

testo 308 · Smoke tester

Instruction manual





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2 Safety and the environment

2.1. About this document

Use

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

Symbols and writing standards

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

2.2. Ensure safety

- > Only operate the product properly, for its intended purpose and within the parameters specified in the technical data. Do not use any force.
- > After the final measurement, allow probes and probe shafts to cool down sufficiently in order to avoid burns from the hot sensor tip or the probe shaft.
- > Do not store the product together with solvents. Do not use any desiccants.
- > Carry out only the maintenance and repair work on this instrument that is described in the documentation. Follow the prescribed steps exactly. Use only original spare parts from Testo.
- > Improper use of the rechargeable battery can lead to destruction or injuries by means of current surges, fire or escaping chemicals. The following instructions must be observed to avoid such hazards:
 - Only use in accordance with the directions in the instruction manual.
 - Do not short, take apart or modify.
 - Do not expose to heavy impacts, water, fire or temperatures above 60 °C.
 - Do not store in the proximity of metal objects.
 - Do not use leaky or damaged rechargeable batteries. In the event of contact with battery acid: Thoroughly wash affected area with water and consult a doctor, if necessary.
 - Only charge in the measuring instrument or the recommended charging station.
 - Immediately stop the charging process if this is not completed in the given time.
 - In the event of improper function or signs of overheating, immediately remove the rechargeable battery from the measuring instrument/charging station. Caution: Rechargeable battery may be hot!

2.3. Protecting the environment

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

3 Specifications

3.1. Use

Functions and use

The digital smoke tester is a hand-held instrument for determining the smoke number of oil firing installations.

These systems can be monitored using the testo 308 and checked for compliance with the applicable limit values.

The measuring instrument is approved for measurements under the First Federal Immission Control Ordinance (1. BImSchV, German ordinance).

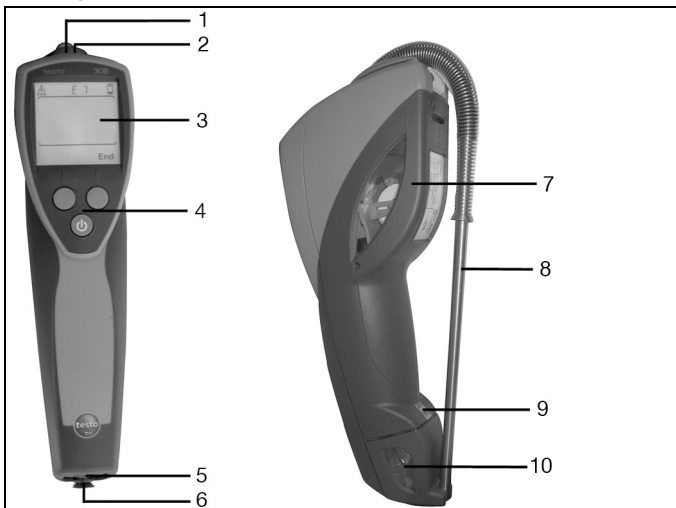
3.2. Technical data

| Characteristic | Values |
|-------------------------------|---|
| Sensor | Photodiode |
| Measuring range | 0 - 6 smoke number |
| Resolution | 0.1 smoke number |
| Accuracy | ±0.2 smoke number |
| Test sample volume | 1.63 ± 0.1 reference litre (990 mbar, 20 °C / 68°F) |
| Storage/transport temperature | -20 to 50°C / -4 to 122°F |
| Operating temperature | 5 to 45°C / 41 to 113°F |
| Rechargeable battery | Lithium ion, 2600mAh / 3.7V |
| Battery operation time | 45 individual measurements |
| Protection class | IP 40 |
| Interfaces | IR, IRDA, optional: Bluetooth (0632 0309) |
| Dimensions | 270 x 63 x 120 mm / 10.63 x 2.48 x 4.73" |
| Weight | 600g / 1.33lb (including battery) |

| Characteristic | Values |
|-----------------------|--|
| Warranty | 2 years, warranty conditions: See guarantee card |
| EU Directive | 2004/108/EC |
| Standards/Tests | 1st Federal Immission Control Ordinance (German ordinance) |

4 Product description







Display and control elements



- 1 IR/IrDA interface
- 2 Gas outlet
- 3 Display. Instrument status icons:

| Icon | Significance |
|------|---|
| | Error message |
| | Data exchange possible |
| | Printing |
| | Meter running |
| | Configuration menu opened |
| | Battery capacity: > 75 %/> 50 %/> 25 %/< 10 % |

