Stethophon® 04

Operating Instructions

SEWERIN
Technologies for leak detection.

Measurable success by Sewerin equipment

Congratulations. You have chosen a quality instrument manufactured by Hermann Sewerin GmbH.

Our equipment will provide you with the highest standards of performance, safety and efficiency. They correspond with the national and international guide-lines.

Please read and understand the following operating instructions before using the equipment; they will help you to use the instrument quickly and competently. If you have any queries we are available to offer advice and assistance at any time.

Yours

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Headphone socket

Probe tip
- for recording vibrations
- removable

Microphone socket
- for connecting an external microphone

Display

Loudspeaker key
- start/stop measurement
- switch off noise

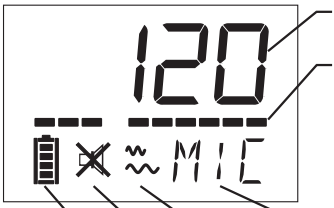
Arrow-up key
- increase volume, filter level, values in normal settings

Arrow-down key
- reduce volume, filter level, values in normal settings

Filter key
- change filter level

ON/OFF key
- switch device on/off

Bar
- for attaching carrying strap



Measured value (current minimum sound level)

Volume, also: **frequency range**

- missing segment indicates selected volume / visible segments indicate bandpass frequency range

Status message, also: **menu item/last measured value/filter level**

Filter symbol

- filter level can be changed

Loudspeaker symbol (crossed out)

- ready to measure
- noise switched off

Battery symbol

- current battery capacity; the more segments that are visible, the higher the remaining capacity available

Note:
All of the figures (with the exception of zero) in the illustrated displays are examples. You will generally obtain other values when working with the device.

Abbreviations:

Status message/ menu item	Abbreviation for	See
APF	Auto Power Off	Section 3.5
BAT	Battery	Section 3.5
END	End	Section 5
LDS	Loudspeaker	Section 5.2
LED	Light emitting diode (display illumination)	Section 5.2
LOC	Lock (filter key)	Section 5.2
MIC	Microphone (external)	Section 4.3.2
PRO	Protect (hearing protection threshold value)	Section 5.2
RES	Reset	Section 5.2
SET	Setup	Section 5.1
VOL	Volume (hearing protection)	Section 5.2

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Stethophon® 04

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CAUTION!
This symbol is used to indicate dangers which may either result in hazards for the operators or in severe damage – or even destruction – of the product.

Note:
This symbol is used to call attention to information and tips which may be helpful and which are exceeding the basic operating procedures.

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1 Introduction

The **Stethophon 04** is an electroacoustic listening device used to detect leaks.

The device's probe tip records the natural vibrations of the object of examination. The **Stethophon 04** displays a relative measurement according to the internal amplification of the vibrations, and emits the corresponding noise through the headphones.

Ranges of use:

- Leak detection in the water distribution network
- Inspecting house service connections
- Inspecting and pinpointing damage in compressed air systems
- Troubleshooting in heating and sanitation facilities in buildings
- Bearing inspection on machines

2 General

2.1 Warranty

The following instructions must be complied with in order for any warranty to be applicable regarding functionality and safe operation of this equipment.
Hermann Sewerin GmbH accepts no liability for any damages resulting from non-compliance with these instructions. The warranty and liability provisions of the terms of sale and delivery of Hermann Sewerin GmbH are not affected by the information given below.

- This product must only be operated after the relevant operating instructions have been read and understood.
- This product must only be used for its intended purpose.
- This product is designed for use in industrial and commercial applications.
- Repairs must only be carried out by the manufacturer or by other suitably trained personnel.
- Changes or modifications to this product must not be carried out without approval from Hermann Sewerin GmbH. The manufacturer cannot be held responsible for damages if unapproved modifications have been made.
- Only replacement parts that have been approved by Hermann Sewerin GmbH may be used.
- Only the specified battery types may be used.
- The manufacturer reserves the right to make technical modifications in the course of further development.

Generally applicable safety and accident-prevention regulations must be complied with, in addition to the information provided in this manual.

2.2 Intended use

The **Stethophon 04** is a sensitive measuring device. It may only be used for listening to sounds.

The device is suitable for both indoor and outdoor use. There are special accessories available for both applications to optimise the measurement results and prevent operating errors. Please contact our sales department for advice.

The manufacturer accepts no responsibility for any damage or harm caused to persons or property as a result of improper use.

