**azbil**

PlantWalker™ Series Portable Operations Support Tool

# Leak Detector II

## Overview

Ultrasonic vibrations are produced when a gas or liquid is discharged into the atmosphere at a certain speed. They also can be generated by flaws, poor lubrication and abnormalities of bearings and other parts on rotary machines, belt slippage on belt-driven devices, and other types of friction between solid bodies.

Leak Detector II is a portable operations support tool that detects ultrasonic vibrations generated by a gas or liquid leaking from pipes, as well as flaws or poor lubrication of bearings on rotary machines, and indicates the strength of the ultrasonic vibrations on an LED bar graph using numerical values and sound. It can be used not only as an equipment diagnosis tool, but also as an effective tool for energy conservation, environmental preservation and safety by detecting instrument air leaks.

Leak Detector II is an ultrasonic detection tool with the following features.
• A sound-collecting parabolic hood with highly directional sound collection characteristics
• An ultrasonic sensor that can be detached from the sound collecting parabolic hood and attached to a sound-collecting probe
• An indicator control panel used to display detected signal intensity with a bar graph and numerical values, to set the signal amplification level and earbud volume,* and to save data.

\* Ultrasound at about 40 kHz is detected by the sensor and is converted to audible sound and output from the earbuds.



**Figure 1. Leak Detector II**



**Figure 2. Exterior view**



**Figure 3. Sensor unit without sound-collecting parabolic hood**



**Figure 4. Sensor unit with sound-collecting probe attached**

## Features

1. Main unit with integrated sound-collecting parabolic hood, ultrasonic sensor and indicator control panel. Simple push-button operation allows anyone to operate the detector with ease.

2. Detects ultrasound at about 40 kHz,[1] a frequency which is prominent in gas leaks, and indicates it by means of a bar graph, numerical values, and audible sound.

3. Detects ultrasound generated by the deteriorated bearings of rotary machines in the same frequency band as that generated by gas leaks.

4. The direction of an ultrasound source can be identified using the directivity of the sound-collecting parabolic hood and using the laser pointer.[2]

5. Allows pinpointing of the ultrasound source[3] after detachment of the parabolic hood from the sensor and the indicator control panel.
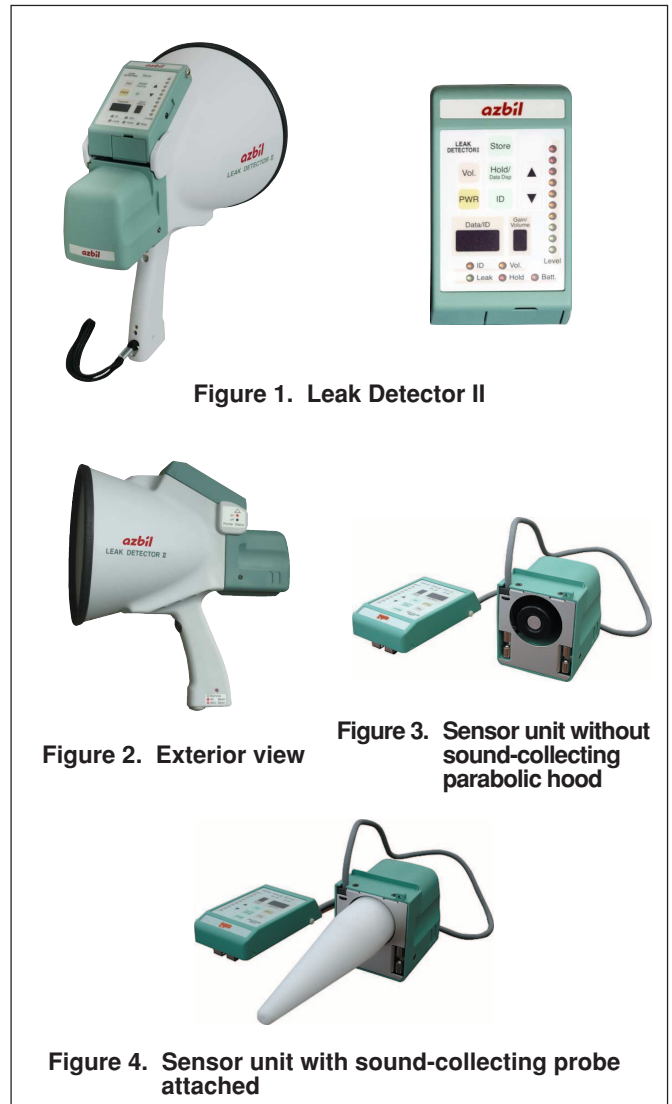
6. Gives a rough estimate of the volume of the leak.[4]

