

Magnetic float switch For vertical installation Model FLS

KSR data sheet FLS



for further approvals
see page 3

Applications

- Level measurement for almost all liquid media
- Pump and level control and monitoring for distinct filling levels
- Chemical, petrochemical, natural gas, offshore, shipbuilding, machine building, power generating equipment, power plants
- Process water and drinking water treatment, food and beverage industry

Special features

- Large range of application due to the simple, proven functional principle
- For harsh operating conditions, long service life
- Operating limits:
 - Operating temperature: $T = -196 \dots +350 \text{ }^\circ\text{C}$
 - Operating pressure: $P = \text{Vacuum to } 40 \text{ bar}$
 - Limit density: $\rho \geq 300 \text{ kg/m}^3$
- Wide variety of different electrical connections, process connections and materials
- Explosion-protected versions

Description

A float with a permanent magnet moves reliably along with the liquid level on a guide tube. Within the guide tube is fitted a reed contact (inert gas contact), which is energised, through the non-magnetic walls of the float and guide tube, by the approach of the float magnet. By using a magnet and reed contact the switching operation is non-contact, free from wear and needs no power supply. The contacts are potential-free. Magnetic float switches are also available with multiple switch points.



Fig. left: Stainless steel version, mounting thread
Fig. right: Plastic version, flange connection

The switch functions always refer to a rising liquid level: normally open, normally closed or change-over contact.

Through the use of a float for a max. of 2 switch points a bistable switch operation can be achieved, meaning that the switching status also remains available, when the filling level continues to rise above or drop below the switch point.

The float switch is simple to mount and maintenance-free, so the costs of mounting, commissioning and operation are low.

Further special features

- Process connection, guide tube and float from stainless steel 1.4571, plastic or Buna
- Universal signal processing:
connection direct to a PLC is possible, NAMUR connection, signal amplification / contact protection relays
- Works independently of foaming, conductivity, dielectricity, pressure, vacuum, temperature, steam, condensation, bubble formation, boiling effects and vibrations.
- Multiple functionality in a single instrument - up to 8 potential-free contacts
- Exact repeatability of the switch points
- Magnetic float switches qualify as passive electrical equipment in accordance with DIN IEC 60079-11 and can be installed in 'Zone 1' hazardous areas without certification, so long as the equipment is operated in a certified intrinsically safe circuit with a minimum explosion protection of EEx ib

Options

- Customer-specific solutions
- Special versions for interface layer detection
 $\Delta\rho \geq 100 \text{ kg/m}^3$
- Process connection, guide tube material and float from stainless steel 1.4435, 1.4539, titanium, Hastelloy (others on request)

Model overview

Float switch model	Description	Approval							
		without	Ex i	Ex d	GL	Ex i + GL	ABS	DNV	3-A
FLS-S	Magnetic float switch, standard version	x	x	x	x	x	x	x	x
FLS-SX	Magnetic float switch, angled version, adjustable version, coated version								
FLS-M	Magnetic float switch, 8 mm guide tube	x	x						
FLS-P	Magnetic float switch, plastic version	x							
FLS-H	Magnetic float switch, pharmaceutical and food version	x							
	Magnetic float switch, 3-A hygienic version								x

Float switch model	Materials									Temperature range
	Stainless steel 1.4571 (316Ti)	Stainless steel 1.4404 (316L)	Titanium 3.7035 (grade 2)	Stainless steel 1.4435 (316L)	Stainless steel 1.4571 (316Ti) / PP	Stainless steel 1.4571 (316Ti) / PA	Stainless steel 1.4571 (316Ti) / brass	PVC, PP, PVDF	Stainless steel 1.4571 (316Ti) / Buna (NBR)	
FLS-S	x	x	x	x	x	x	x		x	-50 ... +350 °C
FLS-SX	x	x								-10 ... +100 °C
FLS-M	x	x			x		x		x	-10 ... +100 °C
FLS-P								x	x	-10 ... +100 °C
FLS-H		x		x						-20 ... +200 °C

