

Technical manual BA 1109



Water level



## Hydrolog 500 – Hydrolog 1000 Water level sensor with data memory

for autonomous measuring and storing  
of water levels and temperatures in liquids

High accuracy and long term stable water level measurement

Ceramic highly overload resp. pressure blow resistive membrane

Food- and drinking water suitable materials

Integrated temperature measurement

Integrated, exchangeable battery for minimum 2 million measurements  
resp. 10 years operation at a measuring interval of 3 minutes

Measuring rates from 1x per second up to 1x per 100 days

Data memory for up to 216 000 measurement values

Interface head up to 3m water column flood protected

Installation in water level tubes of 1 ¼", at wider level tubes, e.g. 2", a  
control plumbing by cable light plumblines is possible without deinstallation

Data retrieval directly per PC resp. handheld-PC or  
wireless remote data transmission per GSM/GPRS

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know how mit system



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## Application description

The water level sensor with data memory **Hydrolog 500** resp. **Hydrolog 500** is a battery powered system for autonomous measurement of water levels from 1 up to 100m water column and temperatures in liquids, at environmental temperatures from – 25°C to +70°C.

The preferential application fields are water supply and distribution e.g. for measurement tubes, control levels, wells, containers and outstanding waters like lakes and rivers.

The excellent characteristics like highest strength against pressure and pressure blows, high resistance against chemicals and corrosion, very good insensitiveness against temperature shocks and EM interference, highest accuracy and long term stability as well as low influence of temperature makes it possible to use the sensor in various fields with liquids like water, waste water, solvents, oil, sludge, grease, cleaning agents, etc., where levels and temperatures combined with date and time should be surveillanced without having any auxiliary power at the place of installation.

For applications, where food or drink water suitability is necessary, a corresponding variant can be ordered where only suitable materials are used.

Because of many possibilities of adjustment a highest flexibility in the application for control level and especially for pumping test or long term surveillance is given.

## Function

The liquid contacts directly the ceramic membrane and causes there a deflection of the membrane because of the hydrostatic pressure of the liquid.

At the maximum deflection the membrane contacts a robust ceramic carrier and because of this, the membrane come through over pressure of e.g. 40-times of nominal load at a sensor with a pressure range of 0...1 m water column without damage.

The water level proportional hydrostatic pressure signal of the ceramic membrane and also the temperature proportional signal of an optional integrated temperature sensor is measured by the integrated high-resolution digital electronic according to the adjusted measurement rate and is stored loss protected.

Because of an intelligent store management the internal data memory with a size of 64kB resp. 128kB allows a recording of minimum 21 600 up to maximum 216 000 measurement data sets at exclusive storage of the measurement signal water level. If water level as well as temperature are recorded, minimum 16 200 up to maximum 162 000 measurement data sets could be stored.

A highly efficient lithium battery, exchangeable at the water level sensor Hydrolog 1000, that is integrated in the probe ensures the power supply of the device. The battery life time is conceived for minimum 2.000.000 measurements. This equals a run time of minimum 10 years at a measurement rate of 1x per 3 minutes.

Integrated over voltage protection modules prevents the destruction of the water level sensor caused by atmospheric influences like e.g. thunder strike.

Function	Hydrolog 500	Hydrolog 1000
food and drink water suitable materials	not available	optional
Separated version with disconnectable connection housing available	not available	optional
Accuracy measuring signal water level	0,25% of nominal measuring range	0,1% / 0,25% of nominal measuring range
Memory capacity	64 kB	64 kB / 128 kB
Battery system	not exchangeable	exchangeable / not exchangeable
Interface	RS-232	RS-232 / RS-485
Gasket materials of the probe	FPM	eligible FPM / CR / EPDM
Alarmmanagement	not available	integrated
Operation interval	not available	integrated
Control value log	not available	integrated

## Operation and data retrieval

The setting of the operation parameter, e.g. measurement place name, measuring unit, measuring rate or control value and the data retrieval from the water level sensor is operated in combination with the operation and evaluation software Gerätanager GM-600 for PC resp. GM-620 for handheld-PC, alternatively directly per cable or wireless per GSM/GPRS remote data transmission (RDT) (only data retrieval) to a PC resp. FTP server.

The software allows a comfortable and flexible adaption to the various requirements of the respective measurement place.

