APPLICATION NOTE

LEAK DETECTION

AT COMPRESSED AIR, GAS AND VACUUM SYSTEMS WITH SONAPHONE POCKET

SONOTEC
Whether in large-scale industrial production, on assembly lines in medium-sized companies or in small workshops – compressed air has an important role to play almost everywhere. And it accounts for a large proportion of energy needs. Regular checking of the compressed air system to identify leaks reduces operating costs appreciably. Around 30 percent of the energy used in compressed air systems is lost through leakages. The leaks typically occur at couplings, valves or gates, as well as on faulty hoses, screw and flange connections or corroded pipework. If these leakages remain undetected, even the best compressed air control can be of no further help. The compressors have to compensate for permanent pressure loss. They run for longer, need more energy and wear out faster. The result is higher costs. The regular detection and rectification of leakages, which are often only millimetres in size, therefore contributes to a huge cost saving and improvement in energy efficiency.

Using SONAPHONE technology, anybody can locate leakages and seal failures in compressed air, gas and vacuum systems quickly and easily. If gas escapes from a leak it causes turbulences, which generate ultrasound. These ultrasonic signals are initially inaudible to the human ear. The ultrasonic testing equipment from SONOTEC converts the signals into optically and acoustically perceptive information for the user. In addition to the fast, reliable location of compressed air and gas leaks, the handy ultrasonic detection devices of the SONAPHONE product family are also suitable for tightness testing of various systems, wear control on rotating machinery and providing evidence of partial electrical discharges where there is insulation damage. The checking of steam traps and valves is another task covered by the mobile devices.
The most important probe for leak detection is the airborne probe L50. It is suitable for leak detection at distances of up to 3 meters.

In order to grossly narrow the location of leakages, the acoustic horn is used in combination with the L50. The attachment makes leak detection possible from a distance of up to 8 meters.

The flexible airborne probe L53 can be used in areas that are hard to access thanks to its malleability.

For leak detection at distances of up to 25 meters, the SONAPHONE is upgraded with the parabolic dish SONOSPOT. An integrated red dot sight facilitates the precise detection of the leak.

The leakages are determined precisely by using the directional tube with tip. The attachment for the L50 shields lateral ultrasonic sources and can easily be plugged in and taken off with just one hand.
Leaks are easy to find especially with the “gross to fine” method. First, the area is roughly determined using the parabolic probe SONOSPOT or the acoustic horn in combination with the airborne sound probe L50. Then the position of the leak is accurately determined with the L50 and the directional tube with tip.

1. Switch on the device.

2. Now, select an appropriate probe and a suitable attachment, depending on the distance and accessibility of the area to be tested. The parabolic dish SONOSPOT is suitable for large distances of up to 25 meters. For distances of up to 8 meters, we recommend the acoustic horn in combination with the airborne probe L50. The attachment can also be removed for areas of up to 3 meters.

3. Familiarize yourself with your test environment. To do so, locate the existing compressed air components and rule out foreign ultrasonic sources. Accustom yourself to the existing ambient noise.

4. Now the test begins. Put on the headphones and follow the audible and visual signals on the display.

5. An increasingly louder noise and an increasing level on the display both indicate an ultrasound source and therefore a leak in a compressed air, gas or vacuum system.

6. To limit the potential leak area, move the probe to the right, to the left, up and down. Follow the acoustic signal and significantly narrow down the potential location of the leak. Some simple but effective shielding techniques against other sources of ultrasonic sound can significantly simplify leak detection. For example, you should close open doors or use your body to shield the area you are searching from foreign sources of sound.

7. If you have been using the acoustic horn or parabolic dish, you can now switch your equipment and begin “fine” leak detection.

8. In order to pinpoint the exact source of the leak, you can expand the L50 airborne probe with the directional tube with tip. Search the area once more and concentrate on the sound coming from the headphones while watching the changing values on the display. Please note that ultrasound is reflected from surrounding walls and objects. Therefore, make sure that you have located the leak and not its opposing reflection.

9. In difficult access areas, the flexible airborne probe L53 should be used. The 30 cm long special probe makes parts of the system that are difficult to reach much easier to test.

10. Once you have found the leak, mark it with a filled-out Leak Tag and arrange its repair.