testo 325-1

Instruction manual

en

Now independently tested & certified to
British Standard for Flue Gas Analysers
Certificate Number PT 01 Y 8013

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Testo worldwide. . . .

Introduction

Dear Customer

You have made the right decision by choosing the testo 325 flue gas analyser. Thousands of customers buy our high standard products every year. There are at least 7 good reasons for doing so:

1) Cost - performance ratio. Reliable quality at a fair price.
2) Extended warranty times of up to 3 years - depending on instrument.
3) We have the ideal solutions for your measuring tasks based on our expert experience gained over 40 years.
4) Our high quality standard is confirmed by the ISO 9001 certificate.
5) Of course, our instruments carry the CE symbol required by the EU.
6) Calibration certificates for all relevant parameters. Seminars, advice and calibration on location.
7) Our after-sales service. Ask for more details.

TÜV By RgG 188

Warnings

Operation via plug-in mains unit
The original mains unit should be used when operating the analyser. Due to the possible hazards of electrical shock do not connect to the power supply or operate the instrument with any protective covers removed.

Tightness
The complete measuring system (probe, condensate trap, hoses and plug-in connections) must be checked for tightness e.g. by attaching a rubber bladder, which has been pressed together, on the probe tip. Measurements may be inaccurate if additional air is drawn in.

Gas outlet
When measuring ensure that the gas outlet in the analyser is free of any obstacles so that the gas can escape unhindered. If this is not the case the results measured may be incorrect.

Condensate trap
Empty the condensate trap once maximum levels have been reached. The pump has to be switched off (the measurement cells are at risk otherwise)!

Measurement cells
There is a low level of concentrated acid (CO sensor) or alkaline solution (O2 sensor) in the measurement cells. Please dispose of these measurement cells carefully.

Analyser
Storage of the analysers in rooms containing solvents, vapours or gases will damage the measurement cells e.g. cleaning fluids, polishes, paints, cooking operations etc.

Manual
This manual should be regarded as part of the **testo 325** analyser and it should be kept as part of the product, for the life of the product. Any amendments received must be incorporated into the text, and the manual should be passed onto any subsequent user of the instrument.

Continuous use of the product
The **testo 325** flue gas analyser is not designed for continuous use or for use as a safety alarm.

Damp or explosive environments
This instrument is not designed to operate while wet, in an environment of condensing humidity or in the presence of flammable gases or vapours.

Appliance hazard
When using the **testo 325** flue gas analyser, a visual inspection of the heating appliance is recommended to ensure its safe operation.

Analyser conforms with EN 50 082-1, EN 55 081-1

Initial operation

Power supply

Standard rechargeable batteries or batteries

- Use standard rechargeable battery type (1.5V IEC KR 15/51 corresponding to type AA) or battery type (1.5V AA size alkaline IEC LR6 •AA•) (4 off).

Testo mains unit (0554.0054)

- Ensure that the connection plug in **testo 325** is securely connected.
- Operation with mains unit is possible if rechargeables/ batteries are empty (batteries cannot be recharged in analyser)

It is normal for the mains unit to heat up. If temperatures are too high (e.g. due to an error in the analyser) the mains unit is protected by a thermal protection switch against overheating.

Capacity display Low Bat

Voltage >4.6 V (Service life: approx. 3 hours, at an ambient temperature of 20°C)

Low Bat

Flashing symbol, voltage <4.6 V
Lifetime of rechargeable battery: 0.5 h
Lifetime of battery: approx. 2.5 h
If the voltage in the rechargeable battery drops below 4.2 V, the analyser is switched off automatically to protect against total discharge.

Gas path

FG = Flue gas
°C FT = Flue gas temperature
°C AT = Separate ambient air temperature
p = Pressure

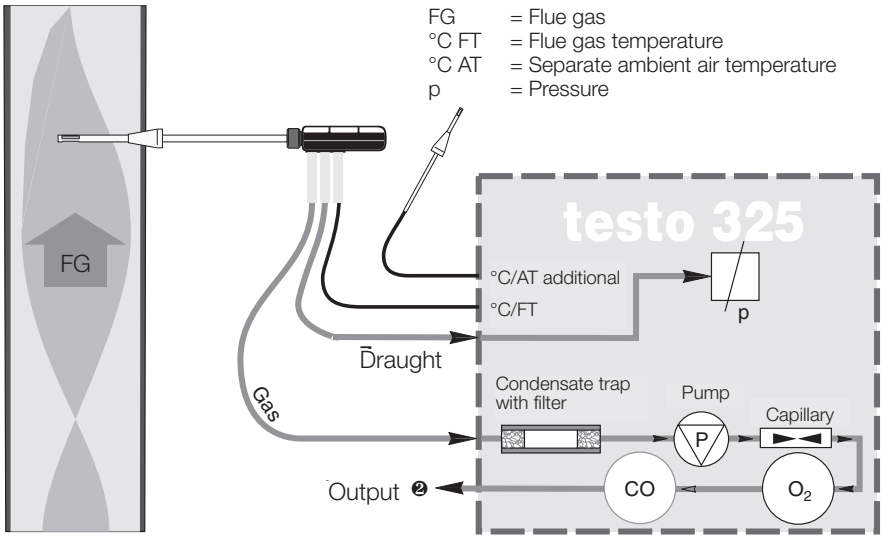
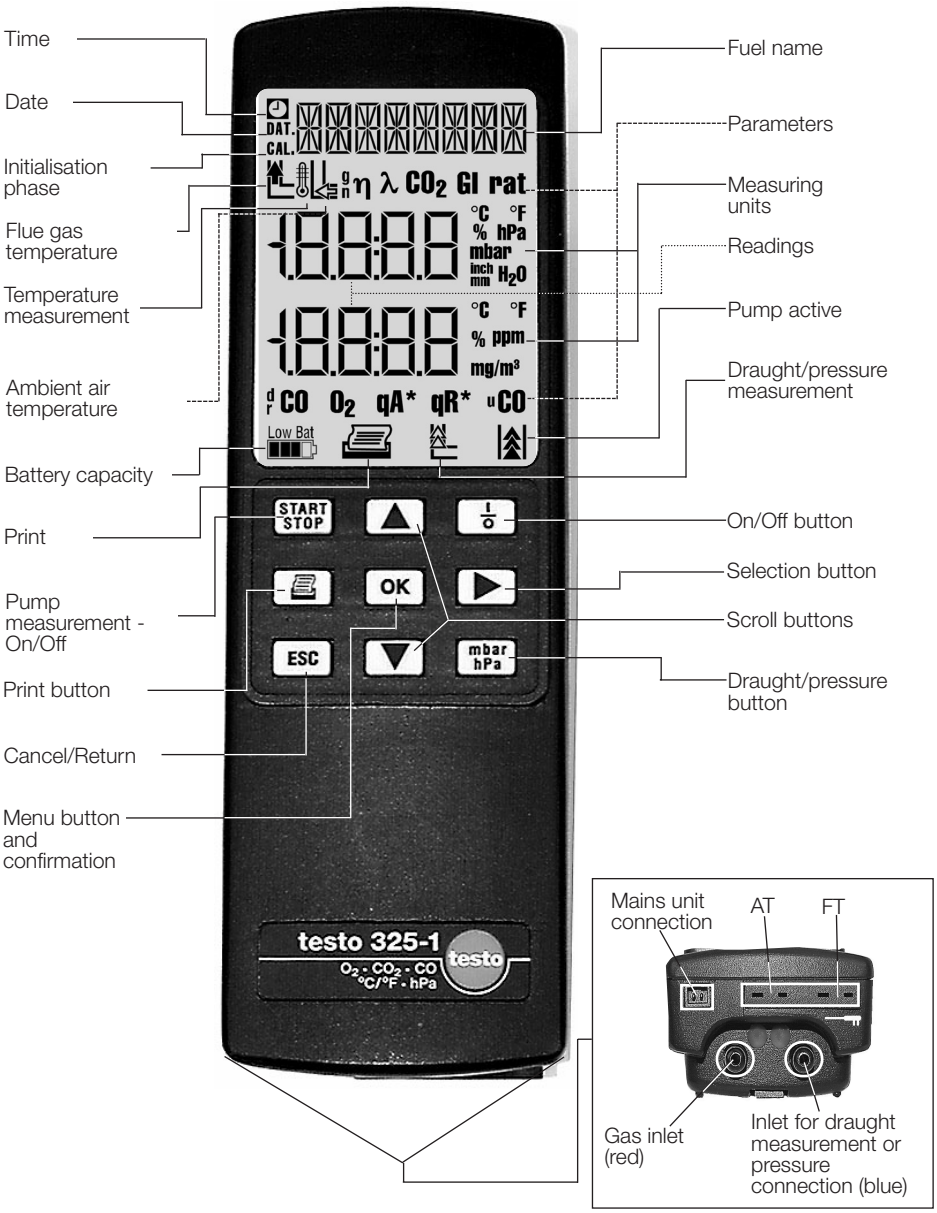


