AQUAPHON® A 100

Operating Instructions

SEWERIN

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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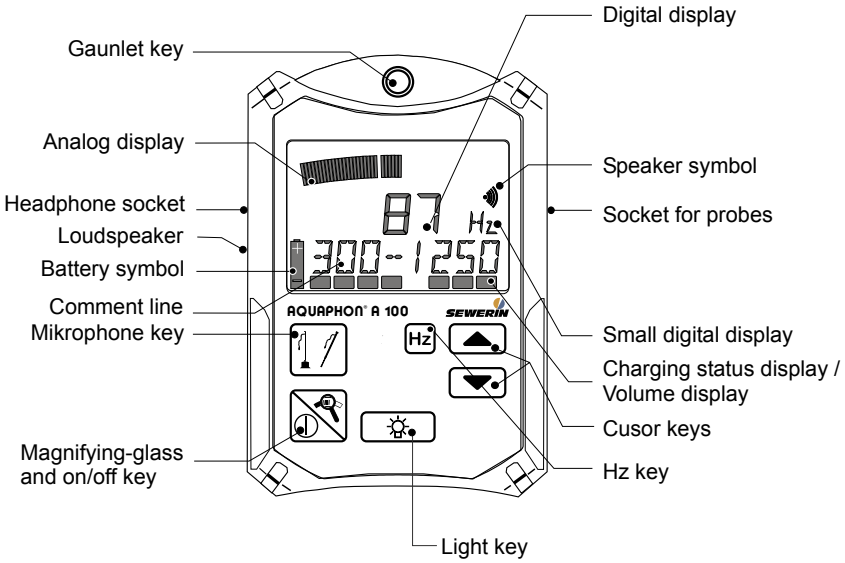
Illustration AQUAPHON A 100



Operating Instructions

AQUAPHON® A 100

17.11.2008 – V8.X – 104194 – en

CAUTION!
This symbol warns of dangers that may threaten the safety of the user or maty damage or destroy the product.

Note:
This symbol flags information and hints extending beyond the actual operation of the product .

1 General

1.1 Warranty

Hermann Sewerin GmbH bears no liability for damage attributable to non-compliance with these instructions.

The terms of warranty and liability of the conditions of sale and delivery of Hermann Sewerin GmbH are not extended by the above.

- This product may only be used after the operating instructions have been read and understood.
- This product was developed for qualified skilled personnel in public utility companies. The device must only be commissioned after respective introduction.
- This product may only be used for its designated purpose.
- This product is destined for industrial and commercial applications.
- Repair work may only be carried out by appropriately trained persons.
- Changes and modifications to the product may only be carried out with the consent of Hermann Sewerin GmbH. Unauthorised modifications to the product render the warranty of the producer null and void.
- Only accessories from Hermann Sewerin GmbH may be used with this product
- Only replacement parts approved by Hermann Sewerin GmbH must be used for repairs.
- We reserve the right to make technical modifications in the interests of further development.

Please comply with general safety rules in addition to these instructions!

1.2 Intended use

The **A 100** is a instrument for electro-acoustic water leak detection and acoustic pipeline location

Note:
This operating instructions describes the functions of software version 8.X. Future changes are subject to modification!

1.3 General notes

- In order to ensure the correct functioning of the devices, the following requirements must be complied with:
  - Devices must not be dipped or immersed.
  - Display and keyboard must not be scratched.
  - Devices must not be dropped.
  - Devices must not be used as supports.
- The allowed operating temperature range is -10 °C … +50 °C.
- The allowed storage temperature is -25 °C … +70 °C.
- If additional devices are used (e.g. generators), the corresponding operating manuals must be complied with.

2 Function description

2.1 Water leak detection

The **A 100** is used in combination with various microphones (listed in the „Accessories“ section) for the electro-acoustic detection of water-leaks.

When a pressurised pipeline develops a leak, water flows through it into the surrounding soil at high speed.
Consequence:
The pipeline material vibrates at the exit point. This vibration is transmitted by the pipe, with the result that it can be picked up even at remote contact points (valves and the like). This structure-borne noise is rendered audible by the **A 100**.

The water jet - and the pipe, in the vicinity of the leak - also induce vibration in the soil. This is transmitted to the surface, where it can be picked up as ground-borne noise.

Even with electro-acoustic leak detection the human ear retains its importance. Suitable practice enables noises of different types. and tones to be compared, and leak noise distinguished from extraneous, unrelated noise.

2.2 Acoustic pipeline location

Plastic lines cannot be located by the classical electromagnetic method because they do not conduct electricity.

