Operating Instructions

SeCorr® 300

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
Radio transmitter RT 300 – Structure of appliance

Aerial
Connector
LED
Charging socket
Microphone socket
Transmitter marking
Housing base
Connection nipple for stand (not visible)

Fig. 1: Radio transmitter RT 300

Connector
Light key
Filter key
ON/OFF-key
Display
Loudspeaker key
Arrow-up key
Connector
Arrow-down key
Aerial connector

Fig. 2: Radio transmitter RT 300 without aerial view from top
Radio transmitter RT 300 – Display

- Signal
- Version number
- Filter
- Charging time
- Battery type
- Error code

**Bar display**
- Volume
- Reception quality
- Charging

**Symbols, here:**
- Battery symbol (full)
- Filter symbol
- Synchronisation symbol

**Status message, here:**
- **BAT** (Battery)

**NOTICE:**
You will find an overview of all symbols and status messages in section 10.2.
Symbol explanation

**DANGER!**
DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING!**
WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION!**
CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

**CAUTION!**
CAUTION, without the safety alert symbol, is used to address practices not related to personal injury.

**NOTICE:**
NOTICE is used to address practices not related to personal injury.
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1 Introduction

The SeCorr 300 system is used to detect leaks in underground pressure line systems, such as water pipes, with the help of a computer. It uses the correlation principle and features continuous digital signal processing and options to manually filter out noise.

The SeCorr 300 can be used to detect leaks in both metal and plastic piping.

All the data recorded is cached in the RT 300 radio transmitter. The advantage of this is

- the data does not have to be analysed directly at the measurement location, rather this can be done at a later stage,

- data can be recorded for a virtually infinite measuring section.

The SeCorr 300 system can also be used to detect leaks by means of multi-point correlation.
2 General

2.1 Warranty

The following instructions must be complied with in order for any warranty to be applicable in respect of the functionality and safe operation of this equipment.

Hermann Sewerin GmbH cannot be held responsible 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 only suitable for use in industrial and commercial applications.
- Repairs must only be carried out by a specialist technician 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 non-approved modifications have been made.
- Only accessories supplied by Hermann Sewerin GmbH may be used with this product.
- All repairs must be carried out using replacement parts that have been approved by Hermann Sewerin GmbH.
- Only approved aerials 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

SeCorr 300 is a system for recording and analysing noises. It is used to detect leaks in brimming pressure line systems (e.g. water pipe networks). The system can be used for both metal and non-metal pipe networks.

Only suitably qualified employees (skilled staff, specialists and technicians) of utility companies are permitted to operate the SeCorr 300 system.

All applicable safety regulations and accident prevention regulations must be observed when using the SeCorr 300 system and its components.

Detailed information on appropriate operating conditions for the components of the SeCorr 300 system at the place of installation are provided in section 10.1.

All components used in the SeCorr 300 system have been manufactured in accordance with all binding legal and safety regulations. All components used correspond to the state-of-the-art. The system is safe to operate when used in accordance with the instructions provided.

Careless or improper use of any of the system components may, however, present a risk of damage or harm to persons or property.

2.3 Improper use

Any application of the system or its components that does not comply with the description in section 2.2. shall be deemed to be improper use.

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

These operating instructions must be read carefully and in full. All advice given in these operating instructions must be followed.

CAUTION!
All applicable accident prevention regulations must be observed.

- Do not carry out any modifications to the SeCorr 300 or otherwise change or tamper with it in any way. Never open devices RT 300, RX 300, EM 300, HY 300 (exception: changing the batteries of the RT 300). Failure to observe the above instructions will invalidate the warranty.

- Ensure that no dirt or moisture gets into the connections on the appliances (sockets, aerial connections, connection nipples).

- Observe the temperature ranges in which the devices may be used and stored (see section 10.1).

- The rated radio frequency power (conducted) of the RT 300 and RX 300 is 0.1 W. Though this is a low power level a minimum separation distance of 8 in. from the device’s aerial to all persons must be kept.

- Always adequately secure the setup locations of SeCorr 300 components to prevent injury to persons and damage to vehicles.

Aerials

The aerials of the RT 300 and RX 300 must not be damaged.

- Never carry a unit by the aerial.

- Never bend, kink or cut the aerial.

Only use SEWERIN-approved replacement aerials and aerial attachments.

The aerials must not be co-located and operated in conjunction with any other transmitter.
Special features of radio transmitter RT 300

● The RT 300 is splash-proof to IP64. The device must therefore not be immersed in liquids or exposed to water jets.

● It is essential to read section 5.7.4 before attempting to replace batteries. Failure to observe the instructions provided may result in injury of the user and/or damage to the RT 300.

Special features of radio receiver RX 300

● The RX 300 must not be operated with computers that are connected to the TNV (Telecommunication Network Voltage) at the same time.

● The RX 300 must not be connected to Powered USB.
3  System SeCorr 300 (Overview)

3.1  System components

The SeCorr 300 system includes:

- **Microphone EM 300**, in short: **EM 300** (see section 4) or **Hydrophone HY 300**, in short: **HY 300** (see section 4) for recording the noises at the measurement location

- **Radio transmitter RT 300**, in short: **RT 300** (see section 5) for caching the data; for sending the data to the receiver

- **Radio receiver RX 300**, in short: **RX 300** (see section 6) for receiving the data from the transmitter; for relaying the data to the computer

- **Stand** for correct positioning of the **RT 300** during the measurement

- **SeCorr 300 software** for analysing the measurements

  The **SeCorr 300 software** is explained in separate operating instructions.

Accessories

There are various optional accessories available for the SeCorr 300 system (see section 10.3). The user may find the following parts particularly useful when performing a measurement:

- **Case** for transporting and storing the system components

- **Cover hammer** for easier opening of manhole covers

- **Headphones** for listening to the noise on the **RT 300**
3.2 Computer

A computer is required for analysing the measurement using the **SeCorr 300 software**. Various computer types are suitable.

<table>
<thead>
<tr>
<th>Computer</th>
<th>Preferred range of use</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PC</strong> e.g.</td>
<td>stationary; fixed installation in a service vehicle</td>
<td>standard</td>
</tr>
<tr>
<td>desktop computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Notebook</strong></td>
<td>mobile</td>
<td>standard; must be protected against effects of weather and damage in transit</td>
</tr>
<tr>
<td><strong>Robust notebook</strong> e.g. microport colibri</td>
<td>mobile</td>
<td>weather-proof</td>
</tr>
</tbody>
</table>

**System requirements**

- **Operating system:** Microsoft Windows 2000 SP4, XP 32/64 SP2, Vista 32/64
- **RAM:** 512 MB (1024 MB recommended)
- **Processor:** 1.2 GHz (1.8 GHz recommended)
- **Features:** USB port 1.1 or higher
  Sound card with headphone jack
- **Screen resolution:** 1024 × 768 pixels
3.3 **Functional principle**

