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CPU-1G
Refrigerant Leak Detector
User Manual

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Introduction

The CPU-1 G is an intelligent halogen leak detector (Figure 1). It is the most reliable and stable leak detector base on the theory of Negative Corona Discharge, specifies all the functions of easy operation, stable function and high performance with high ratio. It is a portable sensitive device designed to pinpoint the location of halogen refrigerant leaks in refrigeration systems. These include automotive air conditioning, refrigerators, freezers, vehicle refrigeration systems and home, office, and industrial cooling /refrigeration systems, where halogen is used as the refrigerant.



Figure 1

This device is a necessity in the toolbox of a service technician in the refrigeration and air conditioning field.

Warning

CPU-1 G refrigerant leak detector is a sensitive instrument designed to find the leaks of halogen refrigerants (CFCs, HCFCs, HFCs etc.) at a very low concentration. When the leak is at a closed space and the leak is severe, the room may have been concentration lack of oxygen and pose a danger to enter, always ventilate the room before entering. Too high concentration of halogen refrigerant can be explosive; use of the leak detector is prohibited in this situation. Refrigeration systems using refrigerants other than halogen, such as ammonia or hydrogen etc., is not detectable by this device.

Technical Characteristics

Power supply: 2 size,*C" Alkaline Batteries

Warm-Up Time: 6 seconds

Application of refrigerant:

- Detect leaks in other systems and storage/recovery containers. It will respond to all halogenated (including Chlorine or Fluorine) refrigerants. This includes, but is not limited to:

CFCs e.g.R12,R11,R500,R503 etc...

HCFCs e.g.R22,R123,R124,R502 etc...

HFCs e.g.R134a,R404a,R125 etc...

Blends such as AZ-50,HP62,MP39 etc...

- Detect Ethylene Oxide gas leaks in hospital sterilizing equipment (it detects the halogenated carrier gas).
- Detect SF-6 high voltage circuit breakers
- Detect most gages that contain chlorine, Fluorine and Bromine (halogen gases)
- Detect cleaning agents used in dry cleaning applications such as perchloroethylene.

Sensitivity: 3 g/yr of R-134a (ultimate Sensitivity); 6 g/yr of R-134a (max. sensitivity).

Battery Life: 50 hours, under typical intermittent operation

Probe: Flexible gooseneck, 14 inches

Visual and Audible Indicators:

Power & Battery: Tri-color LED display (according to the glowing sequence of color: red, green, and orange).

Relative Leak Level: 7 levels of increasing LED display.

Visual - 7 LEDs progressively glow from left to right when halogen level increases.

Audible - Beep-sound, rate change along with the visual LED, increase from its idle rate to a higher frequency when higher levels of halogen are detected.

Operating Environment:

Temperature: 0°C to 52 °C

Humidity: 20 to 80% RH, non-condensing

The forward direction air flue supplied by mechanical pump can improve and enhance the detection sensitivity.

Warranty: 1-year warranty

Control Switches:

Power: Switch the detector ON/OFF.

Sensitivity: Relatively change the response to halogen level.

Reset: Reset the background halogen level at the tip to "zero", any level higher than this "zero" is considered to be a leak and trigger the alarm.

Mute: To mute the buzzer during the detection process.

Battery Installation

 **Warning**

To reduce the risk of igniting flammable gases in a closed atmosphere, batteries must only be changed in an open area or closed space without flammable gas.

Side View

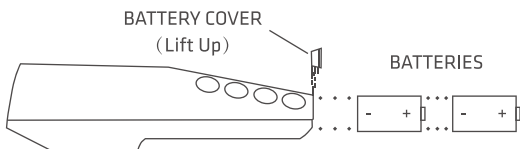


Figure 2

1. See Figure 2. Use a thumb to push open the battery cover located at the bottom of the detector.
2. Install two BC" alkaline batteries into the detector, check the polarity markings on the side of the case.

Installing/Replacing the sensor Tip

See Figure 3

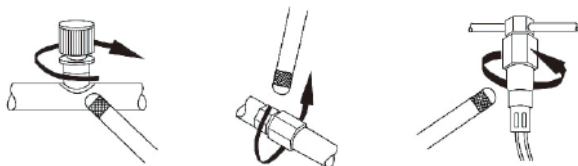
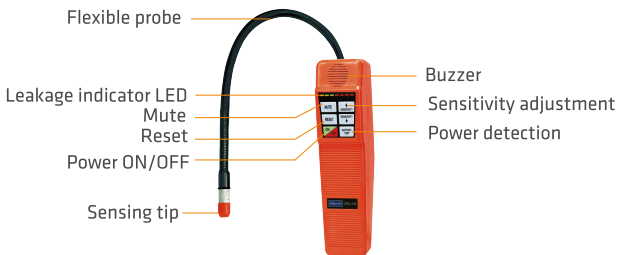


Figure 3

Sensor tip must be installed before any testing and detecting occur. Make sure the power is turned off. Use the tip that comes with the detector only. Line up the thread on the sensor tip with flexible probe end crew, turn it clockwise and hand tight only.

Turning the Detector ON / OFF

Detector Interface and buttons.



POWER button turn on/off the detector.

When first turned on, the LED (the first on the left) glows and detector entered/self-testing phase and then normal warm-up stage. All of the 7 LEDs indicator lights flashes continuously for 3 seconds. Lastly, only the left LED is lit (Green - batteries good, orange- batteries is weak, replace it as soon as possible; Red- batteries need to be replaced before use). At this time, the beeping sounds once every second. The detector sets the atmosphere halogen level to "**zero**" and the detector is in a waiting stage after 6 seconds, the detector is ready for testing/detecting as described below.