The acoustic method of pipeline location uses a different principle: the lines transmit mechanical vibration better than the surrounding earth. If suitable vibrations are applied to the line, they are transmitted along its length and through the earth to its surface, and can then be located there with an ground microphone and receiver with headsets according to the **water leak detection** principle. As with water leak detection, the line is in the place where the greatest intensity is found. Fibrous-cement and metallic pipes can also be located in this way.

If you wish to detect the lines acoustically, follow the operating instructions for the vibration emitter (eg, COMBIPHON). Proceed as with for water leak detection. The **A 100** also offers an additional mode to assist in detecting lines (see section 4.2.1).

3 Use

3.1 Switching on and off

- Plug a probe into the appropriate input .

  Probe connection: **input 1**
- A brief signal tone sounds.
- The software version appears in the display.
- The charge status of the rechargeable batteries appears in the display.
- The type of probe plugged in is automatically determined.
- The probe type briefly appears in the display. If the probe type is not automatically identified it can be selected manually (see section 3.1.1).
- If a microphone has been plugged in, the bandpass currently set for the frequency filter is briefly displayed.

- The layout of the display depends on the used probe. The measurement process may be started.
- To switch off, unplug the probe from the input.

3.1.1 Manual probe selection

If the probe is not automatically identified (if it is an old model, for example), it can be selected manually:

- Hold down the microphone key.
- Plug in the probe.The „>“ symbol appears on the left of the bottom text line and the name of the probe that can be selected, e.g. „M01“ in the middle.

- Pressing the cursor keys switches between possible probes.

- Pressing the magnifying-glass key displays the selected probe.

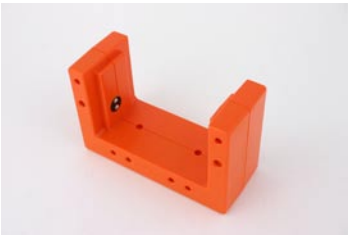
3.2 Adjusting the display contrast

The display contrast can be adjusted as follows:

- Hold down the light key.

- Press the cursor-down key to reduce the contrast.
- Press the cursor-up key to increase the contrast.

3.3 Charging equipment



When fully charged the instruments have a maximum operating time of approx. 12 hours.

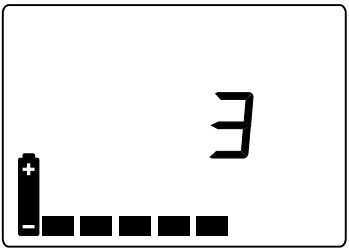
To charge an instrument you need the charging station HS 1,2 A (see fig.), which can be used either in the workshop or in the emergency vehicle.

The charging station has the following sockets on its side:

- AC/DC adapter M4, 100 … 240 V~
- Car charging cable M4

3.4 Charging

Note:
Charging the accumulator only within temperature range 0 ... 45 °C.



- Switch off the instrument and plug it into the charging station. The following (or similar) appears in the display:
- The instrument now has 5 operating hours (= 5 bars) left. It will take another 3 hours to be fully charged.

  The actual operating time depends on the accumulators' condition (age ...) and operation (light, volume ...) charging time takes max. 4 hours.
- When it is fully charged all the bars appear and the number display disappears.

- You can leave the instrument in the charging station until you need it again.

If you have a case for your **A 100**, it can be charged inside.

- Connect cable to the charging station inside the case.
- Connect the plug-in AC/DC adapter M4 or car charging cable M4 to socket 2.

3.4.1 Self-discharge

If the instrument is not placed in the charging station HS 1,2 A when switched off the NiMH-accumulator will self-discharge, which is considered when displaying the remaining operating time.

After no more than 30 days the instrument will indicate zero operating hours, and it must be recharged.

3.5 Connecting the headphones

A 100 are fitted with a **speaker** (1).
Such produces the confirmation and alarm signals. There is, furthermore, a specific tone for pipeline location.

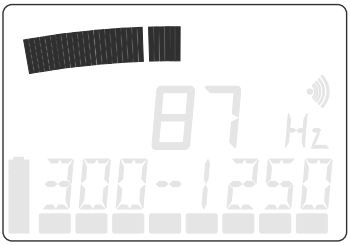
During **water leak detection** no leak noise is emitted over the speaker: **headphones** must be used. Switching from speakers to headphones:

- Plug the headphones jack-plug into **socket 2**.
  The speaker is switched off automatically; sound is output to the headphones.
- When the headphones are unplugged the sound is once more output to the speaker.

4 Water leak detection

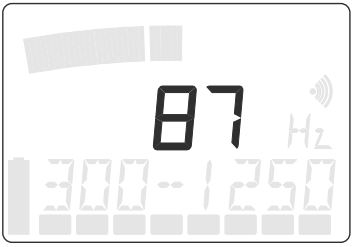
4.1 Displays

4.1.1 Analog display



The analog display indicates the current reading.