**SeCorr 300** uses the correlation principle to detect leaks.

Each leak produces a noise which is different to the background noise in the pipe system. It spreads in both directions along the pipe at a certain speed (depending on the sound velocity of the pipe material). This leak noise is recorded by two **microphones** at two different measurement locations along the measuring section and immediately digitised. The data is recorded in **radio transmitter RT 300** and from there it is sent to **radio receiver RX 300**. The receiver relays the data to the **computer** which determines the position of the leak using the **SeCorr 300 software**. The following is used for the calculation:

- the time difference of the sound between measurement locations different distances away
- other measurement data (e.g. length of the measuring section, sound velocity)

\[ d = \frac{L - v \Delta t}{2} \]

**① ②** Measurement location (transmitter)

- **L** Length of the pipeline
- **Δt** Time difference
- **d** Distance of the leak from ①
- **v** Sound velocity

**Fig. 3:** Principle for determining the leak position

---

**NOTICE:**

**SeCorr 300** is used to determine the position of a source of noise. The user must always decide whether the noise actually stems from a leak or is caused by something else.
4 Microphone EM 300 / Hydrophone HY 300

4.1 Functionality
The EM 300 and HY 300 record noises at the measurement location. The data is digitised immediately and relayed to the transmitter.

4.2 Ranges of use
The EM 300 is a universal microphone. It is equally well suited for use in metal pipes and non-metal pipes. The EM 300 can be attached to the measurement location by means of a magnet or adapter.

The HY 300 can also be used for measurements on both metal and non-metal pipes. It is particularly well suited for correlation measurements over large distances and for large pipe diameters. In contrast to the EM 300, the HY 300 records noises directly from the water column. To do so, it must be screwed to a hydrant, for example.

CAUTION!
Use the HY 300 for measurements in drinking water networks only.

Refer to section 8.2 for detailed information on suitable measurement locations.

4.3 Construction of microphone EM 300
The EM 300 consists of:
- Microphone housing
- Magnet (round or horseshoe magnet)
- Special cable with jack for connecting to RT 300
DANGER!
The magnet is very powerful. Persons with a pace-maker should not go near the EM 300 microphone.
The magnet must be kept away from electronic storage media (diskettes, hard drives, credit cards, etc.), monitors (PC, TV) and clocks.

Fig. 4: Microphone EM 300 with round magnet (left) or horseshoe magnet (right)

CAUTION!
The piezo components and the EM 300 magnet are fragile. Never drop the microphone.

4.3.1 Microphone housing
The front of the housing features:
- thread to screw in the magnet
- two LEDs to illuminate the shaft when lowering the microphone
The LEDs are switched on via the RT 300 (see section 5.7.8).

NOTICE:
The housing rattles when it is moved backwards and forwards. This is due to the design of the device and is not a fault.
4.3.2 Magnet

The magnet is removable and interchangeable. It comes in two models:

- **Round magnet** for flat surfaces, e.g. square gate end
- **Horseshoe magnet** for curves, e.g. pipes

The magnetic force of each model is approx. 11 lb.

The **round magnet** comes with an extra **metal disc**. This reduces the magnetic force and thus protects other devices (e.g. notebooks) from the strong magnetic effect. Nevertheless, you should keep the magnet away from other magnetic storage media.

Retain the metal disc and always use it when the round magnet is not in use. The **cardboard disc** between the magnet and the metal disc is to help you remove the magnetic disc.

4.3.3 Cable

The cable is used to:

- Lower the microphone into the shaft and lift it out again after the measurement
- Transmitting data to the transmitter

**NOTICE:**
The cable is designed to withstand any tractive forces that may occur when lowering/lifting the microphone.

The **jack** at the free end of the cable is marked blue and mechanically coded. It can only be connected to the **microphone socket** of the **RT 300**.
4.4 Construction of hydrophone HY 300

The HY 300 comprises only the hydrophone housing. In contrast to the EM 300, the connection cable to the RT 300 is not permanently attached to the hydrophone.

Hydrophone housing

![Diagram of Hydrophone Housing](image)

- Stopper
- Socket for hydrophone cable
- Ventilation valve
- Sealing cover
- 1" thread for attachment to the measurement location

Fig. 5: Hydrophone HY 300 without stopper and sealing cover (left) and with stopper and sealing cover (right)

**CAUTION!**

Protect the HY 300 from moisture and dirt when not in use by closing off the socket with the stopper and the thread with the sealing cover.

Hydrophone cable

The cable is used to transfer data to the transmitter. The jacks on the cable are marked blue and mechanically coded. They can only be connected to the microphone socket of the RT 300.
5 Radio transmitter RT 300

5.1 Functionality and construction

Radio transmitter RT 300 takes the digitised data from the microphone and saves it in the form of “data packets” (Stack memory). These “data packets” are ready for retrieval by the receiver. Data which has been successfully retrieved from the RT 300 memory is deleted.

The RT 300 acts like a relay station. It can also be used independently of the SeCorr 300 to listen to noises (microphone EM 300 or hydrophone HY 300 required).

You will find an overview and all the part names of the RT 300 in the front cover (fig. 1 and 2).

5.1.1 Marking

The appliances have colour markings.

- **Transmitter 1**: blue
- **Transmitter 2**: orange

It is important to be able to tell the difference between the transmitters because at least two RT 300 have to be used for a measurement and there must be no mix-ups during analysis.

```
NOTICE:
The SeCorr 300 software uses the same transmitter colour and number allocation.
```

5.1.2 Aerial

The RT 300 aerial can be rotated and tilted. This ensures the optimal position for good radio reception according to the on-site situation.
5.1.3 Connections

The sockets on the RT 300 are colour and mechanically coded. This means that only the right cable can be connected.

<table>
<thead>
<tr>
<th>Connection</th>
<th>Colour coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charging socket</td>
<td>black</td>
</tr>
<tr>
<td>Microphone socket</td>
<td>blue</td>
</tr>
<tr>
<td>Headphones socket</td>
<td>colourless</td>
</tr>
</tbody>
</table>

Please ensure when plugging in the jacks that the **red markers** on the jack and the socket are **congruent**.

**CAUTION!**

Do not use force when plugging the jacks into the sockets. If necessary, check whether the jack – socket allocation is correct (same colour coding) and the jacks are correctly aligned (red dot).

5.1.4 LED

Six LEDs are fitted in the housing of the RT 300 above the sockets. The LEDs flash red.

<table>
<thead>
<tr>
<th>Flash rate</th>
<th>Number of LEDs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant alternation: fast rotating (0.2 s) – break (2.2 s)</td>
<td>6</td>
<td>Transmitter ready</td>
</tr>
<tr>
<td>Light constantly on for 3 s</td>
<td>6</td>
<td>Transmitters have been synchronised</td>
</tr>
<tr>
<td>every 2 s</td>
<td>2 (opposite)</td>
<td>Battery charging</td>
</tr>
<tr>
<td>Constant alternation: short double flashing – break</td>
<td>2 (opposite)</td>
<td>Charging complete (conservation charging)</td>
</tr>
</tbody>
</table>

The LEDs also serve to make pedestrians and vehicles aware of the erected device by flashing (**warning function**).
5.1.5 **Keys**
You will find an overview with the names of the keys inside the front cover (fig. 2). The function of the keys is explained in section 5.7.