Diagram of analyser



Initial operation

Operating the analyser

Button panel

- Scroll buttons
Use the **up/down arrow buttons** [▲] / [▼] to scroll between the measured value windows (in
the measurement menu) or to select a menu point in a list. If the last window or the last menu item has been reached, you automatically go to the first window or the first menu item.

- Selection button
Use the arrow button pointing to the right [▶] to access the parameters which can be changed in the Date/Time Menu and in the Display Sequence Menu.
The parameters are set using the [▲] and [▼] buttons.

- Print
The measurement data in the display is printed by pressing **Print** [🖶].

- I/O button
Press **I/O** [⏻] to switch instrument on or off. A switch-off message appears in the display before the instrument is switched off completely. You can still stop the instrument from being switched off by pressing any button except [⏻] .The instrument then returns to the measurement menu.

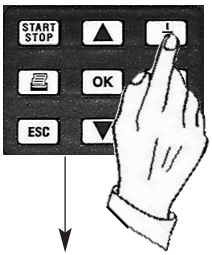
- Escape button
By pressing [ESC] you can cancel selected procedures or a planned selection or you can leave sub-menus. When you leave the sub-menus, by pressing [ESC] you generally go back one menu window until you are in the main menu.

- OK button
The [OK] button takes you from the measurement menu to the main menu.
Chosen functions are selected or executed.

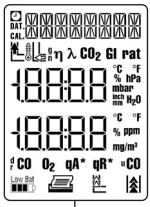
Measuring flue gas and ambient air temperature

The flue gas temperature is measured via the thermocouple at the tip of the flue gas probe. The probe has openings in this area in the probe stem so that the thermocouple is protected but at the same time comes into contact with the flue gas.

Switch on
testo 325



Self-test

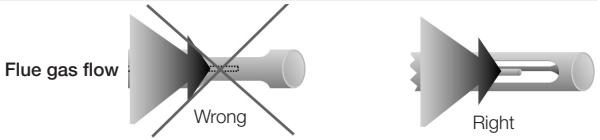


Battery capacity

3 sec.

Initialisation phase

In order to measure the exact flue gas temperature and therefore be able to measure the exact flue gas loss, the thermocouple should always be positioned in the flue gas flow. It should not be covered by the probe stem frame. The flue gas probe must be plugged into the FT connection socket.



The tip of the thermocouple should not touch the protection casing. Bend back the tip of the thermocouple if necessary.

There are two ways to measure the ambient air temperature with **testo 325**:

1. **Measuring the ambient air temperature using the flue gas probe**

   The temperature is already measured during the initialisation phase and is shown in the display.
   The temperature measured by the flue gas probe is interpreted by the **testo 325** as the ambient air temperature and is saved as the ambient air temperature value once the initialisation phase is completed. All of the dependent variables are calculated with this value.

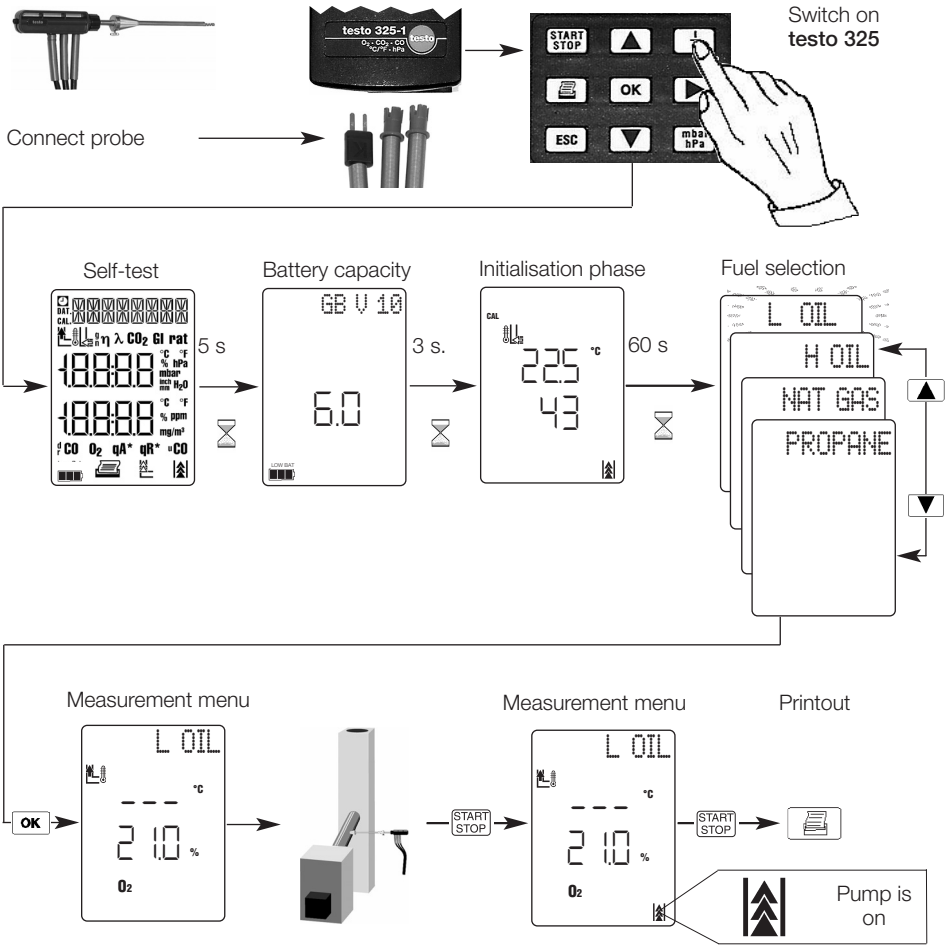
   This type of ambient air temperature measurement is sufficient for systems which are dependent on ambient air. During the initialising phase, ensure that the tip of the flue gas probe is held near the burner´s intake duct.

