



testo 514 refrigerant leak detector

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Instruction manual



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1 About this document

- The instruction manual is an integral part of the instrument.
- Please keep this documentation available for future reference.
- Always use the complete original instruction manual.
- Please read this instruction manual through carefully and familiarize yourself with the product before putting it to use.
- Hand this instruction manual on to any subsequent users of the product.
- Pay particular attention to the safety instructions and warning advice in order to prevent injury and damage to the product.

2 Safety and disposal

2.1 Security

General safety instructions

- Only operate the product properly, for its intended purpose, and within the parameters specified in the technical data.
- Do not apply any force.
- Do not operate the instrument if there are signs of damage on the housing, mains unit or connected cables.
- Dangers may also arise from objects to be measured or the measuring environment. Always comply with the locally valid safety regulations when carrying out measurements.
- Do not store the product together with solvents.
- Do not use any desiccants.
- Only perform maintenance and repair work on this instrument that is described in this documentation. Follow the prescribed steps exactly when doing the work.
- Use only original spare parts from Testo.
- The substantial safety and health requirements are fulfilled in accordance with the following norms:
 - DIN EN 14624
- The leak detector must not be exposed to the processes that generate significant electrostatic charges.

Batteries

- Improper use of batteries may cause the batteries to be destroyed, or lead to injury due to current surges, fire or escaping chemicals.
- Do not expose the batteries to heavy impacts, water, fire or temperatures in excess of 60 °C.
- In the event of contact with battery acid: rinse affected areas thoroughly with water, and if necessary consult a doctor.

Warnings

Always pay attention to any information denoted by the following warnings. Implement the precautionary measures specified!

 **DANGER**

Risk of death!

 **WARNING**

Indicates possible serious injury.

 **CAUTION**

Indicates possible minor injury.

ATTENTION

Indicates possible damage to equipment.

2.2 Disposal

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



WEEE Reg. No. DE 75334352

3 Product-specific information

- Do not carry out measurements on live components.
- Do not operate the instrument in environments above 80 %RH (condensing).
- Do not use in damp environments. Do not use in the rain or similar conditions. It is recommended to use indoors.
- Observe the permissible storage and transport temperatures and the permissible operating temperature (e.g. protect the measuring instrument from direct sunlight)!
- Always carry out a function test before searching for leaks.
- If the instrument is misused or subjected to force, all warranty claims will be voided!
- Do not allow the sensor to come into contact with moisture or acids, as it will react cross-sensitively.

4 Intended use

The testo 514 is a leak detector for the short-term detection of leaks in refrigerant systems.

The following substances can be detected:

- Refrigerants: all CFCs, HCFCs, HFCs, HFOs, mixtures (including A2Ls)

The instrument is not suitable for precise measurement of the concentration.

ATTENTION

Restrictions on the field of use

- **Do not use the instrument in potentially explosive atmospheres!**
 - **Do not use the instrument as a monitoring instrument for personal safety! The instrument is not protective equipment!**
 - **Do not use the instrument as a gas analyzer! The sensor detects almost all combustible gases alike.**
-

5 Product description

5.1 Instrument overview



Symbol explanation

	Observe operating instructions
	Declaration of conformity: Products marked with this symbol comply with all applicable Community regulations of the European Economic Area.
	Declaration of conformity: Products marked with this symbol comply with all applicable Community regulations of the United Kingdom.
	Australian certification symbol
	Certification symbol of the FCC in the USA
	At the end of the product's useful life, dispose of it in accordance with local regulations for the separate collection of electrical and electronic equipment, or return it to Testo for disposal.

6 First steps

6.1 Inserting / changing batteries

⚠ DANGER

Do not open the battery compartment in potentially explosive atmospheres!

⚠ WARNING

Serious risk of injury to the user and/or destruction of the instrument. There is a risk of explosion if the batteries are replaced with ones that are the wrong type.

- Only use non-rechargeable alkaline batteries.

- ✓

The instrument is switched off.
- 1

Open the battery compartment (on the back of the instrument) via the snap lock.
- 2

Insert or replace batteries (3 x AA alkaline batteries).

Observe the polarity!
- 3

Close the battery compartment.



When not in use for a long period: Take out the batteries.

Symbol explanation

	Do not allow children under 6 years of age to play with batteries.
	Do not throw batteries in the trash.
	Do not charge batteries.
	Do not place batteries near fire.



Batteries are recyclable.

6.2 Getting to know the product

6.2.1 Switching the instrument on and off

Switching on

Only switch on the instrument in fresh air, since automatic zeroing is carried out when the instrument is switched on. The ambient temperature and ambient humidity during zeroing should correspond to the ambient conditions at the measuring location. If necessary, zero again manually at the measuring location (switch off and on again).



If the unit is not used for a prolonged period of time, the sensor will become contaminated. Particularly if the instrument has not been in operation for a prolonged period of time (> 2 weeks), it should be left switched on for a while before being used. The longer it has not been in operation, the longer this additional warming-up phase should be. Please note that the instrument switches itself off by default after 10 min of inactivity.