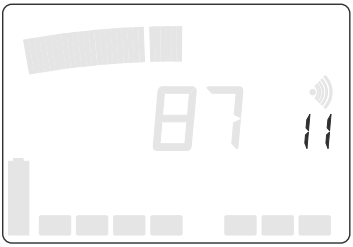
4.1.2 Digital display



The digital display indicates the smallest value measured during a single measurement.

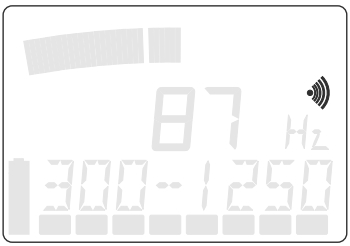
In the „MAX“ mode, the digital display always shows the greatest measured value. In „MAX“ mode you can switch by holding the micro key for 3 seconds (only with microphones with cable connection, not with radio microphones).

4.1.3 Small digital display



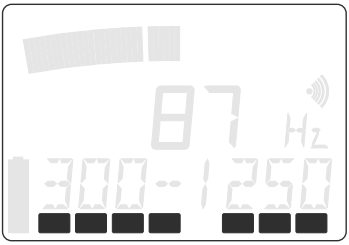
For the purposes of comparison the small digital display always indicates the precedent value measured.

4.1.4 Speaker symbol



The speaker symbol indicates that the **A 100** headphones are activated.

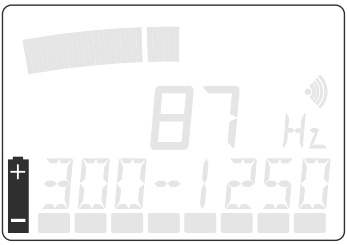
4.1.5 Volume display



The volume display indicates the volume set. If the bar on the extreme left is shown in reverse video, the volume is low; if the bar on the extreme right is shown in reverse video, the volume is maximum.

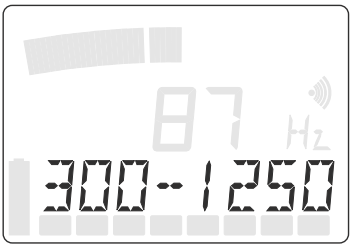
The volume can be adjusted with the cursor keys.

4.1.6 Battery symbol



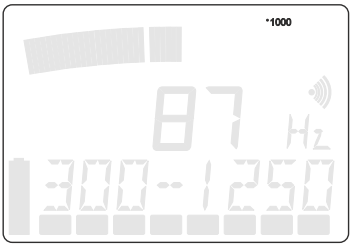
The battery symbol appears about 15 minutes before the battery runs out. In case the accumulator volume drops further, the instrument automatically switches off to protect the accumulator.

4.1.7 Comment line

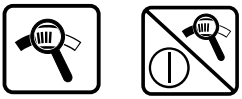


Various possible settings and parameters are displayed in the comment line. The filter setting is shown here, for example.

4.1.8 Basic amplification



Basic amplification is useful for adapting to extreme situations. The higher the basic amplification, the louder the noise in the headphones. The values 10, 100 or 1000 appear in the display.



Basic amplification can be altered with the magnifying-glass key (see section 4.2.6).

10 = high amplification

100 = medium amplification

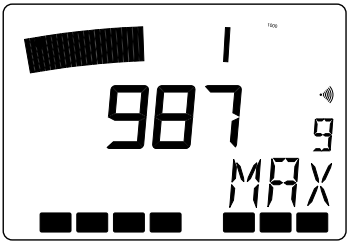
1000 = low amplification

4.2 Key functions

4.2.1 Microphone key

Pressing the microphone key activates the **A 100**. Pressing it again deactivates it.

Modus „MAX“



If you hold down the micro key for 3 seconds, you can switch to „MAX“mode. This mode helps with acoustic line detection. Instead of minimum values, only max values are shown in this mode (only with microphones with cable connection, not with radio microphones).

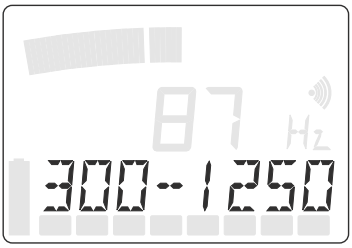
4.2.2 Gauntlet key

Pressing the gauntlet key activates the **A 100**. Depending on the options selected in the set-up menu it is deactivated either by releasing the gauntlet key or by pressing it again.

4.2.3 Hz key

The Hz key is used to alter the frequency-filter setting. The filter bandpass - which is a least 300 Hz wide - can be set anywhere between 1 Hz and 10 kHz.

Pressing both cursor keys at once resets the bandpass to its default setting, which depends on the probe.