2.3 Safety information

Risk of personal injury (health risk)

- You could injure yourself or others with the tip of the device probe. Handle the device carefully therefore when transporting it and using it to measure.
- The device has an automatic hearing protection function. However, only set the volume as loud as is necessary to analyse the noise. Excessive noise can cause permanent damage to hearing!

Risks to the device

- Do not drop the device. This could damage the internal microphone.
- Never open the housing (except the battery compartment). Failure to observe the above instructions will invalidate the warranty.
- Take extra care when handling the device if you use a probe tip extension. The mechanical stress on the extended probe tip can produce forces powerful enough to destroy the internal microphone.
- Never lean on the device.
- Never use the probe tip as a lever for manual tasks.

3 Useful information about the device

3.1 Models

The **Stethophon 04** is available with and without a radio module.

Stethophon 04 with radio module

Devices featuring a radio module feature an SDR sticker (SDR = Sewerin Digital Radio).

The device can be used either with the **F5** wireless headphones or with headphones without a radio module (e. g. **K3** or **S4** headphones).

Stethophon 04 without radio module

The device can only be used with headphones without a radio module (e. g. **K3** or **S4** headphones).

CAUTION!
Correct recognition of the limit for the automatic hearing protection function is only guaranteed if SEWERIN's **F5**, **K3** or **S4** headphones are used.

3.2 Structure

Illustrations with

- all parts of the **Stethophon 04** labelled and
- an explanation of the symbols/abbreviations on the display

are provided on the inside front cover.

3.3 Modes of operation

The device features two modes of operation:

- **Measuring** > see Section 4
- **Normal settings** > see Section 5

It is not possible to switch directly to the normal settings from measuring mode. You must first switch the device off.

3.4 Reset

All the menu items in the normal settings are set to "0". The filter level is "5".

3.5 Listening to noise

The main purpose of the **Stethophon 04** is for **listening** to noise. The device is therefore almost always used with headphones. The minimum sound level shown in the display should confirm the results heard. These digital measurement values alone may not provide enough information in certain situations.

Note:
Inexperienced users are advised to practise listening (see below) to allow them to use the device effectively after a short period of training.

Even though listening is more important than reading off the measurement values, these operating instructions focus in particular on the information shown in the display. This is simply because the visible changes can be explained in greater detail than the audible ones.

There is a volume setting for picking up the noise (see Section 3.5.1).

If the noise becomes so loud that it poses a health risk to the user, the sound will be switched off automatically (see Section 3.5.2).

Practising listening

Practise listening, for example, on an exposed water pipe with a tap. Learn to distinguish the sound of flows of different strength.

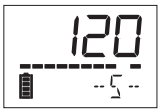
- First listen to what it sounds like when the water tap is closed by placing the probe tip on the water pipe and measuring as explained in Section 4.
- Then listen to the noise when the water tap is open. Take your measurement at the same spot as before.
- Compare the two noises.

Another readily available practice object is a radiator with adjustable thermostat (difference between closed/open thermostat).

3.5.1 Adjusting the volume

The missing segment in the volume display indicates the selected volume.

- **loud**



- **quiet**

Changing the volume	
Action	What happens?
Hold down OR Hold down	Noise gets **louder** Noise gets **quieter**
Release key	Selected volume will be saved

The volume can also be changed during a measurement.

3.5.2 Automatic hearing protection

The device features automatic hearing protection. If the noise picked up exceeds a certain limit, it will be switched off to protect the user.

CAUTION!
Correct recognition of the limit for the automatic hearing protection function is only guaranteed if SEWERIN's **F5**, **K3** or **S4** headphones are used.

The limit for activation of automatic hearing protection is set in the normal settings under **PRO**. The automatic hearing protection function can be disabled.

How automatic hearing protection works

- You measure.
- The current minimum sound level of the measurement exceeds the defined limit.
- The noise is switched off. The loudspeaker symbol will appear crossed out in the display.

How to continue listening

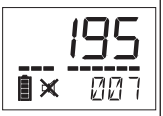
- Continue without stopping the measurement. Once the minimum sound level falls below the limit in the course of the measurement, the noise will become audible again.

OR

- Stop the measurement. Reduce the volume.

3.5.3 Switching off the noise

As soon as you put on the headphones, you will hear continuous noise. This can be switched off between two measurements to protect your hearing.

