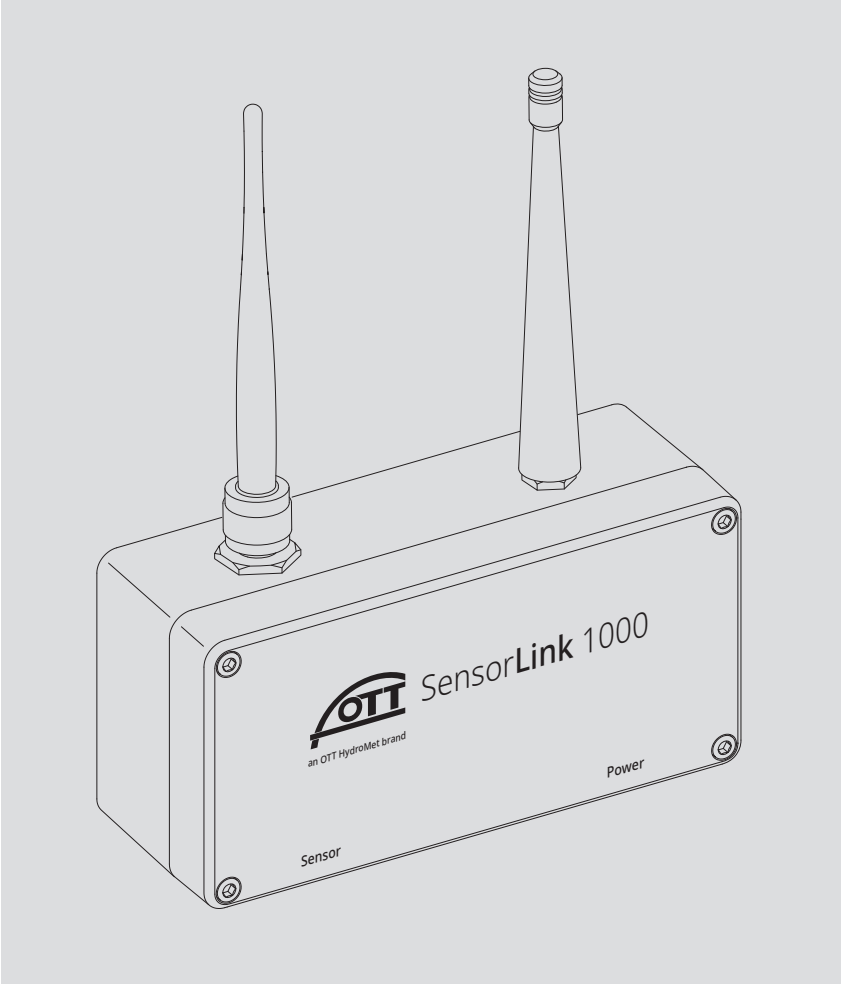
Operating instructions

Compact Datalogger OTT SensorLink 1000

English



We reserve the right to make technical changes and improvements without notice.

Table of contents

1 Scope of supply

▶ **OTT SensorLink 1000**	– 1 Compact datalogger with integrated cellular modem for connecting the OTT RLS 500 radar sensor; two detachable short rod antennas (for cellular modem and Bluetooth); installation sockets for connecting the OTT RLS 500 and an optional solar panel; options for power supply, cellular modem, preset measured value units and accessories included in the scope of supply → see Chapter 2, *Order numbers and variant code* – 1 Factory acceptance test certificate (FAT)

2 Order numbers and variant code

2.1 Valid for: all countries worldwide; exception USA

▶ **OTT SensorLink 1000**	**Compact datalogger**		*5546000190*
Variant code (supplementary to order number)			–□–□–□–□–□–□–□□–□–□–□
– Power supply			
· Type	battery powered	B	
	solar powered [1]	S	
· Battery included in scope of supply[2]	no	0	
	yes	B	
· Length of connection cable for Solar panel [3]	0.5 meters	1	
	10 meters	2	
– Cellular modem	4G/2G modem; excl. USA	MA	
	4G CAT-M1/LTE-M; for global use	MC	
	4G CAT-M1; for USA	MF	
– Preset measurement units	metric	M	
	imperial	I	
– Installation accessories	for DIN-Rail mounting	D	
	for wall mounting	W	
	for pole mounting	P	
– Radar sensor	w/o	0	
	with OTT RLS 500	RL	
· Length of connecting cable to OTT RLS 500 [4]	2 meters	02	
	4 meters	04	
	8 meters	08	
	20 meters	20	
· Installation accessories for OTT RLS 500 [4]	w/o	0	
	with housing bracket	M	
· Operating instructions OTT RLS 500 [4]	w/o	0	
	German	D	
	English	E	
	French	F	
	Spanish	S	
– Operating instructions OTT SensorLink 1000	w/o	0	
	German	D	
	English	E	
	French	F	
	Spanish	S	

[1] "Solar powered" variant includes an integrated NiMH-rechargeable battery and a 5 Watt solar panel
[2] With the "battery powered" variant, you can choose wether a battery is already included in the scope of supply; type of power supply → B
[3] With the "solar powered" variant you can choose the length of the connection cable for the solar panel; type of power supply → S
[4] With variant "radar sensor" → RL (with OTT RLS 500)

▶ **Accessories**	**Solar panel** – 5 Watt – incl. 0.5 meters connection cable	A200733522
	Extension cable for solar panel – Length: 10 meters	A200800016
	Y-adapter for connection cable – for connecting 2 solar panels	A200800025
▶ **Spare parts/Consumables**	**Lithium battery** – with plug connector – 7.2 V / 13 Ah – incl. spare seal for housing cover	9780002692
	NiMH-rechargeable battery – with plug connector – 6 V / 3,3 Ah – incl. spare seal for housing cover	A800000275
	Short rod antenna cellular radio – to screw on	A900000593
	Short rod antenna Bluetooth – to screw on	9798016995
	Desiccant – 1 sachet (2.65 g silica gel)	9710020495

Example

OTT SensorLink 1000
– solar powered
– incl. 0.5 meters connection cable for the solar panel
– 4G CAT-M1/LTE-M modem
– metric measurement units
– installation accessories for poles
– with radar sensor OTT RLS 500
– 2 meters connecting cable to the OTT RLS 500
– with housing bracket for OTT RLS 500
– Operating instructions OTT RLS 500 in German
– Operating instructions OTT SensorLink1000 in German

→ Order number+ variant code: 5546000190–S–1–MC–M–P–RL–02–M–D–D

2.2 Valid for: USA

▶ **OTT SensorLink 1000**	**Compact datalogger**		SenL1k
Variant code (supplementary to order number)			–□–□–□–□–□
– Power supply			
· Type	battery powered	B	
	solar powered[1]	S	
· Battery included in scope of supply [2]	no		0
	yes		B
	(solar powered)		1
– Cellular modem	4G/2G modem; excl. USA		MA
	4G CAT-M1/LTE-M; for global use		MC
	4G CAT-M1; for USA		MF
– Preset measurement units	metric		M
	imperial		I
– Installation accessories	for DIN-Rail mounting		D
	for wall mounting		W
	for pole mounting		P
▶ **Operating instructions OTT SensorLink 1000**	English		SenL1k-Manual-E
	German		SenL1k-Manual-D
	French		SenL1k-Manual-F
	Spanish		SenL1k-Manual-S
▶ **Accessories**	**Extension cable for solar panel** – Length: 10 m / 33 ft		SenL1k-S-Cbl—33ft
	Connecting cable to the OTT RLS 500		RLS500CBL
	Variant code (supplementary to order number)		–□–□
	– M9-socket ↔ M9 plug		P
	– Cable lengths 2 m / 7 ft		2
	4 m / 14 ft		4
	8 m / 27 ft		8
	20 m/65 ft		20
▶ **Spare parts/Consumables**	**Lithium battery** – with plug connector – 7.2 V / 13 Ah – incl. spare seal for housing cover		SenL1k-B-Battery
	NiMH-rechargeable battery – with plug connector – 6 V / 3.3 Ah – incl. spare seal for housing cover – incl. spare sachet with desiccant		SenL1k-S-Battery
	Desiccant – 1 sachet (2.65 g silica gel)		SenL1k-Dessicant

Examples

OTT SensorLink 1000
– solar powered
– 4G CAT-M1/LTE-M modem
– imperia measurement units
– Installation accessories for pipes
→ Order number + variant code: SenL1k–S–1–MC–I–P

Connecting cable to the OTT RLS 500
– M9-socket ↔ M9-plug
– 4 m / 14 ft cable length
→ Order number + variant code: SenL1k–CBL–P–4

[1] "Solar powered" variant includes an integrated NiMH-rechargeable battery and a 5 Watt solar panel incl. 0.5 m/1,65 ft connection cable
[2] With the "battery powered" variant, you can choose wether a battery is already included in the scope of supply; type of power supply → B

3 Basic safety information

3.1 Markings and symbols used in the instruction

■ This bullet point indicates an instruction relating to a specific action.

▶ This bullet point indicates an item in a list.
– This bullet point indicates a sub-item in a list.

Remarks: …
▶ Information on easier and more efficient work
▶ Further information
▶ Definition

Please note: …
Information that prevents potential damage or malfunction on the OTT SensorLink 1000.

3.2 Explanation on safety information used

The safety information used in these operating instructions is classified according to the nature and severity of a particular hazard. The hazard levels defined are indicated by the signal words **Warning/Caution** and corresponding pictograms **orange/yellow triangle** in these operating instructions:

WARNING **Warning of a hazardous situation with a medium level of risk**

The safety information specifies the nature and source of the hazard.
If you fail to carry out the specified actions, the hazardous situation can result in **death** or **serious injuries**.

▶ Action to prevent the hazardous situation!
▶ Action to prevent the hazardous situation!

CAUTION **Warning of a hazardous situation with a low level of risk**

The safety information specifies the nature and source of the hazard.
If you fail to carry out the specified actions, the hazardous situation can result in **minor** or **moderately severe injuries**.

▶ Action to prevent the hazardous situation!
▶ Action to prevent the hazardous situation!

3.3 Note the following for safe and trouble-free operation of the OTT SensorLink 1000

- This manual is intended for professional specialist personnel who carry out work with hydrological dataloggers.
- Read these operating instructions before using the OTT SensorLink 1000 for the first time! Make yourself completely familiar with the installation and operation of the OTT SensorLink 1000 and its accessories. Retain these operating instructions for later reference.
- Please also read and observe the operating instructions for the OTT RLS 500 radar sensor connected to the data collector!

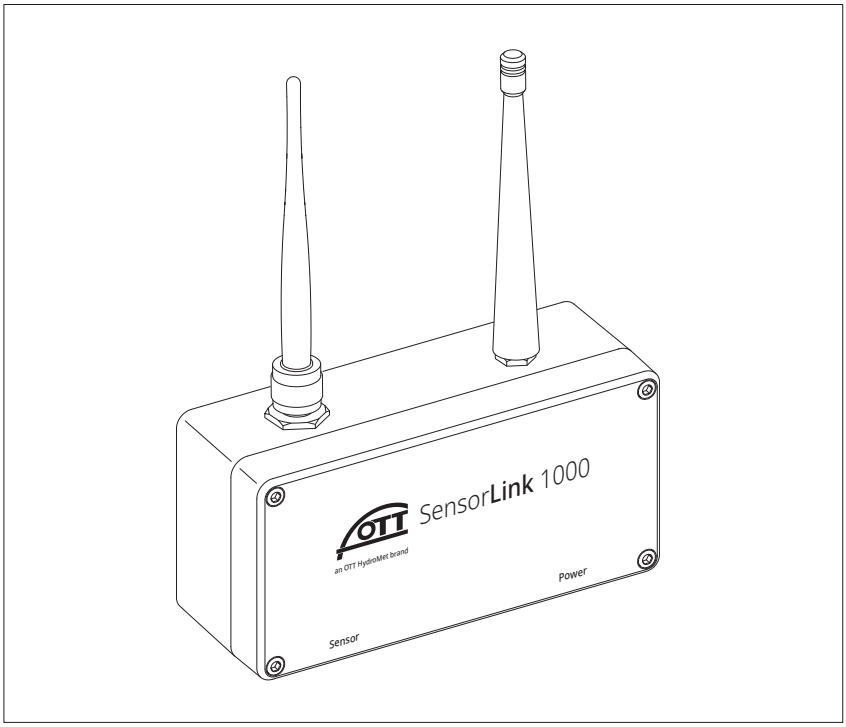
Intended use

- Only use the OTT SensorLink 1000 as described in these operating instuctions! The intended use of the OTT SensorLink 1000 is the cyclical determination and storage of hydrological measured values and the transmission of this data via a cellular network. Any other use is not permitted!
  Further information → see Chapter 4, *Introduction*.
- Only install the OTT SensorLink 1000, if you have the appropriate qualification! If required, OTT HydroMet can provide trainings.
  Further information → see Chapter *5, Installing the OTT SensorLink 1000*.
- Note all the detailed safety and warning information given within the individual work steps during installation and maintenance!
  Further information on the structure and design of warning information → see-Chapter 3.2, *Explanation on saftey information used*.
- When operating an OTT SensorLink 1000, keep a distance between the cellular antenna and
  – persons and
  – other electrical equipment/antennas of at least 0.20 meters!
- It is essential to comply with the electrical, mechanical, and climatic specifcations given in the Technical Data section!
  Further information → see Chapter13, *Technical Data*.
- Do not make any changes or retrofits to the OTT SensorLink 1000! If changes or retrofits are made, all guarantee claims are voided. Furthermore, the radio approval required for its operation is void!
- Check the OTT SensorLink 1000 at regular intervals for heavier soiling, secure fastening, corrosion of the metal parts, mechanical damage and - if present - correct alignment of the solar panel!
  Further information → see Chapter 15, *Maintenance work*.
- Have a faulty OTT SensorLink 1000 inspected and repaired by our repair center! Never make any repairs yourself under any circumstances
  Further information → see Chapter 18, *Repair*.
- After decommissioning, remove the integrated lithium battery/NiMH rechargeable battery and dispose of it separately. Never dispose of batteries/rechargeable batteries in normal household waste!
  Further information → see Chapter 19, *Notes about the disposal of old units*.
- Dispose of the OTT SensorLink 1000 properly after taking out of service! Never put the OTT SensorLink 1000 into the normal household waste! Remove the integrated lithium battery/NiMH rechargeable battery before disposal and dispose of it separately.
  Further information → see Chapter 12, *Note about the disposal of old units*.