4 Control keys:

| Key | Function |
|---|--|
|  | Switching the instrument on/off |
| Left function key: | Function changes depending on the instrument status: |
| [Start] | Begin smoke measurement |
| [Ok] | Accept setting/reading |
|  [] | Oil derivative present |
| [set] | Open configuration menu |
| Right function key: | Function changes depending on the instrument status: |
|  [] | Begin leakage test |
| [No] | Cancel selection |
|  [] | Change selection |
| [End] | End measurement, back to measurement menu |
|  [] | Start printout |
|  [] | No oil derivative present |

- 5 Mains socket
- 6 Condensate outlet
- 7 Service lid: Access to filter paper, battery
- 8 Probe shaft
- 9 Eyelet for wrist strap
- 10 Condensate trap

5 First steps

5.1. Charging the battery

Fully charge the rechargeable battery before using the instrument.


The rechargeable battery can only be charged at an ambient temperature of 0 to 35°C / 32 to 95°F. If the rechargeable battery pack has discharged completely, the charging time at room temperature is approx. 8-9 hrs.



Rechargeable battery care:

- If possible, always discharge the rechargeable battery and recharge it fully.
 - Do not store a discharged battery for an extended period, fully charge before renewed use.
 - Best storage conditions: 50-80 % residual capacity, 10 to 20°C / 50 to 68°F ambient temperature.
-

It is not possible to charge batteries in the instrument when switched on.

- > Switch the instrument off before charging the battery.
1. Insert the instrument plug of the mains unit into the mains socket on the instrument.
 2. Insert the mains plug of the mains unit into a mains socket.
 - The charging process will start. The battery symbol illuminates with a variable number of segments. The charging process stops automatically and  illuminates when the battery is charged.

Alternatively, the battery can be charged in a charger (accessory, 0554 1103).

- > Refer to the documentation that comes with the charger for this.

5.2. Connecting the mains unit

If the mains unit is connected, the instrument is powered automatically via the mains unit. It is not possible to charge the battery in the instrument during operation.

i Even when running from the mains supply, a battery must be inserted in the instrument.

1. Insert the instrument plug of the mains unit 0554 1096 into the mains socket on the instrument.
2. Insert the mains plug of the mains unit into a mains socket.
 - If the instrument is switched off, the battery charging process begins automatically. By switching the instrument on, the battery charging process is stopped and the instrument is then powered via the mains unit.


5.3. Switching the instrument on/off

Switch the instrument on


i If the service lid is not locked, incorrect measurements will result:

- > Check that the service lid is locked before switching on the instrument.
-

Testo recommends performing a leakage test before every measurement:

- > To do so, close the probe shaft before switching on the instrument.
1. Press and hold  until a message appears in the display.
 - A segment test is performed: All display segments illuminate for 2 sec.
 - Finally, the firmware version is displayed for 2 sec and the left function key is assigned the **set** function.


During this time, you have the following options:

- > Open configuration menu: Press **[set]**.
 - The configuration menu is opened, see Performing settings Page 15.
- > Begin leakage test: Press .
 - The leakage test is started, see Performing the leakage test Page 15.

- When initially switching on the instrument, the configuration menu is opened automatically:
 - > Perform the basic settings, see Performing settings Page 15.
- If no function key is pressed, the instrument changes to measurement view, see Measuring Page 16.

Switch the instrument off

- i** With the instrument switched on, the filter paper heating is automatically activated. This reduces the operating time of the rechargeable battery.
 - > Switch the instrument off if you are not performing a measurement.
-

- The measurement view is opened.
 - > Press and hold  until the display goes out or the rinsing phase begins.
 - If a measurement was performed since the instrument was last switched on, a rinsing phase begins (length: 20 sec).
-


- i** The rinsing phase can be manually interrupted:
 - > Press **[End]**.
-

- The instrument switches off automatically.
-




- i** The instrument has an automatic switch-off function. 10 minutes after the last button was pressed, the instrument switches itself off to protect the rechargeable battery.
-





6 Using the product

6.1. Performing the leakage test

- The leakage test was started, see Switching the instrument on/off Page 13.
- **Test** lights up and the smoke tester is running. Air is sucked in for max. 30 seconds. For this time period, the probe shaft must remain closed.
- If the instrument is leak-tight, **Test OK** lights up before the 30 seconds elapse.
 - > Press **[End]** to switch to measurement view.
- If the instrument is leaky,  lights up:
 - > Check whether the service lid is locked correctly.
 - > Check whether the condensate trap is correctly inserted and closed.
 - > Repeat the leakage test: Press **[Start]**.
 - > Contact your dealer or Testo Customer Service if you receive another error message.

