Level control technology

Float switch
PSN

Electronic pump control
ENP

Electronic level relay
ENR

Electronic level relay
HRH-5

Stainless steel
level sensor ENS

Level control

Industries

···→	Level measurement methods	P. 97	
PSN	Float switches which turns On and Off depending on the cable length	P. 101	Fill level switch in wastewater pumping stations, used water tanks, stormwater utilization systems, sump pits, etc. for direct and indirect control of pumps.
ENP	Electronic pump control Single and dual pump control with monitoring functions	P. 107	Electronic level controls are used where fill levels in tanks and pits have to be kept at an exact level or where fluids should be pumped out.
ENR	Electronic level relay Measuring range 0,1 – 2 m Output signal 0 - 10 V	P. 109	
HRH-5	Electronic level relay For level monitoring	P. 111	Electrode relays monitor the fill levels of conductive fluids by means of rod or dipped electrodes in tanks.
ENS	Stainless steel level sensor Output signal 4 - 20 mA	P. 113	For constant detection of minimal changes in water level in shafts and pits, larger pump stations for wastewater or stormwater drainage, with and without the risk of explosions.
···→	Accessories: Bells and accessories for Level Monitoring	P. 115	Bell plungers: robust and maintenance-friendly solution for detecting fill levels in pressurized drainage systems, small pump stations, sewage collection shafts. Approved for use in explosion-risk areas.

Type "WASTE"
waste water

Typ "ACS"
Drinkable

Typ "SiHF"
High Temperature

Typ "FEP"
Chemical Ambient

Typ "ATEX-Schutz"
II 1G Ex ia IIC T6 Explosive*

Suspended float switch

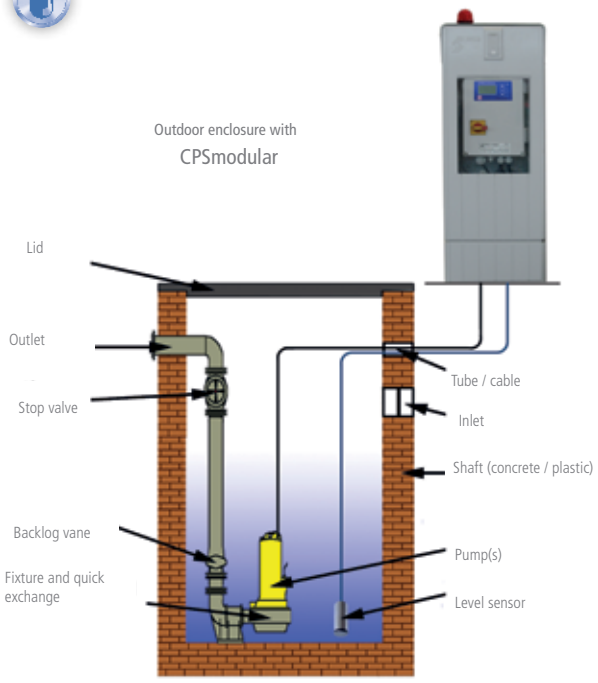
Industries

"WASTE"/"ACS"/SiHF"/"FEP"/"ATEX" NEW!	Suspended float switch - "T" series	P. 105	Used in domestic , industrial or municipal sector , for waste water , drinking water , chemical substances and environment for use in explosive areas (ATEX). . Ideal for level control in drainage systems, pumping stations ,waste-water systems , drinkable water fountains, drinks an foodstuffs , ship building , ...

**others on request

* The rules of the DIN EN 60079 to be observed!

For level measurement there are different methods that can be used



1. Level measurement method using float switches or suspended float switch
2. Impact pressure

2.1 Impact pressure method in closed systems

2.2 Impact pressure method in open systems

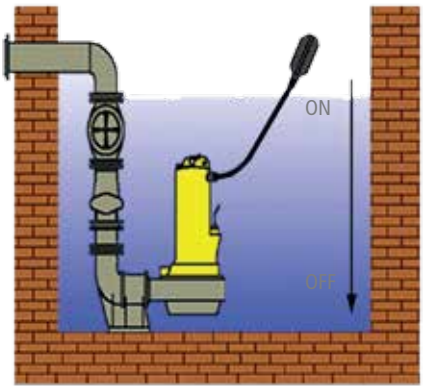
2.2.1 Open system method with air replenishment

2.2.2 Open system method with bubblers

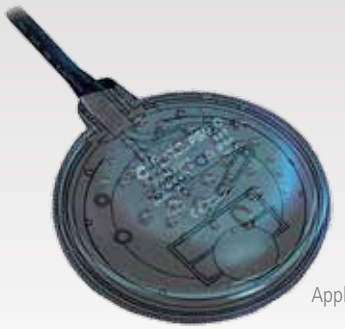
3. Conductivity measurement method

4. Hydrostatic measurement method (ENS)

1. Description float switches - Digital Measurement method



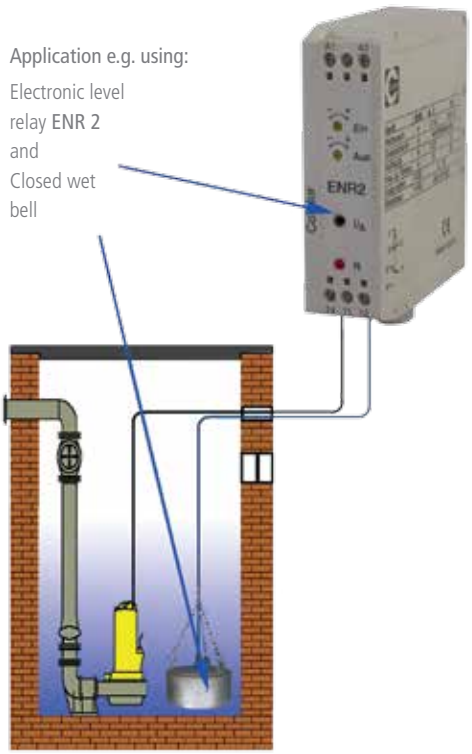
In this application, contacts placed within a floating enclosure are closed / opened depending on the inclination angle of the float switch.



Application e.g. using:

- Float switches
  PSN – O
- Suspended float switch ((series "T")

2.1 Impact pressure method, closed system

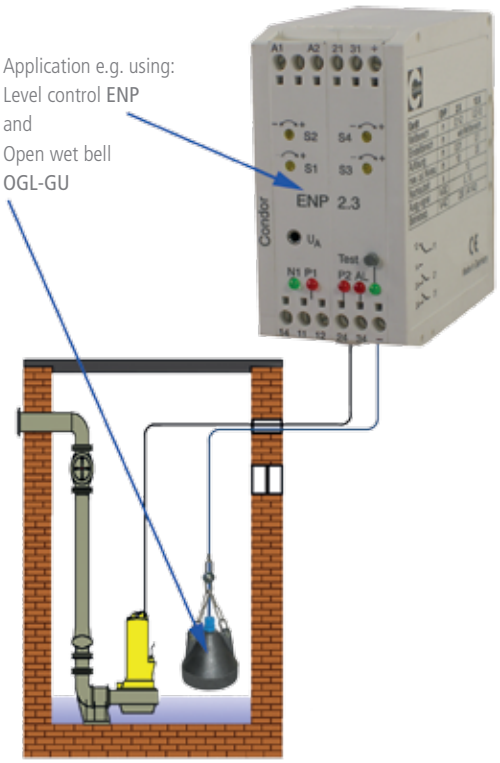


In this application the level change is transmitted via a pneumatic tube to the sensor and evaluated. The two types of systems - closed and open - are described in more detail below:

Closed system

For the use of a closed system, a completely sealed measuring system is an absolute necessity. A leak in the system, through which air can diffuse, leads to a drop in pressure and subsequently a malfunction of the device.
The sealed bell GGL-8 (see accessories section) placed into the medium seals the measurement system at the "measuring point".

2.2.1 Impact pressure method, open system with air replenishment



Open systems

In open systems, the medium to be monitored creates pressure inside the pneumatic tube which is then electronically evaluated. Any leaks, which could lead to false measurement results, can be compensated for by suitable aeration or by bubbler operation.

Air replenishment operation

Open systems which function without aeration must achieve a regeneration of pressure within the system - this can be reached by an increase in volume and temporary operation in air replenishment mode. Any air losses in the measurement system will thereby be compensated for which, during the emptying process, causes the level to drop so far at regular intervals that the bell becomes exposed and air can therefore penetrate into the system (air replenishment).
In addition, with the help of a wet bell, the air volume within the measuring system should be increased.

