testo 316-EX · gas leak detector

Instruction manual

1 Safety and the environment

1.1. About this document

Use

> Please read this documentation through carefully and familiarize yourself with the product before putting it to use. Pay particular attention to the safety instructions and warning advice in order to prevent injuries and damage to the products.

> Keep this document to hand so that you can refer to it when necessary.

> Hand this documentation on to any subsequent users of the product.

1.2. Ensure safety

> Do not operate the instrument if there are signs of damage at the housing, mains unit or feed lines.

> Only operate the product properly, for its intended purpose and within the parameters specified in the technical data. Do not use any force.

> Do not store the product together with solvents. Do not use any desiccants.

> Only use the device in closed, dry rooms and protect it from rain and moisture.

> Carry out only the maintenance and repair work on this instrument that is described in the documentation. Follow the prescribed steps exactly. Use only original spare parts from Testo.

1.3. Protecting the environment

> Dispose of faulty rechargeable batteries/spent batteries in accordance with the valid legal specifications.

> At the end of its useful life, send the product to the separate collection for electric and electronic devices (observe local regulations) or return the product to Testo for disposal.

2 Specifications

2.1. Use

The testo 316-EX is a gas leak detector for the short-term detection of gases in areas at risk of explosion according to Directive 94/9/EC (ATEX).

Areas of application are the gas detection in rooms and the location of leaks at gas systems. The instrument is designed for use by trained personnel.

⟨Ex⟩ For operation in areas at risk of explosion, also observe the **Safety instructions** document.

Explosion limits of flammable substances

A flammable substance in the air has a lower explosion limit (LEL) and an upper explosion limit (UEL). The air/gas mixture is flammable anywhere between these two limits, potentially leading to an explosion (critical range). Below the LEL, the mixture is too lean for an explosion, and above the UEL it is too rich (non-critical range).

The explosion limits depend on the substance:

• Methane CH_4: LEL 4.4 vol% / UEL 16.5 vol%

• Propane C_3H_8: LEL 1.7 vol% / UEL 10.9 vol%

• Hydrogen H_2: LEL 4.0 vol% / UEL 77.0 vol%

Restrictions of the application range

Do not use the instrument as a monitoring instrument for personal safety! The testo 316-EX is no protective equipment!

Do not use the instrument as a gas analyzer! The sensor detects almost all flammable gases to the same extent.
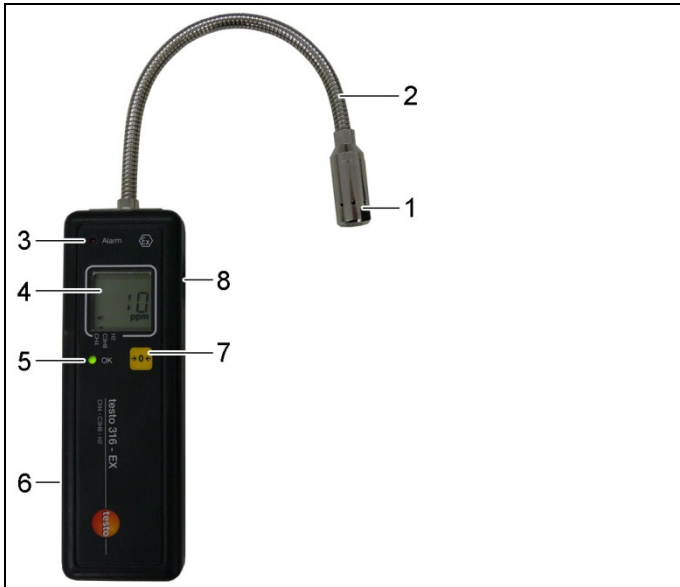
2.2.   Technical data

Characteristic	Values
Type	Semi-conductor
Response threshold	1 ppm
Reaction time (t90)	14 s
Measuring range	Methane CH4: 0 ppm up to 2.5 vol% Propane C3H8: 0 ppm up to 1.0 vol% Hydrogen H2: 0 ppm up to 2.0 vol%
Accuracy (at 20 to 50 % RH, 0 to 40 °C/32 to 104 °F)	at 100 ppm: -50 ppm to +150 ppm at 0.1 vol%: -250 ppm to +0.2 vol%
Accuracy (at 20…50 % RH, -10 to 0 °C/ 14 to 32 °F)	at 100 ppm: -60 ppm to +150 ppm at 1,0 Vol%: -0,4 Vol% to +0,3 Vol%
Accuracy at 50% LEL (at 20 to 50 % RH, 0 to 40 °C/ 32 to 104 °F)	CH4 (2.2 Vol%): -0.2 to +0.2 Vol% C3H8 (1.0 Vol%): -0.2 to +0.3 Vol% H2 (2.0 Vol%): -0.2 to +0.2 Vol%
Resolution	at 0 to 999 ppm: 1 ppm at 0.1 to 2.5 vol%: 0.1 vol%
Power supply	2 x 1.5 V mignon/AA
	⟨Ex⟩ Type approved for use in areas at risk of explosion: Camelion Alkaline PLUS AA
Battery life	approx. 6 h (typical)
Storage/transport conditions	-10 to 50 °C / 14 to 122 °F 0 to 70 % RH
Operating conditions	-10 to 40 °C / 14 to 104 °F 20 to 80 % RH not condensing
Weight	approx. 200 g/0.44 lb. (incl. battery)
Dimensions (L x W x H)	Housing: approx. 135 x 45 x 25 mm / 5.31 x 1.77 x 0.99" Long, flexible sensor shaft including sensor head: approx. 200 mm/7.87"
Protection class	IP54