6.2. Performing settings

- The configuration menu was opened, see Switching the instrument on/off Page 13.
 -  flashes. You can set whether the oil derivative prompt (Oil derivative yes/no?) should appear after a smoke number measurement.
When the oil derivative prompt is switched on, the paper is transported forward after the measurement so that the measurement spot is visible. When the oil derivative prompt is switched off, the paper is not transported.
1. Press **[OK]** to switch on the oil derivative prompt or **[no]** to switch off the prompt.
-  (Prompt switched on) or  (Prompt switched off) is shown for 2 seconds.
 - **1** or **3** flashes. You can set whether the smoke number measurement should occur via an individual measurement or as the average of three measurements.

2. Press [**↑**] to set the measuring method:
 - **1 Test**: Individual measurement.
 - **3 Tests**: Average of three measurements.
3. Press [**OK**].
 - **1 Test** (individual measurement) or **3 Tests** (average) is shown for 2 seconds.
 -  **545** or  **547** flashes. The printer type that is used can be set.
4. Press [**↑**] to select the printer used:
 - **545**: Testo protocol printer (IR) 0554 0545.
 - **547**: Testo protocol printer (IrDA) 0554 0547.
5. Press [**OK**].
 -  **545** (IR printer) or  **547** (IrDA printer) is shown for 2 seconds.
 - The firmware version, the selected measuring method and the selected setting of the oil derivative prompt are shown for 3 seconds.
 - The instrument switches to measurement view.





6.3. Measuring

- > Check the fill level of the condensate trap. Empty this if the **max.** marking is exceeded, see Emptying the condensate trap Page 19.
 - > Check the particle filter for signs of contamination. Change the filter if it is contaminated, see Replacing the particle filter Page 23.
 - > Check whether there is enough filter paper in the instrument (viewing window of the service lid). Replace the filter paper if it is insufficient, see Changing the filter paper page 21.
1. Position the tip of the probe shaft in the centre of the flow (area with the highest flue gas temperature).
 2. Press [**Start**].
 - The measurement begins, the smoke tester is running. The elapsed measurement period is displayed.



A measurement can be interrupted early:

- > Press [**End**].
-

- The smoke tester automatically stops as soon as 1.63 reference litres of flue gas have been sucked in.
 - The evaluation of the blackening mark created on the filter paper is performed.
 - The detected smoke number is shown.
3. Press **[OK]** to accept the value or **[no]** to delete the value.
- If the **3 Tests** measuring method is set, the next measurement can begin:
 - > Repeat steps 2 to 3 for the second and third measurement.
 - If the oil derivative prompt is switched on, the result of the oil derivative determination can be entered after the measurement:
 - : Oil derivative present.
 - : No oil derivative present
 - > Press **[]** or **[]**.
 - The detected smoke number (value of the individual measurement or average from three measurements) is shown. The entry of the oil derivative prompt is also shown (if performed).
 - > To tear off the filter paper strip issued from the instrument: Grip the paper just above the paper outlet and pull sideways.



Caution! Damage to the instrument.




- > Do not pull the filter paper out of the instrument when the service lid is closed.
- > Only pull the paper sideways in order to tear it off.



Caution! Risk of burns due to hot probe shaft.

- > Allow the probe shaft to cool down after a measurement before touching it or placing it in the transport packaging.
-


6.4. Printing the measurement results

- A measurement was performed and the right function key is assigned the  function.
- > Press .
- The data is sent to the protocol printer.  lights up during the data transfer.

6.5. Transferring the measurement results

i Data transfer is presently possible to the following instruments:

- testo 327 with Firmware version from 1.07
 - testo 330 with Firmware version from 1.33
 - testo 335 with Firmware version from 1.23
-

- A measurement was performed and  lights up.
- > Request the data from another Testo measuring instrument with the testo 308. Please refer to the documentation for the respective Testo measuring instrument for this.
- The data transfer takes place by Bluetooth, as long as both instruments have this interface. Otherwise the data transfer takes place via the IrDA interface.