The software version GM-600 is conceived for a PC with operating system MS WINDOWS® 2000 and higher and allows the configuration of the sensor, reading out the measurement values from the sensor, archival, conversion to an excel-, resp. ASCII-, resp. Hydras3-, resp. Wiski-file, as well as the graphical illustration of the measurement values.

The software version GM-620 is conceived for a handheld-PC with operating system MS WINDOWS® and .NET® Framework, like e.g. MS WINDOWS® Mobile.

The water level sensor Hydrolog 500 / Hydrolog 1000 is defaulty equipped with a RS-232 interface. For the direct cable bound connection to the RS-232 interface (COM port) of the PC resp. handheld-PC, the interface cable STK-RS-1,75m is used. For the connection to the USB interface of the PC resp. handheld-PC the interface converter STK-USB-1,75m is used.

The water level sensor Hydrolog 1000 with exchangeable battery can also be configured to a RS-485 interface. Thus the interface converter STK-RSC-232 is used for the direct cable bound connection to the RS-232 interface (COM port) of the PC resp. handheld-PC. For the connection to the USB interface of the PC resp. handheld-PC the interface converter STK-RSC-USB is used.

The signal conversion to a RS232 resp. USB interface is made by the interface converter.

At a directly per cable connected PC resp. handheld-PC a real time view of the measuring values of the water level sensor with a measuring rate of 1x per second is possible.

Besides the data retrieval per PC there is the possibility to read-out the stored measurement values of up to 48 water level sensors without PC by using the hand-held terminal AM-1000. This allows especially in rough terrain an easy retrieval of the measurement values.

Additionally the display of the current measuring value (control measurement) with date and time resp. a real time measurement is possible. Using the hand-held terminal AM-1000, date, time and measuring interval can be changed resp. the measurement can be started or stopped.

For the more comfortable wireless remote data transmission the battery powered GSM RDT module GSM-1000, for the water level sensor Hydrolog 1000 with RS-485 interface also the GSM/GPRS RDT module GSM-3000 can be used to configure the water level sensor resp. to read out the measuring values without the need to go to the place of installation

By this the configuration resp. measuring values can be transmitted directly per GSM network between the RDT module and the PC.

Alternatively, when using the RDT module GSM-3000 the measuring values can be transmitted by GPRS to an FTP server, to make the data's worldwide available per internet.

When using the RDT module the active use of an alarm function is possible that informs immediately and continuously by SMS messages about the actual measuring values if the measuring value exceeds a freely adjustable limit measuring value.

The settings of the water level sensor are protected against unauthorized changing's and can only be changed after the input of the valid password.

Detailed informations to the operation parameter and the operation can be found in the technical manual of the Gerätanager GM-600 resp. GM-620.

## Safety notes

Each person that is engaged with inauguration and operation of this device, must have read and understood this technical manual and especially the safety notes.




Installation, electrical connection, inauguration and operation of the device must be made by a qualified employee according to the informations in this technical manual and the relevant standards and rules.

The device may only be used within the permitted operation limits that are listed in this technical manual. Every use besides these limits as agreed can lead to serious dangers.

The materials of the device must be chosen resp. checked for suitability to the respective application requirements (contacting substances, process temperature). An unsuitable material can lead to damage, abnormal behavior or destruction of the device and to the resulting dangers.

The sensors may not be used as sole device for prevention of dangerous conditions in machines and plants.

The device meets the legal requirements of all relevant EC directives. 

## Installation

The water level sensor with data memory **Hydrolog 500** resp. **Hydrolog 1000** can be mounted into water level tubes wider than 1 ¼". The installation in wider water level tubes than 2" is made by using adapter rings. In water level tubes wider than 2" a control plumbing with a cable light plumbline without deinstalling the sensor is possible.

Due to an optional screw thread at the interface head a measurement in artesian wells is possible. In systems where a better mounting flexibility is necessary, a separated version with a disconnectable connection housing and a sealing screw is available.

The stable carrying cable with steel axis for strain relief that is necessary to ensure the length stability of the cable, with shield for EMC protection and pressure balancing capillary for compensation the environmental air pressure guarantees an interference-free operation of the water level sensor.

The probe of the water level sensor is put into the medium by the carrying cable.

