Operating manual

Leakage detector

Testo Sensor LD

1 Contents

2 Important information

Dear customer,

thank you for purchasing our leakage detector! Please read these operating instructions thoroughly and observe our notices before performing the commissioning. Only if the described regulations and notices are precisely observed, can the flawless function of the device and the safe operation be guaranteed.

In case of a non-observance or non-compliance, no claims for the resulting damages can be asserted based on the manufacturer's liability.

Any kind of modification of the equipment, provided that it does not correspond to the intended and described processes, will lead to the expiry of the warranty and exclusion of liability.

The device is solely intended for the described purpose.

We assume no assume any warranty with respect to the suitability for any particular purpose, and shall not assume any kind of liability for errors which are printed in this manual. Nor for consequential damages in connection with the delivery, performance or use of this device.

3 Safety instructions

3.1 About this document

- Read through carefully this documentation and familiarize yourself with the product before putting it to use. Pay particular attention to the safety warnings to prevent injury and product damage.
- Keep this documentation to hand for easy reference when needed.
- Pass on this documentation to any subsequent users of the product.

3.2 Ensure security

- Use the product only appropriate, in accordance with the regulations and within the parameters specified in the technical data. Do not apply force.
- Measure the unit away from or near energized parts!

Please maintain a sufficient safety distance during the leak checking on electric systems, in order to avoid dangerous electrical shocks!

- Always switch on the device, **before** putting on the headphones! In case of high signal levels (bar graph in the red zone), the volume can be correspondingly high. The volume can be reduced with the help of the sensitivity adjustment.

- Never point the laser directly into the eyes! Absolutely devoid a direct irradiation of the eyes of humans and animals!
  Laser module: according DIN EN 60825-1:2015-07 Class 2 (<1mW)
- Observe the prescribed storage and operating temperatures
- By improper use of the device, the warranty will be lost.

3.3 Environmental protection

- Disposal of faulty rechargeable batteries / empty batteries in accordance with applicable legal regulations
- Lead back the product after the end of the period of use to the separate collection for electric and electronic devices (observe local regulations) or return the product to Testo for disposal.

4 Function description

Noises in the ultrasonic range develop when gases escape from leaks in piping systems (leaking screw connections, corrosion etc.). With the TESTO SENSOR LD even the smallest leaks, which are inaudible to the human ear and also non-visible due to their size, can be detected even if they are several meters away. The TESTO SENSOR LD converts the inaudible ultrasonic to audible frequencies. With the conveniently wearable and soundproof headphones, these sounds can even be perceived in noisy environments.

With the help of an integrated laser pointer, which serves as a targeting device, the leak can be located even more accurately.

The sensitivity of the device can be further improved through the use of a specially designed acoustic trumpet, which can ensure a greater concentration of the sound waves.
This acoustic trumpet acts as a directional microphone, that suppresses annoying background noises and also facilitates the precise localization of leaks in inaccessible areas.
The internal laser pointer can also be used without restrictions due to the special construction of the acoustic trumpet.

5 Device components and controls

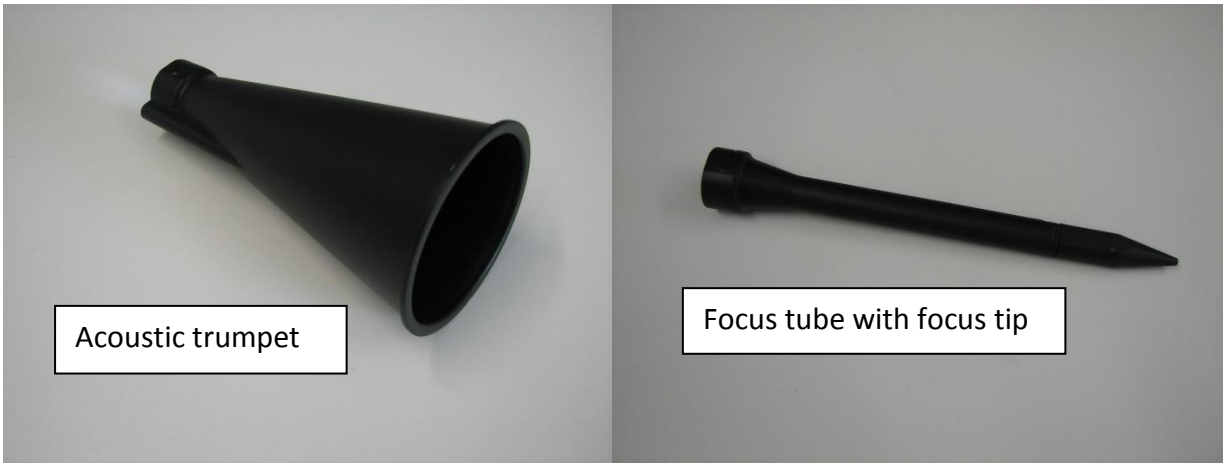
5.1 The front side

The device components and controls of the front side are described in the following picture.

