



# Level Sensors 1001

# Level Sensors 1001

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### Instructions for instrument selection in the catalogue

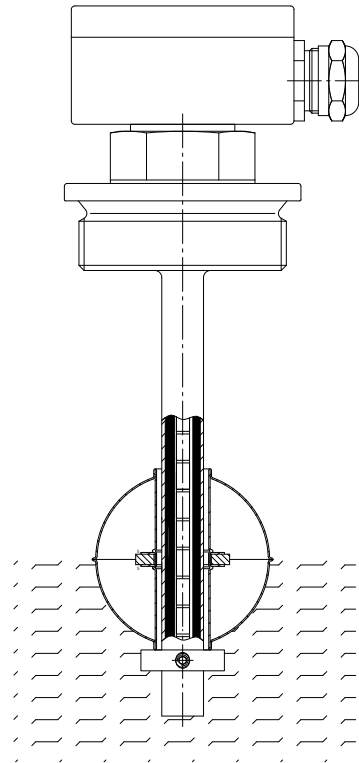
So that the customer gets the best equipment solution according to his requirements, we recommend this simple procedure using the following pages:

- Define the dimension of the fitting or interface (e.g. thread G2", DIN-flange DN25/PN16, etc.)
- Determine the electrical connection (e.g. terminal box, cable entry, plug, etc.)
- Find out the operating conditions, min. and max. operating pressure, temperature and specific gravity of the media at the max. operating temperature.
- With the Size of the fitting and material of the instrument, a guide specification can be selected on pages 8 to 21
- The full and final specification can now be generated by reference to the „type key“ on pages 28-31.
- With the type description and the technical operating conditions a price quotation can be made or the instrument can be ordered
- Specification of the requested approval

# Level Sensors 1001

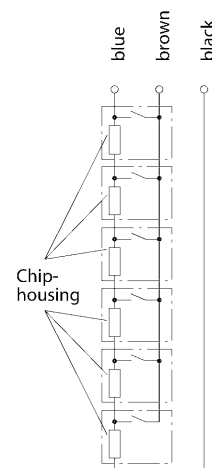
## Description and function

Level sensors are used as measuring sensors for the electrical continuous remote display of levels. Level Sensors work on float principle with magnetic transmission. The magnetic field, which is in the ball or cylindrical floats actuates very small reed contacts through the wall of a guide tube and these pick up an uninterrupted measuring-circuit voltage from a resistance chain. This measuring-circuit voltage is proportional to the liquid level (three-wire potentiometer circuit). The resolution of the reed contacts is available in various types. The resistance reading can be converted into an analogue signal when used with a control unit.



## Technical advantages

- Constant display of the level with highly accurate repeatability, regardless of the build up of foam, varying conductivity and pressure.
- Applicable for temperatures up to 130°C, HTF-Version up to 200°C. (high temperature design on request)
- Remote display of the level over long distances.
- Interface measurement of liquids with ballasted float
- Simplest mounting and initial operation of level sensors, control units and indicating instruments
- Nearly maintenance-free operation during many years
- Nearly applicable for all mediums by use of different materials
- Instruments can be manufactured according to different directives: PED, ATEX, GL/BV/RINA, WHG, 3A-sanitary design



Internal connection diagram for level sensor

# Level Sensors 1001

## Certificates / Approvals

### Certificates



#### **SCHWEIZERISCHER VEREIN FÜR QUALITÄTS- UND MANagementsYSTEME**

Certified according to ISO 9000 rev. 2000



#### **SWISS TECHNICAL SERVICES AG**

Approval as production factory, welding examination and procedure qualification incl. restamping certificate for the production of pressure tanks according to SVTI-regulation 501, 201

### Approvals

The company Heinrich Kübler AG can manufacture level sensors to most national and industrial approvals. Therefore a wide range of instruments with approvals requirements can be produced according to customer's requests.



#### **TECHNISCHER ÜBERWACHUNGSVEREIN DEUTSCHLAND (PED)**

Approval as production factory for manufacture of pressure tanks according to AD HP 0, PED Pressure Equipment Directive 97/23/EG



#### **SOCIETE NATIONALE DE CERTIFICATION ET D'HOMOLOGATION (ATEX)**

Approval for the production of level sensors according to EU-Directive 94/9/EG



#### **DEUTSCHES INSTITUT FÜR BAUTECHNIK DIBT (WHG)**

Approval according to water regime law WHG



#### **GERMANISCHER LLOYD (Building of ships)**

Approval for the production of level sensors according to GL-regulations



#### **BUREAU VERITAS (Building of ships)**

Approval for the production of level sensors according to BV-regulations



#### **REGISTRO ITALIANO NAVALE (Building of ships)**

Approval for the production of level sensors according to RINA-regulations



#### **3A - Sanitary Standards (Dairy equipment)**

Approval for the production of level sensors according to 3A -regulations

# Level Sensors 1001

## Approvals

As an innovative manufacturer of instruments for level control, we can offer to our customers systems according to different directives. The types of approval, applications and limits of use can be taken from the following specifications.

### Approvals

#### Ex

A large number of level sensors from our standard range, or to customer requests, can be built according to the EU-Directive 94/9/EG with the protection types EEx ia IIC T3 to T6, EExd T4 to T6 or dust Ex/D. By the combination of the instruments with the type key the catalogue shows with the Ex hexagonal logo which components can be used for Ex-instruments.

#### Temperatures of media:

##### EEx ia-instruments

T3	180 °C
T4	130 °C
T5	95 °C
T6	80 °C

##### EEx d-instruments

T4	120 °C
T5	95 °C
T6	80 °C

#### PED

Under the Pressure Equipment Directive 97/23/EG, any pressure vessel or instrument used within a pressurised system at 0,5 bar or above, has to conform to various categories. Depending on the design data or customer needs, manufacture of instruments is to either of the categories below.

##### Category II

Module	A1
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##### Category IV

Module	B+D
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#### WHG

The WHG-approval prescribes us, how safety overflow switches must be built for the storage of water-endangering liquids in containers and tanks. We have the possibility of building a large range of level sensors to the standard WHG §19.

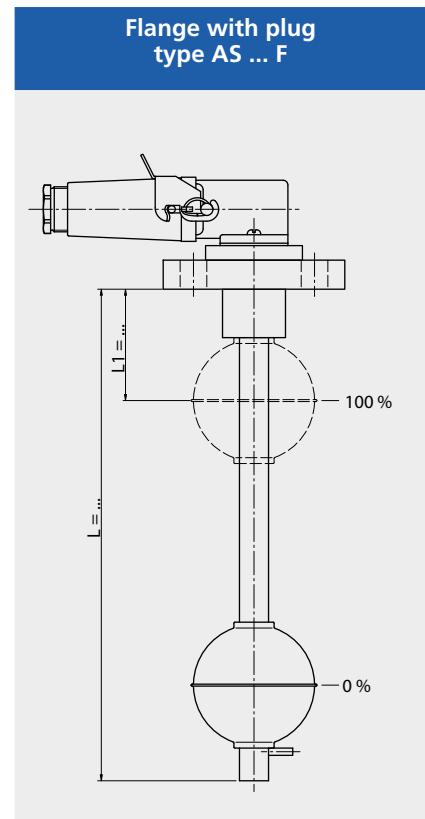
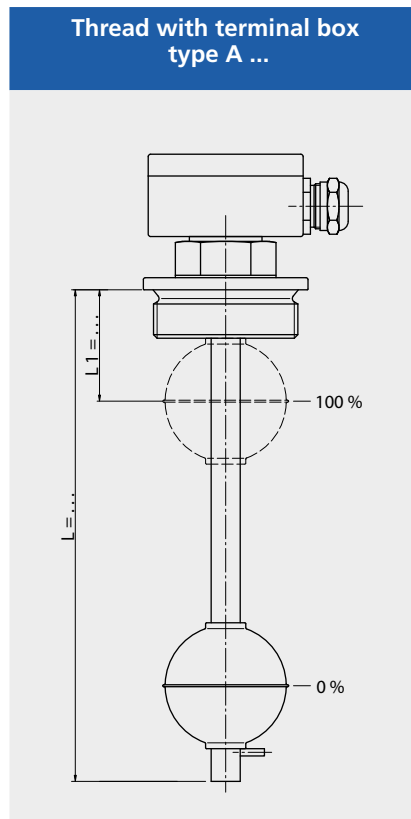
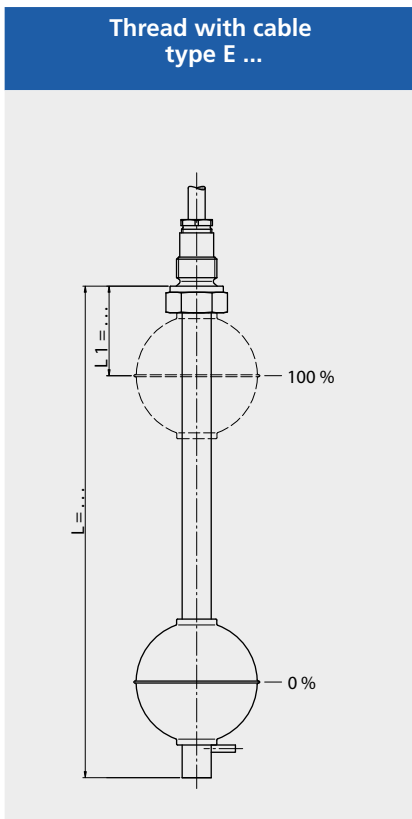
#### GL / BV / RINA

Level sensors for use in shipping can be manufactured to GL (Germanischer Lloyd), BV (Bureau Veritas) or RINA (Registro Italiano Navale) standards in large variety of design possibilities complete with controllers.

# Level Sensors 1001

## Stainless steel DN10 to DN500

Technical data	Stainless steel	
Guide tube diameter:	12 mm length to 3000 mm 14 mm length to 5000 mm	18 mm length to 6000 mm 40 mm length to 25000 mm
Connection sizes:	Thread BSP 3/8" ... Thread NPT 3/8" ...	Flange DIN DN10 ... Flange Ansi 1/2" ...
Resolution - Guide tube diameter - Temperature limit:	R 5 mm           ≥ 12 mm 130 °C R 5 mm (HTF) ≥ 12 mm 200 °C R 5 mm (HT)    ≥ 12 mm * R 10 mm         ≥ 12 mm 130 °C R 10 mm (HTF) ≥ 12 mm 200 °C	R 10 mm (HT) ≥ 12 mm * R 12.7 mm    ≥ 12 mm 130 °C R 15 mm       ≥ 12 mm 130 °C R 15 mm (HTF) ≥ 12 mm 200 °C R 15 mm (HT) ≥ 12 mm *
Temperature contacts / Contacts:	TO ... °C normally closed TS ... °C normally open	U - change over S - normally open O - normally closed
Temperature probe:	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)	
Float:	See float table pages 22-27	
Approvals:	See approvals pages 6-7	
Operating parameters:	Temperature: -30 °C ... 200 °C Pressure: -1 ... 175 bar Specific gravity: ≥400 kg/m <sup>3</sup>	*other values on request



Type combination see type key Level Sensors 1001

# Level Sensors 1001

## Brass DN10 to DN80

Technical data	
Guide tube diameter:	
Connection sizes:	
Resolution - Guide tube diameter - Temperature limit:	
Temperature contacts / Contacts:	
Temperature probe:	
Float:	
Approvals:	
Operating parameters:	

### Brass

12 mm length to 3000 mm  
14 mm length to 3000 mm

Thread BSP  $\frac{3}{8}$ " ...  
Thread NPT  $\frac{3}{8}$ " ...

R 5 mm  $\geq 12$  mm 130 °C  
R 5 mm (HTF)  $\geq 12$  mm 150 °C  
R 10 mm  $\geq 12$  mm 130 °C  
R 10 mm (HTF)  $\geq 12$  mm 150 °C

R 12.7 mm  $\geq 12$  mm 130 °C  
R 15 mm  $\geq 12$  mm 130 °C  
R 15 mm (HTF)  $\geq 12$  mm 150 °C

TO ... °C normally closed  
TS ... °C normally open

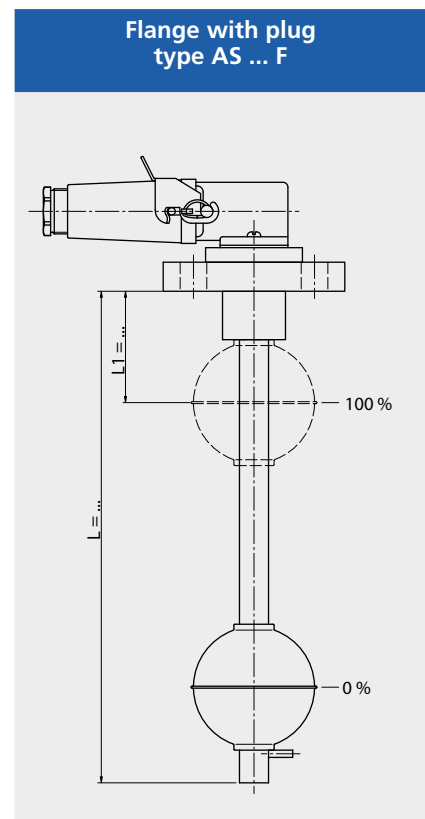
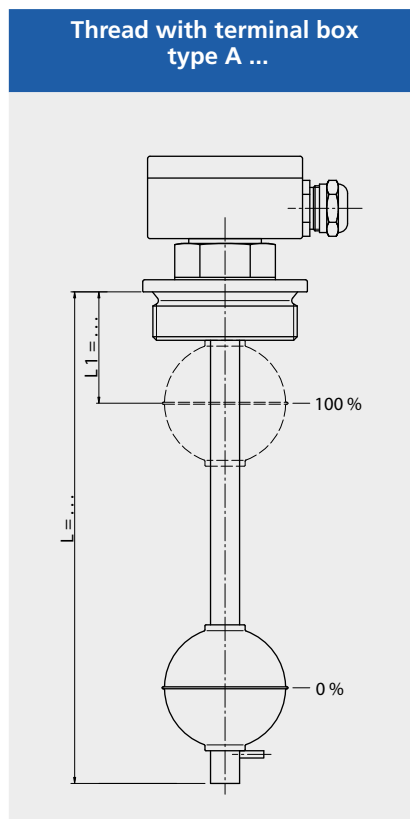
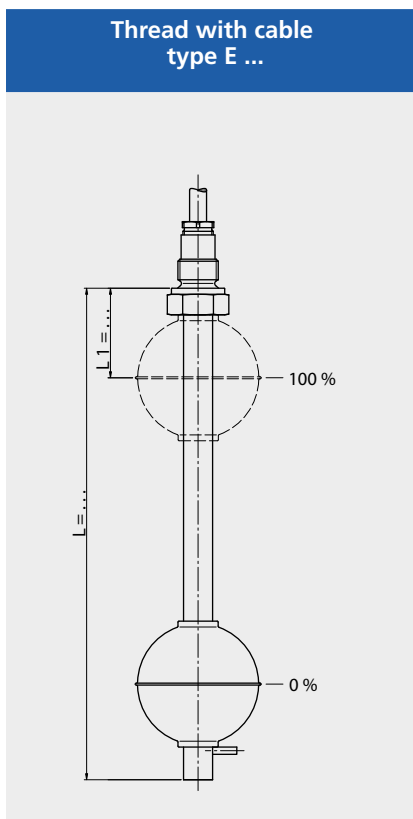
U - change over  
S - normally open  
O - normally closed