5.1.6 **Display**
The display features a backlight (see section 5.7.8). The symbols and status messages are explained in section 10.2.

5.2 **Setup/mounting**
*For a measurement* the receiver must **always be mounted on the stand**.
- Set up the stand (see section 7).
- Push the connection nipple (on the base of the device) onto the quick-connect on the stand.

The quick-connect must be pulled down to release the device from the stand.

The device stands securely on three rubber feet when not being used for measurement.
5.3 Transport

Each RT 300 features a flexible carrying handle. It can be attached to two of the three connectors available.

Fig. 6: Carrying handle attached to RT 300 lengthways (left) or crossways (right)
5.4 Power supply

The RT 300 can be operated by:

- rechargeable NiMH batteries (as delivered)
- disposable Alkaline batteries
- external AC/DC adapter

Batteries

Always use **four battery cells** of the same type. More details about the battery types can be found in section 10.1.1.

It is advisable to switch the unit off when not in use to extend the operating time when the device is powered by batteries.

Please note the following important points:

- As soon as the batteries need replaced/recharged, the **battery symbol** on the display will begin to **flash**.
- **RT 300** cannot store any further data once the batteries are empty.

**NOTICE:**

Check the condition of the batteries **before each measurement**. Replace/recharge the batteries in good time.

5.5 Changing the aerial

The aerial is fitted to the device with a screwed joint. Please note when changing the aerial:

- The screwed joint must always be **clean and dry**.
- **Hand-tighten** the aerial. Do not use any tools to tighten it.

Note: The aerials for the **RT 300** and **RX 300** are identical in construction.
5.6 Operation

5.6.1 Switching on

- Hold down the ON/OFF key until the start screen appears.

The following will be displayed:
- Version number, *here: 2.03*
- Battery symbol
- Type of power supply, *here: ACU* (accu/rechargeable battery)

- Wait a moment.

The device is **ready for use**.
- There will be no signal until the microphone/hydrophone is connected.
- Synchronisation symbol
  - Flashes until the transmitters are synchronised.
  - Not visible when the transmitters are synchronised (**measuring mode**).
- *here: headphones switched off*

**Battery symbol**

The number of segments in the battery symbol represents the remaining battery capacity/remaining charge. If the batteries need replaced/recharged, the battery symbol flashes.

**NOTICE:**
You must press the ON/OFF key again to turn the device off.
5.6.2 Plugging in the microphone/hydrophone

The transmitter automatically recognises when a microphone/hydrophone is connected. It will briefly show the name of the microphone/hydrophone (e.g. EM 300; two-part display: first EM, then 300).

- Signal, here: 1247
- Microphone/hydrophone connected, here: EM

The status message will then disappear. The device is back in measuring mode.

5.6.3 Listening to noise

The noise can be heard on the RT 300 through headphones. The headphones are switched on and off using the loudspeaker key. The various displays are explained below:

<table>
<thead>
<tr>
<th>Headphones</th>
<th>Loudspeaker symbol</th>
<th>Bar display</th>
</tr>
</thead>
<tbody>
<tr>
<td>switched on</td>
<td>not visible</td>
<td>volume</td>
</tr>
<tr>
<td>switched off</td>
<td>visible</td>
<td>reception quality</td>
</tr>
</tbody>
</table>

**Conditions** for listening to noises:

- Headphones connected
- Microphone/hydrophone connected
- Headphones switched on
5.6.3.1 Adjusting the volume
The volume can be adjusted any time during listening using the arrow keys.

The currently selected volume is symbolised by the missing segment.

- Press the **arrow-up key** to **increase** the volume or the **arrow-down key** to **reduce** the volume.

  The missing segment of the volume display will move to the left or right.

5.6.3.2 Hearing protection function
The **RT 300** features a hearing protection function to protect the user. On the headphones this:

- **limits** noise to a certain volume if a preset limit is exceeded.
- The sound is **switched off** if the preset limit is **considerably** exceeded.

  The **hearing protection symbol** appears on the display when the sound is switched off.

Listening again
If the sound has been switched off by the device (hearing protection symbol visible) there are two ways to start listening again:

- Reduce the volume
- Wait until the noise falls back down below the limit again
### Noise protection limits (levels)

<table>
<thead>
<tr>
<th>Level</th>
<th>Limit [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>−</td>
</tr>
<tr>
<td>1</td>
<td>95</td>
</tr>
<tr>
<td>2</td>
<td>85</td>
</tr>
</tbody>
</table>

If **level 0** is set, the hearing protection is **switched off** (as delivered).

---

**WARNING!**

Set the hearing protection function to level 1 or 2 to protect yourself against loud noises.

---

#### Adjusting the hearing protection

- Hold down the loudspeaker key for 3 s.

  The current hearing protection level setting will appear.

  - *here:* level 0
  - Status message **PRO**

- Using the arrow keys set the desired level for the hearing protection function.

- Press the ON/OFF key to save the setting. The device will return to measuring mode.

---

### 5.6.3.3 Filtering noise

The noise that can be heard through the headphones can be filtered. The filters limit the range of the audible frequencies. By systematically changing the filters you can often improve the individual perception of the noise.
**NOTICE:**
The filter does not affect the type or volume of data saved by the **RT 300** or the correlation result.

### Filter limits

<table>
<thead>
<tr>
<th>Frequency [kHz]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2 – 1</td>
</tr>
<tr>
<td>1 – 3</td>
</tr>
<tr>
<td>0 – 0.2</td>
</tr>
<tr>
<td>0 – 0.5</td>
</tr>
<tr>
<td>0 – 1 *</td>
</tr>
<tr>
<td>0 – 5 **</td>
</tr>
</tbody>
</table>

* Factory settings **HY 300**
** Factory settings **EM 300**

### Adjusting the filter

- Press the filter key. The headphones are switched on automatically (if they were switched off).

The currently set filter is shown.

- **here:** filter 0 – 5 kHz
- **Filter symbol** flashes

- Set the desired filter using the arrow keys.
- Press the ON/OFF key OR the filter key to apply the setting. The device will return to measuring mode.

**NOTICE:**
The selected filter is not saved when the device is switched off.
5.6.4 Changing the battery

If the RT 300 is powered by batteries, they must be changed as soon as the battery symbol on the display starts to flash. Rechargeable batteries (accus) can also be changed if required. After replacing the disposable/rechargeable batteries, you must set the type.

NOTICE:
Used batteries must be disposed of carefully using appropriate local recycling facilities.

5.6.4.1 Replacing the disposable/rechargeable batteries

The battery compartment is under the housing base. To unscrew the housing base you will need a large screwdriver or another tool (e.g. metal disc from round magnet on microphone, coin).

NOTICE:
The housing base must be correctly lined up after you have changed the batteries so that it can be screwed back on again. This is easier if you attach the carrying handle lengthways before unscrewing housing base and do not remove it when replacing the batteries.