4 Introduction

The OTT SensorLink 1000 is an IP-capable (Internet Protocol) compact datalogger specially designed for hydrometry. It is designed for connection to an OTT RLS 500 radar sensor. By combining these components, a compact and self-sufficient measuring station for precise, non-contact determination of water levels in surface waters can be realised.

Fig. 1: Compact datalogger OTT SensorLink 1000.



The operating parameters are set using the operating software "LinkComm" of OTT HydroMet. This software allows the system to be conveniently and flexibly tailored to the different requirements of a measuring site. LinkComm is available for PCs running the Microsoft Windows operating system as well as for Apple macOS. It is also available as a mobile app for smartphones and tablets (operating systems Android and iOS).

Local communication on site is carried out via the Bluetooth standard BLE (Bluetooth Low Energy).

The OTT SensorLink 1000 includes a built-in cellular modem, that is used for remote data transfer and remote parameterizing via the cellular network. The cellular modem is available for worldwide use in two variants for the 4G/2G [1)] or LTE Cat-M1 (LTE-M) cellular transmission services. A special LTE Cat-M1 version is available for use in the USA. Remote data transmission can be carried out either via SMS short messages or IP data communication.

Depending on the individual conditions at the measuring site, the compact data logger can be installed on a pole, a wall or on a DIN rail in the control cabinet. The appropriate installation accessories can be selected during the ordering process using a variant code.

The OTT SensorLink 1000 is available with two different types of power supply: battery-powered (lithium battery) or solar-powered via a 5 watt solar panel in combination with a NiMH rechargeable battery. The service life [2)] of the battery-powered device variant is at least 10 years with one remote data transmission per day (depending on other parameters).

[1)] excl. USA

[2)] at 20 °C ambient temperature

5 Installing the OTT SensorLink 1000

WARNING

Danger of explosion due to spark formation and electrostatic discharge!

The use of the OTT SensorLink 1000 in explosive atmospheres can lead to the danger of iginition of this atmosphere. An explosion resulting from this involves the risk of very severe material and personal damage.

- **Never** operate the OTT SensorLink 1000 in explosive areas (e.g. in sewers). The OTT SensorLink 1000 is not equipped with EX-protection (Explosion protection)!

WARNING

Health risk due to malfunctioning pacemakers!

Electromagnetic fields at the cellular antenna of the OTT SensorLink 1000 can cause pacemakers to malfunction. This can cause life-threatening conditions in pacemaker wearers.

- When installing and operating the OTT SensorLink 1000 always maintain a safe distance of 0.2 meters between the cellular antenna and persons.

Remarks:

- Power supply "solar powered": The OTT SensorLink 1000 starts measuring operation within a few seconds of the solar panel being connected during initial commissioning (no on/off switch available).
- Power supply "battery powered": The OTT SensorLink 1000 is in continuous operation with energy-saving settings (no on/off switch available).

The OTT SensorLink 1000 is installed in max. five steps:

- Insert the SIM card → Chapter 5.1
- Connecting the cellular- and Bluetooth antenna → Chapter 5.2
- Mounting the housing → Chapter 5.3
  – on a wall
  – at a pipe
  – on a DIN-Rail
- Connecting the radar sensor OTT RLS 500 → Chapter 5.4
- Optional: Mounting and connecting the solar panel → Chapter 5.5

The OTT SensorLink 1000 housing can be installed either outdoors, indoors or in a control cabinet.

5.1 Insert the SIM card

For communication and data transmission over the cellular network, you will need a suitable SIM card for the cellular modem integrated in the OTT SensorLink 1000 (mini-SIM card type).

Remark: Insert the SIM card before installing the OTT SensorLink 1000. This offers the advantage that this can be done conveniently and regardless of the weather (indoors) on a workbench.

Please note:

- Only insert the SIM card in completely dry ambient conditions! If possible, do this indoors (e.g. in a workshop). Do not allow any moisture to penetrate the device housing!
- Be careful when working inside the housing of the appliance and do not touch any electronic components on the circuit board!

How to insert the SIM card

- Loosen the four hexagon socket screws (3 mm; captive) in the housing cover.
- Lift off the housing cover and carefully place it right of the bottom part of the housing; in doing so, avoid tensile stress on the connection cable of the lithium battery/NiMH rechargeable battery.
- Temporarily disconnect the lithium battery/NiMH rechargeable battery (see Chapter 6.2)

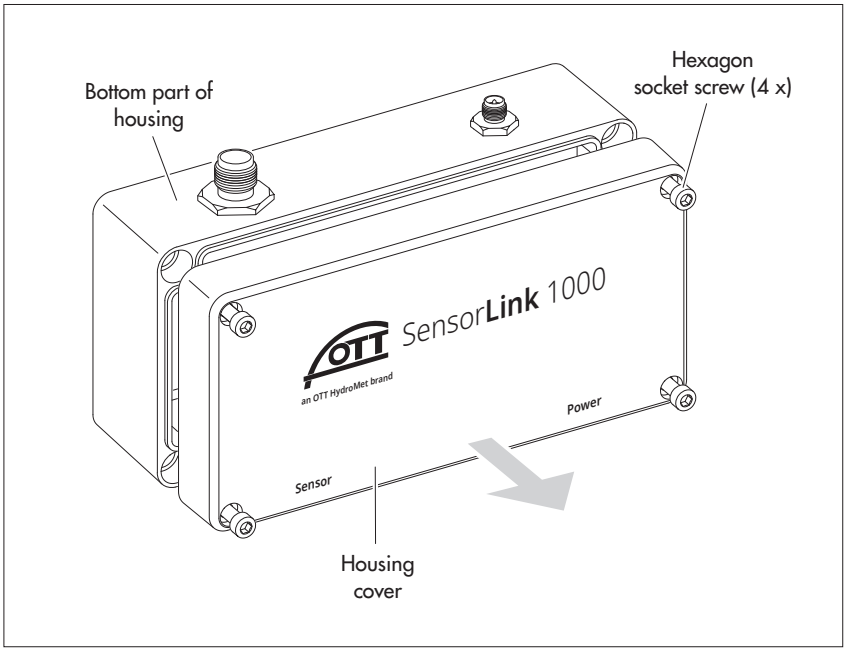


Fig. 2: Remove the housing cover of the OTT SensorLink 1000.

- Slide the latch of the SIM card holder towards the two installation sockets (sensor/power); see Fig. 3 left, step 1.
- Flip the SIM card holder upwards; see Fig. 3 left, step 2.
- Make sure not to touch the gold-coloured contacts of the SIM card. Insert the SIM card into the SIM card holder (with the bevelled edge pointing left); see Fig. 3 in the middle. Make sure the SIM card is fully inserted and engaged!

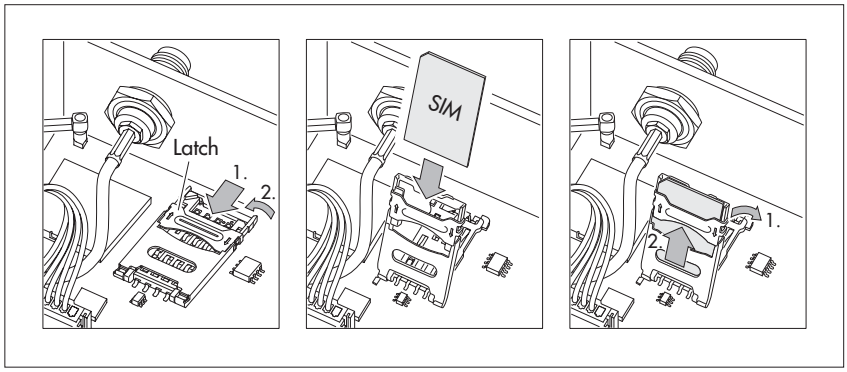


Fig. 3: Insert SIM card into the SIM card holder of the OTT SensorLink 1000.

- Flip the SIM card holder downwards; see Fig. 3 right, step 1.
- Slide the SIM card holder latch in the direction of the two antenna connections; see Fig. 3 right, step 2.
- Reconnect the power supply (see Chapter 6.2).
- Replace the housing cover on the bottom part of the housing.
- Carefully tighten the four hexagon socket screws again (max. 4 Nm).

! **Please note:** If you have to open the housing of the OTT SensorLink 1000 after a longer operating phase (e.g. to replace the SIM card), the rubber seal in the housing cover must be checked for wear/potential damage and replaced if necessary.

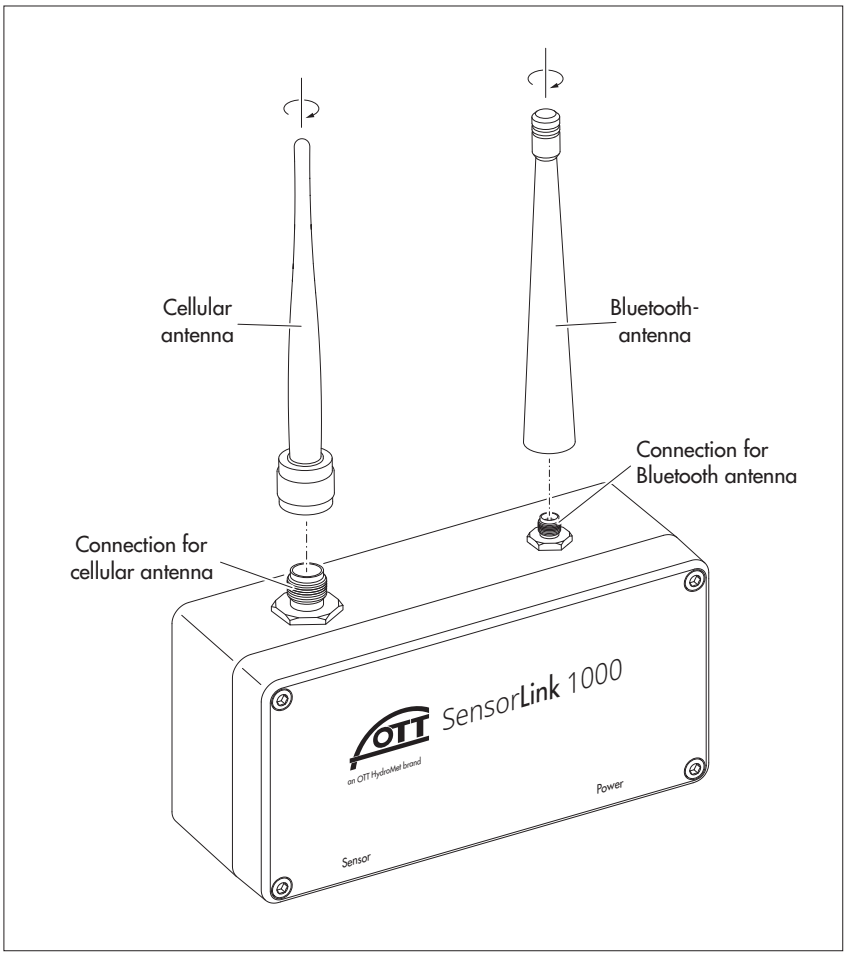
5.2 Connecting the cellular and Bluetooth antenna

The two short rod antennas for cellular radio and Bluetooth are included with the OTT SensorLink 1000. They are not connected on delivery and are enclosed separately in the transport packaging.

How to connect the cellular and Bluetooth antenna

- Carefully screw the cellular antenna onto the left antenna connection without using any tools.
- Carefully screw the Bluetooth antenna onto the right antenna connection without using any tools.

Fig. 4: connecting the cellular- and Bluetooth antenna with the OTT SensorLink 1000.



Please note: Do not use any antennas other than the two short rod antennas supplied by the factory. Do not use any extension cables to connect the antennas. Otherwise the radio licence required for operation will be invalidated!

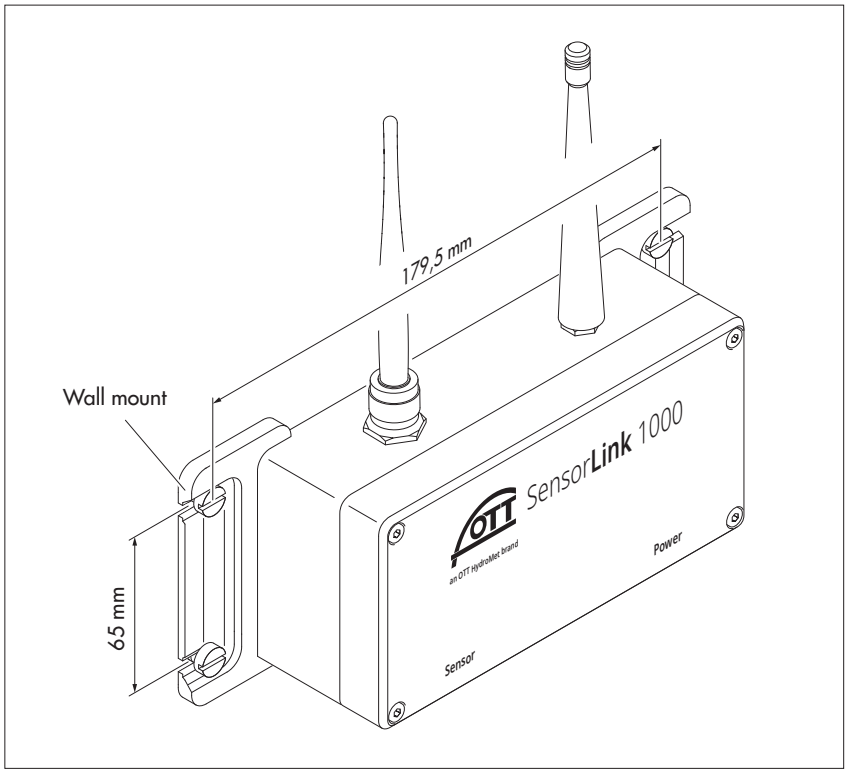
5.3 Mounting the housing

Variant A

▶ Variant code for installation accessories: "W" (for wall mounting)

■ Attach the wall mount of the OTT SensorLink 1000 to a suitable surface using 4 screws (Ø: 3,5 … 4.5 mm). Select suitable wood screws (+ dowels) or machine screws (+ nuts) depending on the surface.

