

LS100 Leak Detector for leak detection in pneumaticsystems



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## Important information

The operating instructions must be read in full and carefully observed before starting up the device.

The manufacturer cannot be held liable for any damage which occurs as a result of non-observance or non-compliance with this manual.


Should the device be tampered with in any manner other than a procedure which is described and specified in the manual, the warranty is cancelled and the manufacturer is exempt from liability.

The device is destined exclusively for the described application.

We offer no guarantee for the suitability for any other purpose and is not liable for errors which may have slipped into this operating manual. They are also not liable for consequential damage resulting from the delivery, capability or use of this device.

## Safety instructions

### Must be read before starting up the device! Warning:

- Switch on instrument without head set on. Monitor the display that there are only green bars shown. In case of yellow or red bars, reduce sensitivity by turning the sensitivity wheel.
- When detecting ultrasonic signals in electrical systems ensure that you keep sufficient safety distance to avoid electrical shocks!
- Do not point into the eyes with the laser! 
- Observe permissible storage, transport and operation temperatures.
- Improper handling or use of force cancels all warranty claims.

## Operating principle

LS 100 ultrasonic leak detector allows maintenance personnel to confirm a diagnosis on the spot by being able to clearly discriminate among various equipment sounds.

This is accomplished by an electronic process called 'heterodyning' that accurately converts the ultrasounds sensed by the instrument into the audible range where users can hear the audible signal through a headphone.

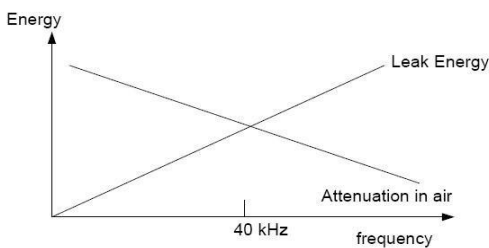
The high frequency, short wave characteristic of ultrasound enables users to accurately pinpoint the location of a leak or a particular sound in a machine.

The basic advantages of ultrasonic instruments are that they can easily locate leaks, provide advanced warning of impending mechanical failure and can be used in loud, noisy environments.

LS 100 integrate a laser pointer which helps to spot the leak from distance.

In unpressurized systems an ultrasonic tone generator can be used whose sound will leak through small openings.

Air leaks produce wide-band ultrasounds in the range of 20 ... 80 kHz. The higher the frequency the more energy it contains. But higher frequencies can't be transported in air that far. That's why LS 100 operates at a centre frequency of 40 kHz which compromises an optimum between energy and distance. Frequencies below and above are cut in order to minimize the noise level.



## Scope of delivery



Description	Order No.
<b>LS 100 Leak Detector set consisting of:</b>	<b>LS 100</b>
LS 100 Leak Detector	LS 100-1
Sensor unit	LS 100-2
Noise isolated head set	LS 100-3
Focus tube and focus tip	LS 100-4
Extension cable to detach sound probe from instrument	LS 100-5
Battery charger	LS 100-6
Transport case	LS 100-7
<b>Accessories not includes in set:</b>	
Aluminium extension tube with fixing elements, 3 x 120 cm	LS - T

### Use with aluminium extension tube



### Technical data

Operating frequency:

40 kHz  $\pm$  2 kHz

Plugs:

- 1) 4 pole connector shared by headphone and battery charger
- 2) 3.5mm stereo phone jack for sensor or sensor cable connection.

Display:

3 colour black-mask LCD, 10 level

LASER pointer:

640 ... 660 nm wavelength

4.0.5 mW output power

Power supply:

Internal NiMH rechargeable battery

Operating time:

about 6 hours without LASER pointer on about 4 hours with LASER pointer on

Charging time:

around 1.5 hour

Charging operation temp.:

10°C to + 45°C (recommended)

Operating temperature:

0 °C to + 40°C

Storage temperature:

-10 °C bis + 50 °C

Weight:

2.5 kg (fullset)

**Performancechart:**

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

**Attention:**

The sensor unit can be unplugged from the main instrument by pulling the unit out of the holder. A separate coiled extension cable is used to connect the sensor to the main unit.

