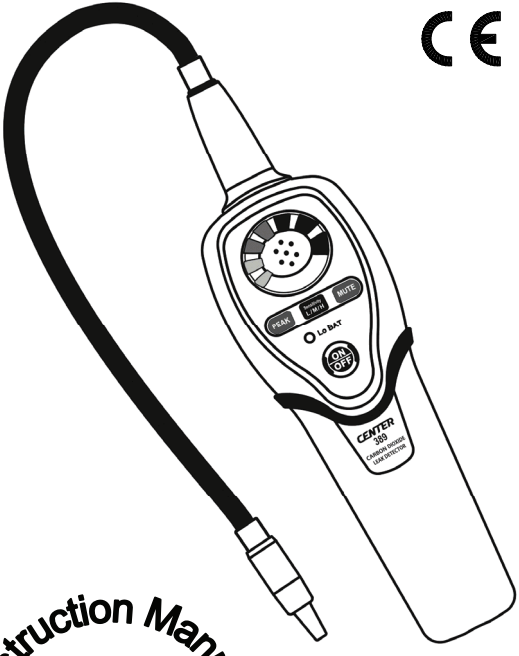
CENTER® 389



Instruction Manual

Carbon Dioxide Leak Detector

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1. GENERAL INFORMATION

Thank you for purchasing CO_2 Refrigerant Leak Detector. Read through the instruction manual before operation for correct and safe usage. Please store and retain this instruction manual for future reference.

2. FEATURES

CO_2 Refrigerant Leakage Detector uses a newly developed optical gas sensor which is extremely sensitive to a variety of R744 refrigerant. It provides features of fast-response, high-reliability, and long-durability. It is an ideal tool for maintaining industrial heat extraction, heat pump water heaters, chilled warehousing, supermarkets, shopping vessels, commercial refrigeration and automotive air conditioning.

- Microprocessor Control with advanced digital signal processing.
- Multi-color visual display.
- Mute function to turn off audible alarm.
- High-Medium-Low leak sensitivity selector.
- Low battery indication.
- Optical gas sensor.
- Detection gas: R744 (CO_2).
- Carrying case included.
- 15.5” (40 CM) flexible stainless probe.
- Ambient concentration reset.
- Peak function – find leaks in noisy environments.

- Automatic zero and background compensation.
- AC Adapter: @5V 1A

3. SPECIFICATIONS

Detectable Gas: R744 (CO_2)

Sensitivity:

	H	M	L
R744	6g/year	15g/year	30g/year

Alarm Method:

Buzzer, Tricolor LED bar Indicator

Power Usage:

3.7Vdc rechargeable Lithium-ion battery

Snake Tube Length: 40cm (15.5")

Dimension / Weight:

222 x 66 x 51 mm (approximately 418g)

Accessories:

User manual, carrying case, AC adapter, Li-ion battery pack

Battery Life:

Approximately 12 hours under normal use

Auto Power OFF: 10 minutes

Warm-Up Time: Approximately 45 seconds

Operating Temperature & Humidity:

0 ~ 40°C, < 80% RH

Storage Temperature & Humidity:
-10 ~ 60°C, < 70% RH
Altitude: < 2000M (6500')

4. OPERATION GUIDE

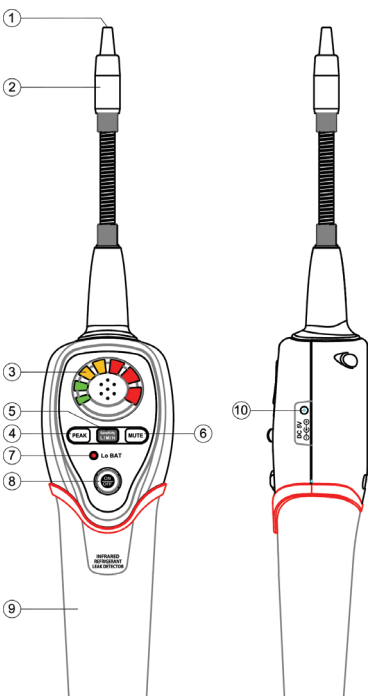
(1) The (CO_2) Leak Detector unit is not equipped with anti-explosive designs and measures. Do not use this unit in the environment with the burnable gases.

(2) There are some environmental conditions that might cause error reading:

- Pollutant places.
- Large temperature variation.
- Places with high wind velocity.
- Organic solvent, adhesive vapor, fuel gas and vesicant will cause abnormal response from the sensor. Try to avoid the environment involved with this substance.
- Places fill with high concentration of R744 gas.