2. **Measuring the ambient air temperature via a separate ambient air probe**

   The probe is connected to the additional probe socket (AT) at the bottom connection panel of **testo 325**. As soon as a separate temperature probe is inserted, the temperature is automatically recognised as the ambient air temperature and is measured continually.

Example of measurement

Flue gas measurement in burners



If the flue gas probe is in a vertical position or at an angle of 45°, the condensate drops which develop could result in a sudden drop in temperature.

Remedy:

Position the flue gas probe horizontally.

After every measurement rinse the measurement cells with fresh air (Pump Start/Stop) until the O_2 level is over 20.0 % and the CO level is below 50 ppm.

Draught measurement/Gas flow pressure

Measurement menu

The flue gas probe is used to measure draught. Draught can be measured before or after a flue gas measurement.

Draught can only be measured if the pump is switched off.

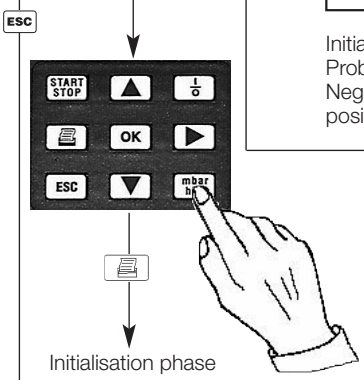
If the draught is measured following flue gas measurement there will still be impact pressure in the hose, after the pump is stopped, which first has to be reduced (approx. 30 seconds).

The analyser's position should not be changed when draught is being measured.

Any remaining condensate in the flue gas probe must be removed (shake the probe with the tip nearest the ground).

Do not switch between rechargeable battery and mains operation when measuring draught (fluctuations in voltage may influence the measured result).

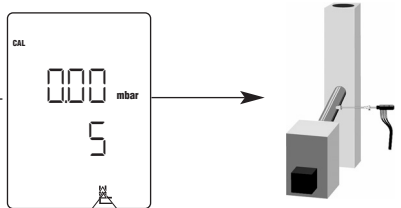
Initialising the pressure sensor:
Probe must be outside the flue.
Negative sign means negative pressure, positive sign means positive pressure in the flue.



Data is not saved

ESC

Initialisation phase



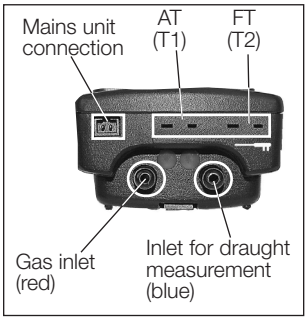
OK

Data is saved. Return to measurement menu.

Symbol for draught measurement appears

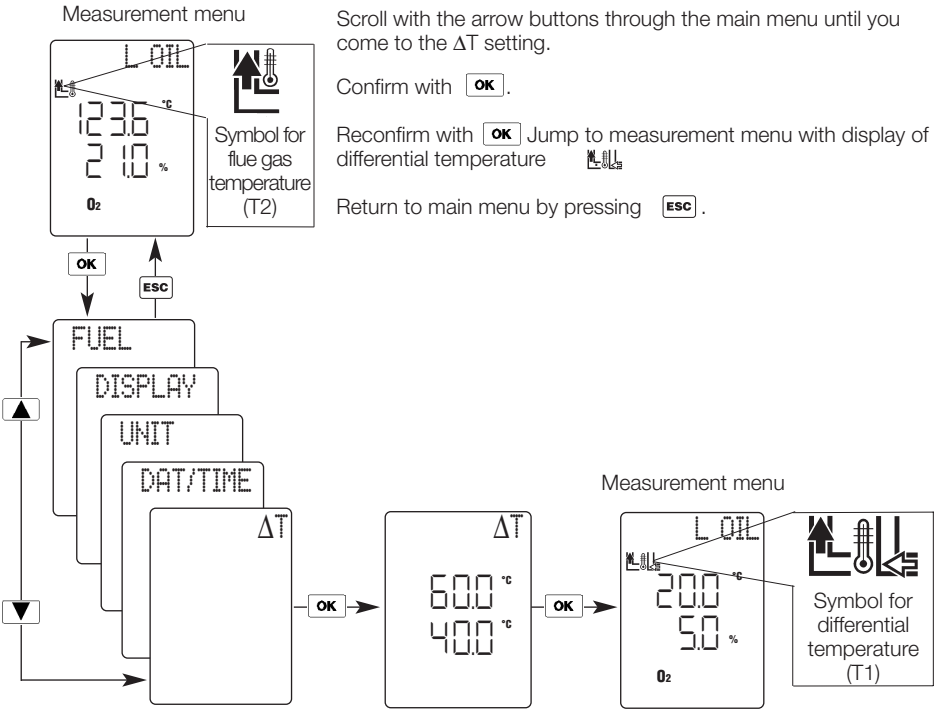
Example of measurement

Differential temperature measurement



Only for measuring temperature e.g. flow/return temperature.

Attach probe T1 and T2.



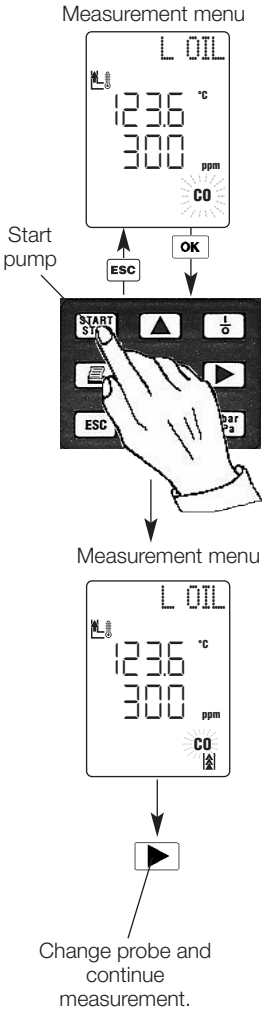
Scroll with the arrow buttons through the main menu until you come to the ΔT setting.

Confirm with OK.

Reconfirm with OK Jump to measurement menu with display of differential temperature

Return to main menu by pressing ESC.

CO undiluted



1. Select uCO in the measurement menu line (uCO flashes)

2. Start pump START STOP

3. Stop pump START STOP

uCO symbol flashes if data has not been saved.

Symbol stops flashing. uCO measured value is saved.

