

SON-TECTOR

An ultrasonic maintenance tool

Used to easily, rapidly locate leaks and
mechanical malfunctions



Hand probe detects ultrasonic leaks.

- ▶ Prevent downtime by doing maintenance on your own schedule.
- ▶ Save money. Avoid the hidden cost of leaks.
- ▶ Test products before they go to market.
- ▶ The Son-Tector ultrasonic detector is easier to use, more accurate, and far more reliable than soap bubbles or stethoscopes.

WHAT IS IT?

The Sontector is a simple industrial maintenance tool used to inspect equipment to find leaks and mechanical malfunctions.

Many call it an instrument, a tester, a locator. Some call it non-destructive testing. We call it a detector. The word “ultrasonic” is the technical term for how it works.

WHY BUY OURS?

- **SIMPLE TO USE**– no complicated calibrations or unnecessary bells and whistles.
- **SENSIBLE DESIGN**– backed by 40 years experience.
- **QUALITY CONSTRUCTION**– rugged, reliable, dependable.
- **LIFETIME WARRANTY**
- **30 DAY MONEY-BACK GUARANTEE**

WHAT CAN I DO WITH IT?

The uses are limited only by your imagination! Here are a few.

You can test for, find, locate, or detect:

- Pressurized leakage in compressed air or gas, truck and trailer air brake systems, pipes and pipelines, high pressure steam systems and boilers, bottled gas, medical gas manifolds, helium, telephone cables, vacuum bags and chambers.
- Pin hole leaks in containers, truck vans and trailers, HVAC, bulkheads, tanks, seals, gaskets (widely used in aircraft, marine, auto and truck manufacture and maintenance).
- Defective, bad, or worn steam traps, steam valves, hydraulic valves, bearings, gears.
- Corona discharge from faulty or damaged insulators or cable.



Contact probe locates mechanical malfunctions.



Son-Caster generates noise to help find non-pressurized leaks.



Rubber sound concentrator slips over end of hand probe to pinpoint leak location.

Descriptions

SON-TECTOR 123 & 112 PACKAGES

The Sontector is solid, dependable, easy to use, and backed by over 40 years of experience. It's rugged housing and noise-excluding head phones are designed for industrial use. This tool easily locates leaks and mechanical malfunctions.



123 PACKAGE

The 123 package is the most flexible package and offers maximum opportunity for cost savings. It contains everything necessary for ultrasonic leak and mechanical malfunction location.

112 PACKAGE

The 112 package omits the ultrasonic noise generating Son-Caster II-S. You would choose this package if you are looking for pressurized leaks or mechanical malfunctions, and would never need to find non-pressurized leaks such as those found in containers or vehicle windshields.

INDIVIDUAL PACKAGE COMPONENTS DESCRIPTIONS

1. Son-Tector 110M. Leather-cased base tool hears the source of the problem. The loudspeaker is more convenient than headphones when background noise is not an issue. The loudspeaker is essential

in industrial applications where personnel are not allowed to wear headphones for safety reasons. Hearing a leak or malfunction is easier and far superior to meter-only read-out. The meter is used when hard hats prohibit use of headphones and background noise prevents hearing the loudspeaker. Leather case has handy belt clip. Sturdy, lightweight, anodized aluminum chassis.

2. Hand probe. Microphone hears airborne ultrasonic sound generated by compressed air and gas leaks, vacuum leaks, and corona discharge. It is also used in conjunction with the ultrasonic noise generator Son-Caster II-S to locate pin hole leaks in seals, containers, vans, and tanks. Far faster and easier than soap bubbles.

3. Sound concentrator. Flexible, rubber funnel slips over the hand probe in order to sharply reduce the effect of ultrasonic noise originating away from the leak. The hand probe is used to locate the general area of the leak. Then, the sound concentrator is slipped over the probe to pinpoint the leak. The sensitive area is reduced to a circle of about 1/4 inch in diameter. The flexible rubber allows bending around pipes or into other difficult to reach locations. Unlike rigid sound concentrators which can make quite a racket when bumped, rubber is completely silent.

4. Contact probe. Metal rod hears mechanical malfunctions in steam traps and condensers, hydraulic valves, by-passing cylinders, bad bearings, and worn gears by touching the probe tip directly to the housing, pipe, or valve. Far more sensitive than a stethoscope.

