FN06

Level Sensor for Continuous Level Measurement - Reed Chain -

- **for almost all liquids**
- **level measurement independent of foam, conductivity, pressure or temperature**
- **made of stainless steel, different plastics or coated st. steel**
- **can be mounted inwards or outwards**
- **interface measurement of liquids with different densities possible**
- **P_{max}: 40 bar, T_{max}: 200 °C**
- **max. guide tube: 6000 mm**

Description:

The level sensors of the type series FN06 operate according to the float principle with magnetic transmission.
The float is lifted by the rising liquid level in the vessel and actuates the contacts of a reed contact / resistance chain in the guide tube by the magnetic field of the permanent magnet in the float. The output signal is a voltage proportional to the level.

Typical applications:

The FN06 level transmitters are suitable for measuring and monitoring the level of almost all liquid media which do not attack the materials used, in containers up to 6 m high.

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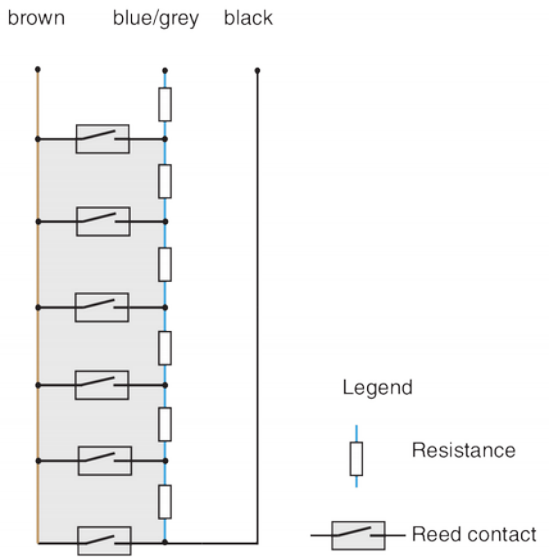
Internal Circuit Diagram of the Reed Sensors:



Measuring Accuracy:

Due to the functional principle of the level transmitters, the measuring accuracy cannot be specified as a constant. Rather, it depends on the measuring length and the grid of the electrode used.
The maximum measurement error can be calculated using the following formula:

$$\frac{\text{raster}}{\text{meas.length[mm]}} \times 100$$

Example:

$$\frac{10\ \text{mm}}{2000\ \text{mm}} \times 100 = 0{,}5\ \%$$

Constituent Parts:

Each level transmitter consists of the following three main assemblies, which are available in different versions depending on the technical requirements:

- **guide tube**
- **float**
- **process connection**

Secondary instrumentation such as transmitters, limit switches, displays and isolating repeaters (Zener barriers) complete the measuring system.

Versions:

The following versions are available as standard:

- **stainless steel**
- **plastics (PVC, PP, PVDF)**
- **stainless steel, E-CTFE coated**
- **stainless steel, PTFE sheathed**

following versions are available on request:

- **explosion-proof (flameproof enclosure)**
- **explosion-proof (intrinsically safe)**
- **sterile version**

Guide tube:

The guide tube is the core of the level transmitter, it contains the measuring chain and can be supplied in a variety of materials, diameters and grid dimensions.

Materials and guide tube diameters
- stainless steel (Ø 8 mm, 12 mm, 14 mm, 18 mm)
- PVC (Ø 16 mm, 20 mm)
- PP (Ø 16 mm, 20 mm)
- PVDF (Ø 16 mm, 20 mm)
- E-CTFE-coated (Ø 18 mm)
- PTFE-sheathed (25 mm)

Contact separation:
Depending on the guide tube diameter, measuring length and design, the following contact separation (distance between the reed contacts) are available:
5 mm, 10 mm, 15 mm, 18 mm

Output Signal:

Standard: 3-wire potentiometer
Optional: head mounted transmitter 4...20 mA (junction box necessary)
Special: HART®, Profibus® PA, Fieldbus™, Exi

Process Connection:

The level transmitters are screwed into the vessel cover from the inside with an external thread (G 3/8, G1/2, G1) as standard. In this case, the devices are supplied with a 3-wire connection cable (PVC or silicone) up to max. 2000 m in length.

