

TROTEC®

SL 2000

MultiMeasure-Series



Operating manual
Leak detector



Version 1.0

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1. Read before commissioning



The instrument may only be used for the intended purpose and within the specified technical data.

Any other use will be construed as misuse. The manufacturer will not be liable for any damage resulting from such use, the user bears the sole risk in this case.

The use for the intended purpose also includes following these operating instructions.



The instrument may not be modified in construction. All modifications require the express permission of the manufacturer. Unauthorised modifications to the instrument as well as the use of spare parts, accessories and special equipment not tested and cleared by the manufacturer may have a negative influence on the function and properties of the instrument. The manufacturer is not liable for any damages resulting from this.

The manufacturer will accept no liability for damages caused by failure to observe the operating instructions or by violation of the obligation for caution in the transport, installation, handling, operation, care and maintenance or repair of the instrument even if no special reference to the obligation for caution has been made in the operating instructions.



The user must have carefully read and understood these operating instructions before working with the instrument. Only use the instrument in the way described in these operating instructions and follow the procedure documented in these operating instructions exclusively to determine measured values. Improper use of sensors and/or undocumented parameter settings can lead to false measuring results.

The determination of valid measuring results, conclusions and measures derived therefrom are the sole responsibility of the user! A liability or a guarantee for the correctness of the results provided are excluded. On no account will liability be accepted for damages resulting from use of the called measuring results.

3. Technical data

3.1 Leak detector receiver

Operating frequency (ultrasonic mode):	40 kHz ± 1 kHz	Change-over button between audible sound and ultrasonic mode. The ultrasonic mode is indicated by the lighting up of the yellow LED.
Operating frequency (audible sound mode):	approx. 200 Hz...4 kHz	
Connections:	for sonic sensors and headphones	
Optical display:	LC display (with automatic background lighting)	
Sound level:	0 to 120 scale divisions on the LCD (similar to dB)	
Headphones volume:	10-stage LED barograph	
Acoustic reproduction:	noise-cancelling headphones (noise insulation approx. 23 dB; weight approx. 290 g)	
Auto power-off:	automatic instrument switch-off after approx. 10 min	
Power supply:	4x Mignon LR6 batteries (AA 1.5 V batteries)	
Operating duration:	approx. 15 hrs (according to conditions of use and battery type) the green indicator starts to flash towards the end of the operating period; the instrument switches itself off when the batteries are discharged.	
Dimensions:	195 x 100 x 40 mm	
Weight:	approx. 500 g	
Operating temperature:	0 °C ... +40 °C	
Storage temperature:	-10 °C ... +50 °C CE conformity	
Directives applied:	89/336/EEC and 92/31/EEC (electromagnetic compatibility)	

3.2 Ultrasonic transmitter

Transmission frequency	40 kHz
Integrated air-coupling generator	
Connection for external sonic generator	
Transmission power	normal/doubled
Frequency modulation	low/high
Power supply	internal 9V battery
Auto power-off function	
Operating duration	approx. 8 hours
Charging duration	max. 14 hours
Dimensions	120 x 65 x 25 mm
Weight	150 g
Operating temperature	0 to +40 °C
Storage temperature	-10 to +50 °C

2. Functional description

Leak detector

If water or air escapes under pressure, a noise is generated that propagates as structure-borne noise in the pipework material and can be pinpointed by listening to it. These noises contain both audible and ultrasonic.

The SL2000 is a modern, easy to operate leak detector for the detection of audible and ultrasonic in gases, liquids and solid bodies.

Ultrasonic cannot be heard by the human ear. The SL2000 either accepts ultrasonic signals and converts these into audible signals, or it amplifies weak audible sound signals. At the same time the level of the sonic received is indicated on a display in the form of a light bar.

Sonic signals that can be evaluated in this way can arise in the course of a large number of processes.

For example:

- in leakages from unsealed pipework in high pressure air, steam and vacuum plants
- in condensate drains
- in unsealed seat valves, gate valves, shut-off devices, and cocks in pipework systems
- in damaged roller bearings
- in cavitation in pumps and compressors
- in flashovers and corona discharges on electrical equipment

Ultrasonic transmitter

To determine the locations in vehicles, tanks, containers and ventilation systems where sealing has broken down, and in which no ultrasonic is actively generated, the ultrasonic transmitter is used. The latter generates ultrasonic waves that escape at the locations where sealing has broken down. Their exact location is determined externally using the leak detector.

When the instrument is first switched on it is in the audible sound mode. Particularly when using the ground microphone (but with the other probes also) this mode is suitable for the location of audible leakages that are concealed (e.g. behind tiled walls in sanitation facilities).

By pressing the change-over button the instrument moves into the ultrasonic mode. This state is indicated by the yellow LED. In the ultrasonic mode it is possible to locate the leakages detected in the audible sound mode more accurately.

