



testo 300 Smoke Edition / testo 300 Pro - Combustion Analyzer



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1 About this document

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

1.1 Symbols

Display	Explanation
	Note: basic or additional information
1 2 ...	Action: several steps, the sequence must be followed.
▶	Result of an action
✓	Requirement

1.2 Warning notices

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

DANGER

Risk of death!

WARNING

Indicates possible serious injury.

CAUTION

Indicates possible minor injury.

CAUTION

Indicates possible damage to equipment.

2 Safety and disposal

Take the **testo information** document into account (accompanies the product).

3 Product-specific safety instructions

CAUTION

**The condensate may be acidic.
Risk of burns to the hands!**

- Wear acid-resistant safety gloves, glasses and overalls to empty the condensate.
-
- Make sure that the condensate has been fully emptied out of the condensate trap before the measuring instrument is stored for a long time.
 - Before disposing of the product, the condensate trap must be emptied and the condensate in the crude gas tube disposed of in a suitable container.
 - When testing a gas pipe, pay attention to the following:

WARNING

Dangerous mixture of gases

Danger of explosion!

- Make sure there are no leaks between the sampling point and the measuring instrument.
 - Do not smoke or use open flames during the measurement.
-

4 Authorizations and certification

Please find the current country approvals in the **Approval and Certification** document which is enclosed with the product.

5 Specifications

The testo 300 is a measuring instrument for flue gas analysis on applications, such as

- residential, commercial and industrial applications (oil, gas, wood, coal)
- low-temperature and condensing boilers
- boilers, furnaces and gas heaters.

Using the instrument, these systems can be adjusted and checked for applicable limit values.

The instrument has been verified as a short-term measuring instrument and should not be used as a safety (alarm) device.

The following tasks can also be performed using the instrument:

- Checking the O₂, CO and CO₂, NO, NO_x values in combustion plants to ensure optimum operation.
- Draft measurement.
- Measuring the gas flow pressure in gas heaters.
- Measuring and optimizing the flow and return temperatures of heating systems.
- Measuring the CO concentration in the ambient air.

A NO_x filter for the CO sensor can be ordered as a spare part to replace a used filter.

6 Product description

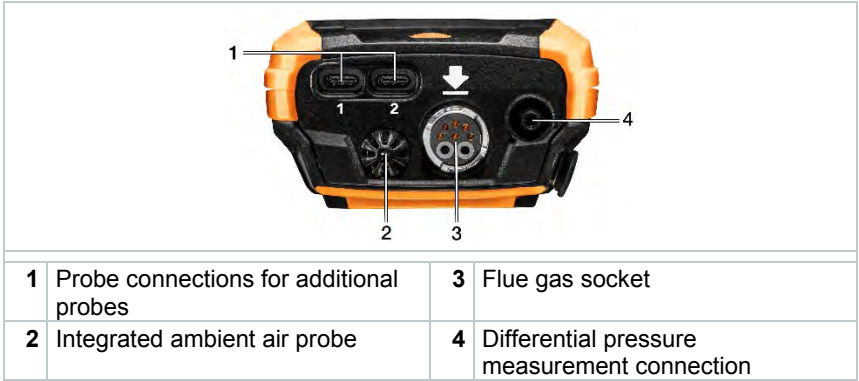
6.1 Front view



6.2 Rear view

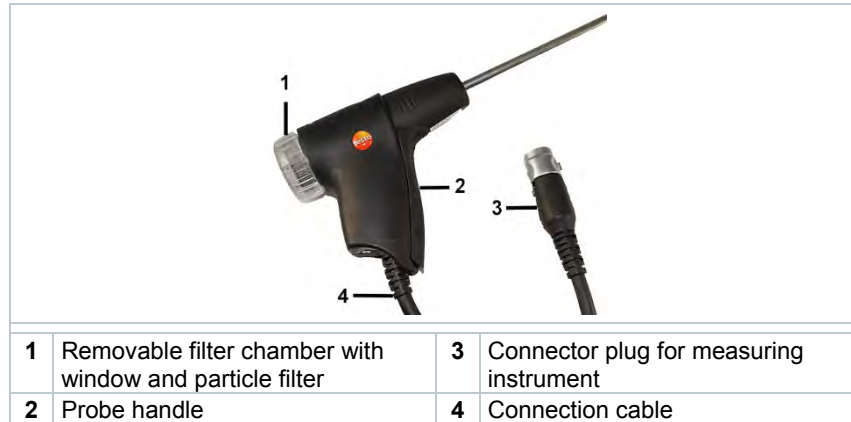


6.3 Connections

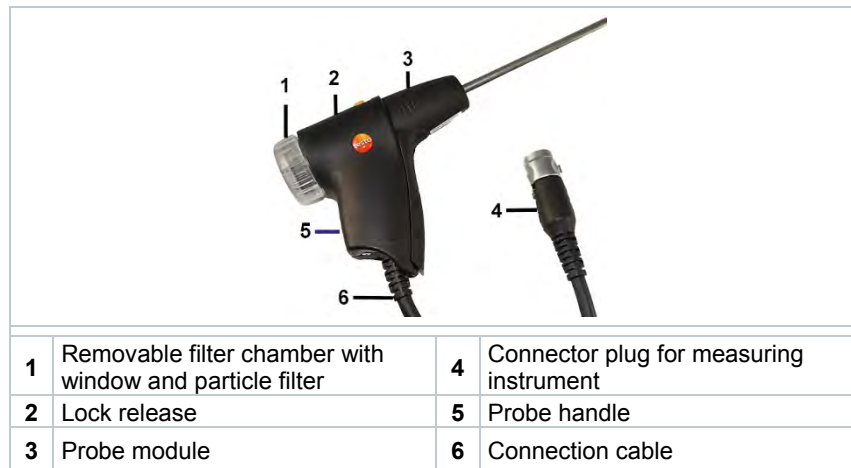


There must be no more than one extension lead (0554 1202) connected between flue gas socket and flue gas probe.

6.4 Compact flue gas probe



6.5 Modular flue gas probe



7 First steps

7.1 Commissioning

Take the information in the **testo information** document (included with the product) into account for this.

7.2 Power supply / Battery

The measuring instrument is supplied with a rechargeable battery.



Fully charge the battery before use.



If plugged in, the measuring instrument is automatically powered via the power supply.



Only charge the battery at an ambient temperature of 32 to 95°F.



Storage conditions for the energy storage unit:

- Ambient temperature from 50 to 68°F
- Charge level of 50 to 80%

7.2.1 Charge battery

- 1 Connect the instrument plug of the power supply to the power supply socket on the measuring instrument.
- 2 Connect the power plug of the power supply to an outlet.

- The charging process starts. LED in the condensate trap flashes red.
- The charging process stops automatically when battery is fully charged. LED in the condensate trap has a continuous red light.



If the battery has discharged completely, the charging time at room temperature is approx. 5-6 hrs.

7.2.2 Power Supply (AC) operation

- 1 Connect the instrument plug of the power supply to the power supply socket on the measuring instrument.
 - 2 Connect the power plug of the power supply to an outlet.
- ▶ The measuring instrument is powered via the power supply.
 - ▶ If the instrument is turned off and a power plug is inserted, the charging process will start automatically. Switching the measuring instrument on stops the charging of the battery and the measuring instrument is powered via the power supply.

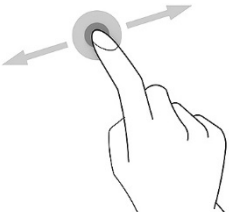


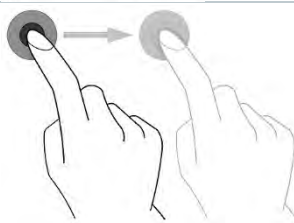
For longer measurements involving AC operation, Testo recommends using a combustion air temperature probe with connection cable. Self-heating of the instrument during AC operation may influence the combustion air temperature measurement using a mini ambient air probe.

7.3 Touchscreen operating concept

Familiarize yourself with the touchscreen operating concept before you use the measuring instrument.

Actions are mostly performed by:

Description	
Tapping To open applications, select menu symbols, press buttons on the display or enter characters with the keypad, in each case tap these with a finger.	
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.	

Description	
Zooming To make a section of the display larger or smaller, touch the display with two fingers and move them apart or together.	
Dragging You can move an element by touching it, holding it and dragging it to the required position. Example: Changing the display sequence of the measurement parameters.	

7.4 Keypad

Some functions require values (figures, numerical value, unit, characters) to be entered. The values are entered via a keypad.

- ✓ Input field is enabled (flashing cursor)

- 1 Enter value: tap the required value on the display (figures, numerical value, unit, characters).



- 2 Confirm entry: Press .
- 3 Repeat steps as required.