PT - 100 (optional with control unit)  
PT - 1000 (optional with control unit)

See float table pages 22-27

See approvals pages 6-7

Temperature: -10 °C ... +150 °C  
Pressure: -1 ... 40 bar  
Specific gravity:  $\geq 400$  kg/m<sup>3</sup>

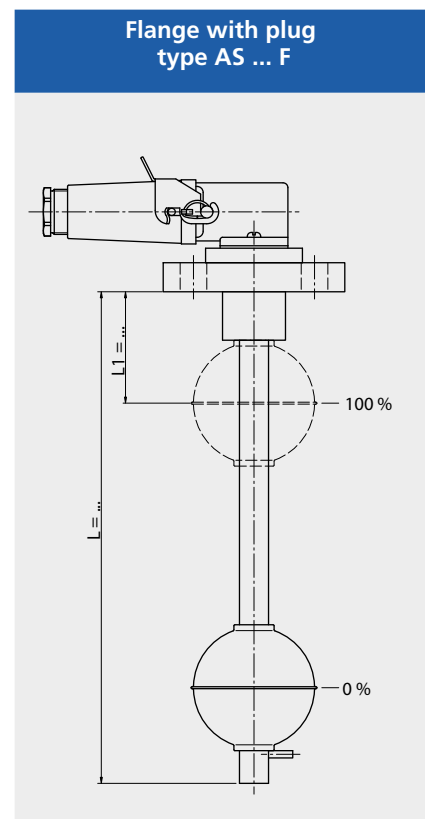
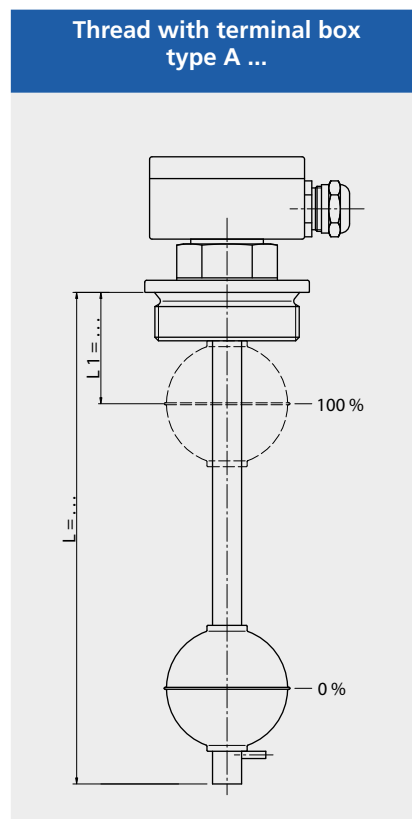
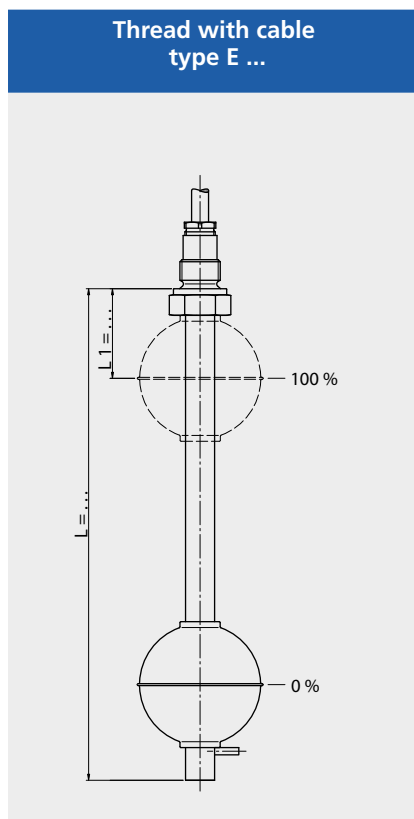


Type combination see type key Level Sensors 1001

# Level Sensors 1001

## Titanium DN10 to DN500

Technical data	Titanium	
Guide tube diameter:	12 mm length to 3000 mm 14 mm length to 5000 mm	18 mm length to 6000 mm
Connection sizes:	Thread BSP $\frac{3}{8}$ " ... Thread NPT $\frac{3}{8}$ " ...	Flange DIN DN10... Flange Ansi $\frac{1}{2}$ " ...
Resolution - Guide tube diameter - Temperature limit:	R 5 mm $\geq 12$ mm 130 °C R 5 mm (HTF) $\geq 12$ mm 200 °C R 5 mm (HT) $\geq 12$ mm * R 10 mm $\geq 12$ mm 130 °C R 10 mm (HTF) $\geq 12$ mm 200 °C	R 10 mm (HT) $\geq 12$ mm * R 12.7 mm $\geq 12$ mm 130 °C R 15 mm $\geq 12$ mm 130 °C R 15 mm (HTF) $\geq 12$ mm 200 °C R 15 mm (HT) $\geq 12$ mm *
Temperature contacts / Contacts:	TO ... °C normally closed TS ... °C normally open	U - change over S - normally open O - normally closed
Temperature probe:	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)	
Float:	See float table pages 22-27	
Approvals:	See approvals pages 6-7	
Operating parameters:	Temperature: -10 °C ... +200 °C Pressure: -1 ... 175 bar Specific gravity: $\geq 400$ kg/m <sup>3</sup>	*other values on request



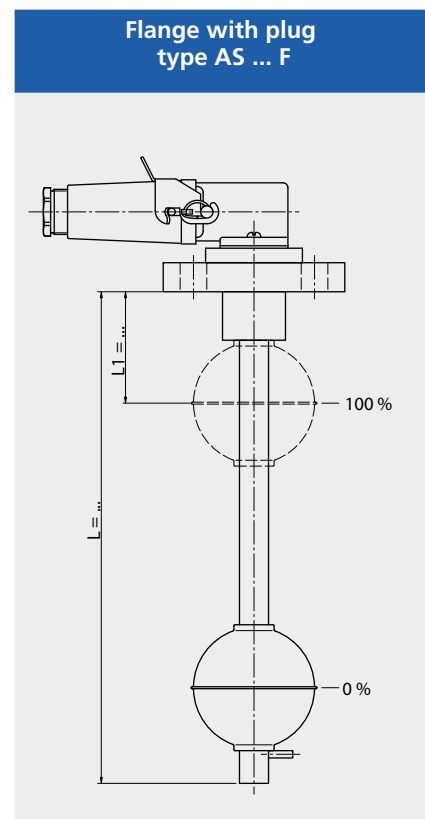
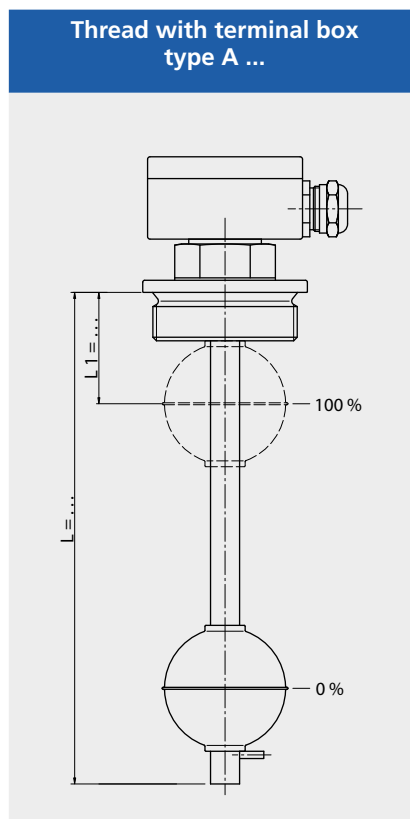
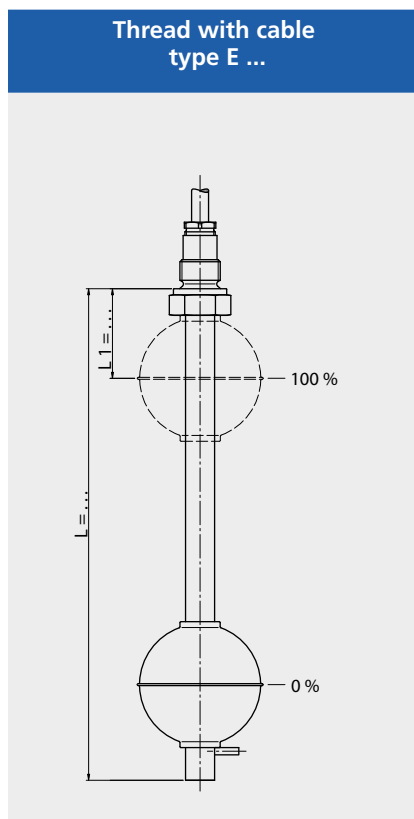
Type combination see type key Level Sensors 1001



# Level Sensors 1001

## Alloy DN10 to DN500

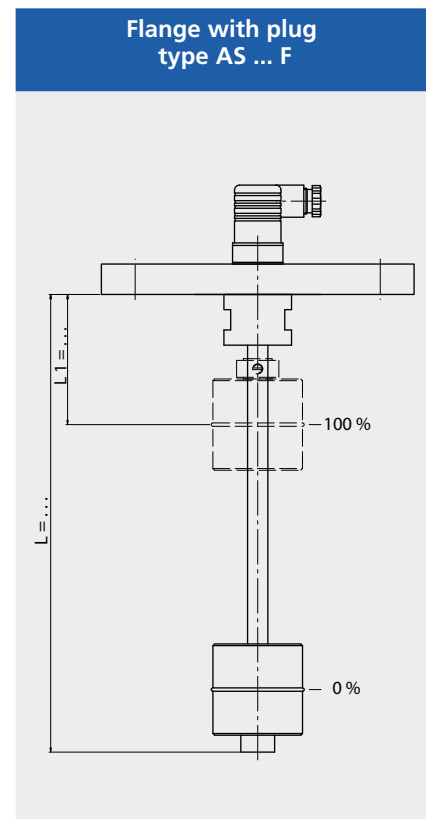
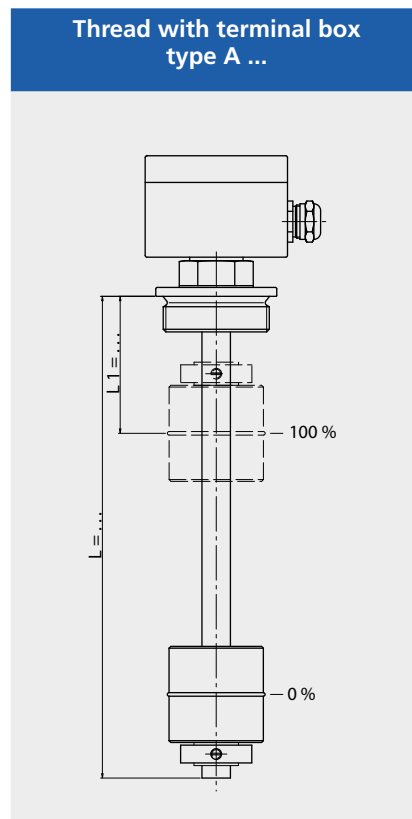
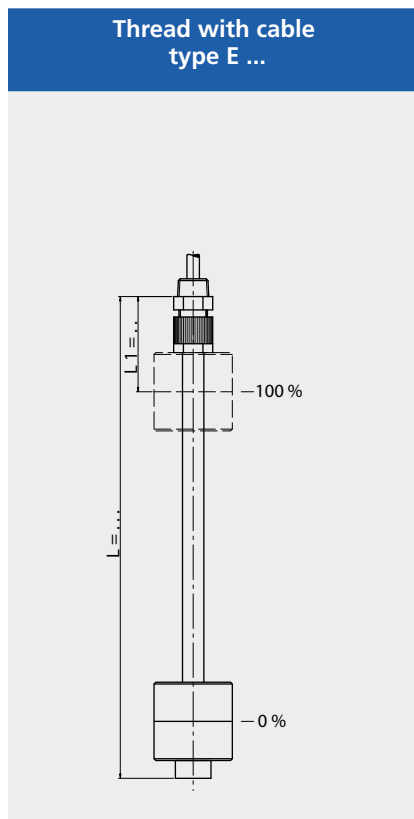
Technical data	Alloy	
Guide tube diameter:	12 mm length to 3000 mm 14 mm length to 5000 mm	18 mm length to 6000 mm
Connection sizes:	Thread BSP 3/8" ... Thread NPT 3/8" ...	Flange DIN DN10 ... Flange Ansi 1/2" ...
Resolution - Guide tube diameter - Temperature limit:	R 5 mm ≥ 12 mm 130 °C R 5 mm (HTF) ≥ 12 mm 200 °C R 5 mm (HT) ≥ 12 mm * R 10 mm ≥ 12 mm 130 °C R 10 mm (HTF) ≥ 12 mm 200 °C	R 10 mm (HT) ≥ 12 mm * R 12.7 mm ≥ 12 mm 130 °C R 15 mm ≥ 12 mm 130 °C R 15 mm (HTF) ≥ 12 mm 200 °C R 15 mm (HT) ≥ 12 mm *
Temperature contacts / Contacts:	TO ... °C normally closed TS ... °C normally open	U - change over S - normally open O - normally closed
Temperature probe:	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)	
Float:	See float table pages 22-27	
Approvals:	See approvals pages 6-7	
Operating parameters:	Temperature: -30 °C ... +200 °C Pressure: -1 ... 40 bar Specific gravity: ≥500 kg/m <sup>3</sup>	*other values on request



Type combination see type key Level Sensors 1001

# Level Sensors 1001 PVC DN10 to DN500

Technical data	PVC	
Guide tube diameter:	16 mm length to 4000 mm 20 mm length to 4000 mm	
Connection sizes:	Thread BSP 3/8" ... Thread NPT 1" ...	Flange DIN DN10 ... Flange Ansi 1/2" ...
Resolution - Guide tube diameter:	R 5 mm      ≥ 12 mm R 10 mm     ≥ 12 mm	12.7 mm    ≥ 12 mm 15 mm      ≥ 12 mm
Temperature contacts / Contacts:	TO ... °C normally closed TS ... °C normally open	U - change over S - normally open O - normally closed
Temperature probe:	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)	
Float:	See float table pages 25-27	
Approvals:	See approvals pages 6-7	
Operating parameters:	Temperature: -10 °C ... +60 °C Pressure: -1 ... 1 bar Specific gravity: ≥600 kg/m³	

