

LED status	Description
Permanently red	Insufficient power supply or no compliant USB mains unit (PC or very old mains unit instead of the USB mains unit).
Flashing green/red (rapidly)	Measurement in progress. Power failure or probe missing/not responding. After a power failure, the IAQ data logger flashes red until the end of the measurement. If a probe is missing, it flashes for as long as it is missing. The measurement is still saved.
Flashing green/green (slowly)	IAQ box connected, ready to measure, no measurement is in progress.
Flashing green/green (rapidly)	Measurement in progress.
Flashing red	Internal error. Disconnect the mains unit from the power supply and reconnect it after a brief waiting period. If the problem persists, contact Testo Customer Service.

13.9 Technical data for IAQ data loggers


Feature	Value
Probe connections	2 x thermocouple type K 4 x Testo Universal Connector (TUC) for connecting cable probes to the corresponding plug
Interfaces	Micro USB for connection to a mains unit
USB mains unit	Recommended power supply 5 V, 2 A
Internal memory capacity	1.5 MB = 360,000 readings
Operating temperature	-5 to 45 °C
Storage temperature	-20 to +60 °C
Dimensions	89 x 136 x 39 mm
Housing material	PC, ABS, TPE
Weight	160 g
Protection class	IP 20 (with probe connected)

Integrated sensors (at 22 °C, ±1 digit)

Characteristics	Measuring range	Accuracy	Resolution
Temperature (TC type K) ¹	-200 to +1370 °C	±(0.3 °C + 0.1 % of m.v.) Internal cold junction measurement: ±0.5 °C	0.1 °C
Temperature (NTC)	-40 to +150 °C	±0.2 °C (-25.0 to +74.9 °C) ±0.4 °C (-40.0 to -25.1 °C) ±0.4 °C (+75.0 to +99.9 °C) ±0.5 % of m.v. (rest)	0.1 °C

¹ The accuracy information is valid in adjusted, stable temperature conditions. Plugging in the mains unit, charging the battery or adding digital probes can distort this temporarily, and additional errors may occur.

14 Questions and answers

Error	Description	
Export option cannot be selected.	If always is selected for the data export, the settings can be undone via the icon  (see Section 9.3.4). This means that both export options will be available again in the future.	
Rechargeable battery life.	The information about the battery life relates to a measurement with the testo 400 and connected probes when the display is switched off.	
	testo 400 + 1x hot wire probe	approx. 8 hours
	testo 400 + 1x hot wire probe + 2x TC	approx. 8 hours
	testo 400 + 1x turbulence probe + 1x CO2 probe + 1x TC	approx. 8 hours
	testo 400 + 1x turbulence probe + 1x humidity probe + 1x TC	approx. 8 hours
	testo 400 + 1x humidity probe + 1x TC	approx. 10 hours
	testo 400 + 1x CO2 + 2x TC	approx. 9 hours
testo 400 is not responding.	If the testo 400 is not responding to any gestures, press the On/Off button for about 10 seconds to restart the instrument.	

14.1 Contact and support

If you have any questions or need further information, please contact your dealer or Testo Customer Service.

Contact details can be found on the internet at: www.testo.com/service-contact



Testo SE & Co. KGaA
Celciusstrasse 2
79822 Titisee-Neustadt
Germany
Phone: +49 7653 681-0
E-mail: info@testo.de
Internet: www.testo.com

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