



PerkinElmer's Electronic Leak Detector

(part number N9306089)

Instruction Manual

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PerkinElmer Electronic Leak Detector

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Operating Instructions

1.0 Introduction

PerkinElmer's portable Leak Detector is specifically designed for use with gas chromatography (GC) systems. It detects minute leaks of any gas with a thermal conductivity different from air. The reference gas inlet (Figure 1) draws in ambient air for comparison to air drawn into the sample probe. A leak is indicated by both an LED light display and an audible alarm.

2.0 Battery Charging:

Only use the universal charger provided. The Leak Detector should be fully charged prior to use. When the unit's charge is low, the green battery indicator LED light will begin to blink when the unit is powered up (Figure 1). The Leak Detector cannot be used during the charging cycle.

| Unit status while engaged with the wall charger | Charge LED Condition |
|--|----------------------|
| Pre-charge qualification (immediately following plug-in) | 1Hz flash |
| Unit is charging | Continuous on |
| Unit is fully charged | Off |

NOTE: Replacement of the rechargeable cells in this unit is performed at the factory. There are no serviceable parts in this unit. Opening the case or tampering with the internal parts will void the factory warranty.

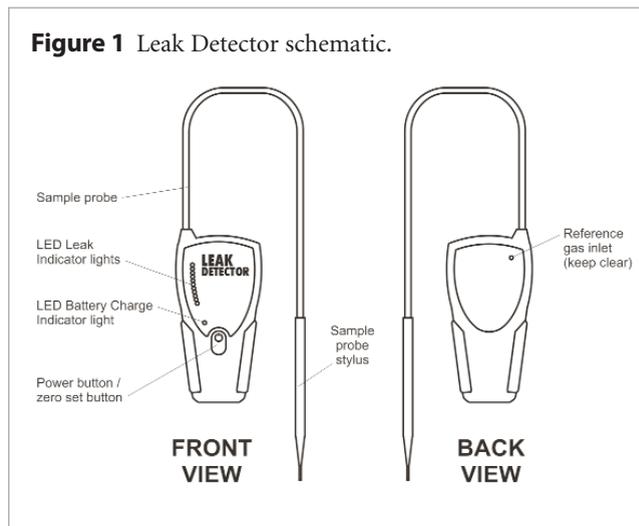
3.0 Powering Up

Depress and hold the power button (Figure 1) until the unit responds with the wake-up mode. The leak detector will run through a self-calibration sequence for approximately 15 seconds. During this time **DO NOT** attempt to zero the unit.

4.0 Zeroing the Unit

After the LED lights stop flashing, the unit is ready for use. The instrument may need to be zeroed periodically between uses, especially if it is moved from room to room, or between areas of differing temperature or humidity. Do not attempt to zero the unit while the probe is stored in the holder. The probe **MUST** be removed from the storage container before zeroing the unit. To re-zero, press the Zero switch. The unit will run a self-calibration sequence for approximately 4 seconds. When all LED lights stop flashing and the green LED light is lit, the unit is ready for use.

NOTE: To avoid false readings, do not attempt to use the unit while the self-calibration sequence is in progress.



5.0 Prior to Operation

Verify the operation of the Leak Detector before each use by sampling gas from a GC split vent, or other source of hydrogen or helium. Also, visually inspect the probe tip, reference gas inlet, and exhaust port for obstructions (Figure 1).

IMPORTANT: *Fittings being checked must be clean and dry; liquid leak detecting agents, dust, and other debris may damage the Leak Detector if drawn into the probe.*

The Leak Detector responds to almost any gas you can smell, and many gases that you can't smell. Solvent vapors, split vent exhaust, or even strong air currents around the probe or reference inlet can cause instability or false positive readings. Be careful not to breathe into the reference inlet when checking for leaks or to cover/block the inlet with your hand.