Ex approvals

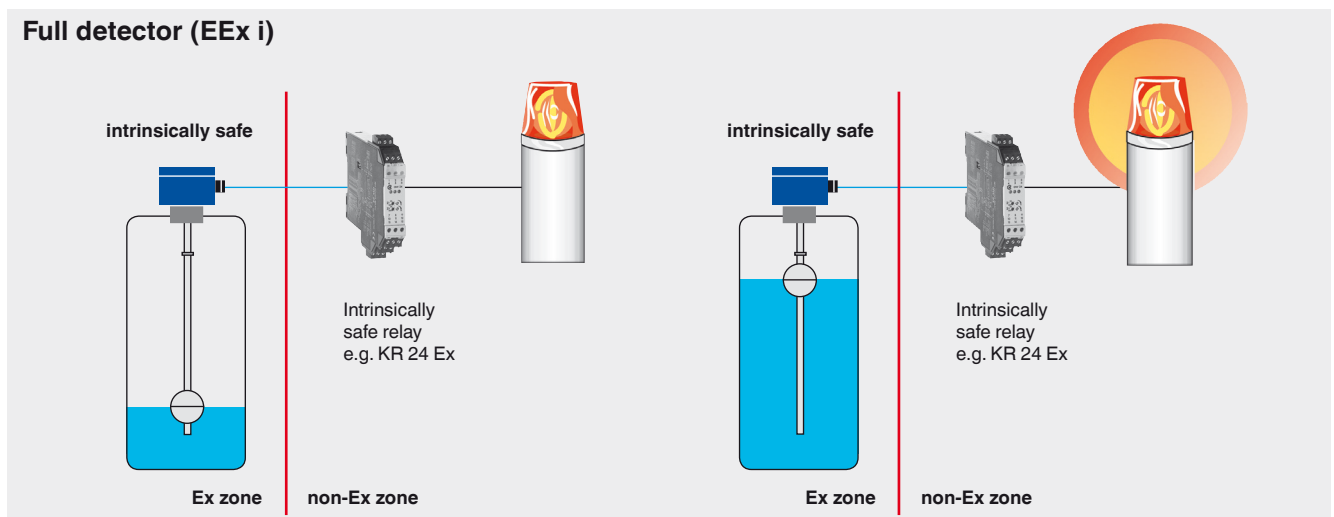
Explosion protection	Ignition protection type	Model	Zone	Approval number
ATEX	Ex i	FLS-S	Zone 0, gas	KEMA 01 ATEX1053 X II 1/2G Ex ia IIC T3 ... T6
	Ex i	FLS-M	Zone 0, gas	KEMA 01 ATEX1053 X II 1/2G Ex ia IIC T3 ... T6
	Ex d	FLS-S	Zone 1, gas/dust	TÜV 13 ATEX 7399 X II 2G Ex d IIC T6 Gb / II 2 D Ex tb IIIC T80 °C Db
	Ex d	FLS-S	Zone 1, gas/dust	IECEX TUR 09.0002X -40 °C <= ta <= +55 °C Ex d IIC T6 Ex tD A21 IP 65 T80 °C
	Ex i + GL	FLS-S	Zone 0, gas	KEMA 01 ATEX1053 X II 1/2G Ex ia IIC T3 ... T6 + GL - 96 716 - 95 HH

Type approval

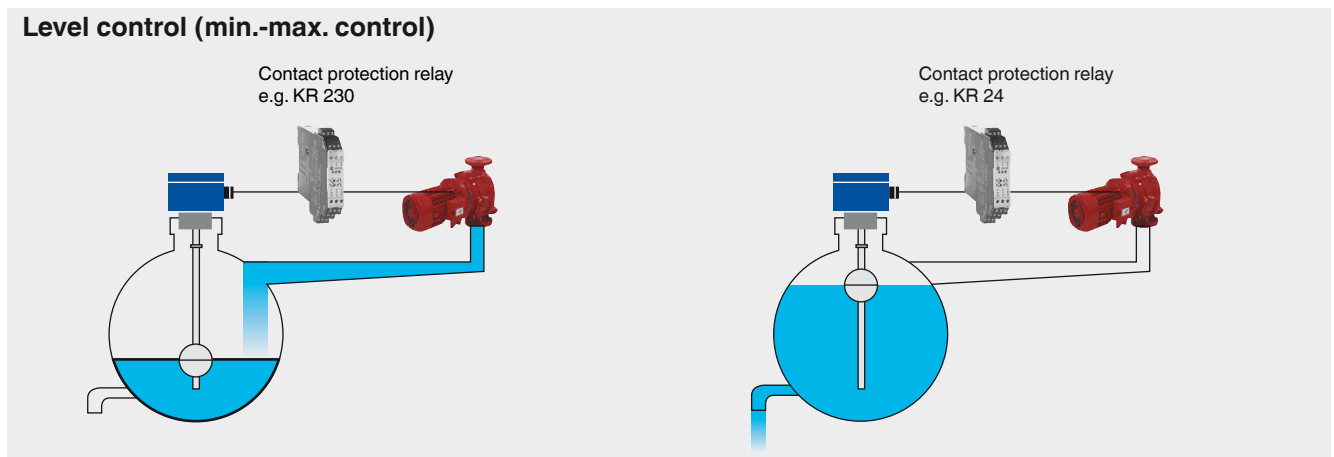
Explosion protection	Model	Approval number
GL	FLS-S	GL - 96 716 - 95 HH
ABS	FLS-S	ABS-02-HG286246-2-PDA
DNV	FLS-S	DNV - A-11453
GOST	FLS-S, FLS-P; FLS-H	959333
3-A	FLS-H	3-A Sanitary Standards, 1698

Application examples

Full detector (EEx i)