Different leak noises can be heard best in different frequency ranges, and two people may hear the same noise differently. To optimise acoustic perception a bandpass can be set.In this case only a particular frequency range is fed to the headphones. The best setting can be found by experiment, or alternatively the **A 100** can search for it automatically.

Setting the frequency range manually

- Press the Hz key.
  The most recently set limits are displayed; the lower filter limit flashes.

- The cursor keys change the lower filter limit step by step.

- Press the Hz key again.
  The upper filter limit flashes.

- The cursor keys change the upper filter limit step by step.

- Press the Hz key again.
  The filter limits are saved.

Automatic search for the best frequency range

The **A 100** has a filter-optimisation function that automatically searches for the best frequency range. It should not be activated if there is any significant extraneous noise, and the leak noise - particularly ground-borne noise - should already be audible.

- Press the Hz key until a clearance tone sounds.
- The **A 100** takes a „noise sample“ and analyses it.
  While analysis is under way the display indicates various frequency ranges. The noise produced by the filter values displayed can be heard over the headphones.
- The **A 100** selects the frequency range in which the leak noise is especially clear.

4.2.4 Cursor keys

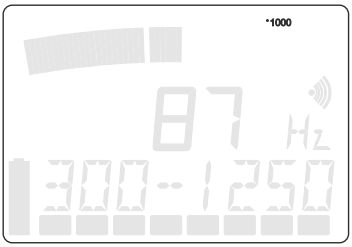
The cursor keys are used to adjust the volume of the speaker or headphones. The volume setting is shown in the display by a bar in reverse video.

4.2.5 Light key

The light key switches the display illumination on and off.
It switches off automatically after about 2 minutes.

4.2.6 Magnifying-glass and on/off key

The analog display indicates the relative noise level. The display can be adapted to prevailing conditions to make a change in the display from one measurement point to another easier to detect. This adaptation switches the analog display (instantaneous value) between scale values 10, 100 and 1000 and alters basic amplification for the headphones.



10 = high sensitivity, high amplification

100 = medium sensitivity, medium noise amplification

1000 = low sensitivity, low noise amplification

Automatic adjustment takes place to maintain the ratio between the current delayed-action value and the instantaneous value.

- Press the microphone key.
  The **A 100** is activated.
- Press the magnifying-glass key.
  The sensitivity of the analog display is altered.
- The current sensitivity setting is shown above and to the right of the display.

4.3 Probe overview

4.3.1 Ground microphone BO-4

The ground microphone BO-4 is used to locate leaks beneath stabilised surfaces.

4.3.2 Ground microphone 3P-4

The ground microphone 3P-4 is used to locate leaks beneath unstabilised surfaces. An earth spike can be screwed onto it for use in soft ground. Its 3 feet guarantee stability at all times.

4.3.3 Carrying rod H-4

The carrying rod can be used with both ground microphones. The BO-4 or 3P-4 microphone is screwed onto its lower end.

4.3.4 Test rod T-4

The test rod is used for preliminary leak location. The test rod is placed in contact with valves on the line under investigation.

4.4 Switching on and off

- Put the microphone jack-plug into socket 1 on the **A 100**.
- The **A 100** switches on.

- If the **A 100** does not switch on, press the on/off key.
- One of the following displays briefly appears in the display:

for test rod or

for ground microphone or

for other microphone types.

- To switch off, unplug the probe from socket 1.

4.5 Sound-protection function

The **A 100** incorporates a sound-protection function. With a sudden loud noise the sound in the headphones is immediately muffled. If the sound gets even louder the headphones are switched off. Once this noise source has ceased the **A 100** reverts to normal operation. The sound-protection function ensures that no excessive sound pressure reaches the ears.

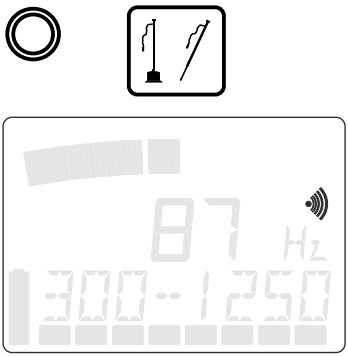
This headphones symbol appears in the comment line when the sound-protection function is activated.

Caution!
Only Sewerin headphones should be used, as these are adjusted to the **A 100**. The threshold at which the sound-protection function is triggered can be adjusted: see section 4.8 „Individual adjustments“.

4.6 Preliminary location

Structure-borne sound is transmitted a very long way by metallic pipes, which makes the test rod very effective for preliminary location.

- Connect the headphones to the **A 100**.
- Connect the test rod to the **A 100**.
- Place test rod on the first measurement point.