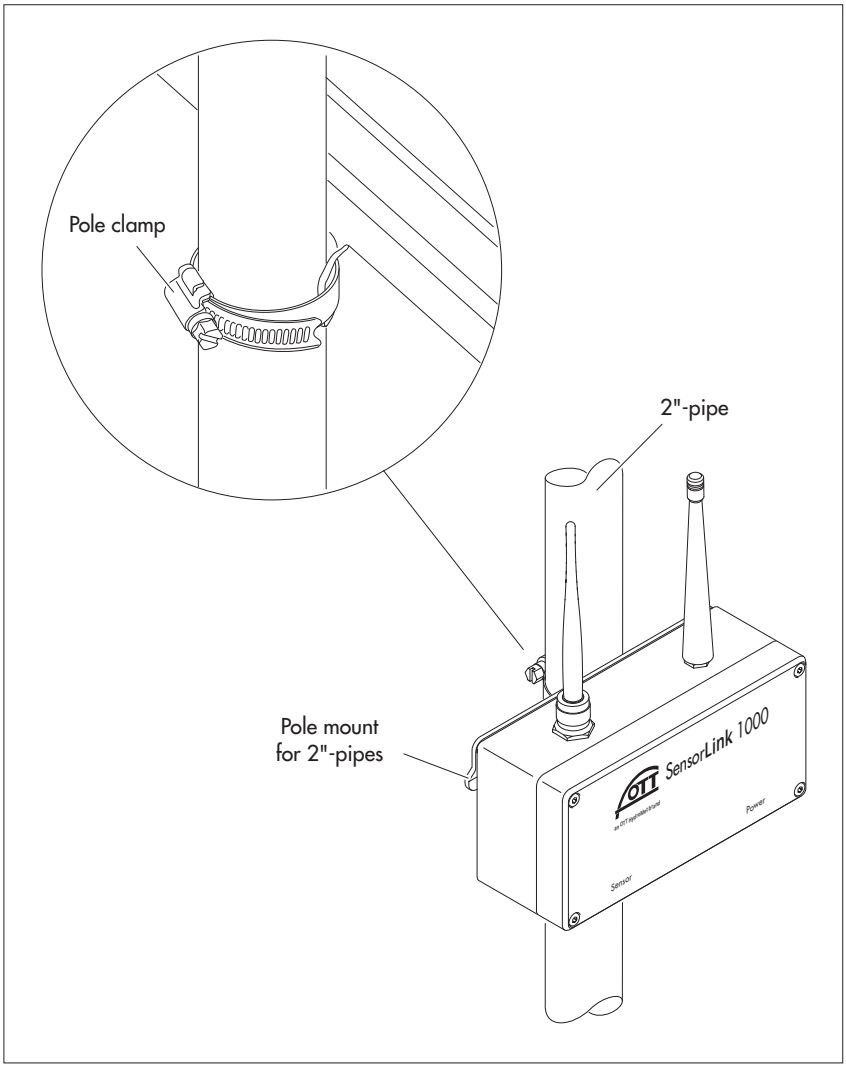
Fig. 5: mounting the OTT SensorLink 1000 housing – Variant A.



Variant B

- ▶ Variant code for installation accessories: "P" (for poles)
- ■ Fix the pole mount at the back of the OTT SensorLink 1000 to a pole using the included pole clamp (for Ø: 1.5" … 2"; with optional pole clamp (accessories) for Ø: 2" … 3").

Fig. 6: mounting the OTT SensorLink 1000 housing – Variant B.



Variant C

- ▶ Variant code for installation accessories: "D" (for DIN-Rail)
- ■ Attach the OTT SensorLink 1000 at the back of the device to a standard DIN-Rail (35 mm) using DIN-Rail adapter. Press the bottom of the device backwards until the DIN-Rail adapter audibly clicks into place.

! **Please note:** When installing the OTT SensorLink 1000 in a metal cabinet, a limited cellular coverage must be taken into account!

5.4 Connecting the radar sensor OTT RLS 500

The electrical connection is made via a factory-assembled connecting cable with M9 subminiature connectors (accessories). The connecting cable is used for both power supply and data transmission.

- Align the cable plug in the correct position (note the coding nose) and place it on the the installation socket of the OTT SensorLink 1000; see Fig. 7, step 1.
- Tighten the union nut by hand; see Fig. 7, step 2.

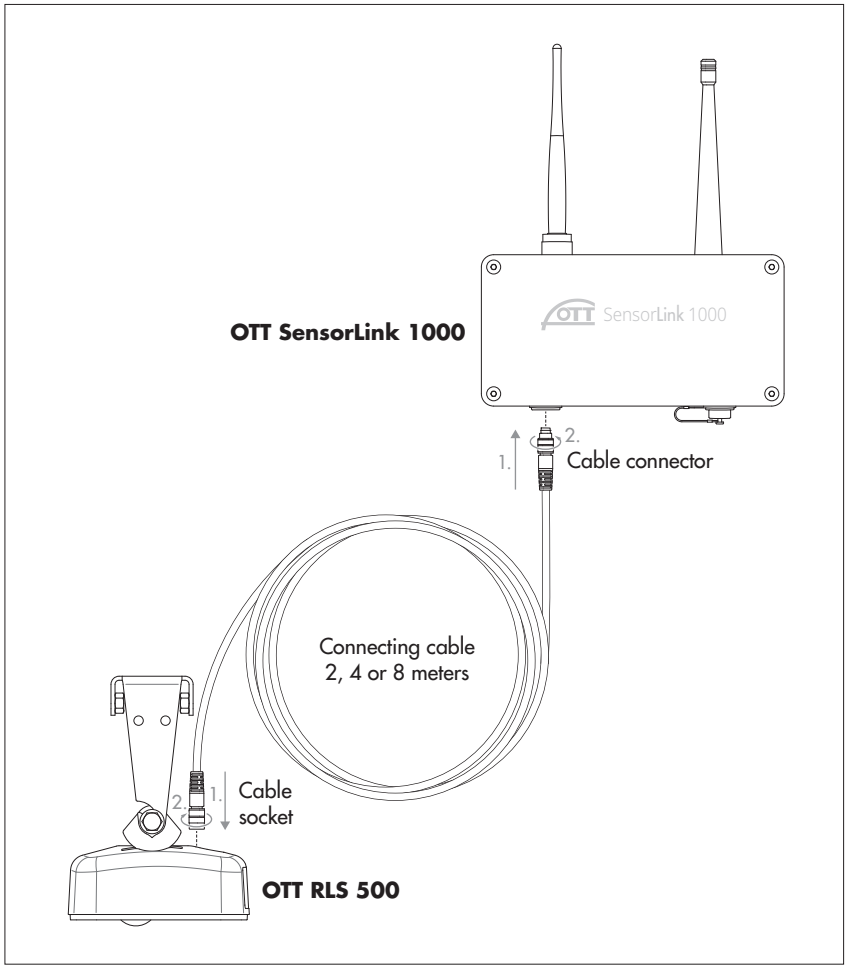
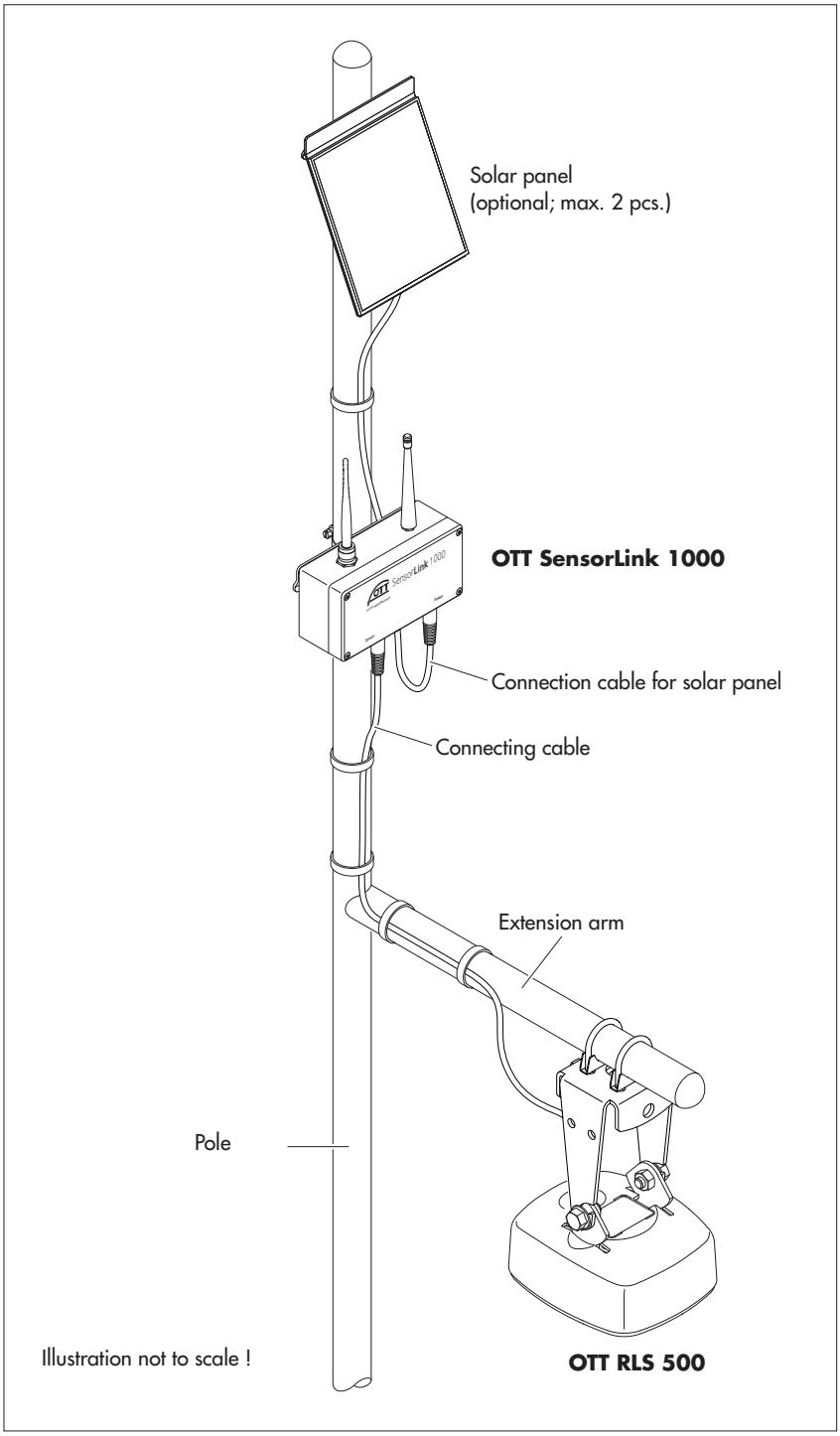


Fig. 7: Connecting the OTT RLS 500 to the OTT SensorLink 1000.

Fig. 8: Example installation of an autonomous level measuring station; consisting of a compact datalogger OTT SensorLink 1000, radarsensor OTT RLS 500 and an optional 5 watt solar panel.

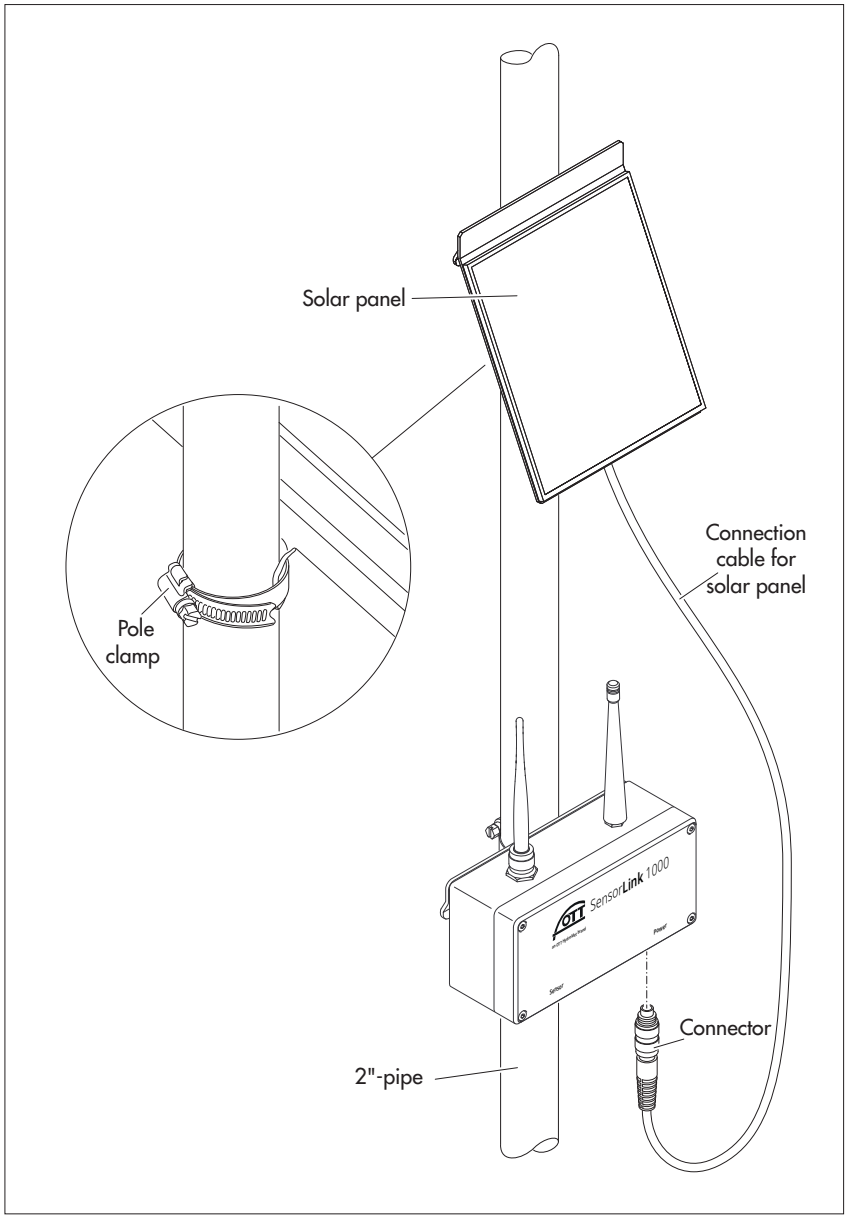


5.5 Optional: mounting and connecting the solar panel

▶ Variant code for power supply, type: "S" (solar powered)

With a solar-powered OTT SensorLink 1000, the 5 watt solar panel must also be mounted and connected to the OTT SensorLink 1000.