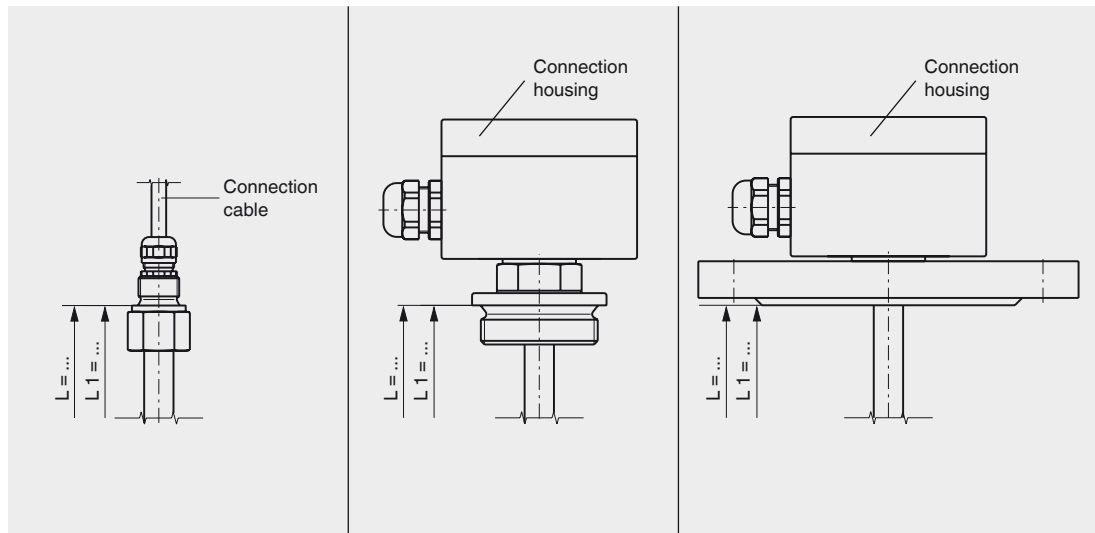


Level control (min.-max. control)



Magnetic float switch, standard version, model FLS-S

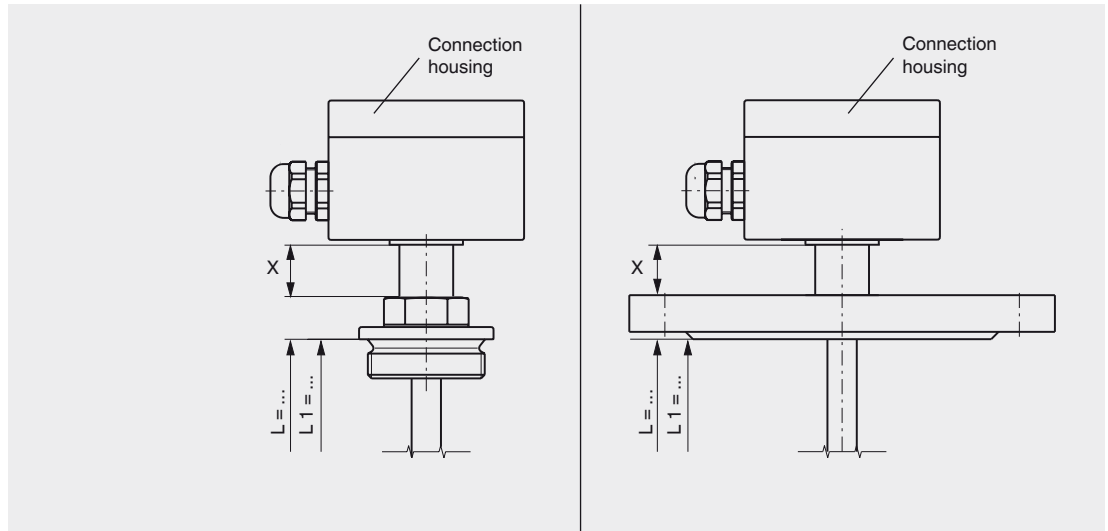
Process connection, guide tube material and float from stainless steel 1.4571 (316Ti)



	Mounting thread (without connection housing)		Mounting thread		Flange	
Electrical connection	Connection cable ■ PVC ■ Silicone ■ PUR		Connection housing ■ Aluminium 64 x 58 x 34 mm, with 1 contact ■ Aluminium 80 x 75 x 57 mm, 2 or more contacts Option: Polypropylene, polyester, stainless steel			
Process connection	Mounting thread upwards G 3/8" (others on request)		Mounting thread downwards G 1 1/2" or G 2"		Mounting flange ■ DIN DN 50 ... DN 200, PN 6 ... PN 100 ■ ANSI 2" ... 8", class 150 ... 600	
Guide tube diameter	12 or 14 mm	18 mm	12 or 14 mm	18 mm	12 or 14 mm	18 mm
Guide tube length L max.	3,000 mm	6,000 mm	3,000 mm	6,000 mm	3,000 mm	6,000 mm
Float	Material stainless steel 1.4571 (Option: Buna (NBR), titanium) Float diameter from 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 20 and 21)					
Temperature range standard	PVC cable -10 ... +80 °C Silicone cable -30 ... +130 °C		-30 ... +150 °C Option: ■ High-temperature version: +150 ... +300 °C Option: ■ Low-temperature version: -196 ... -30 °C			
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level					
max. number of contacts	PVC cable 6 x NO or NC, or 4 x SPDT Silicone cable 5 x NO or NC, or 3 x SPDT		6 x NO or NC, or 4 x SPDT			
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)					
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 20 and 21)					
Switching power	Normally open AC 230 V; 100 VA; 1 A Normally closed AC 230 V; 100 VA; 1 A Change-over AC 230 V; 40 VA; 1 A		DC 230 V; 50 W; 0.5 A DC 230 V; 50 W; 0.5 A DC 230 V; 20 W; 0.5 A		Please observe contact protection measures (see page 23)!	
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding					
Mounting position	Vertical ±30°					
Ingress protection	IP 65 per EN 60529 / IEC 60529					
Materials	Stainless steel 1.4404, 1.4435, 1.4539, titanium, Hastelloy and others on request					