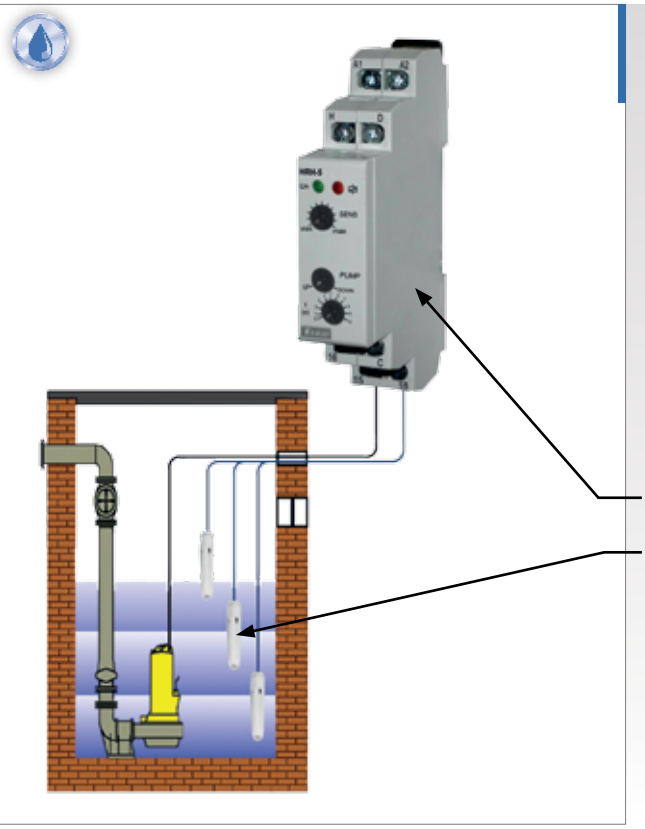
2.2.2 Impact pressure method, open system using bubblers

In this application, the aid of a small compressor is necessary, whereby in either continuous or periodic operation, air is fed into the system. The pressure within the measuring system (pneumatic tube) therefore remains constant. Only when a change in the level occurs is the pressure altered in the measuring system, which is subsequently detected by the evaluating unit.

Application e.g. using:

- Electronic level relay ENR 2
- T-connector for pneumatic tube
- Small air compressor Rena Air 100
- Open wet bell OGL

3. Conductivity measuring method

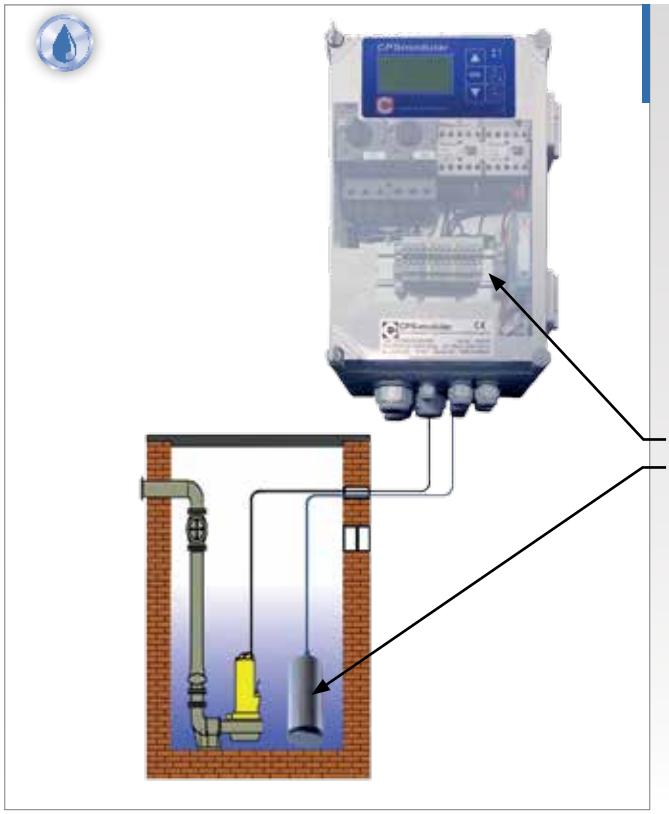


In this application, immersion electrodes are connected to an electronic analyser. When the electrodes are moistened by the liquid being measured, their conductivity alters corre-spondingly. One or two variable threshold values can then be adjusted.

Application e.g. using:

- Electronic level relay HRH-5 and
- Electrodes TEL - ..

4. Hydrostatic measurement method



In this application, a level sensor is lowered into the medium within a sealed enclosure, whereby ceramic or piezoresistive sensors are used.
The filling level pressure then acts directly on the ceramic or piezoresistive sensor and the subsequent value is then transmitted as a 4-20 mA signal via the connecting lead.

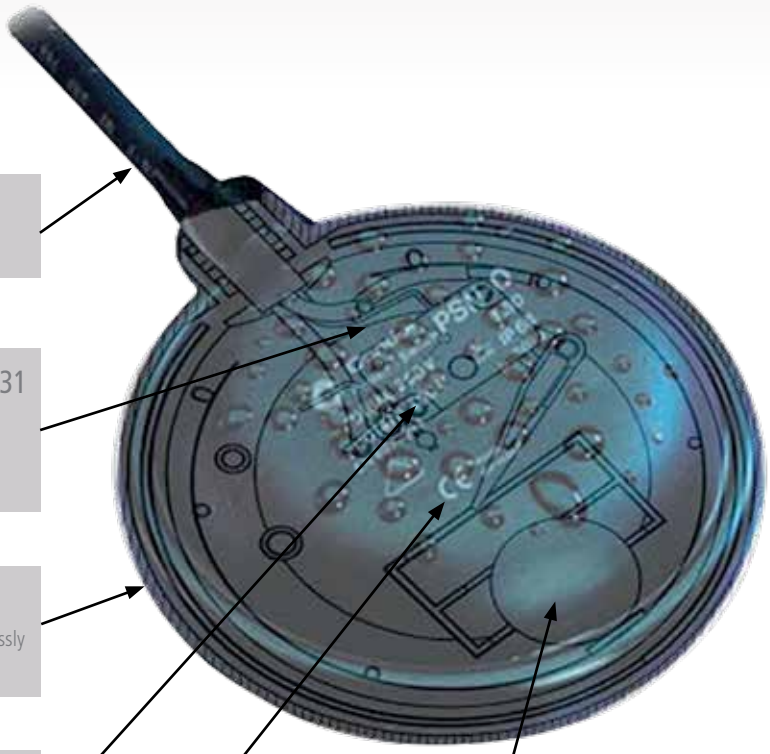
Application e.g. using:

Electronic pump control CPS modular 2 and
Level sensor ENS

Float switches which turns ON or OFF depending on the cable length.

Type Designations

PSN-O	Float switches for emptying. On reaching the upper switching threshold the switching mechanism activates the pump. On reaching the lower switching threshold the pump is switched off. This float switch can also be used as run dry protection.
PSN-F	Float switches for filling. On reaching the lower switching threshold the switching mechanism activates the pump. On reaching the upper switching threshold the pump is switched off.
PSN-X	Float switches for filling and emptying.
PSN-.. + ST	Float switch with plug and socket for pump connection.
PSN-O DB	Float switches for emptying with integrated cable breakage and short-circuit monitoring, with gold flashed contacts.
PSN-X-SP	Float switches for filling and emptying for PLC application and for intrinsically safe circuits, with gold flashed contacts.



Neoprene Insulated Lead

Highly flexible lead acc. to VDE 282 Part 4 resp. HD 22.4 S3 guarantees a long service life.

Protective Conductor Connection acc. to VDE 0631 Part 1 protection class 1 resp. EN 60730-1

A metal shield connected to the protective conductor of the lead ensures additional protection against electrical shock.

Perfect Casing

The inner chamber with the switch mechanism and lead are seamlessly enclosed by isolating polypropylene.

Contact Rating

Motors with a switching capacity of up to 1.1 kW (at 250 V~) may be switched directly.

High Quality HR-Foam Floating Body

Physical properties and chemical resistance of the polypropylene body are extraordinarily high, so that damages due to mechanical impact or chemical influence may be ruled out.

KLS Ball Guiding System

The new ball guiding system KLS ensures an even higher switching accuracy within the tolerance range.

Float switch PSN - Digital measurement procedure

Type overview float switches PSN

Float switch PSN- ..

