



testo 314
Leakage rates measuring instrument

Instruction manual

en









General notes

This documentation contains information that must be applied if the product is to be used safely and efficiently.

Please read this documentation through carefully and familiarise yourself with the operation of the product before putting it to use. Keep this document to hand so that you can refer to it when necessary.

The document describes the country specific version **D** of the testo 314 product and the testo 314 pressure test set (leakage rates measuring instrument with pressure test set and accessories)




Identification

| Symbol | Meaning | Comments |
|---|--|--|
|  Warning! | Warning advice: Warning! Serious physical injury or even death could be caused if the specified precautionary measures are not taken. | Read the warning advice carefully and take the specified precautionary measures! |
|  Caution! | Warning advice: Caution! Slight physical injury or damage to equipment could occur if the specified precautionary measures are not taken. | Read the warning advice carefully and take the specified precautionary measures! |
|  | Important. | Please pay particular attention. |
| Text | Text appears on the instrument's display | - |
|  | Key | Press the key. |
|  | Function key with the function "OK". | Press function key. |
|  → xyz | Short form for operating steps. | See <i>Short form</i> , on this page. |






Short form

This document uses a short form for describing operating steps (e.g. calling up a function).

Example: Calling up the **Main test** function

Short form:  → **Main test** →  → 
(1) (2) (3) (4)

Steps required:

- 1 Open the Main menu: .
- 2 Select the **Main test** menu: , .
- 3 Confirm the selection: .
- 4 Start **Main test** menu: .

Content

! See also *Functional overview*, p. 39.

| | | |
|-------------------------------|---|-----------|
| General notes | General notes | 2 |
| Content | | 3 |
| A. Safety advice | | 5 |
| B. Intended purpose | | 6 |
| C. Product description | | 7 |
| C.1 | Overview | 7 |
| C.2 | Keypad | 8 |
| C.3 | Display | 8 |
| C.4 | Device connections | 9 |
| D. Commissioning | | 10 |
| E. Operation | | 11 |
| E.1 | Mains unit, batteries/rechargeable batteries | 11 |
| E.1.1 | Changing the batteries/rechargeable batteries | 11 |
| E.1.2 | Recharging the rechargeable battery pack | 12 |
| E.1.3 | Operation with the mains unit | 12 |
| E.2 | Connection variants | 13 |
| E.3 | Basic operating steps | 14 |
| E.3.1 | Switching the measuring instrument on | 14 |
| E.3.2 | Calling up a function | 14 |
| E.3.3 | Entering values | 14 |
| E.3.4 | Printing data | 15 |
| E.3.6 | Saving data | 16 |
| E.4 | Memory | 16 |
| E.4.1 | Reading out the log | 16 |
| E.4.2 | Deleting memory | 17 |
| E.4.3 | Free memory? | 17 |
| E.5 | Site (Car serial number) | 18 |
| E.5.1 | Activating a site (serial number) | 18 |
| E.5.2 | Creating a new site (serial number) | 18 |
| E.5.3 | Renaming a site (serial number) | 18 |
| E.5.4 | Deleting a site (serial number) | 19 |



| | | |
|-----------|---|-----------|
| F. | Settings | 19 |
| F.1 | Instrument | 19 |
| F.1.2 | Printer | 20 |
| F.1.3 | Light | 20 |
| F.1.4 | Menu query | 21 |
| F.1.5 | Units | 21 |
| F.2 | Service | 21 |
| F.2.1 | Operating values | 21 |
| F.2.2 | Reset factory | 22 |
| F.2.4 | Device data | 22 |
| F.2.5 | Language..... | 22 |
| G. | Measuring | 23 |
| G.1 | Leakage test | 23 |
| G.2 | Pretest/Main test | 24 |
| G.3 | Leakage rates | 27 |
| G.4 | High pressure / Load test | 30 |
| G.5 | Low pressure..... | 32 |
| G.6 | Temperature | 33 |
| H. | Transferring data | 33 |
| I. | Care and maintenance | 34 |
| I.1 | Cleaning the measuring instrument | 34 |
| I.2 | Regular calibration | 34 |
| I.3 | Inspecting the water trap | 34 |
| I.4 | Changing the water trap | 35 |
| J. | Questions and answers | 35 |
| K. | Technical data | 36 |
| K.1 | Standards and tests | 36 |
| K.2 | Measuring ranges and accuracies | 36 |
| K.3 | Other device data | 36 |
| L. | Accessories/spare parts | 38 |
| | Functional overview | 39 |

A. Safety advice



Avoid electrical hazards:

- ▶ Never use the measuring instrument and probes to measure on or near live parts!



Protect the measuring instrument:

- ▶ Never store the instrument/measuring cells together with solvents (e.g. acetone). Do not use any desiccants.



Product safety/preserving warranty claims:

- ▶ Operate the measuring instrument only within the parameters specified in the technical data.
- ▶ Handle the instrument properly and according to its intended purpose.
- ▶ Never apply force!
- ▶ Temperatures given on probes / sensors relate only to the measuring range of the sensors. Do not expose handles and feeders to any temperatures in excess of 70 °C unless they are expressly permitted for higher temperatures.
- ▶ Open the measuring instrument only when this is expressly described in the operating instructions for maintenance purposes.
- ▶ Carry out only the maintenance and repair work that is described in the instruction manual. Follow the prescribed steps exactly. For safety reasons, use only original spare parts from Testo.

Any further or additional work must only be carried out by authorised personnel. Testo will otherwise refuse to accept responsibility for the proper functioning of the measuring instrument after repair and for the validity of certifications.



Ensure correct disposal:

- ▶ Dispose of defective rechargeable batteries and spent batteries at the collection points provided for that purpose.
- ▶ Send the measuring instrument directly to us at the end of its useful life. We will ensure that it is disposed of in an environmentally friendly manner.



B. Intended purpose

This chapter describes the areas of application for which the measuring instrument is intended.