7. Saves measurement data on up to 500 points in the main unit, for transfer to a PC.

8. With the sound-collecting parabolic hood, is able to detect an ultrasound source at a distant location.[5]

Notes
1. Leak Detector II detects ultrasound at about 40 kHz frequency band only.
2. Optional
3. This effect is enhanced by using the optional sound-collecting probe in place of the sensor.
4. Conversion of ultrasound intensity to leak volume is based on the assumption of data under particular conditions, and yields a rough estimate only.
5. Detection range varies depending on conditions.

# Functions

- **Sensitivity adjustment**

  Sensor sensitivity can be adjusted to eight levels.

- **Signal intensity indication**

  The intensity of the signal detected by the sensor is indicated on a 10-step LED bar graph and by numerical values.

- **Sensor detachment**

  The cable-connected sensor and indicator control panel can be used without the parabolic hood.

- **Conversion to leak volume**

  The detector indicates an estimate of air leak volume based on ultrasound intensity. Conversion of the ultrasound intensity to leak volume is based on the assumption of data under particular conditions, and therefore the estimated volume may not agree with the actual leak volume. The intensity of ultrasonic vibration depends on many factors in addition to the volume of the leak, such as gas pressure, density, temperature, and humidity; ambient environment; shape of the leaking part; leak direction; and others. Thus the leak volume indication given by the Leak Detector II is a rough estimate only.

- **Earbuds**

  Signal detected by the sensor can be output through the earbuds as audible sound. The earbud volume can be adjusted to eight levels.

- **Battery (nickel-metal hydride (Ni-MH))**

  The detector can be used for about 4.5 hours on a full charge. (The time varies depending on LED indicator use, earbud volume, ambient temperature, battery condition, and other factors.)

- **Laser pointer (optional)**

  The laser pointer is attached to the sound-collecting parabolic hood so that it emits a beam of laser light parallel to the sound-collection axis. While the button on the grip of the sound-collecting parabolic hood is pressed, the laser pointer emits a beam of laser light.

- **Transfer of measurement data to a PC**

  Measurement data saved in the main unit can be transferred to a PC via the serial communication port on the indicator control panel. The main unit saves three kinds of data for 500 data points: ultrasound intensity, leak volume estimate, and gain (sensitivity).

# Specifications

| Item | Specifications |
|---|---|
| Ambient temperature and humidity range | 0 to 40℃ , up to 85% RH (without condensation) |
| Storage temperature and humidity range | -10 to 40℃ , up to 85% RH (without condensation) |
| Ultrasound detection frequency | 40 kHz range |
| Auto power OFF | Approx. 15 minutes |
| Indicator | 10-step LED, 2-digit numerical display, 19-step leak volume level |
| Output | Audible sound converted from received ultrasound via earbud. Variable output volume. |
| Data storage | Ultrasound level, leak volume level (in leak mode), and sensitivity setting for 500 data points |
| Communications | Serial communications (9P D-sub), 9600 bps |
| Power | Six AAA nickel-metal hydride (Ni-MH) batteries |
| Weight | Approx. 1.3 kg |

Notes
1. Ultrasound detection performance varies depending on conditions. Conduct preliminary experiments before using the detector.
2. For the rechargeable batteries and charger, consult the manufacturer's documentation. Azbil Corporation does not provide troubleshooting or other services for these items.