The saved (frozen) uCO measured value can be released again by pressing ▶ (symbol flashes).
It is now possible to measure uCO again.

4. Save undiluted CO measured value

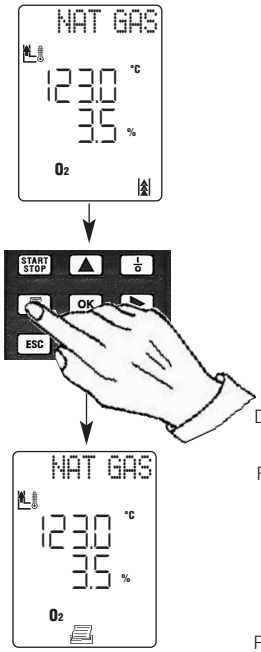
5. Change probe

6. Measure flue gas (see Page 8)

Example of measurement

Printing the measured results

Measurement menu



The readings can be printed by pressing the [button] button.
Printing is only possible if the pump is not in operation.
Printing can be stopped by pressing [ESC].

All readings are printed with

- Date/Time
- Set parameter sequence
- Measuring units

(How to set date/time. See reference section)

Date/Time

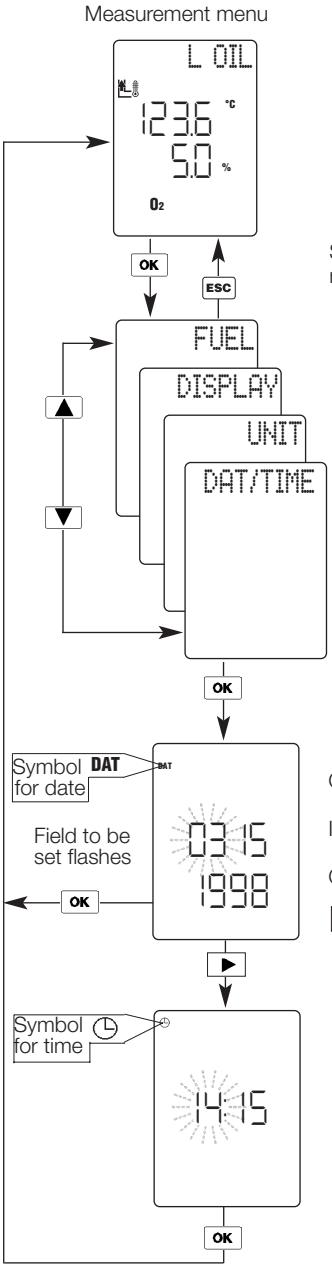
Fuels

Readings

```
-------------------------
      testo 325-1
-------------------------

  29.5.98      10:30:26

L OIL

    FT        147.5   C
    O2          4.5   %
    CO2        12.1   %
    CO          101   ppm
    rat      0.0007
    effg       78.0   %
    PRES      -2.50   mbar
    AT         19.6   °C

  SMNR: ----
  NAME: ----




-------------------------
      testo 325-1
-------------------------
```

* These values are entered by hand on the printout.

Name:
SMNR: Smoke number



Scroll with the arrow buttons through the main menu until you reach **Dat/Time.**

Change the field to be set by pressing ▶.

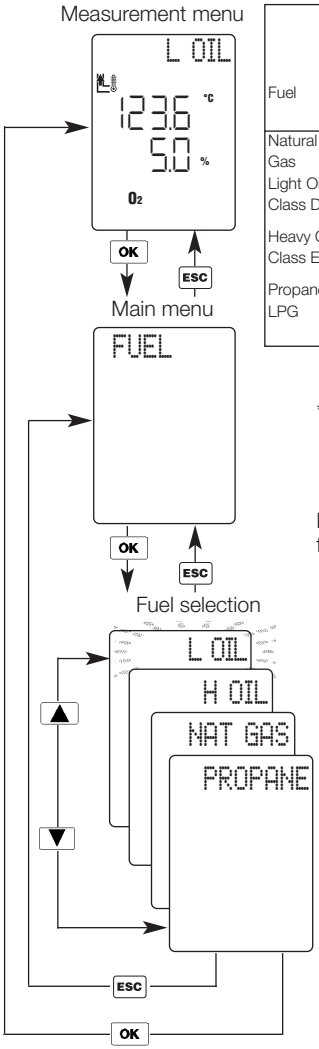
Increase value by pressing ▲, reduce value by pressing ▼.

Confirm settings with OK and return to main menu.

ESC: return to the main menu without taking over the settings.

Reference section

Fuel selection



Fuels

Selectable fuels and their factors

Fuel	K_{gr}	K_{net}	CO_{2max}	K_1	K_2	Hydrogen Content of fuel H	Moisture Content of fuel MH_2O	Q_{gr}	Q_{net}	O_2 ref	F_{Br}
Natural Gas	0.350	0.390	11.9	40	44.3	24.4	0	53.42	48.16	3	0.2304
Light Oil Class D	0.480	0.510	15.4	53	56.4	13.0	0	45.60	42.80	3	0.2434
Heavy Oil, Class E,F&G	0.510	0.540	15.8	54	57.2	11.5	0.2	42.90	40.50	3	0.2545
Propane LPG	0.420	0.450	13.8	48	51.8	18.2	0	50.0	46.3	3	0.2341

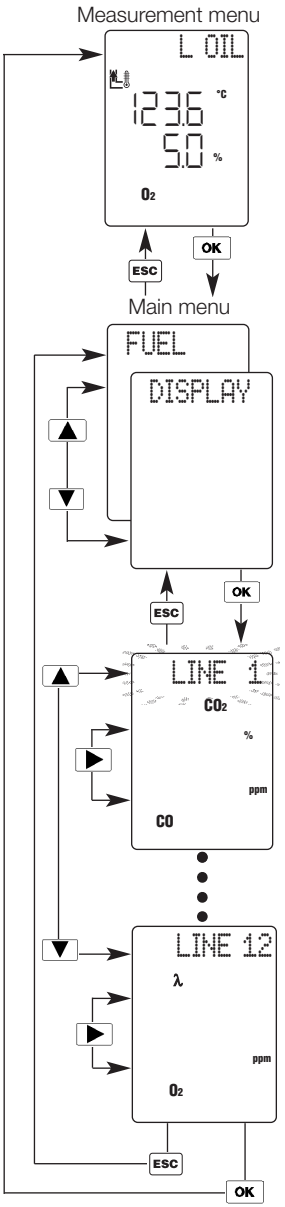
* These values set by the factory can be freely selected.
K_{gr}, K_{net}, CO_{2max}, K_1, K_2, Hydrogen content of fuel H, Moisture content of fuel MH_2O, Q_{gr}, Q_{net}, O_2 ref are all fuel-specific factors

F_{Br} Conversion factor mg/m^3 in g/GJ
f Siegert factor

Scroll through the fuel list using the arrow buttons.

Confirm setting by pressing OK and go to measurement menu.

ESC: Return to the main menu without taking over the settings.