Order reference	Description	Cable length	Weight in g	Part No.
PSN-O 3 m	for emptying	3 m	500	234166
PSN-O 5 m		5 m	650	234173
PSN-O 10 m		10 m	1000	234180
PSN-O 15 m		15 m	1350	234197
PSN-O 20 m		20 m	1700	234203
PSN-O 30 m		30 m	2400	237082
PSN-F 3 m	for filling	3 m	500	234210
PSN-F 5 m		5 m	650	234227
PSN-F 10 m		10 m	1000	234234
PSN-F 15 m		15 m	1350	234241
PSN-F 20 m		20 m	1700	234258
PSN-F 30 m		30 m	2400	258421

Float switch PSN- ..+ ST

Order reference	Description	Cable length	Weight in g	Part No
PSN-X 3 m	for filling and emptying export-version without protective conductor 1 SPDT	3 m	500	234265
PSN-X 5 m		5 m	650	234272
PSN-X 10 m		10 m	1000	234289
PSN-X 15 m		15 m	1350	234296
PSN-X 20 m		20 m	1700	234302
PSN-X 30 m		30 m	2400	237174
PSN-O + ST 5 m	Float switch with plug and socket for pump connection	5 m	750	234319
PSN-O + ST 10 m		10 m	1100	234326
PSN-F + ST 5 m		5 m	750	234333
PSN-F + ST 10 m		10 m	1100	234340
PSN-O DB 5 m	for emptying with integrated cable breakage and short-circuit monitoring, with gold flashed contacts	5 m	650	234357
PSN-O DB 10 m		10 m	1000	234364
PSN-X SP 5 m	for filling and emptying for PLC application and for intrinsically safe circuits, with gold flashed contacts, export-version without protective conductor, 1 SPDT	5 m	650	234371
PSN-X SP 10 m		10 m	1000	234388
PSN-X SP 15 m		15 m	1350	236092
PSN-X SP 20 m		20 m	1700	236115
PSN-X SP 30 m		30 m	2400	245254
PSN-X SP 40 m		40 m	3100	245261

Accessories for Float switches PSN

Weight BG - PS

Cable support K - PS

Zener barrier

Order reference	Description	Weight in g	Part No.
BG-PS	Weight for float switch, color of body blue (for free setting of the switching differences)	400	236658
IG-PS	Weight for float switch, color of body yellow (for free setting of the switching differences)	180	234401
K-PS	Cable support for float switch PSN, (fixing by means of a standard clip)	5	234418
Zener barrier MTL7778 28 V AC	Zener barrier for use e.g. of float switches in areas that are at risk of explosion	110	283072
Zener barrier MTL7787 28 V DC	Attention: The input voltage of the zener barrier mustn't exceed 28 V (AC / DC).	110	260479

Float switch PSN - Digital measurement procedure

Technical Data PSN-O/F/X (ST/SP)			
Rated operational voltage U_e (AC)	PSN-O/F/X	PSN...+ST... .	PSN-X SP
	250 V ~ 400 V ~	250 V ~	max. 30 V ~
Rated operational current I_e (AC)	10(8) A (250 V ~) 10(4) A (400 V ~)	10(8) A	max. 400 mA
Contact rating		1,1 kW	
Max. cycles Cycles 50 E3		≥ 50.000	
Temperature resistance Cable VDE 282 T 4 12/95 Body		60 °C 85 °C	
Temperature resistance gem. VDE PSN-O / PSN-F * PSN-O / PSN-F PSN-O / PSN-F PSN-X SP		10 A – T 45 °C 8 A – T 50 °C 6 A – T 60 °C T 60 °C	
Protection watertight, depth 10 m		IP 68	
Wire cross sections VDE 0631 T 1 01/96		3 x 1 mm²	
Lead - black		H 07 RN-F	

Technical Data PSN-O DB	
Rated operational voltage U_e	< 30 V-DC
Rated operational current I_e	11 mA (R=2,7k) 2,4 mA (R=12,7k)
Rated switching capacity* Thermal switching capacity	250 V AC, 1 mA 250 V AC, 6 A
Max. cycles Cycles 50 E3	≥ 50.000
Temperature resistance Cable VDE 282 T 4 12/95 Body	60 °C 85 °C
Protection watertight, depth 10 m	IP 68
Wire cross sections VDE 0631 T 1 01/96	3 x 1 mm²
Lead black	H 07 RN-F

* These models were conceived so that they can be used in circuits with a low switching capacity (min. 1mA / 4V) and with a middle switching capacity (max. 5A).
The respective product may be used only in one of these circuit types during his complete use duration.

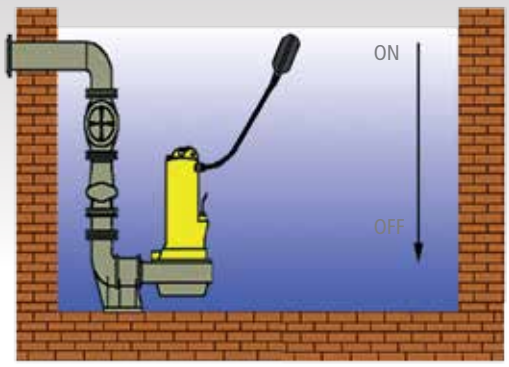
Resistance Body / Cable

Resistance
Formic acid (hydrous 10%), Gasoline (normal), Diesel, Formaldehyde (hydrous 40%), Glycerine, Fuel oil, Lactic acid (hydrous 10%), Phosphoric acid (hydrous 10%), Nitric acid (hydrous 10%), Sulfuric acid (hydrous 35%), Washing powder

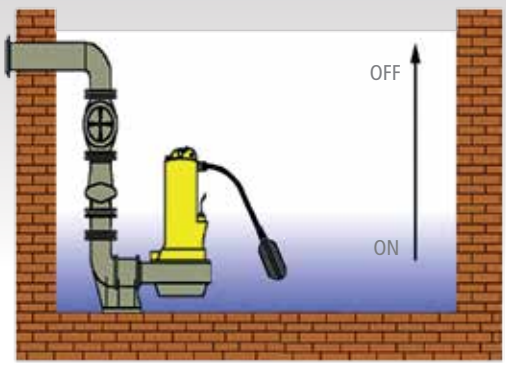
Limited resistance
Acetic acid (hydrous 10%), Nitric acid (hydrous 10%), Chlorinated water, Hydrogen peroxide *

*No approval for use in drinking water...

Types

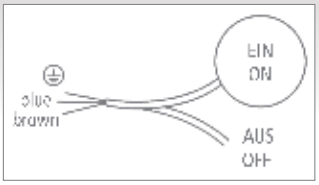


PSN-O Float switch for emptying
Contact closes in upper position and switches the pump on.
PSN-X Float switch for filling and emptying
Export-version with 1 SDT without protective conductor and VDE-Approval mark.

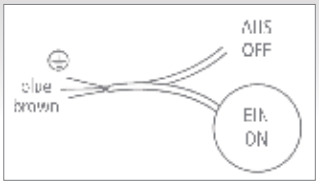


PSN-F Float switch for filling
Contact opens in upper position and switches the pump off.

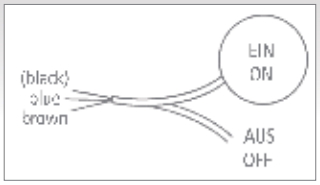
Circuit Diagrams Float switch PSN



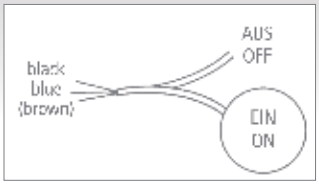
Float switch PSN-O
for emptying



Float switch PSN-F
for filling



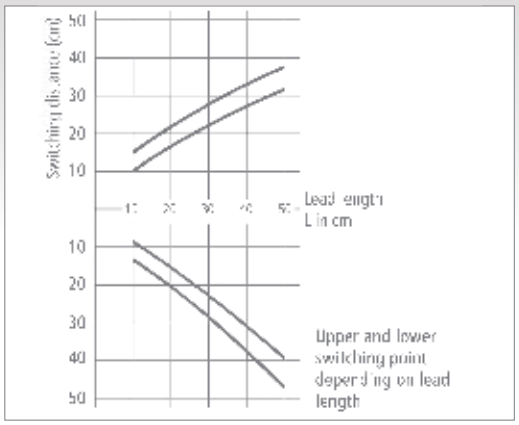
Float switch PSN-X
here in function for emptying



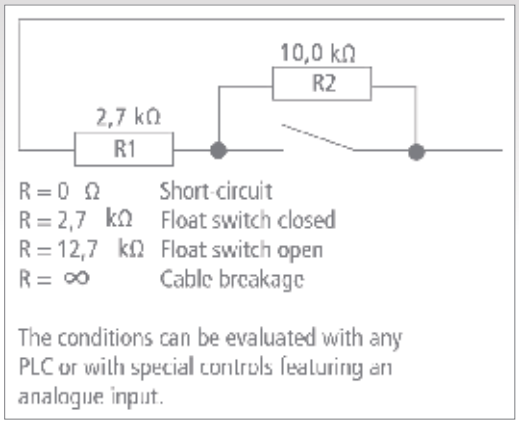
Float switch PSN-X
here in function for filling