**Operation of instrument**

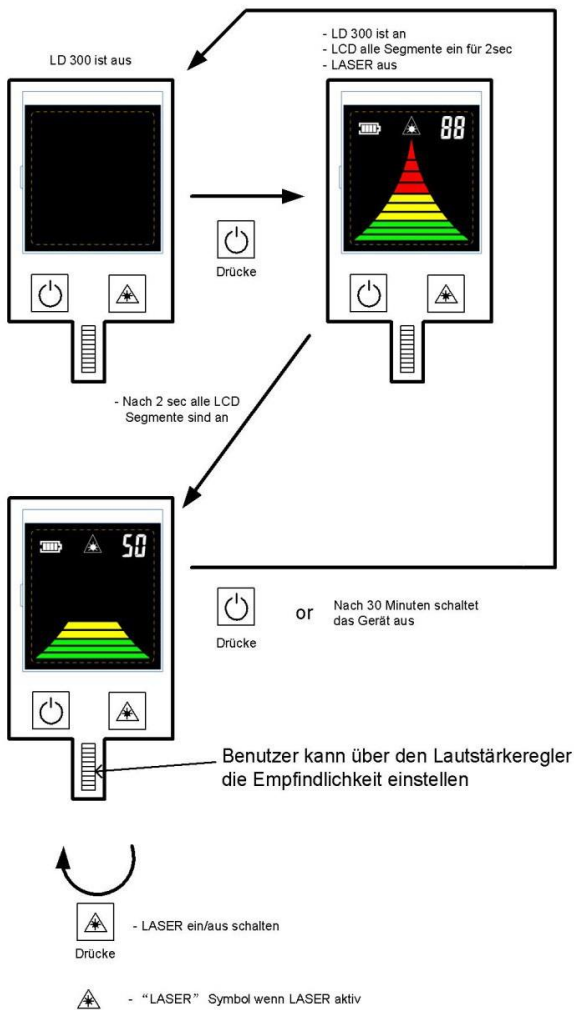


Figure A: LS 100 operation diagram

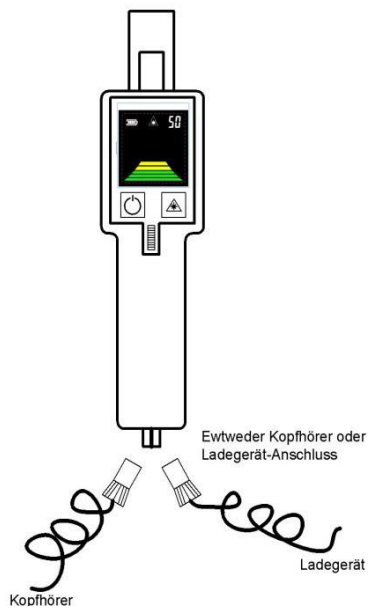


Figure B: Connection of headphone and battery charger

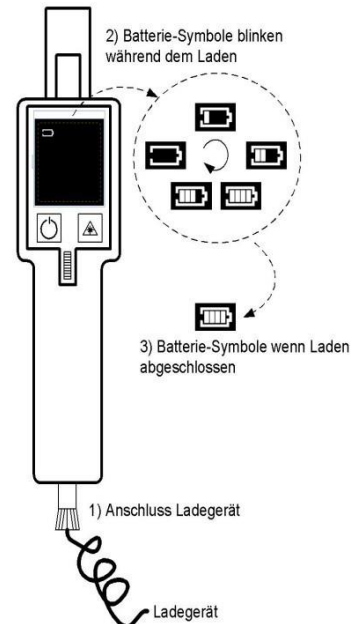


Figure C: Battery charging operation diagram

**Attention:**

If the instrument hasn't been used for more than 2 months, the battery might be over discharged. You should connect the battery charger and wait about 2-3 minutes until the display can show you the actual battery status.

**Applications**

With all operating equipment, most leakage and electrical problems produce a broad range of sound.

The high frequency ultrasonic components of these sounds are in nature, extremely short wave.

A short wave signal tends to be fairly directional.

It is therefore simple to isolate these signals from any background plant noises and to detect their exact location.

In addition, as slight changes begin to occur in mechanical equipment, the directional nature of ultrasound allows these potential warning signals to be detected in time, before actual failure occurs.

Typical applications of LS 100 are compressed air leak detection, vacuum leak detection, steam trap inspection and detection of arcing, tracking and corona in electrical equipment.

**Ultrasonic Leak detector detects:**

- **air leak in compressed air systems**
- **leaks in tanks**
- **Leaks in pneumatic brakes of trucks and trains**
- **pipe system leaks**
- **Leaks at oxygen plugs in hospitals**

- **leaks in pressure and vacuum systems**
- **leaks in steam traps**
- **leaking valves**
- **Partial electrical discharges at insulations**
- **Insulation test on doors and windows**
- **gas leaks in general**

### **Leak detection in compressed air systems**

Compressed air is one of the most expensive energy forms. Only in Germany 60,000 pneumatic systems consume 14,000,000,000 kWh electricity every year. 15% to 20% of this could easily be saved (Peter Radgen, Fraunhofer Institute, Karlsruhe). A large portion of these costs are caused by leaks in compressed air systems. The air “escapes” unused.

Big holes can be detected easily (one can hear the fizzling), but holes smaller than 1 mm<sup>2</sup> can not be heard any more and remain often undetected. For detection of these small holes in compressed air LS 100 is designed.

You can point with the LS 100 to the pipe or to the component of interest. The integrated laser pointer will assist you in case of a measurement from a distance. Then increase the sensitivity until you can hear the characteristic noise of a leak. Go closer to identify the location exactly. Adjust the sensitivity when necessary.

To detect very small holes the focus tube and the focus tip can be stucked onto the sensor unit.

In applications where LS 100 is too bulky for a close up detection, the sensor unit can be removed from the main unit. In the scope of delivery there is an extension cable which can be connected between sensor and main unit.

### **Detection of leaks in unpressurised systems**

LS 100 can be used to detect leaks at insulations of doors, windows and tanks. For this purpose an ultrasonic tone generator (article on request) is placed inside the room or tank. If there are small holes the ultrasonic sound will leak and can be easily located by LS 100

Dear Customer;

You have made the right choice by choosing a quality product. If you have reason for complaint we will repair any faults free of charge if it can be proven that they are manufacturing faults. The fault should be reported immediately after it has been found and within the warranty time guaranteed by us.

Excluded from this warranty is damage caused by improper use and non-adherence to the instruction manual.

The warranty is also cancelled once the measuring instrument has been opened provided this is not described in the instruction manual for maintenance purposes. This is also the case if the serial number has been changed, damaged or removed.

The warranty time for the LS 100 is 12 months for the instrument, 6 months for accessory parts. Warranty services do not extend the warranty time.

If in addition to the warranty service necessary repairs, adjustments or similar are carried out, the warranty services are free of charge but there is a charge for other services such as transport and packaging costs.

Other claims, especially those for damage occurring outside the instrument are not included unless responsibility is legally binding.

After-sales service after the warranty time has elapsed

We are, of course, there for you after the warranty time has elapsed. In the case of function faults please send us your measuring instrument with a brief description of the defect. Include your telephone number should we need to contact you.