- Loosen the two screws securing the housing base. Remove the screws by repeatedly turning them a short way in alternation; this ensures that the housing base does not twist.
- Remove and replace the batteries (disposable or rechargeable). Ensure that the batteries are inserted with the correct polarity (negative terminal to spring / positive terminal to metal strip).
- Replace the housing base and line it up so that the screws can be screwed into the thread. Retighten the screws alternately.
5.6.4.2 Setting the type

... following battery replacement (Section 5.6.4.1)
- Hold down the ON/OFF button until the start screen appears.

Hold down the ON/OFF button until the start screen appears. The following information will be displayed:
- Version number, here: 2.03
- Battery symbol (empty)
- Type of power supply not recognised (dashes)

... following error message F042
- Hold down the filter key.

In both cases wait until the following image appears on the display:

The battery symbol and BAT flash alternately.

- Using the arrow keys set the type of battery in use.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Type of battery</th>
<th>Capacity [Ah]</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT</td>
<td>disposable</td>
<td>–</td>
</tr>
<tr>
<td>5 Ah</td>
<td>rechargeable</td>
<td>5</td>
</tr>
<tr>
<td>6 Ah</td>
<td>rechargeable</td>
<td>6</td>
</tr>
<tr>
<td>7 Ah</td>
<td>rechargeable</td>
<td>7</td>
</tr>
<tr>
<td>8 Ah</td>
<td>rechargeable</td>
<td>8</td>
</tr>
<tr>
<td>9 Ah</td>
<td>rechargeable</td>
<td>9</td>
</tr>
<tr>
<td>10 Ah</td>
<td>rechargeable</td>
<td>10</td>
</tr>
<tr>
<td>11 Ah</td>
<td>rechargeable</td>
<td>11</td>
</tr>
<tr>
<td>12 Ah</td>
<td>rechargeable</td>
<td>12</td>
</tr>
</tbody>
</table>
Display with selected accu type

- *here*: accu type 5 Ah

- Press the ON/OFF key to save the setting. The device will return to measuring mode.

Rechargeable batteries (accus) must be charged before you use the RT 300 again (see section 5.7.5).
5.6.5 Charging the batteries

If the **RT 300** is powered by rechargeable batteries, they must be recharged as soon as the battery symbol on the display starts to flash.

The device must be **switched off** when the batteries are being recharged.

**NOTICE:**
If the **RT 300** is switched on when the jack is plugged into the charging socket, the batteries will not charge. Instead, the device will be powered externally and is ready for use (see also section 5.7.5.3).

- Plug the AC/DC adapter plug into the charging socket of the **RT 300**. The batteries will begin to charge. Two opposite LEDs on the **RT 300** flash every two seconds (see section 5.1.4).

  The **charging start screen** will appear. The following will be displayed:
  
  - Version number, **here**: 1.02
  - Battery symbol (empty)
  - Battery type display **ACU** (rechargeable battery)

- Wait a moment.

  Charging begins.

  - Duration of charging process [h], **here**: 5
  - The bar display will run continually from left to right.
  - Battery symbol; initially empty, number of visible segments will increase with charging

  The time until the end of charging will be counted down.
5.6.5.1 End of charging

The batteries are fully charged when the flash of the LEDs changes to a short double flash (see section 5.1.4).

The display shows the battery symbol (full).

- Remove the AC/DC adapter plug from the charging socket of the RT 300.

5.6.5.2 Charging problems

Any problems encountered when charging the batteries are signalled by status messages (see section 10.2.2).

<table>
<thead>
<tr>
<th>Message</th>
<th>RT 300 response</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>T 0</td>
<td>Charging aborted</td>
<td>● If possible: change the ambient temperature</td>
</tr>
<tr>
<td>T45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10V</td>
<td>Charging voltage reduced to 10 V, charging time doubles</td>
<td></td>
</tr>
</tbody>
</table>

The display shows problems during charging.

- **here**: status message T 0, i.e. temperature of battery during charging below 0 °C (32 °F)

- **here**: status message 10V, i.e. charging voltage reduced to 10 V

- Charging time doubles, **here**: 10 h
5.6.5.3 Changing between charging and external power supply
During the charging process the RT 300 can be switched to measuring mode with external power supply.

- Press the ON/OFF key.

The device switches on.

- DSP status message (powered via AC/DC adapter)

- Wait a moment until the device returns to measuring mode.

Continuing charging
- Press the ON/OFF key again. The device switches back to charging (provided the AC/DC adapter is still connected).

The process will take a while. The device switches off in between, but comes back on again.

5.6.6 Reception quality display
During measurement the RT 300 bar display indicates the quality of the radio connection. The more segments that are visible on the bar display, the better the reception quality.

Conditions for reception quality display:
- Radio receiver RX 300 connected
- Headphones switched off

Display showing reception quality
- here: very good reception quality (one segment missing)
5.6.7 Synchronicity display

The radio transmitters used for a measurement must be synchronised to ensure a correct measurement. The radio transmitters are synchronised via the computer.

Each individual device will show whether the radio transmitters are synchronised.

<table>
<thead>
<tr>
<th>Synchronisation symbol</th>
<th>Radio transmitter RT 300</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗</td>
<td>flashes</td>
</tr>
<tr>
<td>✓</td>
<td>not synchronised</td>
</tr>
<tr>
<td>✗</td>
<td>not visible</td>
</tr>
<tr>
<td>✓</td>
<td>synchronised</td>
</tr>
</tbody>
</table>

5.6.8 Switching on the light (display and microphone)

The display lighting on the RT 300 and the illumination of the measurement location by LEDs on the EM 300 are linked.

- Press the light key to illuminate the display and to switch on the LEDs on the EM 300.
  
The light will stay on for 30 s and will then go out automatically.

- Press the light key again before the 30 s lapse if you want to switch off the light in a specific way.

WARNING!
The LEDs on the microphone have a high intensity. Never shine the microphone light into the eyes.
6 Radio receiver RX 300

6.1 Functionality and construction

Radio receiver RX 300 synchronises the radio transmitters and relays the data from the transmitters to the computer. As such, the RX 300 is the link between the transmitters and the computer.

The RX 300 does not have any controls. It is ready for use as soon as it is receives power from the computer. To this end the jack of the USB cable must be plugged into the appropriate socket in the housing.

You will find an overview and all the part names of the RX 300 in the back cover (fig. 10 and 11).

Fig. 7: Radio receiver RX 300 with connected USB cable and magnet (left) or mounting clip (right)
6.1.1 Aerial
The RX 300 aerial can be rotated and tilted. This ensures the optimal position for good radio reception according to the on-site conditions.

6.1.2 LED
An LED is fitted in the housing of the RX 300 above the USB socket. The LED flashes red.

<table>
<thead>
<tr>
<th>Flash rate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>steadily flashing every 1 s</td>
<td>receiver ready for use, no radio connection to the transmitters</td>
</tr>
<tr>
<td>light permanently on</td>
<td>radio connection to at least one transmitter</td>
</tr>
<tr>
<td>light permanently on, flickering</td>
<td>data transfer between receiver and transmitter</td>
</tr>
</tbody>
</table>

6.2 Setup/mounting
The RX 300 can stand alone when the magnet is screwed on. The magnet prevents the device from toppling on metal surfaces.