Float switch PSN - Digital measurement procedure

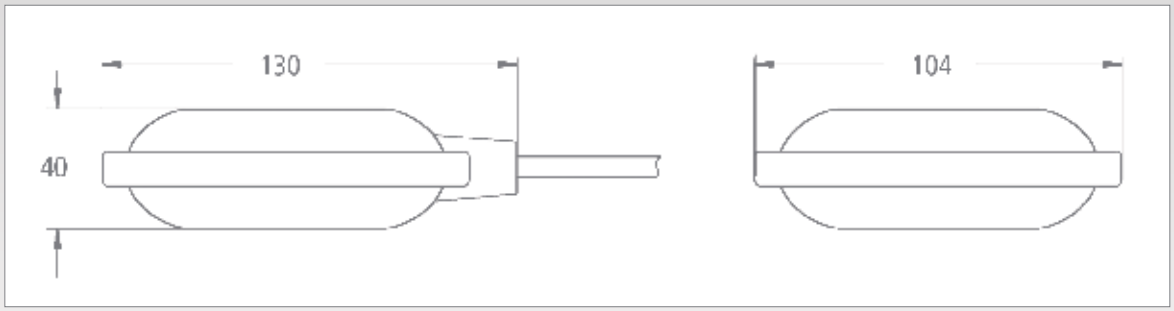
Switching Diagram PSN



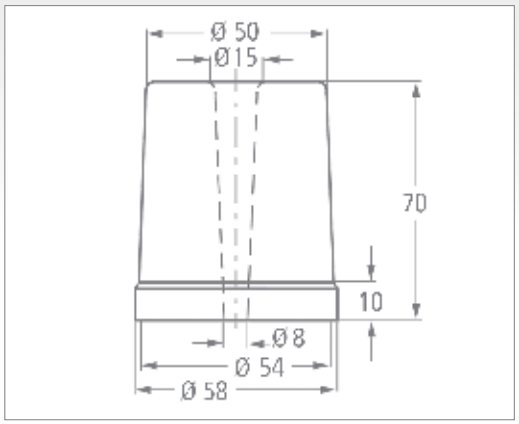
Inner wiring PSN-O DB



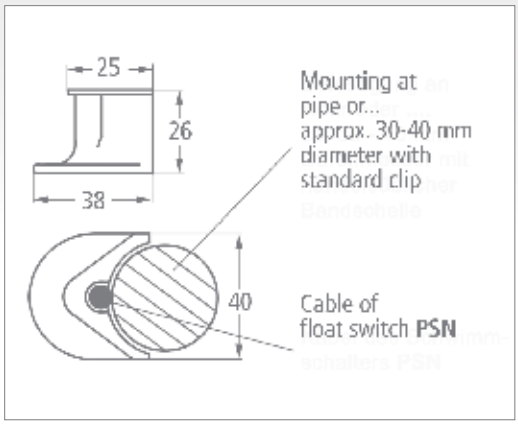
Dimensions PSN / Accessories



Float switch PSN

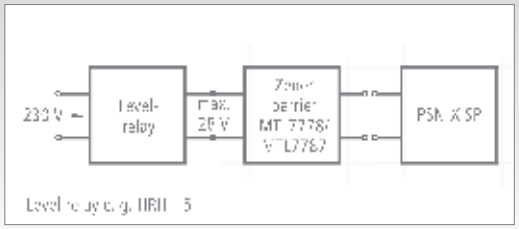


Weight BG-PS / IG-PS



Cable support K-PS

Atex-connecting of the PSN with the zener barrier MTL 7778 / MTL 7787



Technical Data MTL 7778 / MTL 7787	
Max. input voltage U	28 V AC(MTL7778) 28 V DC (MTL7787)
Contact resistance R	600 Ω (MTL7778) 300 Ω (MTL7787)
Operating current	47 mA (MTL7778) 93 mA (MTL7787)

A exceeding the input voltage at the zener barrier leads to the destruction

Suspended float switch - „T“ series ...the patented level controller

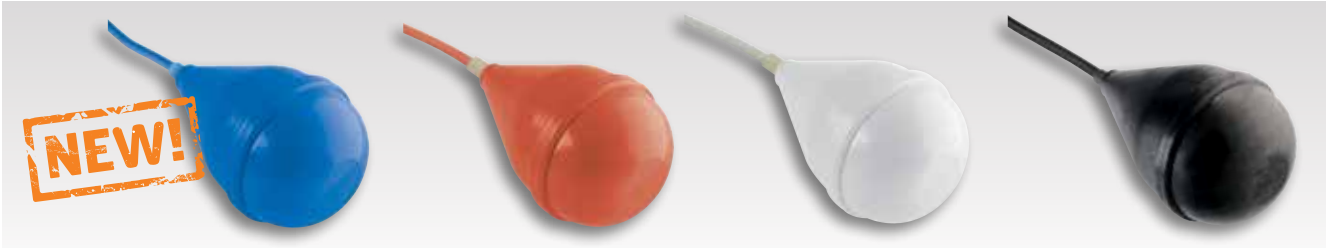
Suspended float switch
„WASTE“ - for use in waste water systems.

The hanging float switch of series „T“ are ideal for level control in drainage systems , pumping stations and wastewater systems.

Used in domestic, industrial or municipal sector, for wastewater, drinking water, chemical substances and environment for use in explosive areas (ATEX)* - (type variety - More on request).

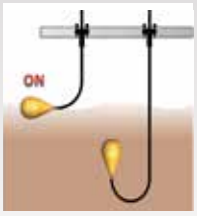
The float switch is hanging freely regulated to the desired level.
By increase or decrease in the liquid level , the situation of the float switch changed, whereby the micro switch opens the circuit or closes (Principle of operation).

Selection (others on request)

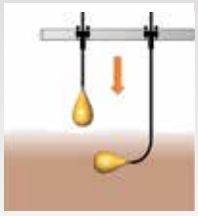


„T“ Series / Type:	„ACS“	„SiHF“	„FEP“	Atex-Schutz
Application:	Drinkable	High Temperature	Chemical Ambient	II 1G Ex ia IIC T6 Explosive *

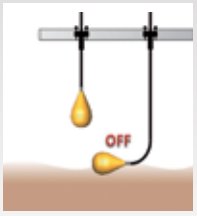
Principle pf operation



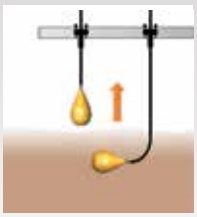
The high level starts the pump...



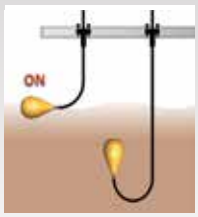
...the tank drains...



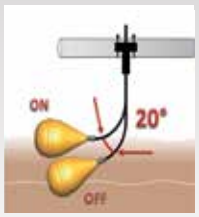
...the low level stops the pump..



...the tank fills...



..and the high level starts the pump.

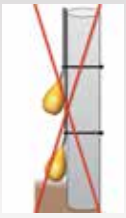


activation angel: 20°

Used in couple with anoter of the same type allows you to adjust the levels of minimum and maximum. It's also possible to use a third and fourth regulator respectively for minimum and maximum alarm.

Fixing

CORRECT - hanging freely!



WRONG

Fixing kit - Straining clamp, Art. 282396

Advantages

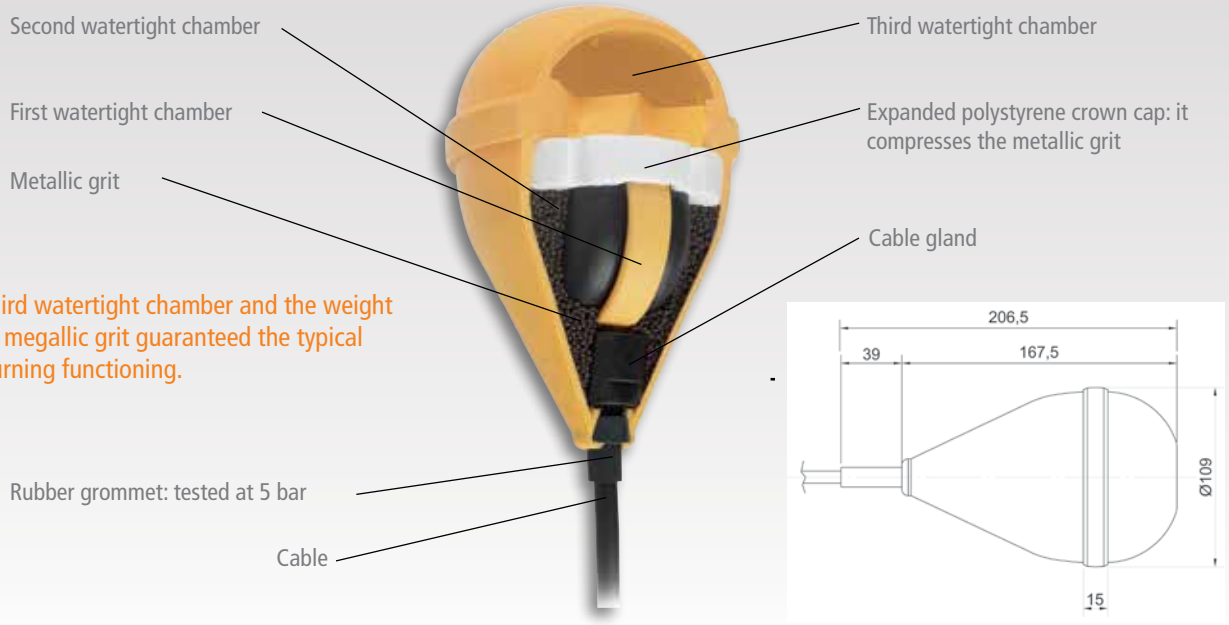
- Used in couple with anoter of the same type allows you to adjust the levels of minimum and maximum. It's also possible to use a third and fourth regulator respectively for minimum and maximum alarm.
- Three watertight chambers level regulator with freely suspended trim variation.
- Unlike traditional floats that floats on the water surface, the float switch of „T“ series thanks to its special construction with integrated counterweight, remains underwater.
- Float swich of „T“ series produced without chemicals, mercury free, 100% recyclabel - patented.