5. Headphones. Essential accessory in noisy environments such as industrial and commercial settings. Headphones increase effective sensitivity by sharply reducing the intensity of outside interfering sounds.

6. Son-Caster II-S. Ultrasonic noise generator for locating non-pressure leaks. Place the Son-Caster inside the tank, vehicle body, trailer, or watertight compartment in order to fill the area with ultrasonic sound. Leaks will be found on the other side of the container using the Sontector. The generated sound will be heard

through the leak point. Excellent way to test for vacuum seal and gasket leaks.

7. Squeeze bottle. Included with every Son-Tector 110M. Squeezing the bottle simulates a leak and is a quick, simple way to field test the unit for proper operation.

8. Carrying case. Lightweight, durable, dye-cut foam interior keeps and protects all components in one handy place.

9. Pole mounting amplifier. (NOT INCLUDED IN EITHER PACKAGE – PURCHASE SEPARATELY).

Used for semi-remote leak detection, such as overhead telephone cables, or where an operator must be completely isolated from a hazard, such as high voltage in the leak area. The receiver/amplifier is mounted on a swivel which will fit most poles or hot sticks. The transmitting probe is mounted on a clamp about 3 feet lower on the pole. The Son-Tector probe is mounted near the bottom of the pole to receive the ultrasonic transmissions for the conversion in the usual way.



COMPARE PACKAGES

| Component | 123 package | 112 package |
|--|--------------------|--------------------|
| Son-Tector 110M | X | X |
| Son-Caster II-S | X | - |
| Hand probe | X | X |
| Sound concentrator | X | X |
| Contact probe | X | X |
| Coiled cord | X | X |
| Headphones | X | X |
| Carrying case with foam insert | X | X |
| Squeeze bottle | X | X |
| Son-Tector 110M with hand probe | - | - |
| Son-Tector 110M with contact probe | - | - |
| Pole mounting amplifier | - | - |
| Extension cord for probes (25 ft. minimum) | - | - |

Specifications

Son-Tector Ultrasonic Detector

| Item | Specification | Comment |
|----------------------|---------------------------------|--|
| Warranty | LIFETIME | Units purchased after September 1, 2003 |
| Previous warranty | Two year | Units purchased before September 1, 2003 |
| Frequency range | 35Khz to 45 Khz | Sound generated by leaks and malfunctions occur in this range. Wider range increases cost and complexity for no practical benefit. |
| Circuitry | Solid state analog | Sturdy, reliable |
| Sensitivity | .5cc/sec. (air at sea level) | Showing relationship between distance from leak and leak size. |
| Battery | 9 V | Easy to obtain. Batteries tend to be replaced due to age rather than from usage. (Estimated life ~100 hours at partial volume. 12 hours at full volume.) |
| Display | Analog meter | Sturdy, reliable, easy to read in any light. |
| Audio output | 100-5000cycles | (1) Built in loudspeaker for low background noise situations. (2)Padded, comfortable headphones for noisy background situations. |
| Base unit dimensions | 6.5 x 4.5 x 1.75 inches | Hand held or clipped to belt. |
| Base unit weight | 1.2 lbs | |
| 123 package weight | 7 lbs. | |
| Training manual | Instruction sheet included | Unit is easy to use. Read the simple instructions and play with the unit for a few minutes. New users find leaks or malfunctions in minutes. |

Why pay more for features you don't need, or be confused by big words that don't make any difference?

Over the years, the manufactures have come to call this topic "BELLS AND WHISTLES".

Using ultrasonics to locate leaks and mechanical malfunctions is far superior to soap bubbles or stethoscopes. That said, ultrasonics is

not rocket science either! The manufacturers have received phone calls and emails from people asking them about various features that sound impressive, make no difference, or are even a bad idea.

Here are a few of their favorites:

Hetrodyming is as common to ultrasonic detectors as wheels are to cars. Hetrodyming is the process by which frequencies are mixed to make pressurized leaks or mechanical malfunctions audible to the human ear.

Adjustable or Variable Frequency. Calibration. We find it hard to imagine why anyone would build, or spend the money to buy, a unit that requires increased training time and increased set-up time for no practical benefit. The Sontector is built to hear the ultrasonic noise generated by pressurized leaks and mechanical malfunctions. Adjustment is unnecessary.