The carrying cable may not be folded and the cable sheath may not be damaged.

The cut of the carrying cable may only be made by the manufacturer.

A holding ring at the interface head fixes the water level sensor in the filler cap.

At the upper end of the interface head an electrical socket is implemented that functions as interface for operation and data transmission.

The construction of the interface head allows those damage protected flooding up to 3m water column.

Avoid faulting the pressure compensation openings resp. the pressure compensation membrane inside it at the bottom side of the interface head.

The hindrance of the air pressure compensation can lead to faulty measurement results. At a damaging of the pressure compensation membrane the flood protection of the interface head is no more longer ensured.

The correct function of the device within the specific technical data can only be guaranteed, if the permitted temperature in the area of the sensor from – 25°C to +70°C will not be exceeded.

## Battery change

The integrated highly efficient lithium battery guarantees a run time of the water level sensor of 10 years at a measuring rate of 1x per 3 minutes.

At higher measuring rates, e.g. 1x per second at real time evaluation resp. at long time connected interface cable the battery is loaded stronger and thus discharged faster. Thus there is an optional system with exchangeable battery available.

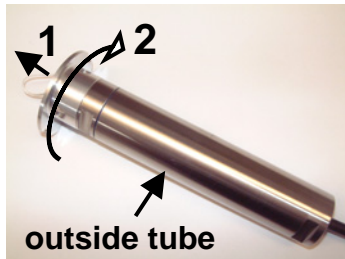


image 1

**For changing the battery proceed like follows:**

Pull the filler cap from the interface socket at first (**image 1 – step 1**) and unscrew the holding ring from the interface head (**image 1 - step 2**). This is necessary to replace the gaskets.

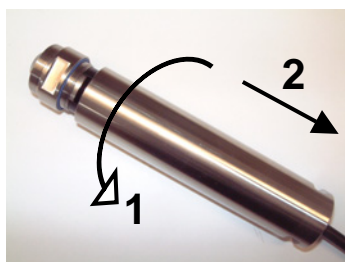


image 2

Unscrew the outside tube of the interface head in direction probe app. 10mm (**image 2 - step 1**). A mill for spanner in size 28 is placed at the outside tube and at the interface socket.

After that the outside tube can be slide in direction probe (**image 2 - step 2**).

**Attention:** The outside tube is not protected against sliding from the interface head. Because the inside drill of the outside tube is greater than the probe there is the danger of loosing the outside tube e.g. in the measurement tube. Protect the outside tube after sliding it from the interface head against drop off.

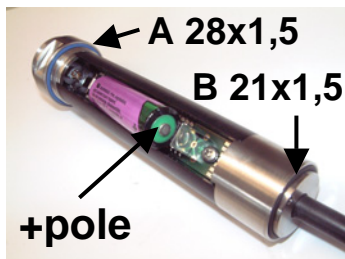


image 3

After longer operation time (1 year and longer) it is favorable to replace the 2 gaskets (**image 3**) of the interface head when changing the battery. Pull all two gaskets in direction to the interface socket from the interface head and after that slide the new gaskets (included in the service pack SPB – 1000) in the same method over the interface head in the following order:

A → Gasket red or blue 28x1,5 at interface side

B → Gasket grey or black 21x1,5 at carrying cable side

Remove the old battery and put in the new one in the correct direction (+pole to the carrying cable - image 3).

**Attention:** At older battery's (more than 3...4 month after the printed production date) it must be reactivated by repeated beating onto a hard surface or by repeated short circuits for each approximate one second. Only after that the battery voltage stays constant also at load.

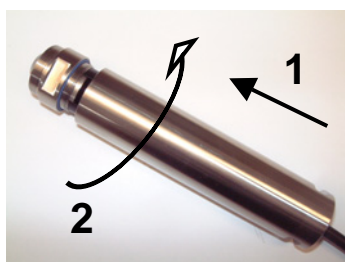


image 4

Slide the outside tube back over the interface head (**image 4 – step 1**) and screw it tight till to the stop (**image 4 – step 2**).

Only the complete screw on of the outside tube up to the stop ensures the damage protected flooding of the interface head.

