Operating instructions
**Groundwater Datalogger
OTT ecoLog 1000**
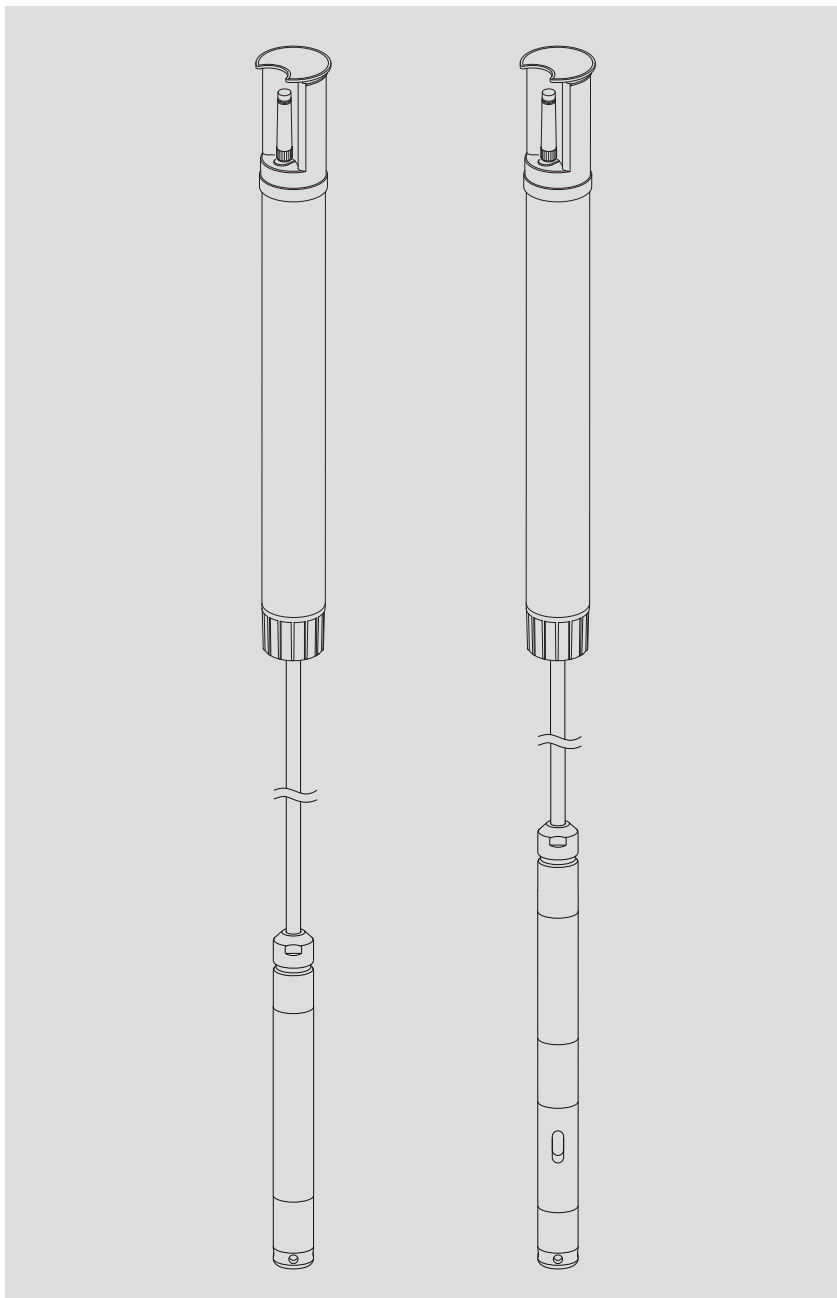
Table of contents

1 Scope of supply

▶ **OTT ecoLog 1000**
– 1 groundwater datalogger consisting of a communication unit with built-in data-logger and cellular modem with short rod antenna, pressure probe cable with pressure compensation capillary and Kevlar core for longitudinal stabilization, 2 desiccant capsules, pressure probe (optionally with integrated conductivity sensor)
– 1 external blade-antenna; SMA connector with 0.9 m connecting cable (only for use in USA in connection with AT&T cellular network)
– 1 factory acceptance test (FAT) certificate

2 Order numbers

2.1 Validity: all countries worldwide; exception USA

▶ **OTT ecoLog 1000**

	with lithium battery (26 Ah)	55.450.001.9.0
	required ordering information	
	– measuring range:	0 … 4 / 10 / 20 / 40 / 100 m
	– system length:	2 … 200 m (±1 % ±5 cm)
	– modem variant:	4G/2G (EU)
		LTE Cat-M1 (LTE-M)
	– conductivity sensor:	without/with
	– operating instructions:	without/with, in DE, EN, FR or ES

with lithium battery (26 Ah) — 55.450.001.9.0
required ordering information
– measuring range: 0 … 4 / 10 / 20 / 40 / 100 m
– system length: 2 … 200 m (±1 % ±5 cm)
– modem variant: 4G/2G (EU)
LTE Cat-M1 (LTE-M)
– conductivity sensor: without/with
– operating instructions: without/with, in DE, EN, FR or ES

without lithium battery — 55.450.011.9.0
required ordering information
– measuring range: 0 … 4 / 10 / 20 / 40 / 100 m
– system length: 2 … 200 m (±1 % ±5 cm)
– modem variant: 4G/2G (EU)
LTE Cat-M1 (LTE-M)
– conductivity sensor: without/with
– operating instructions: without/with, in DE, EN, FR or ES

▶ **Accessories [1]**

Adapter plates
for OTT top caps with cut-out
– 3" — 55.446.022.9.2
– 4" — 55.446.023.9.2
– 4.5" — 55.446.024.9.2
– 5" — 55.446.025.9.2
– 6" — 55.446.026.9.2

Universal suspension bracket — 55.446.021.9.2
for top caps from 3" upwards, without cut-out
as well as for universal installation

OTT ecoCap
Special top cap made of plastic for OTT ecoLog …
(after installation, the radio antenna of the OTT ecoLog …
is positioned above the metal observation well)
– for 2", 3" and 4" observation wells; universal design — 55.446.015.9.2
– for 3" observation well — 55.446.017.9.2
– for 4" observation well — 55.446.016.9.2
– for 5" observation well (OTT ecoCap 4" + adapter) — 55.446.052.9.2
– adapter to 4.5" observation well (for OTT ecoCap 4") — 55.530.478.3.1
– adapter to 6" observation well (for OTT ecoCap 4") — 55.530.480.3.1

[1] additional accessories – e.g. aluminium top caps, top caps with fitted radio antenna on request

OTT top cap KST
Top cap made of plastic; yellow
– for 2" observation well   24.220.099.3.2
– for 4" observation well   24.220.100.3.2
– adapter plate for OTT top cap KST 4"   55.446.424.3.1

USB flash drive with OTT Software   56.575.001.9.7
OTT HydroMet LinkComm Software for Microsoft
Windows 10 and OTT ecoLog 1000 operating instructions
in PDF format

External radio antenna   on request
for applications where the local signal strength of the
cellular network does not permit transmission from the
closed observation well (not suitable for the USA in
connection with AT&T cellular network)
cable length: 0.5 … 3.0 m

5-sided key   20.250.095.4.1
for locking OTT top caps

OTT Stripping tool   99.000.136.9.5
to shorten the OTT ecoLog 1000 pressure probe cable
Please note: this tool **must not be used** on device
variants with integrated conductivity sensor!

**! **

▶ **Spare parts/
Consumables**

Lithium battery (26 Ah)   97.800.016.9.2

Desiccant capsules   97.100.296.9.5
2 x in one aluminium bag

Communication unit with lithium battery   55.450.005.9.0
with integrated data logger and cellular modem with
short rod antenna; incl. 2 desiccant capsules

Communication unit without lithium battery   55.450.015.9.0
with integrated data logger and cellular modem with
short rod antenna; incl. 2 desiccant capsules

Pressure probe   55.450.006.9.0
with permanently fixed pressure probe cable;
measurement of: water level/temperature
required order details
– measuring range: 0 … 4 / 10 / 20 / 40 / 100 m
– cable length: 2 … 200 m (±1 % ±5 cm)

Pressure probe with integrated conductivity sensor on request
with permanently fixed pressure probe cable;
measurement of: water level/temperature/conductivity;
required order information
– measuring range: 0 … 4 / 10 / 20 / 40 / 100 m
– cable length: 2 … 200 m (±1 % ±5 cm)

Calibration container   55.445.025.9.2

Conductivity calibration solution
–   0.1 mS/cm; 1000 ml   H013610HY
–   0.5 mS/cm; 1000 ml   H013770HY
–   1.412 mS/cm; 1000 ml   H013620HY
– 12.856 mS/cm; 1000 ml   H013640HY
–   47.6 mS/cm; 1000 ml   H013650HY

2.2 Validity: USA

▶ **OTT ecoLog 1000**

with lithium battery (26 Ah)
modem variant: LTE Cat-M1 (LTE-M)

– 0-4 m / 0-13 ft [1]		5545000190-4U
	with conductivity sensor	5545000190-4UC
– 0-10 m / 0-33 ft		5545000190-10U
	with conductivity sensor	5545000190-10UC
– 0-20 m / 0-66 ft		5545000190-20U
	with conductivity sensor	5545000190-20UC
– 0-40 m / 0-131 ft		5545000190-40U
	with conductivity sensor	5545000190-40UC
– 0-100 m / 0-328 ft		5545000190-100U
	with conductivity sensor	5545000190-100UC

without lithium battery
modem variant: LTE Cat-M1 (LTE-M)

– 0-4 m / 0-13 ft [1]		5545001190-4U
	with conductivity sensor	5545001190-4UC
– 0-10 m / 0-33 ft		5545001190-10U
	with conductivity sensor	5545001190-10UC
– 0-20 m / 0-66 ft		5545001190-20U
	with conductivity sensor	5545001190-20UC
– 0-40 m / 0-131 ft		5545001190-40U
	with conductivity sensor	5545001190-40UC
– 0-100 m / 0-328 ft		5545001190-100U
	with conductivity sensor	5545001190-100UC

Pressure probe cable
system length: 7 … 656 ft (±1 % ±0.17 ft); per ft   CABLESENSOR-FT
longer on request

Operating instructions   55.450.001.B.E
in EN

▶ **Accessories**

Adapter plates
for OTT top caps with cut-out

– 3"	55.446.022.9.2
– 4"	55.446.023.9.2
– 4.5"	55.446.024.9.2
– 5"	55.446.025.9.2
– 6"	55.446.026.9.2

Universal suspension bracket   55.446.021.9.2
for top caps from 3" upwards, without cut-out
as well as for universal installation

USB flash drive with OTT Software   56.575.001.9.7
OTT HydroMet LinkComm Software for Microsoft
Windows 10 and OTT ecoLog 1000 operating
instructions in PDF-format

External radio antenna   97.980.162.9.5
for cellular network with Cat M1 technology
(mandatory in the AT&T cellular network (USA);
for order numbers "..E" included in the scope of delivery)
blade-antenna; cable length 0.9 m

OTT Stripping tool   99.000.136.9.5
to shorten the OTT ecoLog 1000 pressure probe cable
! **Please note:** this tool **must not be used** on device variants
with integrated conductivity sensor!

[1] measuring range in meter / feet

Lithium battery (26 Ah)	97.800.016.9.2
Desiccant capsules 2 x in one aluminium bag	97.100.296.9.5

Communication unit
with integrated data logger and cellular modem;
incl. 2 desiccant capsules

– with lithium battery (26 Ah)	5545000590-U
– without lithium battery	5545001590-U

Pressure probe
with permanently fixed pressure probe cable;
measurement of: water level/temperature

– 0-4 m / 0-13 ft [1]	5545000690-4
– 0-10 m / 0-33 ft	5545000690-10
– 0-20 m / 0-66 ft	5545000690-20
– 0-40 m / 0-131 ft	5545000690-40
– 0-100 m / 0-328 ft	5545000690-100

**Pressure probe with
integrated conductivity sensor**
with permanently fixed pressure probe cable;
measurement of: water level/temperature/conductivity

– 0-4 m / 0-13 ft [1]	5545000690-4C
– 0-10 m / 0-33 ft	5545000690-10C
– 0-20 m / 0-66 ft	5545000690-20C
– 0-40 m / 0-131 ft	5545000690-40C
– 0-100 m / 0-328 ft	5545000690-100C

Pressure probe cable
for spare pressure probe; per ft

	CABLESENSOR-FT
Calibration container	55.445.025.9.2

Conductivity calibration solution

– 0.1 mS/cm; 1000 ml	H013610HY
– 0.5 mS/cm; 1000 ml	H013770HY
– 1.412 mS/cm; 1000 ml	H013620HY
– 12.856 mS/cm; 1000 ml	H013640HY
– 47.6 mS/cm; 1000 ml	H013650HY

[1] measuring range in meter / feet

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.

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

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

3.2 Explanation of 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 following signal words (Warning/Caution) and 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 lower 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

▶ Read these operating instructions before using the OTT ecoLog 1000 for the first time! Become completely familiar with the installation and operation of the OTT ecoLog 1000 and its accessories! Keep these operating instructions for later reference.

▶ Only use the OTT ecoLog 1000 as described in the operating instructions! The intended use of the OTT ecoLog 1000 is to measure the water level, water temperature and specific conductivity (optional) of natural ground waters (special application: surface waters) and to transmit measured values via a cellular network. Any other use is not permitted!
For further information → refer to Chapter 4, "Introduction".

▶ Only install and maintain the OTT ecoLog 1000 if you are appropriately qualified to do so. If necessary, arrange training by OTT HydroService.

▶ Please note all safety and warning information given within the individual work steps.

▶ Ensure the electrical, mechanical, and climatic specifications listed in the technical data are adhered to.
For further information → refer to Chapter 22, "Technical data".

▶ When operating the OTT ecoLog 1000, keep a minimum distance of 0.2 metres between radio antennae and
– people, as well as
– other electrical equipment/antennae!

▶ In AT&T cellular networks (USA) it is mandatory to use a special external radio antenna specified by OTT (included in the scope of delivery; alternatively see accessories). Operation with short rod antenna is not permitted!

▶ Handle the pressure probe cable with care. Do not kink the cable or pull it across sharp edges!

▶ Do not make any changes or retrofits to the OTT ecoLog 1000! If changes or retrofits are made, all guarantee claims are voided.

▶ Have a faulty OTT ecoLog 1000 inspected and repaired by our repair center. On no account carry out repairs yourself!
For further information → refer to Chapter 20, "Repair".

▶ After putting the unit out of service, properly dispose of the OTT ecoLog 1000. On no account put the OTT ecoLog 1000 into the normal domestic waste.
For further information → refer to Chapter 21, "Note about the disposal of used units".

Special note on the use of the OTT ecoLog 1000 within the US State of California:
WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer or birth defects or other reproductive harm. For more information, go to "www.P65Warnings.ca.gov".

3.4 Radio frequency approvals

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

The antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users may not be provided with the module installation instructions.
The maximum antenna gain including cable lass for compliance with radiated power limits, RF exposure requirements and the categorical exclusion requirements of 2.1091 is 8.5 dBi for 1900 MHz (LTE FDD 2/25) and 1700 MHz (LTE FDD 4), 5.5 dBi for 1700 MHz (LTE TDD 66), 9 dBi for 800 MHz/700 MHz (LTE FDD 5/12/13/14/17/26).

Industry Canada Approval
This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

4 Introduction

The OTT ecoLog 1000 groundwater datalogger is designed to precisely measure and store water level, water temperature and optionally the specific electrical conductivity in ground waters and to transmit these measured values through a cellular network.

The pressure probe equipped with a relative pressure probe cell uses the hydrostatic pressure of the water column to determine the water level. As a reference, a pressure compensation capillary in the pressure probe cable provides the measuring cell with the current ambient air pressure. Erroneous measurement results due to atmospheric air pressure fluctuations are thus eliminated.

The device variant with integrated conductivity sensor measures the specific electrical conductivity via a 4-electrode conductivity sensor with integrated temperature sensor. The measuring electrodes are made of graphite.

The method for temperature compensation of the conductivity measurement as well as the reference temperature used can be selected; likewise the calculation method of the salinity.

The OTT ecoLog 1000 is available in five measuring ranges:
▶ 0 …   4 m / 0 …   13 ft water column (0 ... 0.4 bar)
▶ 0 …   10 m / 0 …   33 ft water column (0 ... 1 bar)
▶ 0 …   20 m / 0 …   66 ft water column (0 ... 2 bar)
▶ 0 …   40 m / 0 … 131 ft water column (0 ... 4 bar)
▶ 0 … 100 m / 0 … 328 ft water column (0 ... 10 bar)

Based on a reference value that is input during startup, the OTT ecoLog 1000 default setting provides measurement results in the form of depth values. Alternatively, levels or pressure values are possible. The measurement intervals (sample intervals) can be preselected as necessary.

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 requirement of a measuring site. LinkComm is available for PCs running the Microsoft Windows operating system. It is also available as an mobile app for smartphones and tablets under Android and iOS.

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

The OTT ecoLog 1000 includes a built-in cellular modem (with SMA antenna connector) that is used for remote data transfer and remote parameterizing via the cellular network. The cellular modem is available in two versions for 4G/2G or LTE Cat-M1 (LTE-M) mobile transmission services. The remote data transfer can be optionally carried out by SMS text [1] messages or via IP data communication via the mobile radio standard 2G/4G. If necessary – e.g. when the signal strength of the cellular network is low at the installation site – the factory installed radio antenna may be replaced by an external one [1].