Fig. 9: mounting the solar panel and connecting it to the OTT SensorLink 1000.



- Fix the pole mount at the back of the OTT SensorLink 1000 to a pole using the included pole clamp (for Ø: 1.5" … 2"; with optional pole clamp (accessories) for Ø: 2" … 3"); orientate the solar panel to the south (in the southern hemisphere: to the north).
- Remove the cover cap on the installation socket (power) of the OTT SensorLink 1000.
- Align the plug of the solar panel connection cable in the correct position (note the coding nose) and place it on the installation socket.
- Carefully tighten the union nut of the plug by hand (without using a tool).
- Fasten the solar panel connection cable to the pipe with cable ties.

Remark: At measuring points with limited direct sunlight (shading, frequent fog, unfavourable orientation), it is possible to connect two 5 watt solar panels in parallel if required. For this purpose, the Y-adapter for solar panel connection cable (see accessories) is required. In this case, thw two solar panel connection cables must be connected to the Y-adapter and the adapter itself to the OTT SensorLink 1000.

6 Controlling the power supply and exchange of lithium battery

WARNING

Fire and explosion hazard due to improper handling of batteries/rechargeable batteries!

- Use only
  – lithium battery (7.2 V / 13 Ah) or
  – NiMH rechargeable battery (6 V / 3.3 Ah)
  (as specified by OTT HydroMet under "Consumables"!
- Do not charge lithium batteries!
- Avoid electrical short circuits!
- Avoid mechanical damages!
- Never open the battery/rechargeable battery!
- Do not dispose of the battery/rechargeable battery in a fire and do not expose to temperatures above +100 °C !
- Do not carry out any soldering work on the battery/rechargeable battery!
- Avoid tensile stress on the battery/rechargeable battery connection cable!
- Protect the battery/rechargeable battery from moisture!

Power supply options

The OTT SensorLink 1000 is optionally available with two different types of power supply (see accessories):

- **battery powered:** with lithium battery; 7.2 V / 13 Ah; not chargeable; exchangeable;
- **solar powered:** rechargeable NiMH battery, combined with a 5 Watt solar panel; 6 V / 3.3 Ah; exchangeable.

The type of power supply cannot be changed at a later date (no change between battery/rechargeable battery operation possible)!

Battery life with lithium battery

With a polling interval of 1 hour, one data transmission per day and one local communication (BLE) per month: at least 10 years.

Please note: Dispose of discharged lithium battery properly! Also of a potentially defective NiMH rechargeable battery. Do not dispose of in normal household waste!

Remarks:

- Power supply "solar powered": The OTT SensorLink 1000 starts measuring operation within a few seconds of the solar panel being connected during initial commissioning (no on/off switch available).
- Power supply "battery powered": The OTT SensorLink 1000 is in continuous operation with energy-saving settings (no on/off switch available).
- If the OTT SensorLink 1000 is to be taken out of operation → disconnect battery/rechargeable battery. This prevents premature draining of the battery/rechargeable battery and the storage of unusable measured values.
- During (later) transport of the OTT SensorLink 1000 → disconnect battery/rechargeable battery. This prevents premature draining of the battery/rechargeable battery and the storage of unusable measured values.

6.1 Checking the battery status of the lithium battery

- Use the "LinkComm" operating software to establish a communication conntection to the OTT SensorLink 1000 (see Chapter 7.2).
- If not yet selected: click on the "Dashbord" button.
- Click on the "Measure All" button → the OTT SensorLink 1000 starts an instantaneous value measurement → the measured value "Battery consumption" shows the energy drawn from the battery so far in milliampere hours (mAh).
- Replacement indicator: drawn milliampere hours > approx. 10 000 mAh → exchange the lithium battery (for technical reasons, with lithium batteries, the level of the displayed battery voltage cannot be used as replacement indicator).
- Click on the "Disconnect" button.
- Close LinkComm.

6.2 Exchanging the lithium battery/NiMH rechargeable battery

A discharged lithium battery or a defective NiMH rechargeable battery can be replaced on site without uninstalling the OTT SensorLink 1000. A new lithium battery/a new NiMH rechargeable battery is available as a spare part from OTT HydroMet; see Spare parts/consumables.

Remark: If there is no difference in the procedure between a lithium battery and a NiMH rechargeable battery, the following steps are described in text form using the lithium battery as an example. They apply equally to a NiMH rechargeable battery.

Please note: Be careful when working inside the housing and do not touch any electronic components on the PCB!

How to exchange the lithium battery (the NiHM rechargeable battery)

- Loosen four hexagon socket screws (captive; 3 mm) in the housing cover.
- Lift off the housing cover and carefully place it to the right of the bottom part of the housing; avoid pulling on the connecting cable of the lithium battery when doing so.

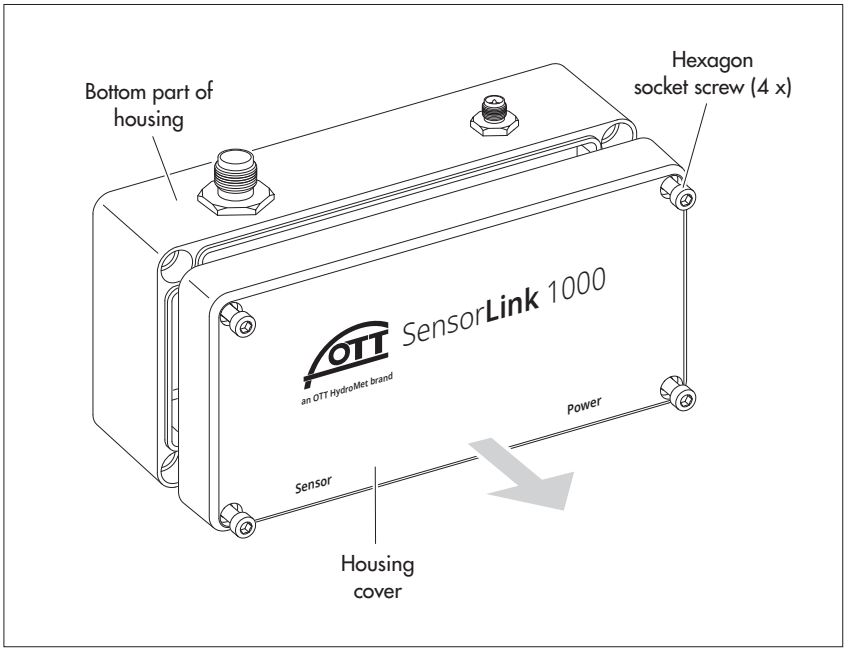
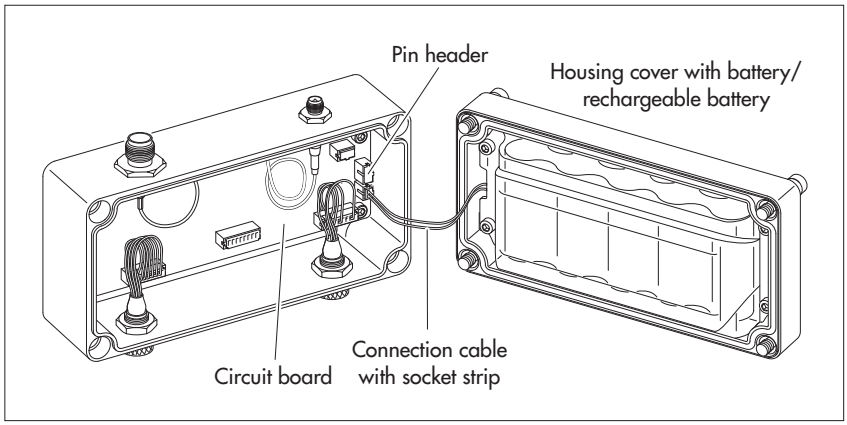


Fig. 10: removing the housing cover of the OTT SensorLink 1000.

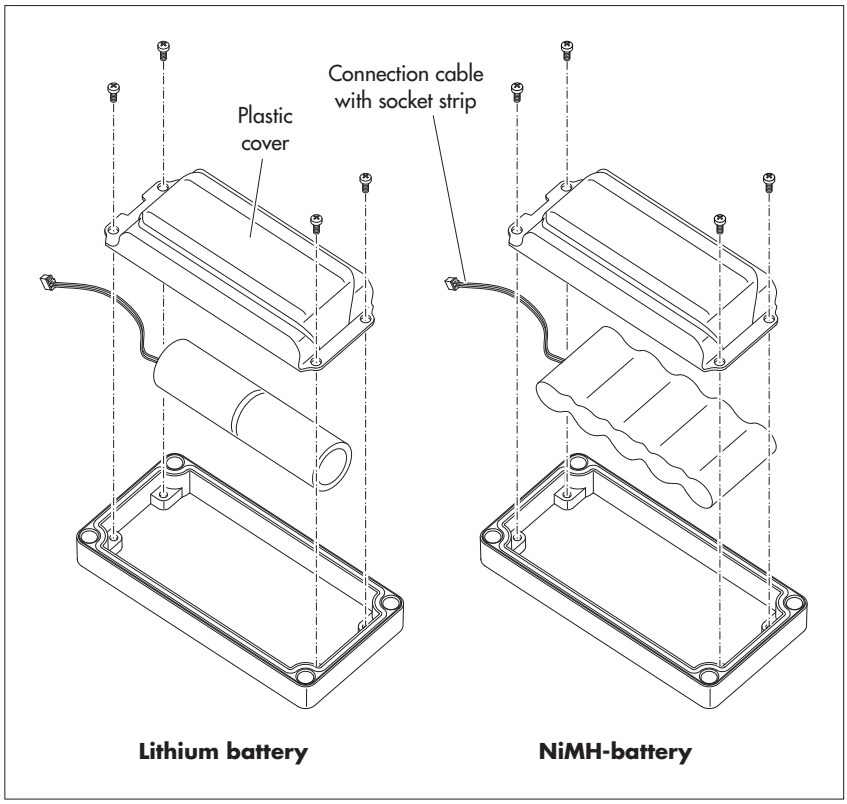
- Carefully remove the socket strip (connecting cable) from the pin header (circuit boad)
- Loosen the four Phillips screws in the housing cover (captive; PH2).
- Remove the transparent plastic cover with the lithium battery.

Fig. 11: open housing of the OTT SensorLink 1000.



- Lead the connecting cable of the new lithium battery through the recess in the plastic cover, insert the lithium battery into the plastic cover and fit it into the housing cover.
- Carefully tighten the four Phillips screws again (max. 1 Nm).
- Check the rubber seal in the housing cover for wear/potential damage and replace if necessary. A replacement seal is supplied with every new lithium battery.

Fig. 12: exchange the lithium battery/NiMH rechargeable battery.



- Connect the socket strip (connecting cable) of the new lithium battery/new NiMH rechargeable battery to the corresponding pin header (printed circuit board):
  2-pin version of the pin header (bottom): for NiMH rechargeable battery
  3-pin version of the pin header (top): for lithium battery
- Replace the housing cover onto the lower part of the housing.
- Carefully tighten the four hexagon socket screws again (max. 3 Nm).
- For battery-powered devices: Reset the "Battery consumption" value (energy drawn from the lithium battery in milliampere hours) to "0" (LinkComm: "Service" | "Reset PBAT" buttons).

Remarks:

- The OTT SensorLink 1000 stores the measured values in a non-volatile memory. This means that no data is lost when the lithium battery is replaced. This also applies to storage without batteries over a longer period of time.
- If it takes longer than approx. 40 seconds to replace a discharged lithium battery, the time (and possibly the date) must be re-entered (see Chapter 12, *Setting the date and time*).
- When replacing the lithium battery, we recommend replacing the desiccant sachet at the same time.

7 Setting OTT SensorLink 1000 operating parameters

7.1 Operating software "LinkComm"

To set the OTT SensorLink 1000 operating parameters, you will need the "LinkComm" software (operating software) from OTT HydroMet.

LinkComm is available for the following hardware:

- PCs with Microsoft Windows operating system, version 10 or higher, Release 1607, Build 14393
- PCs with Apple macOS operating system, version 10.13 (High Sierra) or higher.
- Mobile devices (smartphone/tablet) with Android operating system, from version 5
- Mobile devices (iPhone/iPad) with Apple iOS oerating system, from version 10.0

The PC versions of LinkComm can be downloaded free of charge from the website "www.otthydromet.com", "Service & Support" section. Installation is not required. Unzip the download file and copy the contents to any directory on your PC.

