



Restek[®] Electronic Leak Detector

(cat.# 22655)

Instruction Manual

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Operating Instructions

1.0 Introduction

Restek'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. The severity of a leak is indicated by both an LED light display and an audible alarm.

If this instrument is used in any manner other than described in the manual, the CE and Ex declaration is void.

Restek's leak detector is manufactured by Restek, so you are assured of the same Restek® quality and service you have come to recognize with the Restek® name.

Should you require assistance at anytime regarding our leak detector, please contact Restek® Customer Service at 1-800-356-1688 or 1-814-353-1300, ext. 3.

2.0 Battery Charging

The leak detector should be fully charged prior to use. Only use the AC adaptor provided (cat.# 22653). To charge the battery, first install the correct plug for your country's AC outlets onto the provided AC adaptor. Insert the AC adaptor into an electrical outlet, and then insert the barrel plug on the other end of the AC adaptor into the connector on the bottom of the leak detector unit. The green battery charge indicator LED will illuminate. When the battery is fully charged, the green battery charge indicator LED will go out. When the leak detector's charge is low, the BLUE LED located between the red and yellow LEDs will begin to flash.

If unit is off, the BLUE LED may flash when the power button is depressed. If the battery is fully discharged, no LED will illuminate.

CAUTION: *DO NOT charge the leak detector in a hazardous location.*

NOTE: Replacement of the rechargeable battery 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.

NOTE: Recharging a fully discharged battery will take 3–5 hours.

NOTE: If the battery is fully discharged and you need to use the leak detector, charge the battery for 15 minutes, and then disconnect the unit from the AC adaptor. You will be able to use it for approximately 30 minutes. After use, fully charge the battery.

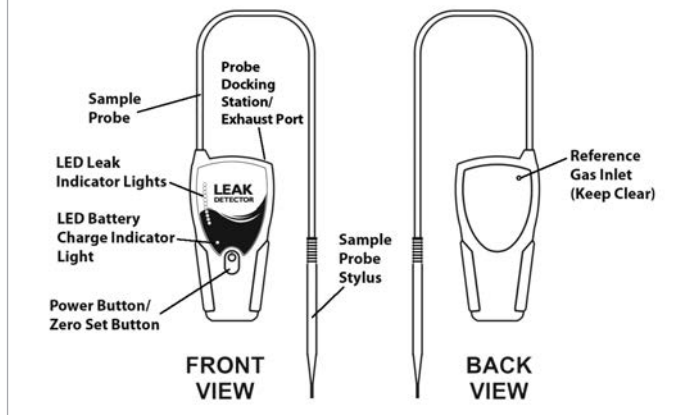
3.0 Powering Up

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 probe docking station before zeroing the unit. To re-zero, press the zero set button. The unit will run a self-calibration sequence for approximately 4 seconds. When all LED lights stop flashing and the blue LED light is lit, the unit is ready for use.

Figure 1: Leak detector schematic.



NOTE: To avoid false readings, do not attempt to use or zero 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, with more lights indicating a more significant leak. On the 3rd red or 2nd yellow LED, an audible tone will begin to beep. The more LEDs that illuminate, the faster the beep. When the last red or yellow LED illuminates, the beep becomes a steady tone. The red LED lights indicate a helium or hydrogen leak. 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. 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 designed to detect TRACE AMOUNTS of hydrogen arising from a small leak in a nonflammable environment, e.g., laboratory room air, etc. This unit is rated for use in a nonflammable atmosphere where the sample gas may become sufficiently high in concentration to become explosive.*

NOTE: To disable the audible beep during leak detection, depress and hold the zero set button for 2–3 seconds. After you hear a steady tone for 1 second, release the button; the beep function is disabled. To turn the beep function on again, depress and hold the zero set button. The beep function is always enabled at power up.

NOTE: The leak detector will power down after 6 minutes of operation. This feature prevents excess battery discharge if the unit is accidentally left on.