7.5 Switch instrument on and off

Current status	Action	Function
Instrument off	Press the button for a long time (> 3 s)	Instrument is turned on.
 When the measuring instrument is started for the first time, the setup wizard guides you through the following setting parameters step by step: - Country version (basis of calculations) - Language - Wi-Fi - Date and Time - Own company address - E-mail account* - Product registration A tutorial can be started after the setup wizard. The tutorial demonstrates the general operation and the most important functions of the measuring instrument using examples.		
Instrument on	Press the button briefly (< 1 s)	Instrument is turned to standby mode. The instrument is re-activated when the button is pressed again.
Instrument on	Press the button for a long time (> 1 s)	Selection: [OK] Instrument is turned off or cancel the instrument being turned off with [Cancel] .



Unsaved readings are lost when the measuring instrument is turned off.

*Note: If you don't have your Email server information available you can skip this step.

7.6 Connect probes

Flue gas probes

- ✓ Instrument is turned on.
- 1 Insert the connector plug into the flue gas socket and lock it in place by turning it slightly clockwise (bayonet lock).



There must be no more than one extension line (0554 1201) between measuring instrument and flue gas probe.

Temperature adapter

- ✓ Instrument is turned on.
- 1 Insert the connector plug of the probe into the probe socket.



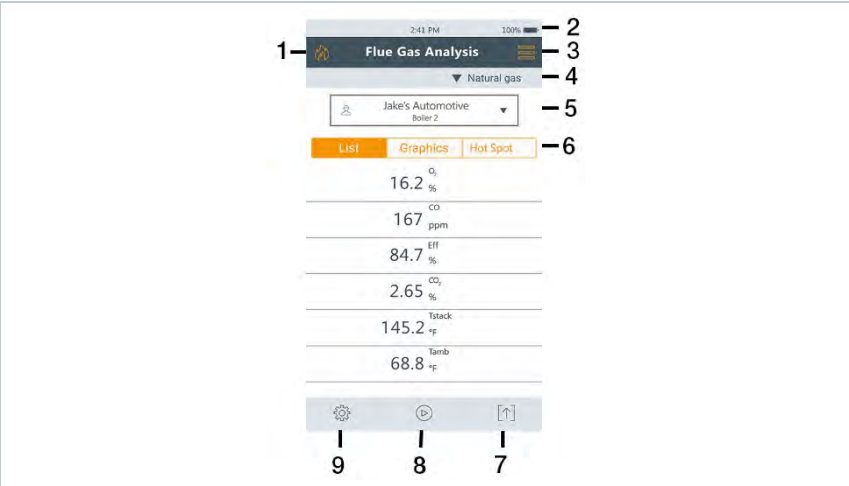
- ▶ System recognizes the probe (info is displayed).



When an external "ext." probe is used, the display will show "ext.".

8 Using the product

8.1 User interface



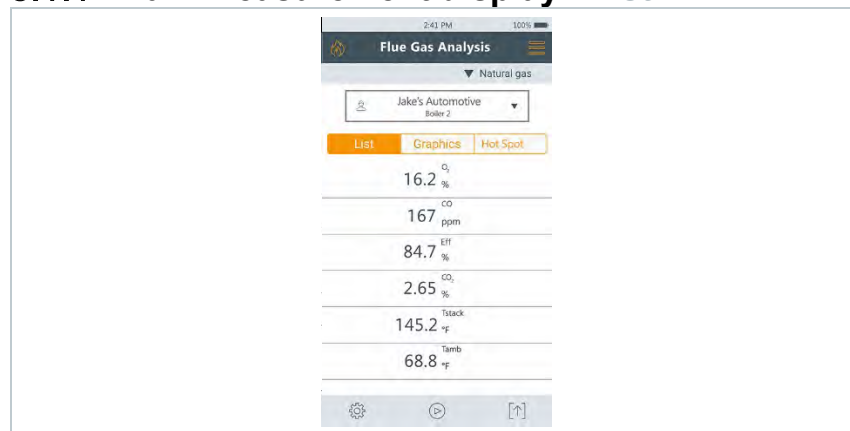
The screenshot shows the 'Flue Gas Analysis' app interface. At the top, there's a status bar (2) with the time 2:41 PM and 100% battery. Below it is a main menu (3) with a flame icon (1). A dropdown menu (4) shows 'Natural gas'. Below that is a selection list (5) for 'Jake's Automotive Boiler 2'. There are three tabs: 'List' (selected), 'Graphics', and 'Hot Spot' (6). The main display shows several measurement readings: O₂ % (16.2), CO ppm (167), Eff % (84.7), CO₂ % (2.65), T_{stack} °F (145.2), and T_{amb} °F (68.8). At the bottom is a navigation bar (9) with icons for settings (9), play/pause (8), and edit (7).

1		Measurement types
2		Status bar
3		Main menu
4		Open Fuels selection list
5		Select Customer/Measuring site
6		Select reading display type: • List • Graphics • Hot Spot
7		Edit measurement data
8		Start measurement Pause measurement Stop measurement
9		Options

Further symbols on the user interface (without numbering)

	Refresh measurement
	One level back
	One level back
	One level back
	Cancel process
	Print values
	Save report
	Save and send report

8.1.1 Main measurement display - List



The measurement units and the number and order of the measurement parameters displayed in the Main measurement display – **List**, can be changed, see section **Configure measurement display**.

Only those parameters shown in the reading display appear in the saved measurement and on the report printouts.

The settings only apply to the measurement type currently enabled.

8.1.2 Main measurement display - Graphics



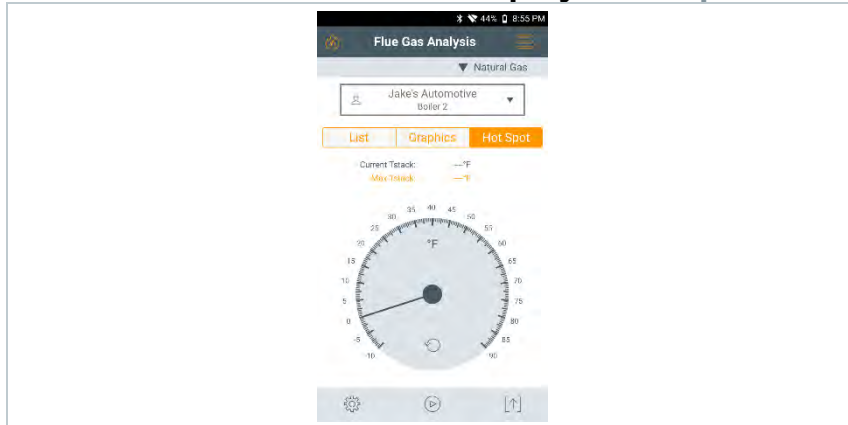
In the Main measurement display - **Graphics**, the reading progression can be displayed as a line diagram.

A maximum of 4 measurement parameters can be set at any one time. Only those measurement parameters can be displayed that are available in the Main measurement display - **Graphics**.

The measurement parameters can be adjusted if necessary:

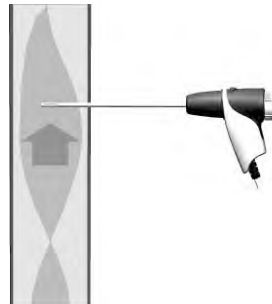
- ✓ Measurement view is enabled.
- 1 Call up function: **Graphics**
- 2 Tap on ▼ to open selection list for measurement parameters/units.
- 3 Select desired measurement data / units.
- ▶ Selection is accepted automatically.

8.1.3 Main measurement display - Hot Spot

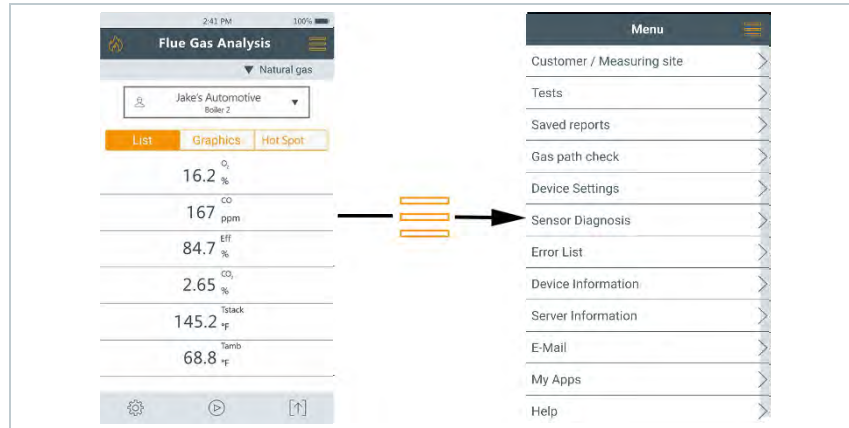


Search for hot spot:

- ✓ Measurement view is enabled.
- 1 Call up function: **Hot Spot**
- 2 Start search:
- 3 Perform zeroing.
 - ▶ The measurement starts automatically after zeroing.
- 4 Align the flue gas probe in the flue so that the probe tip is in the hot spot (area of the highest flue gas temperature **Max Tstack**).
 - Grey value/grey pointer: Display of current flue gas temperature
 - Orange value/orange pointer: Display of maximum flue gas temperature
 - Reset values/pointer:



8.2 Overview of main menu (☰)



Main menu	Description
Customer / Measuring site	Create, edit and delete customer and system information.
Tests	Call up, delete and send measurements that have been performed (various formats possible).
Saved reports	Call up and delete measurement report.
Gas path check	For flawless operation of the measuring instrument, regular tightness testing of measurement systems (measuring instrument + flue gas probe) is recommended.
Device Settings	Settings - Country version and language - Wi-Fi - Date & Time - My company address - Bluetooth® - Hotspot - Display brightness - CO sensor protect - NO2 addition - O2 reference - Alarm limits
Sensor Diagnosis	Overview of the sensors installed and their condition.
Error List	Show error reports

Main menu	Description
Device information	Information - Device name - Serial number - Last service date - Free memory - Operating hours - Operating hours since last service - Software version - Firmware version - Firmware date
Server information	Information about the available server
E-Mail	Set up e-mail account and the e-mail account can be displayed.
My Apps	Additional applications - Alarm clock - E-Mail - Gallery - Browser - Calendar - Pocket calculator - QuickSupport - File manager
Help	Aids - Device Registration - Tutorial - Setup Wizard - Help Online - Testo Website - Update via USB

8.2.1 Customer / Measuring site (point)

Create, edit and copy Customer / Measuring site information.

Customer / Measuring site can be deleted.

- 1 | Call up function:  | **Customer / Measuring site**
- | **Customer / Measuring site** menu is displayed.

8 Using the product

The following functions are available:



1	Search	3	View/edit existing data about Customer / Measuring site
2	Create new Customer / Measuring site		

Search

- 1

Tap **Search** operating field.
- ▶

Text cursor flashes.
- 2

Enter search test using the text editor.
- 

Via the search text, only the Customer / Measuring site is displayed that contains characteristics of the search text.
- 3

Confirm search result: press .

Create new customer

- 1

Tap + **New Customer / Measuring site**.
- ▶

Customer input screen is opened.
- 2

Tap the required input field.
- ▶

Keypad appears.
- 3

Enter the information via the keypad.

-
- 4 | Confirm each input with .



The **Customer/Company Name** input field is a required field and must be filled in.

-
- 5 | **Save.**

▶ Customer is created.



To be able to select a customer, at least one measuring site must be created and selected!

Create new measuring site

-
- ✓ A customer is created.

- 1 | Tap **Measuring site** button.

- 2 | Tap **+ New measuring site** operating field.

▶ **Measuring site parameters** menu is opened.

- 3 | Enter data.



The **Name of measuring site** input field is a required field and must be filled in.

-
- 4 | Confirm each input with .



An additional button (>) appears in some input fields.
These buttons contain a selection of parameters which are adopted in the input field by tapping on them.

-
- 5 | **Save.**

Edit customer

-
- 1 | Tap customer.

▶ **Customer** input screen is opened.

- 2 | Input fields can be edited.

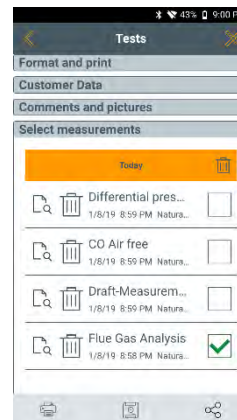
8 Using the product

Edit measuring site

- ✓ **Customer** input screen is open.
- 1 Tap **Measuring site** button.
- 2 Select **Measuring site**.
- 3 Edit data.
- 4 **Save**.

8.2.2 Tests

- 1 Call up function:  | **Tests**
- ▶ **Tests** menu is displayed.
- 2 Select customer.
- 3 Open measuring site.
- 4 Measurements for the selected customer / measuring site can be viewed  and deleted .
More options for selected measurement :
 -  Print readings
 -  Save report
 -  Save and send report



The following information can be selected / added to create a report.

Category	Description
Format and print	Select output format(s): - CSV (comma separated text file, e.g. for Microsoft® Excel) - PDF - ZIV 2.00 (XML file, complying with the regulations of the Guild of Master Chimney Sweeps in Germany).
Customer data	Enter / add contact details.
Comments and pictures	Enter comments and Add (opens the Gallery). Pictures are only included when output is in PDF format.
Select measurements	All saved measurements are displayed in one of the following time categories, depending on the creation date: Today , Yesterday or Older . The measurements selected to create the report are identified with  .
Signature	Sign report.

- 5 Back to the main menu: tap 
or
Back to the measurement menu: tap .

8.2.3 Saved reports

The measurement reports that have been created are stored under **Saved reports**. These can be brought up again, sent or deleted.

- 1 Call up function:  | **Saved reports**.
- The **OI File Manager** folder is opened, and the available reports are displayed.

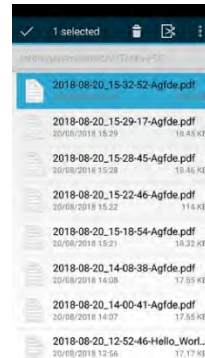
Open report

- 1 Tap required report.
- Report is displayed as a PDF.

Delete report(s)

1 Touch required report for >2 sec.

► Report is marked.



2 If necessary, mark more reports by tapping.

3 Delete report(s): tap .

Send report(s)

1 Touch report for >2 sec.

► Report is marked.

2 If necessary, mark more reports by tapping

3 Tap  symbol.

4 Tap **Send**.

5 Send report by e-mail.

Sort report(s)

1 Tap  symbol.

2 Tap **Settings**.

3 Disable **in ascending order** under sort settings.

► The latest reports are displayed first.

8.2.4 Gas path check

Regular tightness testing of measurement systems (measuring instrument + flue gas probe) is recommended.

- 1 Call up function:  | **Gas path check**
 - ▶ Gas path check starts automatically.
- 2 Place the black sealing cap on the tip of the flue gas probe.
 - ▶ The pump flow is displayed. If the flow rate is less than 0.02 l/min, the gas paths are not leaking, and the measurement is ended.
- 3 Remove the sealing cap from the probe tip.
- 4 Back to the main menu: tap .

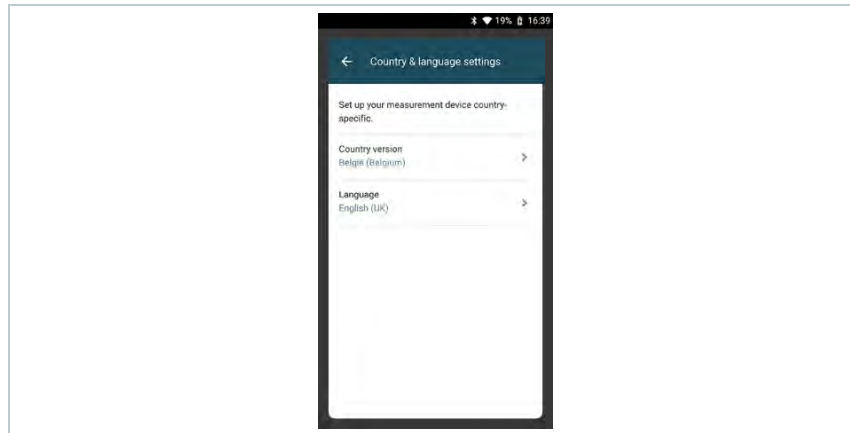
8.2.5 Device settings

8.2.5.1 Country version and language

Set up your measuring instrument country-specifically.

The country version configuration affects the measurement parameters, fuels, fuel parameters and the bases of and formulas for calculations that are enabled. The country version configuration affects the user interface languages that can be enabled.

- 1 Call up function:  | **Device Settings** | **Country and Language**



Set country version

- 1 Tap **Country version (basis of calculations)** selection field.
 - ▶ The available country versions are displayed.
- 2 Select country version.
 - ▶ The query **Change country version?** is displayed.
- 3 Tap **Next**.

 Configuration of the country version can be ended by cancelling. The display goes back to **Device Settings**.

 - ▶ The selected country version is configured (this may take a few minutes). The **Device Settings** menu is then displayed.
 - ▶ Restart the measuring instrument to complete its configuration.

Set language

- ✓ | **Country & language settings** menu
- 1 Tap **Language** selection field.
 - ▶ The available languages for the selected country version are displayed.
 - 2 Select **Language** and tap ← .
 - ▶ The instrument is reconfigured to the selected language.
 - 1 Back to the main menu: tap ← and ↩.