The testo 314 is a leakage rates measuring instrument for the professional performance of the following measuring tasks:

- Preliminary and main testing of gas pipes
- Determining the usability of gas pipes
- Testing the pressure of water pipes via a high pressure probe
- Measuring low pressure against atmospheric pressure
- Temperature measurement

With the "Caravan" option, the testo 314 offers the following scope of function, designed specifically for the measurement of gas pipes from (motor)caravans:

- Main test at gas pipes according to the EN 1949 standard (standardized leak test)
- Special layout for the printout of the readings
- Special memory management using vehicle serial numbers
- The pretest, leakage rate, high pressure/load test, low pressure and temperature functions are not available on instruments with the "Caravan" option!



Warning!

Escaping gas can produce an explosive mixture of gases!

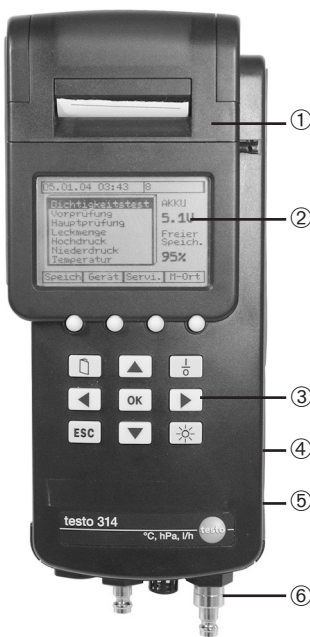
Potential danger of explosion!

- ▶ The testo 314 leakage rates measuring instrument may only be used by authorised personnel who have been trained in the maintenance and inspection of gas equipment.
 - ▶ You must observe local health and safety regulations and test regulations.
-

C. Product description

This chapter provides an overview of the individual components of the product.









C.1 Overview



- ① Printer
- ② Display
- ③ Keypad
- ④ Battery compartment (at rear)
- ⑤ Mains unit socket
- ⑥ Device connections: Pressure sockets, probe socket, RS 232 socket



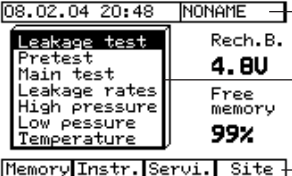
C.2 Keypad

| Key | Functions |
|--|--|
|  (4x) | Function key, relevant function is shown on the display |
|  | Switch measuring instrument on/off |
|  | Open Main menu |
| ESC | Back, cancel function, cancel printing: press 2x within 1s |
|  | Switch display illumination on/off |
| OK | Activate function |
|  | Scroll up, increase value |
|  | Scroll down, reduce value |
|  | Scroll left |
|  | Scroll right |

C.3 Display

Depending on the menu that is active, the display shows a variety of elements.

Function select view



① 08.02.04 20:48 NONAME

② Leakage test Rech.B. 4.8U

③ Pretest

Main test

Leakage rates

High pressure

Low pressure

Temperature

Free memory 99%

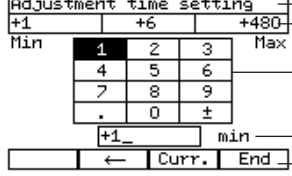
Memory Instr. Servi. Site

① Date/time, active measuring site or active vehicle serial number (with "Caravan" option)

② Function selection field: The selected function has a black background.

③ Assignment of the function keys

Adjustment view



① Adjustment time setting

② +1 +6 +480

Min Max

③ 1 2 3

4 5 6

7 8 9

0 +/-

④ +1 min

⑤ ← Curr. End

① Active menu

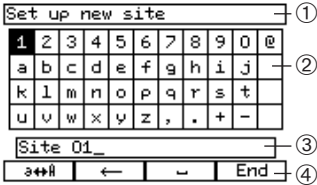
② Minimum adjustable/actual/maximum adjustable value

③ Number editor: The selected value has a black background.

④ Number field: The input values are displayed.

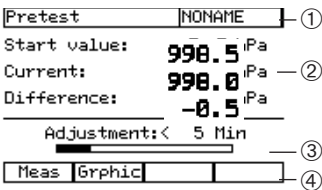
⑤ Assignment of the function keys

Enter characters view



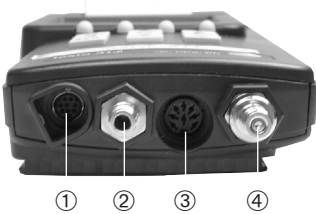
- ① Active menu
- ② Character editor: The selected character has a black background.
- ③ Number field: The input characters are displayed.
- ④ Assignment of the function keys

Measuring view

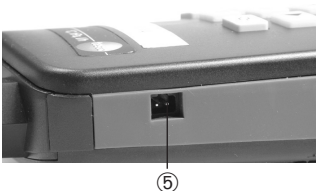


- ① Active menu/active measuring site or active vehicle serial number (with "Caravan" option)
- ② Readings
- ③ Remaining measurement period
- ④ Assignment of the function keys

C.4 Device connections



- ① RS232 socket
- ② Pressure input socket
- ③ Probe socket
- ④ Pressure output socket



- ⑤ Mains unit socket



D. Commissioning

This chapter describes the steps required in order to commission the product.

- ▶ Remove the protective film from the display.

The measuring instrument is supplied with a rechargeable battery already fitted.

- ▶ Charge the battery pack up fully before using the instrument (see *Recharging the rechargeable battery pack*, p. 39).

E. Operation

This chapter describes the steps that have to be executed frequently when using the product.

! Please read this chapter carefully. The following chapters of this document will assume you are already familiar with the content of this chapter.

E.1 Mains unit, batteries/rechargeable batteries

If the mains unit is connected, the measuring instrument is automatically powered from the unit. During operation the battery pack in the measuring instrument is charged with a smaller charging current.

E.1.1 Changing the batteries/rechargeable batteries

! The measuring instrument must not be connected to a mains socket via the mains unit. The instrument must be switched off. Change the batteries within 5 minutes, otherwise device settings (e.g. date/time) will be lost.