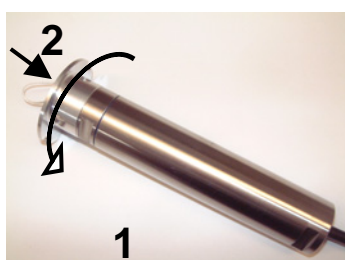


image 5

Screw on the holding ring to the interface head (**image 5 – step 1**) and push the filler cap back into the interface socket (**image 5 – step 2**).



After a battery change the time and date of the water level sensor must be set and the battery counter must be reset by using the operation software Gerätemanager GM – 600 resp. GM – 620.

## Change communication interface

The water level sensor Hydrolog 500 and Hydrolog 1000 are defaultly equipped with a RS-232 interface. Thus these devices can be connected to the RDT module GSM-1000 and to the hand-held terminal AM-1000. For the connection to the RDT module GSM-3000 a RS-485 interface is necessary. At the water level sensor Hydrolog 1000 with exchangeable battery the RS-232 interface can be configured to a RS-485 interface.

### To change the interface proceed like follows:

Unscrew like described in the chapter „change battery“ (previous page), the outside tube of the interface head and remove the battery.

Below 3 areas with solder strap's are positioned, that are lettered with RS232 resp. RS485.

To configure the water level sensor to a RS-485 interface, open at first all solder strap's in the two areas, that are lettered with RS232. Following close all solder strap's in the area, that is lettered with RS485 (**image 1**).

To configure the water level sensor to a RS-232 interface, open at first all solder strap's in the area, that is lettered with RS485. Following close all solder strap's in the two areas, that are lettered with RS232 (**image 2**).

Put in again the battery in the right direction (+pole to the carrying cable).

Slide now the outside tube back over the interface head and screw it tight till to the stop (see chapter “change battery”). Only the complete screw on of the outside tube up to the stop ensures the damage protected flooding of the interface head.

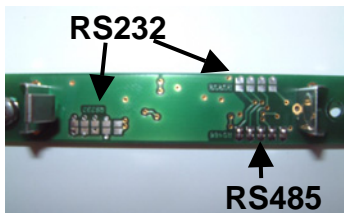


image 1

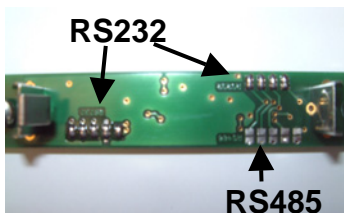


image 2



After a remove of the battery, the time and date of the water level sensor must be set by using the operation software Gerätemanager GM – 600 resp. GM – 620.

## Maintenance

The device is free of maintenance.

Special substances can lead to solid coatings on the membrane. Such depositions can lead to faulty measurement results of the sensor. In the case of coat forming liquids the membrane must be regularly cleaned e.g. with clear water. Don't use sharp tools or aggressive chemicals for cleaning.

## Repair

A repair may only be carried out by the manufacturer.

If the device must be sent back for repair, the following informations must be enclosed:

- An exact description of the application.
- The chemical and physical characteristics of the product.
- A short description of the occurred error.

Before returning the device for repair, the following measures must be proceeded:

- All stick product residues must be removed. This is especially important, if the product is unhealthy, e.g. caustic, toxic, carcinogenic, radioactive etc.
- A returning must be refrained, if it is not possible by 100% to remove the unhealthy product completely, because e.g. it is penetrate into cracks or is diffused through plastic.

## Technical data

### Auxiliary supply

Power supply:	Integrated lithium battery, optionally changeable by user
Battery run time:	≥ 2.000.000 measurements resp. ≥ 10 years at a measuring rate of 1x per 3 minutes

### Signal water level

Measuring range:	1m water column up to 100m water column
Measuring units:	mWs / cmWs / bar / mbar / mNN / mAbsenkung
Measurement resolution:	≤ 0,01% FS <sup>2)</sup> at limit value
Characteristic deviation <sup>3) 5) 12)</sup> :	≤ 0,1% resp. 0,25% FS <sup>2)</sup>
Temperature deviation:	T <sub>k</sub> <sup>4)</sup> zero ≤ ±0,15% FS <sup>2)</sup> / 10 K, max. 0,75K T <sub>k</sub> <sup>4)</sup> span ≤ ±0,15% FS <sup>2)</sup> / 10 K, max. 0,5K
Long term drift <sup>12)</sup> :	≤ ±0,15% FS <sup>2)</sup> / year not cumulative

