



#### 1. Safety

#### Intended use

The sensor must be used solely for the level detection of liquids and solids with a dielectric constant of at least 1.5.

The sensor must only be used for media against which the housing material and sensor tip are resistant.

#### Staff qualification

Only use staff who are trained for the activities described. This applies in particular to assembly, installation and explosion protection. Make sure that the staff have read and understood these instructions.

### 2. Construction and function



Fig. 1. Construction



Fig. 2. Function

#### **Technical condition**

Use the sensor only when in perfect technical condition. Only use Baumer accessories. Baumer will accept no liability for other manufacturers' accessories.

#### Risk of burns from hot media

During operation the sensor housing may warm up to over 50 °C. When working with hot media provide protection against burns.

#### **Explosion hazard areas**

Ensure that safety requirements are complied with. Do not use equipment that would be exposed to hard impacts.

- 1 Sensor tip
- 2 LED
- 3 Connection using a M12-A 4-pin connector, or a cable outlet

An electrode integrated into the sensor tip forms a capacitor with the environment. The medium determines the capacity value depending on its dielectric constant (DC values). A resonant circuit occurs together with a coil in the sensor electronics. Depending on the resonance frequency measured and the programmable trigger threshold, the switch signal is activated.

## 3. Symbols in warning signs

Symbol	Warning term	Explanation
	DANGER	In situations which cause death or serious injuries.
	WARNING	In situations which can cause death or serious injuries.
	CAUTION	In situations which can cause light or medium injuries.
	ATTENTION	For material damage

## 4. Transport and storage

- Check packaging and sensor for damage.
- In the event of damage: Do not use sensor.
- Store sensor where it will be secure against shock.
   Storage temperature: -40...+85 °C Relative humidity: < 98 %</li>

## 5. Assembly



Fig. 3. General mounting options

- 1 Overfill protection
- 2 Limit level, max.
- 3 Limit level, min.
- 4 Run-dry protection

The sensor can be mounted on any point in the vessel.

A sensor mounted at the top of the vessel (1) ensures against overfilling. Sensors attached further down detect a maximum (2) or minimum (3) limit level. A sensor attached at the bottom or on the outfeed pipe (4) can protect a pump against dry running.



- 1 Limit level: Mounting with a tube (version 5)
- 2 Overfill protection (Type K, L)
- 3 Pasty or powdered media limit level (version K, L)

Dip length:

- Type K: 82 mm (fixed)
- Type L: 15...228 mm (adjustable)

The adjustable version L allows bridging across tank insulation.

In pasty or powdered media, the greater dip depth renders the sensor less susceptible to caking.

Fig. 4. Mounting of extended sensors

## 5.1 Installation for industrial applications



#### DANGER Risk of injury from hazardous medium

- Wear protective equipment for hazardous media (such as acids, alkalis).
- Empty vessel and pipelines before mounting.



## PS11 with the following process connections:

G 1/2 A ISO 228-1 BSC (BCID G07) G 3/4 A ISO 228-1 (BCID G10) G 1 A ISO 228-1 (BCID G11) 1/2-14 NPT (BCID N02) 3/4-14 NPT (BCID N03)

- ✓ Vessel and pipelines are free of media.
- Seal thread on sensor with Teflon tape (PTFE).
- Screw in sensor.
   Tightening torque G xx A: 30 Nm max.
   Tightening torque xx-14 NPT: 20 Nm max.



## PS11 with the following process connections:

G 1/2 A ISO 228-1 BSC (BCID G07) with industrial weld-in sleeve for universal use, Ø 30 x 26 (ZPW1-711, ZPW1-721)

 G 1/2 A hygienic (BCID A03) with weld-in sleeve or adapter from Baumer

For these process connections, do not seal with Teflon tape (PTFE) or elastomer.

- ✓ Vessel and pipelines are free of media.
- ✓ Adapter or weld-in sleeve are mounted free of dead space.
- Screw in sensor. Tightening torque: 15...20 Nm

# **PS11 with the following process connections:** G 1/2 A DIN 3852-E (BCID G51)

- ✓ Vessel and pipelines are free of media.
- Push the sealing ring on.
- Screw in sensor. Tightening torque: 15...20 Nm



1





## **PS11** with the following process connections:

G 1/2 A ISO 228-1 for internal installation (BCID T10)

- ✓ Vessel and pipelines are free of media.
- Push the sealing ring on.
- Screw in sensor. Tightening torque: 15...20 Nm



### PS11with the following process connections: M18x1 ISO 965 (BCID M11)

- ✓ Vessel and pipelines are free of media.
- Screw in sensor.
- Tighten the nuts on both sides. Tightening torque: 15...20 Nm

#### 5.2 Installation for hygiene applications



## WARNING

### Danger to health from contaminated medium

- Only use weld-in sleeves or adapters from Baumer.
- ► Do not seal process connections with Teflon tape (PTFE) or elastomer.
- Welding work must only be carried out by welders trained in the area of hygiene.