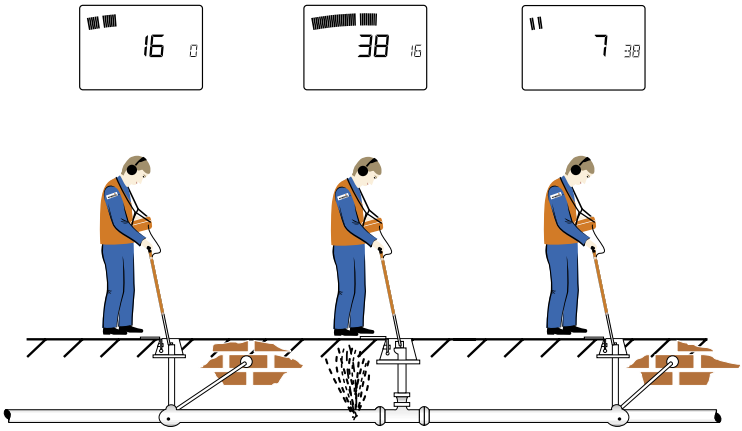


- Activate the **A 100** with the gauntlet key or the microphone key.

  A speaker symbol appears in the display during measurement.
  The analog display indicates the current measurement volume.
  The noise can be heard by the headphones.
  During this measurement the digital display indicates the smallest value measured.
  The small digital display indicates the smallest value measured during the previous measurement. (This value is 0 after first measuring.)
  The smallest measured value is shown in the analog display in reverse video during the measurement.

- To deactivate the **A 100** release the gauntlet key or press the microphone key again.
  If the **A 100** is not deactivated when the gauntlet key is released, the function of the gauntlet key has been changed (see section 4.8). In this event press the gauntlet key again.

- Place the test rod on the next measurement point and proceed exactly as described above.
  The previously measured value now appears in the small digital display for the purposes of comparison.



In water leak detection the display will be similar to that shown in the illustration above.

The noise is loudest near the leak and quieter further away.

On the left: the analog display indicates about 30%: this is the **instantaneous noise value**.

However, the analog display often fluctuates substantially because of changing ambient noise. Even a trend can be hard to recognise. This is why the large digital display (figure 16) indicates the smallest noise value measured at this point so far **(the current delayed-action value)**. Even if ambient noise grows louder, this display is unaffected - while if it grows quieter the display falls further.

The figure 16 is also shown in the analog display as a segment in reverse video.

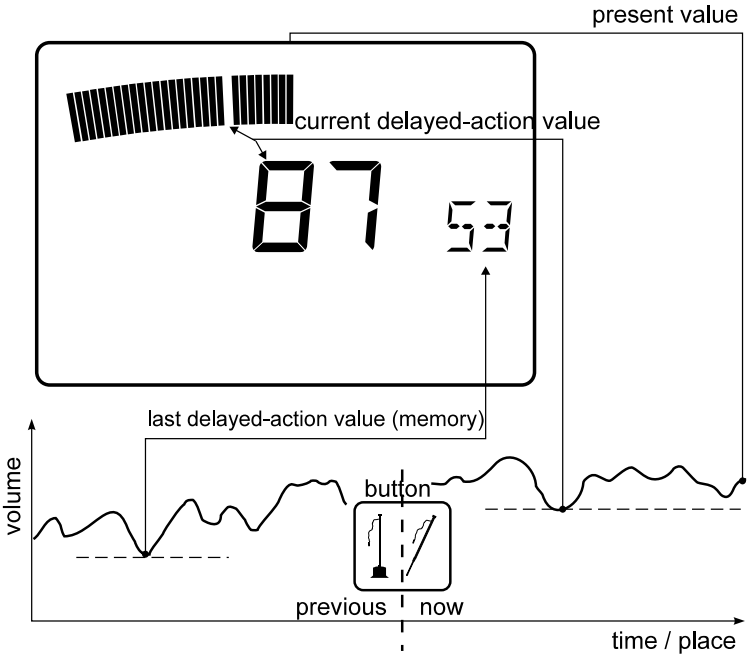
The small digital display indicates “0”: as yet there is no value in memory.

Centre: the analog display indicates about 60%. The large digital display (figure 38) indicates a value greater than the left-hand measurement point. This is an indication that the leak is closer.

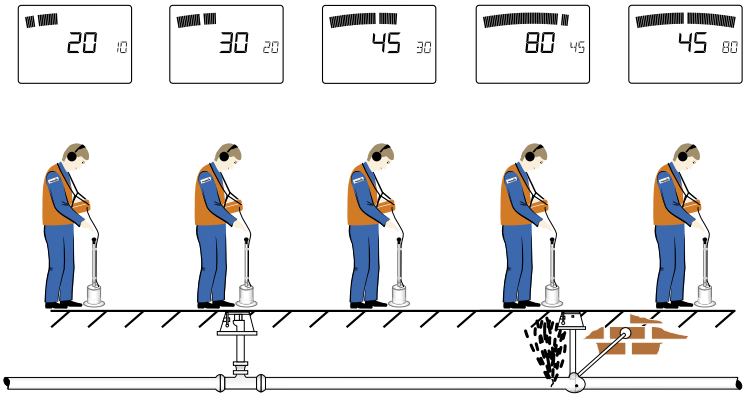
The small digital display now indicates “16”: it reminds you of the result from the last measurement point **(last delayed-action value)**. This makes it easier to decide whether you have not yet reached the leak or have already gone past it.