6.0 Detecting Leaks

Slowly move the probe tip around fittings and other potential leak sources. If the Leak Detector senses a gas other than air, the LED bar graph will begin to light, and an alarm will sound when the last LED light illuminates. The red LED lights indicate helium and hydrogen leaks. The yellow LED lights indicate a nitrogen, argon, or carbon dioxide leak. Remove the probe from the vicinity of the leak and allow the unit to return to zero. If a large amount of gas has entered the probe, it may take a few seconds for the instrument to clear itself. Please do not attempt to zero the unit while it is clearing out the gas from the probe. This may cause the unit to malfunction. Place the probe near the leak again to confirm its location. The reference gas inlet (Figure 1) must not be restricted or the unit will not operate correctly. Similarly, the exhaust port allows the gas being tested to exit the Leak Detector and must remain unobstructed. The exhaust port is located in the probe docking station.

CAUTION: *This unit is **NOT** designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks in a hazardous environment.*

7.0 Specifications

Power Rating: 12 Volts DC (battery charger supplied)

Battery Rating: 6 hours normal operation

Operating Temp. Range: 32°–120°F (0°–48°C)

Humidity Range: 0–97%

Warranty: One year warranty.

Certifications: CE and Japan

Compliance: WEEE, RoHS

8.0 Maintenance

Avoid spilling liquids onto the unit or it may malfunction. If a liquid is spilled onto the unit, turn off the power immediately, remove heavy liquids with a dry towel, and let the unit sit until the liquid dries. Dust and debris can enter the probe tip of the Leak Detector and, over time, can clog the small-bore tubing inside the unit. To prevent this, clean the probe tip periodically. To clean the probe tip, unscrew the cap to expose the brush (Figures 2 and 3). Gently clean the probe, using a small brush or your fingers to remove dust and debris, then replace the cap. Do not use liquids to clean the probe. Liquids can damage the Leak Detector if drawn in through the probe.

Information on where to have the unit sent for maintenance or service is listed at the end of this document.

Figure 2 Cap unscrewed and partially removed.



Figure 3 Cap removed, exposing probe tip brush for cleaning.



9.0 Troubleshooting

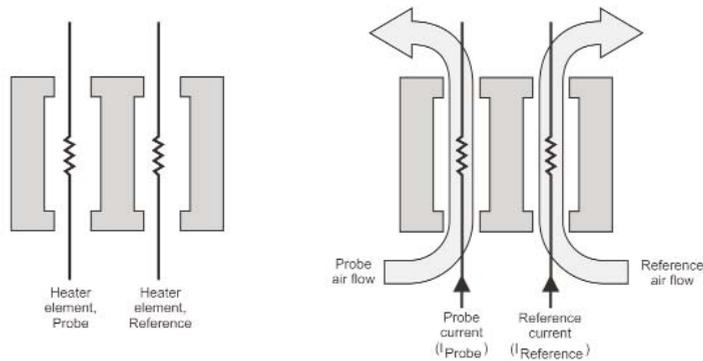
| Problem | Possible Cause | Suggested Solution |
|--|--|--|
| Sensitivity decreased | Probe clogged Probe line punctured Weak battery | Clean the probe tip to remove any debris Visually inspect probe line for holes* Recharge or return to PerkinElmer for battery replacement* |
| Response decreased | Detector not zeroed | Re-zero detector |
| LED bar graph stays lit during operation | Detector re-zeroed before unit was purged out Reference gas inlet covered by hand or other object | Allow adequate time for detector to purge, then re-zero Remove obstruction |

**Contact PerkinElmer or your PerkinElmer representative for return instructions for servicing a damaged unit. Additional charges may apply if the warranty has expired or the unit is damaged due to misuse.*

10.0 Technology

The Leak Detector measurement is based on thermal conductivity comparisons between the probe air and a reference air. The device employs a dual thermistor technology which measures the ratio of [probe]:[reference] heat exchange values and displays the results on an LED scale (Figure 4). Under ideal operating conditions, a ratio of 1:1 indicates identical air samples for both [probe] and [reference], and therefore no leak is present.

Figure 4 Schematic layout of the Leak Detector technology.



LEFT: Dual analysis is achieved with heater elements positioned in separate flow chambers.

RIGHT: Probe and reference air streams are simultaneously monitored for thermal conductivity. Differences in air composition are indicated by differences in the heater element currents.

