

**System COMBIPHON®**



**Acoustic location of plastic pipes**

## Acoustically locating plastic pipes

### The principle

Plastic pipes cannot be located by conventional electromagnetic means because they are not electro-conductive.

The acoustic method of locating pipes applies a different principle: pipes transmit mechanical vibrations better than the surrounding ground. When the pipe is caused to vibrate appropriately, these vibrations spread along the pipe to the earth's surface where they can be picked up by a



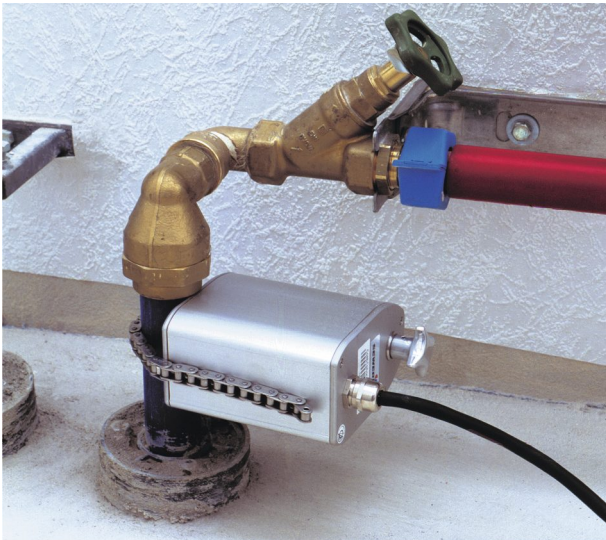
ground microphone. In the same way as water leaks are detected by acoustic means, the pipeline is located where the intensity is greatest. This method can also be used to locate fibre cement pipes and metal pipes.

The **COMBIPHON**<sup>®</sup> system consists of the **Generator G5** central control unit and various impulse generators. It can therefore be used anywhere.

### Generator G5 remote control

When locating house connections, adjustment of the intensity is unavoidable – for example, a high intensity is required over a large distance, whereas this would cause sound contamination close to the generator.

A remote control means that the user does not have to keep going back to the generator.



### Water or gas house service connections

are caused to vibrate using a Knocker. This steadily taps the pipe from the outside like an electric hammer.

Gas or air-filled pipes can sometimes be problematic as there is no transmitting water column.



### Water mains

require more energy to vibrate. The water column is set in motion by controlling the volume using a Stopper at a hydrant. The resulting waves then propagate.

The pressure is controlled using a manometer to prevent pressure spikes in the pipe. The sound can be detected over large distances.



## Acoustic pipeline location

### Locating pipes with the ground microphone

Once the pipeline has been caused to vibrate by the Knocker or Stopper, the location is pinpointed using the ground microphone.