The OTT ecoLog 1000 is installed by simply hanging it into observation wells of 2" in diameter and above. For this purpose, various adapters/universal suspension brackets are available as accessories. The power supply is provided by a lithium battery with a capacity of 26 Ah. Battery lifetime [2] is (depending on additional parameters) at least 5 [3]/10 years, taking into account one single remote data transfer per day.

The communication unit of the OTT ecoLog 1000 can withstand temporary flooding (for details, refer to Chapter 22, "Technical data").

[1] in AT&T cellular networks (USA) always use a special, external blade-antenna
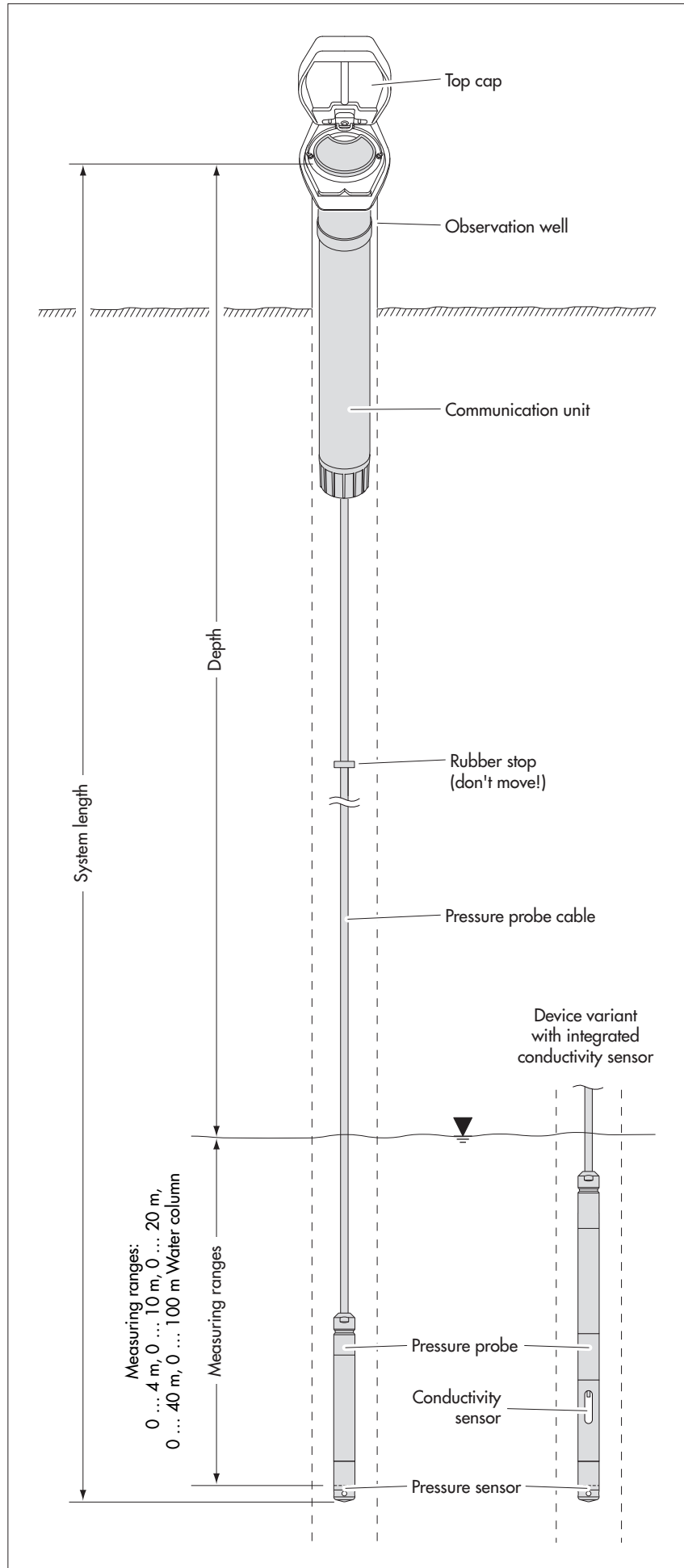[2] at 20° ambient temperature
[3] device variant with integrated conductivity sensor

Fig. 1: Setup of a groundwater measurement station using the OTT ecoLog 1000.

The OTT ecoLog 1000 essentially consists of three components: communication unit, pressure probe cable, and pressure probe.

OTT ecoLog 1000 system length = length of communication unit + cable length + length of pressure probe. (The system length is required when ordering an OTT ecoLog 1000. When setting the OTT ecoLog 1000 operating parameters, the system length is not required.)

The rubber stop attached to the pressure probe cable prevents the pipe casing from falling when the communication unit is open. Do not move the rubber stop!

Top cap

Observation well

Communication unit

Depth

System length

Rubber stop (don't move!)

Pressure probe cable

Device variant with integrated conductivity sensor

Measuring ranges: 0 … 4 m, 0 … 10 m, 0 … 20 m, 0 … 40 m, 0 … 100 m Water column

Measuring ranges

Pressure probe

Conductivity sensor

Pressure sensor

WARNING

Risk of fire and explosion due to improper handling of batteries

▶ Only use the specified lithium battery (26 Ah) from OTT HydroMet.
▶ Do not charge the battery.
▶ Avoid electrical short-circuits.
▶ Avoid mechanical damage.
▶ Do not open the battery.
▶ Do not throw the battery into a fire and do not expose it to temperatures of above +100 °C / 212 °F.
▶ Do not carry out any soldering work on the battery.
▶ Do not pull the battery connecting cable.
▶ Protect the battery from moisture.

CAUTION

Risk of crushing fingers/hands during installation and maintenance

Fingers/hands can become trapped or crushed when lowering the pressure sensor into the observation well and when closing the housing tube.

▶ Wear protective gloves during installation and maintenance.

CAUTION

Risk of burns due to hot surface at high ambient temperature

The metal parts of the OTT ecoLog 1000 housing can become very hot at high ambient temperatures [1]. This can result in burns.

▶ Wear protective gloves during installation and maintenance.

[1] > approx. +60 °C / 140 °F

Please note: Properly dispose of exhausted batteries! Do not put them into domestic waste!

Suitable battery type
▶ Lithium battery with connector; 3.6 V / 26 Ah; see accessories

Battery lifetime
With a sample interval of 1 hour; one single remote data transfer per day and one local communication (BLE) per month: at least 10 years; for the device variant with integrated conductivity sensor: at least 5 years.

Remarks:
▶ The OTT ecoLog 1000 starts measuring within a few seconds after inserting the batteries (there is no ON/OFF switch).
▶ If the OTT ecoLog 1000 is to be shut off → disconnect the batteries. This will prevent the batteries from draining prematurely and will stop any recording of unusable measurements.
▶ When transporting the OTT ecoLog 1000 → disconnect the batteries. This will prevent the batteries from draining prematurely and will stop any recording of unusable measurements.

5.1 Power supply with lithium battery

How to insert the lithium battery

- Loosen the communication unit cap.
- Slide the cap and pipe casing of the communication unit approx. 50 cm / 1.6 ft towards the pressure probe cable.

Fig. 2: Setup of the OTT ecoLog 1000 communication unit.
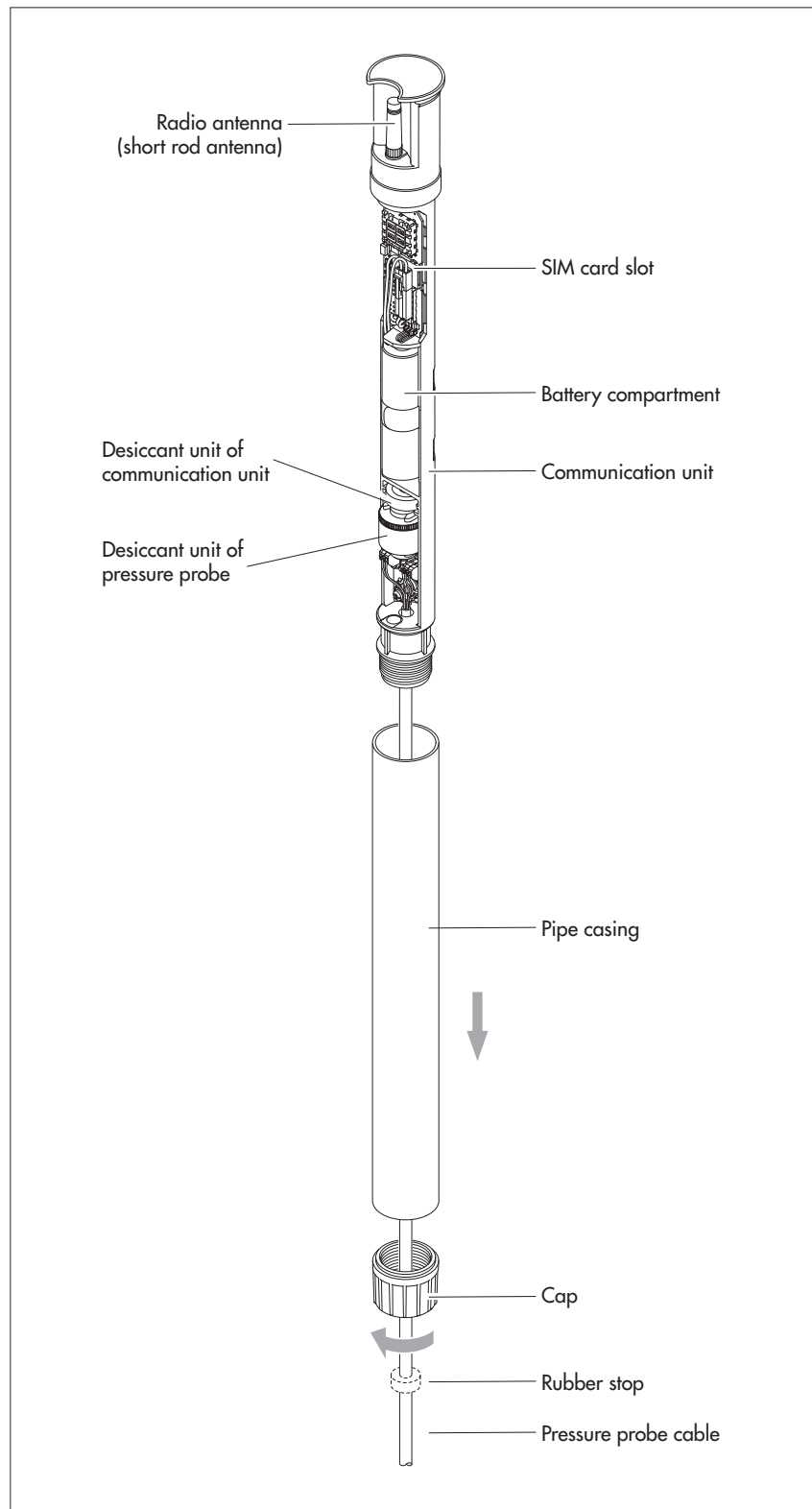
Radio antenna (short rod antenna)

SIM card slot

Battery compartment

Desiccant unit of communication unit

Communication unit

Desiccant unit of pressure probe

Pipe casing

Cap

Rubber stop

Pressure probe cable

■ Connect the lithium battery plug to the socket of the printed circuit board, as shown in figure 3.

■ Open the Velcro strip of the battery compartment.
■ Insert the lithium battery into the battery compartment (connecting cable guidance, see Fig. 4).
■ Firmly close the Velcro strip around the lithium battery.
■ Slide the cap and the pipe casing of the communication unit back up to the stop. Do not bend or pinch the battery lead.
■ Reinstall the cap to the communication unit.

Check the battery voltage as follows

■ Use the operating software "LinkComm" to establish a communication connection to the OTT ecoLog 1000 (Refer to Chapter 9.2).
■ If not yet selected: click on the "Dashbord" button.
■ Click on the "Measure All" button → the OTT ecoLog 1000 starts an instantaneous value measurement → the measured value "Battery used (est.)" indicates the energy drawn from the battery so far in milliampere hours (mAh).
■ Criterion for replacing the battery: milliampere hour drawn > approx. 20 000 mAh → replace the battery (for technical reasons, the battery voltage displayed cannot not be used as a criterion for replacing the battery.)
■ Click on the "Disconnect" button.
■ Quit LinkComm.

How to replace the lithium battery

■ Open the top cap/observation well cover.
■ Pull and hold the communication unit approximately 1 m / 3.3 ft out of the observation well (a second person would be useful).
■ Loosen the communication unit cap.
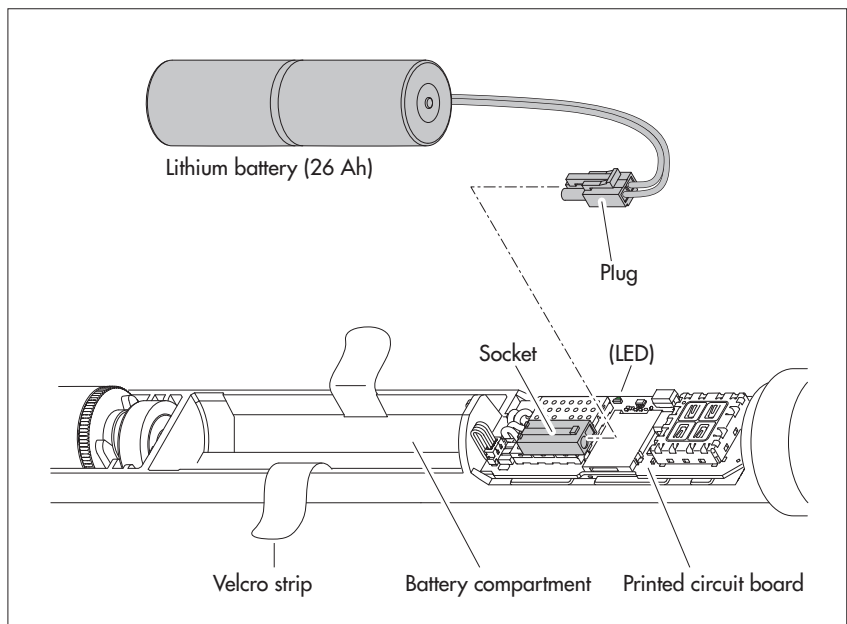■ Slide the cap and pipe casing of the communication unit approx. 50 cm / 1.6 ft towards the pressure probe cable. (The rubber stop located on the pressure probe cable (refer to Fig. 2) prevents the pipe casing from falling. Do not move the rubber stop!)
■ Disconnect the lithium battery plug from the socket of the printed circuit board, while pressing the connector latch.
■ Open the Velcro strip of the battery compartment.
■ Remove the exhausted lithium battery and make sure not to pull the lead!
■ Within 40 seconds, connect the lithium battery plug to the socket of the printed circuit board, as shown in figure 3.
■ Insert the lithium battery into the battery compartment (connecting cable guidance, see Fig. 4).
■ Firmly close the Velcro strip around the lithium battery.
■ Slide the cap and the pipe casing of the communication unit back up to the stop. Performing this, do not bend or pinch the battery lead.
■ Reinstall the cap to the communication unit.
■ Slowly and carefully reinsert the communication unit into the observation well.
■ Reset value "Power consumption" (energy taken from the battery in milliampere hours) to "0" (LinkComm: "Service" button | "Reset PBAT").
■ Close the top cap/observation well cover.

Remarks:

▶ The OTT ecoLog 1000 stores the measured values in a non-volatile memory. There is no loss of data when changing battery.
This also applies to storage without battery for a long period.
▶ If replacing the battery takes longer than approx. 40 seconds the time (and possibly the date) will have to be re-entered, (refer to Chapter 13, "Setting date and time").
▶ When replacing the battery, we recommend changing the desiccant capsules at the same time, (refer to Chapter 17.2, "Replacing the desiccant capsules").

5.2 Note on power supply using alkaline batteries

Power supply with alkaline batteries is not possible for the OTT ecoLog 1000!

6 Inserting a SIM card

For communicating over the cellular network, a SIM card is required
(Type Mini-SIM card).

CAUTION	**Risk of crushing fingers/hands during installation and maintenance**
⚠	Fingers/hands can become trapped or crushed when lowering the pressure sensor into the observation well and when closing the housing tube. ▶ Wear protective gloves during installation and maintenance.

| CAUTION	**Risk of burns due to hot surface at high ambient temperature**
⚠	The metal parts of the OTT ecoLog 1000 housing can become very hot at high ambient temperatures [1]. This can result in burns. ▶ Wear protective gloves during installation and maintenance. [1] > approx. +60 °C / 140 °F

How to insert the SIM card:

■ Loosen the communication unit cap.
■ Slide the cap and pipe casing of the communication unit approx. 50 cm / 1.6 ft towards the pressure probe cable, refer to Fig. 2.
■ Temporarily disconnect battery (refer to Section 5.1).

■ Make sure not to touch the gold-colored contacts of the SIM card!
Insert the SIM card into the SIM card slot as shown in Fig. 4 (with the bevelled edge pointing left) until you hear it clicking into place. Make sure that the SIM card is fully inserted and engaged!

Fig. 4: Inserting the SIM card.