Possible parameters		
O2		Oxygen level
FT		Flue gas temperature
AT		Ambient air temperature
CO2		Carbon dioxide level
Lambda	λ	Excess air value
Draught (hPa.mbar, mmH2O)		Fine draught reading
Eta	η	Efficiency
ΔT		Differential temperature
uCO		Carbon monoxide level undiluted
CO		Carbon monoxide level

Setting the parameter sequence

Select the required line by selecting [▲] or [▼] .

Select the parameter for this line with [▶].

Select additional line if required.

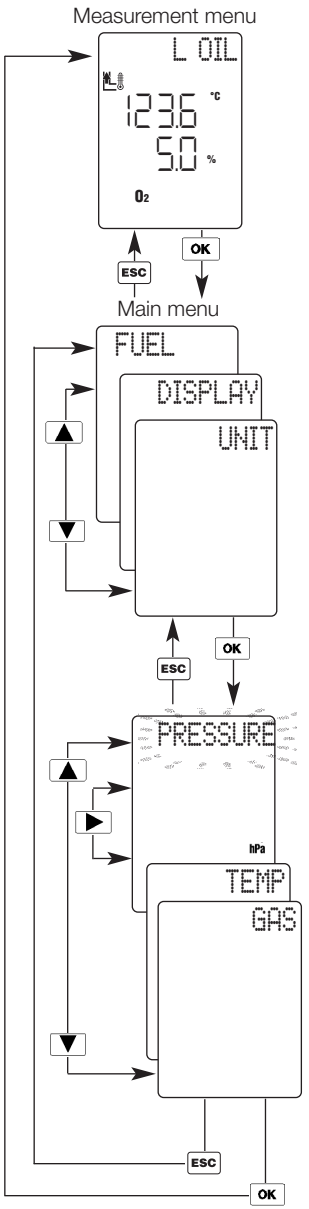
Once selection is complete, the complete parameter sequence is taken over when [OK] is pressed. Jumps to measurement menu.

If the selection is cancelled by pressing [ESC] the settings are not taken over. Jumps to measurement menu.

If parameters were selected which are not measured "– – – –" will appear in the measurement menu.

Reference section

Setting the units



Possible measurement parameters	
Temperature	°C, °F
Gas	ppm, mg/m³
Draught/Pressure	hPa, mbar, mmH₂O

Measuring units

Select the parameter with ▲ or ▼

Select list of all possible measuring units via ▶

Accept measuring unit by pressing OK jumps to measurement menu.

Cancel selection by pressing ESC, settings are not accepted.

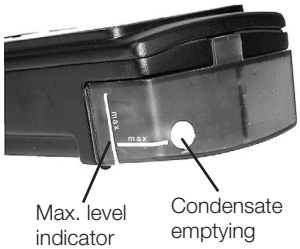
Changing rechargeable batteries or batteries

Switch off analyser before changing battery or rechargeable battery.

Please have mains unit plugged in when changing battery
The set date/time may otherwise be lost.

Remove empty/defect rechargeable battery or empty battery from the battery compartment and replace with new rechargeable batteries or batteries.

Warning
Observe the correct polarity of the rechargeable batteries/batteries



Condensate trap

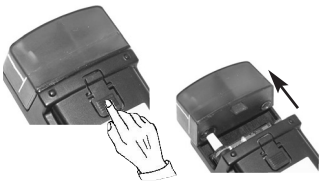
The max. level in the condensate trap should not be exceeded. Remove the emptying plugs to empty the condensate trap.

Empty the condensate trap before storing the unit.

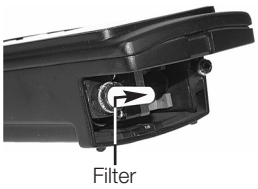
Changing filters

The filter must be exchanged if dirt particles can be seen.

Empty the condensate trap before changing filter.



To do this, unlock the condensate trap and remove from housing.



Remove the filter and replace with a new one. Order spare filter (Part no. 0554.0040).
Only this filter should be used.

A tightness test should be carried out every time a filter is changed (See page 3).

Maintenance

Flue gas probe

Cleaning the flue gas probe if the gas path is clogged

Remove the probe stem and place in hot water. Move about in hot water. Blow air through pipe or clean with a round brush (e.g. made of brass).

Changing a defect thermocouple

Pull out the bending protection spring from the guide at the back outlet with a counterclockwise movement and pull out the tube to the left. Pull out the thermocouple by the tube.

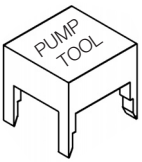
Lever the thermocouple out of the handle with the aid of a screwdriver.

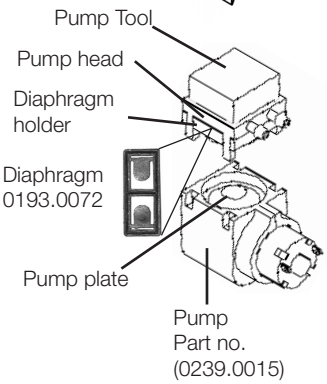
Only remove the thermocouple if it is defect. The thermocouple may be damaged when pulled out by the connection tube.

Remove the bending protection spring and take the tube out of the holder in the handle and out of the slit. Push the bending protection spring over the new thermocouple.

When inserting the new thermocouple do not press on the thermocouple tube. Press it into place with the help of a small screwdriver.

Pump Tool (Part no. 0192.0468)



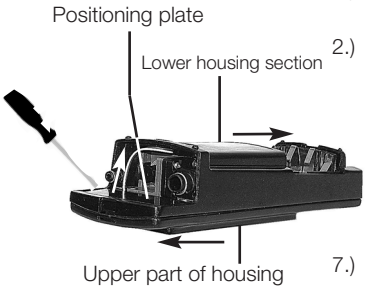


Cleaning the flue gas pump

Open the housing on the measuring instrument (See page 19, Items 1 - 8).

- Take out the pump carefully.
- Insert “Pump Tool” in the pump head guides.
- Take off “Pump Tool” together with the pump head.
- Remove diaphragm holder from pump head and take out diaphragm.
- Clean pump diaphragm, pump plate and pump head with spirit or water.
- Place pump diaphragm in the diaphragm holder and insert in the pump head
- Place pump head on pump.
- Remove “Pump Tool”.
- Place pump in assembly block.
- Reassemble measuring instrument (see page 20).

Changing O_2-CO measurement cells



1.) Remove temperature probe and hose connector of the flue gas probe and the mains unit from the **testo 325-1**.

2.) Empty condensate trap before removing it.

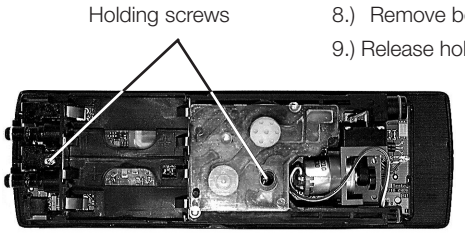
3.) Unlock the condensate trap and remove from housing (See page 17).

4.)Remove filter insert (See page 17).

5.) Remove positioning plate using a screwdriver.

6.) Open battery compartment and remove batteries/rechargeables (See page 17).