You can also install LinkComm for mobile devices free of charge via the "App Store"/"Google play" store.

Remark: The hardware intended for LinkComm requires a Bluetooth interface and must support the Bluetooth standard "BLE" (Bluetooth Low Energy)! This is usually the case with current laptop PCs/mobile devices. Desktop PCs may require a separate USB/Bluetooth adapter, depending on the device configuration.

7.2 Establishing a communication connection to OTT SensorLink 1000 (on site)

In the following chapters the establishment of a communication connection between the OTT SensorLink1000 and a PC/mobile device is a prerequisite for the further worksteps.

Communication between the OTT SensorLink 1000 and a PC/mobile device is contactless via Bluetooth short-range radio using the Bluetooth standard "BLE" (Bluetooth Low Energy).

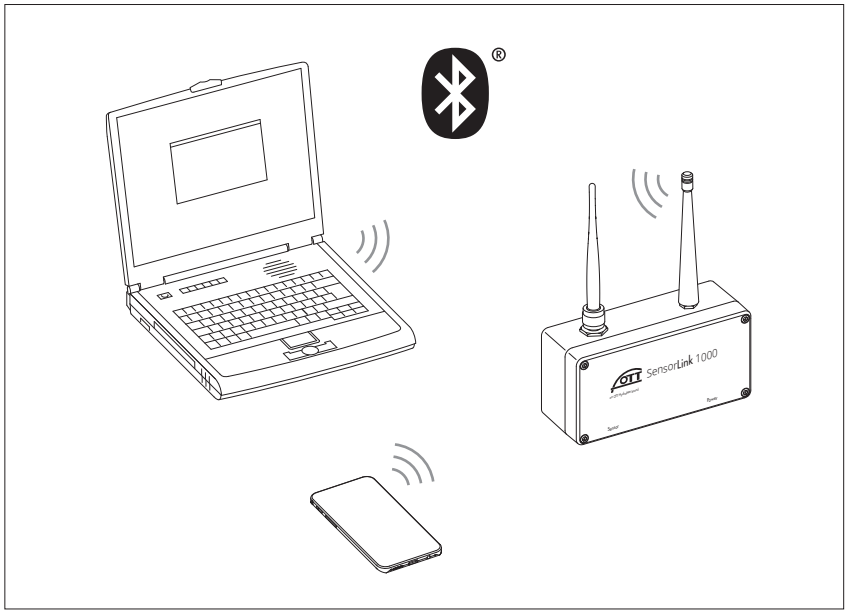


Fig. 13: communication connection between PC/mobile device and OTT SensorLink 1000 via Bluetooth.

How to establish a communication connection

Remark: The maximum range of BLE is 10 meters (with free line of sight). If the OTT SensorLink 1000 is installed in a closed metal control cabinet, the range may be significantly restricted.

- Start the operating software "LinkComm" (Version ≥ 4.0).
- Click on the "New station" button[1].
- If not already done: Select "Station type": "OTT SensorLink 1000" → the operating software automatically sets the "Connection type" to "BLE".
- If a scan has not been performed automatically: Click on the "Start scan" button → the operating software searches for devices within radio range.
- If several devices were found: Select the desired device.
- If required: Activate the "Get recent data on connect" checkbox; this also retrieves the measured values from the last seven days.
- Click on the "Connect" button → the operating software establishes a connection to the OTT SensorLink 1000 and reads in the current configuration and the last measured values. The operating software then opens an overview window, the so-called "Dashboard".

[1] alternatively, if the desired OTT SensorLink 1000 is already saved in the list of stations (via the main menu (≡) | "Save station …"):
- Click on the button of the saved OTT SensorLink 1000.

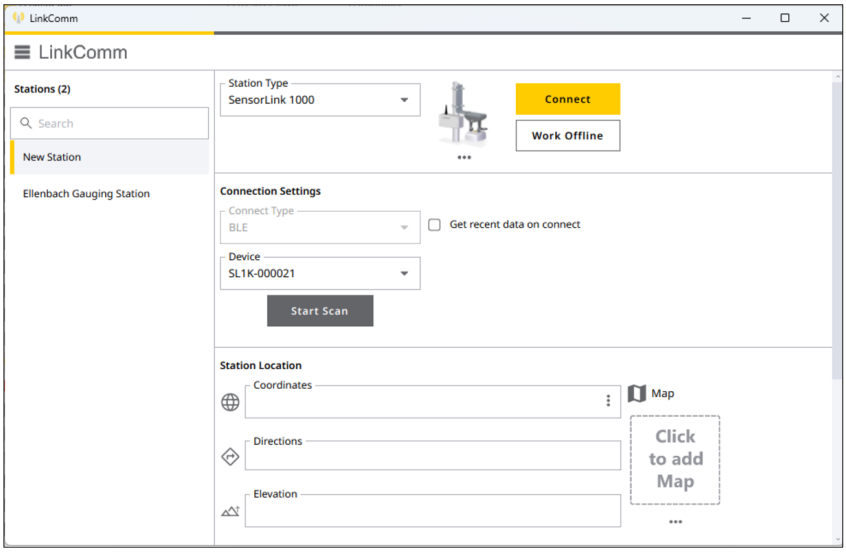


Fig. 14: establishing a communication connection to the OTT SensorLink 1000.

7.3 Setting of OTT SensorLink 1000 operating parameters

- Start the operating software "LinkComm".
- Use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter 7.2).

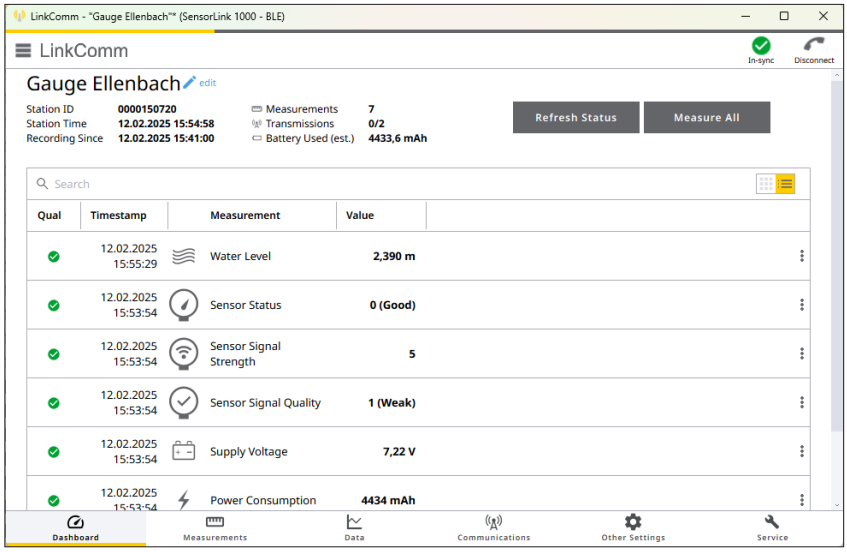


Fig. 15: Setting of OTT SensorLink 1000 operating parameters – Dashbord of operating software "LinkComm".

The sequence of the displayed measured values can be changed if required:
- Click on the "Measurements" button.
- Click on the desired measurement (M1 ... M10) with the right mouse button for a long time, hold it and move it to a new position → the numbering and order of the meaurements in the "Measurements" and "Dashboard" windows are updated.

a) Making station-specific settings

- Click on the "Other settings" button.
- Make the required settings for the station (measuring station with OTT SensorLink 1000):

Input fields "Station"

▶ Station-ID	Station identifier; max. 10 characters (alphanumeric); Default: "0000000001"
▶ Name	Station name; max. 40 characters (alphanumeric); Default: "SensorLink 1000 1"
▶ UUID	Universally Unique Identifier; optionally allows to add a unique identifier to a station; max. 64 characters (alphanumeric). In connection with the file format "ZRXP" this field is used to enter the "REXCHANGE" number (software "WISKI" from company Kisters).

Input fields "Location"

▶ Time zone	Time offset of the station compared to Coordinated Universal Time (UTC)
▶ Latitude	geographical latitude of the station in decimal notation
▶ Longitude	geographical longitude of the station in decimal notation

Remarks:

- ▶ Operation of the OTT SensorLink 1000 does not require the input of location coordinates; the location coordinates are used to display the station location in OTT HydroMet software , e.g. in OTT Hydras 3 or OTT Hydromet Cloud;
- ▶ If location coordinates are available in the units "degrees (°) | minutes (') | seconds (")" → click on the "Convert ..." button and convert to decimal coordinates;
- ▶ When using the "LinkComm" app on a mobile phone, the app automatically adopts the current location coordinates of the mobile phone.
- ▶ Input fields "SNTP time synchronisation"→ see Chapter 11
- ▶ "Change password ..." button → see Chapter 10

b) How to configure measurements

- Click on the "Measurements" button.
- Make the settings required for the measurements 1 … 4 [1] (measuring channels):
  – M1: Measurement of water level
  – M3: Measurement of supply voltage
  – M4: Measurment of power consumption
  – M5: Measurement of cellular signal strength (RSSI)

"Settings" Tab

▶ Number	Sensor number, 4 characters (alphanumeric)
▶ Name	Sensor name, max. 40 characters (alphanumeric)
▶ UUID	Universally Unique Identifier; optionally allows to add a unique identifier to a measurment (Mx); max. 64 characters (alphanumeric). In connection with the file format "ZRXP" this field is used to enter the "REXCHANGE"-number (software "WISKI" from company Kisters).
▶ Sampling interval	5 s (15 min)… 24 h; time interval at which the OTT SensorLink 1000 determines and saves measured values; (save only if averaging is deactivated). The set measurement cycle is based on a fixed time grid (e.g. measurement cycle 10 minutes; resulting time grid …, 00:10, 00:20, 00:30, …).
▶ Measurement cycle	water level or distance to water
▶ Unit	Depending on the respective measurement Mx Level unit: m · cm · ft · in
▶ Right digits	Fixed default, depending on the unit
▶ Last reading	Last measured value
▶ Time of last reading	Date and time of the last measured value

- ▶ The "Refresh" button → retrieves the measured value from the last sampling inteval
- ▶ The "Measure" button → carries out an instantaneous value measurement
- ▶ The"Live Poll" button → opens a window and continuously carries out instantaneous value measurements with adjustable time interval

- ▶ Checkbox "Enable manual entry" see Chapter 8
- ▶ Checkbox "Update measured value" see Chapter 8
- ▶ Button "Calibrate…" see Chapter 8
- ▶ Button "Enter value…" see Chapter 8

"Processing" Tab

- ▶ Slope: Linear scaling of measured values according to the equation "y = ax + b"
  a = Slope
- ▶ Offset: Linear scaling of measured values according to the equation "y = ax + b"
  b = Offset
  Example: In order to relate a level value to NN, it is necessary to provide the measured value with an offset. If for example the reference point is 178 m NN, the scaling is "y = 1 · x + 178".
- ▶ ☑ Enable averaging
  – Averaging interval: the time interval within which the OTT SensorLink 1000 calculates and stores an arithmetic mean value from measurement cycle values. The averaging interval must be an integer multiple of the measurement cycle (e.g. measurement interval: 10 minutes; averaging interval 1 hour: the OTT SensorLink 1000 saves an arithmetic mean value from 6 measurement cycle values every hour.
  – Min. good values: minimum number of valid values for averaging (invalid values = stored error messages, see Chapter 16, *Error messages*).

[1] the numbering of the measurement depends on the device variant; it can be changed of required, see caption of Fig.15

▶ ☑ Enable storage delta: The OTT SensorLink 1000 only saves a measured value, if this value differs from the last measured value by the storage delta value. (Storage delta value = 0, OTT SensorLink 1000 saves all measured values.)

Remarks::
– The storage delta function generates apericodic time series.
– If the storage delta value is not equal to 0 and the OTT SensorLink 1000 contains a measured value for storage, the OTT SensorLink 1000 also stores the previous measured value (which did not exceed the storage delta value). This procedure optimizes the display when the measured values are evaluated graphically.
Example:

Sampling interval:	1 hour
Averaging interval:	1 hour
Storage delta value:	0.05 m
Saved values:	11:00 h; 1.20 m
	19:00 h; 1.21 m (saved subsequently)
	20:00 h; 1.28 m

▶ ☑ Enbable daily min/max: Determines and stores the daily min./max.

"**Actions**" **Tab**

■ Click on "⊕" next to "Add Limit" → the operating programme creates a new limit value (max. 3). If a defined limit value is exceeded or not reached, the OTT SensorLink 1000 automatically performs an action (change measurement cycle and/or transmission interval).
■ Click on the newly created limit value in the "Limit values" table and make the required settings:

Limit Configuration

▶ Type: "High" →Triggers an action when the threshold value is exceeded; "Low" → Triggers an action when the value falls below the threshold.
▶ Threshold: Height of the water level defined as the limit value.
▶ Hysteresis: Value by which the measured value must fall/rise again before the OTT SensorLink 1000 carries out a new action.
▶ ☑ Advanced settings
– Tolerance time [Measurement cycles]: Number of measurement cycles in which the limit value must be reached before an action is executed;
– Alarm also at end of limit value: action is also carried out when the value subsequently falls below/exceeds the limit value (when returning to the normal range);
– Refers to instantaneous value: can be activated when averaging is active
▶ ☑ Enable gradient
– Gradient direction: rising; falling; rising and falling;
– Gradient threshold: additional condition, independent of the statistic limit value, at which the OTT SensorLink 1000 carries out an action;
– Gradient Deadtime: number of measurment cycles, for which the OTT SensorLink 1000 does not carry out a further action when a new gradient limit value occurs.