Noise attenuating headsets. All this means is that cups cover your ears to block out background noise.

Digital. The Sontector remains with solid state analog circuits because they are rugged and reliable. Digital is more modern, and is tempting because digital circuits are cheaper to build. For years the manufacturers offered a two year warranty. Now, they confidently offer a LIFETIME WARRANTY because, over 40 years, they have learned a thing or two about building units that hold up in the field. Solid state analog circuitry is dependable.

We are skeptical, and think you should be, too, about ultrasonic detectors that are loaded with features that increase complexity and cost. Why spend more for the unit as well as making a huge investment in training maintenance personnel? The manufacturers have incorporated feedback from the field over the years in order to keep the Sontector dependable and easy to use.

You can pay more and you can pay less. The Son-Tector was in the forefront of ultrasonic detection manufacturing. We will still be here if you have questions or problems down the road.

Applications and Industries

INDUSTRIES

The Son-Tector has applications in almost every industry.

A partial list:

Aerospace, Brewing, Building Maintenance, Chemicals, Composites, Engineering, Federal Government, Fire Departments, Food Processing, Gas Industry, General Industry, HVAC, Hospitals and Medical, Mining, Municipalities, Pipeline and Oil, Plumbing, Research Labs, Schools and Colleges, Utilities-electric, oil, gas, and telephone, Transportation-auto, truck, bus, marine, rail, airlines.

APPLICATIONS

Testing Steam Trap Operation
Truck Fleet Maintenance

Typical applications of Son-Tector equipment include:

Leak Location:

- compressed air, gas, & natural gas plumbing
- compressed air brakes & tires
- gaskets and seals
- weatherstripping failure
- vacuum brake systems
- vacuum seal leaks
- industrial gas distribution
- compressed air and gas systems
- steam systems – traps and condensers
- high pressure steam
- faults in boilers, watertight containers, tanks, and bulk heads
- pipe joints
- heating, ventilating, and air conditioning duct work
- condenser tubes
- vacuum condensers
- pressurized communications cable
- container, tanks, bulkheads
- pin hole

Mechanical Noise:

- faulty gear mesh
- bad ball and roller bearings
- loose parts
- excess clearances
- drive trains
- sharpness of high-speed automatic machine tools

Hydraulic Systems:

- by-passing or sticking valves
- by-passing cylinders
- partially blocked ports
- elevators and escalators

Corona Discharge:

- generator brush arcing
- substation corona discharge
- transformer corona discharge
- dirty or faulty insulators

Electrical Equipment:

- faulty or arcing connections
- switches
- lightning arrestors
- power supplies
- motors
- radio frequency interference
- perform hipot lab tests on all sized components
- perform HV equipment tests

Miscellaneous:

- diesel injector failure
- large compressor valves
- restrictions in piping systems
- humidity control
- electrical systems
- hospitals and ethylene oxide

THE SONTECTOR CUTS COSTS and pays for itself time and time and time again.

- **Eliminate costly down time.**
- **Perform maintenance on your schedule.**
- **Eliminate crisis repair labor and parts costs.**
- **Improve routine maintenance payroll costs.** Find the trouble quickly. Avoid payroll involved in unnecessary disassembly for diagnostic reasons.
- **Prevent catastrophic failure.** Fix the problem while it is small.
- **Prevent the hidden cost of leaks.** Small leaks or noisy environments can mask energy costs. The following leaks can be detected at distances of 100 feet or more and are commonly overlooked in a noisy plant environment:
Air 100 PSI 1/16" hole \$700/year (at .08KWH)
Steam 100 PSI 1/16" hole \$1618/year (@\$15 /1000 lbs.)
- **Save training payroll.** IT IS SIMPLE TO USE THE SONTECTOR. The Sontector is easier to use, more accurate, and far more reliable than either soap bubbles or stethoscopes. There are no calibrations set. You could say it's use is almost intuitive because leaks or malfunctions sound they way you would expect them to sound.

Just pick up the Sontector. Start playing with it according to the directions supplied with the unit.

Ultrasonic detectors are really very simple. They hear ultrasonic noises in the 35,000 to 45,000 cycles per second region. The unit is built to hear that specific range. Calibrating beyond this range is, in our opinion, a waste of money.