Right: the current delayed-action value has fallen because the leak is further away. The last delayed-action value, “38”, provides us a further comparison.

The following illustration shows how a leak noise overlaid by fluctuating extraneous noise is shown in the display.



4.7 Pin pointing



Non-metallic pipe materials do not transmit structure-borne sound as well. Therefore checking at the valves is not enough. The sections between valves must also be checked with a ground microphone.

Listening to the surface of the ground at short intervals enables the leak to be located without digging. Here, too, the **A 100** provides a precise optical comparison of the noise intensities.

The above illustration, for example, shows how the display changes when passing a leak.

- Connect the ground microphone to the **A 100**.
- Place the microphone on the ground.
- Activate the **A 100** with the gauntlet key or the microphone key.

  A speaker symbol appears in the display during measurement.

  The analog display indicates the current measurement volume.

The current noise can be heard through the headphones.

The digital display indicates the smallest value measured.

The small digital display indicates the previously-measured value. For the first measurement this value is 0.

The smallest measured value is shown in the analog display in reverse video.

- To deactivate the **A 100** release the gauntlet key or press the microphone key again.

  If the **A 100** is not deactivated when the gauntlet key is released, the function of the gauntlet key has been changed (see section 4.8). In this event press the gauntlet key again.

- Place the ground microphone on the next measurement point and proceed exactly as described above.

  The previously measured value now appears in the small digital display for the purposes of comparison.

- Use the ground microphone to check the area of the section where the leak is thought to be.

  The illustration on the previous page shows an example of the display when crossing a leak.

4.8 Individual settings

On the **A 100** various settings can be freely selected and permanently saved. The set-up table on the next page highlights the various possibilities.
This is a list of settings that you can alter and save. First of all please switch-on the instrument.

- Hold down the microphone key.

- Press the on/off key. „ELWset“ appears in the comment line.

- The microphone key calls the menu items one after another.

- The cursor-up key alters the status of the selected menu.
- After the last menu the „save“ message appears.

- The cursor-up key saves the current settings and terminates the function.

Notes:
The ear protection function should be set to „low level“ only with low surrounding noise so that is already activated with moderate noise levels. In situations with high noise, such level should be set to option (1), factory settings. In special cases, the setting option (2) may be used. The ear protection function will then only be activated in case of very loud noise levels. To avoid that the **ear protection function is activatet too often** and impairs locating the leak, the **headphones' volume may not be set too loud**.

ELW - setup table

Menu number	Description	Condition (0)	Condition (1)	Condition (2)
1	The gauntlet key (item 1) is a key which does or does not stay down when pressed	without*	with	/
2	Quit tone on pressing button	on*	off	/
3	sound-protection function operates at	low threshold	middle threshold*	high threshold
4	Basic amplification	low	middle*	high
5	headphones switch off completely	yes*	no	/

(* = factory setting)

Example:

If the comment line contains „No 3 0“, the sound-protection function operates at the low threshold.

Basic amplification is useful for adapting to extreme situations. The higher the basic amplification, the louder the noise in the headphones at a given volume setting. Pressing the magnifying-glass key is a convenient way to alter basic amplification.

If you do not want the headphones to switch off completely when the sound-protection function is triggered by loud noises, only heavily muffled, select „switch off headphones completely: No“. This means that the user will not lose all ambient noise while using the hearing-protection headphones. An orientation, for example in traffic, is limited possible.

4.9 Factory settings (reset)

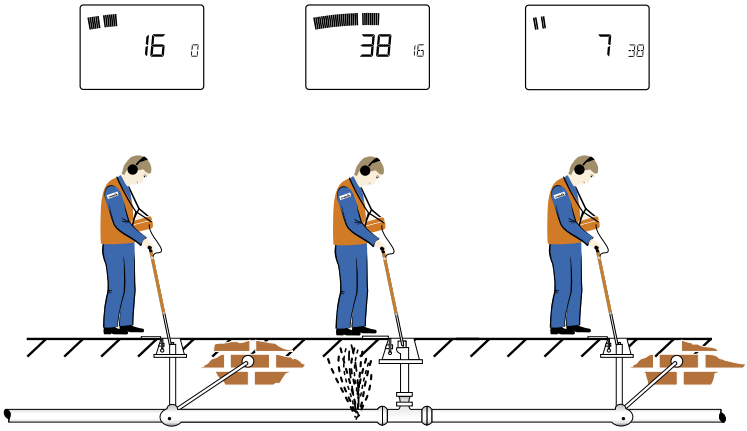
The factory settings (e.g. filter settings) can be restored as follows.