SIM card   SIM card slot
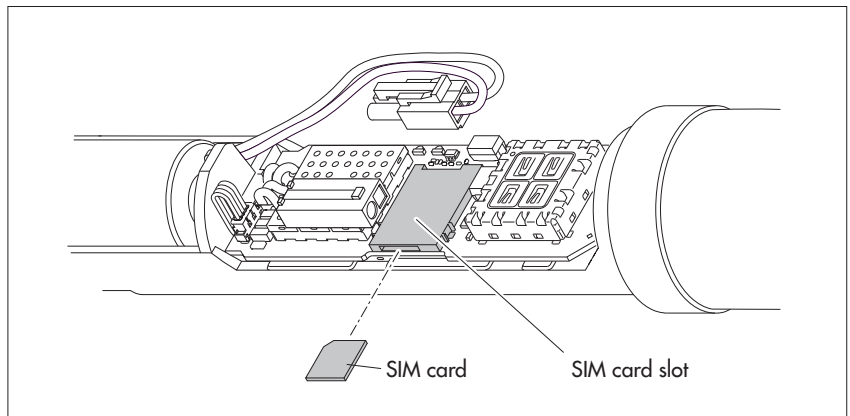
■ Reconnect battery (refer to Section 5.1).
■ Slide the cap and the pipe casing of the communication unit back up to the stop. Performing this, do not bend or pinch the battery lead.
■ Reinstall the cap to the communication unit.

Changing/removing the SIM card

■ Press the SIM card approx. 1 mm further into the SIM card slot before letting go. The SIM card will then be ejected a few millimeters and can easily be pulled out.

7 If required: Connecting an external radio antenna

Note:
▶ An external radio antenna must be installed at a distance of at least 0.20 m / 0.7 ft from people and other electrical equipment and antennae!
▶ Further accessories for optimizing the radio conditions at the measuring point are available on request (e.g. plastic top caps, top caps with attached or integrated radio antenna).

7.1 External radio antenna at low signal strength

If the local signal strength of the cellular network prevents transmitting from the closed observation well, an external radio antenna (accessory) is to be connected to the OTT ecoLog 1000. In this case, only the dedicated external radio antenna specified by OTT must be used for this particular application (cable length max. 3 m / 9.8 ft).

For this installation, an individual solution to fasten the external antenna must be found, depending on the station.

If the observation well is closed by a top cap you need to have a hole in the observation well so that the antenna cable can be routed to the outside (to prevent rain water from entering into the observation well, it is recommended to place the hole on the side). If necessary, seal the cable feedthrough.

How to connect an external radio antenna

Depending on the particular local situation (diameter of the observation well, type of the top cap, and other mounting characteristics), the external radio antenna must be connected prior to or during installation. Please note the relevant chapters 8.2 through 8.4.

- Carefully unscrew the factory mounted radio antenna (short rod antenna) by hand.
- Fasten the radio antenna using the supplied washer and nut. (A drill hole for the thread of the external antenna is required: Ø approx. 18 mm).
- Route the plug of the antenna cable through a hole in the observation well.
- Connect the plug to the antenna socket and hand-tighten the locknut.

Fig. 5: Connecting an external radio antenna.

Radio antenna

External radio antenna

Plug of external radio antenna

Antenna socket

Communication unit

7.2 Special case: external radio antenna for cellular network with LTE-Cat M1 technology in the AT&T cellular network (USA)

! An OTT ecoLog 1000 (modem variant: LTE Cat-M1 (LTE-M)) intended for operation in the AT&T cellular network (USA) is supplied with an external blade-antenna. For this application it is mandatory to use the external blade-antenna specified by OTT (cable length: 0.9 m / 3 ft). Operation with short rod antenna is not permitted!

For this installation, an individual solution to fasten the external blade-antenna must be found, depending on the station.
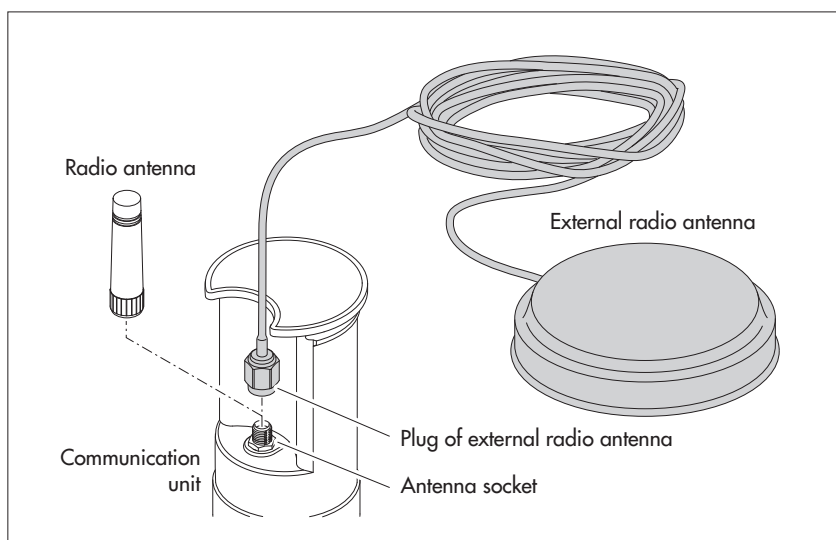
If the observation well is closed by a top cap you need to have a hole in the observation well so that the antenna cable can be routed to the outside (to prevent rain water from entering into the observation well, it is recommended to place the hole on the side). If necessary seal the cable feedthrough.

How to connect the external blade-antenna

Depending on the particular local situation (diameter of the observation well, type of the top cap, and other mounting characteristics), the external radio antenna must be connected prior to or during installation. Please note the relevant chapters 8.2 through 8.4.

- ■ Loosen the lock nut of the factory mounted connector of the external blade-antenna and carefully unscrew the connector.
- ■ Fix the blade-antenna with the double-sided adhesive tape.
- ■ Route the plug of the antenna cable through a hole in the observation well.
- ■ Connect the plug to the antenna socket and hand-tighten the locknut.

Fig. 6: Connecting the external blade-antenna.

External blade-antenna (for AT&T cellular network)

Communication unit

Plug of external blade-antenna
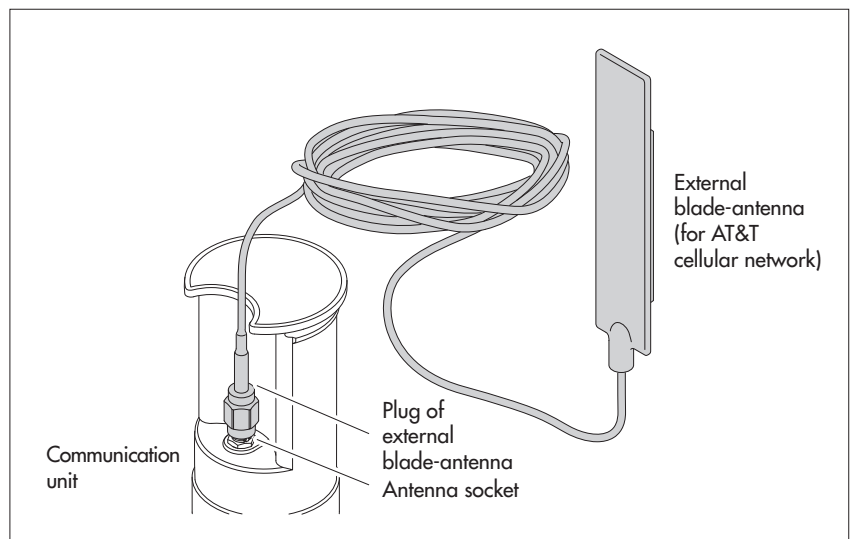
Antenna socket

WARNING

Risk of explosion due to spark formation and electrostatic charge

If the OTT ecoLog 1000 is operated in an explosive atmosphere, there is a risk of the atmosphere igniting. This can cause an explosion involving a risk of very severe injury and damage.

▶ Never operate the OTT ecoLog 1000 in potentially explosive areas (e.g. waste water channels). The OTT ecoLog 1000 does not have EX protection (explosion protection).

WARNING

Health hazard due to malfunctioning of cardiac pacemakers

Electromagnetic fields at the mobile wireless antenna on the OTT ecoLog 1000 can lead to malfunctioning of cardiac pacemakers. This can be life-threatening for users of pacemakers.

▶ Always maintain a safety distance of 0.2 / 0.7 ft metres between the mobile wireless antenna and personnel during installation and operation of the OTT ecoLog 1000

WARNING

Risk of strangulation by pressure sensor cable

Hanging a pressure sensor cable around the neck during transportation/installation can lead to strangulation if sufficient care is not exercised.

▶ Never hang the pressure sensor cable around the neck.

CAUTION

Risk of crushing fingers/hands during installation and maintenance

Fingers/hands can become trapped or crushed when lowering the pressure sensor into the observation well and when closing the housing tube.

▶ Wear protective gloves during installation and maintenance.

CAUTION

Risk of burns due to hot surface at high ambient temperature

The metal parts of the OTT ecoLog 1000 housing can become very hot at high ambient temperatures [1]. This can result in burns.

▶ Wear protective gloves during installation and maintenance.

[1] > approx. +60 °C / 140 °F

The OTT ecoLog 1000 is installed by hanging it into the observation well.
The necessary accessories and type of installation vary depending on the diameter of the observation well and the design of the top cap:

▶ 2" observation wells   refer to 8.1
OTT top cap **with** cut-out for adapter plate
▶ 4" or 6" observation wells,   refer to 8.2
OTT top cap **with** cut-out for adapter plate
▶ Observation wells of 3" in diameter and above,   refer to 8.3
Top caps **without** cut-out for adapter plate
▶ Special case: observation wells beginning at 3" in diameter   refer to 8.4
without top cap, universal installation

Fig. 7: Accessories for installation – Part 1

1 = drilled hole for OTT ecoLog 1000
2 = cut-out for screws of the top cap
3 = cut-out for contact gauge

(Each adapter plate consists of two parts and three bolts. In the figure, the adapter plates are shown in installed condition (on delivery, they are not installed). Furthermore, an O-ring is supplied with the adapter plates.

6" adapter plate
(4,5" and 5"
identical in form)

4" adapter plate

3" adapter plate
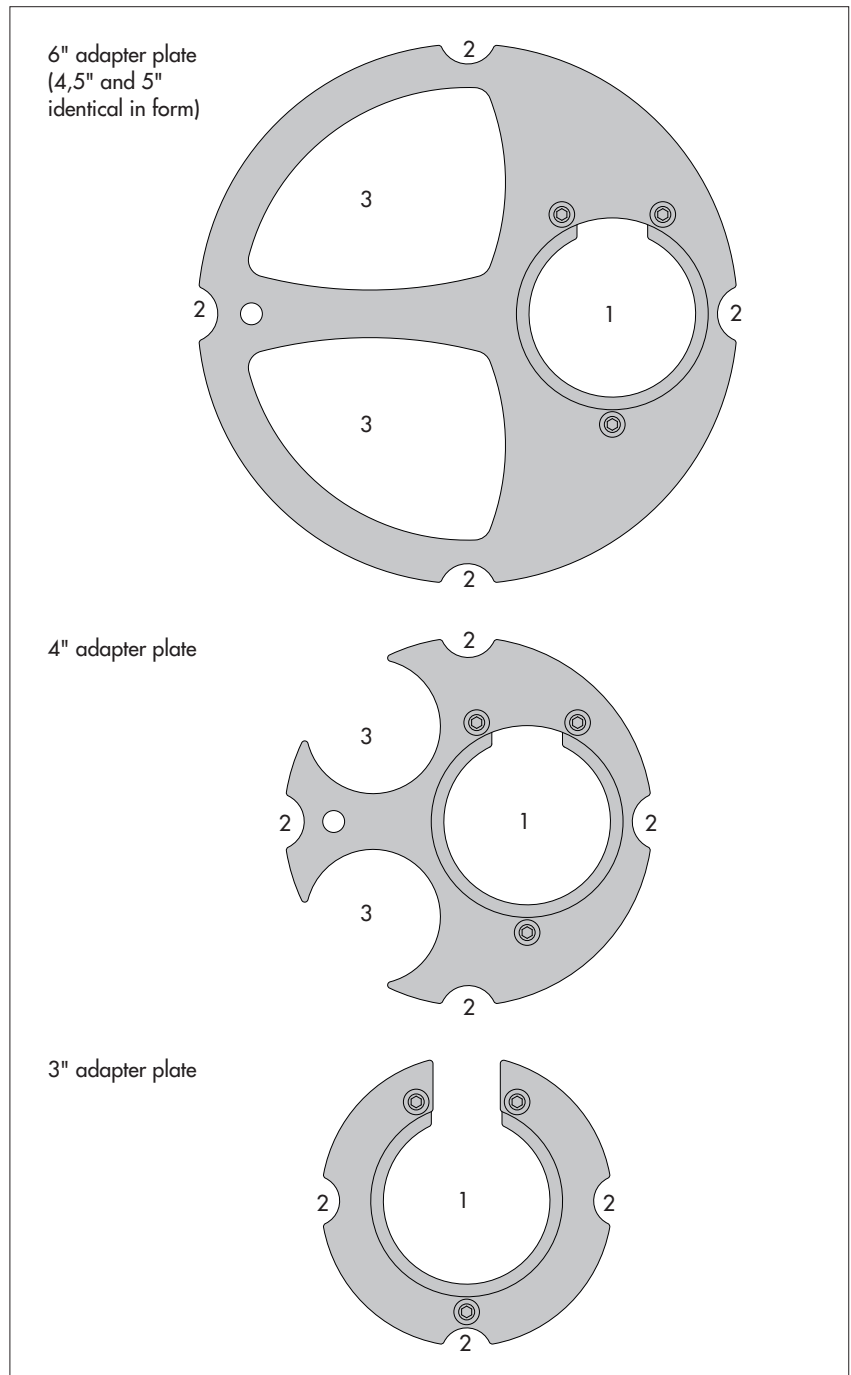
Fig. 8: Accessories for installation – Part 2

1 = drilled hole for OTT ecoLog 1000

Universal suspension bracket
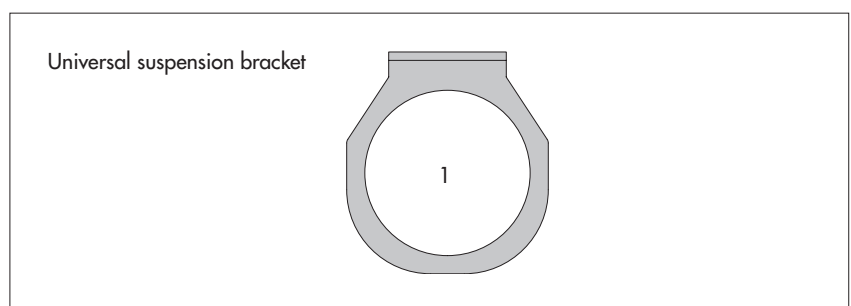
8.1 Installing the unit into 2" observation wells, top cap with cut-out

▶ Required accessories: 2" OTT top cap with cut-out

How to install the OTT ecoLog 1000

■ Preliminary work: If not already done, install battery and SIM card, refer to Chapter 5 and 6.
■ Open the top cap.
■ Determine the current depth using a contact gauge and note the measured value.
■ Insert the pressure probe into the observation well.

! ■ **Slowly** and **carefully** lower the pressure probe by means of the pressure probe cable!

■ Insert the communication unit into the observation well until the upper part of the communication unit is fully seated on the top cap, refer to Fig. 9.
■ Set the operating parameters, refer to Chapter 9.
■ Close the top cap.

Fig. 9: Installing the OTT ecoLog 1000 into a 2" observation well.

OTT top cap

Communication unit
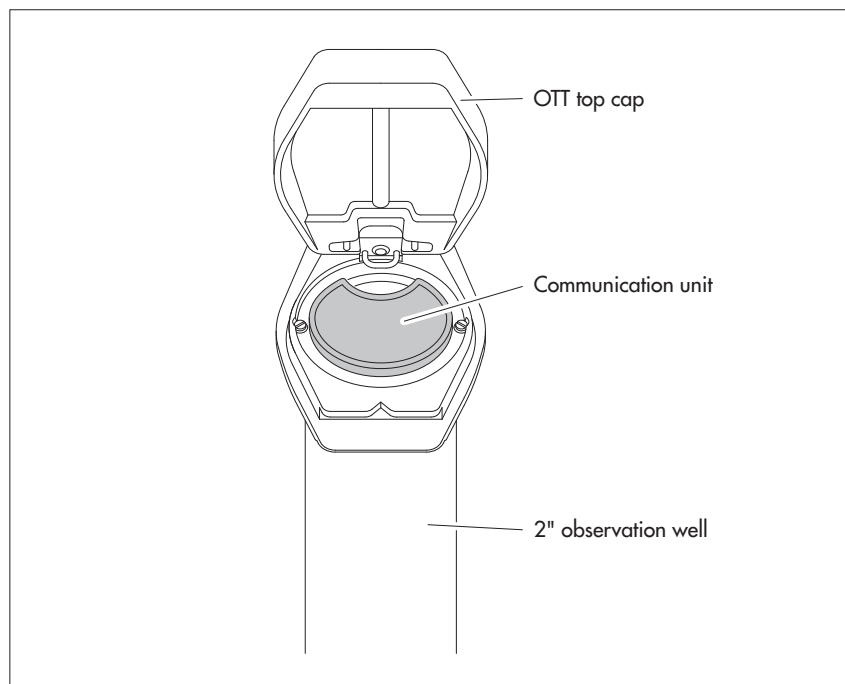
2" observation well

8.2 Installing the unit into 3", 4", 4.5", 5" or 6" observation wells, top cap with cut-out for adapter plate

▶ Required accessories: OTT top cap with appropriately sized cut-out and compatible adapter plate (incl. O-Ring).

How to install the OTT ecoLog 1000

■ Preliminary work: If not already done, install batteries and SIM card, refer to Chapter 5 and 6.