### Signal temperature

Measuring range:	-25°C ... +70°C
Accuracy:	≤ ± 0,3 Kelvin
Measurement resolution:	≤ 0,1 Kelvin
Long term drift:	≤ ± 0,2 Kelvin / 1000 hours

### Clock

Type:	Real time clock
Cycle accuracy:	≤ ±1 minute / month

### Data memory

Memory capacity:	64kB → 10 700 ... 107 000 data records water level → 8 000 ... 80 000 data records water level / temperature 128kB → 21 600 ... 216 000 data records water level → 16 200 ... 162 000 data records water level / temperature
Storage method:	Intelligent memory management. Measuring values are only stored at a exceeding of a minimum deviation, but always at a minimum of every 10 <sup>th</sup> measuring cycle
Memory organization:	Circle memory active → at overflow overwriting of the oldest data records Circle memory inactive → memory is written only once
Measuring rate:	one measuring per 1 second up to one measuring per 100 days
Operation / data retrieval:	Operation and evaluation software GM-600 per PC resp. GM-620 per handheld PC, or per RDT module, or per hand-held terminal AM-1000
Data processing:	Graphic data evaluation resp. data export as excel-, ASCII-, Hydras3- or Wiski-file resp. real time evaluation with measuring rate 1x per second and graphic evaluation by GM-600 resp. GM-620
Alarm management:	Surveillance of the measurement signals on exceeding the preset limit values with alarm message per SMS message by RDT module and separately adjustable alarm measuring rate

### Interface

Type:	Hydrolog 500 RS232 Hydrolog 1000 RS232 / RS485 - full-duplex
Transmission rate:	9600 Baud

<sup>2)</sup> Referring to nominal measuring span resp. full scale (FS)  
<sup>3)</sup> Nonlinearity + Hysteresis + Reproducibility  
<sup>4)</sup> T<sub>k</sub> = Temperature coefficient  
<sup>5)</sup> Limit value adjustment  
<sup>12)</sup> Higher values for special measuring range

## Technical data

### Materials

Membrane: (medium contact)	Ceramic AL <sub>2</sub> O <sub>3</sub> 96%
Probe: (medium contact)	Steel 1.4404 (AISI 316L) / 1.4571 (AISI 316Ti)
Interface head:	CrNi-steel
Holding ring:	Aluminum
Connection housing:	Aluminum, lacquered, dimension (WxHxD) 125mm x 93mm (without plug) x 59mm
Interface socket:	Socket brass nickel plated / chrome plated, insert PBT/PUR, contacts gold plated
Carrying cable: (medium contact)	PE polyethylene
Pressure compens. element:	Filter membrane PES
Gaskets:	medium contact → FPM – fluorelastomere (Viton®) CR – chloroprene-rubber (Neopren®) EPDM – etylene-propylene-dienmonomere
	others → FPM – fluorelastomere (Viton®)