8.2.5.2 Wi-Fi



A radio link, such as a Wi-Fi, is not needed for performing measurements.

Set up a connection to a Wi-Fi router or a Wi-Fi hotspot. The connection allows sending of measurement reports by e-mail.

- 1 Call up function: | **Device Settings** | **Wi-Fi**.
- 2 Tap Wi-Fi selection field.
- 3 Enable Wi-Fi: tap **Off** button or move grey point to the right.
 - ▶ Instrument switches to **On**. The point changes to green.
 - ▶ Display of all available Wi-Fi routers or Wi-Fi hotspots in the vicinity.
- 4 Select Wi-Fi router or Wi-Fi hotspot.
- 5 Tap **Connect**.
- 6 It may be necessary to enter the password for the selected Wi-Fi.
 - ▶ Connection is set up and shown by **Connected**.

Further entries via button

Category	Description
Add network	Enter network name using the keypad, set security standard and if necessary enter further options. Save entry.
Saved networks	Display of saved networks.
Refresh	Updating the display of available networks.
Advanced	Further Wi-Fi settings are displayed.



The Wi-Fi is disabled in standby mode and enabled again once you quit standby mode. The enabling process may take a few seconds.

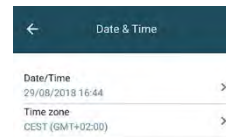
8.2.5.3 Date/Time

You can set the date, time and time zone in the **Date/Time** menu. You can choose between the 24 hr or AM/PM formats for the time.



If the Wi-Fi has already been enabled, the Date/Time provided by the network is automatically set.

- 1 Call up function:  | **Device Settings** | **Date/Time**.



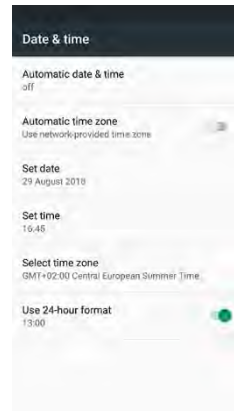
- Various setting options are displayed. Depending on your requirements, you can
- Enable (●) / disable (○) selection fields by tapping
 - Open other selection fields
 - Enter parameters using the keypad
 - Set 24 hr or AM/PM format: 24 hr (●) / AM/PM (○)

- 2 Back to the **Device Settings** menu: Tap  |  | .

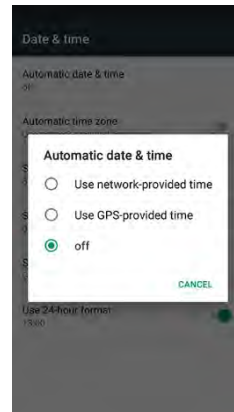
Set Date/Time manually

1 Tap **Date/Time**.

2 Tap **Autom. Date/Time**.



3 Select **Off**.



► **Autom. Date/Time** is disabled. The pop-up window closes automatically.

4 Tap **Set Date**.

5 Select date via the calendar and confirm with **OK**.

- 6 | Tap **Set Time**.
- 7 | Tap hour and set.
- 8 | Tap minute, set and confirm with **OK**.
- 9 | Back to the **Device Settings** menu: tap  |  | .

Set time zone manually

- 1 | Tap **Time Zone**.
- 2 | Tap **Autom. Time Zone** and disable ().
- 3 | Tap **Select time zone**.
- 1 | Select desired time zone.
- 2 | Back to the **Device Settings** menu: tap  |  | .

8.2.5.4 My company address

Enter own company address. This information will be shown on the reports.

- 1 | Call up function:  | **Device Settings** | **My company address**
▶ **Contact information** input screen is opened.
- 2 | Tap the required input field.
▶ Keypad appears.
- 3 | Enter the information via the keypad.
- 4 | Confirm each input with ✓.
- 5 | Back to the **Device Settings** menu: tap .

8.2.5.5 Bluetooth

Enable Bluetooth to print out or transmit measurement data.

- 1 Call up function:  | **Device Settings** | **Bluetooth®**
- 2 Enable/disable **Bluetooth** by tapping the selection field.
- 3 Back to the **Device Settings** menu: Tap .

8.2.5.6 Hotspot

Enable a hotspot to be able to transmit readings to software / industry software.



The interface must also be available in the software / industry software.

- 1 Call up function:  | **Device Settings** | **Hotspot**
- 2 By tapping the selection field, enable ()/disable () **Hotspot**.
- 3 Back to the **Device Settings** menu: tap .

Edit hotspot name and password

- 1 Tap **Hotspot settings**.
- 2 Select **Wi-Fi Hotspot**.
- 3 Tap **Set up Wi-Fi Hotspot**.
- 4 Edit network name and password.
- 5 Tap **Save**.
- 6 Back to the **Device Settings** menu: tap .

8.2.5.7 Display Brightness

- 1 Call up function:  | **Device Settings** | **Display brightness**
- 2 Adjust the display brightness using the slide control.
- 3 Back to the **Device Settings** menu: tap .

8.2.5.8 CO/NO sensor protect

Limit values can be set to protect the CO/NO sensors against overload. Sensor protect is enabled if these are exceeded:

- Fresh air dilution if exceeded (only for instruments with the "Dilution" option)
- Shutdown if exceeded again



When dilution is enabled, the CO and CO undiluted values are displayed in a blue font. A "*" is shown on the printout after the name of both values to indicate dilution.

- 1 Call up function:  | **Device Settings** | **Sensor Protection**
 - ▶ **CO** input screen: **Set Sensor Setting** is opened.
- 2 Enter the alarm limit value via the keypad.
- 3 Confirm input with .



The limit values must be set to 0 ppm to disable sensor protect.

8.2.5.9 O₂ Reference

The O₂ reference value can be set.

- 1 Call up function:  | **Device settings** | **O₂ Reference**
 - ▶ **O₂ Reference** input screen is opened.
- 2 Enter the value via the keypad.
- 3 Confirm input with .
- 4 Tap **[OK]**.

8.2.5.10 Alarm limits

Alarm limits can be set for the **CO Ambient** measurement type. An audible alarm signal is triggered when the alarm limit is reached.

- 1 Call up function:  | **Device Settings** | **Alarm limits**
 - ▶ **Alarm limits** input screen is opened.
- 2 Tap directly on the value in the relevant input field.

- ▶ Keypad appears.
- 3 Enter the value via the keypad.
- 4 Confirm each input with ✓.
- 5 Tap [OK].

8.2.6 Sensor Diagnosis

Overview of the sensors fitted and their condition.

- 1 Call up function:  | **Sensor Diagnosis**

8.2.7 Error List

Call up error reports.

- 1 Call up function:  | **Error List**

8.2.8 Device Information

Call up device information.

- 1 Call up function:  | **Device Information**

8.2.9 Server Information

Information about the available server.

- 1 Call up function:  | **Server Information**

8.2.10 E-mail

Set up e-mail account



An e-mail account must be set up in order to be able to send reports as e-mails. A Wi-Fi connection must be available to set the account up.

- 1 Call up function:  | **E-Mail**
- 2 Enter e-mail address.
- 3 Enter password.
- 4 Set account options, such as synchronization interval

8 Using the product

- 5 | Entry of account name (optional) and name which appears with the sent e-mails.
- ▶ The inbox of the e-mail account is opened.



If the system does not accept the e-mail address and password combination, but you are certain it is correct, check the following possible solutions:

- Open e-mail client, e.g. gmail, on a PC and check e-mail reception. The provider may have sent a security e-mail which has to be confirmed before the e-mail account on the testo 300 is accepted.
- Enable IMAP account
To do this, call up your e-mail account on the PC. You will find the setting for the common e-mail providers, e.g. yahoo, under settings - POP/IMAP. Account-specific information about the enabling of the IMAP account is supplied by the relevant provider. Find out about this from the relevant provider or on the Internet.
- Manual set-up of the e-mail account
 1. Call up function:  | **E-Mail**.
 2. Enter e-mail address.
 3. Select **Manual set-up**.
 4. Select **Personal account type (IMAP)** (recommended).
 5. Enter password.
 6. Enter/change server, port and security type.
This information is e-mail account specific and is supplied by your e-mail account provider. Find out about this from your account provider or on the Internet.
 7. **[Next]**
 8. Enter/change smtp server, port and security type.
This information is e-mail account specific and is supplied by your e-mail account provider. Find out about this from your account provider or on the Internet.
 9. **[Next]**
 10. Set account options, such as synchronization interval.
 11. **[Next]**
 12. Entry of account name (optional) and name which appears with the sent e-mails.
 13. **[Next]**
- ▶ The inbox of the e-mail account is opened.