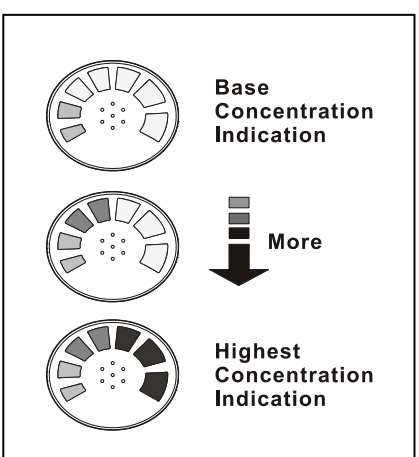
5. PARTS & CONTROL

5-1 Panel Description



① Sensor Probe	② Sensor Protector
③ LED Leak Indicators	④ PEAK Button
⑤ Sensitivity H/M/L Button	⑥ MUTE Button
⑦ Low Battery Indicator	⑧ Power On/Off
⑨ Battery Cover	⑩ DC 5V Jack

5-2 LED Leak Indicator Definition:



6. GETTING STARTED

6-1 Installing Batteries

- Loose the screw and remove the battery compartment door located on the bottom of the instrument as show below (Fig.1).
- Install Lithium-ion battery pack.
- Reinstall the battery cover by aligning it with the handle.

When the battery power is low, the red LED low battery indicator illuminates. The battery should be recharged as quickly as possible.

6-2 Charging

When the battery is being charged, the power indicating LED will be on. It will be off after charging is completed.

During the charging period, if the power indicating LED blinks, it may be caused by the following reasons.

(1) Charging period is too long and the detector is sending the warning signal. Please disconnect the power and try again later. If the situation remains, the battery might need to be replaced.

(2) The temperature of the battery is too high for charging operation. Disconnect the power and wait until it cools down then try it again.

(3) This detector is using Lithium-ion rechargeable battery and there will not be any charging memory

effect. Frequently charging routine after use is recommended to avoid over discharging which could damage the battery.

6-3 Lithium Battery Care

The Refrigerant Leak Detector contains a very powerful Lithium-ion battery. For a long battery life and safe operation, you must observe the following:

CAUTION!

(1) Do not short-circuit battery.
(2) Do not reverse connect.
(3) Do not dissemble or reconstruct battery.
(4) Do not expose the battery to temperatures higher than 140°F (60°C).
(5) Do not charge the battery in or nearby heated places, such as fire, hot vehicles, or direct sunlight.
(6) Do not expose the battery to direct impact or throw it.
(7) Do not get the battery wet.
(8) Do not deform or pierce the battery in any way.
(9) If there is any battery leakage, do not touch the battery. In the case that electrolyte gets into the eyes, flush with fresh water, do not rub, and see a physician immediately.
(10) Replace immediately if there is any deformity, bad smell, color change, or other abnormality.

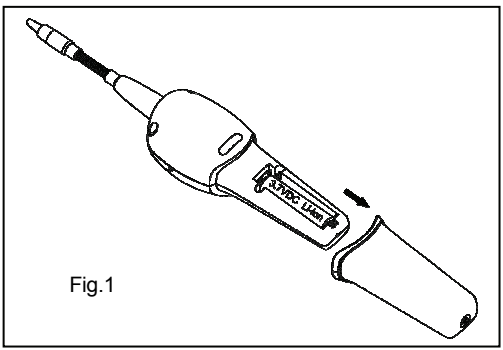


Fig.1

6-4 Automatic Ambient Reset Feature

This Refrigerant Leak Detector features an Automatic Ambient Reset function that sets the unit to ignore ambient concentrations of refrigerant.

- **Automatic Ambient Setup** - Upon initial power on, the unit automatically sets itself to ignore the level of refrigerant present at the tip. Only a level, or concentration, greater than this will cause an alarm.

CAUTION!

Be aware that this feature will cause the unit to ignore any refrigerant present at turn on. In other words, with the unit off if you place the tip up to a known leak and switch the unit on, no leak will be indicated!

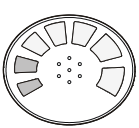
- **Ambient Reset Feature** - Resetting the unit during operation performs a similar function it programs the circuit to ignore the level of CO_2 refrigerant present at the tip. This allows the user to 'home-in' on the source of the leak (higher concentration). Similarly, the unit can be moved to fresh air and reset for maximum sensitivity. Resetting the unit with no refrigerant present (fresh air) causes any level above zero to be detected.
- Keep moving slowly to detect, if suspicious leaks are detected, move slower and repeatedly confirm.
- After the unit is warmed up, the default sensitivity level is set at “Medium”.
- **Peak Button**
  The PEAK function holds the highest change in concentration achieved while continuing to detect leaks. Press **PEAK** to toggle this function on and off.
- **Mute Button**
  If the environment requires silence during leak detection work, press **MUTE** button to turn off the audible alarm and solely rely on visual LED indicators. Press **MUTE** to toggle this function on and off.

6-5 Feature Sensitivity Adjustment

The instrument provides three levels of sensitivity.

When the unit is switched on, it is set to the Medium sensitivity level.