- 1 Place the measuring instrument on its front.
- 2 Open the service cover: Unlock the clip, tilt up and remove.
- 3 Battery pack inserted: Remove the battery pack and pull the connector from the socket.
or
batteries/rechargeable batteries inserted: Remove the batteries/rechargeable batteries.
- 4 Using a battery pack: Insert the connector of the battery pack into the socket and insert the battery pack.
or
Using batteries/rechargeable batteries: Insert the batteries/rechargeable batteries.
Observe the polarity.
- 5 Fit the service cover and clip into place.



E.1.2 Recharging the rechargeable battery pack

The rechargeable battery pack can only be charged at an ambient temperature of $\pm 0 \dots +45$ °C. If the rechargeable battery pack has discharged completely, the charging time at room temperature is approx. 4 5 hrs.

It is not possible to charge standard rechargeable batteries in the measuring instrument.

- 1 Connect the plug of the mains unit to the mains unit socket on the measuring instrument.
- 2 Connect the mains plug of the mains unit to a mains socket.

The charging process will start. The charge status will be shown on the display. The charging process will stop automatically when the rechargeable battery pack is fully charged.

Battery care

- ▶ Do not store the rechargeable battery pack discharged.
- ▶ After lengthy storage the rechargeable battery pack must be fully charged before being used again.

E.1.3 Operation with the mains unit

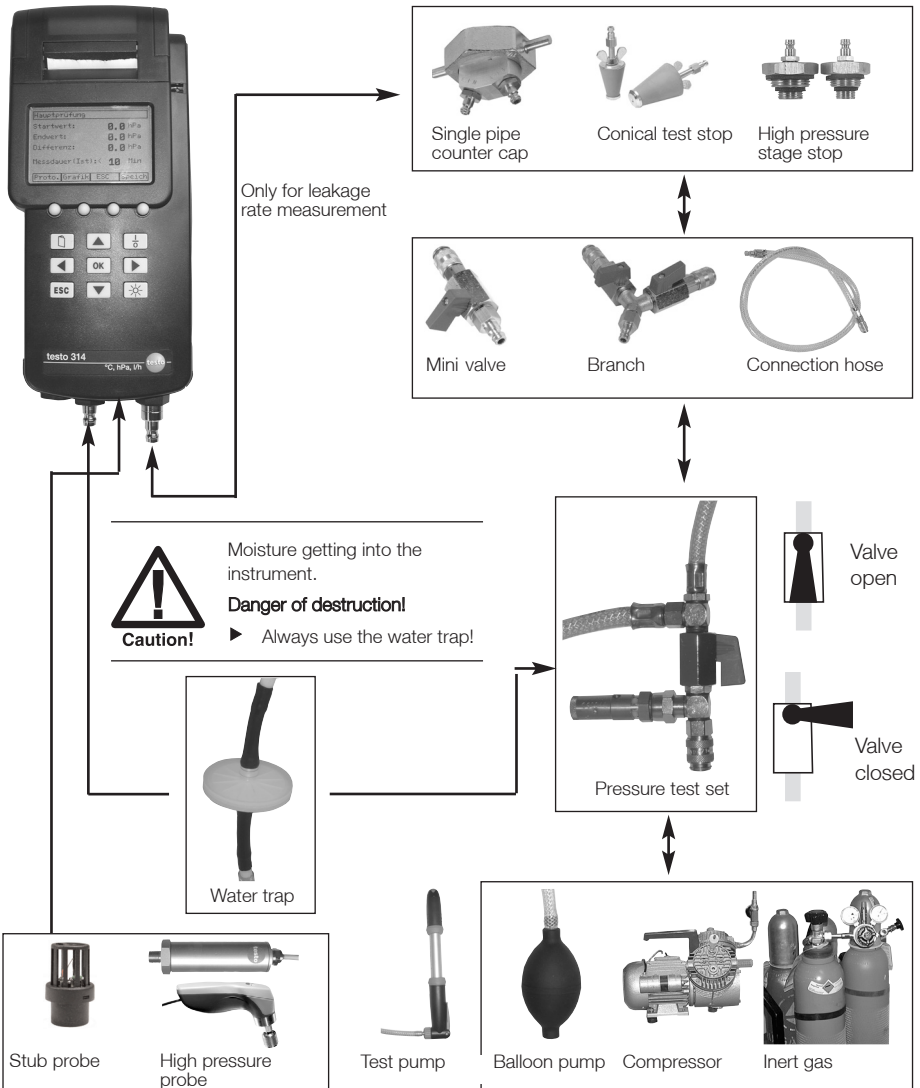
- 1 Connect the plug of the mains unit to the mains unit socket on the measuring instrument.
- 2 Connect the mains plug of the mains unit to a mains socket.

The measuring instrument is powered via the mains unit.

If the instrument is switched off and a rechargeable battery pack is inserted, the charging process will start automatically.

Switching the instrument on has the effect of reducing the charging current; the instrument is then powered via the mains unit.

E.2 Connection variants





E.3 Basic operating steps

E.3.1 Switching the measuring instrument on



The start screen is displayed.

The Main menu is displayed.

E.3.2 Calling up a function

- 1 Select function: , .

The selected function is shown with a black background.

- 2 Confirm selection: .

The selected function is opened.

E.3.3 Entering values

Some functions require values (numbers, units, characters) to be entered. This is done with the help of input editors.

Input editor for numbers

| | | |
|-------------------------|-------|------|
| Adjustment time setting | | |
| +1 | +6 | +480 |
| Min | | Max |
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |
| . | 0 | ± |
| +1_ | | min |
| ← | Curr. | End |

Options:

- ▶ Accept current value: .

- ▶ Delete number: .

- 1 Select number: , , , .

The selected number is shown with a black background.

- 2 Accept number: .

- 3 Repeat steps 1 and 2 as required.

- 4 Save input: .

Input editor for characters (letters, numbers, special characters)



Options:

- ▶ Switch between upper case/lower case letters: .
 - ▶ Delete character: .
 - ▶ Insert space: .
- 1 Select character: , , , .
- The selected character has a black background.
- 2 Accept character: .
 - 3 Repeat steps 1 and 2 as required.
 - 4 Save input: .