4. Leak detector sonic receiver

4.1 Safety instructions



WARNING: A clear view of the working area must constantly be ensured!

Never work in the vicinity of exposed live components of electrical equipment, or without visual contact in areas with which you are unfamiliar!

When locating ultrasonic signals in electrical plants a sufficient safety distance must be maintained to avoid electrical flashovers.

When using the standard ultrasonic probe care must be taken that this is used and transported in a manner that excludes any injury to the operator and other persons caused by the probe tip. We recommend use of the leather bag with carrying strap; the standard ultrasonic probe can be carried in its probe quiver when it is not being used.

Use the leather bag with carrying strap also when working with steps, ladders platforms and similar, so that you can use your hands to ensure personal safety.

4.2 Start of operation

For start of operation, and for switching off, the ON/OFF button is to be actuated.

After an operating duration of approx. 10 min the instrument switches itself off.

If the investigation is not yet complete, the leak detector must be switched on again.

The probe is to be attached to the probe connection socket. This is located on the upper face of the instrument.

When the instrument is first switched on it is in the audible sonic mode. By pressing the change-over button the instrument moves into the ultrasonic mode. This state is indicated by the yellow LED. In the ultrasonic mode it is possible to locate the leakages detected in the audible sonic mode more accurately.

The headphones supplied are to be connected with positive engagement into the **HEADPHONE** connection socket.

Volume control is effected by means of the **VOLUME** rotary knob.

Before switching on the instrument the volume control is to be set to minimum!

The volume is then to be increased until the leakage signal can be detected.

Where light conditions are poor the background illumination of the display automatically switches itself on.

4.3 Using the probes

Ground microphone

This probe is designed for structure-borne noise investigation (see also standard ultrasonic probe). It is particularly well-suited for use on smooth surfaces (e.g. tiles).



WARNING: To improve the measurement effectiveness the use of a coupling medium (ultrasonic coupling gel, water, grease) between the sensor face and the surface to be sampled is recommended.

Separate air-coupling probe and flexible air-coupling probe

The air-coupling probes are used if ultrasonic noise is transmitted to the ambient air as a result of leakages occurring in pipework under pressure.

The probes are also used when the ultrasonic transmitter is employed.

The accuracy of the location process can be increased by use of the directional sonic tube and the directional probe tip.

For signal capture over a longer period of time the separate probe can be screwed onto the clamp or magnetic holder.

The flexible air-coupling probe makes it possible to locate sonic in places that are difficult to access (e.g. supply shafts, areas behind walls).

In cases where the ultrasonic transmitter must be employed, but cannot be introduced into the object that is being investigated, the separate air-coupling probe is used as an external sonic generator.

Standard ultrasonic probe

For the detection of ultrasonic in solid bodies the standard ultrasonic probe is used. The tip of the probe is pressed by hand against the location that is to be investigated. To achieve reproducible results the contact force and direction must be held constant.

For signal capture over a longer period of time the standard ultrasonic probe can be screwed onto the clamp or magnetic holder.

4.4 Ultrasonic transmitter

The ultrasonic transmitter sends out ultrasonic waves continuously.

By a single actuation of the **MODE** button the modulation of the ultrasonic signal can be modified. This function is to be activated in cases where the noises that are to be investigated are overlaid by background noises.

By actuating the **MODE** button twice the transmission power is increased. In this way it is possible to locate even the smaller faults.

By actuating the **MODE** button three times the modulation at increased transmission power is modified.

The connection of external air-coupling probes or standard ultrasonic probes as transmission elements is possible. For this purpose these are to be attached to the socket located on the upper face of the instrument. Here the in-built sound source is switched off.

6. Instrument maintenance

Both the instruments and the probes have a robust design of housing. Nevertheless they must be protected from mechanical damage and severe impact loads.

The use of cleaning materials containing solvents is not permitted.

7. Content of supply

- SL2000 leak detector
- noise-cancelling headphones
- ground microphone with connection cable
- service and ready-for-use bag
- carrying case

Optional - depending upon order content

- air-coupling probe
- directional probe, tube for air-coupling probe
- directional probe, tip for air-coupling probe
- flexible air-coupling probe
- standard ultrasonic probe
- ultrasonic transmitter
- telescopic rod

5. Faults and self-help in fault finding

Not every fault necessarily means that there is an actual defect in the instrument.

You can save time and money if you can remove simple causes of faults yourself.

The following information should help you:

Fault	Cause	Remedy
Instrument will not switch on	Batteries discharged	Insert new batteries
No acoustic signal can be detected	Volume control set too low	Adjust volume
	Probe not correctly connected	Insert plug into the correct connection socket completely
	Headphones not correctly connected	Insert plug into the correct connection socket completely
	Instrument has automatically switched off	Switch the instrument on again.
No acoustic signal when using the transmitter	Transmitter not switched on, or has automatically switched off after a longer period of operation	Switch on transmitter

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