■ Put the O-ring over the upper part of the communication unit and slide 20 mm down.

■ Slide the lower part of the adapter plate (horseshoe-shaped) below the communication unit over the pressure probe cable and, on the communication unit, slide it up horizontally until it touches the O-ring.

■ Slightly tilt the lower part of the adapter plate and, while rotating it, slide it up over the O-ring.

■ Slide the O-ring and the lower part of the adapter plate up until the O-ring is seated in one of the grooves provided for it.

■ Assemble the required upper part of the adapter plate (3", 4", 4.5", 5" or 6") as shown in Figure 10 with the lower part using three M 2.5 socket head bolts.

■ Open the top cap.

■ 3" observation wells: Determine the current depth using a contact gauge and note the measured value.

■ Insert the pressure probe into the observation well.

! ■ **Slowly** and **carefully** lower the pressure probe into the observation well with the pressure probe cable, refer to Fig. 11!

■ Insert the communication unit with adapter plate assembled into the observation well until the adapter plate and the upper part of the communication unit are fully seated on the top cap. Align as shown in Figure 12.

■ 4" and 6" observation wells: Use a contact gauge to determine the current depth and record it (in the adapter plate, there is a cut-out for the contact gauge).

■ Set the operating parameters, refer to Chapter 9.

■ Close the top cap.

Fig. 10: Install the adapter plate to the upper part of the communication unit.

Example: 4" observation well.
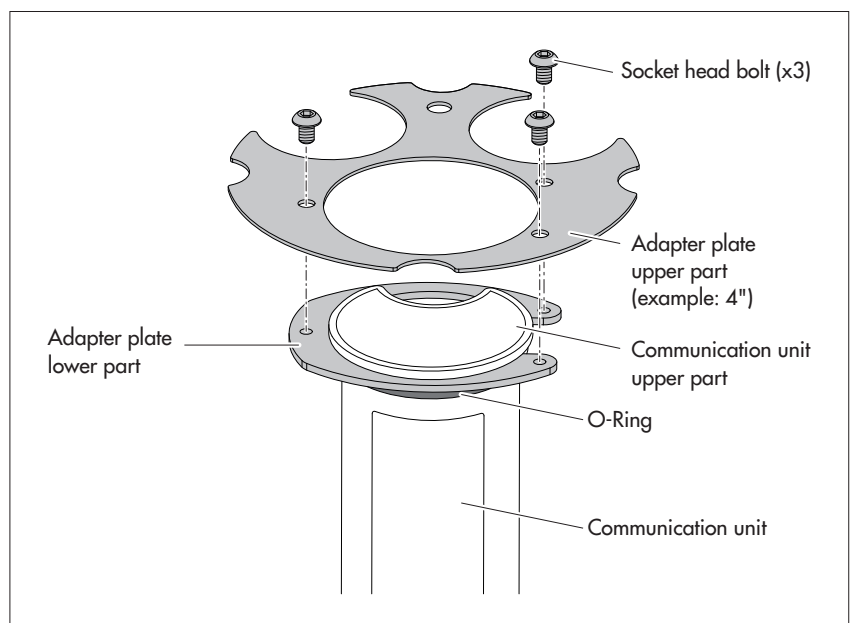
• **Remark:** As an alternative to the procedure described above, you may install the adapter plate independently of the communication unit. In this case, you have to feed the pressure probe through the O-ring and the hole in the adapter plate and to pull the entire pressure probe cable.

Fig. 11: Feed the communication unit and adapter plate into the observation well.

(Illustrated by example: device variant without conductivity sensor.)

Adapter plate — Communication unit upper part

Cut-out for OTT ecoLog 1000

Communication unit

Top cap

Pressure probe cable

Pressure probe
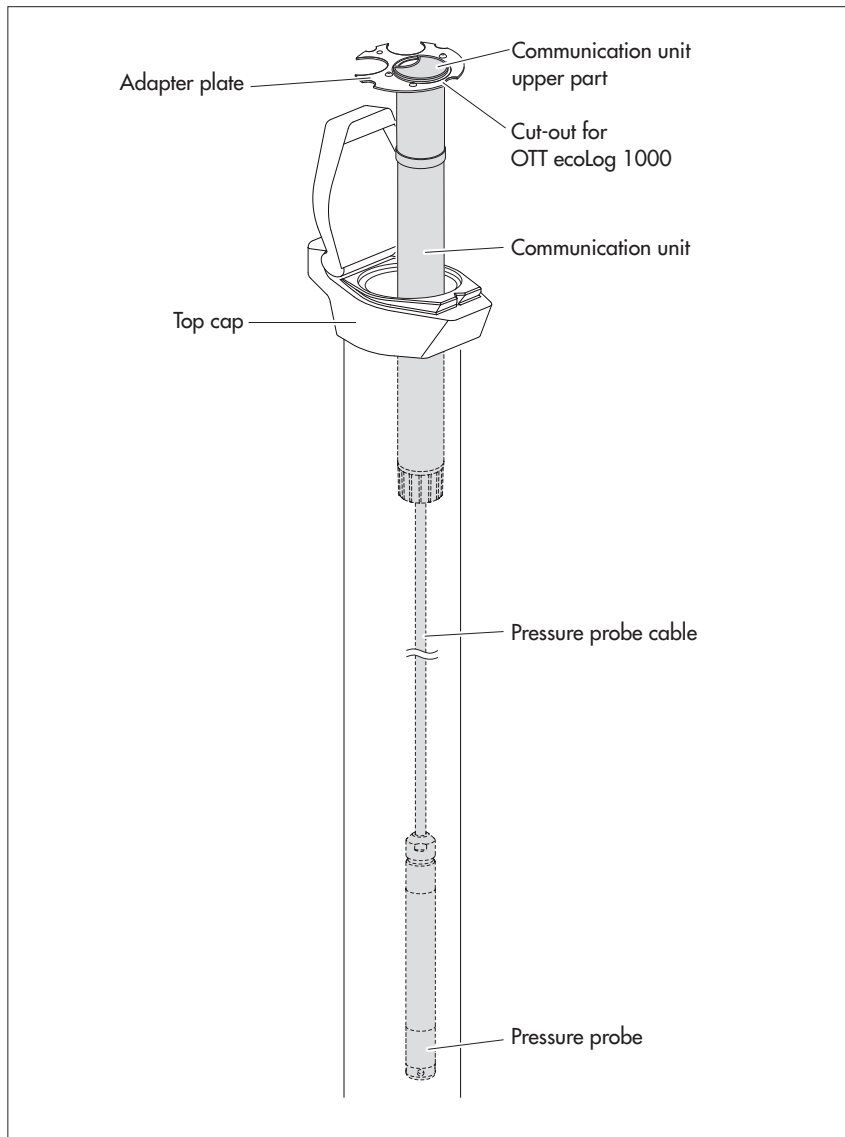
Fig. 12: Installing the OTT ecoLog 1000 into a 3" to 6" observation well.

Example: 4" observation well.

OTT top cap

4" adapter plate

Cut-out for contact gauge

Communication unit upper part
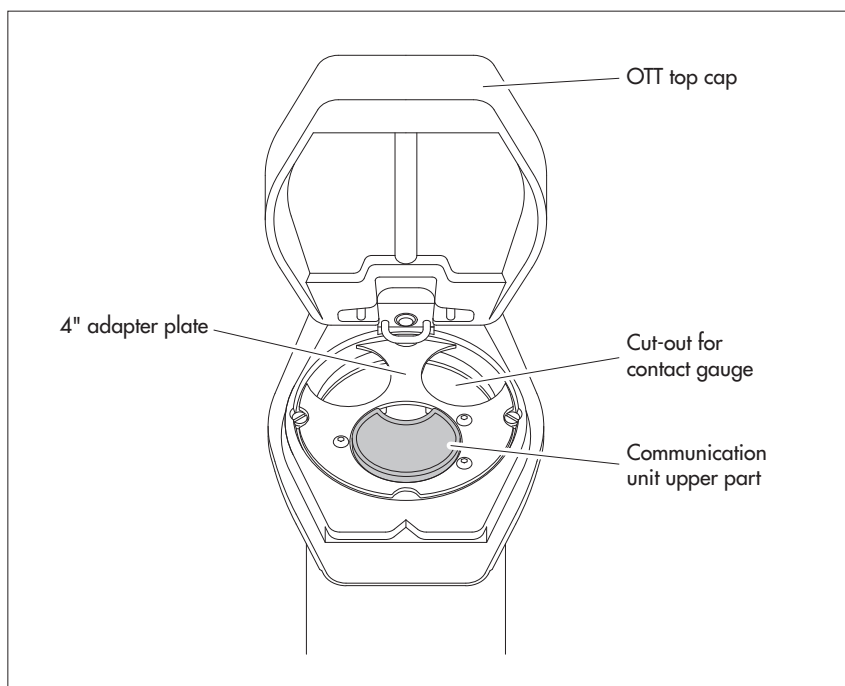
8.3 Installing the unit into observation wells of 3" in diameter and above, top cap without cut-out for adapter plate

For this installation case, an individual solution to fasten the OTT ecoLog 1000 must be found depending on the station. Example: fix the universal suspension bracket using an M6 hex head bolt/hex nut laterally to the upper end of the observation well.

▶ Required accessories: universal suspension bracket, mounting bolts, e.g.: M6 hex head bolt, washer, and M6 hex nut (all made of stainless steel).

How to install the OTT ecoLog 1000

■ Preliminary work: If not already done, install battery and SIM card, refer to Chapter 5 and 6.
■ Open the top cap.
■ Drill 2 holes (Ø 6.5 mm, 20 mm apart) laterally into the upper end of the observation well. The universal suspension bracket is to be mounted in such a way that there is a gap of a few millimeters between the top cap and the upper part of the communication unit with the top cap closed.
■ Attach the universal suspension bracket to the observation well using two M6 hex head bolts, washers, and M6 hex nuts. Use the two lower of the three drilled holes of the universal suspension bracket, refer to Fig. 13.
■ Pass the pressure probe through the cut-out of the universal suspension bracket.
■ **Slowly** and **carefully** lower the pressure probe into the observation well with the pressure probe cable.
■ Pass the communication unit through the holes of the universal suspension bracket until the communication unit is seated on the universal suspension bracket, refer to Fig. 14.
■ Determine the current depth using a contact gauge and note the measured value.
■ Set the operating parameters, refer to Chapter 9.
■ Close the top cap.

Remark: If protection against vandalism is required M6 threads are to be tapped into the observation well instead of mounting the unit by means of hex nuts.

Fig. 13: Mounting diagram for universal suspension brackets in observation wells of 3" and above.

Example: 4" observation well

Minimum clearance (A) of the upper hole to the upper edge of the opened top cap: 43 mm!

2x hex nut, 2x washer

Cut-out for OTT ecoLog 1000

2x drilled hole, Ø 6.5 mm 20 mm clearance

A

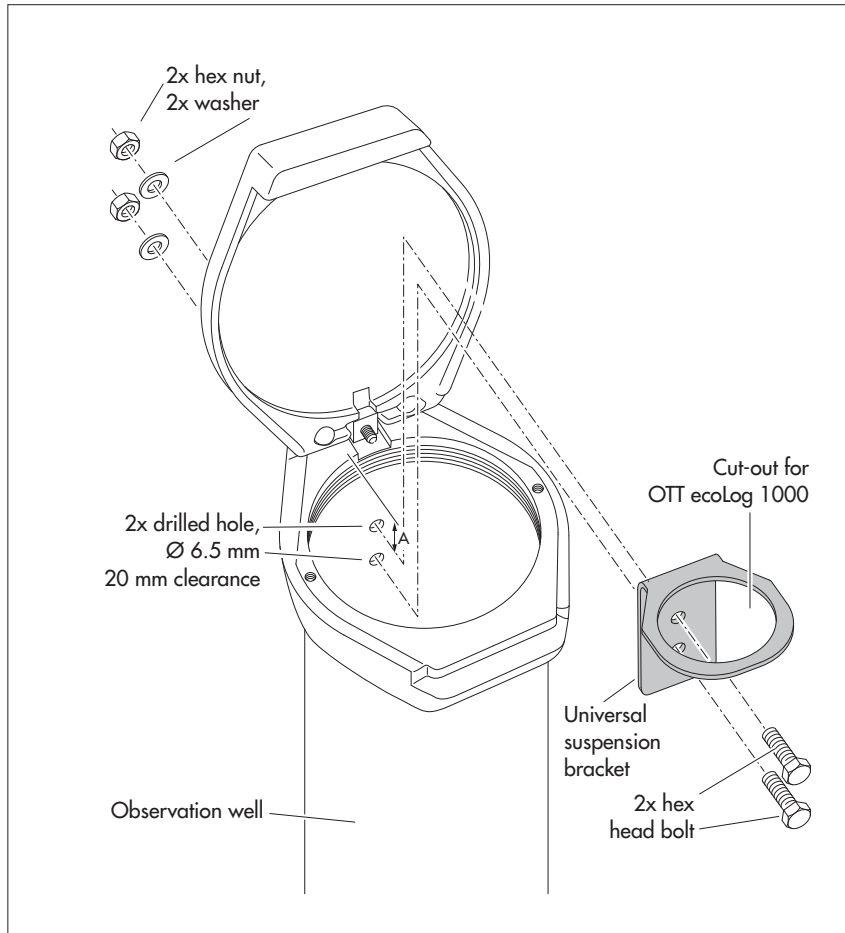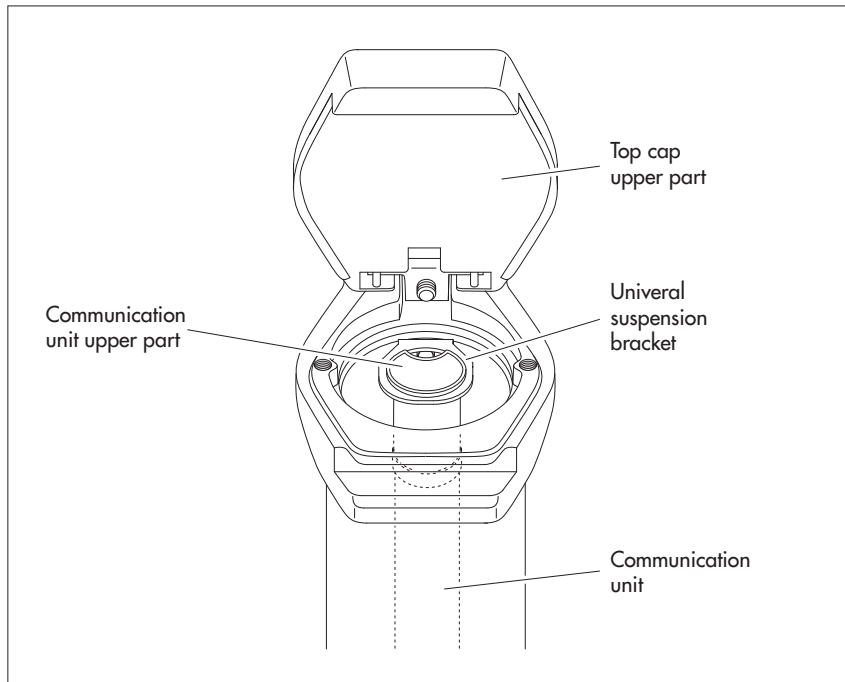Universal suspension bracket

2x hex head bolt

Observation well

Fig. 14: Installing the OTT ecoLog 1000 into observation wells of 3" diameter and above with a top cap without cut-out.

Example: 4" observation well.

Top cap upper part

Univeral suspension bracket

Communication unit upper part

Communication unit

8.4 Installing the unit into observation wells of 3" in diameter and above, without top cap, universal installation

For this installation case, an individual solution to fasten the OTT ecoLog 1000 must be found depending on the station. Example: fix the universal suspension bracket using an M6 hex head bolt/hex nut laterally to the upper end of the observation well.

▶ Required accessories: universal suspension bracket, mounting bolts, e.g.: M6 hex head bolts, washers, and M6 hex nuts (all made of stainless steel).

How to install the OTT ecoLog 1000 (example)

■ Preliminary work: If not already done, install battery and SIM card, refer to Chapter 5 and 6.

■ Drill 2 holes (∅ 6.5 mm, 40 mm apart) laterally into the upper end of the observation well, refer to Fig. 15.

■ Attach the universal suspension bracket to the observation well using two M6 hex head bolts, washers, and M6 hex nuts. Use the uppermost and lowermost of the three drilled holes of the universal suspension bracket, refer to Fig. 15.

■ Pass the pressure probe through the cut-out of the universal suspension bracket.

■ **Slowly** and **carefully** lower the pressure probe into the observation well with the pressure probe cable.

■ Pass the communication unit through the holes of the universal suspension bracket until the communication unit is seated on the universal suspension bracket, refer to Fig. 14.

■ Determine the current depth using a contact gauge and note the measured value.

■ Set the operating parameters, refer to Chapter 9.

Fig. 15: Mounting diagram for universal suspension brackets in observation wells of 3" and above.