5.2 Sensor head and connections

6 Accessories

Further accessories are available for the TESTO SENSOR LD with which the leak detection can be facilitated and improved.

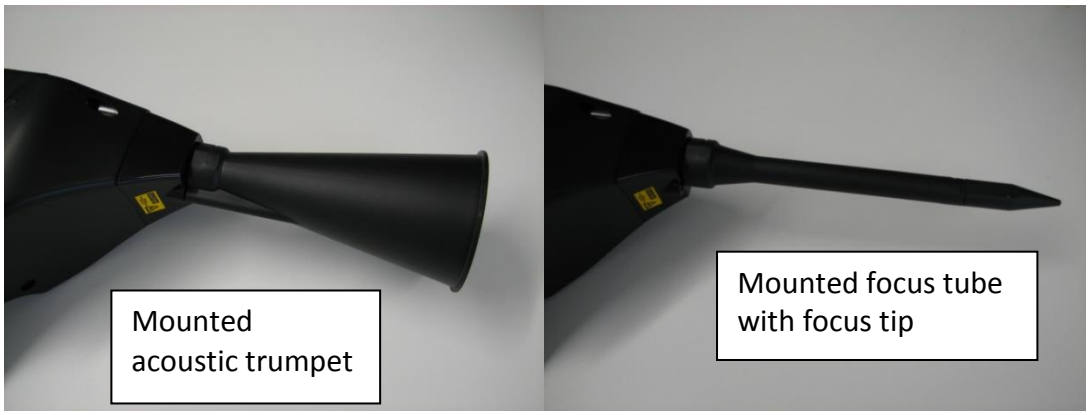


6.1 Acoustic trumpet

Through the concentration of sound waves, the acoustic trumpet creates an acoustic amplification which enables a more precise detection of the leak. Through its special design, the integrated laser pointer will remain usable. The acoustic trumpet is simply placed onto the sensor head and slightly twisted until the latch head reaches the stopper. While doing this, please proceed with caution to prevent an over-winding of the cone.

6.2 Focus tube with focus tip

The focus tube with the tip is used for the detection of very small leaks, in order to locate and pinpoint them precisely. Just like with the acoustic trumpet, the tube is placed onto the sensor head and latched with a twisting motion.



7 Commissioning

7.1 Switching-on

A pressing and holding of the on/off button for about 1s, will switch on the device and a Start-Up sequence will appear on the display. Pressing the button again will switch off the device.

7.2 Louder/quieter

With the volume increase and decrease buttons the volume in the earpiece and the sensitivity can be increased or respectively decreased in 16 steps. By pressing and holding the respective button, the value will automatically increase or decrease.