Magnetic float switch, explosion-protected version Ex i, intrinsically safe, model FLS-S

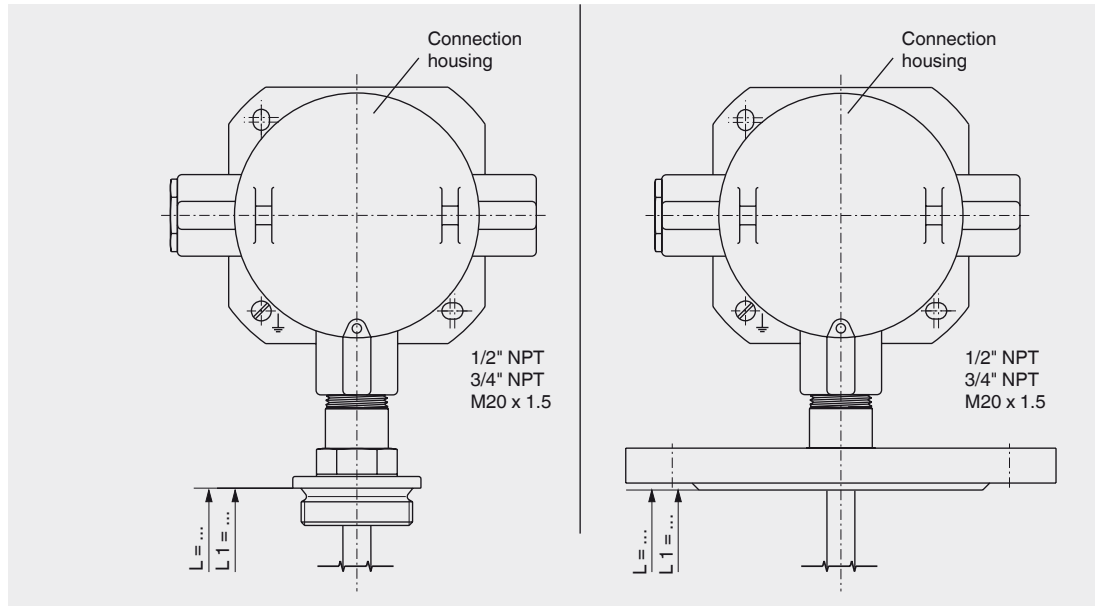
Process connection, guide tube material and float from stainless steel 1.4571 (316Ti)



Mounting thread		Flange		
Electrical connection	Connection housing ■ Aluminium 80 x 75 x 57 mm Option: Polyester, stainless steel			
Process connection	Mounting thread downwards G 1 1/2" or G 2" (others on request)	Mounting flange ■ DIN DN 50 ... DN 150, PN 6 ... PN 64 ■ ANSI 2" ... 6", class 150 ... 600		
Guide tube diameter	12 or 14 mm 18 mm	12 or 14 mm	18 mm	
Guide tube length L max.	3,000 mm 6,000 mm	3,000 mm	6,000 mm	
Float	Material stainless steel 1.4571 (Option: Buna (NBR), titanium) Float diameter from 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 20 and 21)			
Temperature class	T3	T4	T5	T6
Process temperature	Max. 180 °C	130 °C	95 °C	80 °C
Ambient temperature at connection housing	Max. 60 °C	60 °C	60 °C	60 °C
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level			
max. number of contacts	6 x NO or NC, or 4 x SPDT			
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)			
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 20 and 21)			
Switching power	Only for connection to a certified intrinsically safe circuit with U _{max} 36 V, I _{max} 100 mA			
Mounting position	Vertical ±30°			
Ingress protection	IP 65 per EN 60529 / IEC 60529			
Options	<ul style="list-style-type: none"> ■ Housing heightening X (state dimension X) ■ Temperature resistance Pt100 or Pt1000 ■ Bimetal thermal contact 40 ... 120 °C (in 5 degree steps) 			
Materials	Stainless steel 1.4435, titanium, Hastelloy on request			

Magnetic float switch, explosion-protected version Ex d, flameproof enclosure, model FLS-S

