

Lutron GS-5800 ULTRASONIC GAS LEAKAGE DETECTOR



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1. THEORY OF ULTRASONIC LEAK DETECTION

The human ear can hear sound frequency up to 18 kHz. The sound frequency above 20 kHz is categorized as ultrasonic sound which is not audible.

Ultrasonic sound is very directional in nature. We can utilize this nature to pinpoint the exact origin of the sound source &/or where the leak is located.

Physics tells us that the gas always flows from the higher pressure region to the lower one. When the pressure difference is only a small opening, the turbulence created by the gas through that small hole then generates an ultrasonic sound.

When any gas flows through a small opening at a rate greater than 10 F-5 atmospheric ml/sec (milliliter per second), the gas is then generally viewed in the viscous flow dominion. As you know, the bigger the pressure difference across an opening, the faster the velocity. As the velocity increases, the frequency of the emitted ultrasonic sound will become higher too. The overall spectra of the emitted ultrasonic sound is generally called "white noise".

The velocity and volume of a leaking gas are affected by the viscosity of the gas. The higher viscosity of the gas, the velocity is slower and the volume is lower through the opening.

**The Lutron ULTRASONIC GAS LEAKAGE DETECTOR
was designed based on above principals.**

2. FEATURES

This ULTRASONIC GAS LEAKAGE DETECTOR is designed to locate the source of the ultrasonic emissions generated by gas or air leaks. The leakage level is displayed by the "Bar LED Display Panel", and is covered to audible sound by either internal buzzer or to an external earphone (optional).

3. SPECIFICATIONS

Leakage Sensitivity Indicator	Bar LED display panel & audible tone. (Bar LED display is relative measurement only. Audible tone is the frequency of the received ultrasonic sound divided by 32)
Frequency Response	20 kHz to 100 kHz.
Minimum Leak	See Fig. 4 (page 8)
Power Supply	006 P DC 9V battery (Heavy duty, Alkaline type)
Power Consumption	Approx. DC 17 mA.
Operating Temperature	32° to 122°F (0° to 50° C)
Operating Humidity	Max. 80% RH. non-condensing
Weight	Approx. 260 g/0.57 lb including battery).
Dimensions	HxWxD 255 x 70 x 28 mm 10.0" x 2.8" x 1.1"

4. FRONT PANEL DESCRIPTION

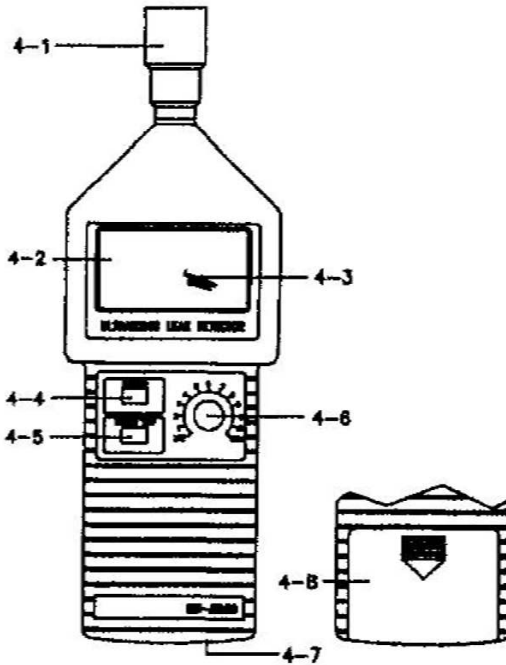


Figure 1

- 4-1 Sensor Horn
- 4-2 Bar LED Display Panel
- 4-3 Battery Condition Indicator
- 4-4 Power Button
- 4-5 Battery Test Button
- 4-6 Sensitivity Setting Dial
- 4-7 Earphone Jack
- 4-8 Battery Cover/Compartment

5. MISCELLANEOUS ACCESSORIES

(accessories included)

(1) Rubble bottle plug with plastic tubing.

This accessory can be used to extend the sensor horn, carrying the sound from places too tight, too dangerous for human contact, to eliminate the background noise

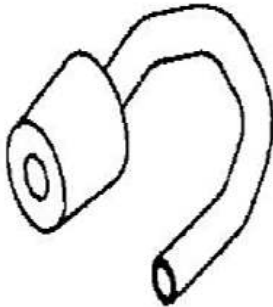


Figure 2

(2) 1/2 inch PVC pipe

The horn of the ultrasonic leak detection unit is designed so that the pipe will fit into the horn to eliminate the background noise & protect the operator from an area of danger. Ref. Fig. 3.