Example: 4" observation well

If required, you may fix the universal suspension bracket reversed by 180° as well. The socket head bolts will then be easily accessible.
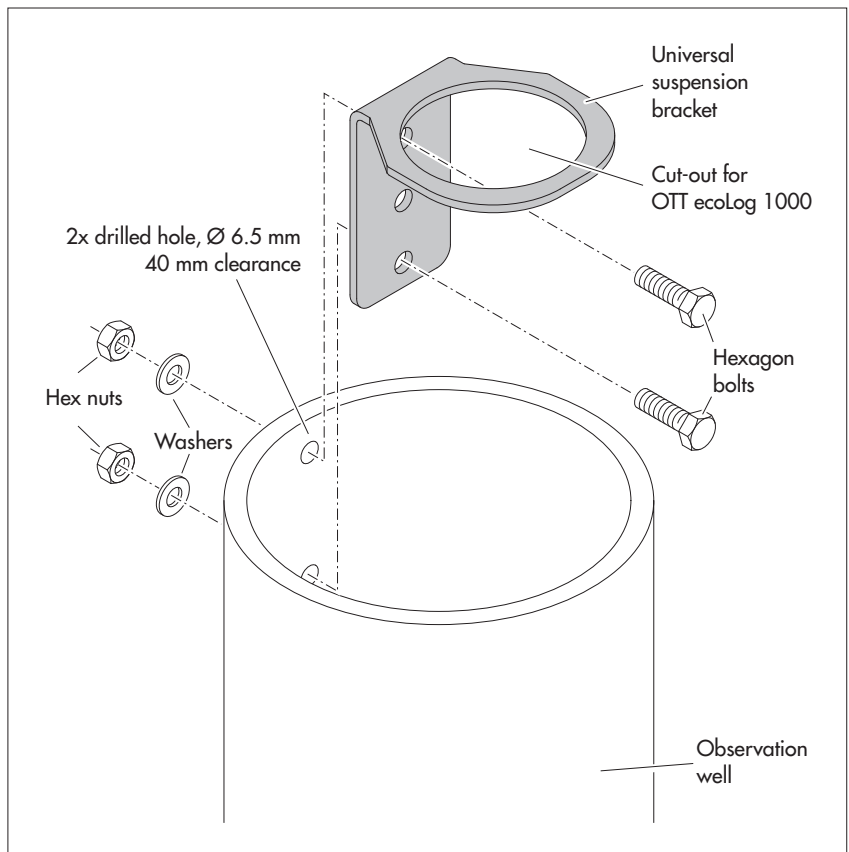
• **Remark:** If protection against vandalism is required M6 threads are to be tapped into the observation well instead of mounting the unit by means of hex nuts.

9 Setting OTT ecoLog 1000 operating parameters

9.1 Operating software "LinkComm"

To set the OTT ecoLog 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, from version 10, Release 1607, Build 14393
▶ Mobile devices (smartphone/tablet) with Android operating system, from version 5
▶ Mobile devices (iPhone/iPad) with iOS operating system, from version 10.0

The PC-versions of LinkComm are included on the "USB flash drive with OTT Software" (see accessories). Alternatively they can be downloaded free of charge from the website "www.ott.com" or "www.otthydromet.com" , section "Resources". An 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 usually require a separate Bluetooth USB dongle.

9.2 Establishing a communication connection to OTT ecoLog 1000 (on site)

In the following chapters the establishment of a communication connection between the OTT ecoLog 1000 and a PC/mobile device is a prerequisite for the further worksteps.

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

Fig. 16: PC/OTT ecoLog 1000 communication link.
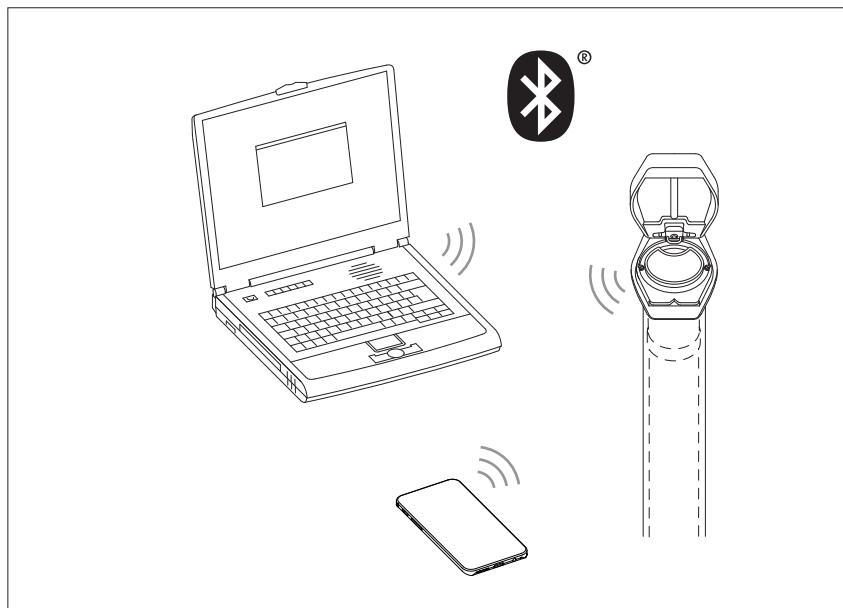
How to establish a communication connection

- **Remark:** The maximum range of BLE is 10 meters (with free line of sight). As a rule, it is not possible to establish a communication connection to an OTT ecoLog 1000 in in a well pipe with a closed well cap (made of metal).

▨ Start the operating software "LinkComm" (version ≥ 3.8).
▨ Click on the "New Station" button [1].
▨ If not yet done: select "Station type:" "OTT ecoLog 1000".
▨ If not yet done: select "Connection type:" "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 checkbox "Get recent data on connect"; this additionally retrieves the measured values of the last seven days.
▨ Click on the "Connect" button → the operating software establishes a connection to the OTT ecoLog 1000 and reads the current configuration and the last measured values. The operating software then opens an overview window, the so-called "Dashbord".

[1] alternatively, if the desired OTT ecoLog 1000 is already stored in the list of stations (via the main menu (≡) | "Save Station…"):
  ▨ Click on the button of the stored OTT ecoLog 1000.

Fig. 17: Establish a communication connection to the OTT ecoLog 1000.
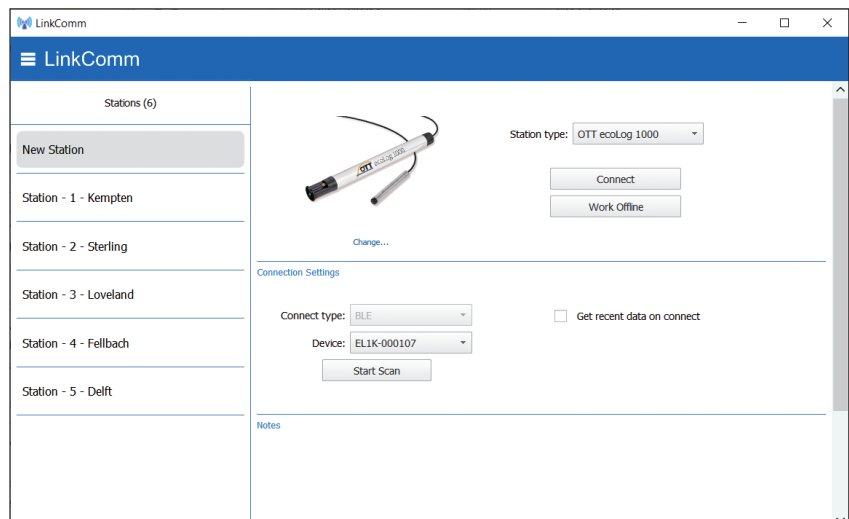
9.3 Setting OTT ecoLog 1000 operating parameters

▨ Start the operating software "LinkComm".
▨ If not yet done: use the operating software to establish a local communication connection to the OTT ecoLog 1000 (Refer to Chapter 9.2).

Fig. 18: Setting OTT ecoLog 1000 operating parameters – dashboard of the operating software "LinkComm".

The illustration shows an example of the measured values of the device variant with integrated conductivity sensor.
For units without a conductivity sensor, the three measured values "conductivity", "salinity" and "TDS value" are omitted.

The order of the displayed measured values can be changed if necessary:
■ 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 measurements in the "Measurements" and "Dashboard" windows is updated.
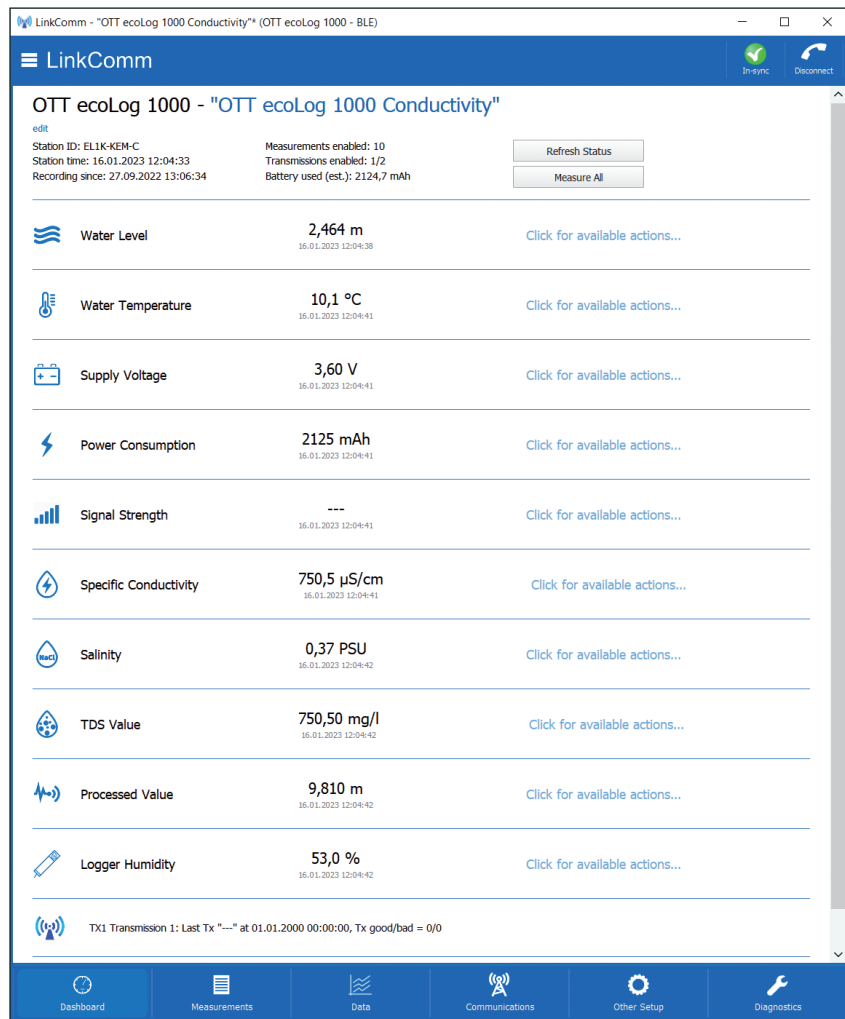
Making station-specific settings

■ Click on the "Other Settings" button.
■ Make the required settings for the station (measuring point with OTT ecoLog 1000).

Input fields "Station"

▶ Station-ID	Station identifier; max. 10 characters (alphanumeric); Default: "0000000001"
▶ Name	Station name; max. 40 characters (alphanumeric); Default: "ecoLog 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"

▶ Latitude   geographic latitude of the station in decimal notation
▶ Longitude   geographic longitude of the station in decimal notation

● **Remarks:**
▶ the operation of the OTT ecoLog 1000 does not require the input of site coordinates; the site coordinates are used for a representation of the station location in OTT HydroMet software, e.g. in OTT Hydras 3 or OTT HydrometCloud;
▶ when site 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 cell phone, the app automatically takes over the current location coordinates of the cell phone.

Input fields "SNTP Time Sync"

→ see Chapter 13

How to configure measurements

■ Click on the "Measurements" button.
■ Make the settings required for the measurements 1 … 10 (measuring channels):
  – M1: Measurement of distance to water, water pressure
  – M2: Measurement of water temperature
  – M3: Measurement of supply voltage
  – M4: Measurement of power consumption
  – M5: Measurement of signal strength (RSSI)
  – M6: Measurement of specific conductivity [1]
  – M7: Measurement of salinity (optional) [1]
  – M8: Measurement of the TDS-value (optional) [1]
  – M6/M9 [2]:   Additional measuring channel with processed value (optional)
  – M9/M10 [2]: Measurement of relative humidity inside the communication unit (optional)

▶ Number   Sensor number, 4 characters (alphanumeric)
▶ Name   Sensor name, max. 40 characters (alphanumeric)
▶ Sampling interval 5 s/10 s [1] (15 min)… 24 h; the time interval in which the OTT ecoLog 1000 determines and stores measured values; (storing only if averaging is deactivated). The set sampling interval is on a fixed time grid (e.g.sampling interval 10 minutes; resulting time grid …, 00:10, 00:20, 00:30, …).

Measurement water level
▶ Sensor type   Measuring range [3]
▶ Measurement type   Water level or pressure
▶ Measurement mode   Level or depth to water (not for pressure measurement)
▶ Gravity   Local gravitational acceleration at the measurement site. Gravity at the Earth's surface varies between 9.78036 m/s^2 at the equator and 9.83208 m/s^2 at the poles. It also decreases by 0.003086 m/s^2 for each kilometre above sea level.
▶ Density   Density of water at the measuring site. If necessary, set the actual density of the water at the measuring site; this is useful, for example, at measuring points with brackish water.

[1] device variant with integrated conductivity sensor
[2] the numbering of the measurement depends on the instrument variant; it can be changed if required, see labeling of Fig. 18
[3] not displayed in "Offline mode" (no communication connection established)

Measurement specific conductivity
▶ Compensation method   the mathematical algorithm on which the calculation of the specific conductivity at a defined reference temperature is based. Possibilities: "Freshwater"; "Saltwater"; "Standard 2510 @ 20 °C"; "Standard 2510 @ 25 °C"; "DIN EN 27888"; "None". For the "Standard 2510 @ …" the reference temperature can be selected: 20 °C or 25 °C.

Measurement salinity
▶ Calculation methode   the mathematical algorithm on which the calculation of the salinity is based. Possibilities: "Standard"; "USGS 2311". With the calculation method USGS 2311 the unit "ppt" is fixed; for the standard method the unit "PSU" is fixed (algorithm is only valid for values > 2.00 PSU/ppt.)

Measurement TDS
▶ TDS factor   applicable factor for the calculation of the TDS value (Total Dissolved Solids) based on salinity.
Factory setting: 0.64.

▶ Unit   Depending on the respective measurement Mx
Level unit   m · cm · ft · in
Pressure unit   bar · psi
Specific conductivity unit   mS/cm · µS/cm
Salinity unit   PSU · ppt [2]
TDS unit   mg/l
▶ 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 of the last sampling interval.
▶ 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.
▶ The "Calibrate Conductivity" button (measurement M6) → see Chapter 17.4

▶ Checkbox "Enable manual entry" see Chapter 10
▶ Checkbox "Update measured value" see Chapter 10
▶ Button "Calibrate …" see Chapter 10
▶ Button "Enter value…" see Chapter 10

▶ UUID   Universally Unique Identifier; optionally allows to add a unique identifier to a measurement (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).

▶ Scaling
→ Linear scaling of measured values according to the equation
"y = ax + b"
a = Slope; 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 level reference point is 178 m NN, the scaling is "y = 1 · x + 178".

[1] device variant with integrated conductivity sensor
[2] depending on the calculation method

▶ Averaging
☑ Enable averaging
→ Averaging interval: the time interval within which the OTT ecoLog 1000 calculates and stores an arithmetic mean value from sampling interval values. The averaging interval must be an integer multiple of the sampling interval (e.g. sampling interval: 10 minutes; averaging interval 1 hour: the OTT ecoLog 1000 stores an arithmetic average of 6 sampling interval values every hour.
→ Min. good values: minimum number of valid values for the averaging (invalid values = stored error messages, see Chapter 17 "Error messages").

▶ Limits
☑ Enable limits
→ defines a limit value at which the OTT ecoLog 1000 generates an alarm or performs an action.
  – "+"/"−": creates up to 3 limit values or deletes them.
  – Apply to sampled value: can be activated when averaging is active.
  – Value: >= (greater than or equal to) or <= (less than or equal to) limit value
  – Hysteresis: value by which the measured value must fall/rise again, before the OTT ecoLog 1000 generates a new alarm.
  – Tolerance count: number of sampling intervals at which the limit value must be reached before an alarm is generated.
  – ☑ Enable gradient
  Gradient direction: rising; falling; rising and falling
  Gradient threshold: additional condition, independent of the statistic limit value, at which the OTT ecoLog 1000 generates an alarm.
  Gradient deadtime: number of sampling intervals for which the OTT ecoLog 1000 does not generate a further alarm when a new slope limit value occurs.
  – Execute at limit end too: alarm generation also at subsequent undercut / exceeding the limit value threshold (when returning to the normal range).

▶ Storage
☑ Enable storage delta
→ the OTT ecoLog 1000 only saves a measured value if this value differs from the last stored measured value by the storage delta value. (If the storage delta value = 0, the OTT ecoLog 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 ecoLog 1000 contains a measured value for storage, the OTT ecoLog 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:

Polling interval:	1 hour
Averaging interval:	1 hour
Storage delta value:	0,05 m
Stored values:	11:00 o'clock; 1,20 m
	19:00 o'clock 1,21 m (subsequently saved)
	20:00 o'clock; 1,28 m

▶ Extremes
☑ Enable daily min/max
→ determines and stores the daily minimum/maximum.