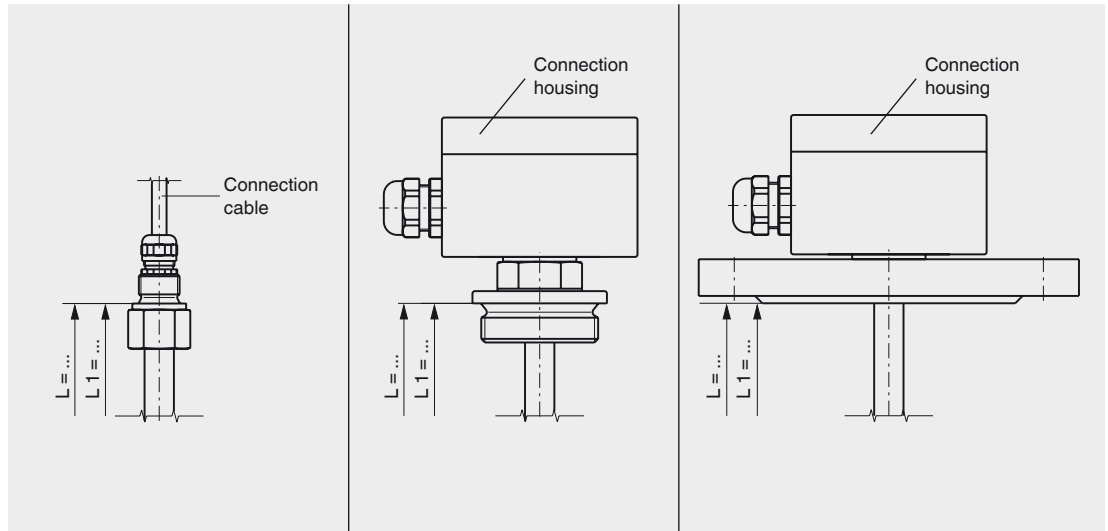
Process connection, guide tube and float from stainless steel 1.4571 (316Ti) or 1.4404 (316L)



Mounting thread		Flange	
Electrical connection	Connection housing ■ Aluminium Option: Stainless steel		
Process connection	Mounting thread downwards G 1 1/2" or G 2" (others on request)	Mounting flange ■ DIN DN 50 ... DN 200, PN 6 ... PN 100 ■ ANSI 2" ... 8", class 150 ... 600	
Guide tube diameter	12 or 14 mm	18 mm	12 or 14 mm 18 mm
Guide tube length L max.	3,000 mm	6,000 mm	3,000 mm 6,000 mm
Float	Material stainless steel 1.4571 Float diameter from 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 20 and 21)		
Temperature class	T4	T5	T6
Process temperature	Max. 120 °C	95 °C	80 °C
Switching function	Change-over SPDT - on rising level		
max. number of contacts	4 x SPDT		
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)		
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 20 and 21)		
Switching power	Change-over	AC 230 V; 40 VA; 1 A DC 230 V; 20 W; 0.5 A	Please observe contact protection measures (see page 23)!
Mounting position	Vertical ±30°		
Ingress protection	IP 65 per EN 60529 / IEC 60529		
Options	<ul style="list-style-type: none"> ■ Temperature resistance Pt100 or Pt1000 ■ Bimetal thermal contact 40 ... 120 °C (in 5 degree steps) 		
Materials	Stainless steel 1.4404 and others on request		

Magnetic float switch, stainless steel and Buna, model FLS-S

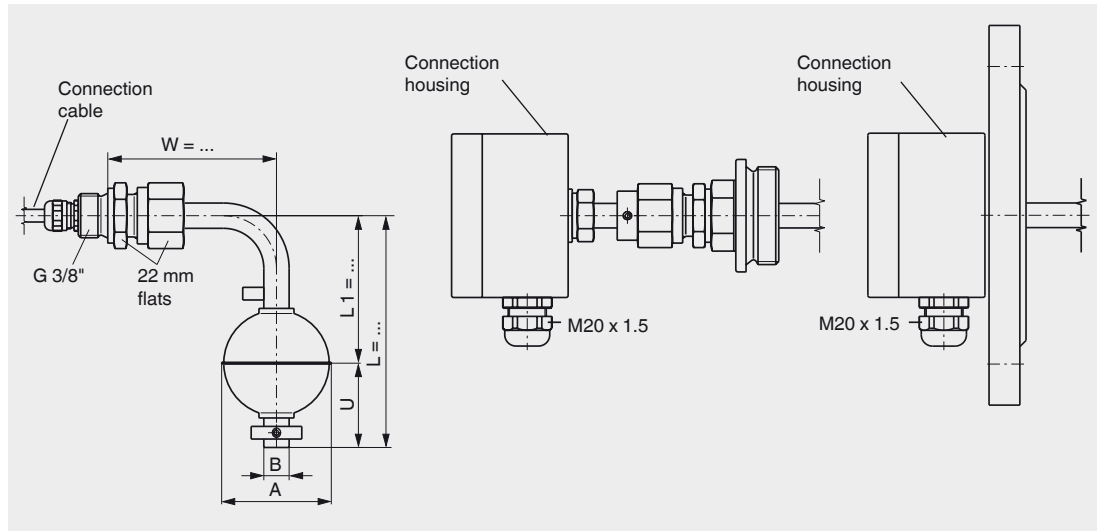
Process connection, guide tube from stainless steel 1.4571 (316Ti) and float from Buna