If the transmitter is to be mounted from the outside through the tank cover, the device must either be equipped with a tank screw connection (G 1, G 1 1/2, G 2 male) or with flanges. The diameter of the tank fitting or flange must be selected so that the float used fits through the opening in the tank cover.

Float-type	min. size vessel connection	min. nominal size flange connection
1	G 2	DN 65
2	-	DN 80
3	G 2	DN 65
4	-	DN 80
5	G 2	DN 65
6	-	DN 80
7	-	DN 80
8	G 1 1/2	DN 50
9	G 2	DN 65
10	-	DN 100
11	-	DN 80
12	-	DN 125
13	-	DN 100

Furthermore, the material of the process connection should be selected to match the float or sliding tube material.

Float:

The selection of the float depends on the medium (aggressiveness, density), the process parameters (pressure, temperature) as well as on the used sliding tube materials and diameters.
The following float types can be used:

Float Types:

Type	Material	Form	Ø [mm]	Min. Density [kg/m³]	Max. Pressure [bar]	Max. Temp. [°C]
1	PVC	Cylinder	55	800	3	60
2			80	580		
3	PP		55	590		80
4			80	440		
5	PVDF		55	800		100
6			80	700		
7	PTFE		80	670		*
8	St. st. 1.4571	Sphere	44	780	25	250
9			52	720	40	
10			83	410	25	
11			80	620		
12			120	540		
13	E-CTFE		81	634	25	*

* depending on the medium

Type	Ø A [mm]	B [mm]	Ø C [mm]
1	55	54	22
2	80	79	25
3	55	54	22
4	80	79	25
5	55	69	22
6	80	79	25
7	80	100	25
8	44	52	15

Type	Ø A [mm]	B [mm]	Ø C [mm]
9	52	52	15
10	83	81	15
11	80	76	23
12	120	116	38
13	81	77	22

Special float (titanium, Buna) on request

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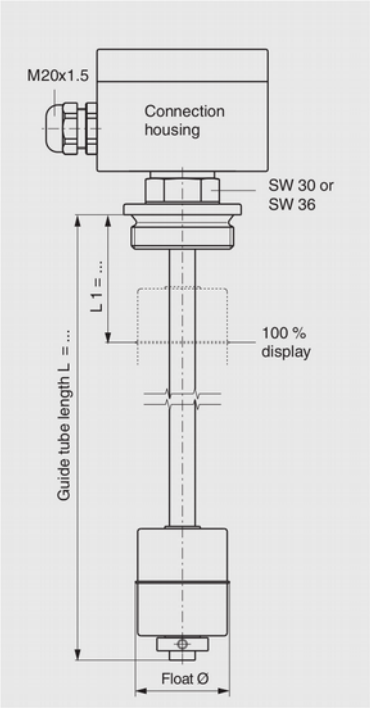
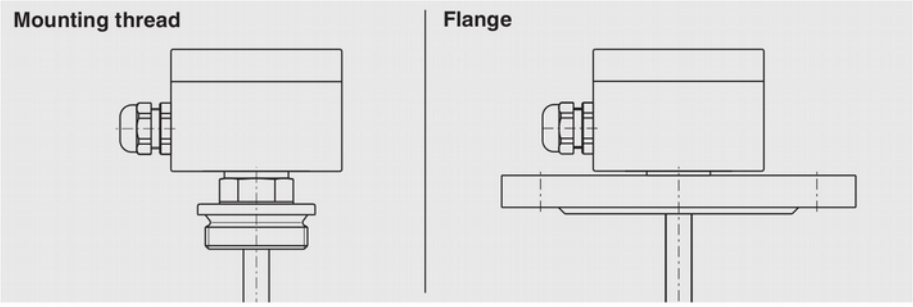
Stainless Steel Version: CrNi-Steel 1.4571





Electrical Connection:

Screw-in thread upwards:	cable made of PVC silicone PUR max. 2000 m, 3-wire, shielded
Screw-in thread downwards:	housing made of alu.: 80 x 75 x 57 mm (option: PP, Polyester, stainless steel)
Flange connection:	housing made of alu.: 80 x 75 x 57 mm (option: PP, Polyester, stainless steel)

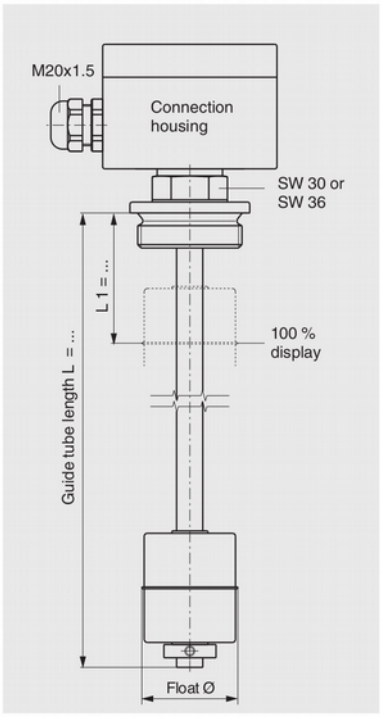
Process Connection:

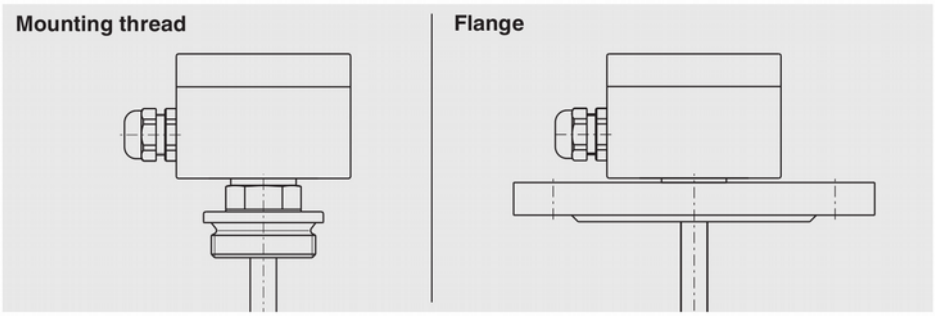
Screw-in thread upwards:	G 3/8 (guide tube-Ø 8,12,14 mm) G 1/2 (g. tube-Ø 18 mm)
Screw-in thread downwards:	G 1 ½ or G 2 (g. tube-Ø 8,12,14, 18 mm)
Flange connection:	DIN DN 50 … DN 200 PN 6… PN 100, ANSI 2“… 8“, class 150… 600 RF

Technical Data:

Guide tube diameter:	8, 12, 14 or 18 mm (reinforced with metal inner tube)
Max. length of guide tube:	500 mm (guide tube-Ø 8 mm) 3000 mm (g. tube-Ø 12, 14 mm) 6000 mm (guide tube-Ø 18 mm)
Material (float, guide tube, process-connection):	CrNi-steel 1.4571 (float optional of Buna, titanium)
Special material (on request):	stainless steel: 1.4404, 1.4435, 1.4439, titanium 3.7035 (grade 2), Hastelloy
Float-Ø:	44...120 mm
Max pressure:	40 bar, (see table floats)
Temperature:	PVC, PUR-cable: -10...+80 °C silicone cable: -10…+120 °C with conn. housing: -20...+120 °C option: high temp: -40...+200 °C, low-temp: -80…+120 °C
Contact grid / Resolution:	18 mm / 9 mm (not for option high-/low-temperature) 15 mm / 7,5 mm 10 mm / 5,5 mm 5 mm / 2,7 mm
Total resistance of measuring chain:	depending to length and raster
Mounting position:	vertical +/- 30°
Protection class:	up to IP66 / IP68 acc. to IEC/EN 60529

Plastic Version PVC, PP, PVDF





Electrical Connection:

Screw-in thread upwards:	cable made of PVC silicone PUR max. 2000 m, 3-wire, shielded
Screw-in thread downwards:	housing made of polyester 80 x 75x 55 mm
Flange connection:	housing made of polyester 80 x 75x 55 mm