Characteristic	Values
Warranty	2 years, warranty conditions: see www.testo.com/warranty
EC Directives	94/9/EC (ATEX) 2014/30/EC
ATEX instrument labelling	CE 1258 ⟨Ex⟩ II 2 G Ex ib IIC T1

3 Product description

3.1. Overview

1 Sensor head with gas sensor and exchangeable protection cap
2 Flexible sensor shaft
3 Alarm LED
4 Display
5 Readiness LED
6 Battery compartment (on rear)
7 Control key
8 On/off switch

4 First steps

4.1. Commissioning

Inserting batteries

✓ The instrument is switched off.

1. Open battery compartment (on rear of instrument) using enclosed Allen key.

⟨Ex⟩ Battery type approved for use in areas at risk of explosion: Camelion Alkaline PLUS AA

2. Insert batteries/rechargeable batteries (observe the polarity!).
3. Close battery compartment, tighten Allen head bolt by hand.

4.2. Getting to know the product

Switching on

Only switch on the instrument in fresh air as an automatic zeroing is performed at the end of the warm-up time. The ambient temperature during zeroing should correspond to the temperature at the measuring location. If required, zero again manually at the measuring location.

i When not in use for a long period of time, the sensor becomes contaminated due to oxidation, causing the zero point to become unstable. If the instrument has not been in operation for a long period of time (> 2 weeks), it must be switched on approx. 30‑45 minutes before use and thereafter zeroed manually.

i If the instrument has been stored at temperatures <0 °C/<32 °F, it must be switched on 10 minutes before use and thereafter zeroed manually.

> Push up on/off switch on the right side of the instrument.
- The sensor is warmed up (duration: approx. 60 s).
  During the warm-up time, the following information is shown in succession:
  - All segments light up. Display segment test
  - **WAIT**: wait
  - **V3.03** (example): firmware version (important information in the event of service)

- • **T126** (example): sensor table version (important information in the event of service)
- • **PPM**: measuring unit, alarm LED (red) and status LED (green) alternately light up
- • Display light is switched on
- • **152** (example): check value (important information in the event of service)
- • **CH4** (methane), **C3H8** (propane) or **H2** (hydrogen): set gas type
- • **EN** (English), **DE** (German), **FR** (French), **ES** (Spanish), **IT** (Italian) or **CS** (Czech): set instrument language
- • **batt** and bar graph: remaining battery capacity
- • **NP** and two short signal tones: automatic zeroing is performed
- - The instrument is ready for use if the status LED (green) lights up and a reading is shown in the display.
- - With **ToN3** (readiness tone) function activated, a short signal tone is also emitted every 20 s as an indication of the readiness for operation.

Switching off
> Push down on/off switch on the right side of the instrument.

Set language
The instrument language is set to **EN** (English) in the condition on delivery. Proceed as follows to change the instrument language:

✓ The instrument is in the measurement view.

1. Press and hold **[--> 0 <--]** for approx. 8 s until a pulsed signal tone sequence sounds.
2. Repeatedly press **[--> 0 <--]** briefly until **LANGUA** is shown.
3. Press and hold **[--> 0 <--]** until the display changes.
4. Repeatedly press **[--> 0 <--]** briefly until the desired language is shown: **EN** (English), **DE** (German), **FR** (French), **ES** (Spanish), **IT** (Italian) or **CS** (Czech).
5. Press and hold **[--> 0 <--]** until the display changes.
- - **EXIT** is displayed.
6. Press and hold **[--> 0 <--]** until the display changes.
- - The instrument is once again in measurement view.

5 Using the product

5.1. Performing settings

Open configuration menu

- ✓ The instrument is in measurement view.
- \> Press and hold **[--> 0 <--]** for approx. 8 s until a pulsed signal tone sequence sounds.
- \- The instrument is in configuration view.

Selecting, opening and setting functions
- \> To select the next function: Briefly press **[--> 0 <--]**.
- \> To open the selected function: Press and hold **[--> 0 <--]** until the display changes.
- \> To set the opened function: Briefly press **[--> 0 <--]**.
- \> To end the function: Press and hold **[--> 0 <--]** until the display changes.