	Mounting thread (without connection housing)	Mounting thread	Flange
Electrical connection	Connection cable ■ PVC ■ Silicone ■ PUR	Connection housing ■ Aluminium 64 x 58 x 34 mm, with 1 contact ■ Aluminium 80 x 75 x 57 mm, 2 or more contacts Option: Polypropylene, polyester, stainless steel	
Process connection	Mounting thread upwards G 3/8" (others on request)	Mounting thread downwards G 1", G 1 1/2" or G 2"	Mounting flange ■ DIN DN 50 ... DN 200, PN 6 ... PN 40 ■ ANSI 1 1/2" ... 8", class 150 ... 300
Guide tube diameter	12 mm		
Guide tube length L max.	3,000 mm		
Float	Material Buna (NBR) Float diameter from 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 20 and 21)		
Temperature range standard	-10 ... +80 °C		
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level		
max. number of contacts	PVC cable 6 x NO or NC, or 4 x SPDT Silicone cable 5 x NO or NC, or 3 x SPDT	6 x NO or NC, or 4 x SPDT	
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)		
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 20 and 21)		
Switching power	Normally open AC 230 V; 50 VA; 1 A Normally closed AC 230 V; 50 VA; 1 A Change-over AC 230 V; 50 VA; 1 A Protective conductor connection on request	DC 230 V; 50 W; 0.5 A DC 230 V; 50 W; 0.5 A DC 230 V; 20 W; 0.5 A	Please observe contact protection measures (see page 23)!
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding		
Mounting position	Vertical ±30°		
Ingress protection	IP 65 per EN 60529 / IEC 60529		
Materials	Stainless steel 1.4571, 1.4404, Buna (NBR) and others on request		

Magnetic float switch, angled version, model FLS-SX

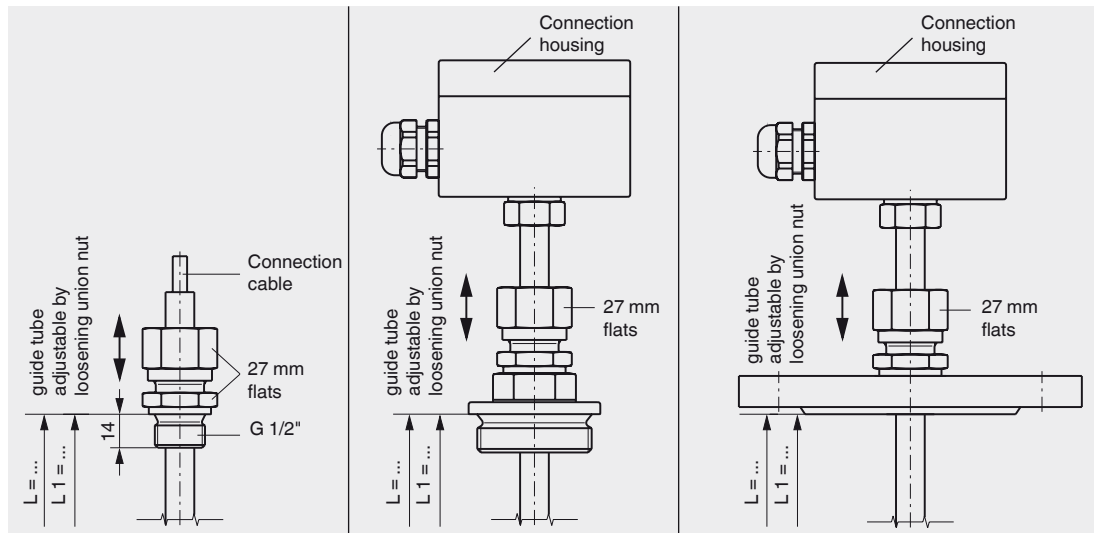
Process connection, guide tube and float from stainless steel 1.4571 (316Ti)



	Mounting thread (without connection housing)	Mounting thread	Flange
Electrical connection	Connection cable ■ PVC ■ Silicone ■ PUR	Connection housing ■ Aluminium 64 x 58 x 34 mm, with 1 contact ■ Aluminium 80 x 75 x 57 mm, 2 or more contacts Option: Polypropylene, polyester, stainless steel	
Process connection	Mounting thread lateral G 3/8" (others on request)	Mounting thread lateral G 1 1/2" or G 2"	Mounting flange ■ DIN DN 50 ... DN 200, PN 6 ... PN 40 ■ ANSI 1 1/2" ... 8", class 150 ... 300
Guide tube diameter	12 mm		
Guide tube length L max.	3,000 mm		
Float	Material stainless steel 1.4571 Float diameter from 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 20 and 21)		
Temperature range standard	PVC/PUR cable -10 ... +80 °C Silicone cable -30 ... +150 °C	-30 ... +150 °C	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level		
max. number of contacts	PVC cable 6 x NO or NC, or 4 x SPDT Silicone cable 5 x NO or NC, or 3 x SPDT	6 x NO or NC, or 4 x SPDT	
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)		
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 20 and 21)		
Switching power	Normally open AC 230 V; 100 VA; 1 A Normally closed AC 230 V; 100 VA; 1 A Change-over AC 230 V; 40 VA; 1 A Protective conductor connection on request	DC 230 V; 50 W; 0.5 A DC 230 V; 50 W; 0.5 A DC 230 V; 20 W; 0.5 A	Please observe contact protection measures (see page 23)!
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding		
Mounting position	Vertical ±30°		
Ingress protection	IP 65 per EN 60529 / IEC 60529		
Materials	Stainless steel 1.4571, 1.4404 and others on request		