Action Configuration

▶ M1 Interval: new measurement cycle when a limit value is exceeded/fallen below.
▶ TX1 Interval: interval: new transmission interval when a limit value is exceeded/fallen below. The transmission interval must first be configured under "Limit value interval 1 ... 3" of an IP transmission/SMS transmission.
▶ ☑ User-defined action: This function offers the option of configuring customised actions that are to be executed when a limit value is exceeded/fallen below.

c) Communication: configuring IP transmissions

Maximum possible number of IP transmissions: 2
Maximal possible number of servers: 4 (2 per IP transmission)

- Click on the "Communication" button.
- In the selection menu (left), click on "⊕" next to "IP transmissions" → the operating software creates a new IP transmission (TX1/TX2).
- Select the newly created IP transmission (TX1/TX2) and make the required settings:
  - Name: name for this IP transmission
  - Scheduled time: start time for the set time interval ("Scheduled interval")
  - Scheduled interval: time interval at which the OTT SensorLink 1000 transmits the measured values via HTTP/HTTPS/FTP/FTPS/MQTT/MQTTS.
    Value range: OFF, 1 minute ... 24 hours, weekday.
  - Limit interval 1 … 3: changed time interval when a limit value is reached. The limit value refers to the conditions defind under "Limit values" ("Measurements" button, "Actions" tab). For example, the OTT SensorLink 1000 carries out a data transmission every 6 hours when a defined water level is exceeded, instead of every 24 hours (planned interval).
    Value range: 1 minute ... 24 hours
  - Data format:
    – CSV: structured text file in CSV format(Comma-Separated Values)
    – OTT MIS: OTT-specific file format (ASCII) for automatic import into the measured value database of the user software OTT Hydras 3
    – OTTML: OTT-specific file format (OTT Markup Language) based on the markup language "XML" (Extensible Markup Language)
    – ZRXP: application-specific file format from Kisters; "WISKI" software
    – ZRXP V3: application-specific file format from Kisters,Version 3; "WISKI" software
  - Transmission content: Activate the checkbox for the desired measurement. The OTT SensorLink 1000 transmits the measured values of the measurements that are activated.
  - Server name: Designation of the "Primary server"/"Secondary server" of this IP transmission.
  - Server type: Type of IP receiving server; HTTP, HTTPS, FTP, FTPS, MQTT or MQTTS.
  - Address: IP address or URL of the HTTP/HTTPS/FTP/FTPS/MQTT/MQTTS-server.
  - Server port: Specifying the port allows a specific TCP/IP communication interface to be controlled (default: HTTP: 80; HTTPS: 443; FTP: 21; FTPS: 990; MQTT: 1883; MQTTS: 8883).
  - Timeout (s): Specifies the maximum number of seconds the OTT SensorLink 1000 waits for a response from the server after it has sent a request (default: 20 s).
  - File name (for server type FTP/FTPS): naming of the files stored on the server;
    – input field empty (default) → <Station-ID><Date><Time>
    – user specific file name: <any name> and optional additionally <Station ID>, <UUID>, <Date>, <Time>.
  - ☑ Active FTP (for server type "FTP"/"FTPS") → activates the "FTP Active Mode" (not recommended, default is "Passive FTP"); default: deactivated.

- Data path: path to the (sub) directory on an FTP server. When using the rootdirectory, leave input field empty (use separator "/" instead of "\").
- ☑ FTP commando paths (for server type FTP/FTPS) → activates the 2-way communication via FTP commands. You find a detailed description of the 2-way communication via FTP commands on the websites "www.otthydromet.com" in the "Resources" section.
- Enable basic authentication: activate checkbox if the HTTP/HTTPS server requires authentication.
- User name: login name of a user registered on the HTTP/HTTPS/FTP/FTPS/MQTT/ MQTTS server.
- Password: password of the registered user; for security reasons, the operating software does not display the entered password legibly (a click on the symbol behind the input field displays the password).
- Private key (for server type "MQTT"/"MQTTS"): private key of the registered user; for security reasons, the operating software does not display the entered password legibly (a click on the symbol behind the input field shows the password).
- ☑ OTT Hydras 3 Net Server: activate checkbox if the (PHP) scripts are managed by an OTT Hydras 3 net server.
- Workspace Type: if necessary, select the number or ID of the work area to which this OTT SensorLink 1000 is assigned
- Checkbox "Data", "Alarms", "Commands": type of scripts used by the OTT Hydras 3 net server.
- Data script: relative URL (to the server address) of a (PHP) script on the HTTP/HTTPS server that handles the automatic sending of data or a data request (mandatory).
- Command script: relative URL (to the server address) of a (PHP) script on the HTTP/HTTPS server that the OTT SensorLink 1000 calls and checks for commands to execute (optional).
- Acknowledge script: relative URL (to the server address) of a (PHP) script on the HTTP/HTTPS server that the OTT SensorLink 1000 calls to acknowledge executed commands or requests (optional).
- Configuration script: relative URL (to the server address) of a (PHP) script on the HTTP/HTTPS server receives a configuration ("*.bin" file) sent by OTT SensorLink 1000 (optional).
- Alarm script: relative URL (to the server address) of a (PHP) script on the HTTP/HTTPS server that the OTT SensorLink 1000 calls in case of an alarm (optional).
- Client ID (server type MQTT/MQTTS): the "Client Identifier" identifies each MQTT client, that connects to a MQTT broker. The client ID must be individual for each OTT SensorLink 1000 client in a network!
- Topic data (server type MQTT/MQTTS): corresponds to the topic to which data is to be transferred.
- Topic command (server type MQTT/MQTTS): corresponds to the "Client ID", used for transmission to the MQTT/MQTTS broker.
- SAS Resource: contains the resource string including the "sr=" prefix.

- Checkbox "Enable secondary server": activate if you want the IP data to be transferred to another server.
  - Redundancy mode: "Backup" (if primary server fails) or "Both Servers" (for greater data security and availability).

Remark: To delete an IP transmission, select the transmission, move it to the left with the mouse and click on the dustbin symbol.

Notes on MQTT and MQTTS:

For an MQTT/MQTTS data transmission, the interpretation of the sent data has to be done on the server side. Therefore, all data types supported by the OTT SensorLink 1000 can be used.

The MQTT/MQTTS network protocol allows commands to be received, executed and to send feedback. Just as with an HTTP(S) connection, the data collector can retrieve, handle and process XML (OTT-ML) command requests. An "MQTT/MQTTS" type connection establishes a connection to an MQTT/MQTTS broker.

The OTT SensorLink 1000 subscribes to the topic configured under "Topic command". Via this topic, information is received from the broker in the form of (OTT-ML) commands (format and content of the commands are identical to an HTTP(S) connection).

The OTT SensorLink 1000 then starts sending the required data to the topic configured under "Topic data". After all data has been sent, it closes the connection if nothing more is to be received on the command side.

If a command has been prepared, the server should make it available under the-topic "Command" so that it can be retrieved by the OTT SensorLink 1000. After receiving such a message, the OTT SensorLink 1000 is able to examine the user data (payload, XML) and store it for processing the command.

Receiving a command does not interrupt the sending of data; the actual processing of a command starts only after all data has been sent and the MQTT(S) client has nothing more to send/receive (as with an HTTP(S) data transfer).

d) Communication: configuring SMS transmissions

Maximum number of SMS transmissions: 2

- In the selection menu (left) click on "⊕" next to "SMS transmissions" → the operating program creates a new SMS transmission (SMS1/SMS2).
- Select the newly created SMS transmissions SMS1/SMS2) and make the required settings:
  - Phone number 1/2: telephone number of the receiving modem or of a "Large Accounts".
  - Scheduled time: start time for the set time interval ("Scheduled interval").
  - Scheduled interval: time interval, in which the OTT SensorLink 1000 transmits measured values by SMS.
    Value range: OFF, 1 minute ... 24 hours, weekday
  - Limit interval 1 … 3: 3 additionally definable time intervals at which the OTT SensorLink1000 automatically transmits data via SMS when certain limit value events are reached.
    Value range: 1 minute ... 24 hours
  - Content: activate checkbox for required measurement. The OTT SensorLink 1000 transmits the values of the measurements which are activated.
  - Max. messages count: maximum number of SMS messages in case one SMS is not sufficient for the amount of data to be transmitted.
  - Button "SMS Test": immediately sends a test SMS with specified transmission content to the set phone number(s).

Remark: To delete an SMS transmission, select the transmission, move it to the left with the mouse and click on the dustbin symbol.

e) Communication: Modem settings

- Click on "Commication".
- In the selection menu (left) click on "Modem Settings" and make the required settings:
  - PIN: PIN (Personal Identification Number) of the SIM card. Format: 4 digits. (You can deactivate the PIN of the SIM card in a mobile phone, for example; security risk! In this case leave the input field empty.)
  - Phone number of station: phone number of SIM card
  - Roaming: On (allow)/Off (do not allow)
  - ☑ Skip registration check: Only for customised special applications. Do not activate the checkbox in the standard case!
  - Region: choose region (North America/Europe/Others/Favorites)
  - Country: choose country
  - Provider name : select the mobile network operator belonging to the SIM card from the selection list. The selection list is sorted by leading countries. The corresponding network access (APN) as well as the user name and password (if required) are automatically specified by the operating software. Alternatively, enter any operator name and the associated additional settings manually.
  - User name: see "Provider name"
  - Password: see "Provider name"
  - Access number: abbreviated number of the PPP dial-in point for establishingan Internet connection via the cellular modem (in the standard case „*99***1#").

f) Communication: activating and setting "SMS commands" function

With the function "SMS Listening" it is possible to activate the mobile modem of the OTT SensorLink 1000 for approx. 1.5 minutes. For this purpose the OTT SensorLink 1000 switches on the cellular modem at a preset time (the cellular modem of the OTT SensorLink 1000 books itself into the cellular network) and after approx. 1.5 minutes it switches off again. During this time, the SMS Service Center can copy SMS messages sent to the OTT SensorLink 1000 cellular modem's phone number into the OTT SensorLink 1000 cellular modem's memory. The OTT SensorLink 1000 then searches the received SMS for a system command and executes it.

- Click on "Commication".
- In the selecection menu (left) click on "SMS commands".
- Activate the checkbox "Enable SMS listening" and make the required settings:
  - Scheduled interval: time interval at which the OTT SensorLink 1000 activates the cellular modem.
  - Scheduled time: Start time for the set time interval ("Scheduled interval").
  - Password: Password that must be contained in the SMS in order for the SMS command to be executed; for security reasons, the operating software does not display the entered password in a legible form (click on the symbol behind the input field to display the password).
  - Additional text: any text that appears as prefix in the response SMS to the SMS command "Request system information".
  - ☑ Acknowledge SMS command: sends an SMS confirmation to an SMS command.

If LinkComm is used on a mobile device, SMS commands can be sent directly from the operating software to an OTT SensorLink 1000:

- Change SMS listening interval
- Change transmission interval (TX1)
- Change storage interval (M1)
- Change limit value (M1)
- Change observed value (M1)
- Request system information

The information required for the respective SMS command and the telephone number of the OTT SensorLink 1000 must be entered in the corresponding input fields. Then send the SMS command using the "Send now" button.

g) Send operating parameters to the OTT SensorLink 1000

After all required operating parameters have been set, a yellow warning triangle indicates that the configuration within the operating software has changed.

- Click on the yellow warning triangle → a window to send the configuration to the OTT SensorLink 1000 opens.
- Click on the "Send Setup to Station" button → a warning appears.
- Acknowledge warning with "Yes" → the operating software sends the changed configuration to the OTT SensorLink 1000.

7.4 Setting OTT SensorLink 1000 operating parameters remotely

Various methods are available for changing the OTT SensorLink 1000 operating parameters remotely:

- offline by "OTT-ML command" using the "OTT Hydras 3 net" application software (OTT Hydras 3 net enables complete network management, for example simultaneous firmware update of several OTT SensorLink 1000);
- offline by "OTT-ML command" via File Transfer Protocol (FTP) using a standard FTP server
- offline by "Send SMS command" using the operating software "LinkComm".

7.5 Importing/exporting the OTT SensorLink 1000 configuration

The import/export functions are available for forwarding an OTT SensorLink 1000 configuration, for example via USB flash drive or e-mail. A configuration can also be transferred to the OTT Hydras 3 application software via export as an XML file. The OTT Hydras 3 application software thus creates the entire measuring site-/sensor configuration in an OTT Hydras 3 working range.

It is also possible to save the configuration of an OTT SensorLink 1000 as so-called "Station" in the "LinkComm" operating software.

Available export/import formats:

- Export as ".bin" file
- Export as ".xml" file for application software OTT Hydras 3
- Import ".bin" file

The "LinkComm" operating software saves all necessary configuration data in a single "*.bin" or "*.xml" file, depending on the export type.

a) How to export a configuration ("*.bin" file)

This export type is required to pass on an OTT SensorLink 1000 configuration as "*.bin" file . The configuration can be read back into the operating software via the "Import Setup…" function.

- If not yet done: use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter 7.2).
- In the main menu (≡) of the operating software select the function "Export Setup …" → a window for setting the file name and storage location opens.
- Make the settings and click on "Save" → the operating software saves the configuration in a "*.bin" file.

Remark: the file name of the "*.bin" file is arbitrary. The operating software will suggest a combination of station name, configuration and date.

b) How to export a configuration (OTT Hydras 3)

This export type is required to pass on an OTT SensorLink 1000 configuration to the application software OTT Hydras 3. This "*.xml" file can be read in via the Hydras 3 function "File", "Import Station configuration (XML)".

- If not yet done: use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter 7.2).
- In the main menu (≡) in the operating software select the function "Export Hydras 3 (XML)…" → a window for setting the file name and storage location opens.
- Make the settings and click on "Save" → the operating software saves the configuration in a "*.xml" file.