7 Maintaining the product

7.1. Emptying the condensate trap



Caution! Damage to the smoke tester by means of condensate entering the gas path.

- > Do not empty the condensate trap with the smoke tester running.



The condensate consists of a weak mix of acids:

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

1. Hold the instrument in such a way that the condensate outlet points upwards.
2. Pull out the sealing plug of the condensate outlet approx. 5 mm to the stop (1).



3. Empty the condensate into a sink.
4. Wipe off any remaining drops at the condensate outlet using a cloth.
5. Close the condensate outlet with the sealing plug.



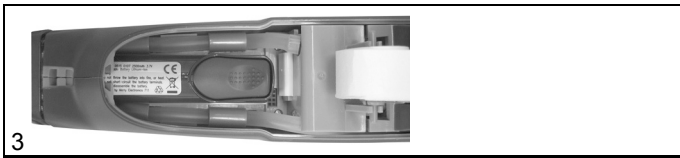
- > Ensure that the condensate outlet is fully closed, as otherwise incorrect measurements may occur due to external air entering.

7.2. Changing the battery

1. Isolate the instrument from the mains and switch it off before changing the rechargeable battery.
2. Open the lock of the service lid (1).
3. Open the service lid and remove it from the instrument (2).



4. Open the battery lock by pressing the grey button and simultaneously pushing in the direction of the arrow (3).



5. Remove the rechargeable battery from the instrument and insert a new battery. Only use the Testo rechargeable battery 0515 0107!
6. Close the battery lock by pressing the grey button and simultaneously pushing opposite the direction of the arrow until the battery engages.
7. Insert the service lid in the retaining hinge and close it.
8. Close the lock of the service lid.

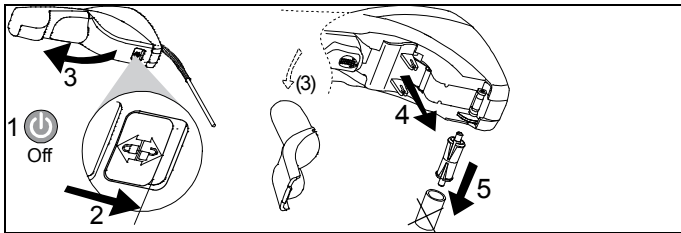
7.3. Changing the filter paper



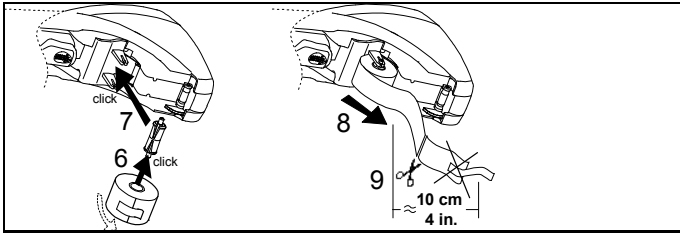
Caution! Damage to or contamination of the measuring lens.

- > Keep the paper rolls free of contamination, as this could potentially be transmitted to the measuring lens.
- > Do not touch the protection glass of the measuring lens.

1. Isolate the instrument from the mains and switch it off before changing the filter paper (1).
2. Open the lock of the service lid (2).
3. Open the service lid (3) and remove it from the instrument.
4. Pull the winder out of the bracket (4).
5. Remove the plastic sleeve of the spent paper roll from the winder and dispose of this (5).




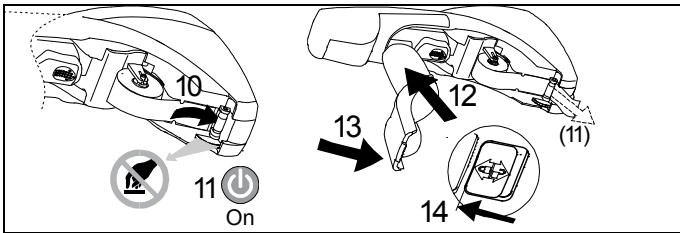
6. Slide a new paper roll onto the winder (6).
7. Align the paper roll as shown below (6) and fasten the winder in the bracket (7).
8. Detach the adhesive strip from the paper roll and unwind approx. 10 cm of paper from the roll (8).
9. Cut off the unwound paper and dispose of this (9).