7.) The **testo 325** housing is opened by moving the housing parts in the direction of the arrows (See diagram).



8.) Remove bottom part of housing.

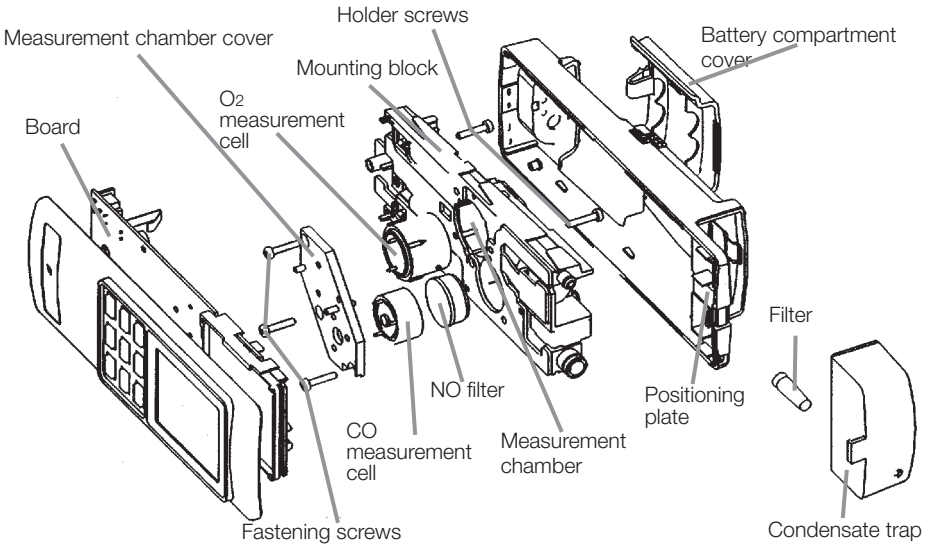
9.) Release holder screws (See diagram).

10.) Remove the mounting block with the electronics from the top of the housing (see below).

11.) Remove mounting block from the board.

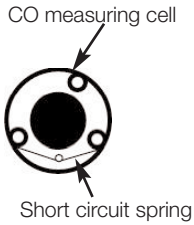
12.) Release fastening screws (3 off) on measurement chamber cover. Remove cover.

Avoid contact with electronic parts.



Maintenance

Changing O_2-CO measurement cells



Changing the CO measurement cell

Before installing the new CO measuring cell, carefully remove the short-circuit spring from the contacts.

- Remove measurement cell from measurement chamber cover and attach the new measuring cell.

When changing a CO measurement cell the NO filter should also be replaced.

- Remove the NO filter from the measurement chamber. When installing the new filter ensure that the area with the bore holes faces downward in the measurement chamber.

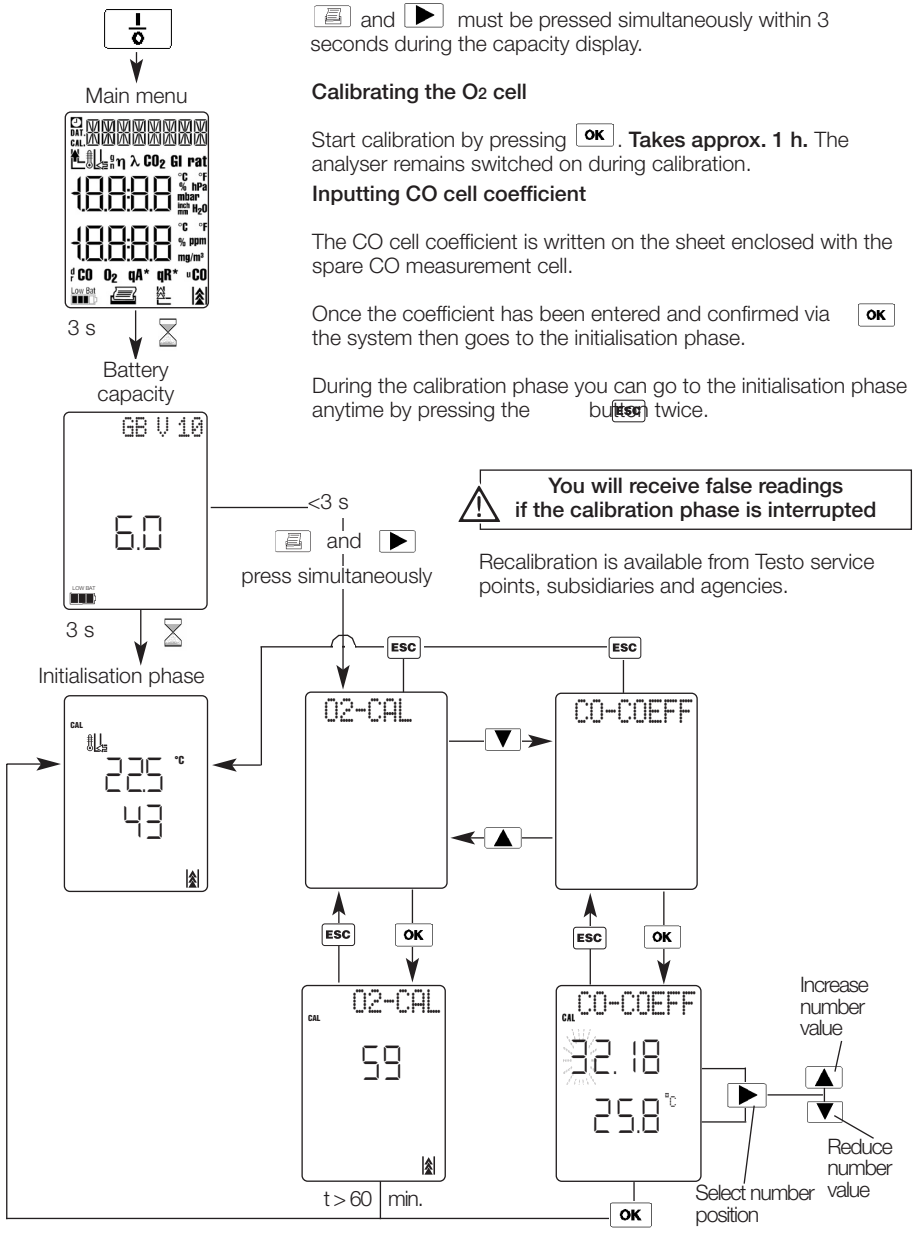
Changing the O_2 measurement cell

- The measurement cell is located in the measurement chamber. When fitting a new component observe the guides on the measurement cell and on the chamber when installing.

Assembling testo 325

- Place the measurement chamber cover on the measurement chamber. Tighten the fastening screws (3 off).
- Connect the mounting block with the electronics.
- Place the mounting block and electronics in the upper part of the housing.
- Attach the mounting block and the electronics to the upper part of the housing with the holder screws (2 off).
- Put upper part of housing in position and close in the opposite direction to the arrow.
- Insert positioning plate and filter.
- Insert condensate trap. Ensure that it snaps into position.
- Put batteries/rechargeables into place and close battery compartment cover.