* The rules of the DIN EN 60079 to be observed!

Float switch - „T“ series

Suspended float switch - „T“ series - Technical Details -

Adjustable control parameters:



The third watertight chamber and the weight of the megallic grit guaranteed the typical overturning functioning.

Technical Details:

Type	„WASTE“	„ACS“	„SiHF“	„FEP“	„ATEX“
Artikelnummer	286431	286448	286455	286462	285618
Application areas	**Dirty water systems, drainage plants, pumping stations...**	Water main, drinkable water fountains, drinks and foodstuffs, aquarium, fishponds, swimming pool...	Resistant to heat and servere temperature changes. Can be used primarily in steel producing industry, aviation industry, ship building, cement, glass factories, ceramic factories...	**Suitable for immersion in: hydrocarbons, medical and scientific plants, purification plants, ari conditioning equipment..**	**For use in explosive environments*. Suitable for level regulation in drainage plants, pumping stations and dirty water systems...**
Cable**	H07 RN-F 3x1 - Ø 8,8mm (2 functions); H05 RN-F 3X1 - Ø 7,4mm (2 functions); H07 RN8-F 3G1 - Ø 8,8mm (1 function) H07 RN-F 3G1 oil resistant - Ø 8,8mm (1 function) ; 10 - 20 m	ACS + AD8 3X1 - Ø 8,8mm (2 functions) (10 m - 20 m) - (32,8 ft - 65,6 ft)	SiHF 4G1,5 - Ø 8,8mm (2 functions) (10 m - 20 m) - (32,8 ft - 65,6 ft)	FEP - FFR105OPR5F 4G0.75 - Ø 8,8mm (2 functions) (10 m - 20 m) - (32,8 ft - 65,6 ft)	H05RN-F 4G0,75 (RN8-F mix) Ø 8,8mm (2 functions) (10 m - 20 m) - (32,8 ft - 65,6 ft)
Grommet	EPDM Santoprene	Megol	Viton	Viton	EPDM
Casing	Polypropylene	Polypropylene	Polypropylene	Polypropylene	Composite Mat. - Carbon Black
Power Supply	20(8)A 250 V	20(8)A 250 V	20(8)A 250 V	20(8)A 250 V	max. 4-40 Vac /max 100 mA
Activation Angle	20°	20°	20°	20°	20°
Depth	20 m - 65,6 ft	20 m - 65,6 ft	20 m - 65,6 ft	20 m - 65,6 ft	20 m - 65,6 ft
Temperature	min. -15°C - max. +60°C	min. -15°C - max. +40°C	max. +80°C	max. +80°C	min. -20°C - max. +80°C
Protection Grade	IP 68	IP 68	IP 68	IP 68	IP 68
Class	I - II	II	I	I	I
Specific Gravity	0,95 - 1,05 kg/dm³	0,95 - 1,05 kg/dm³	0,95 - 1,05 kg/dm³	0,95 - 1,05 kg/dm³	0,95 - 1,05 kg/dm³
Certificates / Approvals	Straining clamp (stainless steel) , part no. 282396				
Fixing kit (optional)	CE	CE	CE	CE Ex	II 1GEx ia IIC T6 2010ATEX 2328 (Tecnoplastic)*

**Other cable materials are available on request

***Technical changes and mistakes reserve.

Electronic pump control ENP

Electronic single/dual pump control with monitoring features
Electronic pump control for filling and emptying a tank with integrated relative pressure transducer for panel board mounting, connection for pneumatic tube, four adjustable switching points, three relay outputs, staging and sequencing control, isolating transformer acc. to VDE 0550.
Function: The device analyses the pressure applied to the sensor. Two pumps for emptying a tank are connected to terminals 11/14 and 21/24 on alarm can be connected to terminals 31/34.

All levels are adjustable.
The LED's illuminate when the pumps or the alarm are switched on. The relays are activated. The tripping delay for the alarm is fixed, preset value

Order reference	Type Code	Measuring range (m)	Max. inaccuracy at 25°C	Resolution	Operating voltage U_B (V-AC)	max. perm. level	Weight (in g)	Part No.
ENP 2.3 oN		0,1–2 m	2,5 %	0,01 m	230	10 m	295	260486
ENP 2.3		0,1–2 m	2,5 %	0,01 m	230	10 m	295	260493
ENP 4.3		0,1–4 m	2,5 %	0,01 m	230	10 m	295	260509
ENP 10.3		0,1 – 10 m	2,5 %	0,10 m	230	20 m	295	260516

* oN = without Follow-up time *[1] Other voltages are also available upon request.*[2] 0 V = 0,1m / 10 V = measuring range end value
*[3] Accessories see page 115

Technical operating data	
Permissible operating voltage range	±10 %
Operating voltage influence at ± 10% operating voltage fluctuation	< 0,1 %
Duty factor ED	100 %
Permissible ambient and media temperature	-20°C up to +60°C
Permissible ambient humidity rel. humidity, non-condensing	10 % up to 90 %
Permissible storage temperature	-40°C up to 80°C
Clearance and creepage distances	VDE 0110
Working position	any position
Power consumption	max. 1,5 VA

Pressure connection	
Quick connect suitable pneumatic tube e.g.	6 x 1 mm Festo PAN

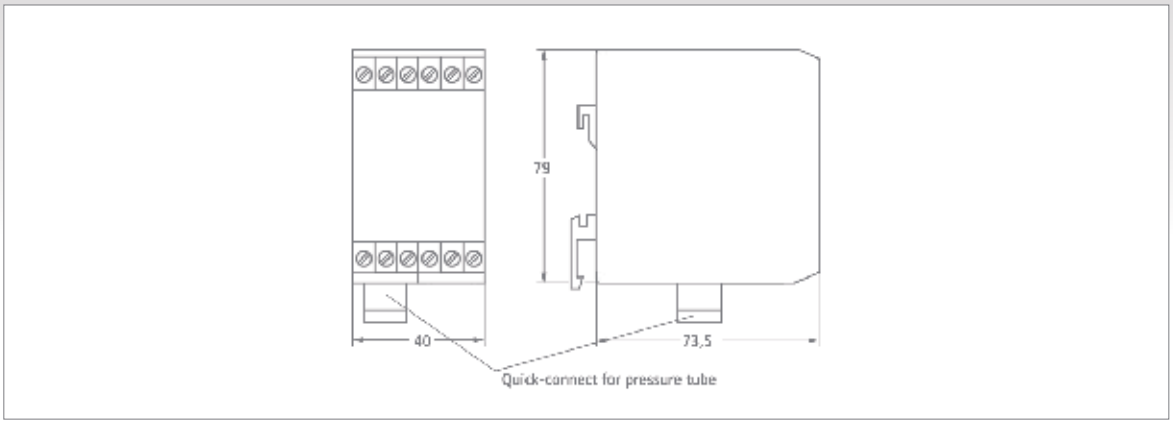
Analogue output	
Analogue voltage signal max. 5 mA short-circuit proof	0 - 10 V

Enclosure	
Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Enclosure protection	IP 40
Protection against shock	acc. VBG 4
Terminals	Cage clamps
Cross section	2,5 mm²
Weight	295 g
Male jack plug Jack 2.5 mm	2,5 mm

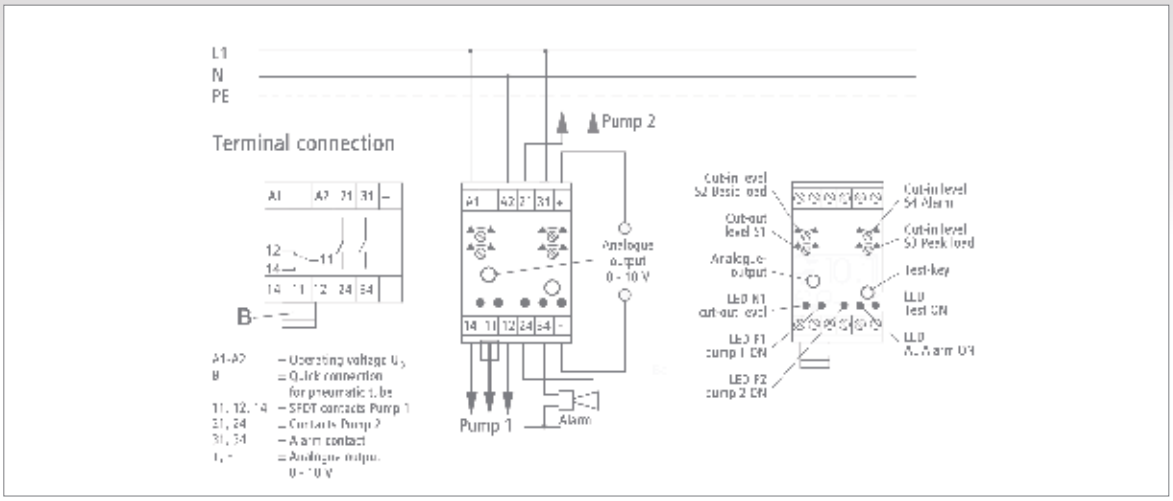
Power section	
Series voltage acc. to VDE 0660 and VDE 0110 Group C	250 V-AC
Maximum continuous current per contact	6 A-AC
Maximum switching capacity per contact	1.500 VA (AC) 50 W (DC)
Mechanical life Schaltspiele	approx. 1 x 10^7
Electrical life (max. load) Cycles	approx. 1 x 10^5