- 1 Press and hold down (2 sec) the **On/Off** key.

Warm-up phase (HEAT)

- ▶ The instrument starts up. With regular use, the warm-up period takes approx. 60 sec and is symbolized by a countdown.
- ▶ Following the warm-up period, the detection view is displayed.

Switching off

CAUTION

Caution! Risk of burns due to hot sensor head after prolonged operation.

- **Before touching the sensor head or packing the instrument: switch instrument off and let the sensor head cool down.**

- 1 Press and hold down (2 sec) the **On/Off** key.
- ▶ The instrument is switched off.

Auto OFF

After 10 minutes of inactivity (no user input, no gas concentration above the warning threshold), the instrument switches itself off. The switch-off is signalled beforehand by an alarm sound and a 10 sec countdown.

You can prevent the instrument from switching off by pressing any key within 10 seconds.

7 Using the product

7.1 Controls

	
1	Sound / Gas key
2	MODE / On/Off key
3	Manual / Auto mode
4	Bar display
5	Maximum value
6	Display for alarm signal, error codes and charge level
7	Current value
8	Detection parameter
9	SENS. / Illumination key
10	VIEW / ->0<- key (zeroing)

7.1.1 Implementing settings

Selecting, opening and setting functions

- 1
- Press the relevant key to select the functions.

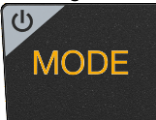
Secondary assignment (long press)

All keys with a white corner have a secondary assignment, which can be selected by pressing and holding the key (2 sec).

Adjustable functions



Ensure correct settings: all settings are transferred immediately. There is no Cancel function.

Function	Setting options/comments
On/Off (long press 2 sec) 	Switches the instrument on or off
Zeroing mode 	Switch between automatic and manual zeroing mode
Alarm sound 	Change alarm tone (high, low, off) The frequency of the alarm sound increases as the concentration increases.
Display illumination (long press 2 sec) 	The brightness of the display lighting is reduced by 50%.
Sensitivity 	Switch sensitivity between High 3 g/a and Low 14 g/a (only possible in manual mode, in automatic mode press and hold to switch the device to manual mode and perform a zeroing)

Function	Setting options/comments
Zeroing (long press 2 sec) 	Zero measurement values (incl. max value) (only possible in manual mode, in automatic mode press and hold to switch the device to manual mode and perform a zeroing)
VIEW 	Switch between bar display and segment display

7.2 Carrying out a function test

- 1 Apply low-concentration gas to the sensor (max. 10 sec).
- ▶ If the sensor does not respond (no alarm), the instrument is defective and must no longer be used. The instrument must be taken to the service centre for repair.



Due to the selectivity of the sensor, gas equivalents are not suitable for checking the function and especially not for calibrating the sensor.

Lighters or car exhaust fumes can contaminate the sensor and must therefore not be used for functional testing.

7.3 Carrying out refrigerant detection

The refrigerant loss can be output in grams/year (g/a), but the instrument only measures the concentration as an input quantity. A conversion is carried out in the instrument. For this, the leak must be scanned at a defined speed of ~2 cm/sec at a distance of ~1 cm.

Selecting the refrigerant to be detected

- ▶ The refrigerant to be detected is automatically detected when a refrigeration sensor is plugged.

Carrying out the detection

- 1 Move the sensor head as close as possible and at low speed (approx. < 2 cm per second) over the components that are to be checked for leaks.
 - ▶ The surface of the sensor must not be covered.
- 2 Observe the display: The more bars or rings that appear, the higher the measured refrigerant concentration.
- 3 Identify the area with the highest reading as a possible leak.
 - ▶ If the acoustic alarm is enabled, a warning sound is emitted when the warning threshold is exceeded, the frequency of which increases as the concentration increases, and changes to a continuous tone when the second alarm threshold (35 ppm) is exceeded.

Changing units

By default, the display shows ppm (concentration in parts per million). From a concentration of >999 ppm, the display changes to vol% (1000 ppm=0.1 vol%). It is not possible to manually change the units.

After the detection

- 1 Ventilate the sensor thoroughly after each use. To do this, place the instrument in fresh air for approx. 2 minutes before using it again.

7.3.1 Selecting the detection view

- 1 Press the **[VIEW]** key, to switch between the different detection views.

- ▶ The gas concentration is displayed using a bar graph that rises from the bottom to the top.

As the concentration increases, the bar graph fills up from the bottom to the top—more bars appear.

As the concentration decreases, the number of bars displayed decreases accordingly from the top to the bottom.



If five or more bars are displayed in the “High” sensitivity level bar graph, an estimated leakage rate of 5 g/a is reached. Given the metal oxide sensor technology used, this value should be considered a guideline only and may vary depending on environmental conditions and external factors.

The PPM display is for guidance only and does not replace a measurement. The testo 514 is an electronic gas leak detector and not a measuring instrument.