Call up e-mail account

- 1 | Call up function:  | **E-Mail**
 - ▶ **Inbox** menu is opened.
- 2 | Create e-mail: tap .
 - ▶ **Compose** menu and the keypad is opened.
- 3 | Enter the e-mail address via the keypad.
- 4 | Fill in subject and create text.



If required, additional files can be attached to the e-mail using the paper clip symbol.

- 5 | Send e-mail: tap .
 - ▶ E-mail is sent.

8.2.11 My Apps

Additional applications

- 1 | Call up function:  | **My Apps**
 - ▶ Available Apps are displayed.

Symbol	Name
	Alarm clock
	Gallery
	Browser
	Calendar
	Calculator
	Quick Support

8.2.12 Help

8.2.12.1 Please register your testo 300

1 | Call up function:  | [Help](#) | [Please register your testo 300](#)

Testo would like to offer you the best possible customer service. Register your instrument so that, when you call, our employees in Customer Service have all the information they need available at all times, so that they can quickly provide you with further assistance.

You will find the information you need for registration on the sticker on the back of the instrument.

Follow the instructions on the display.

Registration gives you the following advantages:

- 1 year's additional warranty for free
- Always get the latest information from testo

8.2.12.2 Tutorial

1 | Call up function:  | [Help](#) | [Tutorial](#)

The tutorial provides you with an overview of and an introduction to the operation and functions of the instrument.

8.2.12.3 Setup Wizard

1 | Call up function:  | [Help](#) | [Setup Wizard](#)

2 | The following settings can be made:

Function	Section
Country version and language	8.2.5.2
Wi-Fi	8.2.5.2
Time	8.2.5.3
Contact information	8.2.5.4 (Own company address)
E-Mail	8.2.10
Registration	8.2.11.1 (Device Registration)

3 | [Next >](#)

▶ Setup is complete.

4 | If necessary, tap [start tutorial](#) or [end setup](#).

8.2.12.4 Update via USB

- 1 | Call up function:  | **Help** | **Update via USB**
- 2 | Confirm info with **OK**.
 - ▶ Firmware update is started.
- 3 | Insert the connecting cable (0449 0134) into the USB port on the measuring instrument, then connect it to the PC.
 - ▶ Your PC identifies the measuring instrument as a removable medium.
- 4 | Copy the new instrument software file (t300.zip) to the identified removable medium.
Length of the copying process: approx. 10 – 15 minutes
- 5 | Disconnect the connecting cable from the measuring instrument.
 - ▶ Once the instrument software has been updated (duration approx. 1.5 hrs), the measuring instrument will automatically reboot and is ready for use again.

9 Performing the measurement

9.1 Prepare for measurement

- 1 Check the condensate trap fill level and if necessary empty trap, see Section 10.5 **Empty condensate trap**.
- 2 Check the particle filter of the flue gas probe for contamination and replace it in good time. If necessary, see Section 10.10 **Check/replace particle filter**.

9.2 Zeroing phases

Measuring the combustion air temperature (T_{amb})

If no external combustion air temperature probe is connected, the combustion air temperature is measured via the integrated temperature probe.

Gas zeroing

The gas sensors are automatically zeroed after the instrument is turned on.

**testo 300 without option of probe zeroing in the flue gas:**

The flue gas probe must be in fresh air during the zeroing phase (30 sec)!

testo 300 with option of probe zeroing in the flue gas:

The flue gas probe can be in the flue gas duct during the zeroing phase (30 sec).



Start zeroing of the gas sensors manually:  | [Zeroing Gas Sensors](#)

Draft/pressure zeroing

The pressure sensors are zeroed when a pressure measuring function is called up.

**testo 300 without option of probe zeroing in the flue gas:**

The flue gas probe must be in fresh air during the zeroing phase! The instrument must not be pressurized during zeroing!

testo 300 with option of probe zeroing in the flue gas:

The flue gas probe can be in the flue gas duct during the zeroing phase. The pressure socket of the instrument must be free (depressurized, not closed).

9.3 Carry out gas path check



Regularly check the measurement system (measuring instrument + flue gas probe) for leaks.

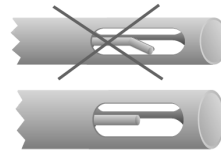
Too high an O₂ value may be an indicator of a leaking measurement system.

> | **Gas path check.**

9.4 Use of flue gas probe

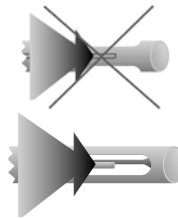
Check thermocouple before use

- > The thermocouple of the flue gas probe must not be touching the probe cage.
Bend the thermocouple back if necessary.



Align flue gas probe

- > The thermocouple must be freely exposed to the flue gas flow.
Align the probe by turning it as required.

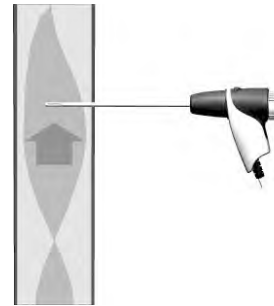


Search for hot spot

- ✓ The tip of the probe is in the hot spot of the flue gas.
- 1 Select **Hot Spot**.
- 2 Start hot spot search: tap .
- 3 Perform zeroing. Please follow the instructions.

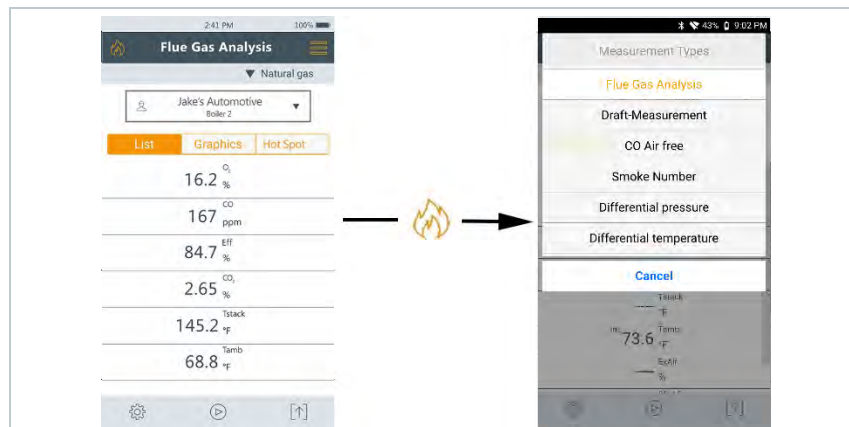
9 Performing the measurement

- 4 Align the flue gas probe in the flue gas duct so that the probe tip is in the hot spot (area of the highest flue gas temperature Max Tstack).



- ▶ Grey value/grey pointer: Display of current flue gas temperature
- ▶ Orange value/orange pointer: Display of maximum flue gas temperature
- > Reset values/pointer:
- 5 End hot spot search: tap

9.5 Overview of measurement types ()



Measurement types

Flue Gas Analysis

Draft

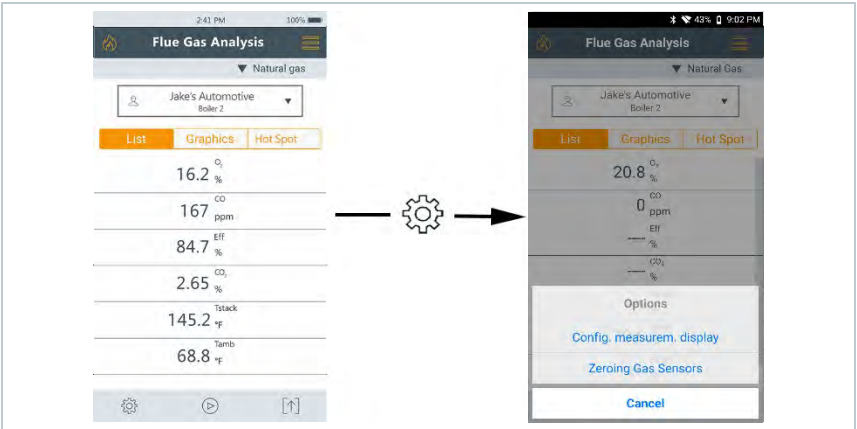
CO Air free

Smoke Number

Differential pressure

Measurement types
Differential temperature
O ₂ Air
Clock Meter
Oil flow calculation
CO Ambient
Pipe Commissioning
Pressure Drop test
Pretest

9.6 Overview of options ()



Options	Description
Config. Measurem. display	Add, delete (), measurement parameters, display sequences () and edit units (click on Unit).
Zeroing Gas Sensors	Manually zeroing gas sensors.  Menu is only available for measurements with gas sensors.

9.6.1 Configure measurement display

1 Call up function:  | **Options** | **Config. measur. Display**

► **Edit Display** menu is opened.