## **PS11 with the following process connection:** G 1/2 A hygienic (BCID A03)

- ✓ The weld-in sleeve or adapter must be hygienically mounted and internally flush.
- ✓ Weld seams are smoothed out to Ra < 0.8  $\mu$ m.
- ✓ Leakage hole points downwards.
- Screw in sensor.
   Tightening torque: 10...15 Nm

#### LBFS with the following process connection:

- G 1/2 A hygienic with adjustable connection (BCID A03)
- ✓ The weld-in sleeve or adapter must be hygienically mounted and internally flush.
- ✓ Weld seams are smoothed out to Ra < 0.8  $\mu$ m.
- ✓ Leakage hole points downwards.
- ✓ The clamping rings must be in faultless condition (if they are deformed, replace both clamping rings).
- Push the wide clamping ring on to the guide tube.
- Push the narrow clamping ring on to the guide tube.
- Position the sensor.
- Adjust the dip depth.
   Projecting length: 15...228 mm
- Tighten the screw-in pin.
   Tightening torque: 10...15 Nm



## Example of mounting with weld-in sleeve ZPW2-321



- 1 ZPW2-321
- 2 Leakage hole

## Example of mounting with weld-in sleeve ZPW2-326 or ZPW2-327



## 6. Approvals



EN 50155 Approved as an electronic device for railway applications.

## 7. Electrical connection

- ✓ A voltage supply of 12 V to 30 V DC is provided.
- Switch off supply voltage.
- Connect sensor in accordance with the pin assignment.

## **Terminal assignment**



Housing dimensions available only for a plug connector in stainless steel

Output type	Equivalent circuit	Function	M12-A 4-pin	Cable outlet
PNP	+Vs	+ Vs	1	brown
		SW1 (NO)	4	black
	Ч ( ) SW1 (NO)	SW1 (NC)	2	white
	OSW1 (NC)	GND (0 V)	3	blue
NPN	+Vs	+ Vs	1	brown
	O SW1 (NO)	SW1 (NO)	4	black
	SW1 (NC)	SW1 (NC)	2	white
		GND (0 V)	3	blue

#### 8. Configuration

The sensor can be configured with the FlexProgrammer. This allows switching points and damping values to be selected as required. In addition pulse width modulation can be specified for the signal.

## Examples for pulse width modulation



#### **Configuring with FlexProgrammer and PC**

- Connect FlexProgrammer to sensor.
- Connect FlexProgrammer to PC and set parameters (see FlexProgrammer instructions).



#### Copying configuration with FlexProgrammer

Copy the configuration of one sensor to another sensor using FlexProgrammer (see FlexProgrammer instructions)



#### Standard operation with factory settings





- BU = blue: Switched output, active
- LED does not light up: Switched output, inactive

#### LED indication for "Power-On"



- BU = blue: Switched output, active
- GN = green: Switched output, inactive

A green LED can be activated indicating "Power-On" by using the FlexProgrammer.

## 10. Cleaning, maintenance and repair

#### Cleaning

 Clean, disinfect or sterilize sensor as needed (CIP/SIP).

#### Maintenance

Regular maintenance is not required.

## 11. Disposal

- Do not dispose of in household waste.
- Separate materials and dispose of in compliance with nationally applicable regulations.

## 12. Accessories

For adapter and other accessories see WEB

## 13. Technical data

Environmental conditions		Output signal		
Operating temperature range	■ -40+85 °C	Output type	<ul><li>PNP</li><li>NPN</li></ul>	
Storage temperature range	■ -40+85 °C			
Ambient humidity	< 98 % RH, condensing	Current load	20 mA max.	
		Short circuit protection	■ yes	
Protection class	IP67			
	<ul> <li>IP69K (with appropriate cable)</li> </ul>	Voltage drop	<ul> <li>PNP: (+Vs –1.5 V) ± 0.5 V,</li> <li>Rload = 10 kΩ</li> </ul>	
Oscillations (sinusoidal) (EN 60068-2-6)	<ul> <li>1.6 mm p-p (225 Hz),</li> </ul>		<ul> <li>NPN: (+1.5 V) ± 0.5 V,</li> <li>Rload = 10 kΩ</li> </ul>	
	4 g (25…100 Hz),	Leakage current	■ ± 100 µA max.	
	1 octave / min.	Switching logic	<ul> <li>Normally open (NO), active low</li> <li>Normally closed (NC), high enabled</li> </ul>	
Power supply				
Voltage supply range	■ 1230 V DC			
Reverse polarity protection	• yes			
Current consumption	<ul> <li>25 mA typ.,</li> <li>50 mA max.</li> </ul>	Cable version		
(without load)		Operating tempera- ture range	<ul> <li>-25+70 °C (if cable is not moved)</li> <li>-5+70 °C (if cable is moved)</li> </ul>	
Power-up time	■ < 2 s			
Features				
Repeatability	■ ± 1 mm		moved)	
Hysteresis	■ ± 1 mm	Bending radius min.	∎ r ≥ 10 mm	
Response time	• 0.1 s			
Damping	<ul> <li>0.010.0 s (configurable)</li> </ul>			

#### Repair

Do not repair the sensor yourself.

#### Process conditions as a function of the ambient temperature



Version L (adjustable connection)



- 1 without cooling neck
- 2 with cooling neck (version E, G, M)

Tamb Ambient temperature

Tp Process temperature

1 Range without restrictions

#### Tamb Ambient temperature

- Tp Process temperature
- Lp min. projecting length:

Lp min. projecting length:

## 15. Factory settings and user settings

Sensor parameter		Factory setting	User setting
SW1 (NO)	Switch window, min.	• 0%	•
	Switch window, max.	■ 75.3%	•
	Switch window hysteresis	■ 2.4%	•
	Damping	• 0.1 s	•