DANGER!
The magnet is very powerful. Persons with a pacemaker should not come close to the RX 300 radio receiver.
The magnet must be kept away from electronic storage media (diskettes, hard drives, credit cards, etc.), monitors (PC, TV) and clocks.
If the RX 300 is mounted on the roof of a vehicle, the vehicle must not be moved.

If a robust notebook is used as the computer, the RX 300 can be attached using the mounting clip on the carrying strap at the front.
6.3 **Power supply**

The **RX 300** is powered via the computer. This means that a computer must always be connected for the **RX 300** to receive data.

6.4 **Changing the aerial**

The aerial is fitted to the device with a screwed joint. Please note when changing the aerial:

- The screwed joint must always be **clean and dry**.
- **Hand-tighten** the aerial. Do not use any tools to tighten it.

Note: The aerials of the **RX 300** and **RT 300** are identical in construction.

6.5 **Advice for use**

- **Basic rule for using the RX 300**:  
  
  **The freer and higher the RX 300 is mounted, the better the data reception.**  
  
  In other words, high, flat surfaces are ideal (e.g. vehicle roof).

- If the vehicle is to be used to mount the **RX 300**, always place the device on the roof. Do not attach the receiver to the side of the vehicle.

- The magnet is rubberised to prevent damage to the underlying surface (e.g. damage to paintwork). Always keep the **magnet clean**. If necessary, wash down with water.
7 Stand

The stand ensures that the RT 300 is positioned securely and is at the required height for optimal data transmission. The RT 300 must always be secured to the stand during the measurement. The stand, RT 300 and microphone can all be easily transported together whilst assembled by the top end of the telescopic tube.

**CAUTION!**
Small magnets secure the three parts of the stand base. Please take into account their magnetic power when assembling and dismantling the stand - your fingers could get trapped.
Always keep your fingers away from moving parts of the stand.

![Diagram of Stand](image)

**Assembling the stand**
- Unfold the two outer parts of the stand base as far as the stop.
- Place the stand on the ground.
- Untwist the knob. Erect the telescopic tube. Fix the telescopic tube in the desired position by tightening the knob again.

Fig. 8: Stand (folded down)
- Extend the telescopic tube as far as possible using the two clamp levers.
- Push the points of the stand base into the ground if it is soft.

**NOTICE:**
The RT 300 must be as vertical as possible on the stand. You can compensate for dips in the ground by adjusting the angle between the stand base and the telescopic tube (15° increments).

![Fig. 9: Stand (assembled) with RT 300 and EM 300](image)
8 Performing a correlation measurement

8.1 Suitable measurement locations

Any accessible point in the pipe network is suitable as a measurement location, provided the leak generates a measurable signal there. This can, however, only be verified through the measurement itself.

Accessible points include, for example, slide gates, hydrants and house connection valves. A radio link or line-of-sight between the measurement locations is not required.

<table>
<thead>
<tr>
<th>EM 300</th>
<th>Can be connected to</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Pipeline</td>
<td></td>
</tr>
<tr>
<td>♦ Hydrant</td>
<td></td>
</tr>
<tr>
<td>♦ House connection valve</td>
<td></td>
</tr>
<tr>
<td>♦ Slide gate</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HY 300</th>
<th>Can be connected to</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Hydrant</td>
<td></td>
</tr>
<tr>
<td>♦ House connection</td>
<td></td>
</tr>
<tr>
<td>♦ Flushing equipment</td>
<td></td>
</tr>
<tr>
<td>♦ Fan</td>
<td></td>
</tr>
</tbody>
</table>

If you intend to use the EM 300 and attach it with a magnet, select an appropriate location that provides the most surface contact for the magnet.

8.2 Requirements

8.2.1 Equipment

To perform a correlation measurement with the SeCorr 300 you will need (at least):

- 2 EM 300 microphones or 2 HY 300 hydrophones
- 2 RT 300 radio transmitters
- 2 stands
- 1 RX 300 radio receiver
- 1 computer
8.2.2 Required data

To calculate the leak position using the SeCorr 300 software, you must have the following information about the pipeline:

- Position
- Material
- Special features in the piping (e.g. bends, house connections, pressure regulators)
- Length of the (water-filled) pipeline between the measurement locations

Please note that it is not the distance (i.e. the shortest connection) between the measurement locations, but rather the actual length of the pipeline that is required.

8.3 Setting up the measuring section

Once all the conditions for performing a measurement have been met (see section 8.2), you can start up the system.

- Set up a stand close to the computer for each measurement location (see section 7).
- Attach a RT 300 to each stand.
- Switch on all RT 300.
- Switch on the computer.
- Connect the RX 300 to the computer.
Performing a correlation measurement

- Erect the **RX 300**. Follow the instructions in sections 6.2 and 6.5.
- Test the system. Launch the **SeCorr 300 software** on the computer. The connection to the **RX 300** will be established automatically and the **RT 300** will be synchronised.

  You will be informed of any problems that occur by a corresponding error message on the computer/display of the **RT 300**.
- Carry the stands (with the **RT 300**) and a microphone/hydrophone to the measurement locations.

**At each measurement location:**

**... When measuring with a microphone**
- Attach the microphone to the measurement location.
  - Despite the strong magnetic force **carefully** place the microphone at the measurement location.
  - Install the microphone at the measurement location as **upright** as possible. The maximum permitted tilt is 45º.
- Connect the microphone to the **RT 300**.
- Test the microphone by connecting headphones to the **RT 300**.

  If you can hear noises through the headphones (see section 5.7.3), the microphone is working.

**... When measuring with a hydrophone**
- Flush the measurement location.
- Disinfect all parts of the **HY 300** that can come into contact with drinking water.

**CAUTION!**

To disinfect the **HY 300**, use only disinfectants approved for use with drinking water.
Performing a correlation measurement

- Attach the hydrophone to the measurement location.
  - Use an adapter if necessary.
  - Seal off the connection.
  - Do this with the aid of the rotary tool if necessary.

**CAUTION!**
When using the adapter for underground hydrants, you must only hand-tighten hydrophone – adapter connection.

- Open the fitting completely.
- Check all connections between the hydrophone, measurement location and any adapter used for leak-tightness. Leaky connections cause interference noises that can falsify the measurement result.
- Vent the measurement location using the ventilation valve on the hydrophone.
- Connect the hydrophone to the **RT 300** using the hydrophone cable.
- Test the hydrophone by connecting headphones to the **RT 300**.
  If you can hear noises through the headphones (see section 5.7.3), the hydrophone is working.

Once you have set up all the measurement locations as described, the system is ready to start measuring. Signals are already being picked up and recorded. Continue to work on the computer.

- Click on the **New measurement** button. The **Measurement parameter** window will appear.
- Enter the required data.
- Confirm your entries with **OK**. The **measuring dialogue** and the **Time stream** window will appear.