2 Measurement parameter



- **Add:** tap **Add** to open selection list of measurement parameters.
- **Delete:** tap on .
- **Edit unit:** tap on the measurement parameter you want to edit. Tap on the required measurement unit in the selection list that has been opened.
- Change position in the list: Press and hold  and drag to the required position.
- Accept changes: tap **Confirm**.

Selection list (example: Country version USA)

The overview of measurement parameters (available selection depends on the chosen measurement type, fuel set and the sensors available in the measuring instrument):

Display	Measurement parameter
Tstack	Flue gas temperature
Tamb	Combustion air temperature
Tinst.	Instrument temperature
Pump	Pump performance
O2	Oxygen

Display	Measurement parameter
CO ₂	Carbon dioxide
Eff net	Efficiency without consideration of the heat value range
Eff	Efficiency with consideration of the calorific value range
CO	Carbon monoxide
Draft	Flue draft
CO AF	Undiluted carbon monoxide
cCO	Corrected CO for environmental regulation
ExAir	Excess Air
CO amb	Ambient carbon monoxide
ΔT	Differential temperature
Dew Pt	Flue gas dewpoint temperature
Δp	Differential pressure
NO	Nitrogen monoxide
NO _x	Nitrogen oxides
O ₂ ref	Oxygen reference
Smoke 1	
Smoke 2	
Smoke 3	
Smoke number Ø	



Only those measurement parameters and units that are enabled in the reading display appear in the reading display, in the saved measurement tests and on the report printouts.



The settings only apply to the measurement type currently enabled.

9 Performing the measurement

9.6.2 Flue Gas Analysis



To maintain the measuring accuracy of the instrument, the correct fuel must be selected or configured.

Tap ▼ (Fuels)
> Select fuel.

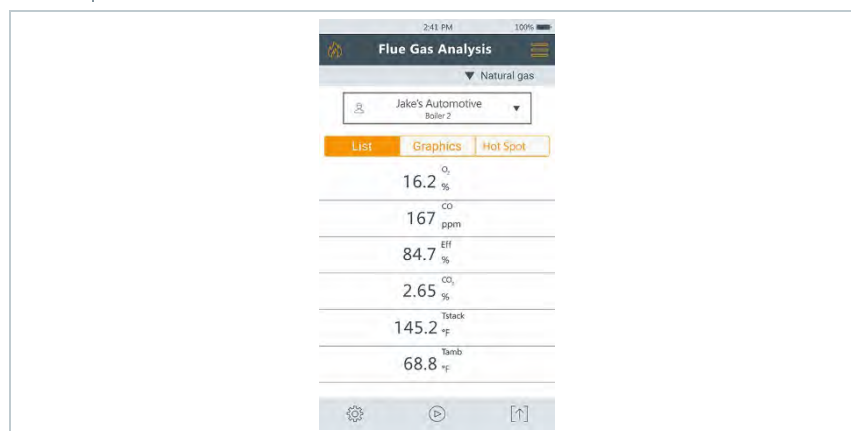


To achieve usable measurement results, the test time of a flue gas measurement should be at least 3 minutes and the measuring instrument should display stable readings.



If a separate **CO Air free** measurement has not yet been performed, this value is calculated using the readings from the flue gas probe and continuously updated.

1 Call up function: | **Flue Gas Analysis**



2 Start measurement: Tap .

- ▶ Zeroing takes place.
- ▶ Readings are displayed.



If the **Draft** measurement parameter is enabled in the reading display, a draft measurement is automatically started in parallel to the flue gas measurement. In the **List** measurement data view, the parallel draft measurement can be stopped/restarted. This draft measurement is performed separately to a measurement of the **Draft** measurement type.



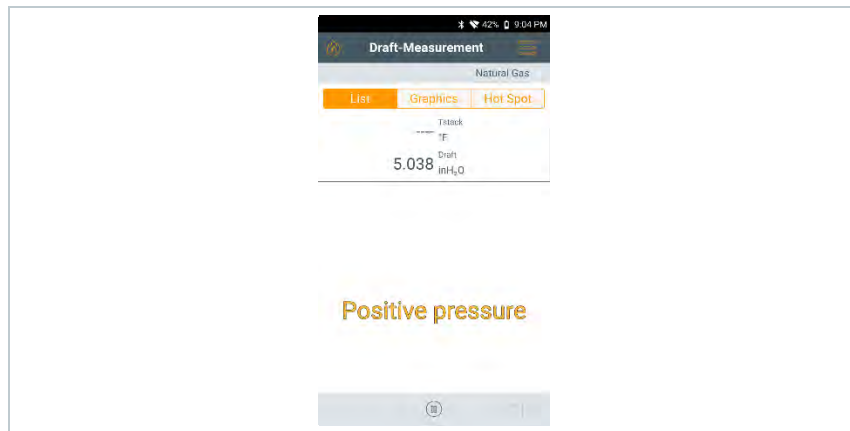
For the draft measurement, the minus connection for differential pressure measurement must be free (ambient pressure, not closed).

- 3 Tap on the draft reading display or next to it.
- 4 End measurement: tap .

9.6.3 Draft-Measurement

- ✓ A flue gas probe must be connected.

- 1 Call up function: | **Draft-Measurement**



The minus connection for differential pressure measurements must be clear (ambient pressure, not closed).

- 2 Start measurement: tap .
- ▶ Zeroing takes place. Please follow the instructions.
- ▶ Reading is displayed.
- 3 End measurement: tap .

9.6.4 CO Air free

- ✓ A multi-hole probe (0554 5762) must be connected.
- 1 Call up function:  | **CO Air free**
- 2 Start measurement: tap .
- ▶ Reading is displayed.
- 3 End measurement: tap .

9.6.5 Smoke Number



The **Smoke Number** and **Oil depos.** parameters are only available for oil fuels. The values calculated by a smoke tester can be entered.

Edit values



All values that can be modified have a dotted underlining.

- 1 Call up function:  | **Smoke Number**
- 2 Tap required value.
- ▶ Keypad appears.
- 3 Enter value.
- 4 Confirm entry: tap ✓.
- 5 Reset readings: tap .

9.6.6 Differential pressure

WARNING

Dangerous mixture of gases!

Danger of explosion!

- Make sure there are no leaks between the sampling point and the measuring instrument.
- Do not smoke or use naked flames during the measurement.

- ✓ The gas pressure kit (0554 1203) must be connected.
- ✓ For an instrument with no dilution option: The minus connection for differential pressure measurement must be depressurized at the start of the measurement (ambient pressure, instrument not connected to system being checked), since the pressure sensor is zeroed.
- 1 Call up function:  | **Differential pressure**
- 2 Tap **Differential pressure**.
- 3 Start measurement: tap .
 - ▶ Zeroing the pressure sensor.
 - ▶ Reading is displayed.
- 4 End measurement: tap .

9.6.7 Differential temperature

- ✓ The differential temperature kit (0554 1208) or two external temperature probes must be connected.
- 1 Call up function:  | **Differential temperature**
- 2 Start measurement: tap .
 - ▶ The readings and the calculated differential temperature ΔT (T1 - T2) are displayed.
- 3 End measurement: tap .

9.6.8 O₂ air (EU regulation)

- ✓ An O₂ dual wall clearance probe (0632 1260) must be connected.
- 1 Call up function:  | O₂ air
- 2 Start measurement: tap .
- ▶ Reading is displayed.
- 4 End measurement: tap .

9.6.9 Clock Meter



The function is only available if the chosen fuel is a gas.

The gas burner capacity is calculated by means of the gas amount consumed. To this end, a gas amount is input, and its consumption read out at the gas meter.

- 1 Call up function:  | Clock Meter
- 2 Set the gas amount to watch for at the gas meter.
- 3 Set the heating value of the burnt gas.
- 4 Start measurement: tap .
- ▶ The test time is displayed.
- 5 When the set gas amount is reached: tap .
- ▶ The calculated gas flow and the gas burner capacity (in BTU/h) are displayed.

Edit values



All values that can be modified have a dotted underlining.

9.6.10 Oil flow calculation



The function is only available if the chosen fuel is an oil.

This function is used to calculate the capacity of the burner from the set oil pressure and the oil flow rate of the oil nozzle.

- 1 | Call up function: | **Oil flow calculation**
- 2 | Set oil flow rate of the oil nozzle and oil pressure.
- ▶ | The calculated oil burner energy is displayed (in BTU/h).

Edit values



All values that can be modified have a dotted underlining.

9.6.11 CO Ambient



- Cigarette smoke influences the measurement by more than 50 ppm. The breath of a smoker influences the measurement by about 5 ppm.
- When using an ambient CO probe, note that:
The direction of flow of the gas influences the accuracy of measurement. Frontal flow onto the sensor leads to higher readings. The best measurement results are achieved when the probe is moved gently backwards and forwards.
- When using the ambient CO probe and the flue gas probe, note that:
The probe must be in the fresh air (CO-free) during the zeroing phase.