- Plug in a microphone jack-plug while holding down the light key.
- „Reset“ appears in the bottom text line for about 2 seconds.

5 Brief instruction

5.1 Brief instruction on water leak detection

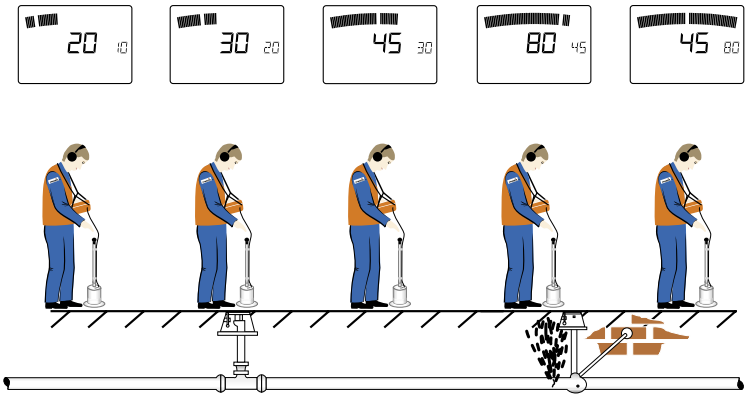
Preliminary location



- Connect the headphones to the **A 100**.
- Connect the test rod to the **A 100**.
- Place test rod on the first measurement point.
- Activate the **A 100** with the gauntlet key or the microphone key.
  A speaker symbol appears in the display during measurement. The analog display indicates the current measurement volume. The noise can be heard by the headphones.
  During this measurement the big digital display indicates the smallest value measured.
  During this measurement the small digital display indicates the smallest value of the precedent measurement. For the first measurement this value is 0. During this measurement the smallest measured value is shown in the analog display in reverse video.
- To deactivate the **A 100** release the gauntlet key or press the microphone key again.
  If the **A 100** is not deactivated when the gauntlet key is released, the function of the gauntlet key has been changed (see section 4.8). In this event press the gauntlet key again.

- Place the test rod on the next measurement point and proceed exactly as described above.
  The previously measured value now appears in the small digital display for the purposes of comparison.

Pin pointing



- Instead of a test rod connect a ground microphone to the **A 100**.
- Place the microphone on the ground.
- Activate the **A 100** with the gauntlet key or the microphone key.
  A speaker symbol appears in the display during measurement.
  The analog display indicates the current measurement volume.
  The current noise can be heard through the headphones.
  The digital display indicates the smallest value measured.
  The small digital display indicates the previously-measured value. For the first measurement this value is 0.
  The smallest measured value is shown in the analog display in reverse video.
- To deactivate the **A 100** release the gauntlet key or press the microphone key again.
  If the **A 100** is not deactivated when the gauntlet key is released, the function of the gauntlet key has been changed (see section 4.8). In this event press the gauntlet key again.
- Place the ground microphone on the next measurement point and proceed exactly as described above.
  The previously measured value now appears in the small digital display for the purposes of comparison.
- Use the ground microphone to check the area of the section where the leak is thought to be.

6 Malfunctions

Malfunctions of the device are indicated through an error message on the display.

An F and an error code will be displayed.

Error code	Description	Error behaviou	Remedy
10	A 100 not recognised	self-locking	Switch device back on, SEWERIN service
40	Temperature at battery to high for charging (> 45°C)	self-locking	Improve device surroundings, SEWERIN service
41	Temperature at battery to low for charging (< 0°C)	self-locking	Improve device surroundings, SEWERIN service
52	Data flash error occurred	self-locking	Switch device back on, SEWERIN service
100	Probe not recognised by device	self-locking	Switch device back on, manually select probe, SEWERIN service

Error code	Description	Error behaviou	Remedy
110	No probe detected by device	self-locking	Switch device back on, manually select probe, SEWERIN service
210	Communication error with CODEC	Self-resetting	Switch device back on, SEWERIN service
239	DSP error in boot program	self-locking	Switch device back on, SEWERIN service
240	DSP error when loading firmware	self-locking	Switch device back on, SEWERIN service
241	Communication error with DSP	Self-resetting	Switch device back on, SEWERIN service

7 Specifications

Fab-no.:	
A 100	**037 11**
Transmission bandwidth (A 100):	
	1 – 10000 Hz
Filter, adjustable:	steps of 50, 500 and 1000 Hz
Filter, minimum bandwidth:	**300 Hz**
Power supply:	**built-in rechargeable accumulator (NiMH)**
	integral automatic charging/ buffer system
	Displayed battery status
	Operating time approx. 12 hours
Type of protection in operation:	IP65
Weight:	approx. 1,0 kg
Approximate dimensions:	(W x H x D): 12.5 × 18 × 6.5 cm
Temperature range:	operation -10 °C – +50 °C storage -25 °C – +70 °C

8 Accessories

8.1 Accessories for water leak detection

Piezo-Test rod T-4, with screwed on tip.