For proper and reliable leak detection, we recommend regular calibration by an authorized service provider.

- ▶ The gas concentration is represented by rings arranged around a central point.

As the concentration rises, the rings are gradually displayed from the outside in.

As the concentration falls, the rings are gradually hidden from the inside out.



8 Maintaining the product

8.1 Changing batteries

The instrument indicates that the battery needs to be changed via a flashing, empty battery symbol.

To change the battery, see the section “Inserting/changing batteries”.

8.2 Cleaning the instrument

DANGER

Danger from electrostatic charge!

- Clean the instrument only outside the hazardous area.

- 1 If the housing of the instrument is dirty, clean it with a soft, slightly damp, lint-free cloth.



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

Storage & transportation

To prevent contamination of the sensor, please do not store or transport the instrument in an environment where any tobacco smoke, foul air, oils, greases, silicones, evaporating liquids or gases are present. Any sensor that is contaminated as a result of storage or transportation must be cleaned before use, see Cleaning the sensor.

Regular inspection

Testo recommends having the gas leak detector inspected by an authorized service centre every year.

8.3 Cleaning the sensor



Danger from electrostatic charge!

- Clean the sensor only outside the hazardous area.**

Tobacco smoke, dirty air, oils, greases, silicones and evaporating liquids or gases can leave deposits on the sensor surface. Possible consequences are reduced sensitivity, distorted displays of gas concentration or display of a background concentration. Clean the sensor if necessary.

- 1 Switch on the instrument, allow it to initialize and then switch it off.
Repeat this procedure several times.
- 2 If the sensor head is dirty, clean it with a soft, slightly damp, lint-free cloth.
 - ▶ Wipe the sensor gently; do not rub it vigorously.
 - ▶ Do not use damp cloths or cleaning agents on the sensor.
 - ▶ Use distilled water for moistening.

Switching on regularly

If the instrument is used infrequently, deposits may build up on the sensor. Switching the instrument on prevents these deposits from building up on the sensor. Testo recommends switching the instrument on regularly to avoid deposits building up on the sensor.

Changing the sensor



Do not change the sensor in potentially explosive atmospheres!

The sensor head can be unscrewed and replaced without tools.



Install only sensors that are intended for use with the device; see the “Accessories and spare parts” section.

- ✓ Switch off the device before changing the sensor.

- 1 Remove the sensor from the front end of the gooseneck.



- 2 Snap the new sensor onto the connector on the gooseneck until it clicks into place.

- ▶ The replacement sensor is pre-calibrated and ready for immediate use.
-



If the sensor was replaced while the device was turned on, the device must be restarted afterward.

9 Technical data for testo 514

Feature	Value
Detection parameters	ppm
Detectable refrigerants	All CFCs, HFCs, and F-gases, for example FX80, I12A, R11, R114, R12, R123, R1234yf, R1234ze, R124, R125, R12a, R13, R134a, R13B1, R14, R142b, R161, R22, R227, R23, R236fa, R245fa, R32, R401A, R401B, R401C, R402B, R403B, R404A, R406A, R407A, R407B, R407C, R407D, R407F, R408A, R409A, R410A, R411A, R412A, R413A, R414B, R416A, R417A, R417B, R417C, R420A, R421A, R421B, R422A, R422B, R422C, R422D, R424A, R426A, R427A, R434A, R437A, R438A, R448A, R449A, R452A, R500, R502, R503, R507, R508A, R508B, R1233zd, R450A, R455A, R513A, R407H, R444B, R452B, R453a, R454A, R454B, R454C, R458A, SP22, R290, R600, R702
Detection range	lower response threshold (detection limit): 3 g/year
Resolution	1 ppm
Sensitivity	3g/a (High); 14g/a (Low)
Start-up time	> 30 sec
Response time	Response time < 2 sec
Leak alarm	Visual, audible alarm
Operating temperature	-10 to +50 °C
Operating humidity	0 to 80 %RH
Operating altitude	≤ 2,000 m
Storage temperature	-20 to +60 °C
Battery type	3x AA Alkaline
Battery life	10 h
Level of contamination	PD2
IP class	IP30
Dimensions	135 x 60 x 28 mm (L x W x H) Probe length with sensor 330 mm
Weight	296 g
Regulations	DIN EN 14624

10 Tips and assistance

10.1 Questions and answers

Question	Possible cause	Possible solution
Zero point is unstable	Contamination of the sensor after a prolonged period of non-use	Leave the instrument switched on until the zero point has stabilized.
Instrument does not switch to measuring mode (remains in warm-up phase)	Battery voltage too low	Change the batteries

10.2 Accessories and spare parts

Description	Order no.
Transport bag	0590 0018
Refrigeration sensor	0554 4515

11 Support

You can find up-to-date information on products, downloads and links to contact addresses for support queries on the Testo website at: www.testo.com.

If you have any questions please contact your local dealer or the Testo Customer Service. You can find contact details on the back of this document or online at: **www.testo.com/service-contact**



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