E.3.4 Printing data

Data are printed out via the function key . The function is only available if a printout is possible.

Cancel printing: **ESC** press 2x within 1s.

E.3.5 Setting up the printer


Inserting paper



- ① 1 → → **Printer** → → **Lf Pr.**
- 2 Lift the printer cover up (see ①).
- 3 Unwind the paper a few centimetres and insert the roll into the paper compartment so that the open end points up (see ②).
- 4 Push the paper into the paper guide with the outside facing down and start the line feed (**Lf Pr**): (see ②).
- 5 Keep actuating the line feed until the paper projects approx. 2 cm out of the printer chamber. Push the paper gently by hand or adjust the direction if necessary.
- 6 Close the printer cover so that the paper projects out of the opening in the cover.



E.3.6 Saving data

When a measurement has been completed the data are saved using the function key ; a separate measurement log is saved for each measurement.

E.3.7 Switching the measuring instrument off

! Unsaved readings are lost when the measuring instrument is switched off.

▶ .



The measuring instrument switches off.

E.4 Memory

On saving, all readings are assigned to whichever measurement site is active or the activated vehicle serial number (with "Caravan" option) at the time of saving. Unsaved readings are lost if another site (another serial number) is selected or the measuring instrument is switched off.

E.4.1 Reading out the log

Calling up the function:

1  → **Memory** → **Select Protocol** .

The stored logs for the active site or for the activated vehicle serial number (with "Caravan" option) are displayed with the date, time and measuring function.

| Display | Measuring function |
|---------|----------------------------|
| P | Pretest ¹ |
| M | Main test |
| L | Leakage rates ¹ |
| H | High pressure ¹ |
| D | Low pressure ¹ |
| T | Temperature ¹ |

¹ Not with "Caravan" option

Displaying the graphic:

- 2 Select log → .

The readings are displayed in graphic form.

Optional:

- ▶ Print graphic: .

Displaying a log:

- 2 Select log → .

The readings are displayed.

Optional:

- ▶ Print log: .

Displaying readings:

- 2 Select log → .

The individual readings are displayed.

Optional:

- ▶ Print readings: .

To delete the protocol:

- 2 Select log → .

The selected log is deleted.

E.4.2 Deleting memory

- ▶ → → **Delete memory** → → **Yes** → .

The entire memory is deleted.

E.4.3 Free memory?

- ▶ → → **Free memory?** → .

The free memory space is displayed.



E.5 Site (Car serial number)

Specifications in parentheses are valid for measuring instruments with the "Caravan" option.

Calling up the function:

- ▶  → ().

The available sites (serial numbers) are displayed in the order in which they were created. Sites (serial numbers) for which logs have already been saved are shown with a star (✳).


E.5.1 Activating a site (serial number)

- ▶  → () → Select site (serial number) → .


The selected site (serial numbers) is activated and the Main menu is opened.

E.5.2 Creating a new site (serial number)

Sites (Cars) are identified by a unique system number (car serial number). Each system number (serial number) can only be allocated once.


- 1  → ().
- 2 → **New site (new car serial number)** → .
- 3 Enter the site designation (car serial number) → .

or


- 1  → () → Select the site (car serial number) whose site designation (serial number) is to serve as the basis for the new site (car serial number).
- 2 → **Copy** → .
- 3 Change the site designation (serial number) → .

E.5.3 Renaming a site (serial number)

Each site designation (serial number) can only be allocated once.

- 1  → () → Select the site (serial number) that is to be renamed.
- 2 → **Rename** → .
- 3 Change the site designation (serial number) → .

E.5.4 Deleting a site (serial number)

- 1  → () → Select the site (serial number) that is to be deleted.
- 2 → **Delete** → .
- 3 Confirm deletion of the site (serial number): .

F. Settings


! Familiarity with the contents of the chapter *Operation* (see page 11) is assumed.

F.1 Instrument

Adjustments of the measuring instrument to the needs of the user can be made in the Instrument menu.

F.1.1 Change date

Calling up the function

- 1  → → **Change date** → .

Setting the date/time

- 2 Select the time or date → .

The number that can be changed has a black background.

Optional:

- ▶ Change to a different number: , .

- 3 Set the value → .
- 4 Repeat step **3** for the other numbers as required.
- 5 Accept inputs: .

 - ▶ Carry out steps **2** to **5** for the time and date as required.

- 6 Save the input: .



F.1.2 Printer

Calling up the function

1  → → **Printer** → .

F.1.2.1 Contrast

2 **Contrast** → .

3 Set the contrast: , .

Optional:

▶ Start the test print: .

4 Save the input: .

F.1.2.2 Print text

2 **Print text** → .

3 Select **Line 1**, **Line 2**, **Line 3** or **Footnote** → .

4 Enter characters → .

▶ Carry out steps **3** and **4** for the other lines in the same way.

F.1.2.3 Linefeed Printer (Lf Pr)

2 **Lf Pr** → .

Two empty lines are inserted.

F.1.3 Light

2 **On/Off** (switching on/off manually) or **Automatic** (light comes on for 3 minutes after the key  is pressed).

F.1.4 Menu query

You can specify whether the line volume and line type are to be requested when the Leakage rates function is called up. If the request is activated, the adjustment time and the measurement period or the standard test pressure are set according to the values entered in response. The corresponding manual adjustment options in the **Leakage rates** menu are then no longer available.

2 **Menu query** →

3 **Line volumes** → → Select **With** (query is made) or **Without** (query is not made) →

4 **Line type** → → Select **With** (query is made) or **Without** (query is not made) →

F.1.5 Units

The units of the measuring variables can be set.

2 **Units** →

3 Select **Temperature**, **Leakage rates** or **Pressure** → → Select unit →

- ▶ Carry out step 3 for the other parameters in the same way.

F.2 Service

Important operating values, device data (incl. absolute pressure), instrument data and the service address can be displayed in the Service menu. It is also possible to perform a factory reset and change the display language.


F.2.1 Operating values

▶ → Servi. → **Operating values** →

Important operating values and the absolute pressure are displayed.