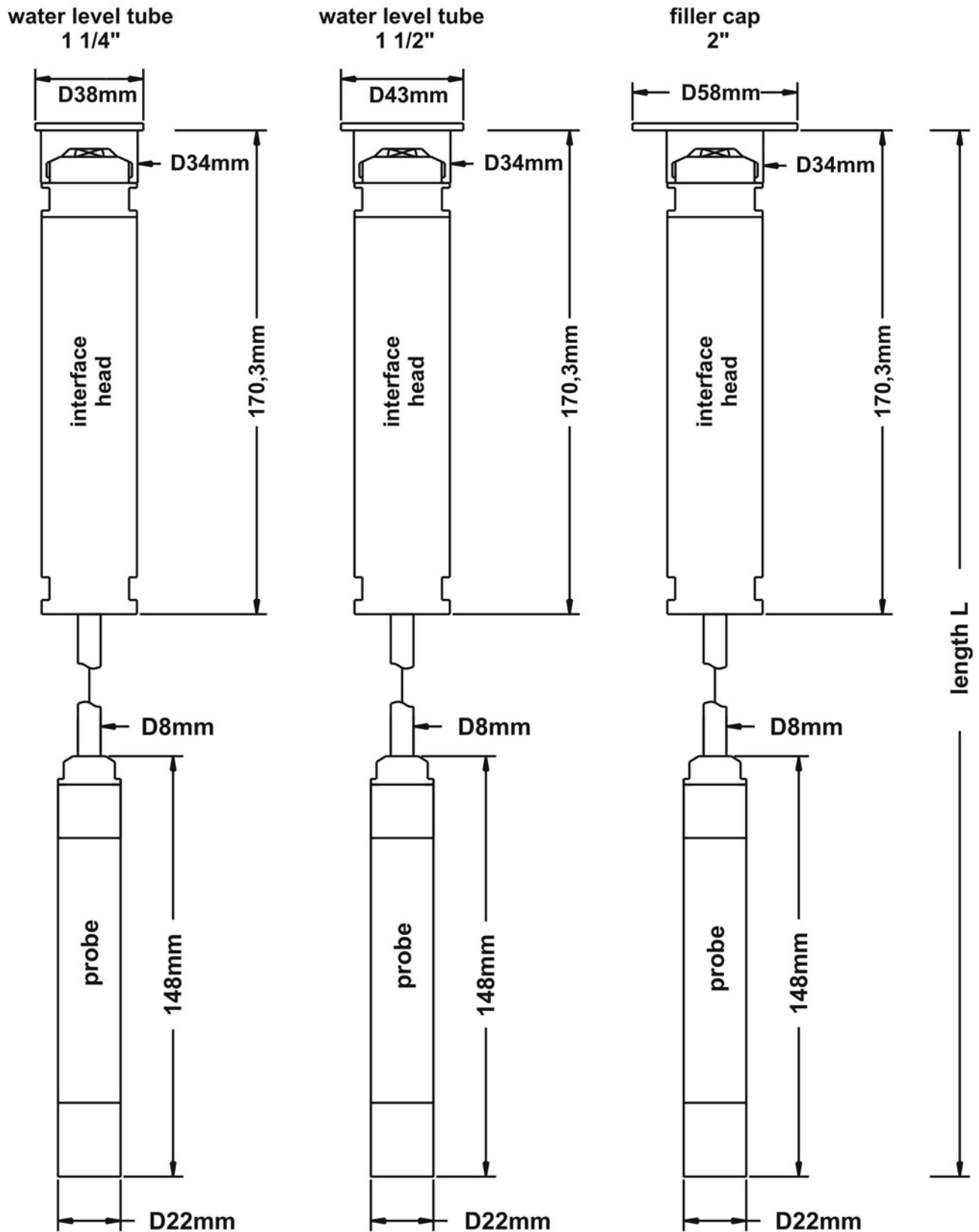
### Environmental conditions

Environmental temperature:	– 25°C...+70°C, ice-free
Liquid temperature:	– 25°C...+70°C, ice-free
Measuring range:	0...1mWs up to 0...100 mWs
Overload resistance:	

Measuring range	overload / burst pressure
0...1 mwc	+4 bar <sub>rel</sub>
0...2 mwc	+4 bar <sub>rel</sub>
0...4 mwc	+4 bar <sub>rel</sub>
0...5 mwc	+10 bar <sub>rel</sub>
0...6 mwc	+10 bar <sub>rel</sub>
0...10 mwc	+10 bar <sub>rel</sub>
0...20 mwc	+15 bar <sub>rel</sub>
0...40 mwc	+25 bar <sub>rel</sub>
0...50 mwc	+40 bar <sub>rel</sub>
0...100 mwc	+40 bar <sub>rel</sub>

Vacuum resistance:	0 mbar <sub>abs</sub>
Weight:	0,7 kg + (sensor length L in meter x 0,035 kg)
Protection classification:	Probe IP68 DIN EN 60529 Interface head IP68 up to 3 mwc DIN EN 60529
Climatic classification:	4K4H DIN EN 60721-3-4
Shock classification:	50 g DIN EN 60068-2-27 (11 ms)
Vibration classification:	20 g DIN EN 60068-2-6 (10 - 2000 Hz)
EM – Compatibility:	Emission DIN EN 61326-1 operation device class B Immunity DIN EN 61326-1 industrial range
Reference conditions:	DIN EN 60770-1 resp. DIN EN 61003-1 T = 25 °C, relative humidity 45...75 %, environmental air pressure 860...1060 kPa