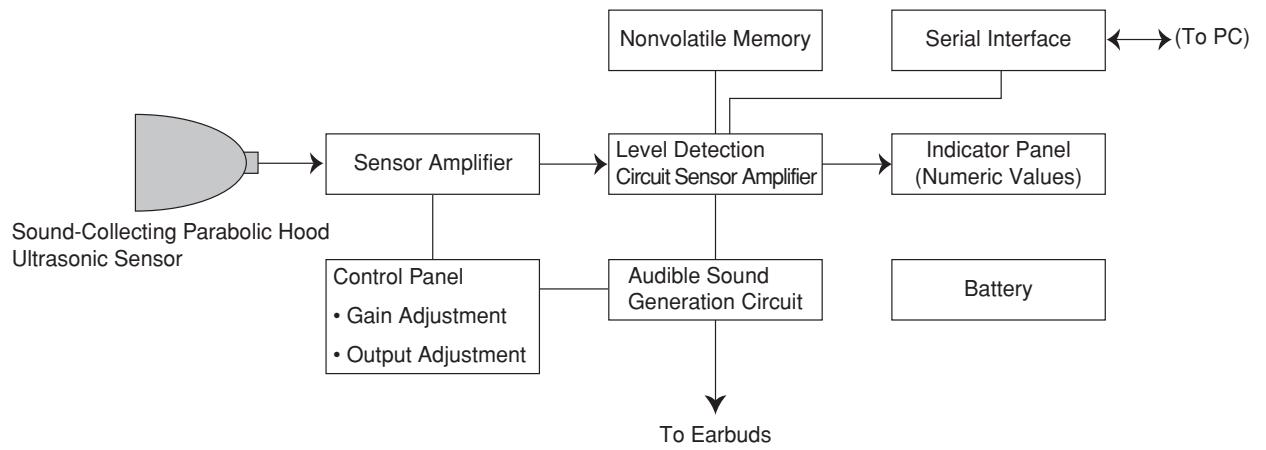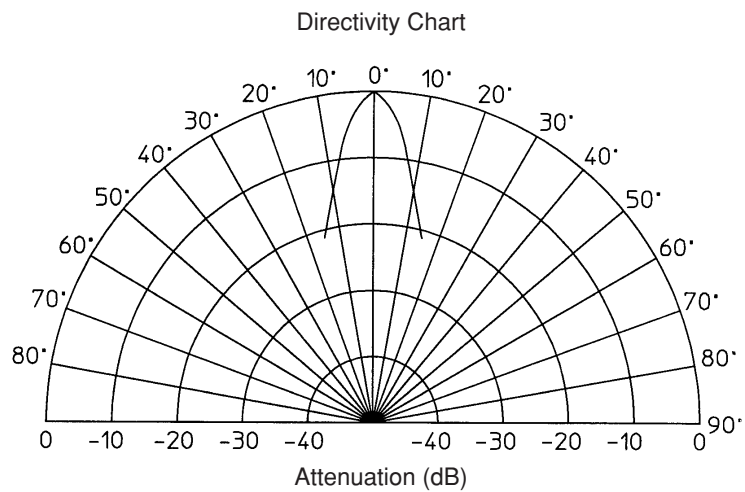| **Caution** | *Avoid using this product for toxic or explosive gas leak testing.* |
|---|---|

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                         ┌──────────────────┐        ┌──────────────────┐
                         │ Nonvolatile Memory│       │ Serial Interface │◄────► (To PC)
                         └──────────────────┘        └──────────────────┘
                                   │                          │
         ┌──────────────┐    ┌──────────────────┐    ┌──────────────────┐
   ───►  │Sensor Amplifier│──►│ Level Detection  │──► │  Indicator Panel │
         └──────────────┘    │Circuit Sensor Amp│    │ (Numeric Values) │
Sound-Collecting Parabolic    └──────────────────┘    └──────────────────┘
Hood                                   │
Ultrasonic Sensor           ┌──────────────┐    ┌──────────────────┐    ┌──────────┐
                            │ Control Panel │────│  Audible Sound   │    │ Battery  │
                            │• Gain Adjustment│  │Generation Circuit│    └──────────┘
                            │• Output Adjustment│ └──────────────────┘
                            └──────────────┘            │
                                                        ▼
                                                   To Earbuds
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**Figure 5.  Leak Detector II Block Diagram**

Directivity Chart



Attenuation (dB)

Note: This chart shows sample measurement characteristics, and does not guarantee performance.