Remark: the file name of the "*.xml" file is arbitrary. The operating software will suggest a combination of station name, configuration and date.

c) How to import a configuration

- If not yet done: use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter 7.2).
- In the main menu (≡) of the operating software, select function "Import Setup …" → a window to select the "*.bin" file opens.
- Select "*.bin" file and click on "Open" → a yellow warning triangle indicates that the configuration within the operating software has changed.
- Click on the yellow warning triangle → a window to send the configuration to the OTT SensorLink 1000 opens.
- Click on the "Send Setup to Station" button → a warning appears.
- Acknowledge warning with "Yes" →the operating software sends the changed configuration to the OTT SensorLink 1000.

Please note:

- The measured values stored in the OTT SensorLink 1000 are irrevocably lost when the configuration is changed! If necessary, read out measured values before deleting!
- The previous configuration of the OTT SensorLink 1000 is also lost. If necessary, export the configuration to a file beforehand (see "a) How to export a configuration ("*.bin" file)").

8 Creating an observer entry (observer function) and adjusting measured values

The operating software enables the input of a manually determined measured value (observer entry, control value) – e.g. staff gauge value – via a so-called "Observer". A manually determined measured value can also be used to adjust the measured values (offset setting). These functions are available for measurement "M1" (water level measurement).

The "Observer entry..." (manual entry) function and the behaviour of the effect of a manually entered measured value can be activated/set using two checkboxes.

As an alternative to the following procedure, you can also dislay instantaneous values or make observer entries from a mobile phone via SMS short message. This requires that the "SMS Commands" function is activated and configured.

a) How to activate "Enable manual entry..." and "Update measured value"

- Start operating software "LinkComm".
- Use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter7.2).
- Click on the "Measurements" button..
- If not selected yet: click on measurement "M1" (water level).
- Function "Enable manual entry…":
  Activate the checkbox "Enable manual entry" → the previously greyed out "Enable manual entry…" button directly below is displayed.
- Function "Update measured value" (optional):
  Activate the checkbox "Update measured value" → the button directly below changes its labelling from "Enable manual entry…" to "Update measured value").
- Click on the yellow warning triangle → a window for sending the configuration to the OTT SensorLink 1000 opens. (The yellow warning triangle indicates that the configuration within the operating software has changed.)
- Click on the "Send Setup to Station" button → the operating software sends the changed configuration to the OTT SensorLink 1000.

Remarks:

- The OTT SensorLink 1000 stores each observer entry in an info channel with date and time. This information can be displayed in the evaluation window of a sensor ("Observer registration general") after it has been read in and transferred to the application software OTT Hydras 3 via the "Info data" | "Station" | "Show" function. They are also visible via "Data" | "View: Events" in the operating software.
- If the checkbox „Update measured value" in the "Measurements" window is not activated, the OTT SensorLink 1000 additionally stores the entered control value additionally to the currently measured instantaneous value. These two values can be displayed in the evaluation window of a sensor ("Observer registration with check value") after they have been read in and transferred to the application software OTT Hydras 3 via the "Info data" | "Sensor" | "Show" function.
  The control value is also visible after downloading by the LinkComm operating software via the "Data" | "View: Events" button.

b) How to adjust measured values (setting the offset)

Precondition: the checkbox "Update measured value" is **activated!**
(see "How to set the options")

- Start the operating software "LinkComm".
- Use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter 7.2).
- Click on the "Measurments" button..
- If not selected yet: click on measurement "M1" (water level).
- Click on the "Calibrate …" button → a window for entering a control value opens
- Enter the control value and click on "Calibrate" → the operating software sends the control value to the OTT SensorLink 1000.

Remark: The offset resulting from the entered control value can then be seen under "Scaling" | "Offset" (rounding error is possible). The OTT SensorLink 1000 now determines all other measured values taking this offset into account.

c) How to create an observer entry

Precondition: the checkbox "Update measured value" is **deactivated!**
(see "How to set the options")

- Start the operating software "LinkComm".
- Use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter 7.2).
- Click on the "Measurements" button.
- If not selected yet: click on measurement "M1" (water level).
- Click on the "Enable manual entry" button → a window for entering a control value opens.
- Enter the control value and click on "Enable manual entry" → the operating software sends the control value to the OTT SensorLink 1000.

9 Downloading displaying and saving data

9.1 Downloading data

How to download data (on site)

- Start the operating software "LinkComm".
- Use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter7.2).
- Click on the "Data" button.
- Choose the time span; set "Start time" and "End time" if required.
- If required click the "Options…" button and activate the checkbox "Include Events". If this checkbox is activated, the operating software also loads all events stored in an info channel; e.g. observer entries.
- Click on the "Download" button. → the operating software downloads the data from the OTT SensorLink 1000 to the PC/mobile device.

• **Remark:** If the "Download" button is marked with ***, the data displayed do not (any longer) correspond to the selected time span. If this is the case, click on the "Download" button once again.

9.2 Displaying data

Precondition: The data to be displayed has already been downloaded
(see Chapter 9.1, *Downloading data*)

a) How to display data graphically

- Click the view "Graph" → the operating software displays all measured values in graphical form.
- If required, activate/deactivate the checkbox for the desired measured values under "⋮" (right above the graphs) (water level, supply voltage, battery consumption)

• **Remark:** the operating software automatically scales the y-axis of the graphical-display – depending on the activated measured values.

b) How to display data in a table

- Click the view "Table" or "Table (grouped)" → the operating software displays all measured values in tabular form.
- If required, activate/deactivate the checkbox for the desired measured values under "⋮" (right above the table) (water level, supply voltage, battery consumption; radio signal strength (RSSI)).

c) How to display events (info channel)

- Click the view "Events" → the operating software provides the content of the info channel as a text file (in OTT ML format). (The checkbox "Include Events" must have been activated during download)

d) How to display logfiles

- Click on the "Log Files" button klicken → a Windows Explorer window opens with the downloaded logfile.

• **Remark:** There are three types of logfiles: "….txt", "….oml" and "….csv". The "….oml" file is only available if the checkbox "Include events" was activated during download.

9.3 Saving data

a) How to save data in a file

- Click the view "Table"or "Table (grouped)".
- Activate/deactivate the checkbox for the desired measured values under "⋮" (right above the table)

Optional when using the "CSV" (Comma-Separated Values) file format:

- Click on the "Options ..." button → a window opens for configuring the CSV format.
- Make the required settings and click on "Close".

- Click on the "Save File ..." button → a window for selection of the data format opens.
- Select the data format:
  - CSV: structured text file in CSV-format (Comma-Separated Values)
  - MIS: OTT-specific file format (ASCII) for automatic import into the measured value database of the OTT Hydras 3 application software
  - OTTML: OTT-specific file format (OTT Markup Language) based on the markup language "XML" (Extensible Markup Language)
  - ZRXP: application-specific file format (software "WISKI" of the company Kisters).
- Click on the "OK" button → a window for setting file name, storage location and file extension opens.
- Make settings and click on "Save" → the operating software saves the selected measured values in a corresponding file (file format: "*.csv", "*.txt", "*.oml", "*.zrx").

b) How to save a graphical presentation as an image file

- Click the view "Graph".
- Activate/deactivate the checkbox for the desired measured values under "⋮" (right above the graphs).
- Click on the "Save Image ..." button → a window for setting the file name and storage location opens.
- Make the required settings and click on "Save As ..." → the operating software saves the selected graph in a corresponding image file (file format: „*.png").

c) How to save events in a file

- Click the view "Events". (The checkbox "Include Events" must have been activated during download).
- Click on the "Save File ..." button → a window for setting the file name, storage location and file extension (for special cases) opens.
- Make settings and click on "Save" → the operating software saves the events in a corresponding file (file format: "*.xml"; in special cases: "*.txt").

Remark: Events (info data) are available in the OTT-specific "OTT-ML"-format (OTT Markup Language; file format: "*.xml"). Info data is explicitly provided for display and evaluation of data in the OTT Hydras 3 application software.

10 Protecting the OTT SensorLink 1000 with a password

To prevent unauthorised access (via local communication via BLE) to the OTT SensorLink 1000, you can protect it with a password.

How to protect the OTT ecoLog 1000 with a password

- Start the operating software "LinkComm".
- Use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter7.2).
- Click on the "Other Setup" button.
- Click on the "Change Password ..." button → a window to define the password opens.
- Enter password (max. 64 alphanumeric characters/special characters).
- Enter password again under "(confirm)" .
- Click "OK" → a yellow warning triangle indicates that the configuration within the operating software has changed.
- Click on the yellow warning triangle → a window for sending the configuration to the OTT SensorLink 1000 opens.
- Click on the "Send Setup to Station" button → the operating software sends the changed configuration to the OTT SensorLink 1000.

Please note: If you lose your password, you will no longer be able to access the OTT SensorLink 1000 with the operating software. In this case, please contact OTT HydroService.

How to release a password-protected OTT SensorLink 1000

- Start the operating software "LinkComm".
- Use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter7.2). → a window to enter the passwor- dopens.
- Enter password and click on "OK" → the operating software retrieves the current configuration of the OTT SensorLink 1000.

Remark: To remove a specified password: proceed as described under "How to protect the OTT SensorLink 1000 with a password" but leave both password input fields empty.

11 Setting date and time

The internal clock of the OTT SensorLink 1000 is a real-time clock with high accuracy. It runs as soon as a solar panel is connected for the first time (solar-powered) or with a lithium battery (battery-powered) from the time the device is produced. After removing the lithium battery/the NiMH rechargeable battery on the circuit board, the clock continues to run for approx. 40 seconds.
The OTT SensorLink 1000 loses the date and time in the event of a longer power interruption. When the lithium battery/the NiMH rechargeable battery is reconnected, the OTT SensorLink 1000 will accept the date and time of the last stored measured value, adding one minute to the stored time. The date and time are set via the operating software "LinkComm".

In addition, the OTT SensorLink 1000 can synchronise the date/time via the cellular network using the "SNTP time synchronisation" function. In this case, it uses the so-called Coordinated Universal Time (UTC), whereby the local time of the measuring point is adjusted via a set time zone. The SNTP time synchronisation checks the date/time once a day and corrects the values if necessary.

! **Please note:** It makes no sense to use daylight saving time (DST) on the OTT SensorLink 1000 if you want to obtain continuous time series. An activated SNTP time synchronisation automatically prevents this (prerequisit: correctly set time zone of the measurement site).

How to set date and time

- Start the operating software "LinkComm".
- Use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter 7.2).
- Click on the "Other Setup" button
- Recommended: activate the checkbox "SNTP time synchronisation" and enter at least one address of a server for SNTP time synchronisation, e.g. "0.europe.pool.ntp.org"; precondition: a SIM card is inserted and the required modem settings have been made.
- Click on the "Set Clock" button.
- Set date and time manually or activate the checkbox "Set clock using PC time". If the PC is in summer time mode, the operating programme automatically corrects the time by one hour.
- If daylight saving time is to be used on the OTT SensorLink 1000 (not recommended), also activate the "Apply DST offset" checkbox.
- Click on the "Set Clock" button → the operating software sets the OTT SensorLink 1000 date and time according to the PC time/PC date or according to the individually set values.
- Click on the "Close" button.

i **Remark:** When restarting after a long period of inactivity, it may be useful to delete the database after setting the date and time (see Chapter 12).

12 Deleting the database

Please note: The measured values stored in the OTT SensorLink 1000 are irrevocably lost when the database is deleted! If necessary read out measured values before deletion!

How to delete the database

- Start the operating software "LinkComm".
- Use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter 7.2).
- Click on the "Service" button.
- Click on the "Delete database" button.
- Acknowledge warning with "Yes" → the operating software deletes the complete database of the OTT SensorLink 1000 (all measured value channels including the info channel). The OTT SensorLink 1000 then determines and stores the water level and other measured values at the set intervals.

13 Updating the OTT SensorLink 1000 Firmware

If required, you have the option of updating the OTT SensorLink 1000 firmware (operating software). This makes sense, if e.g. devices delivered at different times are to receive the same operating system version. Updating is carried out via the operating software "LinkComm". According to availability, an updated version of the SensorLink 1000 firmware can be found on the internet site "www.otthydromet.com", in the "Services & Support" section.

How to update the firmware

- Download the new version of the firmware from the website (file: e.g. "5546030293_01001_sl1000.bin") .
- Use the operating software to establish a local communication connection to the OTT SensorLink 1000 (see Chapter 7.2).
- Click on the "Service" button.
- Click on the "Upgrade" button → a window for selection of the firmware file opens.
- Select firmware file and click on "Open" → the operating software copies the new firmware to the OTT SensorLink 1000. The OTT SensorLink 1000 then determines and stores the water level as well as the other measured values at the set intervals.

Please note When updating, be sure to avoid a break in the communication connection (e.g. by accidentally exceeding the BLE range). If the communication connection is interrupted, the firmware is no longer executable. Likewise, you should not start any further programs/apps during the copy process and should not open any files.

Remark: The measured values stored in the OTT SensorLink 1000 are not lost when the firmware is updated.

14 Further functions of the operating software "LinkComm"

The "LinkComm" operating software provides a range of additional functions for convenient operation, monitoring of communication and troubleshooting.

Calling a function via the "Service" button:

- **System Info**
  Firmware Diagnostics
  LinkComm Data Usage
  LinkComm Diagnostics
  show details of the individual areas.
  The "Save Diagnostics" button (PC) or "Share Diagnostics" button (App) retrieves an extensive diagnostic log from the OTT SensorLink 1000, which can be saved to a file or sent. This diagnostic log is intended for very experienced and trained users as well as for the OTT HydroService!
- **Button "Terminal"**
  Represents the communication flow via the Bluetooth interface (BLE) between the operating software and the OTT SensorLink 1000. In addition, special commands can be sent to the OTT SensorLink 1000. This function is intended for very experienced and trained users as well as for the OTT HydroService!
- **Button "Data Flow"**
  Represents the communication data flow via the Bluetooth interface (BLE) between the operating software and the OTT SensorLink 1000. This function is intended for very experienced and trained users as well as for the OTT HydroService!
- **Button "Set Clock"**
  Sets the time of the OTT SensorLink 1000; refer also to Chapter 11 *Setting date and time*.
- **Button "Upgrade"**
  Executes a firmware update of the OTT SensorLink 1000; refer also to Chapter 13, *Updating the OTT SensorLink 1000 Firmware*.
- **Button "Factory Defaults"**
  Resets the OTT SensorLink 1000 to the factory settings and simultaneously deletes the database completely and irrevocably.
- **Button "Delete Database"**
  Deletes the database of the OTT SensorLink 1000 completely and irrevocably; refer also to Chapter 12, *Deleting the database*.
- **Button "Reboot"**
  Restarts the OTT SensorLink 1000 (disconnects the active connection).
- **Button "Reset PBAT"**
  Resets the value "Power consumption" (energy taken from the lithium battery in milliampere hours) to "0"; refer also to Chapter 6, *Controlling the power supply and exchange of lithium battery*.