7.0 Specifications

Power Rating: 3.7 volts DC, 60 mA (AC adaptor supplied)

Battery Rating: 12 hours normal operation

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

Humidity Range: 0–97%

Warranty: 1-year warranty

Certifications: CE, Ex, 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.



9.0 Troubleshooting

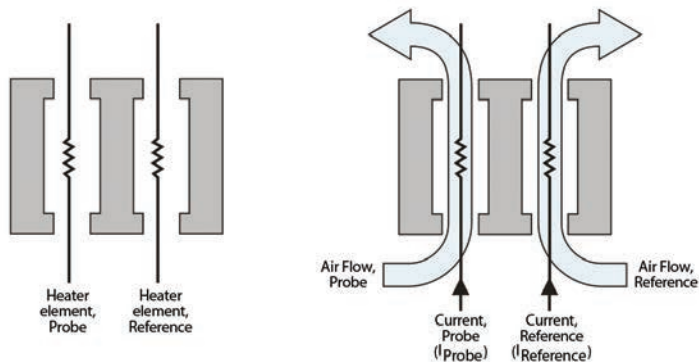
Problem	Possible Cause	Suggested Solution
Sensitivity decreased	Probe clogged	Clean the probe tip to remove any debris
	Probe line punctured	Visually inspect probe line for holes*
Response decreased	Detector not zeroed	Re-zero detector
LED bar graph stays lit during operation	Detector re-zeroed before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

*Contact Restek or your Restek® 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 that 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.

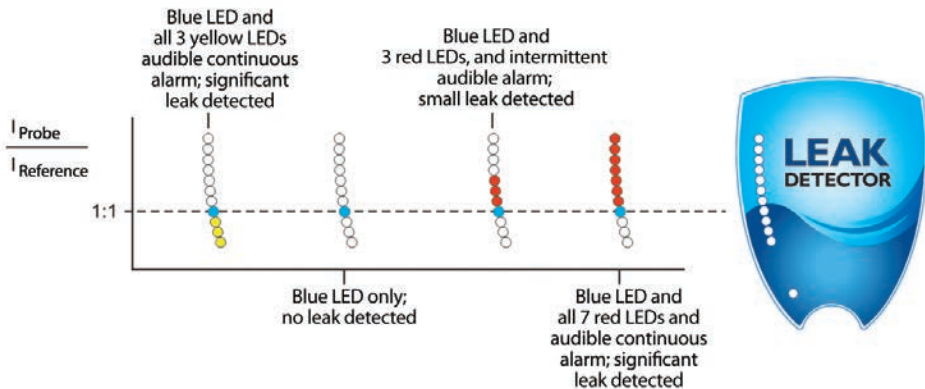
Because of slight differences in air temperature and/or humidity between the reference inlet (Figure 1) and the probe tip, a small response indicated by a single red or yellow LED light is generally insufficient to positively identify a gas leak. Small to moderate leaks are reliably indicated with 3 red or 2 yellow LED lights and an intermittent beep. Larger leaks are indicated with all red or yellow LED lights lit and a continuous audible alarm.

11.0 Interpretation of 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 helium and/or hydrogen. Yellow LED lights indicate the presence of nitrogen, argon, and/or carbon dioxide.



****CAUTION:** This unit is designed to detect TRACE AMOUNTS of hydrogen arising from a small leak in a nonflammable environment, e.g., laboratory room air, etc. This unit is rated for use in a nonflammable atmosphere where the sample gas may become sufficiently high in concentration to become explosive.