Process Connection:

Screw-in thread upwards:	G ½ (g. tube-Ø 16 mm) G 1 (g. tube-Ø 22 mm)
Screw-in thread downwards:	G 2
Flange connection:	DIN DN 65 … DN 125 PN 10, form A ANSI 2 1/2“… 5“, class 150 FF

Technical Data:

Guide tube diameter:	16 or 20 mm (reinforced with metal inner tube)
Max. length of guide tube:	3000 mm (guide tube-Ø 16 mm) 5000 mm (guide tube-Ø 20 mm)
Material (float, guide tube, process-connection):	PVC, polypropylene (PP), PVDF
Float-Ø:	44...80 mm
Max pressure:	3 bar
Temperature:	PVC: 0...60 °C PP: -10...+80 °C PVDF: -10...+100 °C
Contact grid / Resolution:	18 mm / 9 mm 15 mm / 7,5 mm 10 mm / 5,5 mm 5 mm / 2,7 mm
Total resistance of measuring chain:	depending to length and raster
Mounting position:	vertical +/- 30°
Protection class:	up to IP66 / IP68 acc. to IEC/EN 60529

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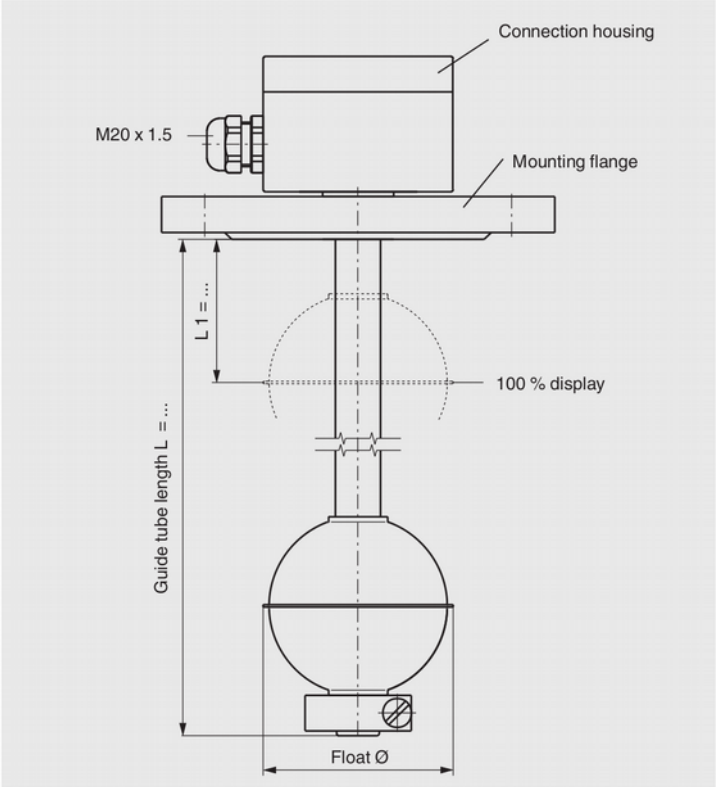
Version: E-CTFE Coated, PTFE Sheathed

Process connection, guide tube and float made of CrNi-steel 1.4571



Electrical Connection:

Connection housing made of aluminium: 80 x 75 x 57 mm
(Option: PP, Polyester, stainless steel)

Process Connection:

Flange connection: DIN DN 50 … DN 200
PN 6… PN 100,
ANSI 2“… 8“,
class 150...600 RF

Technical Data:

Connection housing:	aluminium 80 x 75 x 57 mm option: PP, polyester, CrNi-steel
Process connection:	DIN DN 50...DN 200 PN 6...PN 100 ANSI 2“… 8“, Class 150… 600
Guide tube diameter:	E-CTFE: 18 mm PTFE: 25 mm (PTFE-coating: 3,5 mm thick)
Max. length of guide tube:	4000 mm (guide tube-Ø 18 mm) 5000 mm (guide tube-Ø 25 mm)
Material float:	CrNi-steel 1.4571, E-CTFE-coated PVDF PTFE
Material process conn., guide tube:	CrNi-steel 1.4571, E-CTFE coated or PTFE-sheathed
Float-Ø:	44...120 mm
Max pressure:	25 bar, (E-CTFE-coated) 3 bar (PTFE-sheathed)
Temperature range:	depending to medium
Contact grid / Resolution:	18 mm / 9 mm 15 mm / 7,5 mm 10 mm / 5,5 mm 5 mm / 2,7 mm
Total resistance of measuring chain:	depending to length and raster
Mounting position:	vertical +/- 30°
Protection class	up to IP66 / IP68 acc. to IEC/EN 60529

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Order Code (General):

Order number: FN06. E. 8. 2000. 5. 01. T.10E. A. P. 0

Level sensor

Material of guide tube:
E = stainless steel 1.4571
PVC = PVC
PP = PP
PVDF = PVDF
EC = E-CTFE coated
PTFE = PTFE sheathed
9 = special

Guide tube diameter:
8 = 8 mm (stainless steel)
12 = 12 mm (stainless steel)
14 = 14 mm (stainless steel)
16 = 16 mm (PVC, PP, PVDF)
18 = 18 mm (st. steel, E-CTFE)
20 = 20 mm (PVC, PP, PVDF)
25 = 25 mm (PTFE coated)
9 = special

Length of guide tube:
_ _ _ _ length [mm]

Raster of resistance chain:
5 = 5 mm
10 = 10 mm
15 = 15 mm
18 = 18 mm (not with high/low temp.)
9 = special

Float type:
01…13 = see table „Float types“

Process connection:
AG.10E. up to A.EE.200.40.
acc. to „Order Code Process Connections“ on this site

Electrical connection:
P__ = 1 m PVC-cable (up to 80 °C), length [m]
S__ = 1 m silicone-cable (up to 120 °C), length [m]
U__ = 1 m PUR-cable (up to 80 °C), length [m]
PS = polyester connection box, 80 x 75 x 57 mm
A = aluminium connection box, 64 x 58 x 34 mm
E = stainless steel connection box, h= 77 mm, Ø = 70 mm
9 = special

Output signal:
P = 3-wire potentiometer
K = head mounted transmitter 4...20 mA
S = special (HART®, Profibus® PA, Fieldbus™, Exi)

Options / version resistance chain:
0 = standard -10...+80 °C
HT = high temperature version -40...+200 °C (only for FN06.**E**)
TT = low temperature version -80…+120 °C (only for FN06.**E**)

Order Code (Process Connections):

Order number T. 10E. - -

Process connection
AG = male thread (screw-in thread upwards)
T = tank thread (screw-in thread downwards)
D = flange connection DIN
A = flange connection ANSI

Male thread
10E = G 3/8 male, stainless steel 1.4571
15E = G ½ male, stainless steel 1.4571
15PVC = G ½ male, PVC
25PVC = G 1 male, PVC
15PP = G ½ male, PP
25PP = G 1 male, PP
15PVDF = G ½ male, PVDF
25PVDF = G 1 male, PVDF
9 = special

or:

Tank thread
40E = G 1 1/2, stainless steel 1.4571
50E = G 2, stainless steel 1.4571
50PVC = G 2, PVC
50PP = G 2, PP
50PVDF = G 2, PVDF
9 = special

or:

Flange connection material:
E = stainless steel 1.4571
PVC = PVC
PP = PP
PVDF = PVDF
EP = stainless steel with PTFE-seal
EE = stainless steel with E-CTFE-coating
9 = special

Flange connection nominal size:
50 = DN 50, 2“
65 = DN 65, 2 ½“
80 = DN 80, 3“
100 = DN 100, 4“
125 = DN 125, 5“
150 = DN 150, 6“
200 = DN 200, 8“
9 = special

Flange connection pressure stage:
6 = PN 6
10 = PN 10, 150 lbs
16 = PN 16, 300 lbs
40 = PN 40, 600 lbs
64 = PN 64
100 = PN 100
9 = special