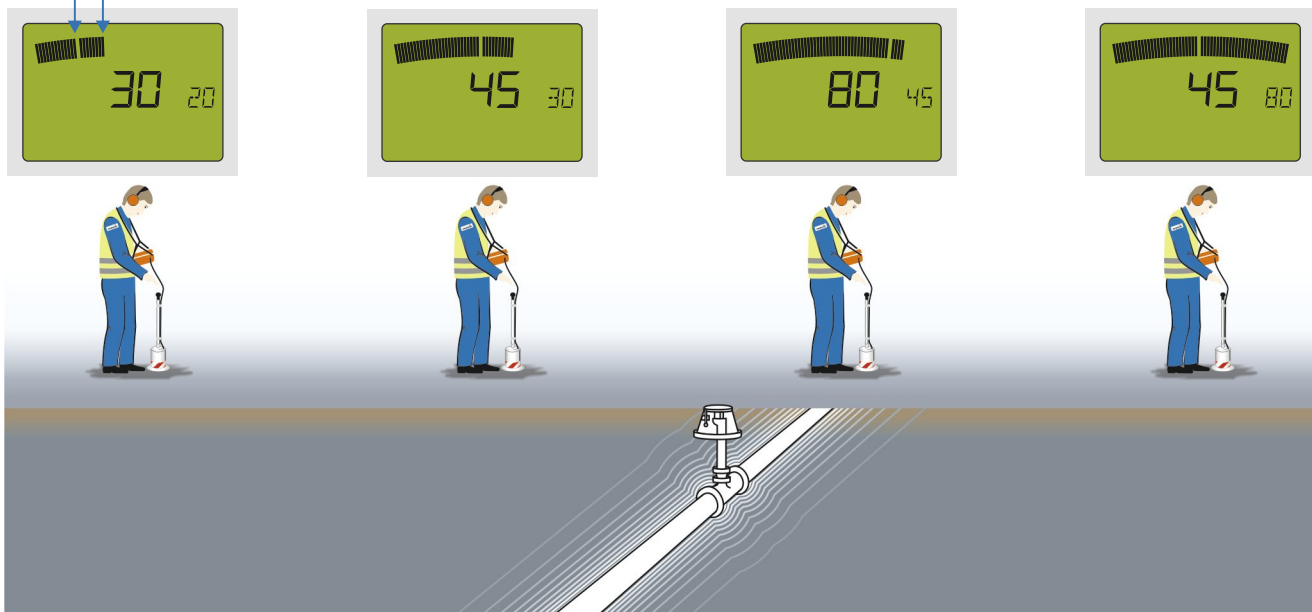
This involves systematically testing the ground surface at short intervals. The **AQUAPHON® A 100** receiver displays an accurate visual and acoustic comparison of the noise intensities.

Is the noise getting louder or softer?

The volume increases as you get closer to the vibrating pipeline. The signal is loudest directly above the pipe, thereafter the intensity starts to decrease again. The visual display is particularly helpful for novices or those who do not use the system often.



- **Analogue minimum value** for the noise intensity at the current measuring point.
- **Analogue value** for the noise intensity at the current measuring point.



### The hearing protection function

The **AQUAPHON® A 100** fulfils all the current occupational health and safety requirements. Adequate hearing protection is particularly important. In the past an unpleasant and sometimes even dangerous acoustic pressure occurred if the test rod slipped off the contact point, the headphones were activated too early or too late or an object fell to the ground directly beside the ground microphone.

This is a thing of the past now thanks to new technology. The incoming sound signal is continuously monitored. If the noise gets very loud, the sound relayed by the headphones is muffled. If the signals continue to get louder, the headphones are switched off.

The **AQUAPHON® A 100** automatically recommences its work once the source of the noise goes quiet. The hearing protection function can be customised to various operational environments and different users.

### The filter optimisation function

The **AQUAPHON® A 100**'s innovative filter optimisation function makes it easier to accurately pinpoint water leakages. This is particularly useful where the ground microphone has identified a leak noise but the exact position of the leak is difficult to determine because of loud ambient influences.

The receiver records a noise sample using the ground microphone and analyses it. It then automatically switches to a suitable frequency range which distinguishes the structure-borne sound from the leak particularly clearly.



## Microphones

**Ground microphone BO-4 1** is ideal for fixed surfaces. The solid metal soundproofing with separate acoustic centre can be optimally adjusted to the unevenness of the ground thanks to its freedom of movement.

**Ground microphone 3P-4 2** is used for non-fixed surfaces. A spike can be screwed on for soft ground. The three feet provide stable contact at all times.



**AQUAPHON® A 100**

**AQUAPHON® AF 100**  
Combi device for electro-acoustic water leak detection and pipeline location

## Features of the **AQUAPHON® A 100**

Automatic microphone recognition, therefore various frequency settings

Digital signal processor

Filter optimisation function

Slider function

Memory function

Large illuminated display

Integrated NiMh rechargeable battery, integrated automatic charging/buffering function, battery status display



As well as acoustic pipeline location, the **A 100** can also be used for professional, electro-acoustic water leak detection.

The **A 100** receiver is also available for locating metal pipes and fibre glass probes.

*Please contact us for a comprehensive quotation, including additional technical specifications and information on accessories.*

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