Make communication settings

■ Click on the "Communication" button.
■ Make the required communication settings:
   – IP Transmittions
   – SMS Transmissions
   – Modem settings
   – SMS Commands

IP transmissions

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

▶ 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 ecoLog 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 interval refers in each case to "Limit 1" to "Limit 3" of the conditions defined under "Limits" ("Measurements" button). For example, if a defined water level is exceeded, the OTT ecoLog 1000 carries out a data transmission every 6 hours instead of every 24 hours (planned interval).
   Value range: 1 minute ... 24 hours
▶ Content: the OTT ecoLog 1000 transmits the measured values of the measurements that are activated.
▶ Server type: type of IP receiving server; HTTP, HTTPS, FTP, FTPS, MQTT or MQTTS.
▶ Server address: IP address or URL of the HTTP/HTTPS/FTP/FTPS/MQTT/MQTTS server
▶ Server port: specifying the port allows the control of a specific TCP/IP communication interface (default: HTTP: 80; HTTPS: 443; FTP: 21; FTPS: 990; MQTT: 1883; MQTTS: 8883)
▶ Timeout (sec): defines the maximum number of seconds the OTT ecoLog 1000 waits for a response from the server after sending 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 aditionally <Station ID>, <UUID>, <Date>, <Time>
▶ ☑ Active FTP (for server type "FTP"/"FTPS"" → activates the "FTP Active Mode" (not recommended, the standard is "Passive FTP"); default: deactivated.
▶ Data path: path to the (sub) directory on an FTP server. When using the root-directory, 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.ott.com" or "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).

▶ 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).

▶ Alarm script: relative URL (to the server address) of a (PHP) script on the HTTP/HTTPS server that the OTT ecoLog 1000 calls in case of an alarm (optional).

▶ Command script: relative URL (to the server address) of a (PHP) script on the HTTP/HTTPS server that the OTT ecoLog 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 ecoLog 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 ecoLog 1000 (optional).

▶ 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 ecoLog 1000 is assigned.

▶ Checkbox "Data", "Alarms", "Commands": type of scripts used by the OTT Hydras 3 net server.

▶ Client ID: the "Client Identifier" identifies each MQTT client, that connects to a MQTT broker. The client ID must be individual for each OTT ecoLog 1000 client in a network!

▶ Topic data: corresponds to the topic to which data is to be transferred.

▶ Topic command: 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 antoher server.
  Redundancy mode: "Backup" (if primary server fails) or "Both Servers" (for greater data security and availability).

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 ecoLog 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 ecoLog 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 ecoLog 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 ecoLog 1000. After receiving such a message, the OTT ecoLog 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).

Modem 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: phone number of SIM card
▶ Roaming: On (allow)/Off (do not allow)
▶ 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 establishing an Internet connection via the mobile modem (in the standard case "*99***1#").

SMS transmissions

Maximum number of SMS transmissions: 2

▶ 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 ecoLog 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 ecoLog 1000 automatically transmits data via SMS when certain limit value events are reached.
  Value range: 1 minute ... 24 hours
▶ Max. messages count: maximum number of SMS messages in case one SMS is not sufficient for the amount of data to be transmitted.
▶ Content: the OTT ecoLog 1000 transmits the measured values of the measurements that are activated.
▶ Button "SMS Test": immediately sends a test SMS with specified transmission content to the set phone number(s).

SMS commands

With the function "SMS Listening" it is possible to activate the mobile modem of the OTT ecoLog 1000 for approx. 1.5 minutes. For this purpose the OTT ecoLog 1000 switches on the cellular modem at a preset time (the cellular modem of the OTT ecoLog 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 ecoLog 1000 mobile modem's phone number into the OTT ecoLog 1000 mobile modem's memory. The OTT ecoLog 1000 then searches the received SMS for a system command and executes it.

▶ Scheduled interval: time interval at which the OTT ecoLog 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 ecoLog 1000.

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

The information required for the respective SMS command as well as the OTT ecoLog 1000 phone number must be entered in the corresponding input fields. Then send the SMS command via the "Send now" button.

Send operating parameters to the OTT ecoLog 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 yellow warning triangle → a window to send the configuration to the OTT ecoLog 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 ecoLog 1000.

9.4 Setting OTT ecoLog operating parameters remotely

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

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

9.5 Importing/exporting the OTT ecoLog 1000 configuration

The import/export functions are available for forwarding an OTT ecoLog 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 ecoLog 1000 as so-called "Station" in the "LinkComm" operating software.

Available export/import formats

▶ Export ("bin" file)
▶ Export for user 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.

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

This export type is required to pass on an OTT ecoLog 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 ecoLog 1000 (Refer to Chapter 9.2).
■ 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.

How to export a configuration (OTT Hydras 3)

This export type is required to pass on an OTT ecoLog 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 ecoLog 1000 (Refer to Chapter 9.2).
■ In the main menu (≡) of 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.

How to import a configuration

■ If not yet done: use the operating software to establish a local communication connection to the OTT ecoLog 1000 (Refer to Chapter 9.2).
■ In the main menu (≡) of the operating function select "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 ecoLog 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 ecoLog 1000.

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

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

The operating software enables the input of a manually determined measured value (observer entry) – e.g. contact 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/pressure measurement). The effect of a manually measured value (control value) can be set via checkbox options.

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.

How to set the options

- Start the operating software "LinkComm".
- Use the operating software to establish a local communication connection to the OTT ecoLog 1000 (Refer to Chapter 9.2).
- Click on the "Measurements" button.
- If not selected yet: click on measurement "M1".
- Activate the checkbox "Enable manual entry".
- If required: checkbox "Update measured value" (the button directly below changes its label from "Enter value..." to "Calibrate ...") → 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 ecoLog 1000 opens.
- Click on the "Send Setup to Station" button → the operating software sends the changed configuration to the OTT ecoLog 1000.

Remarks:

▶ The OTT ecoLog 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 OTT Hydras 3 application software via the "Info data" | "Station" | "Show" function. They are also visible via "Data" | "View: Events" in the operating software.

▶ If the checkbox "Calibrate…" in the "Measurements" window is not activated, the OTT ecoLog 1000 additionally stores the entered control value 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.
They are also visible via "Data" | "View: Events" in the operating software.

How to adjust measured values (offset setting)

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 ecoLog 1000 (Refer to Chapter 9.2).
- ■ Click on the "Measurements" button.
- ■ If not selected yet: click on measurement "M1".
- ■ Click on the "Calibrate..." button → a window for entering a control value opens.
- ■ Enter control value and click on "OK" → the operating software sends the control value to the OTT ecoLog 1000.

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

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 ecoLog 1000 (Refer to Chapter 9.2).
- ■ Click on the "Measurements" button.
- ■ If not selected yet: click on measurement "M1".
- ■ Click on the "Enter value..." button → a window for entering a control value opens.
- ■ Enter control value and click on "OK" → the operating software sends the control value to the OTT ecoLog 1000.

11 Downloading, displaying and saving 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 ecoLog 1000 (Refer to Chapter 9.2).
- Click on the "Data" button.
- Choose the time span; set "Start time" and "End time" if required.
- Activate the checkbox "Include Events" if required. If this checkbox is activated, the operating software also loads all events stored in an info channel; e.g. observer entries.
- Activate the checkbox "Disable Graph" if required. This prevents the potentially time-consuming (with a large number of measured values) graphical display immediately after downloading .
- Click on the "Download" button.

• **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.

How to display data graphically

- Click the view "Graph" → the operating software displays all measured values in graphical form (if the checkbox "Disable Graph" is activated: deactivate checkbox).
- Activate/deactivate checkbox for the desired measured values (Water Level, Water temperature, Power Consumption, Signal strength (RSSI), Supply Voltage).

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

How to display data numerically

- Click the view "Table" → the operating software displays all measured values in tabular form.
- Activate/deactivate checkbox for the desired measured values (Water Level, Water temperature, Power Consumption, Signal strength (RSSI), Supply Voltage).

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).

How to save data in a file

■ Click the view "Graph" or "Table".
■ Activate/deactivate checkbox for the measured values you want to save.

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","*.mis", "*.oml", "*.zrx").

How to save a graphical presentation as an image file

■ Click the view "Graph".
■ If the checkbox "Disable Graph" is activated: deactivate checkbox.
■ Activate/deactivate checkbox for the desired measured values.
■ Click on the "Save Image ..." button → a window for setting the file name and storage location opens.
■ Make settings and click on "Save" → the operating software saves the selected graph in a corresponding image file (file format: "*.png").

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 and storage location opens.
■ Make settings and click on "Save" → the operating software saves the events in a corresponding file (file format: "*.xml").

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

How to access downloaded log files

■ Click on the "Log files ..." button → a Windows Explorer window opens with the downloaded log files.

• **Remark:** There are three types of log files available: "....txt", "....xml" and "....oml". The "....xml" file is available only if the checkbox "Include Events" was enabled during downloading.

12 Protecting the OTT ecoLog 1000 with a password

To prevent unauthorized access (via local communication via BLE) to the
OTT ecoLog 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 ecoLog 1000 (Refer to Chapter 9.2).
- 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.
- 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 ecoLog 1000 opens.
- Click on the "Send Setup to Station" button → the operating software sends the
  changed configuration to the OTT ecoLog 1000.

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

How to release a password-protected OTT ecoLog 1000

- Start the operating software "LinkComm".
- Use the operating software to establish a local communication connection to
  the OTT ecoLog 1000 (Refer to Chapter 9.2) → a window to enter the pass-
  word opens.
- Enter password and click on "OK" → the operating software retrieves the
  current configuration of the OTT ecoLog 1000.

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

13 Setting date and time

The internal clock of the OTT ecoLog 1000 is a real-time clock with high accuracy. It runs as soon as the battery is inserted into the OTT ecoLog 1000. After removing the battery, the clock continues to run for approx. 40 seconds.
The OTT ecoLog 1000 loses the date and time in the event of a longer power interruption. When the battery is reconnected, the OTT ecoLog 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 ecoLog 1000 can synchronise the date/time via the mobile 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 site 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 ecoLog 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 ecoLog 1000 (Refer to Chapter 9.2).
- Click on the "Other Setup" button.
- Recommended: activate the checkbox of the SNTP time synchronization (prerequisit: a SIM card is inserted and the required modem settings are entered).
- Enter at least one server address for the SNTP time synchronisation (e.g. "0.europe.pool.ntp.org").
- Click on the "Set Clock" button.
- Activate the checkbox "Set clock using PC time" (if the PC uses daylight saving time (DST) do not activate the checkbox but set time manually).
- Click on the "Set Clock" button → the operating software sets the OTT ecoLog 1000 date and time according to the PC time/PC date or according to the individually set values.
- Click on the "Close" button.

• **Remark:** When restarting after a long period of inactivity, it may be useful to delete the database after setting the date and time (Refer to Chapter 14).

14 Deleting the database

! **Please note:** The measured values stored in the OTT ecoLog 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 ecoLog 1000 (Refer to Chapter 9.2).
- 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 ecoLog 1000 (all measured value channels including the info channel). The OTT ecoLog 1000 then determines and stores the water level and water temperature as well as the other measured values at the set intervals.

15 Updating the OTT ecoLog 1000 Firmware

If required, you have the option of updating the OTT ecoLog 1000 firmware (operating system 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 verion of the OTT ecoLog 1000 firmware can be found on the internet site "www.ott.com", in the "Resources" section.

How to update the firmware

■ Download new version of firmware from the website
   (File: e.g. "5545030293_01001_el1000.bin").
■ Use the operating software to establish a local communication connection to the OTT ecoLog 1000 (Refer to Chapter 9.2)
■ 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 ecoLog 1000. The OTT ecoLog 1000 then determines and stores the water level and water temperature 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 ecoLog 1000 are not lost when the firmware is updated.

16 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 ecoLog 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 ecoLog 1000. In addition, special commands can be sent to the OTT ecoLog 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 ecoLog 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 ecoLog 1000; refer also to Chapter 13, "Setting date and time".

▶ **Button "Upgrade"**
  Executes a firmware update of the OTT ecoLog 1000; refer also to Chapter 15, "Updating the OTT ecoLog 1000 Firmware".

▶ **Button "Factory Defaults"**
  Resets the OTT ecoLog 1000 to the factory settings and simultaneously deletes the database completely and irrevocably.

▶ **Button "Delete Database"**
  Deletes the database of the OTT ecoLog 1000 completely and irrevocably; refer also to Chapter 14, "Deleting the database".

▶ **Button "Reboot"**
  Restarts the OTT ecoLog 1000 (disconnects the active connection).

▶ **Button "Reset PBAT"**
  Resets the value "Power consumption" (energy taken from the battery in milliampere hours) to "0"; refer also to Chapter 5, "Installing, checking, and replacing batteries".

▶ **Button "System length"**
  After shortening of the pressure probe cable, enter the new system length.

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

▶ **Import Setup**
Imports all data of stations contained in a "*.ldz" file (database file) (OTT ecoLog 1000 configurations) into the operating software.

▶ **Export Setup**
Exports all data of stations stored in the operating software (OTT ecoLog 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.

▶ **Language**
Opens a window for setting the language of the LinkComm user interface (German, English, French, Spanish).

▶ **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).

17 Maintenance work

17.1 Cleaning the pressure probe

Recommended interval: Every 12 months
In case of difficult local measuring conditions (heavy deposits): as required every 4 to 6 months.
(Measurements that are inaccurate or not plausible indicate a contaminated pressure sensor.)

How to clean the pressure probe

■ Open the top cap/observation well cover.
■ Completely remove the OTT ecoLog 1000 from the observation well.
■ Remove the black protective cap.

Fig. 19: Cleaning the pressure probe.

Pressure probe with datalogger

Pressure sensor

Black protective cap

Temperature sensor

Graphite electrodes

Conductivity sensor

Device variant with conductivity sensor
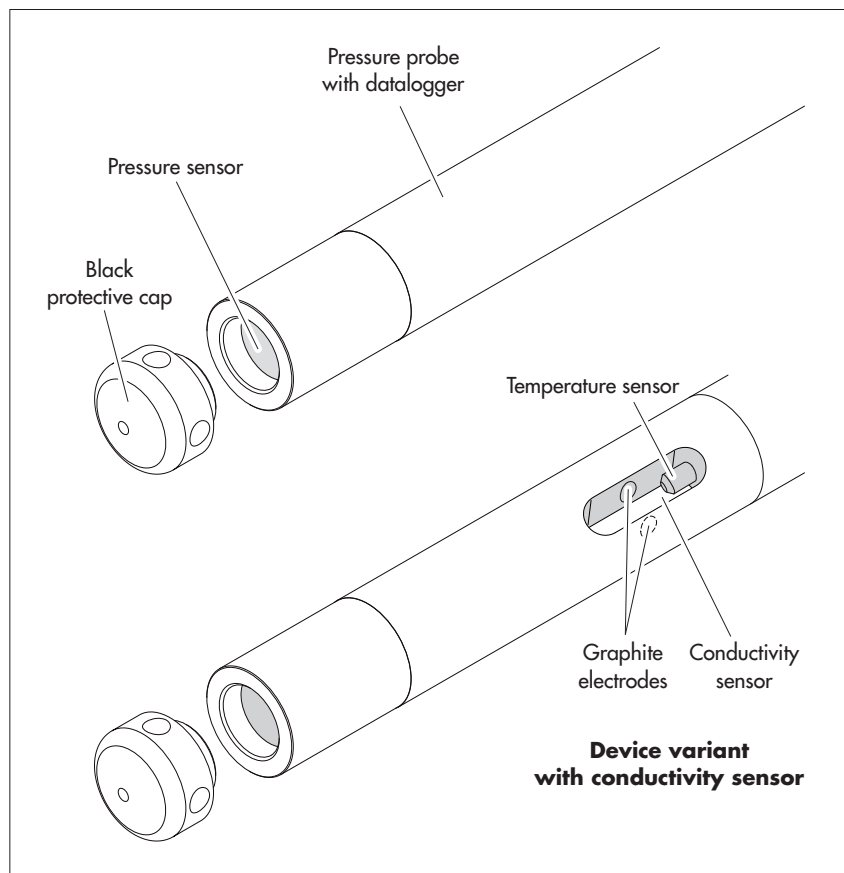
■ Clean the pressure sensor carefully using a brush and water. Device variant with conductivity sensor: clean the graphite electrodes and the temperatuare sensor of the conductivity sensor with soapy water and cotton buds. Lime scale deposits can be removed using a common household scale remover.
CAUTION: Make sure to follow the use and safety instructions for the scale remover!
■ Rinse the pressure probe **thoroughly** with clear water!
■ Reattach the black protective cap.
■ Reinstall the OTT ecoLog 1000 (see Chapter 8).
■ Determine current reference value by means of a contact gauge and enter it, (see Chapter 9.4 or 10).
■ Brunnenkappe/Pegelrohrverschluss schließen.

17.2 Replacing the desiccant capsules

Recommended interval: Depending on the level of air humidity at the station, every 12 to 24 months and when replacing the battery. There is a humidity indicator on the desiccant capsule. When this indicator changes its color from blue to pink the desiccant capsule has to be replaced, irrespective of the time elapsed.

Quantity: 2 (1x pressure compensation capillary,
      1x communication unit).

Remarks:
▶ Store the desiccant capsule only in its original packaging.
▶ Use only desiccant capsules that are fitted with a blue humidity indicator.

How to replace the desiccant capsules

A) Desiccant capsule for pressure compensation capillary

■ Open the top cap/observation well cover.
■ Pull and hold the communication unit approximately 1 m out of the observation well (a second person would be useful).
■ Loosen the communication unit cap.
■ Slide the cap and pipe casing of the communication unit approx. 50 cm towards the pressure probe cable. (The rubber stop located on the pressure probe cable (refer to Fig. 2) prevents the pipe casing from falling.)
■ Pull the desiccant capsule container of the pressure compensation capillary from the holder, as shown in Fig. 20. Do not pull the container off the pressure compensation capillary!