Ground microphone BO-4
With sound-proofed against extraneous noise, especially suitable for stabilised surfaces.

Carrying rod H-4
For ground microphones BO-4 and 3P-4

Ground microphone 3P-4
with tripod, for both stabilised and unstabilised surfaces, with screw-on 20-cm measuring spike.

Test rod extension 60 cm
needed for listening to valves in shafts

Valve adapter

Gate valve adapter

Piezo-microphone EM30
especially suitable for use in buildings.

8.2 General accessories

Headphones stereo

Charging station HS 1.2 A

Case A 100
Case with foam inlay, special transport protection, incorporated pockets for accessories, device may be charged inside the case.

AC/DC adapter M4

Car charging cable M4

Carrying system Triangel
adjustable upholstered back belt

Carrying system Cross Belt
Carrying system „Cross Belt“, 2 adjustable straps with diagonal attachment points. The straps cross over at the back for extra comfort.

9 Hints on Disposal

The disposal of instruments and accessories is governed by the European Waste Catalogue (EWC).

Type of Waste	Corresponding EWC Code
Instrument	16 02 13
Battery, accu	16 06 05

Old Instruments

Old instruments can be returned to Hermann Sewerin GmbH. We will arrange the qualified disposal free of charge through certified specialists.

Konformitätserklärung / Declaration of Conformity

Gerätebezeichnung:	**Tragbares Leitungssuchgerät**	**Tragbares Leitungs- und Wasserleck-suchgerät**	**Tragbares Wasserleck-suchgerät**
Type of Product:	**portable battery operated pipe-locator**	**portable battery-operated pipe locator and water leak detector**	**portable battery-operated water leak detector**
Geräte-Typ: *Product Name:*	**FERROPHON EL**	**AQUAPHON AF 100**	**AQUAPHON A 100**
Fabrikations-Nr.: *Fabr. No.:*	**035 11 xxxx**	**036 11 xxxx**	**037 11 xxxx**

Hiermit erklären wir, dass oben genanntes Produkt mit der/den folgenden Norm(en) oder normativen Dokument(en) übereinstimmt. Bei einer mit uns nicht abgestimmten Änderung des Produkts verliert diese Erklärung ihre Gültigkeit.

We hereby declare that the above product complies with the following norms or standardized directives. In the event of any modification of this product which has not been authorized by us, this declaration becomes invalid.

Norm(en)/Norm(s):

DIN EN 61000-6 – 2	*EMV – Fachgrundnorm Störfestigkeit* *Generic Immunity Standard*
DIN EN 61000-6 – 4	*EMV – Fachgrundnorm Störaussendung* *Generic Emission Standard*

Gemäß den Bestimmungen der Richtlinie(n)/The unit complies with:

89/336/EWG	*EG-Richtlinie: Elektromagnetische Verträglichkeit* *EG-Directive: Electromagnetic Compatibility*
92/31/EWG	*Änderung dazu/amendment to above*
93/68/EWG	*Änderung dazu/amendment to above*

Gütersloh, den 17.02.2006

HERMANN SEWERIN GMBH

(Geschäftsführer/Managing Director)

Record of changes

Version 4.2

- **Display:** set to sensitivity ranges 1 … 10, 1 … 100, 1 … 1000, switch via magnifying-glass key
- **Factory settings:** sound protection functions only active at middle threshold. This threshold is active after renewed power-up.
- **Band filter acc. to micro type** (manually adjustable to 9,950 Hz):

  BO-4: 50 … 1500 Hz

  T-4: 50 … 3000 Hz

  EM30, M01: 50 … 9950 Hz
- **Pre-amplification** matched to micro-types

Version 5.0

- Radio microphones usable
- If the accu-voltage is lower than the accu-nominal voltage, the device is being recharged.
- The version number of the software is displayed on switch-on.

Version 5.2

- Marker for system Combiphon (max level is stored)
- Version with battery power possible

Version 7.0

- Use of new hardware resulting in a weight reduction from 1.4 to 1.0 kg.
- In this version, the programme is stored in a flash memory and no longer in a EPROM.
- Quick charging due to NiMH-accumulators.
- The lowest level of the band-pass filter is set from 50 Hz to 1 Hz. This allows for hearing even lower frequencies.

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V

W

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