Switching noise off/on			
Action		What happens? / Why?	Information in display
1.	Press	● Noise will be switched off ● Loudspeaker symbol will appear	
2.	Press	● Noise audible again ● Loudspeaker symbol hidden	

Note:
The loudspeaker key also starts and stops measurements. This means that if you do not wish to hear noise during a measurement, you will have to remove the headphones.

3.6 Automatic shut down

The **Stethophon 04** switches off automatically

- **if there is insufficient battery power**.
  (**BAT** will appear briefly in the display.)
  In some cases this may also happen immediately after switching the device on! Replace/recharge the batteries (see Section 6.3).
- if the device has not been used for **10 mins** (no key pressed) or there has been no change in the display. (**APF** will appear briefly in the display.)

The automatic shut down function does not work when a microphone is plugged in.

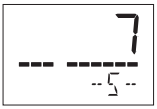
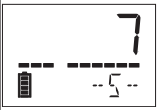
3.7 Illumination of display

The device display automatically illuminates when **any key is pressed** (stays lit for 20 s).

Note:
The automatic display illumination function can be locked (see Section 5.2).

4 Measuring

4.1 How to switch the device on (measuring mode)

Switching the device on (measuring mode)			
Action		What happens? / Why?	Information in display
1.	⏻ Press approx. 2 s	● The device switches on	
2.	Wait	● internal power supply verification: disposable or rechargeable battery	
3.		● Battery symbol appears ● Device ready to start measuring	

4.2 How to measure

The device is switched on (see Section 4.1).

- Establish a radio/electric connection between the headphones and device.

  Wireless headphones

  − Press the ON button on the headphones.
  The green LED on the headphones will illuminate. The radio connection will be established automatically.

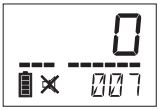
  Headphones without radio module

  − Plug the cable of the headphones into the headphone socket.

- Place the headphones on your head.

> **CAUTION!**
> Wearing headphones impairs your perception of ambient noise. Pay extra attention therefore when in dangerous surroundings (e. g. traffic).

Note:
When using the wireless headphones please ensure that you do not move too far away from the device and that you stay within the radio range.

Measuring			
Action		What happens? / Why?	Information in display
1.	Press	● Device is preparing for measurement ● Noise switched off	
2.	Place probe tip on object of examination (see note below)		
3.	Press	● The measurement starts ● Current minimum sound level counts down ● Noise switches on	
4.	Wait until the measurement rests at a constant value		
5.	Press	● Measurement complete ● Measurement result in example on right: minimum sound level = 361 ● Noise switched off	

Please note the following when measuring:

- Ensure that there is **firm contact** between the device and the object of examination. However, do not exert any pressure on the probe tip.
- Always measure until you have a clear impression of the measurement location.

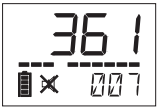
4.2.1 What you need to know about the noise picked up

If the device is switched on, you will hear noise through the headphones. If a measurement is not underway (e. g. when carrying the device around whilst it is switched on) irregular interference noise will dominate. If the probe tip is placed on an object of examination, a steady ambient noise will immediately become audible. **If you measure close to a leak, the sound of the noise will still be steady, but it will be much louder and clearer than at an intact measuring point.**

To ensure reliability when analysing noise, you may have to practise listening (see Section 3.5).

4.2.2 What you need to know about the measured value displayed

The measured value shown in the display during a measurement (here: 859) indicates the **current minimum value** of the noise intensity. Values above the minimum value will not be displayed.



When the measurement is complete the device will show the **minimum value over the entire measurement** (here: 361).

The calculated minimum sound level is a **relative** value, which only becomes meaningful when it is compared with measured values from other measuring points.

The current measured value is always shown with the minimum value of the previous measurement (here: 007) to help you compare two successive measurements.

4.3 How to influence the quality of the measurement result

Various factors can affect the quality of a measurement.

- If possible only measure when the amount and intensity of **interference noise** (e. g. open water pipes, vibrating machines, talking) is **minimal**.
- Check and see if **selecting another filter level** delivers a clearer result (see Section 4.3.1).
- **Hold the device** still during the measurement. Otherwise the measurement values will be distorted.

  If necessary use an **external microphone** which does not have to be held steady (see Section 4.3.2) or **extend** the **probe tip** to allow easier access to the object of examination (see Section 4.3.3).
- Never measure just once.

  Firstly familiarise yourself with the acoustic environment by conducting several **test measurements**.

  Repeat the actual measurement at various points around a suspected leak to obtain an informative **series of measurements**.