F.2.2 Reset factory

- 1  → → **Reset factory** → .
- 2 **Yes** → .

The settings of the Light, Units, Adjustment time, Measurement period, Test pressure, Menu query (line volume and type), Leakage rates relative to operating pressure, Default gas type and gas factors (User gas 1 and User gas 2) functions are reset to the factory setting. Other settings such as sites or serial numbers (with "Caravan" option) and print texts are not changed.

F.2.3 Service address

- ▶  → → **Service address** → .


The Testo service address is displayed.

F.2.4 Device data

- ▶  → → **Device data** → .

Important device data are displayed.

F.2.5 Language

- 1  → → **Language** .

or

- 1  → → **Sprache** → .

- 2 Select **Deutsch** or **English** → .

The selected display language is activated.

G. Measuring

This chapter describes the measuring tasks that can be carried out with the product.

! Familiarity with the contents of the chapter *Operation* (see page 11) is assumed.

! Temperature fluctuations and positional changes have an effect on the accuracy of pressure measurements:

- The entire measuring system must be preconditioned to the ambient temperature and to the temperature of the line system to be tested.
- The temperature of the measuring system and the line system must remain stable during measurement.
- The position of the measuring system must not change during measurement.

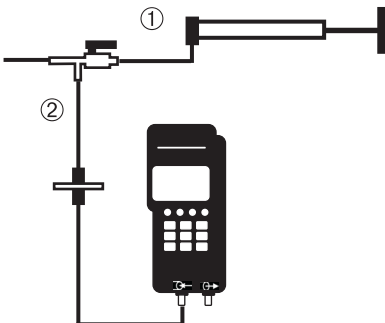
The pretest, leakage rate, high pressure/load test, low pressure and temperature functions are not available on instruments with the "Caravan" option!

G.1 Leakage test

! A leakage test should always be carried out in conjunction with a measurement case or hose set.

Preparing for measurement:

- ▶ Connect the temperature sensor.
- ▶ Connect test pump to the pressure test set ①.
- ▶ Connect pressure test set to the pressure inlet socket of the measuring instrument ②.



**Calling up the function:**

- 1  → **Leakage test** → **OK**.

Measuring:**Optional:**

- ▶ Set test pressure: **Setting** → Set value → **End**.

- 2 Open the stop valve of the pressure test set and pressurise the measuring instrument using the test pump (800 – 1000hPa, otherwise an error message will appear). Close the stop valve again.

- 3 Start measuring: **Start**.

Zeroing will take place (duration: 5 s)

If the pressure applied is higher than the set test pressure, an audible alarm signal sounds (sensor protection). Below the set test pressure, this is automatically deleted.

The adjustment time will run (duration: 2 min.).

The measuring phase will be carried out (duration: 1 min.).

If a leak or temperature drift is found, measurement will automatically be repeated up to two more times.

A message is given when measurement has been completed.

- 4 Confirm the message: **ESC**.

G.2 Pretest/Main test

The pretest function is not available on instruments with the "Caravan" option!

The pretest (using air) is used for the load test (stability test) of newly laid gas pipes. The test is performed at the pipe without gas meter and fittings.

The main test (using air or inert gas, e.g. CO₂ or N₂) is used for the leak test (acceptance inspection) of newly laid or restructured pipes. The test is performed at the pipe, including the fittings, without gas installations and corresponding control and safety equipment.



Gas will escape from a leaky measuring system.

Danger of explosion!

- ▶ Check the complete measuring system for leaks before carrying out any measurement on pipes carrying gas, see *Leakage test*, p. 23.



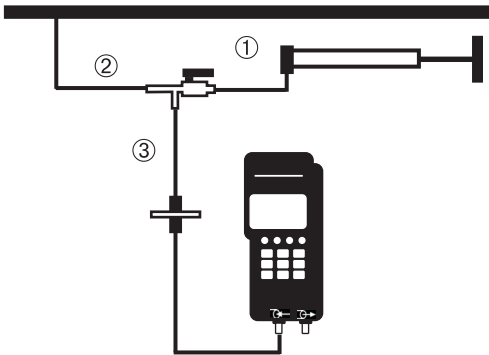
Maximum pressure is exceeded.

Sensors are damaged.

- ▶ Do not apply pressures $\geq 1300\text{mbar}$ on the instrument.

Preparing for measurement:

- ▶ Connect the temperature probe.
- ▶ Connect test pump to the pressure test set ①.
- ▶ Connect pressure test set to the gas pipe ②.
- ▶ Connect pressure test set to the pressure inlet socket of the measuring instrument ③.



Calling up the function

1  → **Pretest** → .

or

1  → **Main test** → .



Measuring

Options:

- ▶ Set adjustment time: → **Adjustment time** → → Set value → → .
 - ▶ Set measurement period: → **Meas. duration** → → Set value → → .
 - ▶ Set test pressure: → **Test pressure** → → Set value → → .
- 2 Open the stop valve of the pressure test set, pressurise the measuring instrument using the test pump and close the stop valve again.
- 3 Start measuring: .

Zeroing will take place (duration: 5 s)

If the pressure applied is higher than the set test pressure, an audible alarm signal sounds (sensor protection). Below the set test pressure, this is automatically deleted.

The adjustment time will run. The start value, actual value and difference value will be displayed.

Options:

- ▶ End adjustment time early and start measuring: .
- ▶ Display values as graphic:
 - ▶ Change between pressure and temperature difference graphic:
, .
 - ▶ Print graphic: .

The measuring phase will be carried out. The start value, actual value and difference will be displayed.

Options:

- ▶ Display values as graphic: .
- ▶ End measuring phase early: .

The readings are displayed when measurement has been completed.

Options:

- ▶ Display a log:
 - ▶ Print log: .
- ▶ Display values as graphic:
 - ▶ Print graphic: .
- ▶ Reject log and open Main menu: → .
- ▶ The log is saved automatically when the measuring phase finishes; open Main menu: .

G.3 Leakage rates

The leakage rate function is not available on instruments with the "Caravan" option!