- To change the sensitivity, press the "**L/M/H**" key. Sequentially Indicate: H→L→M→H
- When switching to High sensitivity, the all LED's (2 green+2 orange+3 red) will momentarily light.
- When switching to Low sensitivity, the two left LED's (2 green) will momentarily light.
- When switching to Medium sensitivity, the four left LED's (2 green+2 orange) will momentarily light.



Low Sensitivity level (Green LED)



Medium Sensitivity level (Orange LED)



High Sensitivity level (Red LED)

7. OPERATING PROCEDURE

> ⚠ ***WARNING*!**
> ***Do not operate this instrument in the presence of gasoline, natural gas, propane, or in other combustible atmospheres.***

● How to Find Leaks?

NOTE: A sudden whipping of the leak detector probe or "blowing" into the sensor tip will affect the air flow over the sensor and cause the instrument to alarm.

(1) Power-Up key:

The  key turns the CO_2 Refrigerant Leak Detector instrument ON or OFF function.

Press  key once to turn on the CO_2 Refrigerant Leak Detector, the display will illuminate with flash, for 45 seconds to heat up the sensor.

Press and hold this button for 3 second to turn off the power.

(2) Enter the measuring mode

- Place the tip of the leak detector probe as close as possible to the site of the suspected leak. Try to position the probe within 1/4 inch (6 mm) of the possible leak source.
- Slowly move the probe past each possible leakage point.
- When the instrument detects a leak source, the

audible tone will alarm. Additionally, the visual indicators will light from lower to higher; green LED then orange LED then red LED (highest concentration) as increasing of level indicate that the location is close to the source.

- When the instrument signals a leakage, pull the probe away from the leak for a moment, then bring it back to pinpoint the location. If the CO_2 refrigerant leak is large, setting the sensitivity switch to LOW will make it easier to find the exact site of the leak.
- Reset the sensitivity switch to HIGH before searching for additional leaks.
- When you've finished leak-testing, turn off the instrument and store it in a clean place, protect the leak detector from possible damage.

(3) Leak Detection Procedure

- Press and hold the ON/OFF button for one second. The warm-up and calibration sequence takes approximately 45 seconds. The sensitivity level defaults to Medium at startup.
- The most likely place for a CO_2 refrigerant leak is at soldered joints in refrigerant lines and changes in cross section or direction of these lines. The detect changes in concentration of CO_2 refrigerant, not the absolute concentration of CO_2 refrigerant. This makes the detection of leaking locations possible

with the CO_2 refrigerant in the air. Use the following "**double pass**" procedure to find leaks by detecting the change in CO_2 refrigerant concentration.

(A)Charge the system with sufficient CO_2 refrigerant. Turn the system on and force compressor to operate. This could set the high pressure end of the circulation ring to its operating pressure. Turn the system off for safer test operation and less interference.

(B)Visually trace the entire CO_2 refrigerant system, and look for signs of air conditioning lubricant leakage, damage, and corrosion on all lines, hoses, and components. Check each questionable area with the detector probe, as well as all fittings, hose-to-line couplings, refrigerant controls, service valves with caps in place, brazed or welded areas, and areas around attachment points and hold-downs on lines and components. During this larger leakage finding process, use the Medium sensitivity range.

(C)Always go through the complete CO_2 refrigerant circulation path so that no areas of potential leaks are missed. If one leakage is found, continue to test the remaining part of the system.

(D)Recheck service valves with caps removed. Air clean the service valve to clear the immediate area, and then check with detector with medium sensitivity setting.

(E)Move the detector at the speed no more than 75 mm/sec (3 in/sec) and as close as possible to 6 mm (1/4 in) from the surface, completely encircling each test position (switch, sensor, refrigerant tubing connection, etc).

(F)Slower movement and closer approach of the probe normally improve the possibility of finding a leak. However, detectors made to meet this standard are based on air sampling from the 6 mm (1/4 in). Retest is advisable when a leak appears to be found at the most sensitive settings, particularly if the probe was in a static position on a joint, or making physical contact with a joint, as it was moving. Repeat the test by moving probe around that location, taking care to maintain the small gap (6 mm or 1/4 in) to confirm the leak is of repairable size. Use of the 15 g/yr position of the detector, after finding an apparent leak with the 6 g/yr setting, may also be helpful.

(G) The leak detector is sensitive and can take up to 30 seconds to clear after detecting a small

amount of contaminant. It will typically clear in 2 to 15 seconds.

When the source of the leak is detected, the detector may cause a reaction. If the first green LED continues to flash, indicating that the sensor is not restored to the best condition. Please wait a few seconds to be restored.

> ⚠ ***WARNING!***
>
> ***DO NOT use the detector without the proper filter correctly installed.***
>
> ***If the detector strong vibrations will cause the sensor instability, avoid violent shaking.***

8. CLEANING:

The Instrument plastic housing can be cleaned with standard household detergent or isopropyl alcohol. Care should be taken to prevent the cleaner from entering the instrument. Gasoline and other solvents may damage the plastic and should be avoided.

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