Further use of the **SeCorr 300 software** is explained in separate operating instructions.
9 Troubleshooting

If you encounter problems when working with the SeCorr 300, you will generally receive an error message on the computer from the SeCorr 300 software. This states the cause of the fault and repair options.

The following sections explain problems that can be attributed to the individual system components.

9.1 Problems with the RT 300

9.1.1 Device not ready for use

<table>
<thead>
<tr>
<th>Description of alert</th>
<th>Cause/corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEDs not flashing</td>
<td>• Batteries empty &gt; Change/recharge batteries</td>
</tr>
<tr>
<td></td>
<td>• Device faulty &gt; Send device to SEWERIN Service</td>
</tr>
</tbody>
</table>

9.1.2 Status messages during the charging process

Charging problems are indicated by a status message: section 10.2.2 explains what the status messages mean.

9.1.3 Error codes

The RT 300 displays internal errors on the display with an error code (see table).

- Error code, here: F042
- Status message ERR (error)
<table>
<thead>
<tr>
<th>Error code</th>
<th>Cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>F014</td>
<td>Device malfunction</td>
<td>● Only through SEWERIN Service</td>
</tr>
<tr>
<td>F042</td>
<td>Battery requires charging</td>
<td>● Insert rechargeable OR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Replace battery (instead of charging) OR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● set correct battery type (see Section 5.6.4.2)</td>
</tr>
<tr>
<td>F055</td>
<td>Device malfunction</td>
<td>● Only through SEWERIN Service</td>
</tr>
<tr>
<td>F062</td>
<td>Battery missing or inserted wrong way</td>
<td>● Insert battery</td>
</tr>
<tr>
<td></td>
<td>round</td>
<td>● Check polarity</td>
</tr>
<tr>
<td>F063</td>
<td>External voltage less than 10 V</td>
<td>● Device will automatically halve charging voltage (display 10 V)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If malfunction reoccurs:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● AC/DC adapter faulty &gt; replace AC/DC adapter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Replace vehicle cable with AC/DC adapter</td>
</tr>
<tr>
<td>F064</td>
<td>Charging electronics error</td>
<td>● Only through SEWERIN Service</td>
</tr>
<tr>
<td>F200</td>
<td>Device malfunction</td>
<td>● Switch on device again</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Fault can be ignored if it occurs occasionally</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● If it occurs regularly contact SEWERIN Service for help.</td>
</tr>
<tr>
<td>F201</td>
<td>Communication error</td>
<td>● Temporary error message</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Fault can be ignored if it occurs occasionally</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● If it occurs regularly contact SEWERIN Service for help.</td>
</tr>
<tr>
<td>F210</td>
<td>Device malfunction</td>
<td>● Only through SEWERIN Service</td>
</tr>
<tr>
<td>F211</td>
<td>Device malfunction</td>
<td>● Only through SEWERIN Service</td>
</tr>
<tr>
<td>F212</td>
<td>Device malfunction</td>
<td>● Only through SEWERIN Service</td>
</tr>
<tr>
<td>F213</td>
<td>Device malfunction</td>
<td>● Only through SEWERIN Service</td>
</tr>
<tr>
<td>F214</td>
<td>Device malfunction</td>
<td>● Only through SEWERIN Service</td>
</tr>
<tr>
<td>F215</td>
<td>Device malfunction</td>
<td>● Only through SEWERIN Service</td>
</tr>
</tbody>
</table>
### 9.2 Problems with the RX 300

<table>
<thead>
<tr>
<th>Description of alert</th>
<th>Cause/corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED not flashing</td>
<td>• Check plug connection (cable) on RX 300 and on computer</td>
</tr>
<tr>
<td></td>
<td>• Exit software and restart</td>
</tr>
<tr>
<td></td>
<td>• Device faulty &gt; Send device to SEWERIN Service</td>
</tr>
</tbody>
</table>

### 9.3 Problems with radio connection RX 300 – RT 300

The most common reason for problems with exchanging data between the RX 300 and the RT 300 is the quality of the radio connection.

<table>
<thead>
<tr>
<th>Description of alert</th>
<th>Cause/corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar display on RT 300 display:</td>
<td>• Check transmission path: are objects causing dark zones?</td>
</tr>
<tr>
<td>Only a few or no segments visible</td>
<td>• Change position of RT 300, e.g. move to side, position higher up</td>
</tr>
<tr>
<td>AND SeCorr 300 software, Info transmitter area:</td>
<td>• Set up RT 300 close to RX 300 for data transmission</td>
</tr>
<tr>
<td>aerial symbol shows low signal strength; status bar, right: black square visible</td>
<td>• Change position of RX 300, e.g. move to side, position higher up</td>
</tr>
</tbody>
</table>

**NOTICE:**
The radio connection is only required for data transmission. A radio connection is not required for a correlation measurement.
## 10 Appendix

### 10.1 Specifications and permitted operating conditions

#### 10.1.1 Radio transmitter RT 300

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Type of protection</td>
<td>IP64</td>
</tr>
<tr>
<td>Power supply</td>
<td>4 cells, type: mono D 1.5 V, optionally:</td>
</tr>
<tr>
<td></td>
<td>- Rechargeable batteries (accus): NiMH, 5 – 12 Ah</td>
</tr>
<tr>
<td></td>
<td>- Disposable batteries: Alkaline also possible: externally via AC/DC adapter</td>
</tr>
<tr>
<td>Operating time</td>
<td>- Rechargeable batteries (accus): 8 – 20 h (depending on type)</td>
</tr>
<tr>
<td></td>
<td>- Disposable batteries: &gt; 25 h</td>
</tr>
<tr>
<td>Charging time for rechargeable batteries</td>
<td>3 – 7 h (depending on type)</td>
</tr>
<tr>
<td>Weight</td>
<td>5.73 lb. (with batteries)</td>
</tr>
<tr>
<td>Dimensions (Ø × H)</td>
<td>4.33 × 8.46 in. excl. aerial</td>
</tr>
<tr>
<td></td>
<td>4.33 × 12.4 in. incl. aerial</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>14 ºF – 104 ºF</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-4 ºF – 140 ºF</td>
</tr>
<tr>
<td>Data memory</td>
<td>40 min latch</td>
</tr>
<tr>
<td>Communication</td>
<td>Bi-directional radio data</td>
</tr>
<tr>
<td>Frequency band</td>
<td>2.4 – 2.48 GHz</td>
</tr>
<tr>
<td>Processor</td>
<td>- Signal processing: DSP, 24 Bit</td>
</tr>
<tr>
<td></td>
<td>- Data processing: Microcontroller</td>
</tr>
<tr>
<td>Connections</td>
<td>sturdy, non-twist, coded sockets for:</td>
</tr>
<tr>
<td></td>
<td>- charging/external power source</td>
</tr>
<tr>
<td></td>
<td>- Microphone/Hydrophone</td>
</tr>
<tr>
<td></td>
<td>- Headphones (phone jack 0.25 in.)</td>
</tr>
<tr>
<td>Transport</td>
<td>Carrying handle:</td>
</tr>
<tr>
<td></td>
<td>- to be secured in 2 positions</td>
</tr>
<tr>
<td></td>
<td>- 3 attachment points (Tenax connections)</td>
</tr>
<tr>
<td>Secured by</td>
<td>Quick-connect</td>
</tr>
<tr>
<td>Permitted operating environments</td>
<td>Outdoors</td>
</tr>
<tr>
<td>Non-permitted operating environments</td>
<td>In liquids</td>
</tr>
<tr>
<td></td>
<td>In aggressive media</td>
</tr>
<tr>
<td></td>
<td>In potentially explosive areas</td>
</tr>
<tr>
<td>Permissible relative humidity</td>
<td>95 % non condensing</td>
</tr>
</tbody>
</table>
## 10.1.2 Radio receiver RX 300