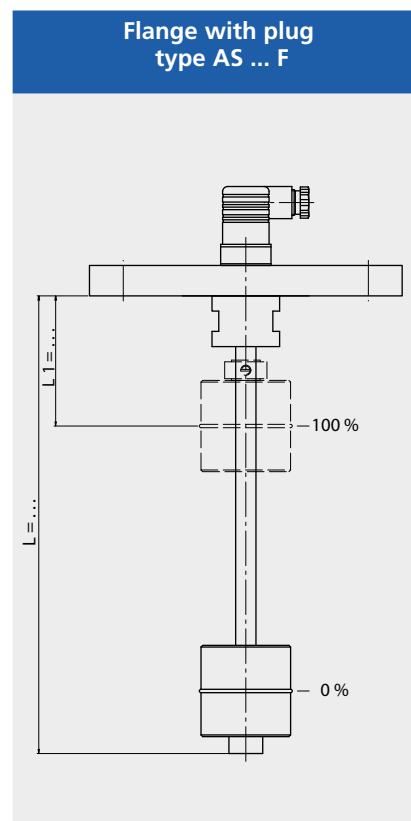
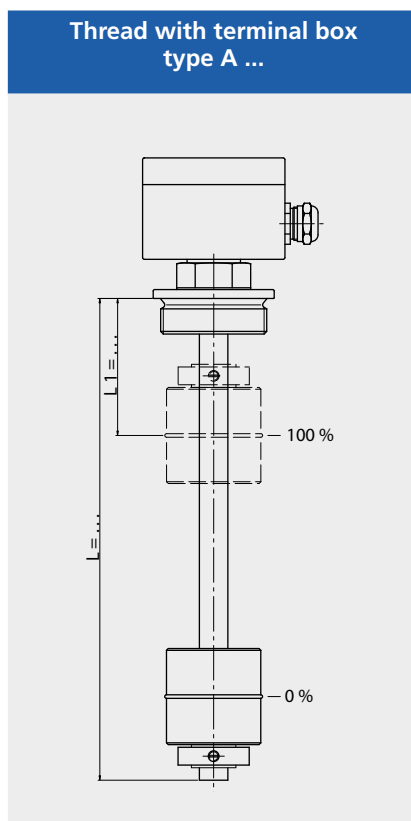
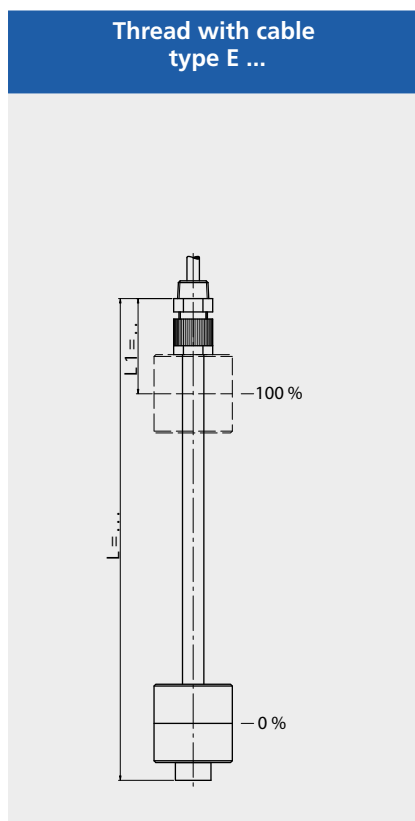


Type combination see type key Level Sensors 1001

# Level Sensors 1001

## PP DN10 to DN500

Technical data	PP	
Guide tube diameter:	16 mm length to 4000 mm 20 mm length to 4000 mm	
Connection sizes:	Thread BSP 3/8" ... Thread NPT 1" ...	Flange DIN DN10 ... Flange Ansi 1/2" ...
Resolution - Guide tube diameter:	R 5 mm      ≥ 12 mm R 10 mm     ≥ 12 mm	R 12.7 mmm   ≥ 12 mm R 15 mm       ≥ 12 mm
Temperature contacts / Contacts:	TO ... °C normally closed TS ... °C normally open	U - change over S - normally open O - normally closed
Temperature probe:	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)	
Float:	See float table pages 25-27	
Approvals:	See approvals pages 6-7	
Operating parameters:	Temperature: -5 °C ... +80 °C Pressure: -1 ... 1 bar Specific gravity: ≥500 kg/m³	

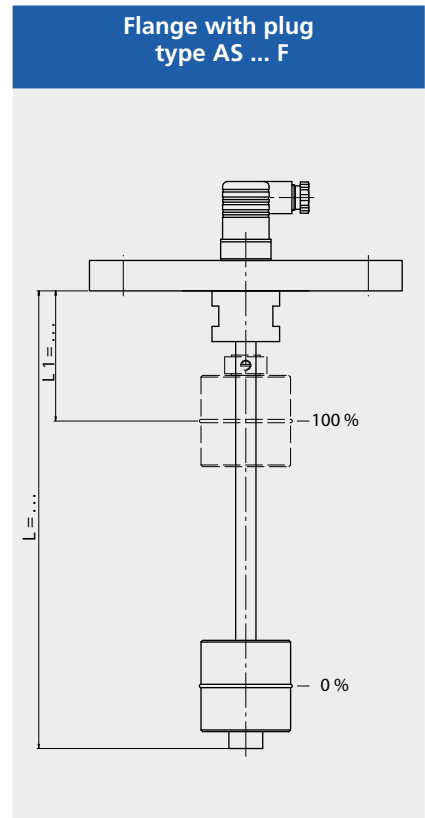
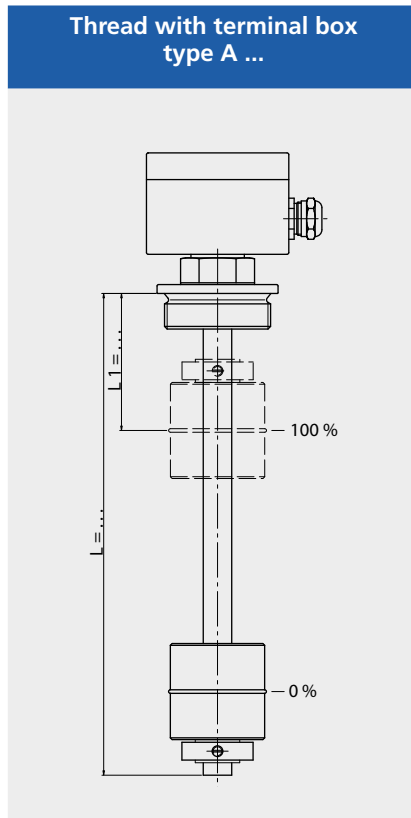
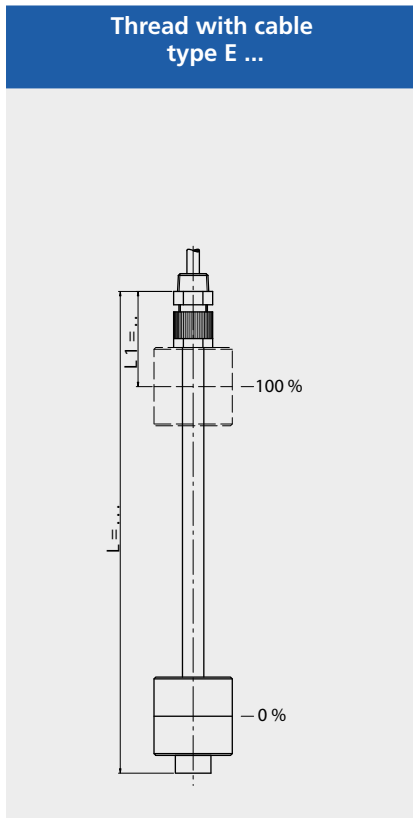


Type combination see type key Level Sensors 1001

# Level Sensors 1001

## PVDF DN10 to DN500

Technical data	PVDF	
Guide tube diameter:	16 mm length to 3000 mm 20 mm length to 5000 mm	
Connection sizes:	Thread BSP 3/8" ... Thread NPT 1" ...	Flange DIN DN10 ... Flange Ansi 1/2" ...
Resolution - Guide tube diameter:	R 5 mm      ≥ 12 mm R 10 mm     ≥ 12 mm	R 12.7 mm    ≥ 12 mm R 15 mm      ≥ 12 mm
Temperature contacts / Contacts:	TO ... °C normally closed TS ... °C normally open	U - change over S - normally open O - normally closed
Temperature probe:	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)	
Float:	See float table pages 25-27	
Approvals:	See approvals pages 6-7	
Operating parameters:	Temperature: -5 °C ... +100 °C Pressure: -1 ... 1 bar Specific gravity: ≥700 kg/m³	

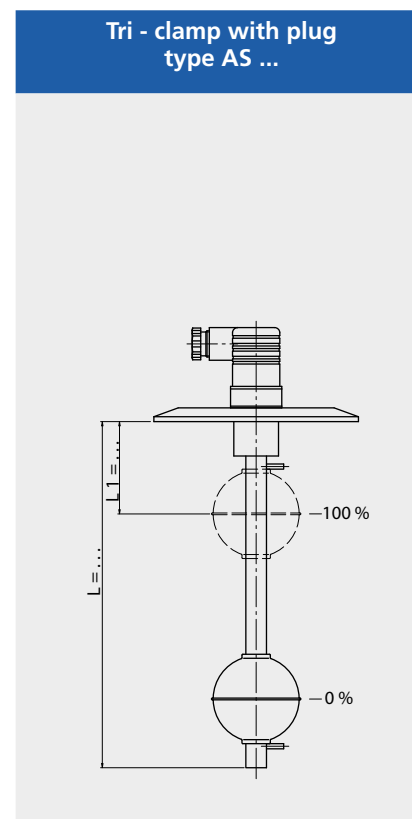
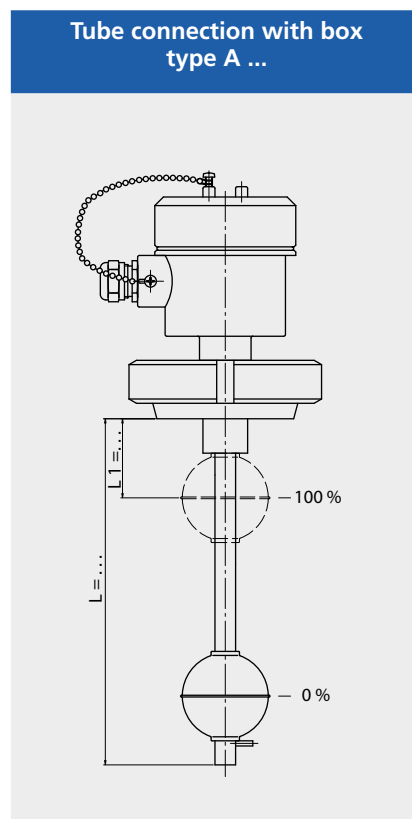
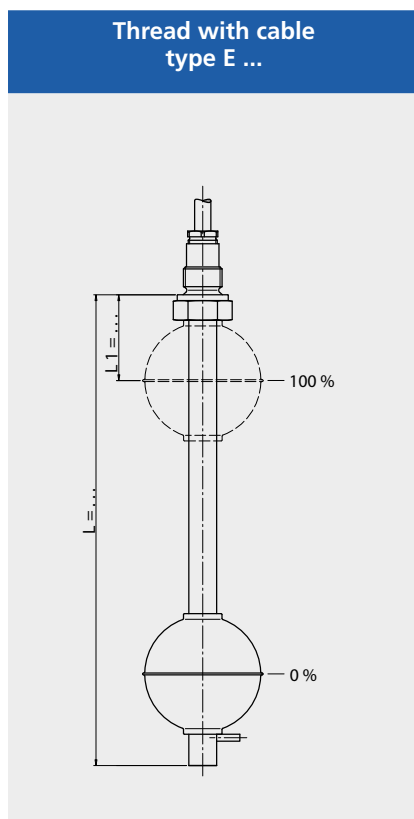


Type combination see type key Level Sensors 1001

# Level Sensors 1001

## Aceptic design / Electrolytically polished

Technical data	Stainless steel aceptic design / electrolytically polished	
Guide tube diameter:	12 mm length to 5000 mm 14 mm length to 5000 mm 18 mm length to 6000 mm	
Connection sizes:	Thread BSP 3/8" ... Tube connection acc. to DIN 11851 NW25 ... Tri - clamp connection 1" ...	
Resolution - Guide tube diameter - Temperature limit:	R 5 mm ≥ 12 mm 130 °C R 5 mm (HTF) ≥ 12 mm 200 °C R 5 mm (HT) ≥ 12 mm * R 10 mm ≥ 12 mm 130 °C R 10 mm (HTF) ≥ 12 mm 200 °C	R 10 mm (HT) ≥ 12 mm * R 12.7 mm ≥ 12 mm 130 °C R 15 mm ≥ 12 mm 130 °C R 15 mm (HTF) ≥ 12 mm 200 °C R 15 mm (HT) ≥ 12 mm *
Temperature contacts / Contacts:	TO ... °C normally closed TS ... °C normally open	U - change over S - normally open O - normally closed
Temperature probe:	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)	
Float:	See float table pages 22-27	
Approvals:	See approvals pages 6-7	
Polishing:	Electrolytically polished, surface finish approx. 0.8µm	
Operating parameters:	Temperature: -30 °C ... +200 °C Pressure: -1 ... 40 bar Specific gravity: ≥400 kg/m³	*other values on request