**Figure 6.  Parabolic Hood Directivity Characteristics**
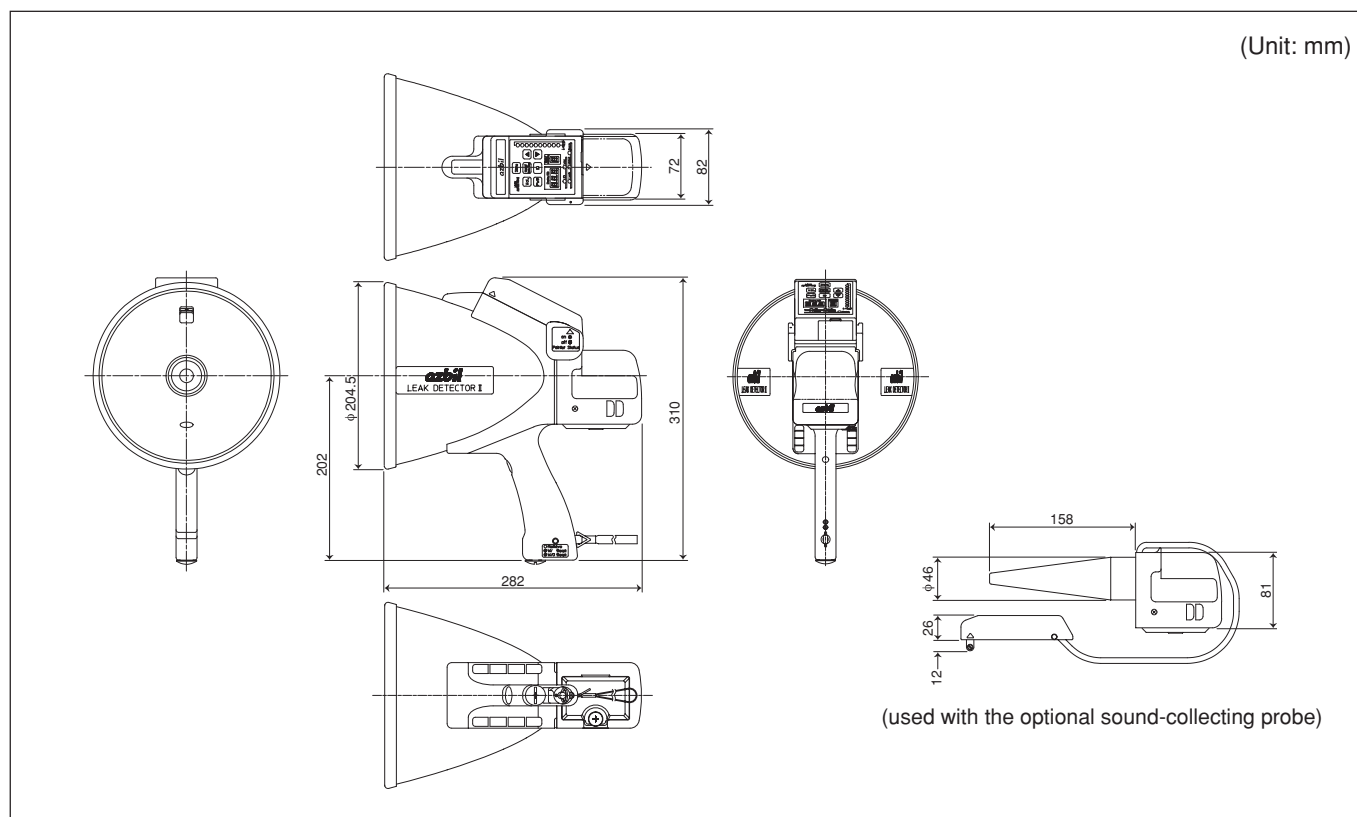
## Model Numbers

**Table 1-1.  Main Unit**

| Model Number | Product Name | Remarks |
|---|---|---|
| AAM-PWFLD003E | Leak Detector II | International version (except China). Main unit, sound-collecting parabolic hood, strap, and earbuds included. |
| AAM-PWFLD004E | Leak Detector II | Chinese version. Main unit, sound-collecting parabolic hood, strap, and earbuds included. |

**Table 1-2.  Options**

| Model Number | Product Name | Remarks |
|---|---|---|
| AAM-PWLDLS03 | Laser pointer kit | International version (except China). |
| AAM-PWLDLS04 | Laser pointer kit | Chinese version. |
| AAM-PWLDBX01 | Storage case | 34 (H) × 42 (W) × 26.5(D) cm. |
| AAM-PWLDPB01 | Sound-collecting probe | Use without the sound-collecting parabolic hood |

## Dimensions



(Unit: mm)

(used with the optional sound-collecting probe)

Please read the "Terms and Conditions" from the following URL before ordering or use:

**http://www.azbil.com/products/bi/order.html**

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*Specifications are subject to change without notice.*

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