<table>
<thead>
<tr>
<th>Construction:</th>
<th>Injection-moulded aluminium housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of protection:</td>
<td>IP68</td>
</tr>
<tr>
<td>Power supply:</td>
<td>Externally via USB, i.e. powered by computer</td>
</tr>
<tr>
<td>Weight:</td>
<td>1.1 lb.</td>
</tr>
<tr>
<td>Dimensions (W × H × D):</td>
<td>1.97 × 4.25 × 2.01 in. excl. aerial</td>
</tr>
<tr>
<td></td>
<td>1.97 × 11.81 × 2.01 in. incl. aerial</td>
</tr>
<tr>
<td>Operating temperature:</td>
<td>14 ºF – 104 ºF</td>
</tr>
<tr>
<td>Storage temperature:</td>
<td>-4 ºF – 140 ºF</td>
</tr>
<tr>
<td>Communication:</td>
<td>Bi-directional radio data</td>
</tr>
<tr>
<td>Frequency band:</td>
<td>2.4 – 2.48 GHz</td>
</tr>
<tr>
<td>Processor:</td>
<td>Data processing: microcontroller</td>
</tr>
<tr>
<td>Connection:</td>
<td>Sturdy, non-twist socket for USB cable RX 300 (Connection to computer: USB 1.1 or higher, power consumption 500 mA)</td>
</tr>
<tr>
<td>Cable length:</td>
<td>9.5 ft.</td>
</tr>
<tr>
<td>Secured by:</td>
<td>● Magnet (rubberised)</td>
</tr>
<tr>
<td></td>
<td>● Mounting clip</td>
</tr>
<tr>
<td>Permitted operating environments:</td>
<td>● Outdoors</td>
</tr>
<tr>
<td>Non-permitted operating environments:</td>
<td>● In aggressive media</td>
</tr>
<tr>
<td></td>
<td>● In potentially explosive areas</td>
</tr>
<tr>
<td>Permissible relative humidity:</td>
<td>95 % non condensing</td>
</tr>
</tbody>
</table>
### 10.1.3 Microphone EM 300

<table>
<thead>
<tr>
<th>Construction:</th>
<th>Stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of protection:</td>
<td>IP68</td>
</tr>
<tr>
<td>Weight:</td>
<td>2.43 lb. (incl. cable)</td>
</tr>
<tr>
<td>Dimensions (W × H):</td>
<td>1.77 × 5.91 in.</td>
</tr>
<tr>
<td>Operating temperature:</td>
<td>-4 ºF – 176 ºF</td>
</tr>
<tr>
<td>Storage temperature:</td>
<td>-22 ºF – 194 ºF</td>
</tr>
<tr>
<td>Communication:</td>
<td>Digital via cable with RT 300</td>
</tr>
<tr>
<td>Frequency band:</td>
<td>0 – 5000 Hz</td>
</tr>
<tr>
<td>Processor:</td>
<td>Signal processing: ADC, 2 × 24 Bit</td>
</tr>
<tr>
<td>Cable length:</td>
<td>9.2 ft.</td>
</tr>
<tr>
<td>Other:</td>
<td>• Digital microphone</td>
</tr>
<tr>
<td></td>
<td>• Integrated LEDs (torch function)</td>
</tr>
<tr>
<td>Permitted operating environments:</td>
<td>• Outdoors</td>
</tr>
<tr>
<td></td>
<td>• Submersible to 3.3 ft.</td>
</tr>
<tr>
<td>Non-permitted operating environments:</td>
<td>• In liquids other than water</td>
</tr>
<tr>
<td></td>
<td>• In aggressive media</td>
</tr>
<tr>
<td></td>
<td>• In potentially explosive areas</td>
</tr>
<tr>
<td>Permissible relative humidity:</td>
<td>95 % non condensing</td>
</tr>
</tbody>
</table>

### 10.1.4 Hydrophone HY 300

<table>
<thead>
<tr>
<th>Construction:</th>
<th>Stainless steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of protection:</td>
<td>IP68</td>
</tr>
<tr>
<td>Weight:</td>
<td>1.54 lb. (without cable)</td>
</tr>
<tr>
<td>Dimensions (W × H):</td>
<td>1.77 × 5.91 in.</td>
</tr>
<tr>
<td>Thread:</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Pressure:</td>
<td>16 bar</td>
</tr>
<tr>
<td>Operating temperature:</td>
<td>-4 ºF – 176 ºF</td>
</tr>
<tr>
<td>Storage temperature:</td>
<td>-22 ºF – 194 ºF</td>
</tr>
<tr>
<td>Communication:</td>
<td>Digital via cable with RT 300</td>
</tr>
<tr>
<td>Frequency band:</td>
<td>0 – 3000 Hz</td>
</tr>
<tr>
<td>Processor:</td>
<td>Signal processing: ADC, 2 × 24 Bit</td>
</tr>
<tr>
<td>Cable:</td>
<td>• Separate</td>
</tr>
<tr>
<td></td>
<td>• Length: 9.2 ft.</td>
</tr>
<tr>
<td>Other:</td>
<td>Digital microphone</td>
</tr>
<tr>
<td>Permitted operating environments:</td>
<td>• Outdoors</td>
</tr>
<tr>
<td></td>
<td>• Submersible to 3.3 ft.</td>
</tr>
<tr>
<td>Non-permitted operating environments:</td>
<td>• In liquids other than water</td>
</tr>
<tr>
<td></td>
<td>• In aggressive media</td>
</tr>
<tr>
<td></td>
<td>• In potentially explosive areas</td>
</tr>
<tr>
<td>Permissible relative humidity:</td>
<td>95 % non condensing</td>
</tr>
</tbody>
</table>
10.1.5 Stand for RT 300

<table>
<thead>
<tr>
<th>Construction</th>
<th>Aluminium, zinc-coated steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>6.83 lb.</td>
</tr>
<tr>
<td>Dimensions (W × H)</td>
<td>22.83 × 34.25 in.</td>
</tr>
<tr>
<td>Mounting</td>
<td>Quick-connect for RT 300</td>
</tr>
<tr>
<td>Other:</td>
<td>• Adjustable telescopic rod tilt angle (15° increments)</td>
</tr>
<tr>
<td></td>
<td>• Microphone holder</td>
</tr>
</tbody>
</table>