Electronic level relay ENP

Dimensions ENP

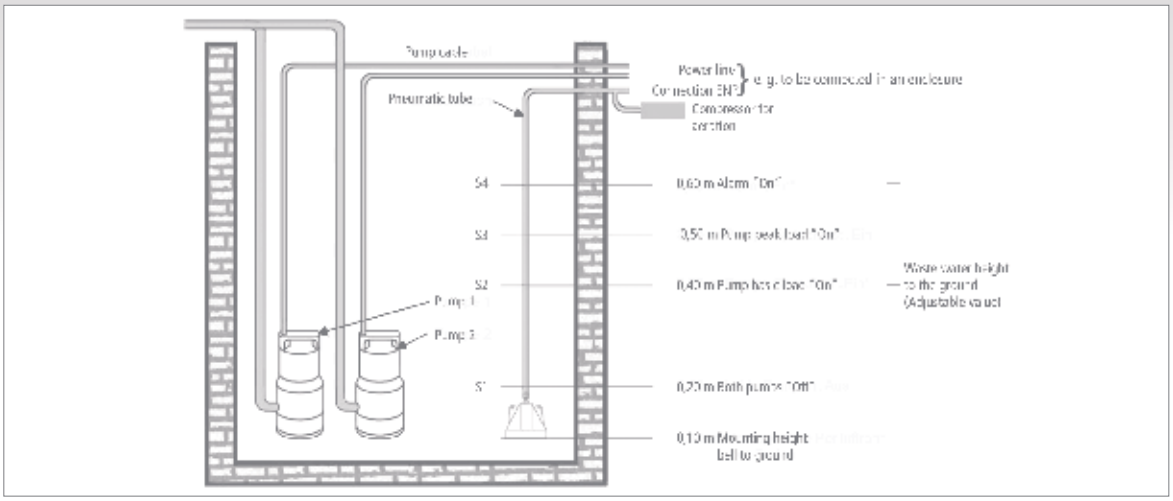


Wiring Diagram ENP



ENP as single or dual-pump control

Wiring diagrams ENP



Electronic level relay ENR

- Electronic level relay for all ranges from 0.1 – 2 m
- For panel board mounting
- Measurement according to impact pressure method
- Relay output
- Output signal: 0 – 10 V

Electronic level relay with integrated relative pressure transformer for panel board mounting, quick-connect for pneumatic tube, two adjustable thresholds, relay output and isolating transformer according to VDE 0550.

Function: The device evaluates the pressure applied to the sensor. Should a pump for emptying a tank be connected to terminals 11 and 12, then the pump is switched on when the upper threshold is exceeded. The pump is switched off when falling below the lower threshold. Both thresholds are adjustable. The LED illuminates when the pump is running, whereby the relay is deactivated.

Order reference	Type Code	Measuring range (m)	Max. inaccuracy at 25°C	Resolution	Operating voltage U_B (V-AC)	max. perm. level	Weight (in g)	Part No.
ENR 2		0,1–2 m	2,5 %	0,01 m	230	10 m	100	260523

Accessories see page 115

0 V = 0,1m / 10 V = measuring range end value

Technical operating data	
Permissible operating voltage range	±10 %
Operating voltage influence at ± 10% operating voltage fluctuation	< 0,1 %
Duty factor ED	100 %
Permissible ambient and media temperature	-20°C up to +60°C
Permissible ambient humidity rel. humidity, non-condensing	10 % up to 90 %
Permissible storage temperature	-40°C up to 80°C
Clearance and creepage distances	VDE 0110
Working position	any position
Power consumption	max. 1 VA

Pressure connection	
Quick connect suitable pneumatic tube e.g.	6 x 1 mm Festo PAN

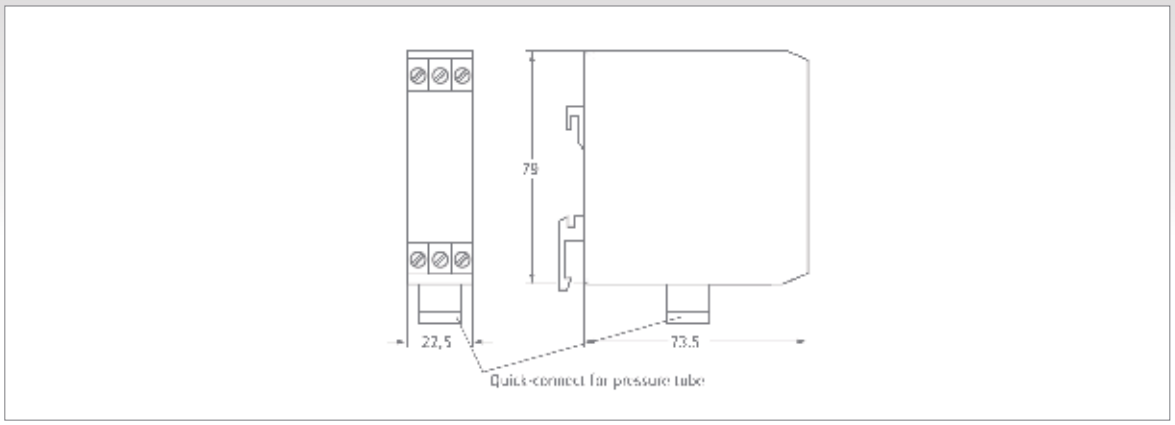
Analogue output	
Analogue voltage signal max. 5 mA short-circuit proof	0 - 10 V

Enclosure	
Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Enclosure protection	IP 40
Protection against shock	acc. VBG 4
Terminals	Cage clamps
Cross section	2,5 mm²
Weight	100 g
Male jack plug Jack 2.5 mm	2,5 mm

Power section	
Series voltage acc. to VDE 0660 and VDE 0110 Group C	250 V-AC
Maximum continuous current per contact	6 A-AC
Maximum switching capacity per contact	1.500 VA (AC) 50 W (DC)
Mechanical life Schaltspiele	approx. 1 x 10^7
Electrical life (max. load) Cycles	approx. 1 x 10^5

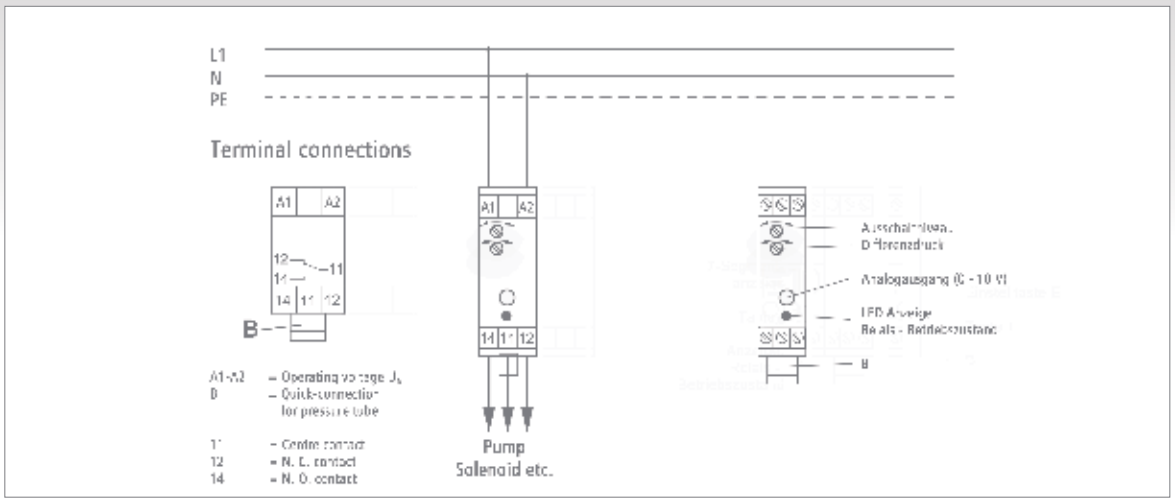
Electronic level relay ENR

Dimensions ENR



Dimensions in mmr

Wiring Diagram ENR



Electronic level relay HRH-5

Level relay for level monitoring, using 2 or 3 electrodes
1 SPDT

Standard relay for level monitoring with 1 and 2 threshold values, infinitely variable limit values, 1 SPDT and isolating transformer according to VDE 0550.

Function: The electrodes are connected to the relay. Should the tank be made of a conductive material, it can be used as a third electrode (For connection see wiring diagram).