Magnetic float switch, version with adjustable guide tube, model FLS-SX

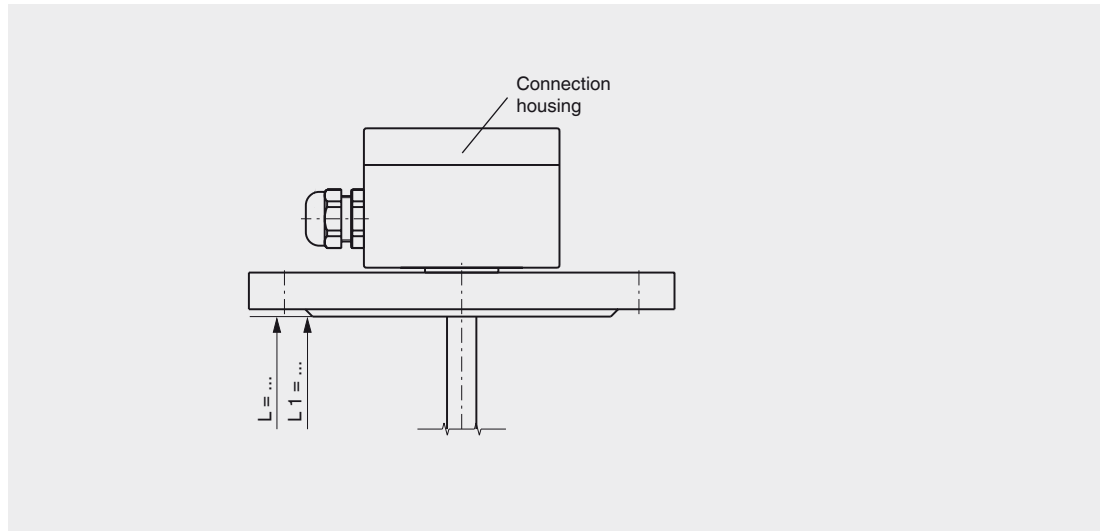
Process connection, guide tube and float from stainless steel 1.4571 (316Ti)



	Mounting thread (without connection housing)	Mounting thread	Flange
Electrical connection	Connection cable ■ PVC ■ Silicone ■ PUR	Connection housing ■ Aluminium 64 x 58 x 34 mm, with 1 contact ■ Aluminium 80 x 75 x 57 mm, 2 or more contacts Option: Polypropylene, polyester, stainless steel	
Process connection	Mounting thread downwards G 1/2" (others on request)	Mounting thread downwards G 1 1/2" or G 2" (others on request)	Mounting flange ■ DIN DN 50 ... DN 200, PN 6 ... PN 100 ■ ANSI 2" ... 8", class 150 ... 600
Guide tube diameter	12 mm		
Guide tube length L max.	3,000 mm		
Float	Material stainless steel 1.4571 (Option: Buna (NBR), titanium) Float diameter from 44 ... 83 mm Float selection depending on guide tube diameter and process conditions (see page 20 and 21)		
Nominal pressure	5 bar		
Temperature range standard	PVC / PUR cable -10 ... +80 °C Silicone cable -30 ... +180 °C	-30 ... +150 °C	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level		
max. number of contacts	PVC cable 6 x NO or NC, or 4 x SPDT Silicone cable 5 x NO or NC, or 3 x SPDT	6 x NO or NC, or 4 x SPDT	
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)		
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 20 and 21)		
Switching power	Normally open AC 230 V; < 50 VA; 1 A Normally closed AC 230 V; < 50 VA; 1 A Change-over AC 230 V; < 50 VA; 1 A Protective conductor connection on request	DC 230 V; 50 W; 0.5 A DC 230 V; 50 W; 0.5 A DC 230 V; 20 W; 0.5 A	Please observe contact protection measures (see page 23)!
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding		
Mounting position	Vertical ±30°		
Ingress protection	IP 54 per EN 60529 / IEC 60529	IP 65 per EN 60529 / IEC 60529	
Materials	Stainless steel 1.4435, 1.4539, titanium, Hastelloy and others on request		