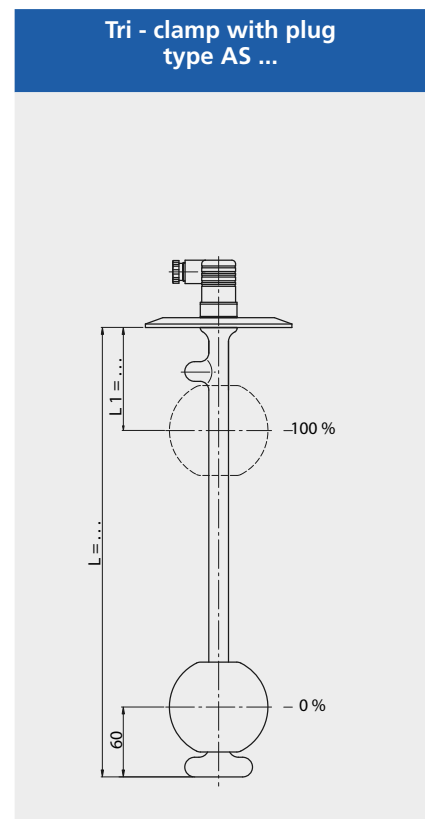
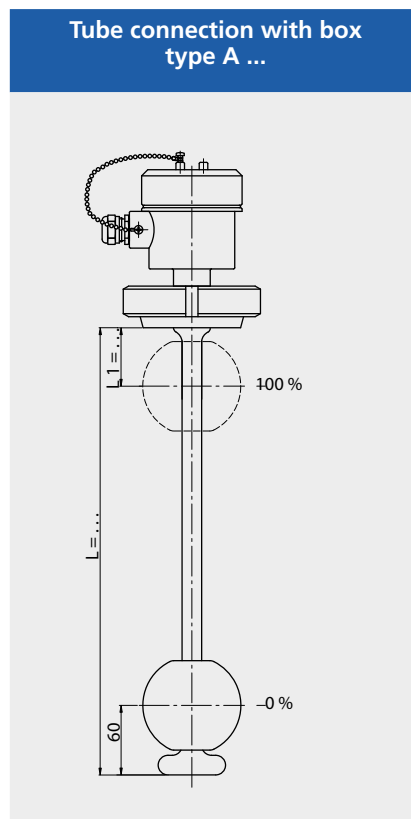
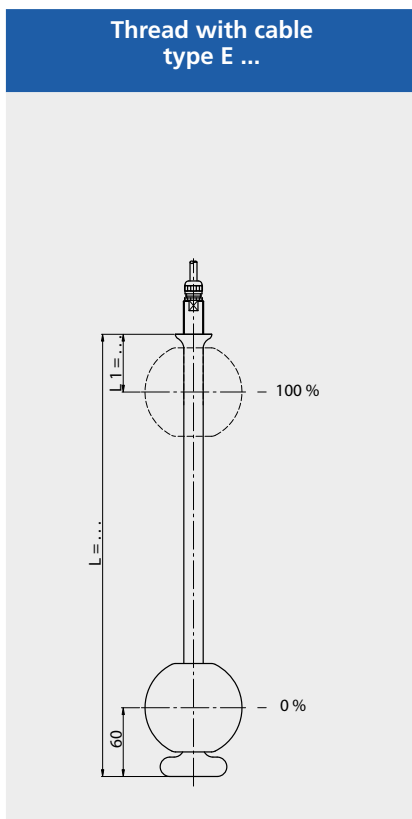


Type combination see type key Level Sensors 1001

# Level Sensors 1001

## Food design / Sanitary - Standard 3A

Technical data	Stainless steel Sanitary - Standard 3A	
Guide tube diameter:	16 mm length to 5000 mm	
Connection sizes:	Thread BSP 3/8" Tube connection acc. to DIN 11851 NW100 ... Tri - clamp connection 4" ...	
Resolution - Guide tube diameter - Temperature limit:	R 5 mm ≥ 12 mm 130 °C R 5 mm (HTF) ≥ 12 mm 200 °C R 5 mm (HT) ≥ 12 mm * R 10 mm ≥ 12 mm 130 °C R 10 mm (HTF) ≥ 12 mm 200 °C	R 10 mm (HT) ≥ 12 mm * R 12.7 mm ≥ 12 mm 130 °C R 15 mm ≥ 12 mm 130 °C R 15 mm (HTF) ≥ 12 mm 200 °C R 15 mm (HT) ≥ 12 mm *
Temperature contacts / Contacts:	TO ... °C normally closed TS ... °C normally open	U - change over S - normally open O - normally closed
Temperature probe:	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)	
Float:	SV 80/3A	
Approvals:	See approvals pages 6-7	
Sanitary - Standard 3A:	Surface polished, surface finish 0.4 µm	
Operating parameters:	Temperature: -30 °C ... +200 °C Pressure: -1 ... 45 bar Specific gravity: ≥750 kg/m³	*other values on request



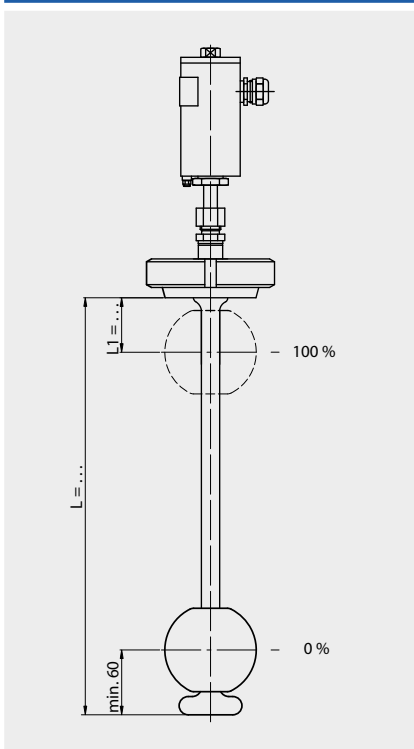
Type combination see type key Level Sensors 1001

# Level Sensors 1001

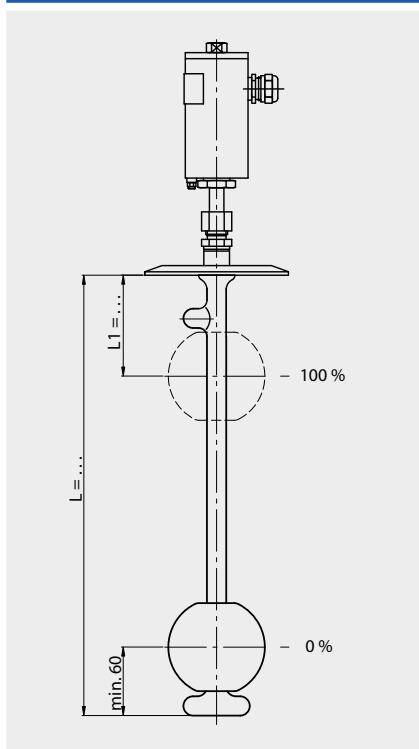
## Magnetostrictive / Sanitary - Standard 3A

Technical data	Special steel Sanitary - Standard 3A
Guide tube diameter:	16 mm length to 5000 mm
Connection sizes:	Tube connection acc. to DIN 11851 NW100 ... Tri - Clamp connection 4" ... Ingold connection ( without 3A marking)
Terminal box:	Ø 50 x 112 mm stainless steel
Cable entry:	M16 x 1.5 mm
Resolution - Guide tube diameter - Temperature limit:	0.1 mm            -40 °C ... +125 °C 0.1 mm (HT)    -200 °C ... +250 °C
Electrical Connections:	2-wire connection 10 ... 30 V DC 4 ... 20 mA
Ambient temperature:	-40 °C ... +85 °C
System of protection:	IP68
Float:	SV 80/3A
Approval:	See approval pages 6-7
Sanitary - Standard 3A	Surface polished, surface finish 0.4µm
Dimension limits:	Temperature: -200 °C ... +250 °C Pressure: -1 ... 45 bar Specific gravity: ≥ 750 kg/m³

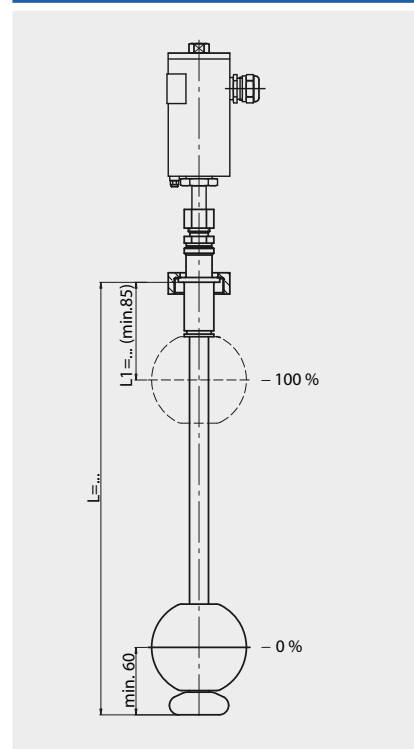
Tube connection with box  
Type AVVBKNW ...



Tri - clamp with box  
Type AVVTC ...



Ingold connection with box  
Type AVVE ...

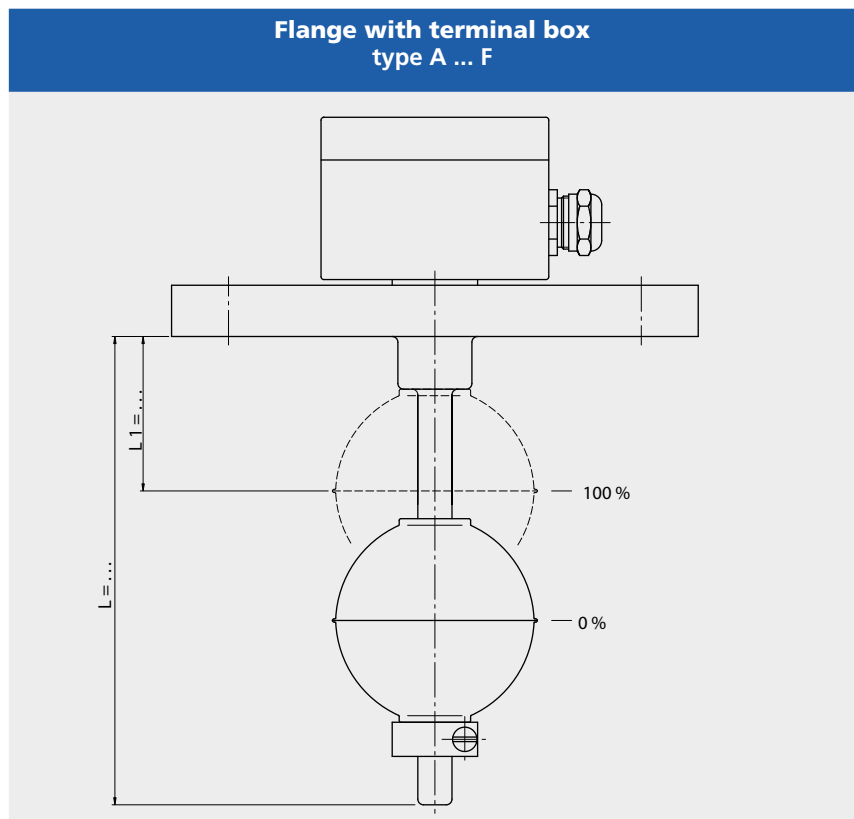


Type combination see type key Level Sensors 1001

# Level Sensors 1001

## E-CTFE coated DN50 to DN500

Technical data	E-CTFE coated stainless steel	
<b>Guide tube diameter:</b>	14 mm length to 1000 mm 16 mm length to 5000 mm 18 mm length to 5000 mm	
<b>Connection sizes:</b>	Flange DIN DN50 ... Flange Ansi 2" ...	
<b>Resolution - Guide tube diameter - Temperature limit:</b>	R 5 mm            ≥ 14 mm 130 °C R 5 mm (HTF) ≥ 14 mm 150 °C R 10 mm          ≥ 14 mm 130 °C R 10 mm (HTF) ≥ 14 mm 150 °C	R 12.7 mm        ≥ 14 mm 130 °C R 15 mm            ≥ 14 mm 130 °C R 15 mm (HTF) ≥ 14 mm 150 °C
<b>Temperature contacts / Contacts:</b>	TO ... °C normally closed TS ... °C normally open	U - change over S - normally open O - normally closed
<b>Temperature probe:</b>	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)	
<b>Float:</b>	See float table pages 22-27	
<b>Approvals:</b>	See approvals pages 6-7	
<b>Operating parameters:</b>	Temperature: -30 °C ... +150 °C Pressure: -1 ... 25 bar Specific gravity: ≥650 kg/m <sup>3</sup>	



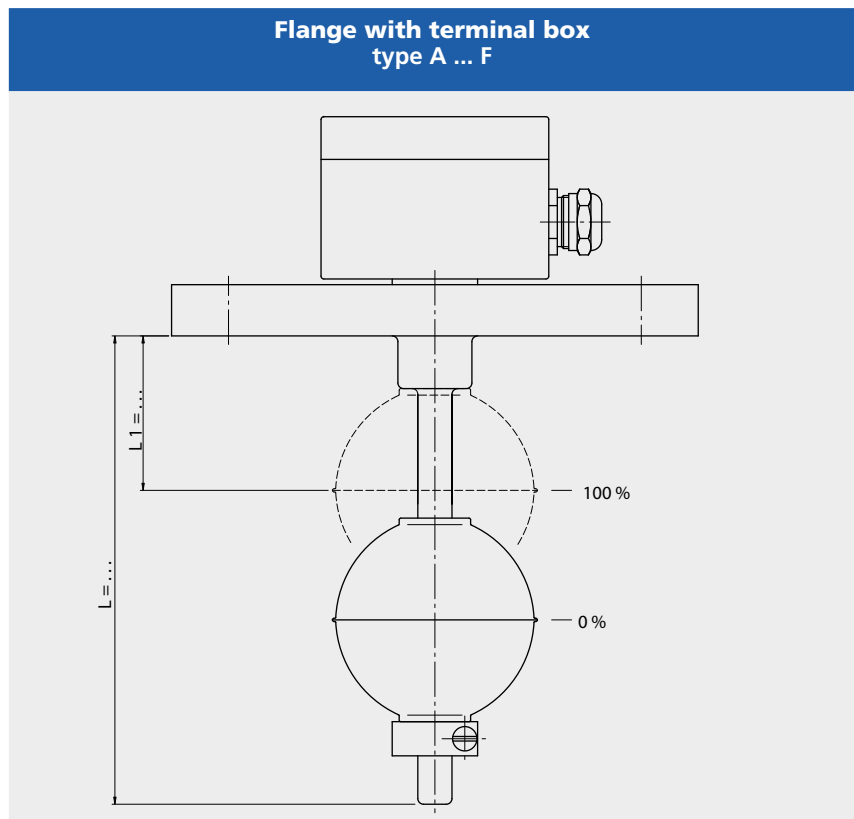
Type combination see type key Level Sensors 1001



# Level Sensors 1001

## PFA coated DN50 to DN500

Technical data	PFA coated stainless steel	
Guide tube diameter:	14 mm length to 1000 mm 16 mm length to 5000 mm 18 mm length to 5000 mm	
Connection sizes:	Flange DIN DN50 ... Flange Ansi 2" ...	
Resolution - Guide tube diameter - Temperature limit:	R 5 mm $\geq$ 14 mm 130 °C R 5 mm (HTF) $\geq$ 14 mm 200 °C R 10 mm $\geq$ 14 mm 130 °C R 10 mm (HTF) $\geq$ 14 mm 200 °C	R 12.7 mm $\geq$ 14 mm 130 °C R 15 mm $\geq$ 14 mm 130 °C R 15 mm (HTF) $\geq$ 14 mm 200 °C
Temperature contacts / Contacts:	TO ... °C normally closed TS ... °C normally open	U - change over S - normally open O - normally closed
Temperature probe:	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)	
Float:	See float table pages 22-27	
Approvals:	See approvals pages 6-7	
Operating parameters:	Temperature: -30 °C ... +200 °C Pressure: -1 ... 25 bar Specific gravity: $\geq$ 650 kg/m <sup>3</sup>	