Dimension drawings



## Order code overview Hydrolog 500

Digital battery powered water level sensor with integrated temperature sensor with data memory 64kB, interface RS-232

**Type:**

- Standard

**Process connection:**

20 for installation into 2" water level tube control measurement without removal possible  
 14 for installation into 1 1/4" water level tube control measurement without removal not possible  
 12 for installation into 1 1/2" water level tube control measurement without removal not possible  
 A1 interface head with screw thread 1" acc. to DIN EN 10226-1 (formerly DIN2999) for artesian wells

**Measurement signals:**

S Water level  
 T Water level and temperature

**Accuracy measuring system <sup>1)</sup> – material measuring membrane (medium contact):**

0 0,25% ceramic AL<sub>2</sub>O<sub>3</sub> 96%

**Measuring range:**

A 0...1 m water column (mwc)  
 B 0...2 m water column (mwc)  
 C 0...4 m water column (mwc)  
 M 0...5 m water column (mwc)  
 D 0...6 m water column (mwc)  
 E 0...10 m water column (mwc)  
 F 0...20 m water column (mwc)  
 G 0...40 m water column (mwc)  
 J 0...50 m water column (mwc)  
 H 0...100 m water column (mwc)  
 Y special measuring range separate specification necessary

**Memory capacity:**

0 64 kB max. 107 000 data records water level  
 max. 80 000 data records water level and temperature

**Material probe (medium contact):**

1 Steel 1.4404 (AISI 316L) / 1.4571 (AISI 316 Ti)

**Material gaskets (medium contact):**

1 FPM fluorelastomere (Viton®)

**Material carrying cable (medium contact):**

A PE polyethylene

**Sensor length L (see dimension drawings):**

measure in mm

**Hydrolog 500 – \_ \_ 0 \_ 0 1 1 1 A \_**

Montagematerial und Anschlusskabel sind nicht im Lieferumfang enthalten

<sup>1)</sup> Höhere Werte bei Sondermessbereich

## Order code overview Hydrolog 1000

Digital battery powered water level sensor with integrated temperature sensor with data memory 64kB/128kB, interface RS-232 resp. RS-485, alarmmanagement, operation interval and control value protocol

### Type:

- Standard
- T Certificate for food and drink water suitability of all liquid contacting materials

### Process connection:

- 20 for installation into 2" water level tube control measurement without removal possible
- 14 for installation into 1 ¼" water level tube control measurement without removal not possible
- 12 for installation into 1 ½" water level tube control measurement without removal not possible
- A1 interface head with screw thread 1" acc. to DIN EN 10226-1 (formerly DIN2999) for artesian wells
- A2 separated interface unit in an aluminum housing, sealing screw G 1" DIN EN ISO228-1
- A0 separated interface unit in an aluminum housing (sensor fixing necessary)

### Measurement signals:

- S Water level
- T Water level and temperature

### Accuracy measuring system <sup>1)</sup> – material measuring membrane (medium contact):

- |   |       |  |  |
|---|-------|--|--|
| 0 | 0,25% | ceramic AL <sub>2</sub> O <sub>3</sub> | 96%  |
| K | 0,1%  | Linearization protocol                 | ceramic AL <sub>2</sub> O <sub>3</sub> 96% |

### Measuring range:

- A 0...1 m water column (mwc)
- B 0...2 m water column (mwc)
- C 0...4 m water column (mwc)
- M 0...5 m water column (mwc)
- D 0...6 m water column (mwc)
- E 0...10 m water column (mwc)
- F 0...20 m water column (mwc)
- G 0...40 m water column (mwc)
- J 0...50 m water column (mwc)
- H 0...100 m water column (mwc)
- Y special measuring range separate specification necessary

### Memory capacity:

- |   |        |                           |                             |
|---|--------|---------------------------|-----------------------------|
| 0 | 64 kB  | max. 107 000 data records | water level                 |
|   |        | max. 80 000 data records  | water level and temperature |
| 1 | 128 kB | max. 216 000 data records | water level                 |
|   |        | max. 162 000 data records | water level and temperature |

### Battery / interface:

- 1 welded interface RS-232
- 2 exchangeable interface configurable to RS-232 or RS-485