AC current is used in order to avoid polarisation, electrolysis and undesired oxidation of the electrodes.
To minimize false relay switching (e.g. pollution of the probes, humidity ….), the switching sensitivity can be adjusted to the conductibility of the respective media.

Ordering reference	Type Code	adjustable hysteresis (kΩ)	Time reaction	Adjustable delay time	Operating voltage (V-AC / DC)	Weight (in g)	Part No.
ENR 2 HRH-5		5 - 100 kΩ	< 400 ms	0,5 - 10 s	24…240 V-AC / DC	92	250203

Accessories, electrodes for HRH-5

Ordering reference	Description	Applica-tion	Part No.
TEL-00	Single electrode with screw version		236467
TEL-05	Single electrode, 5m cabel H07 RN-F 1x1,5 mm²		260684
TEL-10	Single electrode, 10 m cabel H07 RN-F 1x1,5 mm²		260691
TEL-20	Single electrode, 20 m cabel H07 RN-F 1x1,5 mm²		260707
TEL-TW-05	Single electrode, 5 m cabel TML-B 1x1,5 mm² Waquasan Reg. Nr. 11156/09564	Suitable for use with potable water. Tempera-ture range 0 … 90°C	260714
TEL-TW-10	Single electrode, 10 m cabel TML-B 1x1,5 mm² Waquasan Reg. Nr. 11156/09564		260721
TEL-TW-20	Single electrode, 20 m cabel TML-B 1x1,5 mm² Waquasan Reg. Nr. 11156/09564		260738

Dipped elektrodes TEL	
Electrode and screw	stainless steel (1.4301 or higher)
plastic coat	polyethylene
seal	brass
Cable optional	1-conductor cable, for example Rubber Cable H07 RN-F

Dipped elektrodes TEL-TW (suitable for drinking water)		
Electrode and screw	stainless steel 1.4305	
plastic coat	ISO-LEN® 1000	Food law-tion statement from the manufacturer
seal	NBR	KTW and DVGW W 270
Cable optional	FACAB DRINCABLE + 07 KTW-W270-acs 1x1,5 mm² ARISTONCAVI 2010	KTW and DVGW W 270

Electronic measurement method - Electronic level relay HRH-5

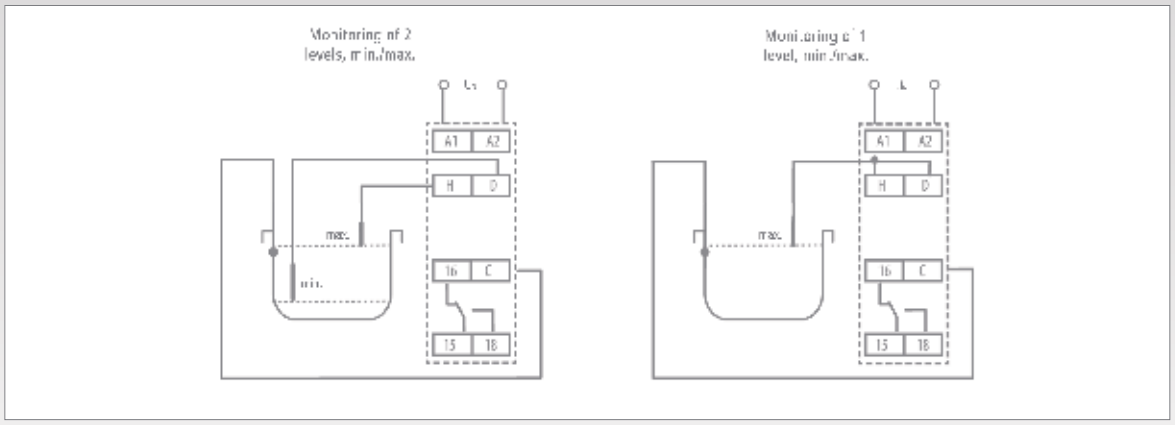
Enclosure	
Material	ABS flameproof, UL-approved
Mounting	snap on 35 mm DIN-rail connector acc. to EN 50 035
Degree of Protection	IP 40
Shock protection	acc. to VBG 4
Connection Box	Box-type terminals
Max. cross-section with cable end sleeves	max, 1 x 4, 2 x 2,5 mm^2 max, 1 x 2,5, 2 x 1,5 mm^2

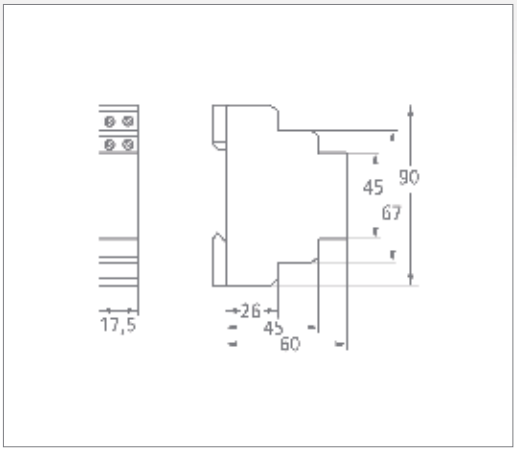
Output contacts	
Series voltage acc. to VDE 0660 and VDE 0110 Group C	24…240 V-AC/DC
Maximum continuous current per contact	8 A AC1
max. switching capacity (240V AC1/ 24 V DC) min. switching capacity (24 V DC)	2.500 VA, 240 W 500 mW
Mechanical life Cycles	approx. 1 x 10^7
Electrical life (max load) Cycles	approx. 1 x 10^5
Weight	72 g

Technical operating data	
Permissible operating voltage range	-15 % +10 %
Operating voltage influence at ± 10% operating voltage fluctuation	< 0,1 %
Duty factor ED	100 %
Permissible ambient temperature	-20°C bis 55°C

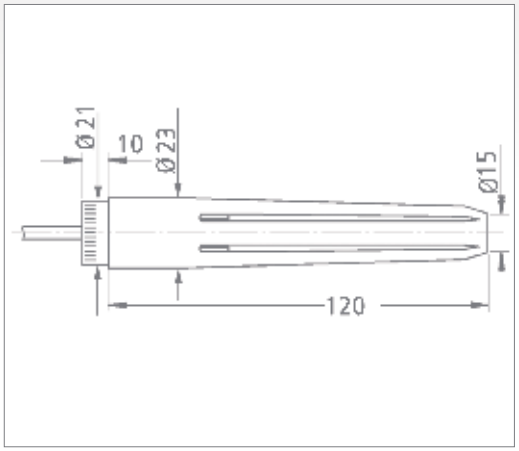
Technical operating data	
Permissible storing temperature	- 30°C bis 70°C
Clearance and creepage distances	VDE 0110
Working position	any position
Power consumption	max. 2,0 VA

Wiring Diagram HRH-5 (Sample with a conducting tank)



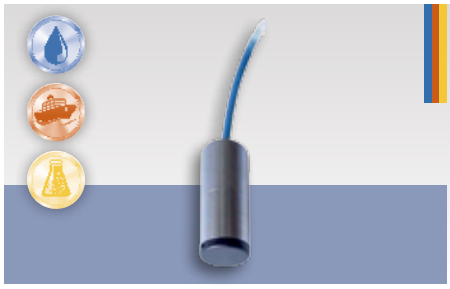


Electronic level relay HRH-5



Electrode TEL-05-..

Stainless steel level sensor ENS



With ceramic measuring cell, shielded cable and a specially designed stainless steel enclosure, Condor offers a precision level sensor for all different types of applications, like e.g. wastewater. The sensor offers extremely high media resistance and the especially large membrane makes the sensor insensitive to pollution.

The shielded cable protects the output signal (4 – 20 mA) against electromechanical influences.

The ENS level sensor is also available with ATEX (explosive atmosphere) approval.