- ✓ | An ambient CO probe (0632 1272) must be connected.

- 1 | Call up function: | **CO Ambient**
- 2 | Start measurement: tap .
- ▶ | Reading is displayed.
- 3 | End measurement: tap .

9.6.12 Pipe Commissioning (EU regulation)

The pipe commissioning (using air or inert gas such as CO₂ or N₂) is a tightness test for pipes, including fittings, but without gas appliances and the relevant regulating and safety devices. The pipe commissioning is performed 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.



According to DVGW TRGI 2008 and ÖVGW G10, the stabilization time and test time depend on the pipe volume.

- Pipe volume < 100 l: Adjustment time 10 min, test time 10 min.
- Pipe volume > 100 l to < 200 l: Adjustment time 30 min, test time 20 min.
- Pipe volume > 200 l: Adjustment time 60 min, test time 30 min.

- > Connect the connector plug of the hose pressure connection kit (0554 1203) to the pressure test kit (0554 1213). Insert the pressure adapter into the flue gas socket and lock by slightly turning it clockwise (bayonet fitting).

Performing the measurement

- ✓ The pressure socket of the instrument must be free (depressurized, not closed).
- ✓ Pressure zeroing has been performed.

- 1 Call up function:  | **Pipe Commissioning**

- 2 Set parameters or enter values.



All values that can be modified have a dotted underlining.

- 3 Pressurize the system.



Once the pressure has built up, a stabilization time specified by DVGW-TRGI 2008 should be observed to ensure that any possible pressure fluctuations are not recorded in the measurement as well. The relevant standard provides more detailed information.

- 4 Start stabilization time: tap . If applicable, follow instructions.
- ▶ Reading is displayed.

- ▶ Stabilization time is finished.



End stabilization time early: tap .

- ▶ Measuring time starts.
- ▶ The readings are automatically saved and displayed after the measurement has been completed.
- 5 The measuring value result can be assessed.
- 6 Conclude measurement: tap **Next**.
- 7 If applicable, repeat measurement: tap .

9.6.13 Pressure Drop test (EU regulation)

This measurement is performed to test the serviceability of an existing gas pipe system (in contrast to the load test and pipe commissioning) and is used to check the actual condition of the pipes. The pipe system may be in operation or disused.



Adhere to DVGW-TRGI 2008, worksheet G624!

Absolute pressure (parameter of the measuring location) must be entered to obtain correct readings. If this is not known, it is advisable to use the value 966 hPa (corresponds to 1013 hPa barom. 400 m above sea level).

- > Insert the connector plug of the hose pressure connection kit (0554 1203) into the flue gas socket and lock it in place by turning it slightly clockwise (bayonet fitting).

Performing the measurement

- ✓ The pressure socket of the instrument must be free (depressurized, not closed).
- ▶ Pressure zeroing has been performed.
- 1 Call up function:  | **Pressure Drop test**

9 Performing the measurement

- 2 Set parameters or enter values.



All values that can be modified have a dotted underlining.



Three circle diameters and three pipe lengths can be entered, which are then used to calculate three partial volumes. The pipe volume is calculated by adding these three partial volumes.

- 3 Pressurize the system.

- 4 Start stabilization time: tap . If applicable, follow instructions.

▶ Reading is displayed.

▶ Stabilization time is finished.



End stabilization time early: tap .

- 5 End measurement: tap .

▶ Measuring time starts.

▶ The readings are automatically saved and displayed after the measurement has been completed.

- 6 The measuring value result can be assessed.

- 7 Conclude measurement: tap **Next**.

- 8 If applicable, repeat measurement: tap .

9.6.14 Pretest (EU regulation)

- > Insert the connector plug of the hose connection kit (0554 1203) into the flue gas socket and lock it in place by turning it slightly clockwise (bayonet fitting).

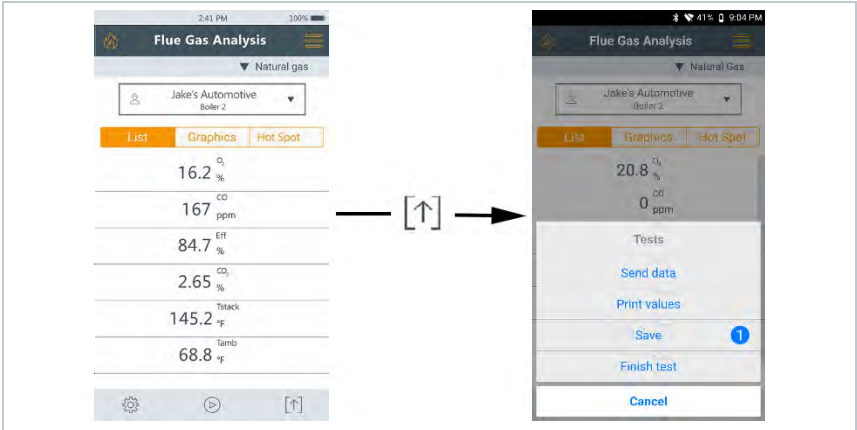
Performing the measurement

- ✓ The pressure socket of the instrument must be free (depressurized, not closed).
- ✓ Pressure zeroing has been performed.
- 1 Call up function:  | **Pretest**
- 2 Set parameters or enter values.

 All values that can be modified have a dotted underlining.
- 3 Start stabilization time: tap . If applicable, follow instructions.
 - ▶ Reading is displayed.
 - ▶ Stabilization time is finished.

 End stabilization time early: tap .
 - ▶ Measuring time starts.
 - ▶ The readings are automatically saved and displayed after the measurement has been completed.
- 4 The measuring value result can be assessed.
- 5 Conclude measurement: tap **Next**.
- 6 If applicable, repeat measurement: tap .

9.7 Overview of tests ([↑])



Tests	Feature
Print values	Print out measuring values via Bluetooth®.
Save	Save measuring values, including selected customers / measuring sites. Saved measuring values can be retrieved in the main menu.
Finish test	Create, save and send measurement report, including - Own company data - Format and print - Customer data - Comments and pictures - Select measurements - Signature Saved reports can be retrieved in the main menu.

9.7.1 Print values

The current readings are printed via a Bluetooth® printer (accessories: Testo printer 0554 0621).

Carry out print text settings

Print text settings can be performed and the reading printout can be supplemented with individual creator information (header: company address; footer: name of technician), see Section 8.2.5.4 **My company address**.

Print current readings

- ✓ The printer is turned on and within wireless range.
- 1 Tap .
- ▶ Tests menu is opened.
- 2 Tap **Print values**.
- ▶ The test is created and sent to the printer.
- ▶ The test is printed.

9.7.2 Save

The measurement data from the last measurement performed of each measurement type are saved on the measuring instrument.

Measurements that have been performed can be saved to back up the measurement data and for the subsequent creation of a report:

- 1 Tap .
- ▶ Tests menu is opened.
- 2 Tap **Save**.
- ▶ The measurement test is saved.



Only saved readings can be further processed at a later stage for a report.



The readings are automatically saved for the following measurement types:

- Pipe Commissioning
- Pressure Drop test
- Pretest

9.7.3 Finish test

- 1 Tap .
- ▶ Tests menu is opened.

9 Performing the measurement

2 Tap **Finish test**.

► Options for **Tests** are opened.

3 Enter/select log data:

Category	Description
Format and print	Select output format(s): - CSV (comma separated text file, e.g. for Microsoft® Excel), - PDF - ZIV (XML file, complying with the regulations of the 'Federal Association of Chimney Sweeps in Germany').
Customer data	Enter contact details
Comments and pictures	Enter comments and add pictures.
Select measurements	All saved measurements are displayed in one of the following time categories, depending on the creation date: Today, Yesterday or Older. The measurements selected to create the report are identified with . Recently saved measurements for these customers are automatically identified. To display saved readings to check them: ➤ . To delete individual measurement: ➤ . To delete all measurements of a time category: ➤ Tap  next to the time category name. To select/deselect a measurement for the report: ➤ .
Signature	Tap Sign Report and sign. Options: Abort , Reset and Save

4

Print values: tap .

To save readings: tap .

Save and send report: tap .

10 Maintenance

10.1 Service



Testo recommends an annual check of the testo 300 which can be performed by a service center authorized by Testo. Please contact

10.2 Calibration



The measuring instrument is supplied with a calibration protocol as standard. Testo recommends calibration of the measuring instrument once every 12 months. This can be performed by Testo or another certified service center. Please contact

10.3 Check instrument status

10.3.1 Sensor diagnosis

The status of the sensors can be displayed.

To replace expended sensors, see Section "Replace sensors".

Call up function: | **Sensor Diagnosis**

- ▶ Sensor diagnosis is displayed.



A sensor can recover. It is therefore possible for the sensor status display to change from **not OK** to **OK**.