The measurement of leakage rates is used for the serviceability test of an existing gas pipe system. The pipe can be in operation or shut down during the test.

In the event of pressure fluctuations in the pipe system, the use of a gas feeding unit (accessory) is recommended with which a measurement independent of the mains power supply can be performed.

! If a leakage rate of $>1\text{ l/h}$ is established when measuring leakage rates, a load test must be carried out to check for possible corrosion damage, see High pressure/ Load test, p. 30.



Warnung!

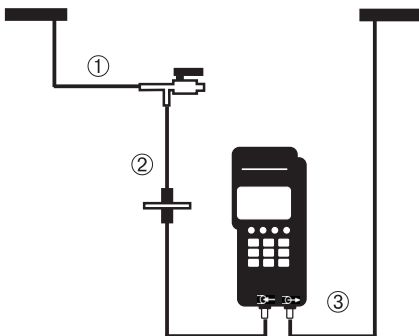
Gas will escape from a leaky measuring system.

Danger of explosion!

- ▶ Check the complete measuring system for leaks before carrying out any measurement on pipes carrying gas, see *Leakage test*, p. 23.

Preparing for measurement

- ▶ Connect the temperature sensor.
- ▶ Connect pressure test set to the gas pipe ①.
- ▶ Connect pressure test set to the pressure inlet socket of the measuring instrument ②.
- ▶ Connect pressure output socket of the measuring instrument to the gas pipe ③.





Calling up the function

1  → **Leakage rates** → **OK**.

If menu query is activated: The line volume and/or line type are requested:

- ▶ Select **Line volume** or **Line type** → **OK**.

Measuring

Options:

- ▶ Set adjustment time (not available if menu query is activated):

Setting → **Adjustment time** → **OK** → Set value → **End** → **ESC**.

- ▶ Set measurement period (not available if menu query is activated):

Setting → **Meas. duration** → **OK** → Set value → **End** → **ESC**.

! According to DVGW* Rules and Regulation VP952, dating from July 2004, the following reference pressure must be used: 22mbar reference pressure in units with an operating pressure ≤ 30 mbar, the current operating pressure in units with operating pressure > 30 mbar.

*German Technical and Scientific Association for Gas and Water.

- ▶ Set reference pressure:

Setting → **Leakage quantities** → **OK** → **on reference pressure** or **on operating pressure** → **OK** → **ESC**.

! Make sure that the gas type is set correctly, otherwise measuring errors will occur.

- ▶ Set gas type:

Setting → **Gas type** → **OK** → Select gas type → **OK** → **ESC**.

Exception:

If **User Gas 1** or **User Gas 2** are selected, the editor for entering the gas factor opens after **OK** is pressed. Factors for user specific gas types can be obtained from Testo Customer Service (with costs, delivery time approx. 4 weeks).

2 Pressurise the measuring instrument.

3 Start measuring: .

Zeroing will take place (duration: 5 s)

If the pressure applied is higher than 1200hPa, an audible alarm signal sounds (sensor protection). Below 1200hPa, this is automatically deleted.

The adjustment time will run. The operating pressure, leakage rate and temperature change will be displayed.

Options:

- ▶ Display values as graphic: .

Where the line volume is <50 l, the adjustment time can be shortened if the stability criteria (pressure change <0.5 mbar, change in leakage rate <0.2 l/h) are satisfied. If this is the case, a message appears stating that measurement can begin. The message is displayed alternately with the readings.

- ▶ End adjustment time early after stability criteria are satisfied and start measuring: .

If the stability criteria are not satisfied:

An advisory message appears. The message is displayed alternately with the readings. Measurement of the leakage rate can continue, but there is no request to carry out a visual check or to assess the serviceability after the measurement. The value for serviceability is automatically set to "unstable".

If the stability criteria are satisfied:

The measuring phase is carried out. The operating pressure, leakage rate and temperature difference are displayed.

Options:

- ▶ End measuring phase early: .
- ▶ Display values as graphic: .

The readings are displayed when measurement has been completed.

Options:

- ▶ Display values as graphic:
 - ▶ Change between pressure, leakage rate and temperature difference graphic: , .
 - ▶ Print graphic: .
 - ▶ Cancel measurement and open Main menu: → .

4 Change to the visual check request: .**5 Carry out the visual check and enter the result:** or .

6 Assess the serviceability and enter the result: Select **Full**, **Reduced** or **None** → **OK**.
The readings are displayed.

Options:

- ▶ Display log: **Log**. Change display view: **▲**, **▼**.
 - ▶ Print log: **Print**.
- ▶ Display values as graphic: **Graphic**.
 - ▶ Change between pressure, leakage rate and temperature difference graphic: **▲**, **▼**.
 - ▶ Print graphic: **Print**.
- ▶ Reject log and open Main menu: **Delete** → **Yes**.
- ▶ Save log and open Main menu: **End**.

G.4 High pressure/Load test

The high pressure/load test function is not available on instruments with the "Caravan" option!



Maximum pressure is exceeded.

Sensors are damaged.

- ▶ High pressure measurement / Load test should only be carried out with the high pressure probe.

Preparing for measurement

- ▶ Connect the high pressure probe.

Calling up the function

1 **High pressure** → **OK**.

Measuring

2 Depressurise the high pressure probe → **Next**.

Zeroing will take place (duration: 5 s)

If the pressure applied is higher than the set test pressure, an audible alarm signal sounds (sensor protection). Below the set test pressure, this is automatically deleted.

Options:

- ▶ Set measurement period: **Setting** → **Meas. period** → **OK** → Set value → **End** → **ESC**.

3 Pressurise the high pressure probe.

4 Start measuring: .

The adjustment time will run. The start value, actual value and difference value will be displayed.

Options:

- ▶ End adjustment time early and start measuring: .
- ▶ Display values as graphic .

The measuring phase is carried out. The start value, actual value and difference value will be displayed.

Options:

- ▶ Display values as graphic: .
- ▶ End measuring phase early: .

The readings are displayed when measurement has been completed.

