

## INSTRUCTION MANUAL



### **LD 300 Leak Detector:**

For leak detection in pneumatic systems.



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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.

CS Instruments GmbH offers 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 ultra sonic 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 operating temperatures.
- Improper handling or use of force cancels all warranty claims.

## Operating principle

LD 300 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.

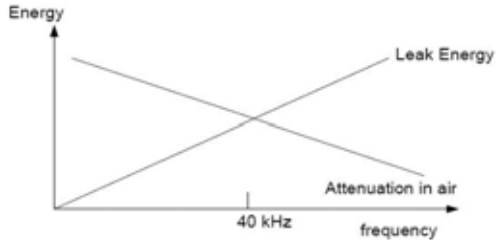
The high frequency, short wave characteristic of ultrasound enables users to accurately pinpoint the location of a leak or a particular sound in a machine.

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.

LD 300 integrates 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 LD 300 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



<i>Description</i>	<i>Order No.</i>
<b>LD 300 Leak Detector set consisting of:</b>	<b>0601 0103</b>
LD 300 Leak Detector	0560 0102
Sensor unit	0605 0001
Noise isolated head set	0554 0102
Focus tube and focus tip	0530 0101
Cable to detach sound probe from instrument	0553 0101
Battery charger	0554 0001
Transport case	0554 0101
<b>Accessories not includes in set:</b>	
Ultrasonic Tone Generator	0554 0103
Telescope extension with cable	0530 0102

## 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 0.4.0.5 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 to + 50°C
Weight:	2.5 kg (full set)

## Performance chart

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

<b><i>Pressure / diameter</i></b>	<b><i>0.1 mm</i></b>	<b><i>0.2 mm</i></b>	<b><i>0.5 mm</i></b>
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

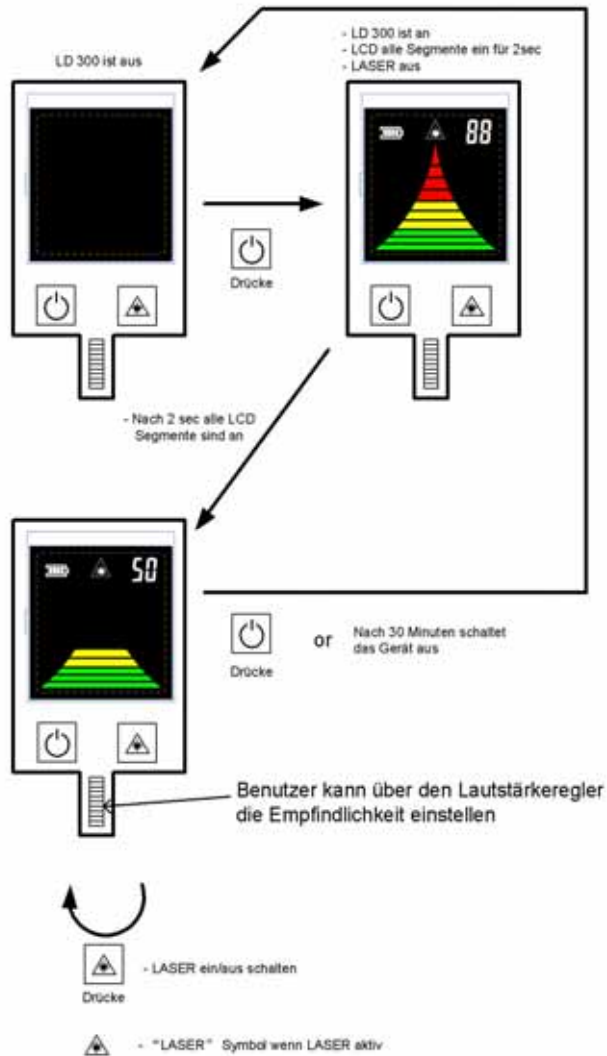


Figure A: LD 300 operation diagram

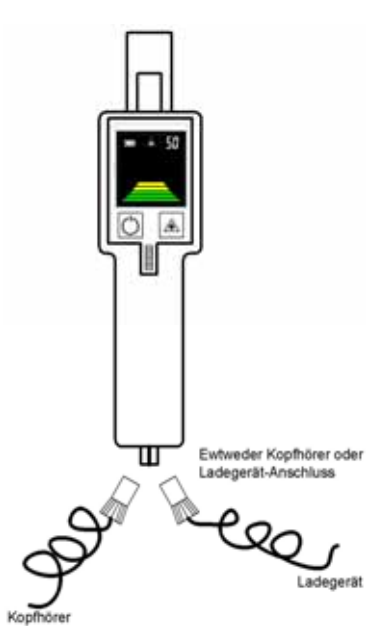


Figure B: LD 300 headphone and charger connection diagram

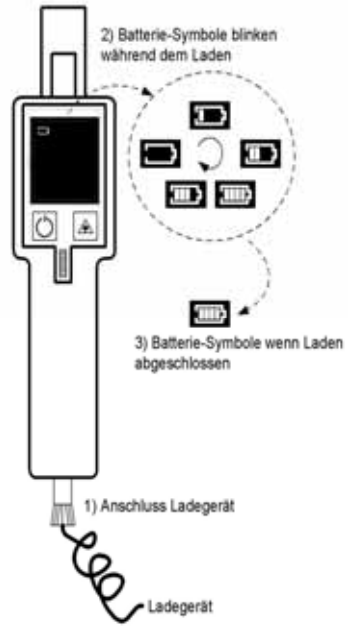


Figure C: Battery charging operation diagram

**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 LD 300 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 LD 300 is designed.

You can point with the LD 300 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 LD 300 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**

LD 300 can be used to detect leaks at insulations of doors, windows and tanks. For this purpose an ultrasonic tone generator (0554 0103) is placed inside the room or tank. If there are small holes the ultrasonic sound will leak and can be easily located by LD 300.

Dear Customer,

Thank you for your confidence in CS Instruments which you have shown by purchasing this measuring instrument. 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 LD 300 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.

Our **CUSTOMER SERVICE** puts the customer first.

## EC Declaration of Conformity

for

**DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL  
of 27. January 2003  
on waste electrical and electronic equipment (WEEE)**

and

**DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL  
of 27. January 2003  
on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)**

of the down mentioned instruments from CS Instruments GmbH:

Leak detector **LD 300** and accessories

CS Instruments GmbH as the manufacturer herewith declares that the above instruments and accessories belongs to the category 9 (WEEE 2002/96/EC).

Therefore the above instruments do not fall upward aforementioned directive RoHS 2002/95/EC and are not affected by the material restriction. In accordance with directive WEEE 2002/96/EC the measuring instruments specified above are taken back from CS Instruments GmbH to the disposal.

CS Instruments GmbH  
Harrislee, 26.April 2007

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Christian Schuldt, Managing Director

This declaration does not guarantee any product characteristics.

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