Order reference	Type Code	Measuring range	Cable length	EX Approval	Weight (in g)	Part No.
ENS 1/10		bis 1,0 m	10 m		1000	245414
ENS 4/10		bis 4,0 m	10 m		1000	290193
ENS 10/15		bis 10,0 m	15 m		1250	290049
ENS 1/10 EX		bis 1,0 m	10 m	X	1000	245421
ENS 1/15 EX		bis 1,0 m	15 m	X	1250	245438
ENS 1/20 EX		bis 1,0 m	20 m	X	1500	290025
ENS 1/25 EX		bis 1,0 m	25 m	X	1750	245445
ENS 1/30 EX		bis 1,0 m	30 m	X	2000	245452
ENS 4/10 EX		bis 4,0 m	10 m	X	1000	242673
ENS 4/15 EX		bis 4,0 m	15 m	X	1250	242680
ENS 4/20 EX		bis 4,0 m	20 m	X	1500	290209
ENS 4/25 EX		bis 4,0 m	25 m	X	1750	290216
ENS 4/30 EX		bis 4,0 m	30 m	X	2000	290230
ENS 4/40 EX		bis 4,0 m	40 m	X	2500	290247
ENS 10/10 EX		bis 10,0 m	10 m	X	1000	242703
ENS 10/15 EX		bis 10,0 m	15 m	X	1250	242697

Accessories ENS

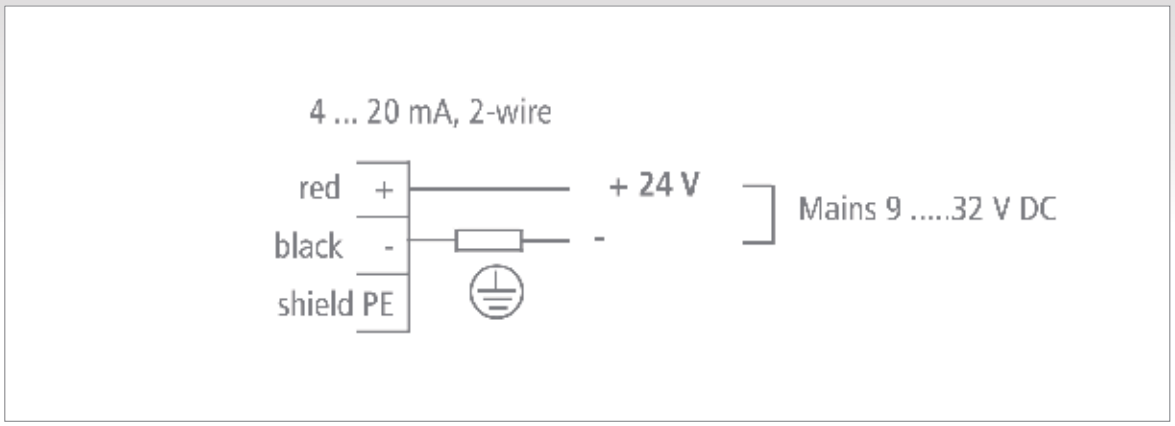
Description	Weight (in g)	Part No.
Galvanized fixing clamp for level sensor	165	290223
Stainless steel fixing clamp for level sensor	170	282396
Protective cap for level sensor as replacement	12	282372
Terminal box ENS - to extend the connection line of electronic immersion sensors -	30 g	282389

Technical operating data	
Measuring range	0 – 25 mbar (0 - 0,254 mWs) up to 0 – 60 bar (0 - 612 mWs)
Output signal	4 – 20 mA, 2-wire
Accuracy	< 0,2 % v. M.E.
Adjustment time	200 ms (other values on demand)
Auxiliary voltage	9...32 V DC, max. 30 mA (12...30 V for EX-type)
Temperature range	-25...80 °C (-25...70 °C for EX-type)

Technical operating data	
Temperature influence	< 0,015 %/K of measuring range
Housing	Stainless steel, 1.4571
Degree of Protection	IP 68
Electrical connection	Kevlar braided PE cable, wire cross-section 0,34 mm², with pressure compensation
EX-protection	EEx ia IIC T6

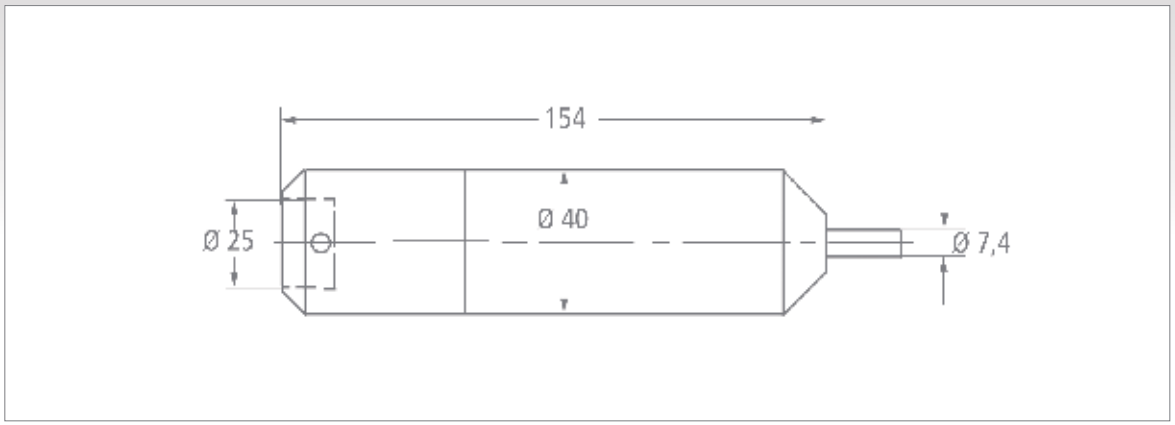
Hydrostatic measurement method - Stainless steel level sensor ENS

Wiring diagram ENS



Level Sensor ENS

Dimensions ENS

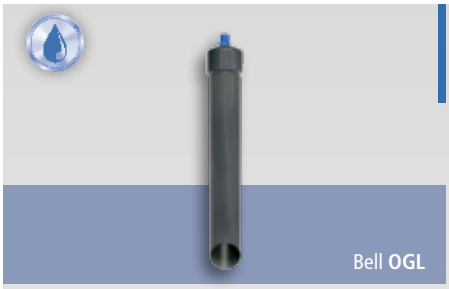


Level Sensor ENS

Application example:

Level sensor ENS
Monitors e.g. Wastewater/Water level in a pump shaft

Bells and Accessories for Level Monitoring



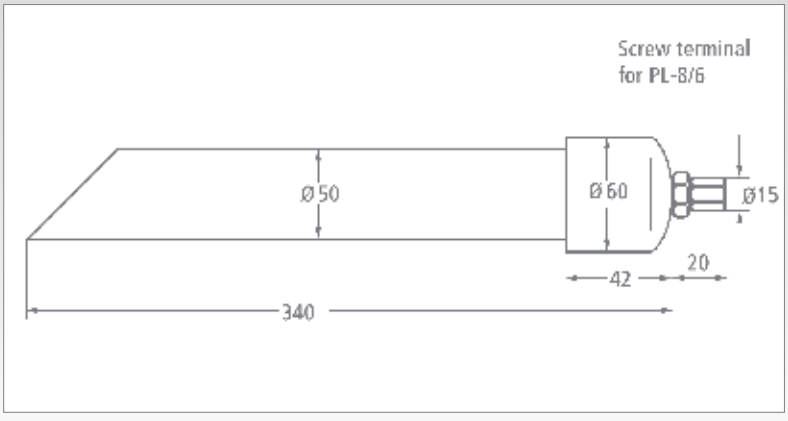
Bell **OGL**

Bell **OGL-GU**

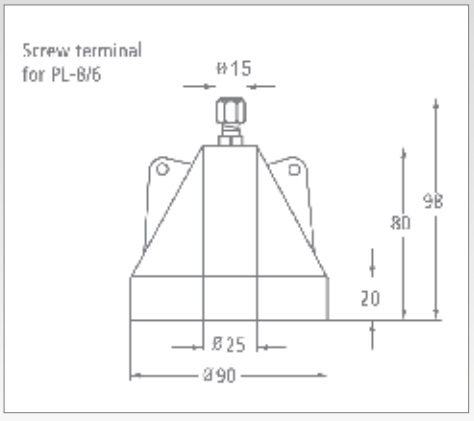
Small air compressor in plastic casing

Order reference	Description	Weight (in g)	Part No.
	Wet bells		
OGL-8	Open wet bell with screw connection for PL-8/6	250	260530
OGL Installation kit	Installation kit for OGL-8, stainless steel, screw tube clamp and Stockschraube	150	282198
OGL-8 GU	Open wet bell (gray cast ion with stainless steel chain) with screw connection for PL-8/6, chain length 2,9 m	1100	290117
	Pneumatic tube (PL) PL-8/6 – 8 mm outer-ø, 6 mm inner-ø PL-6/4 – 6 mm outer-ø, 4 mm inner-ø		
PL-8/6, 10 m	10m rope PL-8/6	225	260554
PL-8/6, 20 m	20m rope PL-8/6	450	260561
PL-8/6, 1 m	Length > 20 m, each m (max. length per rope 100 m)	23	260578
PL-6/4, 1 m	Pneumatic tube PL-6 (price / m)	20	260585
	Screw connections		
Screw connection 1/8"	Screw connection 1/8" for OGL-8 GU / GGL-8	20	260592
R-SCH	Reducing screw connector for PL from PL-8/6 to PL-6/4	22	260615
T-ST 6	T-plug connector für PL-6/4 for aeration	11	260622
T-SCH 8	T-screw connector for PL-8/6 for aeration	14	260639
	Small compressors		
Rena-Air 100	for aeration, incl. check and security valve with T-screw connector for PL-8/6 (120 L/h; 150 mb; 3W; 230 V AC IP X4), e.g. usable with open wet bells	315	260646
Rena-Air 100 in casing	for aeration, incl. check and security valve with T-screw connector for PL-8/6 (120 L/h; 150 mb; 3W; 230 V AC IP X4), e.g. usable with open wet bells	720	260653

Bell Dimensions



Bell OGL



Bell OGL – GU