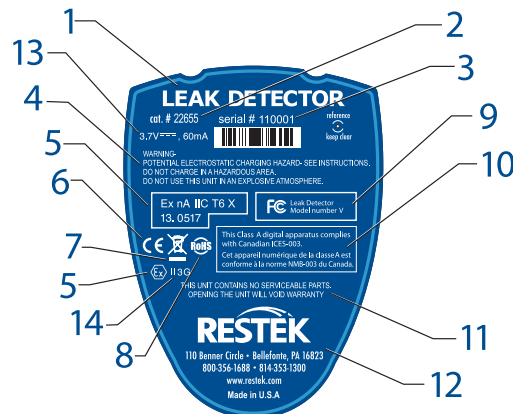
Tip drift

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 Back Label Explanation

1. Product name.
2. Product catalog number.
3. Product serial number.
4. Warning note: This plastic case does not exhibit adequate surface resistance properties suitable for high electric fields. DO NOT CHARGE THIS DEVICE IN A HAZARDOUS AREA.
5. Definition of symbols—see table at right.
6. This unit conforms to EU/EMC Directive 2004/108/EC, Standards to which Conformity is declared include EN61326-1:2006 w/A3 Class A.
7. Unit is WEEE compliant.
8. Unit is RoHS compliant.
9. This complies with part 15 of the FCC Rules. Operation is subject to the following 2 conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
10. This Class A digital apparatus complies with Canadian ICES-003.
11. Units must be sent back to Restek Corporation for service.
12. Manufacturer company name, address, and contact information.
13. Electrical parameters.
14. ATEX coding; for definition of symbols see table to the right.

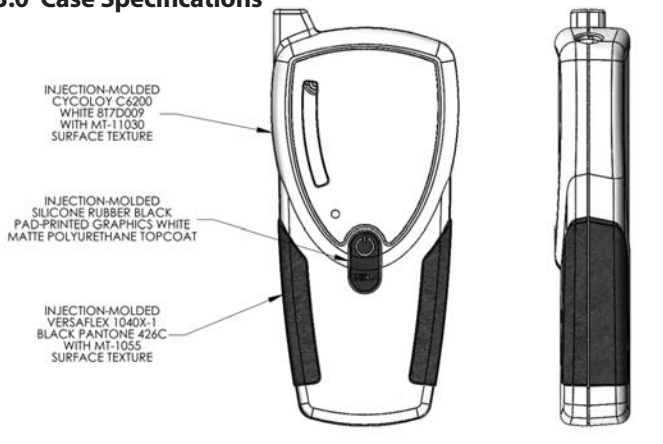
For the most up-to-date information, see our website
www.restek.com/leakdetector



Definition of back label symbols.

---	DC Voltage
Ex nA	EN60079-0: 2012; Electrical apparatus for explosive gas atmospheres- Part 0: General Requirements EN60079-15: 2010; Electrical apparatus for explosive gas atmospheres- Part 15: Electrical Apparatus With Type of Protection "n"
IIC	Group II applies to areas above ground environments. Gas Group IIC relates to hydrogen and related gas types.
T6	While testing this unit neither internal nor external elements exceed 85 °C.
X	Additional information. Operating range. $32^{\circ}\text{F} \leq T_{\text{amb}} \leq 120^{\circ}\text{F}$ $0^{\circ}\text{C} \leq T_{\text{amb}} \leq 48^{\circ}\text{C}$ This unit is designed to detect TRACE AMOUNTS of hydrogen arising from a small leak in a nonflammable environment, e.g., laboratory room air, etc. This unit is rated for use in a nonflammable atmosphere where the sample gas may become sufficiently high in concentration to become explosive.
13.0517	Certificate Reference
	EU Explosive Atmosphere symbol.
11	Equipment Group (non-mining).
3	Normal protection.
G	Gas.

13.0 Case Specifications



14.0 Service

The Restek® leak detector carries a 1-year limited warranty from time of purchase. Please have the leak detector serial number available when calling Restek 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 2 years from time of purchase. Customers will need to return the unit to Restek 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, or repair services:

Within the U.S.:

Call Restek® Customer Service at 1-800-356-1688 or
1-814-353-1300, ext. 3.

Outside the U.S.:

Contact your local Restek® representative.