10.3.2 Error list

Instrument errors that have not yet been cleared can be displayed.

Call up function: | **Error list**

- ▶ Error list is displayed if there are errors present.

10.4 Clean the measuring instrument

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



Use distilled water, or alternatively mild solvents, such as isopropanol, to clean the flue gas analyzer.

⚠ CAUTION

Improper use of isopropanol!

Irritation of the eyes and sensitive mucous membranes! Fumes have a slight narcotic effect!

- If using isopropanol, please refer to the instruction leaflet for the product.
- When using it, please ensure that there is adequate ventilation.

ATTENTION

Leaking solvents and degreasers!

Damage to the instrument and sensors!

- Do not store solvents and degreasers, such as isopropanol, in the case.

ATTENTION

Strong or harsh alcohol or brake cleaner!

Damage to the instrument!

- Do not use any strong or harsh alcohol or brake cleaner.

10.5 Drain condensate trap

The fill level of the condensate trap can be read from the markings. Hold the instrument horizontally or vertically to check the fill level.



⚠ CAUTION

Weak mix of acids in the condensate!

Minor injuries!

- Avoid skin contact.
- Make sure that the condensate does not run over the housing.

⚠ CAUTION

Condensate entering the gas path!

Damage to sensors and flue gas pump!

- Do not empty condensate trap while the flue gas pump is in operation.

- 1 Open the condensate outlet on the condensate trap.



- 2 Let the condensate drain out.



- 3 - Wipe off any drops still on the condensate outlet with a cloth and close the condensate outlet.



The condensate outlet must be completely closed, otherwise incorrect measurements could occur due to infiltration of external air.

10.6 Open the measuring instrument

Only open the measuring instrument when this is required for maintenance purposes (replacing gas sensors).

- ✓ The measuring instrument must not be connected to a mains socket via the mains unit. The measuring instrument must be turned off.



When opening/assembling the instrument, take care not to lose any screws that have been removed. It is advisable to place a cloth on the work surface.

- 1 Place the instrument on its front so that the back is facing upwards.
- 2 Using a torx screwdriver (size T 10), remove both housing screws on the top of the instrument.



ATTENTION

The instrument may be damaged by incorrect removal of the housing screws!

- Only remove the two housing screws on the top of the instrument. The other four screws must be left as they are.

- 3 Unlock the operating module in the direction of the arrow.



- 4 Remove the operating module.

- 5 Place the instrument on its front again.
- 6 Remove the remaining four screws on the back of the instrument.
- 7 Lift off the back of the instrument.



Assembly



Perform in reverse order to assemble. Please note:

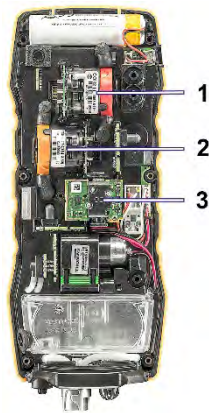
- Lay hoses and lines in the guides intended for this purpose.
- Make sure that hoses and lines do not get jammed.

10.7 Replace sensors



A slot bridge (0192 1552) must be inserted in slots which are not equipped with a sensor. Used sensors must be disposed of according to local regulations!

Available slots:



1	NO sensor type	3	O2 sensor type
2	CO sensor type		

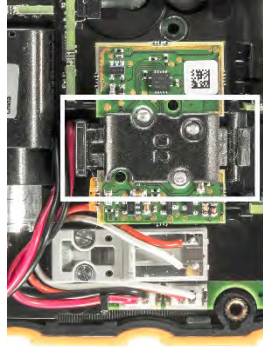


When retrofitting a sensor, the associated measurement parameter/unit must be enabled in the reading display.

10.7.1 Replace O2 sensor

- ✓ Measuring instrument is open, see Section **Open measuring instrument**.

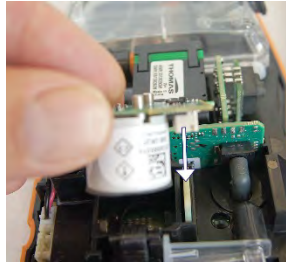
- 1 Unlock retaining bracket and open out.



- 2 Remove faulty sensor from the slot.

- 3 Insert new sensor in the slot.

 Make sure that the socket on the sensor circuit board is correctly connected to the contact plug.



- 4 Close the retaining bracket with an audible "click".

- 5 Close the measuring instrument.



After replacing an O2 sensor, wait for an acclimatization time of 15 min to elapse before using the instrument.



When replacing an O2 sensor and when there is an interruption of the power supply for more than 10 hours, we recommend an acclimatization time of 1 hour for compliance with measuring accuracy.

10.7.2 Change CO, CO H2 and NO sensor

- ✓ Measuring instrument is open, see Section **Open measuring instrument**.

- 1 Remove faulty sensor and hose connections from the slot.



- 2 Remove hose connections from the faulty sensor/bridge.



For NO sensor: Remove auxiliary circuit board.
Do not remove the auxiliary circuit board of the NO sensor until immediately before installation. Do not leave the sensor without auxiliary circuit board for longer than 15 minutes.

- 3 Fit the hose connections onto the new sensor.
- 4 Fit new sensor into the slot and at the same time fit the hose connections onto the gas path connections.



Make sure that the socket on the sensor circuit board is correctly connected to the contact plug.

- 5 Close the measuring instrument.

10.8 Clean modular flue gas probe

- ✓ Disconnect flue gas probe from the measuring instrument.
- 1 Release probe catch by pressing the key on the probe handle and remove probe module.
- 2 Blow compressed air through flue gas ducts of the probe module and probe handle (see illustration). Do not use a brush!
- 3 Fit probe module onto the probe handle and click into place.



10.9 Replace the probe module

- ✓ Disconnect the flue gas probe from the measuring instrument.
- 1 Press the key on the top of the probe handle and remove the probe module.
- 2 Fit new probe module and click into place.



10.10 Check/replace particle filter

Check particle filter

- Particle filters of the modular flue gas probe must be checked regularly for contamination: check visually by looking through the window of the filter chamber.
- If there is visible contamination or inadequate pump flow, replace the filter.

Replace particle filter



The filter chamber may contain condensate. This is not a malfunction and will not cause incorrect readings.

- 1 Open filter chamber: turn slightly counter-clockwise.



- 2 Remove filter chamber.



- 3 Remove filter plate and replace it with a new one (0554 3385).



- 4 Attach the filter chamber and lock it: turn slightly clockwise.



10.11 Replace thermocouple

- 1 Release probe catch by pressing the key on the probe handle and remove probe module.
- 2 Remove thermocouple plug-in head from the socket using a screwdriver and pull thermocouple out of the probe shaft.
- 3 Insert new thermocouple into the probe shaft until the plug-in head clicks into place.
- 4 Fit probe module onto the probe handle and click into place.



11 Technical data

Feature	Value
Temperature measuring instrument	-40 to +2192°F
Draft measurement	-4.01 to +16.06 inH ₂ O
Pressure measurement	-40.15 to 80.29 inH ₂ O
O ₂ measurement	0 to 21 vol. %
CO measurement	0 to 4000 ppm
Option: CO measurement (H ₂ -compensated)	0 to 8000 ppm
Option: CO measurement with activated fresh air dilution/measuring range extension	0 to 15000 ppm
Option: CO measurement (H ₂ -compensated) with activated fresh air dilution/measuring range extension	0 to 30000 ppm
NO measurement	0 to 3000 ppm
Efficiency testing (Eta)	0 to 120%
Flue gas losses	0 to 99.9%
CO ₂ determination (calculation from O ₂)	Display range 0 to CO ₂ max.
Ambient CO measurement (internal/flue gas probe)	0 to 2000 ppm
Ambient CO measurement (external with CO probe)	0 to 500 ppm
Lifetime O ₂ -sensor	up to 72 months, depending on the load
Lifetime CO-sensor	up to 72 months, depending on the load
Lifetime NO-sensor	up to 72 months, depending on the load

General technical data

Feature	Value
Storage temperature	-4 to +122°F
Operating temperature	23 to +113°F
Charging temperature	32 to +113°F
Energy storage unit	3.6 V/3.5 Ah
Mains unit	5 V / 1 A
Humidity application range	15 to 90% RH, non-condensing

Feature	Value
Power supply	Energy storage unit, USB mains unit
Energy storage unit service life	10 hrs
Lifetime energy storage	> 1000 charging cycles
Protection class	IP 40
Memory	1 million measuring values
Display	5.0" touch display, HD 1280x720 pixels
Weight	Approx. 800 g
Dimensions	L: 9.6 inch (including probe connection) H: 2.3 inch W: 3.86 inch
Certification	TÜV-tested according to 1st German Federal Immission Control Ordinance (BImSchV) EN 50379, Parts 1-3