Changing O_2-CO measurement cells



and must be pressed simultaneously within 3 seconds during the capacity display.

Calibrating the O_2 cell

Start calibration by pressing OK. **Takes approx. 1 h.** The analyser remains switched on during calibration.

Inputting CO cell coefficient

The CO cell coefficient is written on the sheet enclosed with the spare CO measurement cell.

Once the coefficient has been entered and confirmed via OK the system then goes to the initialisation phase.

During the calibration phase you can go to the initialisation phase anytime by pressing the ESC button twice.

You will receive false readings if the calibration phase is interrupted

Recalibration is available from Testo service points, subsidiaries and agencies.

German Calculation Information

These equations are used to calculate the following values:

CO_2 value: $$CO_2 = \frac{CO_{2max}\ (21\% - O_2\%)}{21\%}$$

CO_{2max} : Fuel-specific maximum CO_2 value
21 % : Oxygen level of air in %
O_2 % : Measured oxygen level in %

Flue gas loss: $$qA = \left[(FT - AT)\left[\frac{A2}{21\% - O_2\%} + B\right]\right] - K_k$$

FT : Flue gas temperature
AT : Ambient air temperature
A2/B : Fuel-specific factors
21% : Oxygen level in air
O_2% : Measured oxygen level
K_k : is a factor which can turn into a negative value if qA falls below the temperature. Necessary for measurements on burners.

If the fuel-specific factors A2 and B are zero, the Siegert-Formula is applied using factor f.

$$qA = f \times \frac{(FT - AT)}{CO_2}$$

FT : Flue gas temperature
AT : Ambient air temperature
CO_2 : calculated CO_2 value
f : fuel-specific factor

Burner efficiency: **Eta = 100 - qA**

If qA is negative, Eta will be greater than 100%.

Excess air value λ: $$\lambda = \frac{CO_{2max}}{CO_2}$$

CO_{2max} : Fuel-specific maximum CO_2 value
CO_2 : Calculated CO_2 value

$CO_{undiluted}$: $$CO_{undiluted} = CO \times \lambda$$

CO : Measured CO value
λ : Excess air value

Calculating ppm in mg/m³ referred to the O_2 reference value

CO (mg/m³): $$CO = \frac{21\% - O_2\%\ reference}{(21\% - O_2\%)} \times CO\ (ppm) \times 1.25$$

21% : Oxygen level in air
O_2% : Measured oxygen level

Conversion of ppm to mg/m³ referred to the O_2 reference value (freely selectable according to fuel)

$$CO\ (mg/m^3) \qquad CO = \frac{0_{2\ set} - O_{2ref}}{(0_{2\ set} - O_2)} \times CO\ (ppm) \times 1.25$$

$0_{2\ set}$: Oxygen content in the air
O_2: Measured oxygen content

Conversion of ppm to g/GJ

$$CO\ (g/GJ)\ CO = \frac{0_{2\ set}}{0_{2\ set} - 0_{2\ meas.}} \times CO\ (ppm) \times F_{Br} \times 1.25$$

$0_{2\ set}$: Oxygen content in the air
O_2: Measured oxygen content

Conversion of (ppm) to mg / kWh

$$CO\ (mg/kWh) \qquad CO = \frac{0_{2\ set}}{0_{2\ set} - 0_{2\ meas.}} \times CO\ (ppm) \times F_{Br} \times 3.6 \times 1.25$$

F_{Br} : See “Fuel selection”, page 14

Gross Efficiency

$$Effg = 100 - \left[\left[\frac{K_{gr} \times (FT - AT)}{CO_2} \right] + \left[\frac{X \times (2488 + 2.1 \times FT - 4.2 \times AT)}{Q_{gr} \times 1000} \right] + \left[\frac{K1 \times CO}{CO_2 + CO} \right] \right]$$

Net Efficiency

$$Effn = 100 - \left[\left[\frac{K_{net} \times (FT - AT)}{CO_2} \right] + \left[\frac{X \times (210 + 2.1 \times FT - 4.2 \times AT)}{Q_{gr} \times 1000} \right] + \left[\frac{K1 \times Q_{gr} \times CO}{Q_{net} \times CO_2 + CO} \right] \right]$$

where $x = MH_2O + 9 \times H$. (taken from page 14)

CO/CO_2 Ratio

$$rat = \frac{CO\ (ppm)}{CO_2\ (\%) \times 10000}$$

Error message Error messages during measurement	Cause / Remedy
 Symbols are flashing	1. Flue gas temperature probe not connected. 2. Temperature probe is not connected properly. Flue gas temperature and its calculated values are not measured, the remaining values are listed. Check the temperature probe connection or insert new temperature probe.
CO, O_2 and  are flashing	Admissible operating temperature has been exceeded. The ambient air changes to non-permissible values. Adapt to ambient air temperature.
O_2 is flashing	Measurement of the O_2 signal in the calibration phase is unstable. Cause: O_2 cell was changed but the specified adaptation time of 60 minutes for the cell was not adhered to. →Switch off instrument and wait on adaptation.
During the initialisation phase O_2 is flashing	O2 cell is depleted. Change measurement cell.
CO is flashing	Measurement of the zero point is not stable. Let the initialising phase run several times. If this is not successful, the CO measurement cell is depleted.
Before switching off O_2 and/or CO are flashing	There is still flue gas in the analyser or very high concentrations were measured or the initialising phase is taking longer. Cause: Insufficient air was rinsed through after the last measurement or the probe is in the flue gas. → Probe should be brought into contact with fresh air. If there is still no change after several runs of the initialising mode the cell is probably defect or the cell is depleted.
	The analyser supply voltage is too low. Recharge batteries or connect to mains.

Technical data

testo 325

Temperature measurement

Measurement range:	-40 to +600 °C
Resolution:	0.1 °C
Accuracy:	±0.5 °C (0 to +99.9 °C) ±0.5 % of m.v. (from +100 °C)
Sensor:	Thermocouple Type K (NiCr-Ni) to DIN IEC 584 Part 2, Class 1

Draught/pressure measurement

Measurement range:	± 100 mbar
Resolution:	0.01 mbar
Accuracy:	< 3.00 mbar ± 0.03 mbar > 3.00 mbar ± 1.5% of m.v.
Max. overload:	1000 mbar

Effg/Effn

Measurement range:	0 to 120.0 %
Resolution:	0.1 %

Flue gas loss

Measurement range:	0 to 99.9 %
Resolution:	0.1 %

O_2 measurement

Measurement range:	0 to 21 vol.%
Accuracy:	± 0.2 vol.% absolute
Resolution:	0.1 vol.%
Response time t90:	Approx. 40 s

CO_2 measurement

Display range:	0 to CO_2max
Accuracy:	± 0.2 vol.%
Resolution:	0.01 vol.%
Measurement:	Digital calculation from O_2
Response time t90:	Approx. 40 s

CO measurement

Measurement range:	0 to 2000 ppm
Accuracy:	± 20 ppm (to 400 ppm) ± 5 % of m.v.
H_2 level:	< 10%
Resolution:	1 ppm
Response time t90:	Max. 60 s, typically 40 s