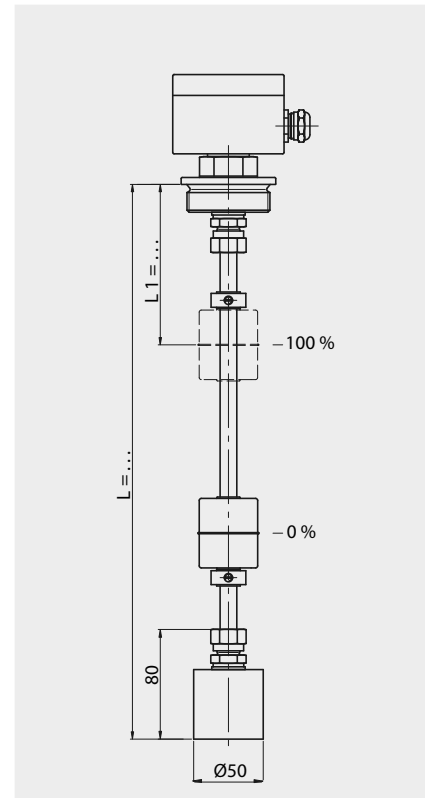


Type combination see type key Level Sensors 1001

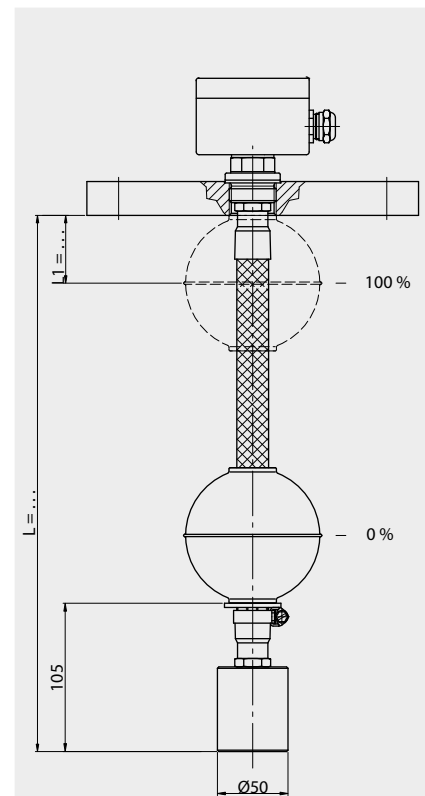
# Level Sensors 1001

## Polyamide and Stainless steel in flexible design

Technical data		Polyamide flexible
Guide tube diameter:		12 mm length to 3000 mm
Connection sizes:		Thread BSP 1" ... Thread NPT 1" ... Flange DIN DN25 ... Flange Ansi 1" ...
Resolution - Guide tube diameter:		R 12.7 mm    12 mm
Temperature contacts / Contacts:		TO ... °C    U - change over TS ... °C    S - normally open O - normally closed
Temperature probe:		PT - 100 (optional with control unit) PT - 1000 (optional with control unit)
Float:		See float table pages 25-27
Electrical Connections:		See connections pages 32-33
Operating parameters:		Temperature: -10 °C ... +80 °C Pressure: -1 ... 1 bar Specific gravity: $\geq 460 \text{ kg/m}^3$ Bending radius: >500 mm



Technical data		Stainless steel flexible
Guide tube diameter:		16 mm length to 20000 mm
Connection sizes:		Thread BSP 1" ... Thread NPT 1" ... Flange DIN DN25 ... Flange Ansi 1" ...
Resolution - Guide tube diameter:		R 12.7 mm    16 mm
Temperature contacts / Contacts:		TO ... °C    U - change over TS ... °C    S - normally open O - normally closed
Temperature probe:		PT - 100 (optional with control unit) PT - 1000 (optional with control unit)
Float:		SV 72/23 and SV 80/23
Zulassung:		See approvals pages 6-7
Electrical Connections:		See connections pages 32-33
Operating parameters:		Temperature: -30 °C ... +130 °C Pressure: -1 ... 25 bar Specific gravity: $\geq 620 \text{ kg/m}^3$ Bending radius: >500 mm

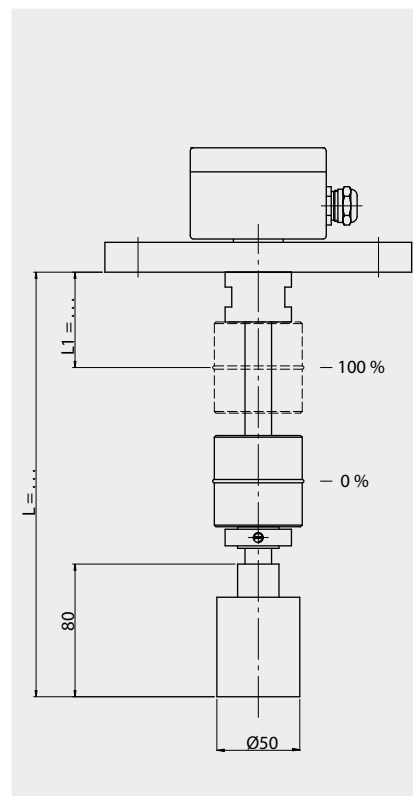


Type combination see type key Level Sensors 1001

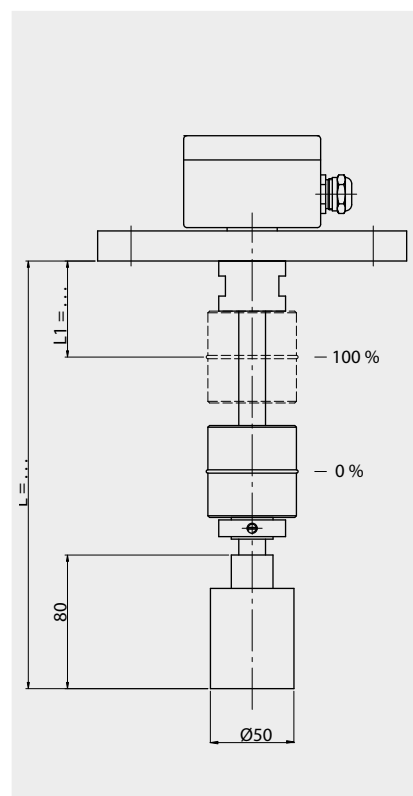
# Level Sensors 1001

## PP and PVDF in flexible design

Technical data	PP flexible
Guide tube diameter:	16 mm length to 4000 mm
Connection sizes:	Thread BSP 1" ... Thread NPT 1" ... Flange DIN DN25 ... Flange Ansi 1" ...
Stretching weight diameter:	50 mm
Resolution - Guide tube diameter:	R 12.7 mm    16 mm
Temperature contacts/Contacts:	TO ... °C    U - change over TS ... °C    S - normally open O - normally closed
Temperature probe:	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)
Float:	See float table pages 25-27
Electrical Connections:	See connections pages 32-33
Operating parameters:	Temperature: -5 °C ... +80 °C Pressure: -1 ... 1 bar Specific gravity: $\geq 500 \text{ kg/m}^3$ Bending radius: > 500 mm



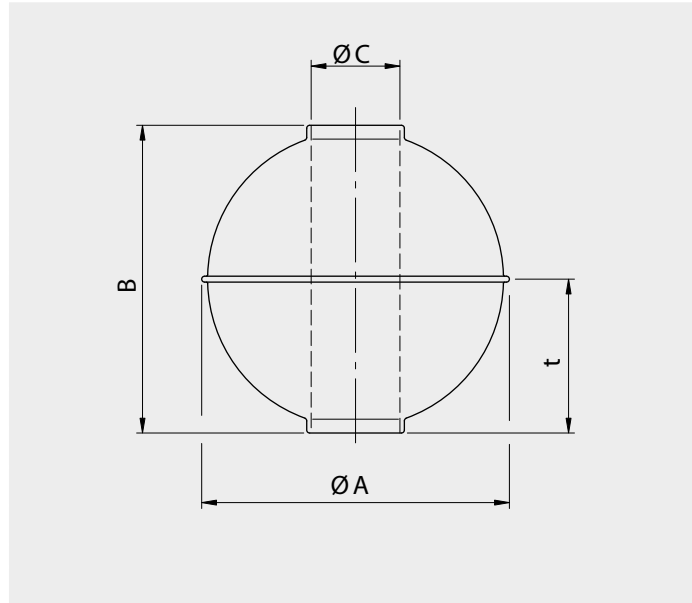
Technical data	PVDF flexible
Guide tube diameter:	16 mm length to 3000 mm
Connection sizes:	Thread BSP 1" ... Thread NPT 1" ... Flange DIN DN25 ... Flange Ansi 1" ...
Stretching weight diameter:	50 mm
Resolution - Guide tube diameter:	R 12.7 mm    16 mm
Temperature contacts/Contacts:	TO ... °C    U - change over TS ... °C    S - normally open O - normally closed
Temperature probe:	PT - 100 (optional with control unit) PT - 1000 (optional with control unit)
Float:	See float table pages 25-27
Electrical Connections:	See connections pages 32-33
Operating parameters:	Temperature: -5 °C ... +100 °C Pressure: -1 ... 1 bar Specific gravity: $\geq 700 \text{ kg/m}^3$ Bending radius: > 500 mm



Type combination see type key Level Sensors 1001

# Level Sensors 1001

## Ball float with radial - magnetic system



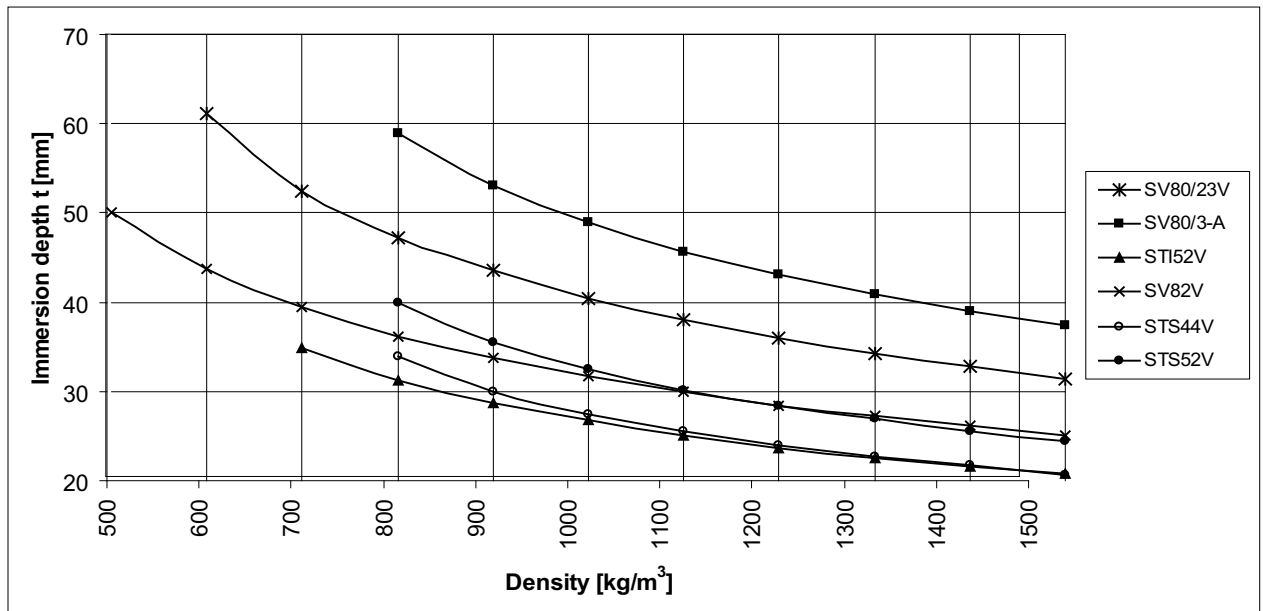
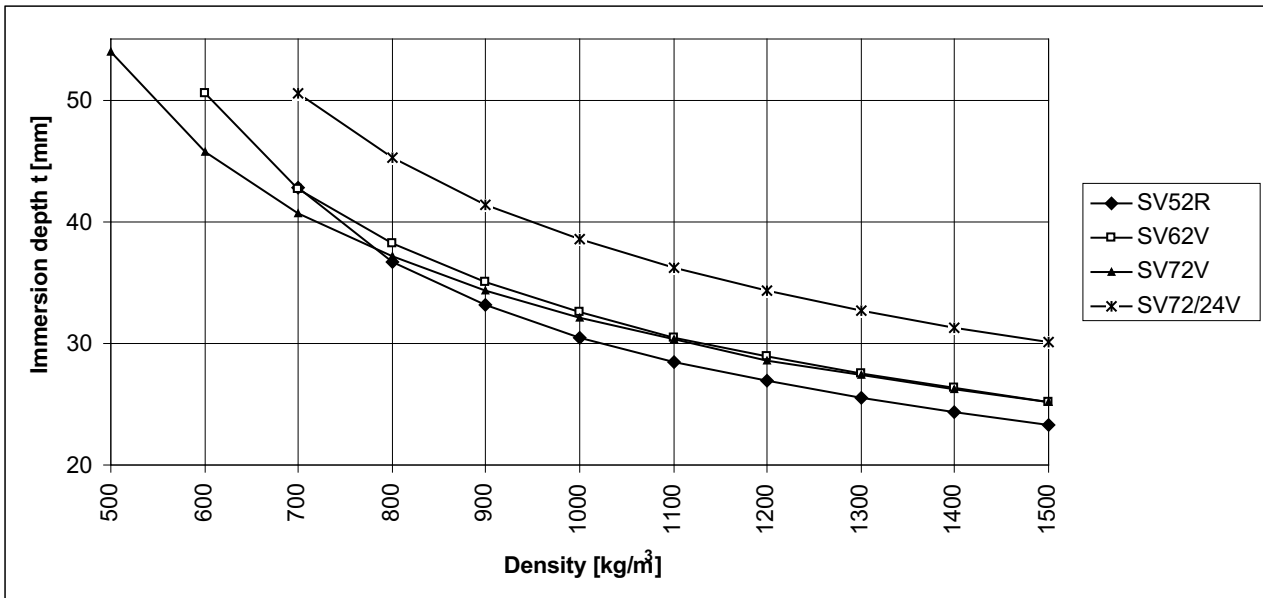
Type	Material	Ø A [mm]	B [mm]	Ø C [mm]	Min. gravity [kg/m <sup>3</sup> ]	Max. oper. pressure [bar]	Max. oper. temp. [°C]	Weight [g]	Immersion depth t by gravity 1 [mm]
SV52R	St. steel	52	52	15	720	40	200	38	31
SV62V	St. steel	62	62	15	600	25	200	58	33
SV72V	St. steel	72	72	15	460	25	200	73	32
SV72/24V	St. steel	72	70	24	620	25	200	86	39
SV82V	St. steel	83	82	15	400	25	200	87	32
SV80/23V	St. steel	80	75	23	600	25	200	109	40
SV80/3A	St. steel	80	72	23	750	45	200	158	49
STS44V	Titanium	44	44	12	780	100	300	25	28
STS52V	Titanium	52	52	15	750	150	300	42	33
STI52V	Titanium	52	52	14	600	25	150	32	27
STI62V	Titanium	62	62	14	460	25	150	42	26
SH72/23V	Alloy C	72	72	23	820	25	200	116	48
SH82V	Alloy C	82	80	15	500	16	200	95	34
SH82/23V	Alloy C	82	80	23	700	18	200	150	48
SH98V	Alloy C	98	96	23	500	16	200	208	47
SEECV72/23V	E-CTFE coated	74	72	21	650	25	150	101	40