How it works

How does the Son-Tector ultrasonic detector work?

Most mechanical failures or leaks generate ultrasonic noises which are inaudible to the human ear. It is simple to find problems with a tool designed to hear ultrasonic noises generated by the problem itself, and not hear interfering background noises. When equipment is operating correctly, it generates very little ultrasonic sound.

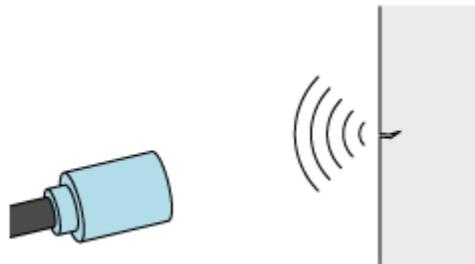
Pressurized leaks and mechanical malfunction problems generate sounds in the 35,000 – 45,000 cycles per second region. The Son-Tector converts and amplifies the 35,000 – 45,000 cycles to frequencies that can be heard by humans.

The user can hear and evaluate whether a mechanical sound is normal or abnormal based on his/her real world experience. A good bearing sounds one way, a bad bearing sounds another. A good steam trap sounds one way, a faulty steam trap sounds another. It takes just a few trials to be comfortable with the differences.

There are three different ways the Son-Tector is used to hear malfunctions or leaks:

Microphone Hand Probe

Pressurized or vacuum leaks make noise when the escaping molecules bang into each other. The Son-Tector hears the banging molecules. Sweep the area with the hand probe and the leak is quickly located. The closer you are to the leak, the louder the sound and the higher the meter registers.



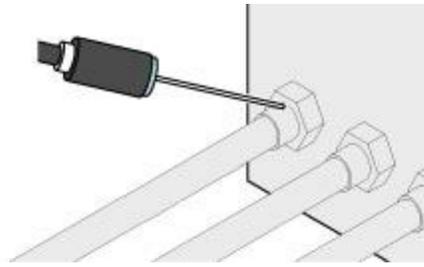
Son-Caster Ultrasonic Noise Generator

Non-pressurized leaks, such as container leaks, don't make noise. The Son-Caster is placed inside the vessel to create ultrasonic noise. Go outside the vessel to locate where the ultrasonic sound is leaking out.



Contact Probe

Internal mechanical malfunctions are identified and located with the contact probe. The probe hears by physically touching the housing that encloses the problem.

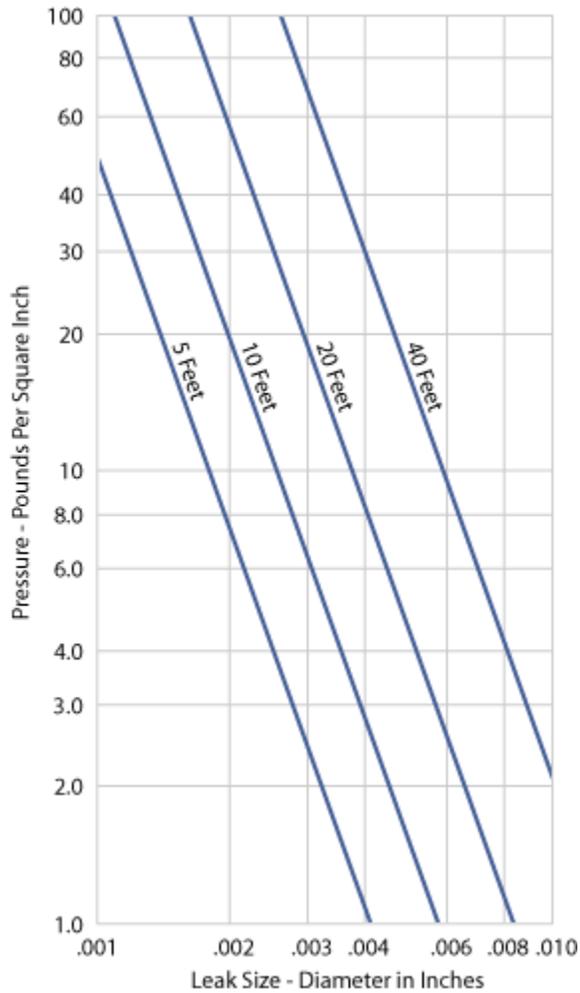


Leak Sensitivity

Ultrasonic detection will work for leaks in the order of .5 cc per second.