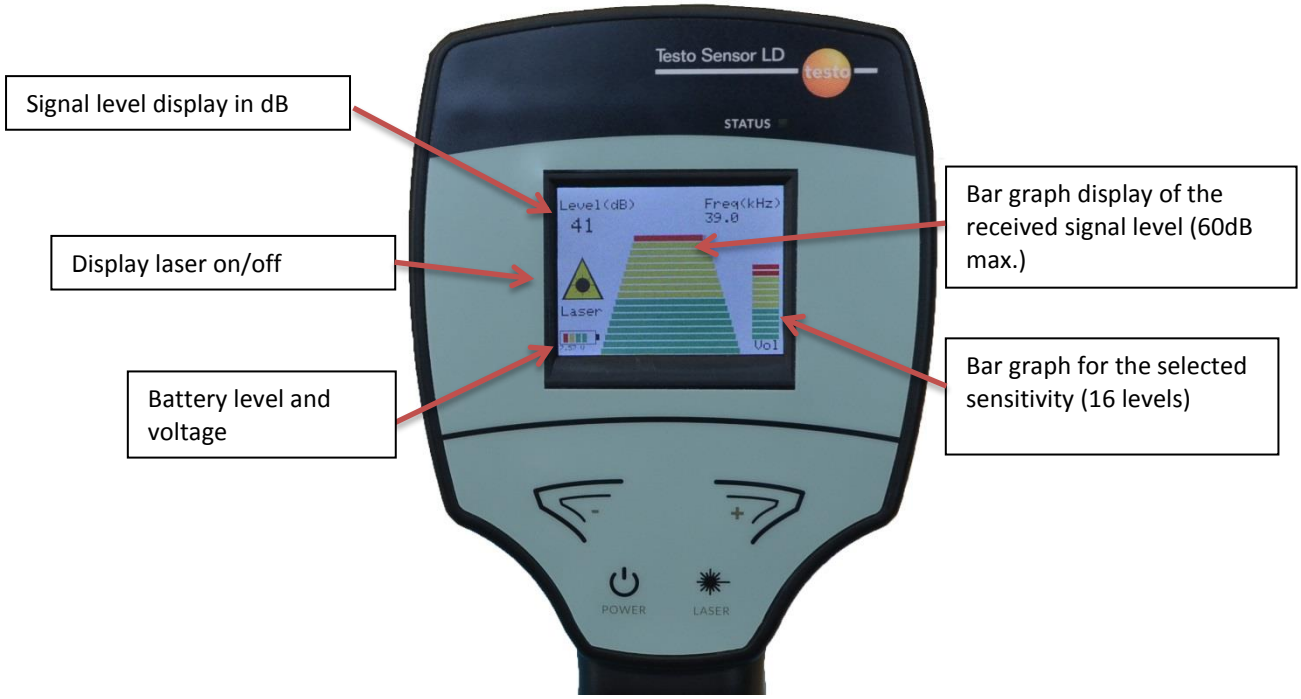
7.3 Laser

The integrated laser pointer can be switched on or off with the laser on/off button. In the on state, a laser warning symbol will appear in the display. In the off state, the triangle will remain grey.

Warning: Never point the laser directly into the eyes! Absolutely devoid a direct irradiation of the eyes of humans and animals!

8 Display

The display elements are shown and described in the following picture.



8.1 Signal strength (level)

In the middle of the display, a bar graph is displayed depending on the received signal strength. A numerical value of the received signal strength in dB will also appear in the upper-left corner of the display. The max. level to be displayed is **60 dB**.

8.2 Volume/sensitivity

The selected volume/sensitivity will appear on the right side in a bar with up to 16 steps.

8.3 Battery level

On the bottom left, a battery symbol is displayed with a battery level bar. The current battery voltage in volts is also displayed below it.

9 Battery charging

The battery is charged within the device. For this, the supplied plug-in power supply is connected to the built-in charging socket of the TESTO SENSOR LD and the 230V socket.

The TESTO SENSOR LD checks the charge status of the battery and automatically starts the charging process. The following scenarios are possible:

- If the battery is sufficiently charged, the status LED will flash green after the connection of the power supply and no additional charging will be performed.
- If the charge state of the battery is too low, the charging process will automatically start and the LED will light up red. The charging is automatically discontinued after the battery reaches its full capacity. The LED will then be permanently illuminated in green.
- A red blinking LED signals a charging error. This may have caused during charging outside the valid temperature range (0-40 °C).

Comment[1]:
Switching on the device during charging, the display will show additionally a progress bar with
The text “Charging”.

9.1 Protection of exhaustive discharge

To protect the Li-ION accumulator of exhaustive discharge the device is switching off automatically if a cell voltage of 6,4V will be reached.

[1] Available with FW-version V1.12

10 Applications

The typical applications for the TESTO SENSOR LD include the detection of:

- Leaks in pressure and vacuum systems
- Leaks in containers
- Leakage points in the pneumatic brakes of trucks and trains
- Leaks in piping systems
- Leaks in oxygen connections in hospitals
- Leaks in steam separators - leaky valves
- electrical partial discharges on seals

Also defective bearings in engines and transmissions produce sounds in the ultrasonic range, which can be protected with the TESTO SENSOR LD.

10.1 Leakage detection in compressed air systems

Compressed air is one of the most costly forms of energy. In Germany alone, 60,000 compressed air systems are consuming 14.000.000.000 KWh of electricity each year. 15% to 20% of these could easily be saved (Peter Radgen, Fraunhofer Institut, Karlsruhe). Much of these costs are attributable to leaks in compressed air systems. The air simply "escapes" unused.

Large openings can be detected easily (you can clearly hear the hissing sound), but often holes smaller than 1 mm^2 remain undetected because they cannot be heard. The Testo Sensor LD is perfectly suited for the detection of these small openings.

The unit is focused on the pipe or the component where leaks are suspected. Initially the sensitivity will be set to half of the full value. The integrated laser will assist the location detection from a certain distance. The sensitivity will then be varied with the volume control until the characteristic sound can be heard.

A significant sensitivity improvement can already be attained with the help of the acoustic trumpet which is already included in the set. Through this, it is possible to determine leakages even from larger distances.
To detect very small openings, a focus tube with a directional tip is attached onto the sensor, and the suspicious points are directly approached in close proximity.