Specifications subject to change

# Level Sensors 1001

## Immersion depths-diagram

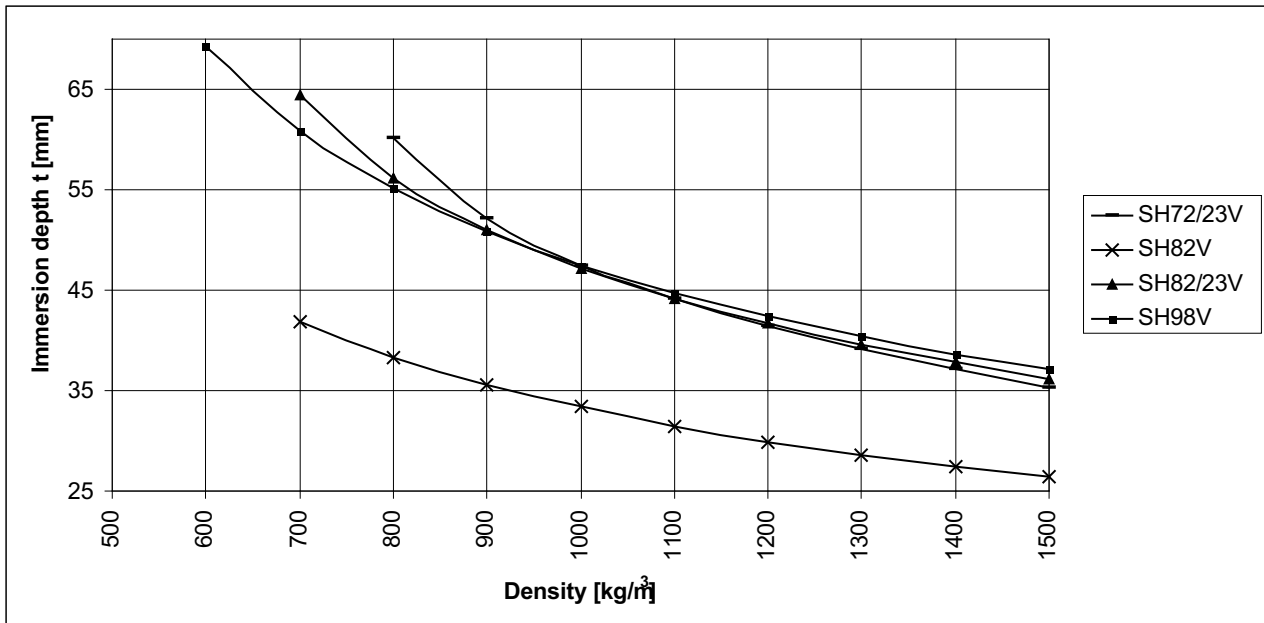
### Spherical float with radial-magnetic system



# Level Sensors 1001

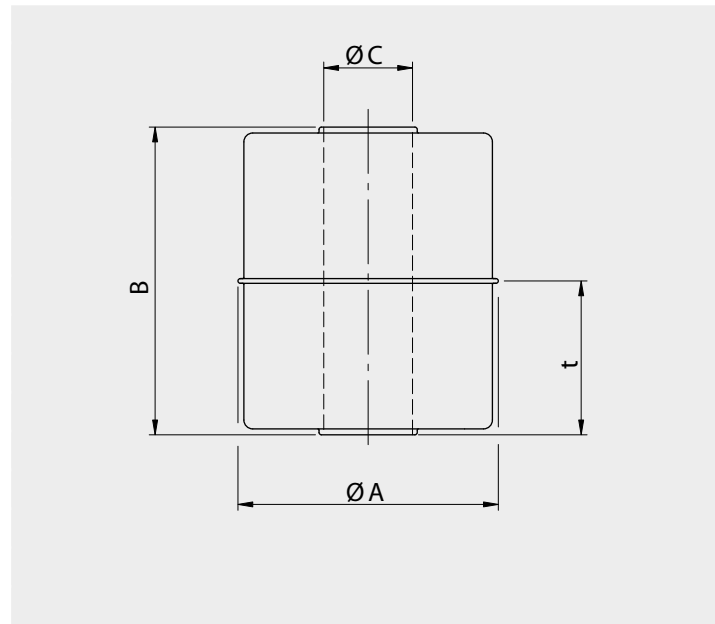
## Immersion depths-diagram

### Spherical float with radial-magnetic system



# Level Sensors 1001

## Cylindrical float with radial - magnetic system



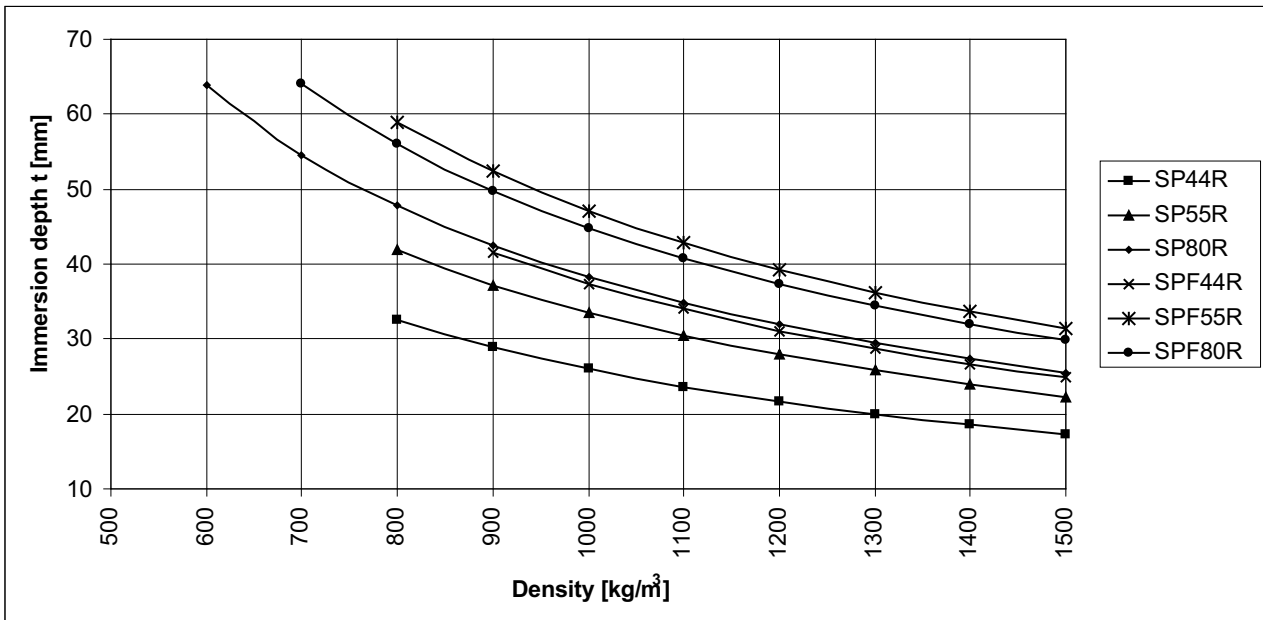
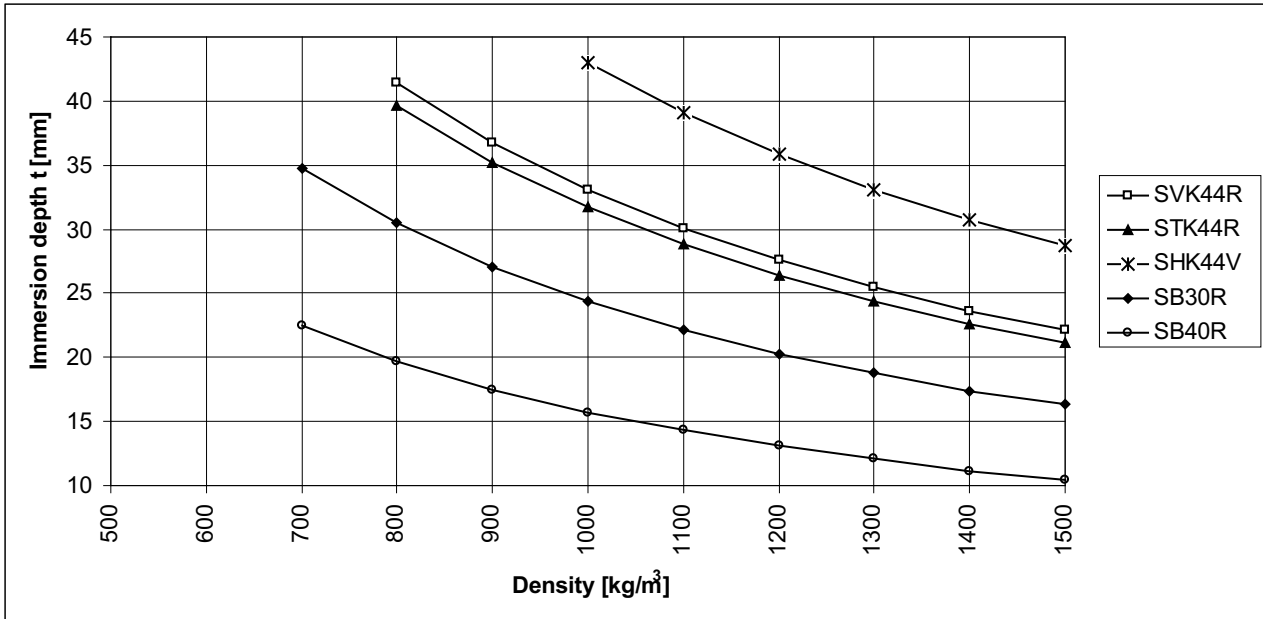
Type	Material	$\varnothing A$ [mm]	B [mm]	$\varnothing C$ [mm]	Min. gravity [kg/m <sup>3</sup> ]	Max. oper. pressure [bar]	Max. oper. temp. [°C]	Weight [g]	Immersion depth t by gravity 1 [mm]
SVK44R	St. steel	44	52	15	800	25	200	40	33
STK44R	Titanium	44	52	14	760	15	150	39	32
SHK44V	Alloy	44	52	15	1000	45	200	52	43
SB30R	NBR	30	45	13	700	6	80	14	24
SB40R	NBR	40	30	15	700	6	80	17	16
SP44R	PVC	44	44	14	800	1	60	32	26
SP55R	PVC	55	55	22	750	1	60	64	34
SP80R	PVC	80	80	25	600	1	60	164	38
SPP44R	PP	44	44	13	700	1	80	25	20
SPP55R	PP	55	55	21	600	1	80	50	26
SPP80R	PP	80	80	24	500	1	80	126	29
SPF44R	PVDF	44	57	13	850	1	100	46	37
SPF55R	PVDF	55	70	21	800	1	100	90	47
SPF80V	PVDF	80	80	24	700	1	100	192	45

Specifications subject to change

# Level Sensors 1001

## Immersion depths-diagram

### Cylindrical float with radial-magnetic system

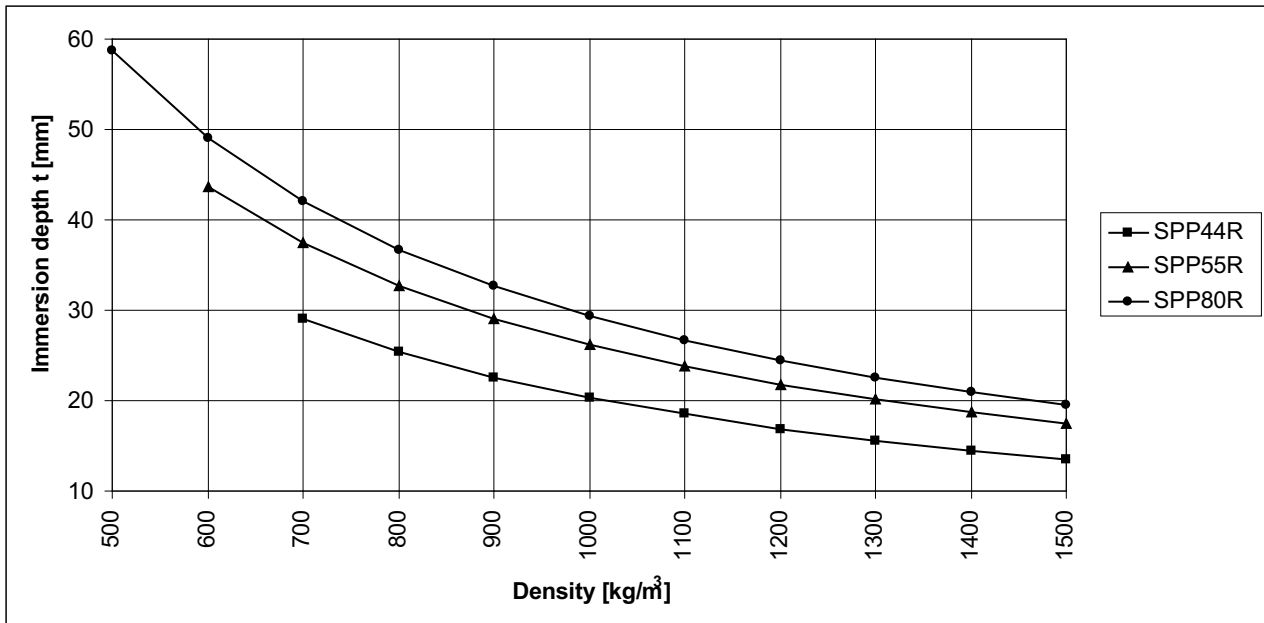




# Level Sensors 1001

## Immersion depths-diagram

### Cylindrical float with radial-magnetic system



# Level Sensors 1001

## Type key

Code 1	Key 1	Electrical connection	ATEX
	AL ... -	Aluminium terminal box	
	AV ... -	Stainless steel terminal box	
	ALDC ... -	Aluminium terminal box EExd explosion proof	
	ALD ... -	Aluminium terminal box EExd explosion proof	
	AVD ... -	Stainless steel terminal box EExd explosion proof	
	AP ... -	Terminal box Polyester	
	AB ... -	Terminal box ABS	
	AS ... -	Connection plug	
	AF -	Connection plug with PA-flange	
	E -	Connection cable	
	ALB ... -	Aluminium terminal box (for bypass housing)	
	ASB ... -	Connection plug (for bypass housing)	
	EB ... -	Connection cable (for bypass housing)	
	W .. -	Bent Constructions	
	U .. -	Mounting from bottom	
	... -	Various	
	Key 2	Materials of the process connection	ATEX
	.. V .. -	Stainless steel	
	.. Ti .. -	Titanium	
	.. H .. -	Alloy	
	.. S .. -	Steel	
	.. M .. -	Brass	
	.. EEC .. -	Stainless steel E-CTFE coated	
	.. PFA .. -	Stainless steel PFA coated	
	.. A .. -	Aluminium	
	.. P .. -	Polyvinylchloride PVC	
	.. PP .. -	Polypropylene PP	
	.. PF .. -	Polyvinylidenfluoride PVDF	
	... -	Various	
	Key 3	Design process connection	ATEX
	... E .. -	Thread to the top DIN G 3/8" ... / ≥ M10	
	... E NPT .. -	Thread to the top NPT 3/8" ...	
	... R .. -	Thread to the bottom DIN G 3/8" ... / ≥ M10	
	... NPT .. -	Thread to the bottom NPT 3/8" ...	
	... BKNW .. -	Screwed connection acc. to DIN 11851, NW25 ...	
	... TC .. -	Tri-clamp flange DN25 ... / 1/2" ...	
	... F -	Flange acc. to different standards	
	... VE -	Various	