Fig. 20: Replacing the pressure probe desiccant capsule.

Container for desiccant capsule

Pressure compensation capillary desiccant capsule

Cap

Pressure compensation capillary
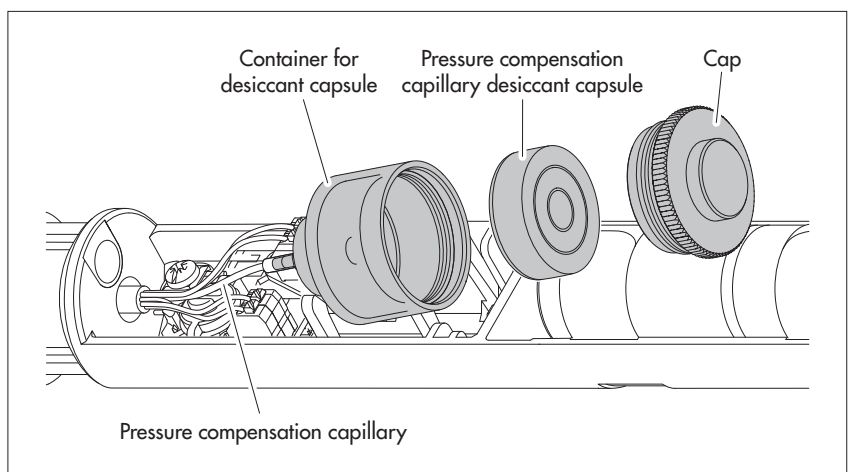
- Remove the cap of the container by rotating it counter-clockwise.
- Remove the exhausted desiccant capsule.
- Install new desiccant capsule. Labeling must face towards pressure compensation capillary.
- Install the cap by rotating it clockwise.
- Reinsert the container into the holder.

B) Desiccant capsule for communication unit

- Remove the exhausted desiccant capsule of the communication unit, as shown in Figure 21.
- Install new desiccant capsule.

Fig. 21: Replacing the communication unit desiccant capsule.

Communication unit desiccant capsule

40 %
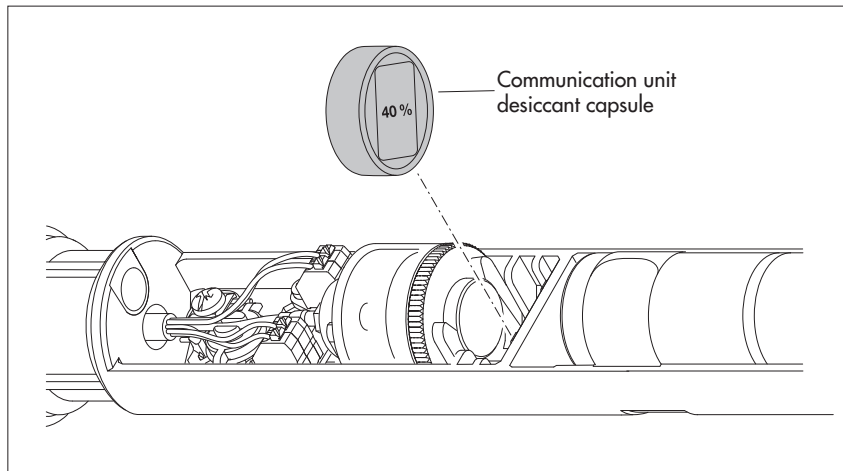
- Slide the pipe casing of the communication unit back up to the stop. Performing this, do not bend or pinch the battery lead
- Reinstall the cap to the communication unit.
- Slowly and carefully reinsert the communication unit into the observation well.
- Close the top cap/observation well cover.

17.3 Checking/replacing the battery

Refer to Chapter 5.

17.4 Calibrating the conductivity sensor

The aim of calibration is to determine the variable known as "cell constant" of the conductivity sensor. This requires checking the zero point and measuring the conductivity with a standardized calibration solution

In addition to the invariable geometric dimensions, the materials used and the design of the conductivity sensor, the cell constant primarily takes into account the aging process of the electrodes.

Recommended interval: every 12 months (after each cleaning);
in case of difficult local measuring point conditions
(heavy deposits): every 4 to 6 months, as required
Accessories required: standardized calibration solution, calibration container
(see Chapter 2, "Order numbers")

- **Remark:** For an optimal calibration process, the OTT ecoLog 1000 and the calibration solution must have assumed the ambient temperature!

How to calibrate the conductivity sensor

- ▣ Uninstall OTT ecoLog 1000.
- ▣ Start the operating program "LinkComm".
- ▣ Establish a local communication link to the OTT ecoLog 1000 using the operating software (see Chapter 9.2).
- ▣ Click on the "Measurements" button.
- ▣ If not already selected: click on measurement "M6" .
- ▣ Click on the"Calibrate Conductivity …" button → the operating software guides you through the further work steps.
- ▣ Carefully clean the pressure probe and dry well (see Chapter 17.1).
- ▣ Measure zero point: press the "Start" button. The operating program starts an instantaneous value measurement and updates this every 5 to 6 seconds. A successful zero point measurement is signaled by the operating software with a green check mark (likewise for successfully executed, subsequent work steps); if an error message appears → clean the conductivity sensor again and dry it well.
- ▣ Select the calibration solution used in the "Calibration Solution" drop-down menu. Alternatively, enter the corresponding conductivity value manually in the input field.
- ▣ Click on the "Continue" button.
- ▣ Add the calibration solution to the calibration container (filling height approx. 3/4).
- ▣ Place the OTT ecoLog 1000 in the calibration container (screw cap on) and tighten the screw cap by hand. **Caution:** There must not be any air bubbles in the slot of the conductivity sensor! If necessary, shake the calibration container gently.
- ▣ Click on the "Continue" buttton → the operating software starts several instantaneous value measurements again. The operating software signals successful calibration with the messages "Measurement is stable (x.x)" and "Calibration verified!".
- ▣ Answer the question "Export calibration log file?" with "Yes" (→ a Windows Explorer window opens to select a location for the log file; the suggested file name can be changed if required) or "No". The calibration log file contains detailed information about the calibration process: date/time, calibration solution used, zero point measurement, stability of temperature measurement, stability of conductivity measurement, … .
- ▣ Close the operating program.
- ▣ Rinse the pressure probe thoroughly with clear water!
- ▣ Reinstall OTT ecoLog 1000 (see Chapter 8).
- ▣ Determine current reference value with a contact gauge and enter it (see Chapter 10).
- ▣ Close the top cap/observation well cover.

- **Remarks:**

  - ▶ The OTT ecoLog 1000 restarts after the calibration process. If necessary, re-establish the communication link.
  - ▶ If an error message appears during the calibration process (+ exclamation mark highlighted in red),→ restart the calibration process from the beginning.
  - ▶ Use the calibration solution only once!
  - ▶ Always store the bottle with the calibration solution closed! (The conductivity value can change due to carbon dioxide in the ambient air and evaporation).
  - ▶ Avoid water entering the calibration solution! Always dry the calibration container well after calibration.
  - ▶ Calibration solution can be disposed of via the normal sewage system!

18 Error messages

When faulty measurements or a malfunction occur, the OTT ecoLog 1000 stores one of the following error messages in the data memory 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   No communication/cable break between communication unit and pressure probe
▶ 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 (in-dividual 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.

19 Troubleshooting/remedy

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

▶ Password assigned?
   → Enter correct password.
▶ Battery installed?
   → Install battery.
▶ Battery exhausted?
   → Replace the battery.
▶ PC/tablet/mobile phone does not have a (current) BLE interface?
   → Use other hardware for the operating software.

Communication starts and then aborts

▶ Battery exhausted?
   → Replace the battery.

Faulty measured values

▶ Temperature values faulty
   → Check configuration ("Measurements" button).
▶ Pressure sensor values faulty
   → Check configuration ("Measurements" button).
   → Check the pressure compensation capillary in the communication unit (blocked?). Clean as necessary.
   → Check pressure sensor for contamination. Clean as necessary.
▶ Conductivity measured values incorrect
   → Check configuration ("Measurements" button).
   → Check the conductivity sensor for contamination; if necessary clean and then recalibrate
▶ Calculated salinity values incorrect
   → Check configuration ("Measurements" button).
   → Input value is outside the valid range:
      – Salinity according to standard method
        $1.0 \,°C \leq t \leq 35.0 \,°C$ for salinity $2.0 \text{ PSU} \leq salinity \leq 42.0 \text{ PSU}$
      – Salinity according to "USGS 2311"
        $0 \,°C \leq t \leq 30.0 \,°C$ for salinity $2.0 \text{ ppt} \leq salinity \leq 60.0 \text{ ppt}$)

▷ Observer does not display calculated salinity values
  → values lie outside the valid range:
    – Salinity according to standard method
      2.0 PSU ≤ salinity ≤ 42.0 PSU
    – Salinity according to "USGS 2311"
      2.0 ppt ≤ salinity ≤ 60.0 ppt

No measured values in database

▷ Configuration incorrect?
  → Check configuration ("Measurements" button).
▷ Battery exhausted?
  → Replace the battery.

Communication through cellular network not possible/ not successful

▷ Modem settings (modem, IP connection) are not or incorrectly configured
  → check modem settings (refer to Chapter 9.4).
▷ Data transmission is not or incorrectly configured
  → Check settings of "IP transmissions" and/or "SMS transmissions" (refer to Chapter 9.4).
▷ SMS Commands are not or incorrectly configured
  → Check settings of "SMS Commands" (refer to Chapter 9.4).
▷ Battery exhausted?
  → Replace the battery.
▷ SIM card missing
  → Insert the SIM card, refer to Chapter 6.
▷ Incorrect PIN
  → Check PIN, refer to Chapter 9.4.
▷ Signal strength of cellular network too weak.
  → Check whether an external radio antenna should be used, refer to Chapter 7.
▷ No measured values present (by transmitting data)
  → Wait for the next data interval.

20 Repair

▪ In case of a device malfunction, use Chapter 19, Troubleshooting/remedy 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 5617-439
repair@ott.com

! **Please note:** Have a faulty OTT ecoLog 1000 checked and repaired only by the OTT repair center. Never attempt to repair the unit yourself! Any repairs or attempted repairs carried out by the customer will void any warranty.

21 Notes about the disposal of old units

Within the member countries 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.ott.com". 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 ecoLog 1000.
■ Observe the regulations applicable in your country for the disposal of electronic devices.
■ Never dispose of the OTT ecoLog 1000 in the normal domestic waste.

Materials used

Refer to Chapter 22, Technical data.

22 Technical data

Water level

Measuring range	0 … 4 m / 0 … 13 ft water column (0 … 0.4 bar)
	0 … 10 m / 0 … 33 ft water column (0 … 1 bar)
	0 … 20 m / 0 … 66 ft water column (0 … 2 bar)
	0 … 40 m / 0 … 131 ft water column (0 … 4 bar)
	0 …100 m / 0 … 328 ft water column (0 … 10 bar)
Resolution	0.001 m; 0.1 cm; 0.01 ft; 0.1 inch
	0.0001 bar; 0.001 psi
Accuracy (linearity + hysteresis)	± 0.05 % full scale
Long-term stability (linearity + hysteresis)	± 0.1 %/a full scale
Zero	± 0.1 % full scale
Overload-resistant without permanent	
mechanical damage (pressure sensor)	
0 … 0.4 bar	4 bar
0 … 1 bar	10 bar
0 … 2 bar	15 bar
0 … 4 bar	25 bar
0 … 10 bar	40 bar
Units	m, ft, inch, bar, psi
Pressure sensor	ceramic; temperature-compensated
Temperature-compensated operating range	−5 °C … +45 °C / +23 °F … +113 °F (ice free)

Temperature

Measuring range	−25 °C ... +70 °C / −13 °F … +158 °F
Resolution	0.01 °C / 0.02 °F
Accuracy	± 0.1 °C / ± 0.2 °F
Units	°C · °F

Conductivity

Measuring range	5 … 100 000 µS/cm
Calibrated range	+5 °C … 45 °C
Resolution	
5 …2000 µS/cm	1 µS/cm
0.10 …100.00 mS/cm	0.01 mS/cm
Accuracy	
5 …2000 µS/cm	±0.5 % of measured value (at least ± 1 µS/cm)
0.10 …100.00 mS/cm	±1.5 % of measured value (at least ±0.01 mS/cm)
Units	
5 …2000 µS/cm	mS/cm · µS/cm
0.10 …100.00 mS/cm	mS/cm

Power supply

	lithium battery with connector; 3.6 V / 26 Ah
Current consumption	
Sleep mode	< 100 µA
Local communication (BLE)	approx. 30 mA
Measuring operation	approx. 20 mA
Measuring operation; device variant	approx. 50 mA
with integrated conductivity sensor	
Mobile communication activ; modem variant 4G/2G (EU)	approx. 160 mA
modem variant LTE Cat-M1 (LTE-M)	approx. 90 mA
Battery lifetime[1] (1 hour sample interval, one transfer per day,	
one local communication (BLE) per month)	> 5 years[2]/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 / +77 °F)

[1] for 20 °C ambient temperature
[2] device variant with integrated conductivity sensor

LED indicator

	Position see Fig. 3
lights up continuously green	Bluetooth communication connection to "LinkComm" established [1]
llights up continuously red	Data transmission via mobile modem is active
flashes red once	On (re)start of OTT ecoLog 1000 (e.g. after battery replacment)

Interface for local communication
   Type   BLE 5.0 (Bluetooth Low Energy)

Interface for local communication	
Type	BLE 5.0 (Bluetooth Low Energy)
Antenna	integrated circuit board antenna
BLE range	≤ 10 m / 33 ft; with a clear line of sight
Networks/cellular modem frequencies	
2G	GSM, GPRS, EDGE; 900 MHz, 1800 MHz
4G	LTE Cat-1; B3 (1800 MHz), B8 (900 MHz), B20 (800 MHz)
LTE 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)
Radio antenna	
Standard	integrated short rod antenna [2]; SMA-connection; robust and weather-proof
Modem variant LTE Cat-M1 (LTE-M) in connection with AT&T cellular network	external blade-antenna; SMA-connection with 0.9 m / 3 ft connecting-cable; self-adhesive Please note: A minimum distance of >0.20 metres must be maintained between the radio antenna and people and between radio antenna and other electrical equipment/antennae!

Data memory

Measurement memory	28 MB
Number of stored values	Approx. 1 000 000
Measured physical quantities	Water level/pressure Specific conductivity[3] Temperature Supply voltage Mobile radio signal strength (RSSI) energy taken from the battery (in mAh) relative humidity (inside the communication unit)
Sample interval	5/10 [3] seconds … 24 hours
Storage interval (mean interval)	5/10 [3] seconds … 24 hours
Individually configurable functions	– Selection of units – Pressure/level measurement or depth measurement – With consideration of the local gravitational acceleration – Compensate water density by salinity and temperature [3] – Temperature compensation of conductivity. Options: fresh water; salt water; standard method 2510 (reference temperature: 25 °C or 20 °C); ISO 7888 / EN 27888; none [3] – Salinity (standard method or USGS 2311) [3] – Display of instantaneous values – Password protection – Measured value processing: Calculation of mean; delta storage; scaling function; extreme value storage; limit control of the sampling interval – Alarm management – Remote data transfer – Additional measuring channel with processed value

Mobile communications functions

Transmission interval	1 minute … 1 week
SMS transmission	✓
SMS command	✓
IP communication	FTP, FTPS, HTTP, HTTPS (TLS 1.2), MQTT, MQTTS

[1] with active Bluetooth communication connection no data transmission via mobile modem is possible; no parallel operation! After disconnecting the Bluetooth communication link, the mobile modem does not initiate self-timed mobile communication for 3 minutes
[2] in case of poor local reception conditions, an external antenna can be connected as an alternative (from OTT HydroMet; see Accessories)
[3] device variant with integrated conductivity sensor

Ambient conditions

Temperature range, operating	−30 °C … +85 °C / −22 °F … +185 °F
Temperature range, storage	−40 °C … +85 °C / −23 °F … +185 °F
Air humidity	5 % … 95 % (non-condensing)

Mechanical Data

Can be installed in observation wells	
– Top caps with cut-out (OTT, HT)	2"
– With adapter plates for top caps With cut-out (OTT, HT)	3", 4", 4.5", 5", 6"
– With universal suspension brackets for top caps Without cut-out/universal installation	> 2"
Dimensions	
Communication unit (L x Ø)	520 mm x 50 mm / 20.7 x 2.0 in
Pressure probe (L x Ø)	195 mm x 22 mm / 7.7 x 0.9 in
Pressure probe; variant with conductivity sensor L x Ø	317 mm x 22 mm/12.5 x 0.9 in
System length (cable length including communication unit/pressure probe)	2 … 200 m ±1 % ±5 cm / 7 … 656 ft (±1 % ±0.17 ft)
Minimum bending radius of pressure probe cable	45 mm / 1.8 in
Weight	
Communication unit (incl. lithium batteries)	approx. 0.9 kg / 31.7 oz
Pressure probe	approx. 0.3 kg / 10. oz
Pressure probe; variant with conductivity sensor	approx. 0.42 kg /13.8 oz
Pressure probe cable	approx. 0.042 kg/m / 0.45 oz/ft
Pressure probe cable; variant with conductivity sensor	approx. 0.082 kg/m / 0.9 oz/ft
Material	
Pressure probe housing	POM, stainless steel 1.4539 (904 L)
Seals	FPM/Viton [1]
Separating membrane	Al_2O_3 ceramics (96 %)
Cable jacket	PUR
Communication unit housing	Aluminum, PA-GF
Type of protection	
Communication unit	IP 67 (flood-proof up to 1 week / 1 m water column)
Pressure probe	IP 68
Desiccant	2 capsules (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

EU directives compliance

the OTT ecoLog 1000 complies with the EU directives applicable at the time of production; for details, see Declaration of Conformity (www.ott.com/resources)

$C \in$

[1] device variant with integrated conductivity sensor

Product certifications

FCC ID
    for integrated cellular modem HL7800-M [1]   N7NHL78M
    for integrated Bluetooth module BlueMod+S50   RFR-S50

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 LTE Cat-M1 (LTE-M)

Annex A – Note on Declaration of Conformity

If necessary, you can download the current version of the Declaration of Conformity for the OTT ecoLog 1000 from our website as a PDF file: "www.ott.com/resources"!