11 Special product features

- Ruggedness and low weight ensure a fatigue-free operation within industrial environments
- improved detection of leakages with an optional acoustic trumpet
- modern lithium-ion battery with a high capacity and an external battery charger
- Operating time > 10 h
- simple operation via keypad

12 Scope of delivery

The TESTO SENSOR LD is available either as a stand-alone device or as a set. The set contains all the components and accessories, which are housed protected in a rugged and shock-resistant transport case.

The following table lists the components with their respective order numbers.

Description	Order number
TESTO SENSOR LD ultrasound detector set, consisting of:	8800 0301
TESTO SENSOR LD ultrasound detector basic device	8800 0302
Acoustic trumpet	8800 0303
Soundproof headset	8800 0304
Focus tube with directional tip	8800 0305
Battery charger	8800 0306
Transport case	8800 0307

13 Technical Data TESTO SENSOR LD

Handheld case dimensions	263 x 96 x 88 mm
Weight	0.4 kg, complete set in the case approx. 2.8kg
Frequency range	40kHz (+/- 2kHz)
Power supply	Internal 7.4 V lithium-ion battery
Operating time	> 10 h
Operating temperature	-5 °C to +40 °C
Charging	Ext. battery charger (included in the scope of delivery)
Charging time	approx. 1.5 h
Storage temperature	-10 °C to +50 °C
Laser	Wavelength 645-660nm, output < 1mW (Laser class 2)
Connections	3.5 mm jack for headphones, power jack for connecting an external charger

14 Performance chart

It shows the detection distance of various hole diameters at different pressures (lab environment).

Pressure / diameter	***0.1 mm***	***0.2 mm***	***0.5 mm***
0.5 bar	2 m	2 m	10 m
5.0 bar	8 m	14 m	18 m

15 Appendix

In the appendix on the following pages you will find the Test Report of the Li-ion batteries used.

Report ID: H11133012221D~1 Page 1 of 11

PONY
Pony Testing International Group

I、 SAMPLE DESCRIPTION

Sample Name	Lithium-ion Battery		Battery Type	238700	
Client	Jauch Quartz GmbH-Batteries				
Manufacturer	Jauch Quartz GmbH-Batteries				
Nominal Voltage	7.2V	Rated Capacity	2600mAh	Limited Charge Voltage	8.56±0.025V
Charge Current	1250mA	Maximum Continuous Charge Current	2600mA	End Charge Current	100mA
Cut-off Voltage	5.5V	Maximum Discharge Current	5200mA	Use	---
Cells Number	2PCS	Cell Model	18650	Rated Capacity	2600mAh
Manufacturer of cell	Samsung SDI Co., Ltd				
Chemical component	Li-Ion				
Client date	2013-11-12		Finished date	2013-12-02	

II、 REFERENCE METHOD

《United Nations Recommendations On The Transport Of Dangerous Goods, Manual Of Tests And Criteria》 (ST/SG/AC.10/11/Rev.5/Amend.1).

III、 TEST ITEM

1. Altitude simulation
2. Thermal test
3. Vibration
4. Shock
5. External short circuit
6. Impact
7. Overcharge
8. Forced discharge

IV、 CONCLUSION

ITEM	SAMPLE NUMBER	STANDARD	CONCLUSION
Altitude simulation	N1~N4 C1~C4	UN38.3	PASS
Thermal test			PASS
Vibration			PASS
Shock			PASS
External short circuit			PASS
Impact	N9~N13		PASS
Overcharge	N5~N8 C5~C8		PASS
Forced discharge	N14~N23 C9~C18		PASS

The submitted battery and component cell were complied with the UN Manual of Tests and Criteria, Part III, sub-section 38.3.

Prepared by: Pang Yue Kun Checked by: zhengpeng Approved by: Liyu

Approval Date: December 2, 2013

PONY
Pony Testing International Group

报告编号(Report ID): H11133012221D~1

锂电池UN38.3测试报告

Lithium Battery UN38.3 Test Report

样品名称 (Sample Description): Lithium-ion Battery 238700

委托单位 (Applicant): Jauch Quartz GmbH-Batteries

生产单位 (Manufacturer): Jauch Quartz GmbH-Batteries

No.: H11133012221D
Code: ssak93kqv

PONY 谱尼测试
Pony Testing International Group
www.ponytest.com

Testo Sensor GmbH
Testo-Straße 1
79853 Lenzkirch
Tel.: 07653 96597 0
Fax: 07653 96597 99
E-Mail: info@testo-sensor.de
www.testo-sensor.com