Adjustable functions

> **i** Ensure correct settings: All settings are applied immediately; there is no cancel function.

Function	Setting options/comments
LIGHT (display light)	**OFF** (display light cannot be activated) or **ON** (display light can be activated)
SOUND1 (alarm tone)	**ON** (acoustic alarm on) or **OFF** (acoustic alarm off). The frequency sequence of the alarm tone becomes faster with a higher concentration.
ALARM (alarm threshold)	Any value within the measuring range.
	i If a value above the measuring range final value is set: The alarm tone sounds after reaching the measuring range final value (CH4: 2.5 vol%, C3H8: 1.0 vol%, H2: 2.0 vol%).
	The respective flashing number can be set; the number that can be set changes if a button is not pressed for 5 s.

Function	Setting options/comments
PROBE (detection characteristic curve)	**CH4** (methane), **C3H8** (propane) or **H2** (hydrogen)
SOUND3 (readiness tone)	**OFF** (readiness tone off) or **ON** (readiness tone on). A short signal tone every 20 s.
CONTRAST (display contrast)	Value between **0005** and **0025**
LANGUA (instrument language)	**EN** (English), **DE** (German), **FR** (French), **ES** (Spanish), **IT** (Italian) or **CS** (Czech)
Exit (close configuration menu)	-

5.2. Performing gas detection

> **CAUTION**
>
> **Destruction of the sensor by external influences!**
> > Do not expose the sensor to high concentrations of H_2S (hydrogen sulphide), SO_x (sulphur dioxides), Cl_2 (chlorine) or HCl (hydrogen chloride).
> > Avoid contact between alkaline materials or water and the sensor.
> > Avoid the effect of moisture and frost on the sensor.

i Have the instrument calibrated by the manufacturer annually.

i Checking natural gas pipelines or hydrogen pipelines: Methane (the main constituent of natural gas) and hydrogen are lighter than air. The detection should take place above the line/the suspected leak.

Checking propane gas pipelines: Propane is heavier than air. The detection should take place below the line/the suspected leak, starting from the ground up.

> Guide the sensor head as near as possible and at a low speed (approx. < 2 cm per second) over the components that are to be checked for leaks.
- If the set alarm value is exceeded, the **Alarm** LED lights up red. If the acoustic alarm is switched on a warning tone also sounds,

the frequency sequence of which becomes faster as the concentration increases.

Manually perform zeroing

It is only possible to manually set the zero point if the gas concentration currently detected is below 1000 ppm.

> **i** Gas concentrations present at the point of the zeroing are suppressed by means of the zeroing. The reading shown therefore no longer conforms to the gas concentration actually present.

✓ The instrument is in the measurement view.

\> Briefly press **[--> 0 <--]**.

\- The zero point is reset.

Switching display light on/off

✓ The instrument is in the measurement view.

✓ The **LIGHT** function is activated.

\> Press and hold **[--> 0 <--]** until a signal tone sounds.

\- The display light is switched on or off.

\- The display light automatically goes out if no buttons are pressed for 2 minutes.

6 Maintaining the product

Changing the batteries

⟨Ɛx⟩ Do not change the battery in areas at risk of explosion.

✓ The instrument is switched off.

1. Open battery compartment (on rear of instrument) using enclosed Allen key.

⟨Ɛx⟩ Battery type approved for use in areas at risk of explosion: Camelion Alkaline PLUS AA

2. Remove empty batteries and insert new batteries (observe the polarity!).
3. Close battery compartment, tighten Allen head bolt by hand.

Cleaning the 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.

Clean protection cap

Contamination at or in the protection cap can be removed using compressed air.

CAUTION
Destruction of the sensor
> With the sensor protection cap open, take care that the sensor is not damaged.
> Do not direct the compressed air jet at the sensor, do not touch the sensor.

1. Carefully unscrew protection cap from sensor shaft.
2. Blow out protection cap and then screw on again.

7 Tips and assistance

7.1. Questions and answers

Question	Possible causes	Possible solution
Error is displayed.	Instrument error	> Contact Testo Customer Service or your dealer.
F30 is shown and the red LED lights up	Sensor faulty	> Contact Testo Customer Service or your dealer.
Zero point instable	Contamination of the sensor due to oxidation during long periods of non-use	> Leave instrument switched on until the zero point stabilizes (can take up to 45 minutes).
The instrument does not change to measuring mode (remains in the warm-up phase)	Battery voltage too low	> Change batteries.

If we could not answer your question, please contact your dealer or Testo Customer Service. You can find the contact data in the Internet under: www.testo.com/service-contact

7.2. Accessories and spare parts

Description	Article no.
Camelion Alkaline PLUS AA battery, 1 pc. Note: 2 batteries are required for the testo 316-EX	0515 0316
Sensor protection cap	0180 0316