4.3.1 Changing the filter level

The device can be operated with eight different filter levels. The selected filter level affects individual perception of the noise.

Note:
The filter level cannot be changed if the filter key is locked (see Section 5.2).

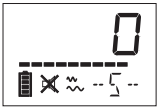
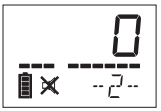
Each filter level accentuates certain specific noise elements.

Suitability of filter levels			
Filter level	Frequency	Noise	Select for
1	low	muffled	● Large pipe diameters ● Plastic piping ● Floors
.	⋮	⋮	⋮
.	⋮	⋮	⋮
.	⋮	⋮	⋮
.	⋮	⋮	⋮
.	⋮	⋮	⋮
.	⋮	⋮	● Small pipe diameters
8	high	clear	● Metal pipes

The filter levels also allow frequency ranges of different widths to pass.

Width of frequency range in the individual filter levels						
Filter level	Low	<	Frequency	>	High	
1						
2						
3						
4						
5						
6						
7						
8						

Note:
The filter level influences the device's internal calculation of the minimum sound level. It is therefore important only to compare measurement values that have been calculated at the same filter level.

Changing the filter level			
Action		What happens? / Why?	Information in display
1.	Press	● Filter symbol appears ● Current filter level flashes ● Instead of the volume the frequency range is displayed	
2.	Press OR Press	● Filter level increases ● Filter level decreases	
3.	Press	● New filter level is applied ● Filter symbol is hidden ● Volume visible again	

The last filter level used is saved when the device is switched off or when the batteries are replaced.

4.3.2 Using an external microphone

The **Stethophon 04** can record the structure-borne noise of the object of examination either using the device's internal or an external microphone.

Using an external microphone is preferable if it makes examination of the object easier (e. g. setting the microphone up on surfaces). Optional accessories for the device include, for example, the external **EM 30 and EM 35 Piezo microphones**.

Points to note when working with an external microphone

- The external microphone can be plugged into the microphone socket when the device is both switched on and off.
- Once the microphone is connected to the device the status message **MIC** will appear in the display.
- The device can **only be switched off if the microphone is first unplugged** from the microphone socket.
- Only **filter levels 1-5** are available.
- The device's **automatic shut down** function is **disabled**. Remember to switch the device off yourself when not in use for a long period to save the batteries.

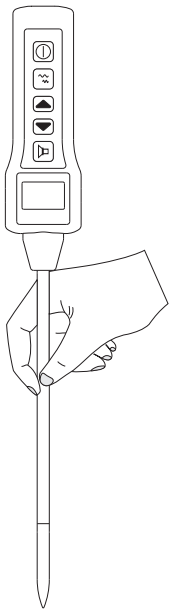
4.3.3 Extending the probe tip

The probe tip of the **Stethophon 04** can be extended if the object of examination is too far away or awkward to reach.

One or more probe tip extensions can be screwed between the device and the probe tip.

Always follow the safety advice in Section 2 when working with an extended probe tip.

When measuring with an extended probe tip:



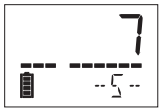
Do not hold the device **by the housing, but rather by the probe tip** close to the housing.

5 Normal settings

5.1 How to use the normal settings

Opening the normal settings			
Action		What happens?	Information in display
1.	Condition: Device must be switched off		
2.	Hold down **whilst pressing**	● The device switches on ● Software version is displayed briefly	
3.	Wait a moment	● First menu item in normal settings appears	

Accessing the menu items and changing values	
Action	What happens?
Press briefly	**Next menu item** appears
	Value **increases**
	Values **decreases**

Exiting normal settings			
Action		What happens?	Information in display
Exit			
1.	Select **END** from the menu		
2.	Set value to **1** OR Leave value at **0**	● Changed settings will be saved ● Changed settings will not be saved	
3.	Press	● Device switches to measuring mode	
Cancel			
1.	Select any menu item, but **not END**		
2.	Hold down	● Device switches off	

5.2 What values can be adjusted?

Menu item	Adjusted setting	Significance/function	
LDS	Listening	**0**	Listening functions according to the power switch principle: 1.  Press > Listening switched on, loudspeaker symbol hidden 2.  Press again > Listening switched off, loudspeaker symbol visible
		1	Listening functions according to the principle of the button: – Listening switched on as long as  is held down
PRO	Limit for activation of hearing protection	**0**	Noise is switched off at average volume (good hearing protection)
		1	Noise is switched off at high volume (poor hearing protection)
		2	Hearing protection function switched off (no hearing protection)
VOL	Noise when hearing protection activates	**0**	Noise is switched off
		1	Noise gets quieter
LOC	Filter key	**0**	Filter key released > filter level can be changed
		1	Filter key locked > filter level cannot be changed