Calling a function via the main menu (≡) of the operating software:

- **Import database**
  Imports all data of stations contained in a "*.ldz" file (database file) (OTT SensorLink 1000 configurations) into the operating software.
- **Export database**
  Exports all data of stations stored in the operating software (OTT SensorLink 1000 configurations) into a "*.ldz" file. This can be used to back up data and share a variety of configurations.
- **About**
  Shows the version of the operating software "LinkComm" as well as other information.
- **Options**
  Opens a window for setting various LinkComm options:
  – Language: language of the LinkComm user interface (German, English, French, Spanish);
  – Downloads: specifies the storage location of the downloaded log files (log files).
  – Theme: appearance of the LinkComm user interface;
  – Other: optional "Hydromet Cloud warnings" and "Show Active FTP warnings".
- **Event log**
  Shows all internal activity of the operating software. The event log is intended for very experienced and trained users as well as for the OTT HydroService!
- **Exit**
  Exits the operating software (not available in the LinkComm-Apps for Android and iOS).

Remark: Various entries in the main menu are only visible in the start window of the operating software (Station overview; before connection is established).

15 Maintenance work

The OTT SensorLink 1000 compact datalogger is almost maintenance-free. No adjustment or calibration work is necessary. There are also no parts that need to be replaced at regular intervals.

Carry out the following maintenance work at regular intervals, depending on your local conditions:

- Check the device housing with the two antennas and connection cables for damage, corrosion and correct fastening.
- Solar powered: Check the solar panel for dirt and correct alignment.
- Battery powered: Check the condition of the lithium battery and replace the battery if necessary; see Chapter 6.1, *Checking the battery status of the lithium battery* and Chapter 6.2, *Exchanging the lithium battery/NiMH rechargeable battery*.
- Every time you open the housing after a long period of operation:
  – Check the rubber seal in the housing cover for wear/potential damage and replace the seal if necessary.
  – Also replace the desiccant sachet in the housing when changing the battery/rechargeable battery.

  A replacement seal and a new desiccant sachet are supplied with every new lithium battery/NiMH rechargeable battery.

- In addition, carry out the necessary maintenance work on the OTT RLS 500 radar sensor. See Chapter 9, *Carrying out maintenance work* in the operating instructions of the OTT RLS 500.

16 Error messages

If measurements are faulty or if there is a malfunction, the OTT SensorLink 1000 saves one of the following error messages in the database instead of a measured value.

- Err 00 Internal error (automated measurement)
- Err 01 Internal error (A/D conversion error)
- Err 03 Measuring range exceeded
- Err 05 Communication error/cable break between datalogger and sensor (OTT RLS 500)
- Err 10 Measured value (still) not recorded; "Err 10" indicates measured values that are missing from the database and that
  – have not yet been recorded or
  – could not be determined due to a short-term, temporary fault (individual measured values). As these faults cannot be avoided in all cases due to technical reasons, they may also occur occasionally during regular operation.

Internal errors indicate a device fault, if they occur repeatedly.

17 Troubleshooting/remedy

No communication possible
(Operating software "LinkComm" ↔ OTT SensorLink 1000)

- Password assigned?
  → enter correct password.
- Lithium battery (battery powered)/NiMH rechargeable battery (solar powered) installed and connected on the circuit board?
  → install and connect lithium battery/NiMH rechargeable battery.
- Lithium battery exhausted (battery powered)?
  → replace the lithium battery.
- NiMH rechargeable battery deeply discharged (solar powered)?
  → Check the solar panel for device defects, soiling and correct alignment.
- PC/tablet/mobile phone does not have a (current) BLE interface?

→ Use other hardware for the operating software.

- Interference with BLE communication?
  → temporarily deactivate other hardware that also communicates via the BLE interface.

Communication starts and then aborts

- Lithium battery (battery powered)/NiMH rechargeable battery (solar powered) exhausted? → replace lithium battery/charge NiMH rechargeable battery.

Measured values are faulty or not available

- Water level values
  → Check configuration ("Measurements" button).
  → For further measures, see "Troubleshooting/remedy" in the OTT RLS 500 operating instructions.

No measured values in database

- Configuration incorrect?
  → Check configuration ("Measurements" button).
- Lithium battery (battery powered)/NiMH rechargeable battery (solar powered) exhausted?
  → Change lithium battery/charge NiMH rechargeable battery

Communication through cellular network not possible/ not successful

- Modem settings (modem, IP connection) are not or incorrectly configured → check modem settings (see Chapter 7.3).
- Data transmission is not or incorrectly configured
  → Check settings of "IP transmissions" and/or "SMS transmissions" (see Chapter 7.3).
- SMS commands are not or incorrectly configured
  → check settings of "SMS commands" (see Chapter 7.3).
- Lithium battery (battery powered)/NiMH rechargeable battery (solar powered) exhausted?
  → Change lithium battery/charge NiMH rechargeable battery.
- SIM card is missing
  → Insert the SIM card (see Chapter 5.1).
- Incorrect PIN
  → Check PIN number (see Chapter 7.3).
- Signal strength of cellular network too weak
  → Install the OTT SensorLink at a suitable location
- No measured values present (when transmitting data)
  → Wait for the next data interval.

18 Repair

- In case of device malfunction, use Chapter 17 to see if you can resolve the problem yourself.
- In case of device failure, please contact the OTT repair center:

OTT Hydromet GmbH
Repaircenter
Ludwigstrasse 16
87437 Kempten · Germany
Phone +49 831 5617-433
Fax +49 831 5617-489
repair@ott.com

! **Please note:** Have a faulty OTT SensorLink 1000 checked and repaired only by the OTT repair center! Never attempt to repair the unit yourself! Only a qualified repair followed by a final factory test guarantees the specified measuring accuracy. If you carry out repairs or attempted repairs yourself, you will also lose all warranty claims.

19 Notes about the disposal of old units

Within the member states of the European Union

In accordance with the European Union guideline 2012/19/EU, OTT takes back old devices within the member countries of the European Union and disposes of them in an appropriate way. The devices concerned by this are marked with the symbol shown aside.

- For further information on the return procedure, please contact your local sales contact. You will find the addresses of all sales partners in the internet on "www.otthdromet.com" under "Find Your Sales Contact". Please take into consideration also the national implementation of the EU guideline 2012/19/EU of your country.

For all other countries

- After putting the unit out of service, properly dispose of the OTT SensorLink 1000.
- Observe the regulations applicable in your country for the disposal of electronic devices!
- Never dispose of the OTT SensorLink 1000 in the normal domestic waste.

Materials used

See Chapter 20, *Technical data*

20 Technical data

Water level in combination with OTT RLS 500

Measuring range	0 … 30 m; depth to water

Temperature in the datalogger housing

Measuring range	–40 … +70 °C
Resolution	0.01 °C
Accuracy	typ. ±0.05 °C; max. ±0.15 °C

Relative air humidity in the datalogger housing

Measuring range	0 … 100 % rH (non-condensing)
Resolution	1 % rH
Accuracy	±4 % rH (0 … 80 % rH)
Units	% rH

Power supply

Type	
Integrated lithium battery (with plug connector)	7.2 V / 13 A
Integrated NiMH rechargeable battery (with plug connector) + Solar panel	6 V / 3.3 Ah 5 watts (optional 2 x 5 watts)
Current consumption	
Sleep mode	< 45 µA (at +25 °C / +77 °F)
Local communication (BLE)	approx. 15 mA (average)
Measuring operation	approx. 10 mA (average)
Mobile communication active; modem variant 2G/4G; for EU	approx. 50 mA (average)
modem variant LTE-M; global	approx. 30 mA (average)
Battery lifetime [1] with lithium battery (one hour sample interval, one transfer per day, one local communication (BLE) per month)	> 10 years

Clock

Design	Real-time clock
Accuracy	±26 seconds/month (at +25 °C / +77 °F) when using SNTP < ±3 seconds
Buffer period for battery replacement	approx. 40 seconds (at +25 °C)

LED indicator [2]

lights up continuously green	Bluetooth communication connection to "LinkComm" established [3]
lights up continuously red	Data transmission via cellular modem is active
flashes red once	On (re)start of OTT SensorLink 1000 (e.g. after battery replacement)

Interface for local communication	
Type	BLE 5.0 (Bluetooth Low Energy)
Antenna	Detachable short rod antenna; SMA connection
BLE range	≤ 10 m; with a clear line of sight
Networks/cellular modem frequencies	
2G	GSM, GPRS, EDGE; 900 MHz, 1800 MHz
4G	LTE Cat-1 (4G); B1 (2100 MHz), B3 (1800 MHz), B7 (2600 MHz), B8 (900 MHz), B20 (800 MHz), B28 (700 MHz)
4G Cat-M1/LTE-M	B1, B2, B3, B4, B5, B8, B9, B10, B12, B13, B17, B18, B19, B20, B25, B26, B27, B28, B66
SIM card	Mini-SIM (UICC; 2FF)
Cellular antenna	Detachable short rod antenna; TNC connection Please note: A minimum distance of >0.20 metres must be maintained between the cellular antenna and people and between cellular antenna and other electrical equipment/antennae!

[1] at 20 °C ambient temperature
[2] for service purposes on the circuit board
[3] with active Bluetooth communication connection, data transmission via cellular modem is not possible; no parallel operation! After disconnecting the Bluetooth communication the cellular modem does not initiate self-timed mobile communication for 3 minutes.

Data memory

Measurement memory	28 MB
Number of stored values	approx. 1 000 000
Measured physical quantities	water level or depth to water Temperature in the datalogger housing Supply voltage Cellular signal strength (RSSI) Energy drawn from the battery (in mAh) Relative humidity in the datalogger housing
Sample interval	5 seconds … 24 hours
Storage interval (mean interval)	5 seconds … 24 hours
Individually configurable functions	– Selection of units – Level measurement or depth measurement – Display of instantaneous values via LinkComm – Password protection of local communisation (BLE) – Measured value processing: Calculation of mean; delta storage; scaling function; extreme value storage; limit control of the sampling intervals – Remote data transmission via IP communication – Remote data transmission via SMS – Alarm management via SMS – Configuration change via SMS – Configuration change via FTP – Command-based two-way communication (network management) – Additional measuring channel with processed value – Geographical coordinates

Mobile communications function [1)]

Transmission interval (IP communication)	1 minute … 1 week
SMS transmission	15 minutes … 24 hours
IP communication	FTP, FTPS, HTTP, HTTPS (TLS 1.2), MQTT, MQTTS

Ambient conditions

Temperature range, operating	
solar powered	–30 °C … +60 °C/ –22 °F … +140 °F
battery powered	–30 °C … +70 °C/ –22 °F … +158 °F
Temperature range, storage	–40 °C … +85 °C/ –23 °F … +185 °F
Air humidity	5 % … 95 % (non-condensing)

Mechanical Data

Dimension L x W x H	160 mm x 80 mm x 60 mm
Weight (incl. lithium battery)	aprox. 0.9 kg
Material	Aluminium
Type of protection	IP 67 (flood-proof up to 1 week/ 1 m water column)
Desiccant	2 sachets (2.65 g silica gel) recommended replacement interval: once per year

Performance classification of the sensors according to DIN EN ISO 4373

Measurement reliability	Performance class 1
Temperature range	Temperature class 2
Relative air humidity	Class 1

[1)] data transmission via cellular radio modem is not possible when the Bluetooth communication connection is active; no parallel operation! After disconnecting the Bluetooth communication connection, the cellular radio modem does not initiate any self-timed cellular radio communication for 3 minutes.

Eu directives compliance

the OTT SensorLink 1000 complies with the EU directives applicable at the time of production; for details, see Declaration of Conformity (www.otthydromet.com/Service & Support/ Product Resources)

CE

Product certifications

FCC ID	
for integrated cellular modem HL7800-M [1]	N7NHL78M
for integrated Bluetooth module BlueMod+S50	OA6-S50
	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: – this device may not cause harmful interference, and – this device must accept any interference received, including interferences that may cause undesired operation
Industry Canada Approval	
for integrated cellular modem HL7800-M [1]	2417C-HL78M
for integrated Bluetooth module BlueMod+S50	4957A-S50
PTCRB [1]	certified according to NAPRD03
cellular networtk "Verizon" [1])	Verizon Open Development Certification
cellular network "AT&T" [1]	AT&T IoT Device Certification
ACMA	Conformity Levels 1, 2 and 3 in Australia; the product meets the requirements of the relevant ACMA standards under the Radiocommunications Act 1992 and the Telecommunications Act 1997. These standards are referred to in notices issued under section 182 of the Radiocommunications Act and 407 of the Telecommunications Act.

[1] only modem variant 4G Cat-M1/LTE-M

Annex A – Note on the Declaration of Conformity

If necessary, you can download the current version of the Declaration of Conformity for the OTT SensorLink 1000 from our website as a PDF file: www.otthydromet.com/Services & Support/ Product Resources!

Document number
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OTT HydroMet GmbH
Ludwigstrasse 16
87437 Kempten · Germany
Phone +49 831 5617-0
Fax +49 831 5617-209
euinfo@otthydromet.com
www.otthydromet.com