Options:

- ▶ Display log:
 - ▶ To print the protocol: .
- ▶ Display values as graphic:
 - ▶ Print graphic: .
- ▶ Reject measurement log and open Main menu: → .
- ▶ Save measurement log and open Main menu: .

G.5 Low pressure

The low pressure function is not available on instruments with the "Caravan" option!

Preparing for measurement

- ▶ Connect the temperature sensor.



Warnung!

Gas will escape from a leaky measuring system.

Danger of explosion!

- ▶ Check the complete measuring system for leaks before carrying out any measurement on pipes carrying gas, see *Leakage test*, p. 23.

Calling up the function

- 1  → **Low pressure** → **OK**.

Measuring

Optional:

- ▶ Set measurement period: **MeasPe** → Set value → **End**.

- 2 Start measuring: **Start**.

Zeroing will take place (duration: 5 s).

If the pressure applied is higher than 1200hPa, an audible alarm signal sounds (sensor protection). Below 1200hPa, this is automatically deleted.

The measuring phase begins. The start value, actual value and difference value will be displayed.

Options:

- ▶ Display values as graphic: **Grphic**.
- ▶ End measuring phase early: **Stop**.

The readings are displayed when measurement has been completed.

Options:

- ▶ Display log: **Log**.
 - ▶ Print log: **Print**.
- ▶ Display values as graphic: **Grphic**.
 - ▶ Print graphic: **Print**.
- ▶ Reject measurement log and open Main menu: **Delete** → **Yes**.
- ▶ Save measurement log and open Main menu: **End**.

G.6 Temperature

The temperature function is not available on instruments with the "Caravan" option!

Preparing for measurement



- ▶ Connect the temperature sensor.

Calling up the function

- 1  → **Temperature** → .

Measuring



Optional:

- ▶ Set measurement period:  → Set value → .

- 2 Start measuring: .








The measurement is carried out. The start value, actual value and differential value will be displayed.

Options:

- ▶ Display values as graphic: .
- ▶ End measurement early: .

The readings are displayed when measurement has been completed.

Options:

- ▶ Display log: 
 - ▶ Print log: .
- ▶ Display values as graphic: 
 - ▶ Print graphic: .
- ▶ Reject measurement log and open Main menu:  → .
- ▶ Save measurement log and open Main menu: .

H. Transferring data

A measuring instrument/PC (0409 0178) cable is required in order to transmit data to a PC. You must also refer to the documentation that comes with the software.



I. Care and maintenance

This chapter describes the steps and action required in order to keep the product functioning properly.

I.1 Cleaning the measuring instrument

- ▶ 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.
- ▶ Keep pressure connections clean and grease them lightly at regular intervals.

I.2 Regular calibration

Leakage rates measuring instruments must be calibrated once a year in accordance with DVGW guideline VP952. Calibration is performed by Testo Customer Services or a service point authorised by Testo.

I.3 Inspecting the water trap

The pressure display must respond immediately when pressure is applied in the leakage test. If it does not, the water trap is blocked and must be replaced.

I.4 Changing the water trap



- 1 Pull the hose off the black connecting pieces on both sides of the water trap.
- 2 Change the water trap
- 3 Press the hose back on to the black connecting pieces on both sides of the water trap.

J. Questions and answers

This chapter gives answers to frequently asked questions.

| Question | Possible causes | Remedy |
|--|--|---|
| Measuring instrument keeps switching off or instrument will not switch on. | Rechargeable battery (pack)/ batteries empty | ▶ Charge rechargeable battery (pack), replace batteries or connect mains unit (see <i>Operation</i> , page 11). |
| No pressure can be built up, the pressure escapes. | Inlet or outlet is open. There is a leak. | ▶ Check connections. ▶ Check the system for leaks. |
| No pressure can be built up, the gas path is not leaking. | Water trap is blocked. | ▶ Replace the water trap. |

If we could not answer your question, please contact your dealer or Testo Customer Service. Contact details can be found on the guarantee card or on the Internet under www.testo.com.



K. Technical data

K.1 Standards and tests

Tested to DVGW VP952 by TÜV Munich.

Certification by DGWV has been applied for.

K.2 Measuring ranges and accuracies

| Measurement method | Measuring range | Accuracy | Resolution |
|-----------------------------------|-------------------|--|------------|
| Pressure (internal) | 0...1000 hPa | $\pm 0.5\text{h Pa}$ or $\pm 3\%$ of read.* ¹ | 0.1 mbar |
| Pressure (external)* ² | -1...+30 bar | $\pm 1\%$ of fullscale | 0.01 bar |
| Leakage rate | 0...10 l/h | $\pm 0.2\text{ l/h}$ or $\pm 5\%$ of read.* ¹ | 0.1 l/h |
| Temperature | depends on sensor | | |
| Absolute pressure | 600hPa to 1150hPa | $\pm 10\text{Pa}$ | 0.1Pa |

*¹ whichever is the greater

*² via high pressure probe 0638 1842

K.3 Other device data

| Characteristic | Values |
|--|---|
| Ambient temperature | 5...40 °C |
| Storage temperature | -20...60 °C |
| Max. pressure (internal) | 1200 hPa |
| Pressure valve | opens at 1200mbar, closes at 1100mbar |
| Permitted operating pressure (pressure testing set + accessories) | 4 bar |
| Power supply | Rechargeable battery pack (0515 0097) 4 x mignon rechargeable batteries, AA 4 x mignon rechargeable batteries, AA Mains unit (0554 1084) |
| Battery operation time | > 5 hrs |
| Display | Dot matrix |
| Printer | integrated |
| Interfaces | RS232 |
| Dimensions (L x W x H) | 252 x 115 x 58 mm |
| Warranty | Measuring instrument: 2 years (except printing unit) Accessories: 2 years |