Operational humidity	0 to 95 % RH
Weight:	500g
Dimensions:	216 x 68 x 47 mm
Transport/ storage temperature:	-20 to +50 °C
Ambient temp.	-5 to +45 °C
Power supply:	Via plug-in mains unit, batteries or exchangeable rechargeable batteries
Input (UK)	230V~/50Hz/54mA/125VA
Output	8V /600mA/4.8VA
Fuse rating	3A

Accessories

Testo log printer 0554.0545

Technical data

Type or printer: . . . . . .Infrared thermal printer
Operating temperature: . . . . . .0 to +50 °C
Storage/transport temperature: . . . . . .-40 to +60 °C
Dimensions: . . . . . .150 x 88 x 50 mm
Weight: . . . . . .0.33 kg (incl. batteries)
Power supply: . . . . . .4 AA batteries, 1.5 V or NC rechargeable batteries
Accessories: . . . . . .Spare paper, Part no. 0554.0569

Note:
The printer switches to power save after 10 minutes of inactivity.

- Paper feed
- Return from power save
- Self-test = Keep button pressed when switching on

Adjust contrast

ON/OFF

Magnetic plate at rear of instrument

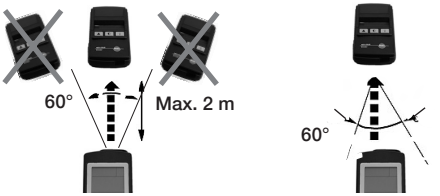
Instructions for disposal:
Only run down batteries should be disposed of. Place batteries in separate plastic bags to prevent short-circuits.

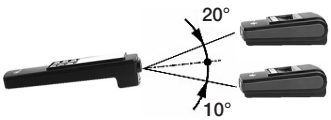
Data terminal and Switch on-Control lamp

Green = ON/Battery o.k.
Yellow= ON/Battery warning
Red = ON/Battery empty

Ensure window is clean.

Transmission distance:





Description	Part no.
Analyser	
testo 325-1 flue gas analyser (incl. batteries and calibration certificate)	0563.0320
Flue gas and temperature probes	
6mm flue gas probe (length 180mm, hose length 1.5m)	0600.9545
Compact flue gas probe (length: 300 mm, hose length: 1.5 m)	0600.9542
TÜV approved flue gas probe for measurements on atmospheric gas systems	0600.9543
Mini ambient air probe (length: 60 mm)	0600.9798
Clamp probe (for meas. on pipes with max. diameter of 1“, Tmax +100 °C)	0602.4692
Surface probe (with sprung thermocouple band, Tmax +300 °C)	0602.0392
Pipe clamp probe	0628.0020
Printer	
Testo log printer	0554.0545
Accessories	
Instrument TopSafe cover (for protection against dirt and humidity)	0516.0444
Instrument SoftCase (for attachment to boiler)	0516.2570
Instrument case (plastic version)	0516.3250
Mains unit (230 V for mains operation)	0554.1084
Spare particle filter for testo 325 (10 off)	0554.0040
Spare paper for infrared printer	0554.0569
Battery recharger for printer and testo 325, incl. 4 rechargeable batteries	0554.0110
Hose connection set (incl. silicon hose and adapter)	0554.0315
Pump	0239.0015
Pump tool	0192.0468
Pump diaphragm	0193.0072
Spare cells	
O_2 spare cell	0390.0069
CO spare cell	0390.0168

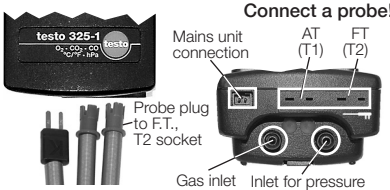
Short instruction

testo 325-1

1

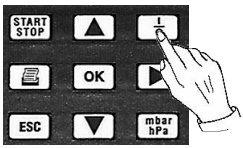
Remove battery cover/ Insert batteries/ accu

2



Connect a probe!

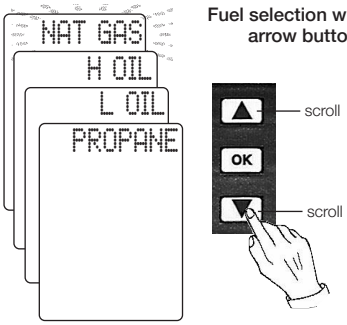
3



Switch on the instrument!

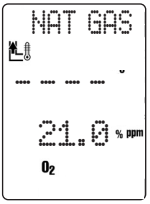
- Probe in fresh air!
- Self-test (3 sec.)
- Battery-capacity test (3 sec.)
- Initialisation phase (60 sec.)

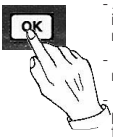
4



Fuel selection with arrow buttons

5



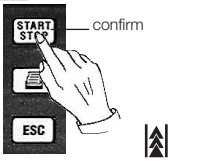


Activate fuel selection

- Automatic jump into measurement menu
- Ready to measure
- Place the probe into the flue

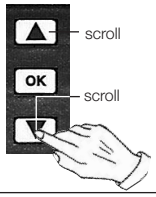
6

Start measurement



7

Scroll to view all measured values



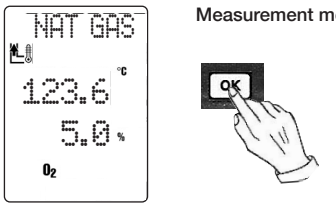
8 **Read the measurement.**

9 **Stop** START STOP Measured values are held. To print out please turn over (no. 5

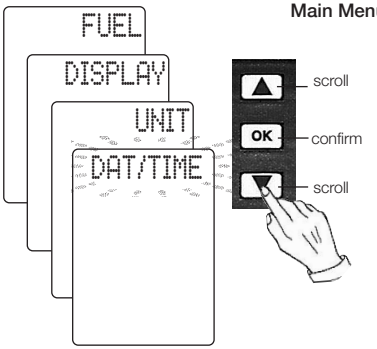
10 **Switch off the instrument** ⏻ (see point 3).

Setting date/time for printout

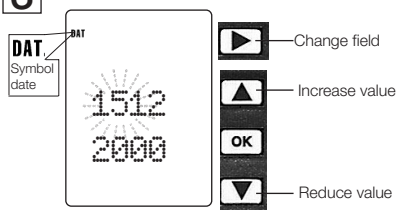
1 Measurement menu



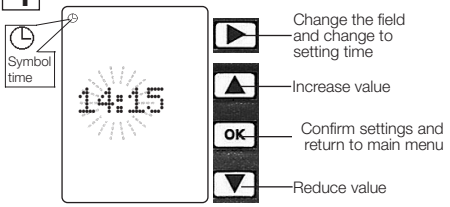
2 Main Menu



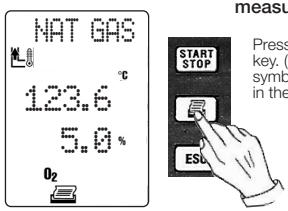
3 Setting date



4 Setting time



5 Measurement menu — **Printout of measured values**



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