Smaller leaks do not agitate air molecules enough to create acoustic energy.

The chart shows the general relationship between pressure differential, leak size, and distance from the leak.



Warranty and Repairs

LIFETIME WARRANTY for Son-Tectors purchased beginning September 1, 2003

Manufacturer's Warranty

If you have not squished the unit flat, if you have not melted it in a furnace, or abused it in some other way, AND the battery is not the problem, send the unit to the manufacturer. They will fix it and send it back at no cost to you. In other words, they cover defects in material or workmanship as well as normal wear and tear. Your only risk is one-way postage. They will even pay standard ground rates to return it to you.

Son-Tector units have been built since 1963 and their repair rate is extremely low. If the manufacturers believe your repair is outside the normal wear and tear category, is not a defect, or has been caused by abuse, they will call you and make sure you want to authorize the reasonable repair charge. (See "if repair is required" instructions below.)

The manufacturer's thought about hiring a lawyer to write the warranty. But they decided that is not necessary because the whole thing is pretty simple. Please feel free to contact us if you have questions. We like to talk to our customers.

TWO-YEAR WARRANTY for Son-Tectors purchased before September 1, 2003

The original warranty continues against defects in material or workmanship for a period of TWO YEARS after being purchased by the end user. All service required during this period is performed by the manufacturer at no charge, unless the instrument has received abuse. After the two year warranty period expires, repairs are charged at a very reasonable rate, currently \$99.

IF REPAIR IS REQUIRED

If trouble develops, **first try a new battery before returning the unit for repair.** Do not attempt to open the rest of the unit. If the battery is good and the unit does not work, return it to the manufacturer.

Send to the factory. Include all the parts, a brief description of the problem, **your telephone number**, and your return address.

Operations Manual

The Son-Tector ultrasonic detector is a simple to use tool. No calibration or training is required. Follow these easy steps:

INSTRUCTIONS FOR PRESSURIZED LEAKS

Some applications are: compressed air or gas, truck air brake systems, pipes and pipelines, high pressure steam systems, bottled gas, medical gas manifolds, helium, telephone cable, vacuum bags and chambers.

1. Attach the coil cord to the hand probe (blue plastic cylinder).
2. Attach the other end of the coil cord to the unit.
3. Turn on the unit.
4. Turn up the volume until you can just hear the background noise (hiss). Increasing the volume does not increase the leak detection sensitivity. Setting the volume control too high can create operator fatigue.
5. Ask someone to simulate a leak by squeezing the enclosed plastic bottle. Move the blue hand probe in a sweeping motion in the direction of the simulated leak. You will hear the sound escaping from the bottle and see the meter move. You are ready to find leaks.
6. Move the blue hand probe in a sweeping motion in the direction of the suspected leak. You will hear the leak. Follow the sound. It is as easy as that.
7. We suggest you play around with the unit for a few minutes. You will be surprised that leaks sound just the way you would expect.

Additional items you may need:

- A. Headphones are for noisy environments.
- B. The rubber sound concentrator finds the exact point of the leak. Once the general area of the leak has been located with the blue hand probe, slip the rubber sound concentrator over the screen end of the probe to zero in on the precise leak location.

In the **112 and 123 packages**, the rubber sound concentrator is normally stored over the metal rod of the contact probe.

INSTRUCTIONS FOR NON-PRESSURIZED LEAKS

Non-pressurized leaks do not generate ultrasonic noise. We create our own noise with the SON-CASTER ultrasonic transmitter. Some examples are: pin hole leaks in containers, tanks, truck van and trailers, HVAC, seals, and gaskets.

1. Follow steps 1 through 4 for pressurized leaks (above).
2. Turn on the small blue metal Son-Caster box and place it on one side of the barrier with the screen opening facing the suspected leak. The ultrasonic Son-Caster noise generator fills the leaking area with ultrasonic sound. On the other side of the barrier, use the Son-Tector with the blue plastic cylindrical hand probe to hear the sound coming through the leak.
3. Follow steps 6 and 7 for pressurized leaks (above).

INSTRUCTIONS FOR MECHANICAL MALFUNCTIONS

Some examples are:

faulty or bad bearings, hydraulic valves, steam traps.