Menu item	Adjusted setting	Significance/function	
LED	Display illumination	**0**	Display illumination switched off (energy saving mode)
		1	Display always lights up when a key is pressed
RES	Reset	**0**	Menu items are not reset when you exit normal settings
		1	All menu items are reset when you exit normal settings
END	Exit normal settings	**0**	Set values are not applied
		1	Set values are applied

The set values (except **END**) are permanently saved until the next change. They apply both when the device is switched back on again and following battery replacement.

6 Maintenance and servicing

6.1 Overview

Maintenance and servicing of the **Stethophon 04** comprises the following points:

Maintenance and servicing			
What?	How?	By whom?	How often?
Simple function test	See Section 6.2	User	If suspected that the device is not functioning properly
Servicing	Wipe down with damp cloth	User	As required
Replacing disposable/ rechargeable batteries	See Section 6.3	User	As required

6.2 Simple function test (troubleshooting)

If you cannot pick up any noise through the headphones, first check the following:

- Has the noise been switched off accidentally (loudspeaker symbol visible)?
- Have the headphones been plugged into the right socket?

Perform the following function test as soon as you suspect that the device is not working properly:

- Open the normal settings and reset the device (RES = 1, then END = 1).
- When the device is in measuring mode, apply a vibration to the probe tip, for example by rubbing it. If in doubt, increase the volume.

If you do not hear any noise, the device is probably faulty. Send it to the manufacturer or an authorised company for repair.

6.3 Replacing disposable/rechargeable batteries

The battery compartment is locked with a quick-release fastener (1/4 turn). It can be opened using a tool (e. g. coin, screwdriver).

CAUTION!
The **polarity** of the two disposable/rechargeable batteries in the battery compartment points in **the same direction**.

7 Appendix

7.1 Technical data

Protection rating	IP54
Power supply	2 AA-size alkaline batteries or 2 NiMh rechargeable batteries (each min. 2000 mAh)
Operating time:	min. 8 h
Weight:	approx. 290 g (0.64 lbs.)
Dimensions:	50 × 228 × 30 mm (W × H × D) (1.96 × 8.97 × 1.18 in.)
Operating temperature:	-10 °C – +50 °C (14 °F – 122 °F)
Storage temperature:	-25 °C – +70 °C (-13 °F – 158 °F)
SDR radio module:	● Transmitting power: ≤ 10 dBm ● Connection time: typically 10 ms ● Frequency band: 2.408 – 2.476 Ghz ● Marking: FCC ID WSP-EZ1300102 IC 7994A-EZ1300102
Pressure:	950 – 1100 hPa (13.78 psi. – 15.95 psi.)
Permissible relative humidity:	15 % – 90 % non-condensing

7.2 Accessories

Piezo microphone EM 35

Art. no.: EM35-10100

- particularly for use indoors
- Flexible cable 1.3 m
- Phone jack 3.5 mm
- M6 external thread for attaching adapters

Piezo microphone EM 30

Art. no.: EM30-10400

- particularly for use outdoors
- Tension resistant cable 1.3 m
- Phone jack 6.3 mm
- M10 internal thread for attaching adapters

Other accessories are available for the device. Please contact our sales department for further information.

7.3 EU declaration of conformity

Hermann Sewerin GmbH hereby declares that the **Stethophon® 04** fulfils the requirements of the following guideline:

- 2014/30/EU

Hermann Sewerin GmbH hereby declares that the **Stethophon® 04 SDR** fulfils the requirements of the following guideline:

- 1999/5/EC

The product belongs to radio equipment device class 1.

The complete declaration of conformity can be found online.

7.4 FCC Compliance Statements

The device has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the device is operated in a commercial environment. The device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

7.5 Advice on disposal

The European Waste Catalogue (EWC) governs the disposal of appliances and accessories.

Description of waste	Allocated EWC waste code
Device	16 02 13
Disposable battery, rechargeable battery	16 06 05

End-of-life equipment

Used equipment can be returned to Hermann Sewerin GmbH. We will arrange for the equipment to be disposed of appropriately by certified specialist contractors free of charge.

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