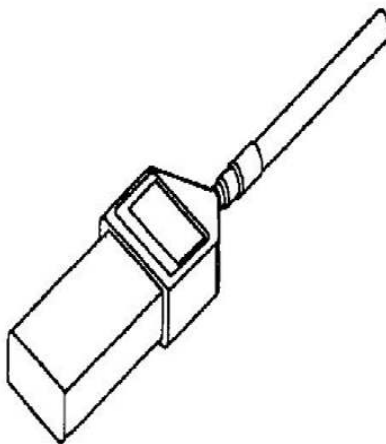


Figure 3

6. MEASURING PROCEDURE

- (1) Plug in the optional earphone into the "Earphone Jack" (4-7, Fig. 1) to enhance detection ability.
- (2) Press the "**Battery Test Button**"(4-5, Fig. 1) to check the battery level. The LED display panel will light in "**BAT OK**" position if it is adequately powered, otherwise, the battery should be replaced.
- (3) Press and hold the "**Power Button**"(4-4, Fig. 1) during the whole measuring period.
- (4) Set the "**Sensitivity Setting Dial**"(4-6, Fig. 1) to the "**HIGH**" position. (Note: The "**Power Button**" is still held down.
- (5) Approach the object under test from different angles and to different positions. The level of the audible tone and the level of the LED display panel will change in this process.
- (6) Try to locate a point or an area where the audible tone is louder and the level of the LED display panel shows the maximum.
(Note : When the LED at the right-hand side of the display panel is lit, it indicates the maximal reading of detector to that specific sensitivity range setting.)
- (7) Change the "**Sensitivity Setting Dial**"(4-6, Fig. 1) to a lower setting. Repeat step (6).
- (8) Repeat steps (6) and (7) until the leaking source is located.

7. IMPORTANCE of THE MEASURING WARNING

- (1) If there is quite a bit of background noise, you may muffle the leak detector to hear the actual leaks. This can be accomplished with the "rubber plug with plastic tubing" & "PVC pipe"

MISCELLANEOUS ACCESSORIES).

- (2) For very noisy environments, the optional earphone are suggested to allow the operator to hear the converted ultrasonic sound.
- (3) This detector is not intended for use with flammable gases.

8. APPLICATIONS

Ultrasonic Leakage Detector only

(1) Leaks in refrigeration and air condition systems.

The leakage detector be used to detect vacuum leaks or pressure leaks in refrigeration and air conditioning installation. A leak will emit an ultrasonic sound as the refrigerant escapes the unit. The detector can be used to pinpoint the exact location of the leak by "homing" in on this sound.

(2) Leaks in heating system.

(3) Internal leaks in steam transfers. (4) Compressed air leaks.

(5) Tire & tube leaks. (6) Engine seals. (7) Electrical arcing.

Electrical arcing can be detected with the ultrasonic leakage detector. Arcing produces a rich ultrasonic spectrum that is quite noisy. Used the PVC pipe accessory to extend the sensor horn of the detector for safety purpose.

(8) To check the bearing problems. (9) Brake system.

Ultrasonic Leakage Detector +

Ultrasonic transmitter(GS-400 at InspectUSA.com)

(1) Air leaks around door & window gaskets & seals.

(2) Water leaks in roofs.

(3) Conduit & pipe identification.

(4) Door & trunk seals.

(5) Windshield leaks.

9. BATTERY REPLACEMENT

(1) Please ref to Section 6, "MEASURING PROCEDURES", step 2.

Press and hold the "Power Button"(4-4, Fig. 1) during battery level. The LED display panel will lit in "BAT. OK" position if it is adequately powered, otherwise, the battery should be replaced.

(2) Open the Battery Cover (4-8, Fig 1) at the back of tester and remove the battery. Replace with a 9V battery (heavy duty) or equivalent and reinstall the cover.

10. MINIMUM FLOW RATE GRAPH

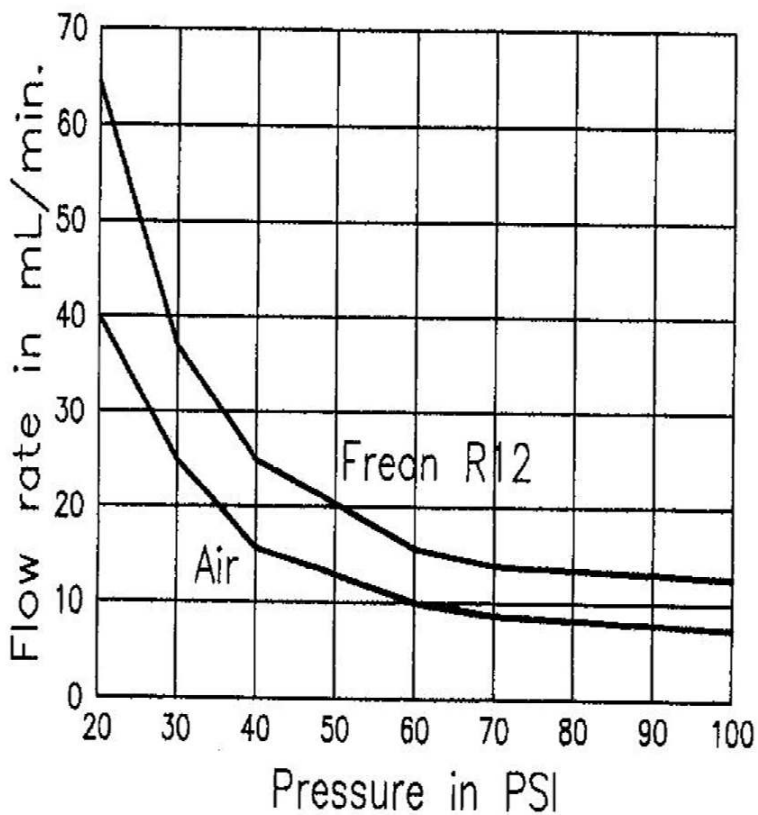


Fig. 4