### Type combination

Code	1	2	3	4	5	6	7	8	9	10
Key	1/2/3	1	1/1/1	1/2	1/2	1	1	1	1	1

Example	ALVF-	TP43A-	65/16/C-	VK10 -	U/TS -	1TF -	L1250 -	SV52V -	2SIL -	Ex
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# Level Sensors 1001

## Type key

Code 2	Key 1	2-wire control unit in terminal box	ATEX
- ZMU -		XT - 42 - SI	
- ZMUP -		956045	
- ZMUL -		2251	
- TP -		TP5333B	
- TPA -		TP5333A	
- TP43 -		TP5343B	
- TP43A -		TP5343A	
- TD -		TD5335B	
- TDA -		TD5335A	
- TP50 -		TP5350B	
- TP50A -		TP5350A	
- AMU -		AMU	
...		Various	

Code 3	Key 1	Flange dimensions and designs	ATEX
.. / .. / .. -		Standard      1. Nom.width      2. Nom.pressure      3. Form	
		DIN      DN15... 500      PN 6 .. 400      C, F, N,B ..	
		ANSI      1/2" ... 20"      150 ... 2500lbs      SF, RTJ, FF ...	
		JIS B 2010      1/2" ... 20"      5K ... 63K      SF, RTJ, FF ...	
		BSI BS 4504      DN 15 ... 500      PN 6 ... 400      6/x ... 400/x	
		BSI BS 10      1/2" ... 20"      150 ... 2500 lbs      A .. T	
		S      Special flange with outside diameter mm	

Code 4	Key 1	Guide tube material	ATEX
V .. / .. -		Stainless steel (also flexible)	
Ti .. / .. -		Titanium	
H .. / .. -		Alloy	
M .. / .. -		Brass	
EEC .. / .. -		Stainless steel E-CTFE coated	
PFA .. / .. -		Stainless steel PFA coated	
P .. / .. -		Polyvinylchloride PVC	
PP .. / .. -		Polypropylene PP (also flexible design)	
PF .. / .. -		Polyvinylidenfluoride PVDF (also flexible design)	
PA .. / .. -		Polyamide PA (flexible design)	
... / .. -		Various	

### Type combination

Code	1	2	3	4	5	6	7	8	9	10
Key	1/2/3	1	1/1/1	1/2	1/2	1	1	1	1	1
Example	ALVF-	TP43A-	65/16/C-	VK10 -	U/TS -	1TF -	L1250 -	SV52V -	2SIL -	Ex

# Level Sensors 1001

## Type key

	<b>Key 2</b>	<b>Resolution</b>	<b>ATEX</b>
	K5	Resolution 5 mm	
	K5 (HTF)	Resolution 5 mm high temperature design	
	K5 (HT)	Resolution 5 mm high temperature design	
	K10	Resolution 10 mm	
	K10 (HTF)	Resolution 10 mm high temperature design	
	K10 (HT)	Resolution 10 mm high temperature design	
	K12.7	Resolution 12.7 mm	
	K15	Resolution 15 mm	
	K15 (HTF)	Resolution 15 mm high temperature design	
	K15 (HT)	Resolution 15 mm high temperature design	
<b>Code 5</b>	<b>Key 1</b>	<b>Contact function</b>	<b>ATEX</b>
	.. U	Change over	
	.. U/R	Change over with 22 Ohm protective resistor	
	.. U/N	Change over with Namur circuit acc. to EN 60947	
	.. S	Normally open - closing on rising level	
	.. S/R	Normally open - closing on rising level with 22 Ohm protective resistor	
	.. O	Normally closed - opening on rising level	
	.. O/R	Normally closed - opening on rising level with 22 Ohm protective resistor	
		Option: (H) hysteresis to approx. 10 mm / e.g. .. U(H)/..	
	<b>Key 2</b>	<b>Temperature contacts</b>	<b>ATEX</b>
	.. .. / TO -	With temperature contact normally closed - opening on rising level	
	.. .. / TS -	With temperature contact normally open - closing on rising level	
<b>Code 6</b>	<b>Key 1</b>	<b>Temperature probe / Temperature control unit</b>	<b>ATEX</b>
	.. TF -	Quantity temperature probe without control unit	
	.. TF / TP -	Quantity temperature probe with control unit TP5333 A/B	
	.. TF / TD -	Quantity temperature probe with control unit TP5335 A/B	
	.. TF / TP50 -	Quantity temperature probe with control unit TP5350 A/B (control units only possible with terminal boxes)	
<b>Code 7</b>	<b>Key 1</b>	<b>Length of guide tube</b>	<b>ATEX</b>
	L .. -	Length of guide tube in ... mm	

### Type combination

Code	1	2	3	4	5	6	7	8	9	10
Key	1/2/3	1	1/1/1	1/2	1/2	1	1	1	1	1
Example	ALVF-	TP43A-	65/16/C-	VK10 -	U/TS -	1TF -	L1250 -	SV52V -	2SIL -	Ex

# Level Sensors 1001

## Type key

Code 8	Key 1	Float designs	ATEX
	SV .. -	Stainless steel	
	STi .. -	Titanium	
	SH.. -	Alloy	
	SEEC .. -	Stainless steel E-CTFE coated	
	SPFA .. -	Stainless steel PFA coated	
	SP .. -	Polyvinylchloride PVC	
	SPP .. -	Polypropylene PP	
	SPF .. -	Polyvinylidenfluoride PVDF	
	SB .. -	Buna	
	.. -	Various	

Code 9	Key 1	Cable / length of cable in m	ATEX
	.. PVC -	.. Polyvinylchloride PVC (PVC-grey)	
	.. PVC - blau -	.. Polyvinylchloride PVC (PVC-blue)	
	.. Sil -	.. Silicone	
	.. PUR -	.. Pur (partly oil resisting)	
	.. FEP -	.. Teflon	
	.. Lit -	...Insulated stranded wire	
	.. NiLit -	.. Insulated nickel stranded wire	
	.. Radox -	.. Radox	
	.. -	.. Various	
	Options		
	... / CY	Shielded cable	
	... / ÖL	Oil resisting cable	

Code 10	Key 1	Approvals and Options	ATEX
	Ex	Intrinsically safe design acc. to EExia / EExib	
	EExd	Explosion proof design acc. to EExd	
	Ex/D	Intrinsically safe design acc. to EExia / EExib with dust Ex	
	EExd/D	Explosion proof design acc. to EExd with dust Ex	
	WHG	Wasserhaushaltsgesetz (Germany)	
	GL	Germanischer Lloyd	
	BV	Bureau Veritas	
	RINA	Registro Italiano Navale	
	3A	3-A Sanitary Standard (Food design)	
	TEST	With test function	
	FLEXIBLE	Flexible guide tube design	

### Type combination

Code	1	2	3	4	5	6	7	8	9	10
Key	1/2/3	1	1/1/1	1/2	1/2	1	1	1	1	1

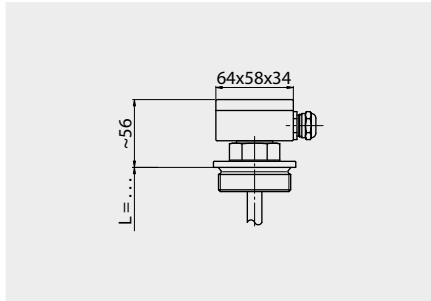
Example	ALVF-	TP43A-	65/16/C-	VK10 -	U/TS -	1TF -	L1250 -	SV52V -	2SIL -	Ex
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# Level Sensors 1001

## Electrical Connections

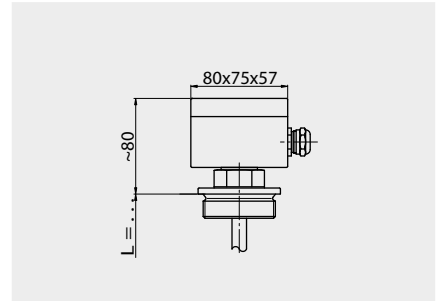
### Terminal box

**Type AL (101)**



Ambient temperature: max. +150 °C  
 Material: Aluminium  
 Cable gland: Brass nickel-plated  
 Cable entry: M20x1.5 mm  
 Protection rating: IP 65

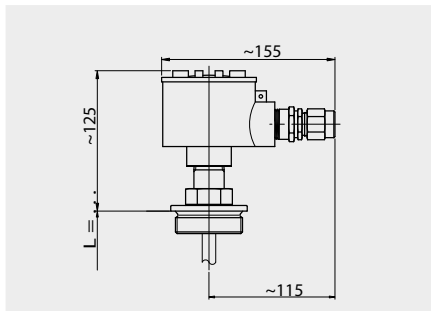
**Type AL (105)**



Ambient temperature: max. +150 °C  
 Material: Aluminium  
 Cable gland: Brass nickel-plated  
 Cable entry: M20x1.5 mm  
 Protection rating: IP 65

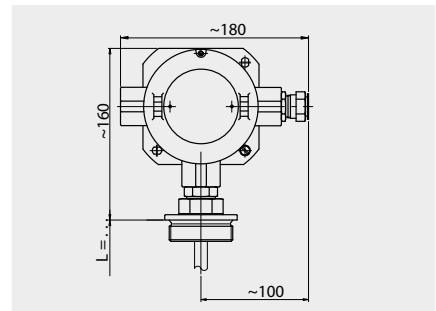
### Terminal box

**Type ALDC (EExd)**



Ambient temperature: max. +85 °C  
 Material: Aluminium  
 Cable gland: Brass nickel-plated  
 Cable entry: M20x1.5 mm  
 Protection rating: IP 65

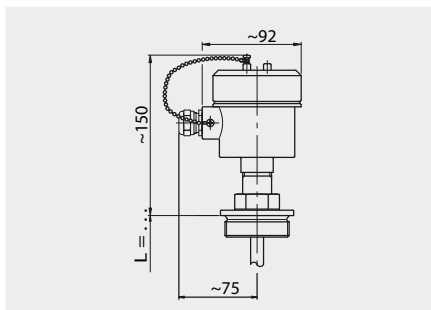
**Type ALD (EExd)**



Ambient temperature: max. +55 °C  
 Material: Aluminium  
 Cable gland: Brass nickel-plated  
 Cable entry: M20x1.5 mm  
 Protection rating: IP 66

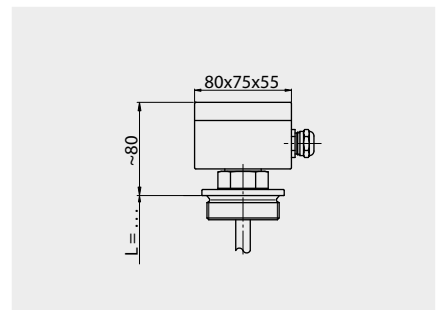
### Terminal box

**Type AV/AVD (EExd)**



Ambient temperature: max. +40 °C (AVD)  
 max. +130 °C (AV)  
 Material: Stainless steel  
 Cable gland: Brass nickel-plated  
 Cable entry: M20x1.5 mm  
 Protection rating: IP 65  
 Option: Cable gland  
 M20x1.5 mm in stainless steel

**Type AP**



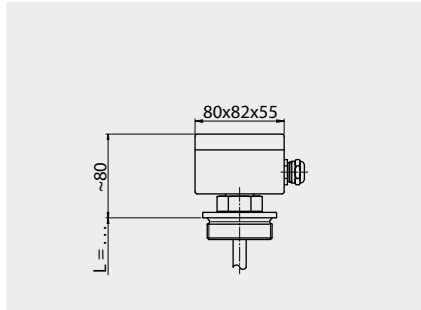
Ambient temperature: max. +100 °C  
 Material: Polyester  
 Cable gland: Polyamide  
 Cable entry: M20x1.5 mm  
 Protection rating: IP 65

# Level Sensors 1001

## Electrical Connections

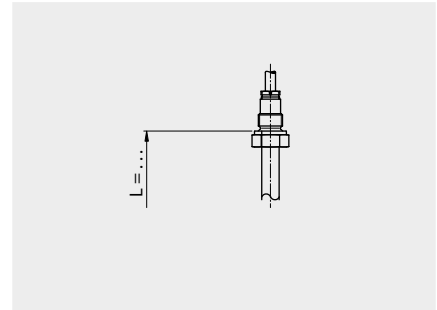
### Terminal box / Cable

#### Type AB



Ambient temperature: max. +80 °C  
 Material: ABS  
 Cable gland: PVC  
 Cable entry: M20x1.5 mm  
 Protection rating: IP 65

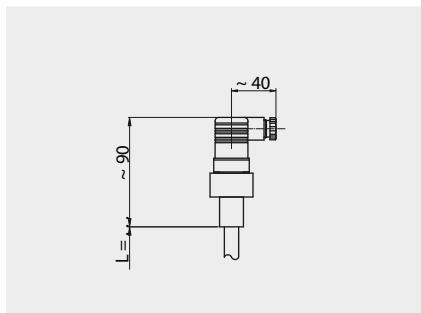
#### Type E



Ambient temperature: max.+180 °C  
 Material: Various  
 Cable gland: Brass nickel-plated  
 Cable entry: Various  
 Protection rating: IP 55 - 68