Factory settings and adjustment ranges

| Measurement method | Adjustment time [min] | Meas. period [min] | Test pressure [hPa] |
|-----------------------|-----------------------|----------------------|----------------------|
| | Factory/ min. / max. | Factory/ min. / max. | Factory/ min. / max. |
| Leakage test | 2/-/- (fix) | 1/-/- (fix) | 900.0/800.0/1000.0 |
| Pretest | 2/1/480 | 10/1/480 | 1000.0/1.0/1000.0 |
| Main test | 2/1/480 | 10/1/480 | 150.0/1.0/200.0 |
| With option „Caravan“ | 5/1/480 | 5/1/480 | 155.0/1.0/200.0 |
| Leakage rates | 2/1/480 | 5/1/480 | 22.0/1.0/1000.0 |
| High pressure | 2/1/480 | 10/1/480 | 3000.0/1000.0/6000.0 |
| Low pressure | - | 10/1/480 | - |
| Temperature | - | 10/1/480 | - |

Serviceability test with menu query activated

Adjustment time and measurement period as a function of the line volume:

| Line volume [l] | Adjustment time [min] | Meas. period [min] |
|-----------------|-----------------------|--------------------|
| <=50 | 10 *1 | 5 |
| <=100 | 10 | 5 |
| <=200 | 30 | 10 |
| <=300 | 60 | 15 |
| <=400 | 120 | 20 |
| <=500 | 240 | 25 |
| > 500 | 480 | 50 |

*1 If the stability criteria (pressure change < 0.5 mbar, change in leakage rate < 0.2 l/h) are satisfied in the adjustment time, the adjustment time can be shortened.

Test pressure as a function of the line type

(Also refer to „Technical specifications for gas installations (DVGW TRGI) 86; 96 Edition, Page 13):

| Line type | Test pressure [hPa] |
|-------------------|---------------------|
| Distribution line | 70 hPa |
| Consumer line | 22 hPa |

Caculation formula for measurement cycle

The measurement cycle (time interval in which readings are taken) is calculated as follows using the measurement duration entered:

(Measuring duration [min] + 9) / 10 = quantifying parameter for measurement cycle.

The quantifying paramter (rounded to whole numbers) gives the measurement cycle in seconds.







L. Accessories/spare parts

| Designation | Article no. |
|--|-------------|
| testo 314 | 0560 3140 |
| testo 316-1 | 0632 0316 |
| TopSafe testo 316 | 0516 0189 |
| Power unit | 0554 1084 |
| Battery pack | 0515 0097 |
| Battery (4 pieces), type AA, 1.5 V | 0515 0014 |
| Test pump for generating pressure | 0554 3157 |
| Single pipe counter cap, connects test fittings to pipe | 0554 3156 |
| Two valve branch (brass) for connecting 2 or more pipes, can be blocked off separately | 0554 3161 |
| Single valve stop for blocking off pipe | 0554 3162 |
| LW6 connection hose to connect T-fitting/single-pipe counter cap or extension purposes | 0554 3158 |
| Conical test stop 1/2" for connection test set to gas pipe 16-32 mm | 0554 3151 |
| Conical test stop 3/4" for connection test set to gas pipe 24-44 mm | 0554 3155 |
| Conical test stop 1" for connection test set to gas pipe 35-65 mm | 0554 3152 |
| High-pressure stage stop 3/8" and 3/4" to connect test set to gas pipe | 0554 3163 |
| High-pressure stage stop 1/2" and 1" to connect test set to gas pipe | 0554 3164 |
| Leak detection spray for spraying on gas pipe, shows leaking points where bubbles form | 0554 3166 |
| Pressure release plug | 0554 3171 |
| Gas feeding unit for testo 314 | 0554 3142 |
| System case with hose set | 0516 3140 |
| Spare thermal paper for printer (6 rolls) | 0554 0569 |
| Pressure set for gas pressure measurement on heating units | 0554 0449 |
| Hose set for connection to gas pipe with test pump and conical test plug 1/2" | 0554 3141 |
| High-pressure probe 30 bar with connection line | 0638 1842 |
| High-pressure probe 15 bar with connection line | 0638 1743 |
| Analysis software | 0554 3332 |
| Measuring instrument/PC connecting cable | 0409 0178 |
| Calibration certificate | 0520 0084 |
| Pipe wrap probe for pipes with diameter up to 2" | 0600 4593 |
| Surface probe | 0604 0194 |
| Connection line for surface probe | 0440 0143 |
| Water trap | 0554 3146 |


Functional overview

The table gives an overview of the most important functions configured on the instrument. Detailed information about the individual functions can be found on the pages indicated.

| Task | Call/function | see page |
|---|---|----------|
| |  → | |
| Perform leakage test | Leakage test → OK | 23 |
| Perform pretest | Pretest → OK | 24 |
| Perform main test | Main test → OK | 24 |
| Perform serviceability test | Leakage rates → OK | 27 |
| Perform high-pressure measurement/ Load test | High pressure → OK | 30 |
| Perform low-pressure measurement | Low pressure → OK | 32 |
| Perform temperature measurement | Temperature → OK | 33 |
| |  → Memory → | |
| Display measurement log | Select Protocol → OK | 16 |
| Delete entire memory | Delete memory → OK | 16 |
| Display free memory | Free memory → OK | 16 |
| |  → Instr. → | |
| Change date/time | Change date → OK | 19 |
| Set up printer | Printer → OK | 19 |
| Set up display light | Light → OK | 19 |
| Activate/deactivate menu query | Menu query → OK | 19 |
| Set up units | Units → OK | 19 |
| |  → Servi. → | |
| Display operating values | Operating values → OK | 22 |
| Reset values to factory setting | Reset factory → OK | 22 |
| Display service address | Service address → OK | 22 |
| Display device data | Device data → OK | 22 |
| Set language | Language → OK or Sprache → OK | 22 |



40 Functional overview

| Task | Call/function | see page |
|-------------------------------------|---|----------|
| |  → Site (Car-Sn) → | |
| Activate site (serial number) | Select site → OK | 18 |
| Create new site (new serial number) | Edit → New site (new car serial number) → OK | 18 |
| Copy site (serial number) | Edit → Copy → OK | 18 |
| Rename site (serial number) | Edit → Rename → OK | 18 |
| Delete site (serial number) | Edit → Delete → OK | 18 |