Operation instruction:

1. Check the battery level by observing the constant power indicator light (see above).
2. Upon turning on, a rapid and steady beep can be heard from the device. It has 5 sensitivity level. User may set the desired sensitivity level.
3. When a refrigerant is detected, the frequency of the beeping will get higher. Additionally, the visual indicators (LED) will light progressively as described in the alarm indications section.
4. Sensitivity can be adjusted at any time during operation by pressing ↑ and ↓ key. The adjustment will not interrupt detection.
5. If the alarm went off before the leak is pinpointed, please press RESET key to reset to 0 levels, and restart.
6. Press "Mute" key to off the alarm, press it again to unmute the alarm, and switch the alarm status by pressing "Mute" key several time.
7. Press the "BATTERY TEST key to check the battery capacity.

A Note before Leak Check

1. In order to check on a leak in a refrigeration system, the system must have normal operating pressure, or at least partially charged (50 PSI minimum). Lower environmental temperature (lower than 59 °F or 15 °C) may lower the system pressure and may caused the leak less likely to be detected. The situation when a leak is not found does not mean the system does not have leak. Check the pressure before making that conclusion.
2. Leaking areas are usually associated with contaminations of compressor oil or dirt, be careful not to let the sensor tip in contact with these contaminants.
3. The detector's function is to detect a relative change in halogen level at the sensor tip. Pinpoint depends on the technique of a field technician. Use the manual sensitivity adjustment and/or reset as needed and follow the recommendations bellow.
 - (1) In areas where the atmosphere is contaminated with halogen refrigerant in the background. Reset button can be used to "ignore" the background level as often as needed. Make sure not to move the sensor probe away from the contaminated background while resetting the detector.
 - (2) In windy area, the leaked halogen refrigerant may be quickly diluted or removed from the leaking point. The technician may use a wind shield to isolate the leaking area under checking or turn off the fan in the area.
 - (3) To avoid false alarm, protect and present the sensor tip against contacting any moisture or other solvent.

Recommended Leak Detecting Procedures

1. Visual exam the system for the refrigeration lines, coils, compressor, check for oily and dirty spots, those are the likely areas to be checked. Joints, valves, connectors, dented area on the pipe/hoses are likely the places for leakage. to occur. However, leak check should be done on the whole system.
2. Start leak checking at a joint and travel along the line at a speed of 1 inch per second and the sensor tip should be held at a distance 1/6 to 1/4 inch away from the line.
3. When the alarm is triggered, it may indicate a leak is close by. Check around that area and see if the alarm is repeatable. If a leak is confirmed, pinpoint the leak source by moving slowly from no-leaking (no-alarm) area to the leaking area from different directions.

And by manipulation the reset and sensitivity controls, moving the detector away from the leaking area and reset the unit, adjusting the sensitivity lower and repeat the above process to pinpoint the leak. Once confirmed, mark around the leak and continue checking the whole line of the system.

4. Additional work may be needed to eliminate possible ambiguity, like other contaminants at the spot that make the detector alarm goes off. Clean the leaking area with dry cloth and blow clean dry air to the leaking area and repeat step 3 above to confirm the leak.
5. Leak on evaporator coil is harder to detect than other areas because of accessibility is limited. Most evaporator coils are made as a module and are installed in a closed space with fan carrying air through it for heat exchange. The system should be turned on with this fan at high speed for 10 seconds and the fan is turned off to let the leak to accumulate for 10-15 minutes in the evaporator well. Then use the warmed-up detector to check at the outlet of the condensate or check the air inside the evaporator chamber. Most halogens are heavier than air and likely to accumulate at the lowest spot in a closed space. An alarm may indicate a leak at the evaporator coil. Repair to evaporator is hard to do depend on the precise location of the leak. In most cases, the whole coil module has to be replaced.
6. After the repair service or maintaining service is accomplished, leak checking should be performed on the serviced part/area before leaving the job or system.

Maintenance

Proper maintenance is important and may extend the product life and improve the performance of your detector.

Warning: Turn the Power off before replacing the sensor tip. Voltage across the tip may pose an electrical hazard.

Keep the sensor tip clean: Use cotton cloth or compressed dry air to clean the shield on the sensor tip if it gets contaminated.

If the sensor tip itself is contaminated, soak the tip in absolute alcohol for a few minutes, and then use compressed air to blow it dry, or dry it with cloth.

Note: Never use strong solvents such as Gasoline, mineral oil, turpentine and the alike, these solvents may coat the sensor with a thin film and reduce the sensitivity of the detector and cause the detector slow respond to a leak. Always store the detector and the tip at a dry and clean place with the batteries unloaded if the detector is not going to be used for a long period of time.

TABLE 1. TROUBLESHOOTING GUIDE

The detector does not turn on

Possible reason:

A. The battery is running low

Solution: Please change new batteries.

B. The battery contact has been oxidized.. Solution: Please remove the oxidation layer.

The detector does not respond to a known leak

Possible reason: Sensor tip is aged.

Solution: please change to new sensor as soon as possible.

The detector gives false alarm, when there is no halogen present

Possible reason: There are some ingredients had changed in the ambient atmosphere.

Solution: please press RESET key to set the background to "zero" level; Try to avoid the change in air moisture and/or temperature.



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