### Material probe (medium contact):

- 1 Steel 1.4404 (AISI 316L) / 1.4571 (AISI 316 Ti)

### Material gaskets (medium contact):

- 1 FPM fluorelastomere (Viton<sup>®</sup>)
- 2 CR chloroprene-rubber (Neopren<sup>®</sup>)
- 3 EPDM etylene-propylene-dienmonomere for food applications

### Material carrying cable (medium contact):

- A PE polyethylene

### Sensor length L (see dimension drawings):

measure in mm

**Hydrolog 1000** \_ \_ \_ \_ \_ **1** \_ **A** \_

Montagematerial und Anschlusskabel sind nicht im Lieferumfang enthalten

<sup>1)</sup> Höhere Werte bei Sondermessbereich

## Accessories, not implemented in standard extend of supply

<b>GM-600</b>	Operation / evaluation software for operating system MS WINDOWS® 2000 & higher
<b>GM-620</b>	Operation and evaluation software for operation system with .NET® Framework, e.g. MS WINDOWS® Mobile
<b>STK-RS-1,75m</b>	Interface cable RS232 for PC interface RS 232, cable 1,75m
<b>STK-USB-1,75m</b>	Interface cable USB for PC interface USB, cable 1,75m
<b>STK-RSC-232</b>	Interface converter RS485/RS232 for PC interface RS 232, cable 1,75m for connection of a Hydrolog 1000 (RS-485) with the COM port of a PC
<b>STK-RSC-USB</b>	Interface converter RS485/USB for PC interface USB, cable 1,75m for connection of a Hydrolog 1000 (RS485) with the USB port of a PC
<b>GSM-1000</b>	GSM RDT module for connection of a Hydrolog 500 resp. Hydrolog 1000 (RS-232), for remote data transmission for configuration, data transmission and alarmmanagement
<b>GSM-3000</b>	GSM/GPRS RDT module for connection of a Hydrolog 1000 (RS-485) for remote data transmission for configuration, data transmission and alarmmanagement
<b>TDS RECON</b>	Handheld PC for outdoor-use with operation system MS WINDOWS® Mobile with preinstalled operation and evaluation software GM-620 for connection to water level sensors resp. RDT modules for configuration and data retrieval
<b>AM - 1000</b>	Hand-held terminal with interface RS232
<b>STK-RSX- 1,75m</b>	Interface cable, length 1,75m necessary for use of AM-1000
<b>SPB - 1000</b>	Service pack for battery exchange, with battery and replacement gaskets

### **Filler cap in foundry aluminum, plastic coated, with 6-edge-seal**

<b>VK-A 200</b>	G 2"	acc. to DIN EN ISO228-1
<b>VK-A 300</b>	G 3"	acc. to DIN EN ISO228-1
<b>VK-A 400</b>	G 4"	acc. to DIN EN ISO228-1
<b>VK-A 412</b>	G 4 ½"	acc. to DIN EN ISO228-1
<b>VK-A 500</b>	G 5"	acc. to DIN EN ISO228-1
<b>VK-A 600</b>	G 6"	acc. to DIN EN ISO228-1
<b>SCHVK-6</b>	Key for 6-edge-seal	

### **Filler cap in foundry aluminum, plastic coated, with 5-edge-security-seal**

<b>VK-A 200 S</b>	G 2"	acc. to DIN EN ISO228-1
<b>VK-A 300 S</b>	G 3"	acc. to DIN EN ISO228-1
<b>VK-A 400 S</b>	G 4"	acc. to DIN EN ISO228-1
<b>VK-A 412 S</b>	G 4 ½"	acc. to DIN EN ISO228-1
<b>VK-A 500 S</b>	G 5"	acc. to DIN EN ISO228-1
<b>VK-A 600 S</b>	G 6"	acc. to DIN EN ISO228-1
<b>SCHVK-5</b>	Key for 5-edge-secure seal	

### **Adapter rings for mounting the water level sensor into wider filler caps**

<b>ZR-2-3</b>	2" to 3"
<b>ZR-2-4</b>	2" to 4"
<b>ZR-2-412</b>	2" to 4 ½"
<b>ZR-2-5</b>	2" to 5"
<b>ZR-2-6</b>	2" to 6"

**Cable clamp fixing**      CrNi-steel, for cable diameter 8mm