10.1.6 SeCorr 300 software

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Windows 2000, XP, Vista</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM:</td>
<td>512 MB minimum (1024 MB recommended)</td>
</tr>
<tr>
<td>Processor</td>
<td>1.2 GHz minimum (1.8 GHz recommended)</td>
</tr>
</tbody>
</table>

10.1.7 SeCorr 300 system (system features)

| Range:                | • Built-up area: approx. 650 ft. |
| Number of RT 300 that can be connected: | 2 |
10.2 RT 300 display

10.2.1 Symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Battery symbol" /> <img src="image" alt="Battery symbol" /></td>
<td>Battery symbol, full (left) or empty (right)</td>
</tr>
<tr>
<td><img src="image" alt="Loudspeaker symbol" /></td>
<td>Loudspeaker symbol (always crossed out)</td>
</tr>
<tr>
<td><img src="image" alt="Filter symbol" /></td>
<td>Filter symbol</td>
</tr>
<tr>
<td><img src="image" alt="Synchronisation symbol" /></td>
<td>Synchronisation symbol</td>
</tr>
<tr>
<td><img src="image" alt="Hearing protection symbol" /></td>
<td>Hearing protection symbol</td>
</tr>
</tbody>
</table>

10.2.2 Status messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACU</td>
<td>Powered by accumulator</td>
</tr>
<tr>
<td>BAT</td>
<td>Powered by battery</td>
</tr>
<tr>
<td>DSP</td>
<td>Powered by AC/DC adapter</td>
</tr>
<tr>
<td>EM ... 300</td>
<td>Microphone EM 300 detected</td>
</tr>
<tr>
<td>ERR</td>
<td>Error code display</td>
</tr>
<tr>
<td>HY ... 300</td>
<td>Hydrophone HY 300 detected</td>
</tr>
<tr>
<td>KHZ</td>
<td>Kilohertz unit [kHz]</td>
</tr>
<tr>
<td>PRO</td>
<td>Adjusting the hearing protection</td>
</tr>
<tr>
<td>T 0</td>
<td>Battery temperature when charging below 0 ºC (32 ºF)</td>
</tr>
<tr>
<td>T45</td>
<td>Battery temperature when charging above 45 ºC (113 ºF)</td>
</tr>
<tr>
<td>10V</td>
<td>Charging voltage reduced to 10 V due to under-voltage (charging time doubles)</td>
</tr>
</tbody>
</table>
10.3 Accessories

RT 300 case
Art. no.: ZD32-10000
• for transporting and storing two RT 300 including accessories
• RT 300 batteries can be recharged from outside
• with large free-running rollers

RX 300 case
Art. no.: ZD33-10000
• for transporting and storing a notebook and the RX 300 including accessories
• Case inlay with sections for various notebooks (e.g. DELL Latitude D820, COLIBRI X6)

Hydrophone HY 300 equipment set
Art. no.: HY30-S0001
• includes two HY 300 units, two hydrophone cables and two adapters for mounting on underground hydrants, as well as one rotary tool
• comes complete in carrying case
AC/DC adapter M300
12 V = / 5 A EURO
Art. no.: LD30-10000

- for charging the RT 300 batteries in the case
- for charging individual RT 300 from the mains

Vehicle cable M300
Art. no.: ZL08-10100

- with jack and integrated fuse (5 A)
- for charging the RT 300 batteries in the case
- for charging individual RT 300 from the 12-V car battery

Vehicle cable M300 mounting
Art. no.: ZL08-10200

- for charging the RT 300 rechargeable batteries or individual RT 300 units from the 12-V car battery
- permanently connects unit to the vehicle electrical system

Headphones K3
Art. no.: EZ13-11000

- for listening to noises on the RT 300
M10 main pipe adapter  
Art. no.: ZM02-10000  
- to permanently connect a microphone to slide gates or hydrants

M10 house connection adapter  
Art. no.: ZM04-10000  
- to permanently connect a microphone to a house shut-off valve

Cover hammer  
Art. no.: 7222-0001  
- for opening covers

Magnetic cover lifter  
Art. no.: 7222-0002  
- for undoing and lifting covers

8-pin hydrophone cable  
Art. no.: HY30-Z0100  
- for transferring data between HY 300 and RT 300

RX 300 vehicle aerial  
Art. no.: RX30-Z0400  
- for permanent mounting on vehicle  
  - 3 m in length  
  - 5 m length also available
10.4 Declarations of conformity

EC Declaration of Conformity

Product: RT 300
Intended use: Radio transmitter for leak detection system SeCorr® 300
Manufacturer: Hermann Sewerin GmbH
Address: Robert-Bosch-Str. 3
33334 Gütersloh - Germany

The product complies with the following directives:

1999/5/EC

For evaluation of conformity the following harmonised standards apply:

EN 301489-1
EN 60950-1
EN 301489-6 (only Fab-No. 0300X)
EN 55022 (only Fab-No. 0300X)
EN 301489-17 (only Fab-No. 0301X)
FCC Part 15 B (only Fab-No. 0301X)

Gütersloh, 2009-03-05

S. Sewerin
Dr. S. Sewerin
(General Manager)
EC Declaration of Conformity

Product: RX 300
Intended use: Radio receiver for leak detection system SeCorr® 300
Manufacturer: Hermann Sewerin GmbH
Address: Robert-Bosch-Str. 3
33334 Gütersloh - Germany

The product complies with the following directives:

1999/5/EC

For evaluation of conformity the following harmonised standards apply:

- EN 301489-1
- EN 60950-1
- EN 301489-6 (only Fab-No. 0310X)
- EN 55022 (only Fab-No. 0310X)
- EN 301489-17 (only Fab-No. 0311X)
- FCC Part 15 B (only Fab-No. 0311X)

Gütersloh, 2009-03-05

Dr. S. Sewerin
(General Manager)
10.5 FCC/IC Compliance statements

The RT 300 and RX 300 include modules with the following identification:

- FCC ID: WSP860221
- IC: 7994A-860221

Radio receiver RX 300

The RX 300 has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This Class B digital apparatus complies with Canadian ICES-003.

Radio transmitter RT 300

The RT 300 complies with part 15.103 (c) Exempted devices of the FCC Rules.
10.6 Advice on disposal

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

<table>
<thead>
<tr>
<th>Description of waste</th>
<th>Allocated EWC waste code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device</td>
<td>16 02 13</td>
</tr>
<tr>
<td>Battery, accumulator</td>
<td>16 06 05</td>
</tr>
</tbody>
</table>

**Old instruments**

Old instruments can be returned to Hermann Sewerin GmbH. We will arrange for the appliance to be disposed of appropriately by certified specialist contractors free of charge.
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Fig. 10: Radio receiver RX 300, front view with aerial

Aerial connector
Guide rail for mounting clip
Holder for mounting clip

Fig. 11: Radio receiver RX 300, back view without aerial