1. Attach the long, narrow, metal contact probe to the coil cord.
2. Attach the other end of the coil cord to the unit.
3. Turn on the unit.
4. Turn up the volume until you can just hear the background noise (hiss).

Increasing the volume does not increase the leak detection sensitivity. Setting the volume control too high can create operator fatigue. You may find it convenient to touch the probe tip to the noise source before advancing the volume control. Often, mechanical noise pick-up is quite intense and setting the volume too high may be deafening.

5. Touch the tip of the metal contact probe to the area being tested. Correct operation sounds one way, malfunction sounds another way. You can easily hear the difference. You may need headphones if you are working in a noisy environment.

INSTRUCTIONS FOR CORONA DISCHARGE

NOTE: these are the same as

INSTRUCTIONS FOR PRESSURIZED LEAKS

1. Attach the coil cord to the hand probe (blue plastic cylinder).
2. Attach the other end of the coil cord to the unit.
3. Turn on the unit.
4. Turn up the volume until you can just hear the background noise (hiss). Increasing the volume does not increase the leak detection sensitivity. Setting the volume control too high can create operator fatigue.
5. Ask someone to simulate a leak by squeezing the enclosed plastic bottle. Move the blue hand probe in a sweeping motion

in the direction of the simulated leak. You will hear the sound escaping from the bottle and see the meter move. You are ready to find corona discharge.

6. Move the blue hand probe in a sweeping motion in the direction of the suspected corona discharge. You will hear the corona discharge. Follow the sound. It is as easy as that.
7. We suggest you play around with the unit for a few minutes. You will be surprised that corona discharge sounds just the way you would expect.

HANDLING & STORAGE

The Son-Tector is rugged. One was dropped from a 30-foot tower onto pavement and continued to operate! Nevertheless, while hard knocks may not cause failure, they should be avoided as much as possible. Common sense and the following suggestions will insure trouble-free operation:

1. To prolong battery life, be sure the instrument is turned off before placing it in storage, even overnight.
2. Protect the blue plastic hand probe (microphone) from moisture and other contamination. Water, in small amounts, will not cause permanent damage. Corrosive or coating material will destroy the unit's sensitivity.
3. The unit is not waterproof and should be protected from the elements.
4. We recommend the use of the carrying case for storage and transportation. The case gives effective protection from rough handling and considerable protection from the weather when the unit is used outdoors.
5. If the unit is to be stored for more than several months, the battery should be removed. The battery, if allowed to corrode while in storage, may do considerable damage.

BATTERY REPLACEMENT FOR THE SON-TECTOR ULTRASONIC DETECTOR

The Son-Tector uses a standard 9 volt alkaline or mercury battery obtainable at most stores. The battery is located under the leather flap at the bottom of the amplifier package. (Discontinued models 100 and 130 - in the handle - remove three screws). When replacing the battery or battery cover, be careful not to strain or pinch the wires.

BATTERY REPLACEMENT FOR THE SON-CASTER ULTRASONIC NOISE GENERATOR

Current Son-Casters come factory equipped with a 9 volt zinc-carbon battery. A zinc-carbon battery brings any possible explosion hazard which may exist in a gas atmosphere to a minimum. Alkaline or mercury batteries may be used for all other applications.

PERFORMANCE TESTING OF THE SON- TECTORULTRASONIC DETECTOR

Blue plastic microphone hand probe: Turn up the volume control until you can barely hear the hissing background noise. Enclosed with your Son-Tector you will find a small plastic squeeze bottle. The bottle is a handy way to check for proper operation. A brisk squeeze should be clearly audible to the tool at a distance in excess of 50 feet. In the event the sound cannot be heard or the meter does not move, the battery should be replaced.

Metal contact probe: Turn up the volume control until you can barely hear the hissing background noise. Rub the metal probe over any surface. You will hear the scraping sound. In the event the sound cannot be heard or the meter does not move, the battery should be replaced.

PERFORMANCE TESTING OF THE SON- CASTERULTRASONIC NOISE GENERATOR

To test the Son-Caster, turn it on and hold it close to your ear. If the unit is operating properly you will be able to hear a faint buzzing sound. If you cannot hear the buzzing sound, replace the battery.