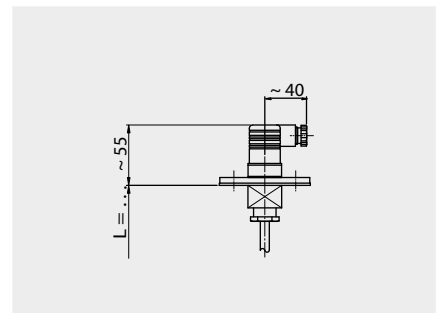
### Connection plug

#### Type AS



Ambient temperature: max. +80 °C  
 Material: PVC  
 Cable gland: PA  
 Cable entry: -  
 Protection rating: IP 65

#### Type AF

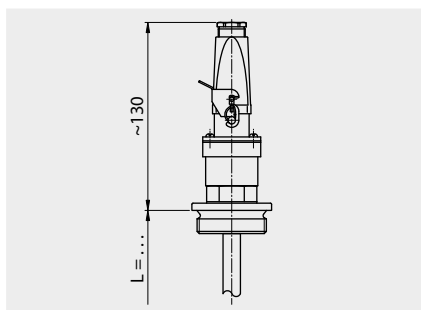


Ambient temperature: max. +80 °C  
 Material: PA / PVC  
 Cable gland: PA  
 Cable entry: -  
 Protection rating: IP 65

### Connection plug

#### Type AS

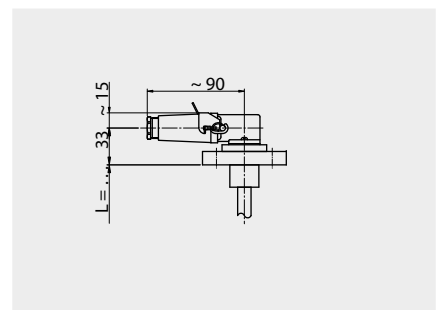
(HTS)



Ambient temperature: max. +80 °C  
 Material: Thermoplast / Aluminium  
 Cable gland: PA / Alu  
 Cable entry: -  
 Protection rating: IP 65

#### Type AS

(W/HTS)

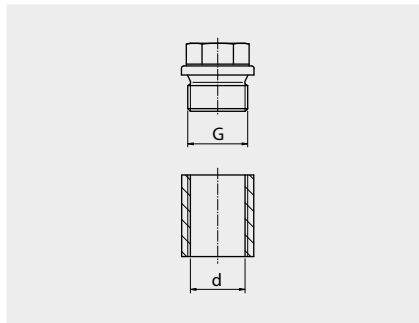


Ambient temperature: max. +80 °C  
 Material: Thermoplast / Aluminium  
 Cable gland: PA / Alu  
 Cable entry: -  
 Protection rating: IP 65

# Level Sensors 1001

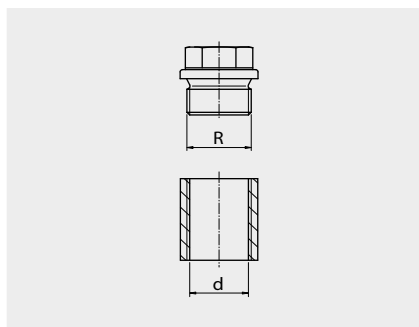
## Design process connections

### Thread G ..."



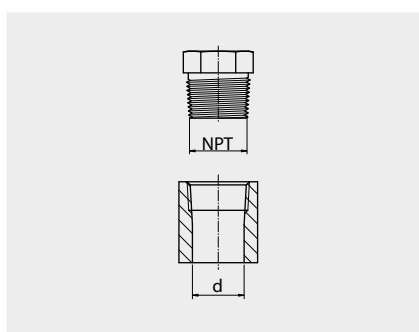
Size	Diameter G [mm]	Core ø d [mm]	Bore [mm]
1/8"	9.7	8.5	8.0
1/4"	13.2	11.4	11.0
3/8"	16.7	14.9	14.5
1/2"	21.0	18.9	18.0
3/4"	26.5	24.1	23.5
1"	33.3	30.2	29.5
1 1/2"	47.8	44.9	44.0
2"	59.7	56.6	56.0

### Thread R ..."



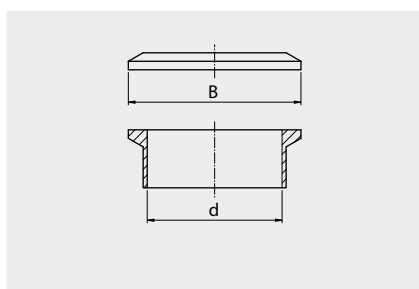
Size	Diameter R [mm]	Core ø d [mm]	Bore [mm]
1/8"	9.7	8.5	8.0
1/4"	13.2	11.4	11.0
3/8"	16.7	14.9	14.5
1/2"	21.0	18.6	18.0
3/4"	26.5	24.1	23.5
1"	33.3	30.2	29.5
1 1/2"	47.8	44.8	44.0
2"	59.7	56.6	56.0

### Thread NPT ..."



Size	Diameter NPT [mm]	Core ø d [mm]	Bore [mm]
1/8"	9.6	8.4	8.5
1/4"	12.8	11.2	11.0
3/8"	16.2	14.6	14.5
1/2"	19.9	18.2	18.0
3/4"	25.6	23.4	23.0
1"	31.8	29.8	29.0
1 1/2"	46.8	44.2	44.0
2"	58.6	56.4	56.0

### Flange Tri - clamp DIN 32676



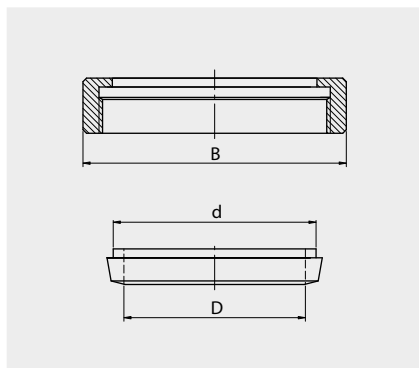
Size	Diameter B [mm]	Inside ø d [mm]	Bore [mm]
DN15	34.0	16.0	15.0
DN20	34.0	20.0	19.0
DN25	50.5	26.0	25.0
DN50	64.0	50.0	48.0
DN65	91.0	66.0	64.0
DN80	106.0	81.0	79.0
DN100	119.0	100.0	98.0



# Level Sensors 1001

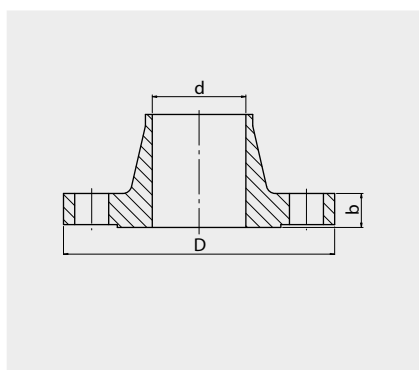
## Design process connections

### Tube connection DIN 11851



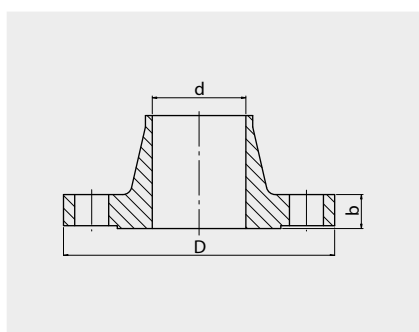
Size	Bore $\varnothing$ d [mm]	Inside $\varnothing$ D [mm]	Union nut B [mm]
DN10	18	10	38
DN15	24	16	44
DN20	30	20	54
DN25	35	26	63
DN40	48	38	78
DN50	61	50	92
DN65	79	66	112
DN80	93	81	127
DN100	114	100	148

### Flange DIN 16 bar DIN 2633



Size	Flange $\varnothing$ D [mm]	Inside $\varnothing$ d [mm]	Flange thickness b [mm]
DN10	90	13.6	14
DN15	95	17.3	14
DN20	105	22.3	16
DN25	115	28.5	16
DN40	150	43.1	16
DN50	165	54.5	18
DN65	185	70.3	18
DN80	200	82.5	20
DN100	220	107.1	20

### Flange Ansi 150 lbs B 16.5

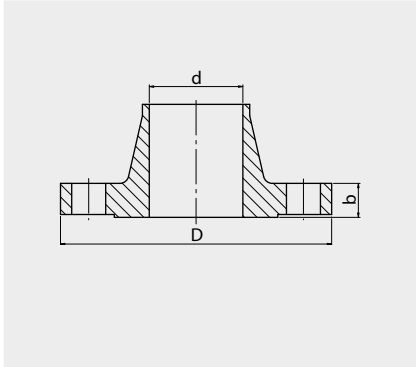


Size	Flange $\varnothing$ D [mm]	Inside $\varnothing$ d [mm]	Flange thickness b [mm]
½"	88.9	15.7	11.2
¾"	98.6	20.8	12.7
1"	108.0	26.7	14.2
1½"	127.0	40.9	17.5
2"	152.4	52.6	19.1
2½"	177.8	62.7	22.4
3"	190.5	78.0	23.9
4"	228.6	102.4	23.9

# Level Sensors 1001

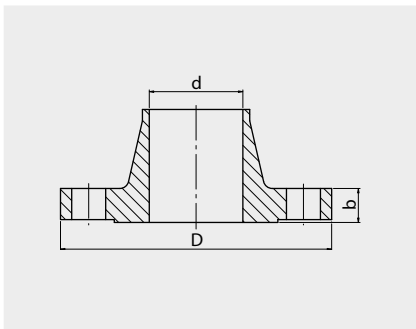
## Design process connections

### Flange DIN 40 bar DIN 2635



Size	Flange ø D [mm]	Inside ø d [mm]	Flange thickness b [mm]
DN10	90	13.6	16
DN15	95	17.3	16
DN20	105	22.3	18
DN25	115	28.5	18
DN40	150	43.1	18
DN50	165	54.5	20
DN65	185	70.3	22
DN80	200	82.5	24
DN100	235	107.1	24

### Flange Ansi 300 lbs B 16.5



Size	Flange ø D [mm]	Inside ø d [mm]	Flange thickness b [mm]
½"	95.2	15.7	14.2
¾"	117.3	20.8	15.7
1"	124.0	26.7	17.5
1½"	155.4	40.9	20.6
2"	165.1	52.6	22.4
2½"	190.5	62.7	25.4
3"	209.6	78.0	28.4
4"	254.0	102.4	31.8

# Level Sensors 1001

## Resolution / contact functions / temperature probe

Resolution in mm	K5	K5HTF	K5HT	K10	K10HTF
Max. temperature [°C]	+130	+200	+250	+130	+200
Min. temperature [°C]	- 30	- 30	-100	- 30	- 30
Construction	Glass	Glass	Glass	Glass	Glass

	K10HT	K12.7	K15	K15HTF	K15HT
Max. temperature [°C]	+250	+130	+130	+200	+250
Min. temperature [°C]	-100	- 30	- 30	- 30	-100
Construction	Glass	Chip	Glass	Glass	Glass

Contacts	acc. to guide tube	max. voltage	max. current	switch.capacity
Change over	∅ 12 ... 40 mm	150 V DC / AC	0.5 A	10 VA
Normally open	∅ 12 ... 40 mm	150 V DC / AC	0.5 A	10 VA
Normally closed	∅ 12 ... 40 mm	150 V DC / AC	0.5 A	10 VA
Change over	∅ 12 ... 40 mm	230 V DC / AC	0.5 A	40 VA
Normally open	∅ 12 ... 40 mm	230 V DC / AC	1 A	100 VA
Normally closed	∅ 12 ... 40 mm	230 V DC / AC	1 A	100 VA
Max. quantity	acc. to guide tube	change over	normally open	normally closed
	∅ 12 mm	4	4	4
	∅ 14 mm	4	4	4
	∅ 16 mm	5	6	6
	∅ 18 ... 40 mm	8	8	8

also with hysteresis to 10 mm possible (H)

Temperature contacts	acc. to guide tube	max. voltage	max. current	switch.capacity
Normally open	∅ 10 ... 40 mm	230 V DC / AC	0.5 A	40 VA
Normally closed	∅ 10 ... 40 mm	230 V DC / AC	0.5 A	40 VA
Max. quantity	acc. to guide tube		normally open	normally closed
	∅ 12 mm		2	2
	∅ 14 mm		3	3
	∅ 16 mm		3	3
	∅ 18 ... 40 mm		6	6

Measuring accuracy	normally open	normally closed	normally open PEPI	normally closed PEPI
Hysteresis	7.5 °C	7.5 °C	1 °C	1 °C
Accuracy	+ / - 5 °C	+ / - 5 °C	+ / - 3 °C	+ / - 3 °C
Graduation / Resolution	5 °C	5 °C	5 °C	5 °C
Measuring range	40 °C ... 120 °C	40 °C ... 120 °C	40 °C ... 120 °C	40 °C ... 120 °C

Temperature probe	acc. to guide tube	max. quantity	2/3/4 wire	temp. range
PT - 100	∅ 10 ... 40 mm	2	2/3/4 wire	- 196 °C ... 250 °C
PT - 1000	∅ 10 ... 40 mm	2	2/3/4 wire	- 196 °C ... 250 °C

# Level Sensors 1001

## Cable / Materials

Cable	Min. / Max. temperature [°C]	Material	Max. leads	Thickness of lead
... PVC -	-20 °C / +80 °C	Polyvinylchloride	12	0.25 - 0.75
... PVC-blau -	-20 °C / +80 °C	Polyvinylchloride	7	0.75
... Sil -	-60 °C / +180 °C	Silicone	12	0.25 - 0.75
... PUR -	-40 °C / +80 °C	Polyurethane	10	0.25 - 0.75
... FEP -	-100 °C / +200 °C	Fluorethylenpropylene	4	0.25 - 0.5
... Radox -	-35 °C / +120 °C	Radox	10	0.5 - 0.75
... Lit -	-5 °C / +70 °C -65 °C / +200 °C	Insulated stranded wires PVC Insulated stranded wires FEP	1 1	0.5 0.5
... NiLit -	-60 °C / +450 °C	Insulated nickel stranded wires with glass insulation	1	0.5

### Options

... / CY	Shielded cable
... / ÖL	Oil resisting cable

Material design temperatures	Material	Temperature min.	Temperature max.
V	Stainless steel	- 196 °C	+ 400 °C
Ti	Titanium	- 10 °C	+ 300 °C
H	Alloy / Ni Mo	- 196 °C	+ 400 °C
EEC	Stainless steel E-CTFE coated	- 78 °C	+ 150 °C
PFA	Stainless steel PFA coated	- 100 °C	+ 250 °C
P	Polyvinylchloride PVC	- 15 °C	+ 60 °C
PP	Polypropylene PP	- 5 °C	+ 100 °C
PF	Polyvinylidenfluoride PVDF	- 5 °C	+ 150 °C
PA	Polyamide PA	- 40 °C	+ 110 °C
M	Brass	- 196 °C	+ 250 °C
AL	Aluminium	- 196 °C	+ 150 °C