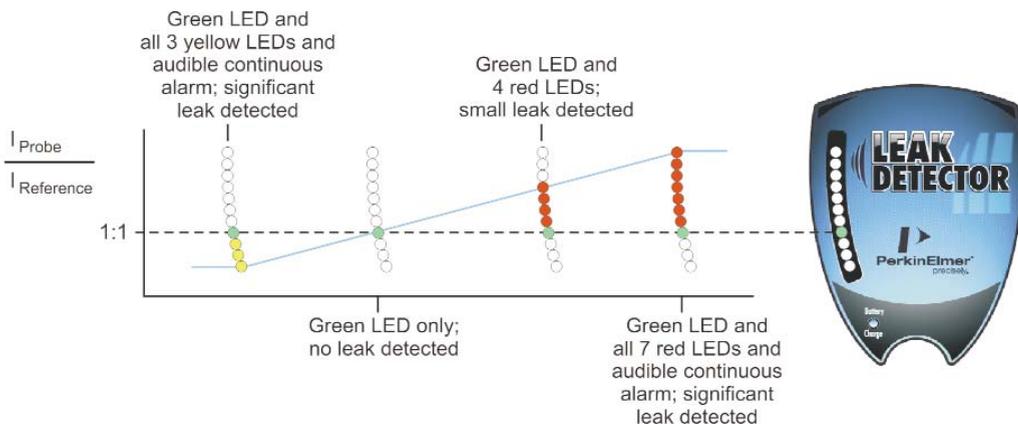
Because of slight differences in air temperature and/or humidity between the reference inlet (Figure 1) and the probe tip, a small response indicated by a single red or yellow LED light is generally insufficient to positively identify a gas leak. Small to moderate leaks are reliably indicated with four red LED lights, larger leaks are indicated with all red LED lights or yellow LED lights lit and the continuous alarm is audible.

11.0 Interpreting the Results

Figure 5 illustrates the Leak Detector's LED light response range. The greater the number of red or yellow LED lights lit correlates in general to the size of the leak. **NOTE:** The Leak Detector is not a quantitative device, rather it is designed to detect leaks in gas line connections commonly associated with laboratory equipment

| Gas | Minimum Detectable Leak Rate (atm cc / sec.) | Indicating LED Light Color |
|----------------|--|----------------------------|
| Helium | 1.0×10^5 | Red |
| Hydrogen** | 1.0×10^5 | Red |
| Nitrogen | 1.4×10^3 | Yellow |
| Argon | 1.0×10^4 | Yellow |
| Carbon dioxide | 1.0×10^4 | Yellow |

Figure 5 LED light response chart for the Leak Detector. A 1:1 ratio of $I_{\text{Probe}} : I_{\text{Reference}}$ indicates no leak present. Red LED lights indicate the presence of one or more of the following gases: helium or hydrogen. Yellow LED lights indicate the presence of one or more of the following gases: nitrogen, argon, or carbon dioxide.



**This unit is NOT designed for determining leaks of combustible gases. A combustible gas detector should be used for determining combustible gas leaks in a hazardous environment.

Tip drift

Tip drift is the phenomenon when a false LED light response is registered as the unit is quickly turned or swept in dramatic arc movements. Tip drift is inherent to all dual thermistor leak detector technology and is based in large part on the asymmetry of the flow cells; shaking or tipping the unit influences the air flow profiles which impacts the rates of heat exchange. If the device is functioning normally, the LED light signal will return to zero in 3-5 seconds after the unit is held still. In extreme cases, the unit may require another 'zero' cycle before using. To avoid tip drift, be sure to hold the unit steady while making measurements.

12.0 Service

The PerkinElmer Leak Detector carries a one year limited warranty from time of purchase. Please have the Leak Detector serial number available when calling PerkinElmer with any concerns you may have. Additional charges may apply if the warranty is expired or the damage is due to misuse.

Expected battery lifetime is two years from time of purchase. Customers will need to return the unit to PerkinElmer for battery replacement. At that time, preventative maintenance services can also be performed on the unit. A fee will be charged for servicing the unit.

For questions, problems, repair services:

Within the USA:

Call PerkinElmer's Technical Support at 800-762-4000

For a complete listing of our global offices:

Visit www.perkinelmer.com/lasoffices

***Call Technical Support at 800-762-4000 (USA) or 800-561-4646 (Canada)
8:30am–5:00pm EST, if you have any questions about this product.***



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