Annex B – Shorten pressure probe cable

If required, you can shorten the pressure probe cable of an OTT ecoLog 1000 independently. This is useful in all cases where a groundwater well to be installed requires a shorter system length (do not loop a pressure probe cable that is too long). It is not possible to extend the pressure probe cable.

The design of the pressure probe cable of the OTT ecoLog 1000 differs depending on the device variant (without/with integrated conductivity sensor). The work steps for shortening therefore depend on the respective pressure probe cable:

▶ Shorten pressure probe cable for device variant
  without intergrated conductivity sensor → see subchapter **B1**
▶ Shorten pressure probe cable for device variant
  with intergrated conductivity sensor → see subchapter **B2**

! **Please note:** Shorten a pressure probe cable only under completely dry ambient conditions! If possible, do this in an interior (e.g. in a workshop). No moisture may penetrate into the pressure compensation capillary!

B1 – Shorten pressure probe cable for device variant without conductivity sensor

Tool required

▶ OTT Stripping tool; see accessories
▶ Side cutter
▶ Phillips screwdriver; PH 2
▶ Open-end wrench; wrench size 17

**CAUTION**   **Risk of cuts when trimming the pressure sensor cable!**

When trimming the pressure probe cable, the stripping tool/side cutter can cause injuries to the fingers or hands.

▶ Wear protective gloves when trimming the pressure probe cable.

---

1) Disconnecting the pressure probe cable on the communication unit

◾ Unscrew cap, see Fig. 2.
◾ Slide the cap and pipe casing approx. 50 cm / 1.6 ft towards the pressure probe cable, refer to Fig. 2.
◾ Disconnect the lithium battery plug from the socket of the printed circuit board; to do this, press on the locking of the plug connection, refer to Fig. 3.
◾ Remove the desiccant capsule container from the holer (refer to Fig. 21) and disconnect the pressure compensation capillary.
◾ Disconnect blue, green, orange and red wire: to do this, press the respective key on the terminal block (do not use any tools); refer to Fig. B4.
◾ Loosen the clamping screw, pull out the purple strain relief and unwind from the cylinder; refer to Fig. B4
◾ Loosen the union nut of the cable gland with the open-end wrench, refer to Fig. B4.
◾ Pull the pressure probe cable completely out of the communication unit.
◾ Remove pipe casing from the pressure probe cable.
◾ Leave the cap, the union nut (with sealing insert) and the rubber stop on the pressure probe cable and move it to point where you want to shorten the cable.

Pressure probe cable   Cap   Union nut

Rubber stop   Sealing insert
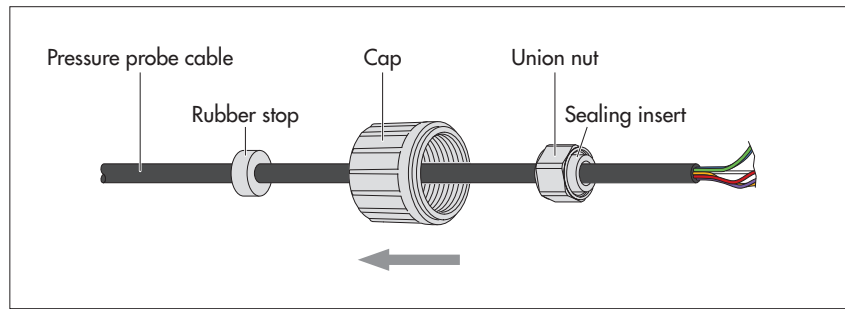
- **Remark:** if the union nut (with the sealing insert) cannot be moved without great effort, leave it in its original position on the pressure probe cable. The union nut thus remains on the cable residue to be cut off and cannot be reused. In this case you will need a replacement union nut (see Spare parts/Consumables). Please push the replacement union nut onto the shortened pressure probe cable before stripping it!

2) Shorten pressure probe cable

☐ Shorten pressure probe cable by "x.xx" meter;
x.xx = system length$_{old}$ – system length$_{new}$ – 0.18 m

(definition of system length: refer to Fig. 1)

Fig. B2: shorten pressure probe cable.

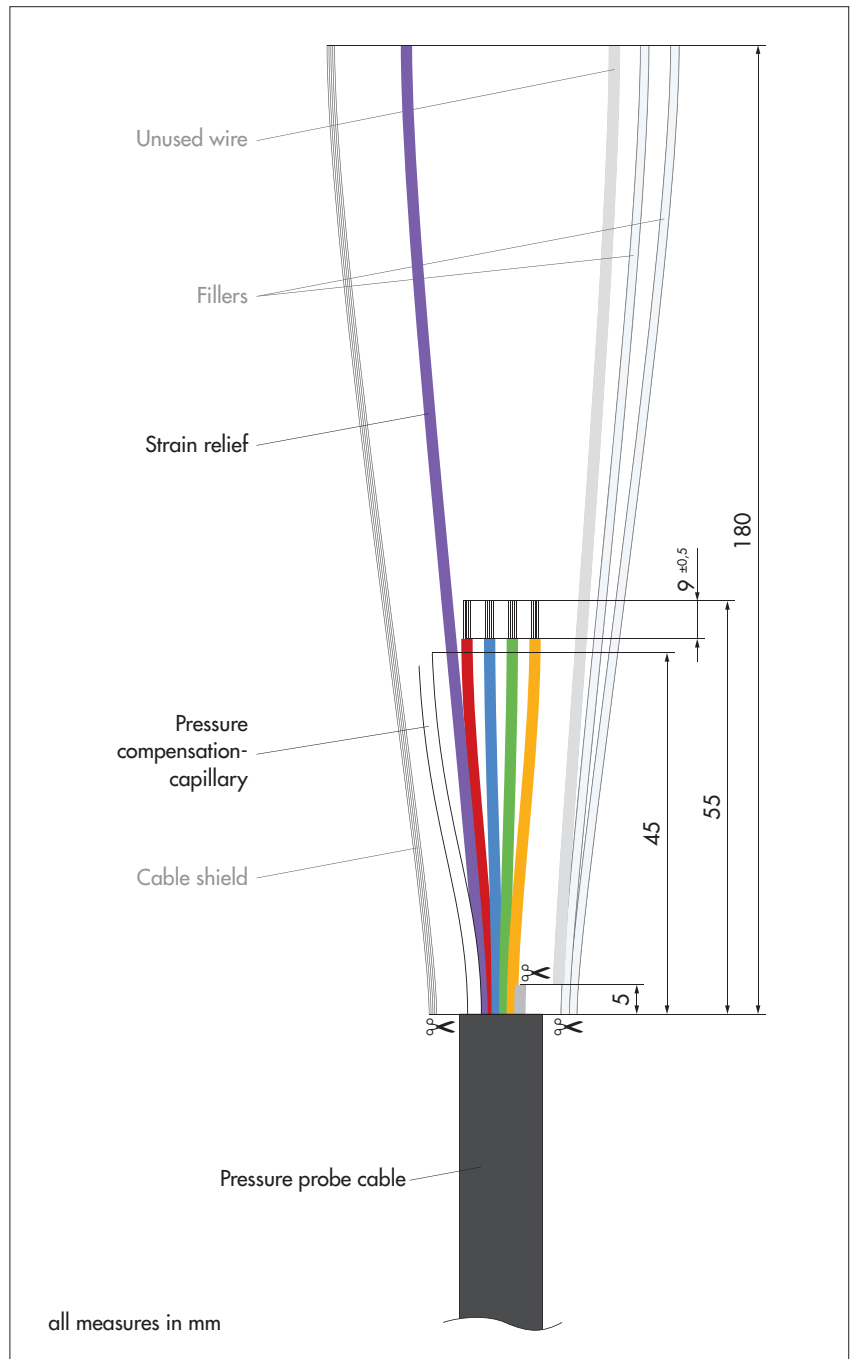(Dotted: position of the union nut
in case it cannot be moved.)

Pressure probe cable

x.xx m
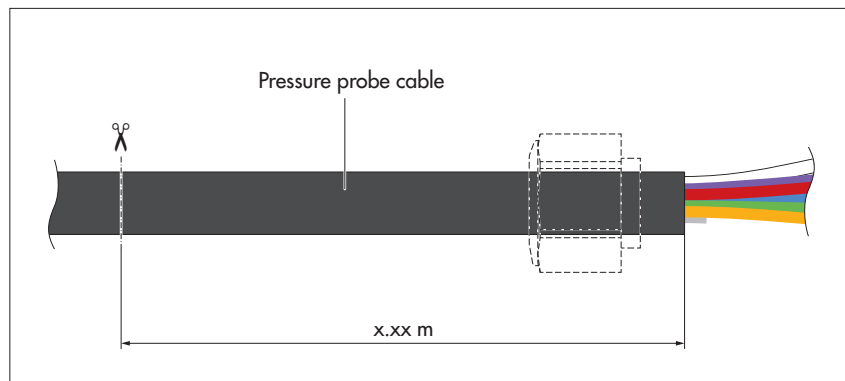
- **Remark:** You find the system length (old) in the FAT (included in the scope of delivery), or you can read out the system length from the device using the "OTT HydroMet LinkComm" operating software ("Service" button).

3) Connecting the pressure probe cable to the communication unit

☐ Slide tube housing onto the pressure probe cable.
☐ Lead the probe cable through the body of the cable gland, refer to Fig. B4.
☐ Strip/insulate the pressure probe cable with OTT stripping tool (Tip: first, practice stripping a cable rest); refer to Fig. B3:
  – Place OTT Stripping tool onto the cable sheath and cut in carefully by turning the blade; remove the cable sheath;
  – Pinch off and remove the cable shield at the cable sheath end;
  – Pinch off and remove both fillers at the cable sheath end;
  – Allow the grey wire at the cable sheath end to protrude 5 mm, pinch off and remove it;
  – Shorten blue, green, orange and red wire to 55 mm and strip ends using the OTT Stripping tool by $9^{\pm 0,5}$ mm.

Fig. B3: Dimensions of the pressure probe cable (picture is not to scale).

Unused wire

Fillers

Strain relief

Pressure compensation-capillary

Cable shield

Pressure probe cable

180

9 ±0,5

55

45

5

all measures in mm

■ Pull back the pressure probe cable until the calbe sheath exceeds approx. 6 … 8 mm the bore of the communication unit.

■ Turn the pressure probe cable so that the purple strain relief is at the bottom; refer to Fig. B4

■ Lead purple strain relief first 1.5 times around the cylinder and then around the clamping screw; make sure the strain relief is in the correct position in relation to the guide; refer to Fig. B4.

■ Tighten clamping screw (1.5 … 2 Nm).

■ Pull the pressure probe cable back a little until the strain relief is slightly under tension.

■ Screw the union nut onto the body of cable gland and tighten carefully with an open-ended wrench until the sealing insert inside the union nut slightly bulges outwards.

Cable gland
(body, union nut with sealing insert)

Guide

Terminal screw

Pressure probe cable

Cylinder

(1,5 x)

Pressure compensation capillary

Silicone tube

Metal nippel

Wires

Strain relief   Terminal block

Desiccant capsule container

Cut-out for pressure
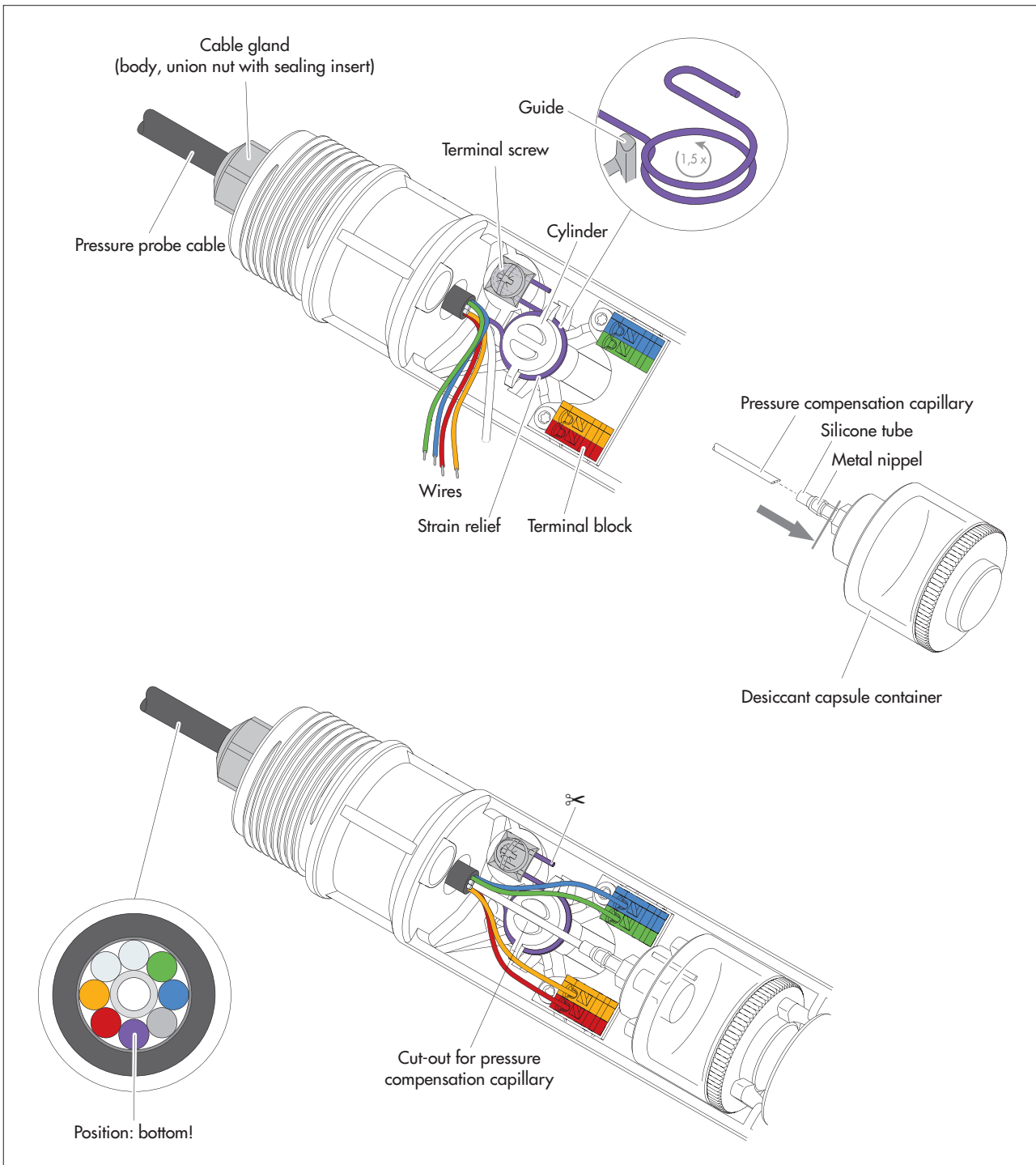compensation capillary

Position: bottom!

Fig. B4: Connecting the pressure probe cable to the communication unit.

- Connect blue, green, orange and red wires to the terminal blocks in the corresponding colour; to do this, press the respective push-button of the terminal block when inserting the wire (do not use any tools).
- Shorten the pressure compensation capillary to $45^{\pm2}$ mm; do not make the cut at a right angle but diagonal!
- Insert the pressure compensation capillary into the transparent silicone tube of the desiccant capsule container (as far as the grey line shown in figure); the end of the pressure compensation capillary must then be in the metal nipple!
- Pinch off protruding strain relief approx. 1 cm behind the terminal screw.

- If required: exchange desiccant capsule; refer to Chapter 17.2.
- Replace the desiccant capsule container in its holder.
- Press the pressure compensation capillary into the cut-out on the cylinder.
- Reconnect the plug of the lithium battery to the socket on the circuit board; refer to Fig. 3.
- Push the cap and the pipe casing of the communication unit back as far as it will go. Please note: Do not bend or pinch the battery lead!
- Screw cap back on.
- Correct position of the rubber stop: distance = approx. 53 centimeters.

- Set new system length by means of "OTT HydroMet LinkComm" (operating software).

B2 – Shorten pressure probe cable for device variant with conductivity sensor

Note : The pressure probe cable for the device variant **with** integrated conductivity sensor can also be shortened in principle. Due to the design of the cable, the work involved is greater and there is an increased risk of cable damage! **Therefore, only shorten the pressure probe cable if you have the required expertise and the necessary special tools.** If you have any questions, please contact OTT Hydroservice or your local sales representative.

CAUTION **Risk of cuts when trimming the pressure sensor cable!**

When trimming the pressure probe cable, the cable knife/side cutter can cause injuries to the fingers or hands.

▶ Wear protective gloves when trimming the pressure probe cable.

Please note: The OTT Stripping tool (accessory) **cannot be used** with the device variant **with** integrated conductivity sensor!

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