Caution! Damage to the gear wheel for paper transport.

- > Do not turn the gear wheel for paper transport.

10. Slide through the end of the paper strip, under the guide tabs on the side, until it lies underneath the draw roll (10).
11. Press .
- The instrument is switched on and the automatic paper feed pushes out the paper underneath the draw roll.
12. Insert the service lid in the retaining hinge (12) and close it (13).
13. Close the lock of the service lid (14).



Caution! Damage to the instrument.

- > Do not pull the filter paper out of the instrument when the service lid is closed.
- > Only pull the paper sideways in order to tear it off.

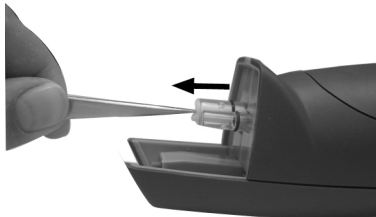
7.4. Replacing the particle filter

1. Isolate the instrument from the mains and switch it off before changing the particle filter.
2. Disconnect the instrument plug of a connected mains unit from the instrument.
3. Remove the condensate trap from the instrument (1).



1

4. Remove the spent particle filter from the plastic sleeve (2) and insert a new filter.



2

5. Place the condensate trap on the instrument again.



7.5. Cleaning the instrument

Housing

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

Do not use any aggressive cleaning agents or solvents! Weak household cleaning agents and soap suds may be used.

Protecting glass of the measuring lens



Caution! Danger of breaking the protecting glass of the measuring lens!

- > When cleaning, only exert light pressure on the protecting glass.
-

- > If contaminated, clean the protecting glass of the measuring lens with a damp cloth that is not too moist.








Do not use any aggressive cleaning agents or solvents! Weak household cleaning agents and soap suds may be used.

7.6. Calibration

In order to guarantee measurement accuracy, we recommend having the instrument calibrated once a year. Please contact your dealer or Testo customer service. For contact details see Service information page 27 or in the internet at: www.testo.com

8 Tips and assistance

8.1. Questions and answers

| Question | Possible causes/solutions |
|---|---|
| uu lights up | <p>The measured smoke number is less than 0. The filter paper was contaminated before the measurement.</p> <p>> Repeat the measurement.</p> |
|  and E1 or E2 light up | <p>The measured smoke number is above the permissible range:</p> <p>> Check the blackening mark and set the system as needed. Repeat the measurement.</p> <p>The gas path is blocked:</p> <p>> Check the probe shaft for foreign matter and repeat the measurement.</p> |
|  and E4 light up | <p>The instrument temperature is outside the permissible range:</p> <p>> Let the instrument warm up or cool down.</p> |
|  and E3 light up | <p>A measurement error has occurred because the service lid is not correctly locked, the condensate trap is not correctly inserted / closed, or there is no filter paper in the instrument:</p> <p>> Eliminate the cause of the error and repeat the measurement.</p> |
|  and E7 light up | <p>A mechanical error has occurred:</p> <p>> Confirm the error message with [End] and repeat the measurement.</p> |
|  and E41 to E49 light up | <p>A serious error has occurred:</p> <p>> Contact your dealer or Testo Customer Service.</p> |
|  and  flash | <p>Recharging the battery is impossible:</p> <p>> Check the contact of the battery.</p> |

If we could not answer your question or the solutions given during troubleshooting did not help: please contact your dealer or Testo Customer Service. For contact data, see Service information page 27 or look up our website: www.testo.com

8.2. Accessories and spare parts

| Description | Article no. |
|------------------------------|--------------------|
| Mains unit | 0554 1096 |
| Smoke tester bracket | 0554 0616 |
| Rechargeable battery charger | 0554 1103 |
| Spare rechargeable battery | 0515 0107 |
| Spare filter paper (8 rolls) | 0554 0146 |
| Spare particle filter | 0554 1101 |
| Acetone dispenser | 0554 0159 |
| Cone | 0554 9010 |
| Case | 0516 0002 |

8.3. Service information

Contact details Service

Testo AG

Kundendienst

Kolumban-Kayser-Str. 17, D-79853 Lenzkirch

Service hotline: Tel.: +49-7653-681-620

Service hours: Mo. - Th.: 07:00 19:00

Fr.: 07.00 - 17:30 (excluding holidays)

Contact details Head office

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