Magnetic float switch, flange, E-CTFE coated, model FLS-SX

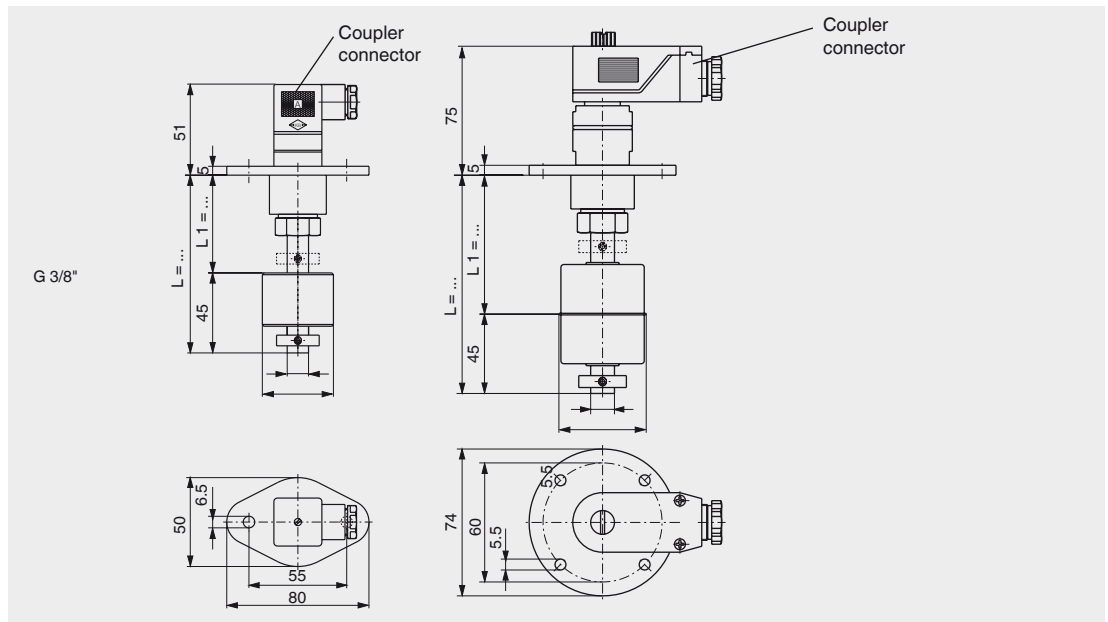
Process connection, guide tube and float from stainless steel 1.4571 (316Ti), E-CTFE coated



	Flange (Guide tube diameter 12 mm)	Flange (Guide tube diameter 18 mm)
Electrical connection	Connection housing ■ Aluminium 64 x 58 x 34 mm, with 1 contact ■ Aluminium 80 x 75 x 57 mm, 2 or more contacts Option: Polypropylene, polyester, stainless steel	
Process connection	Mounting flange ■ DIN DN 50 ... DN 200, PN 6 ... PN 40 ■ ANSI 2" ... 8", class 150 ... 300	
Guide tube diameter	12 mm	18 mm
Guide tube length L max.	2,000 mm	4,000 mm
Float	Material stainless steel 1.4571 (E-CTFE coated) Float diameter from 45 ... 121 mm Float selection depending on guide tube diameter and process conditions (see page 10)	
Temperature range	Depending on medium	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
max. number of contacts	3 x NO or NC, or 2 x SPDT	
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)	
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 10)	
Switching power	Normally open AC 230 V; 100 VA; 1 A Normally closed AC 230 V; 100 VA; 1 A Change-over AC 230 V; 40 VA; 1 A	DC 230 V; 50 W; 0.5 A DC 230 V; 50 W; 0.5 A DC 230 V; 20 W; 0.5 A
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding	
Mounting position	Vertical ±30°	
Ingress protection	IP 65 per EN 60529 / IEC 60529	
Materials	Stainless steel 1.4571, E-CTFE coated, option anti-static	

Magnetic float switch, special flange, model FLS-SX

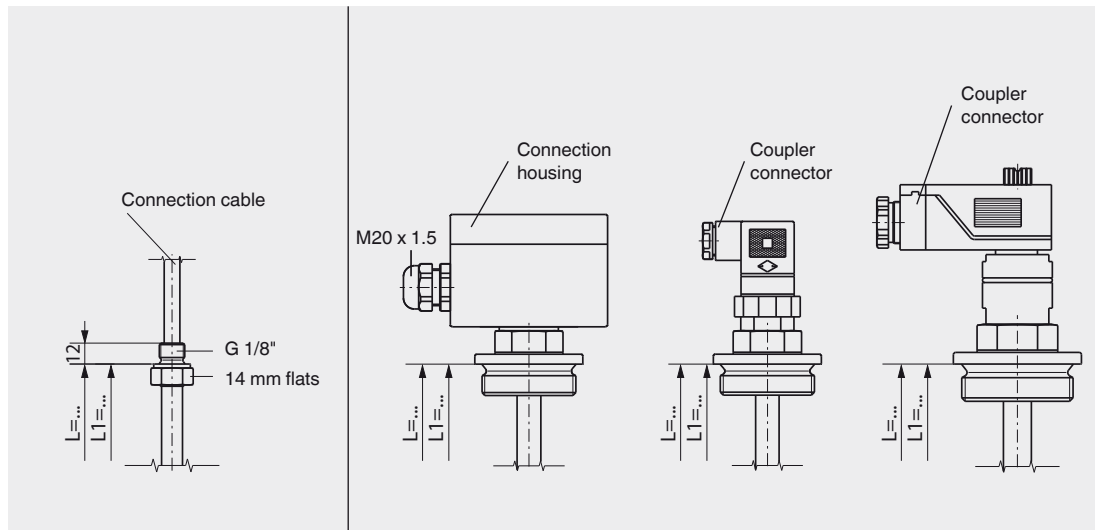
Process connection from polyamide or brass, guide tube from stainless steel 1.4571 (316Ti), float from Buna or stainless steel 1.4571 (316Ti)



	Polyamide flange	Brass flange
Electrical connection	Connector C164-232-F-4P	Connector C164-332-F-5P Connector C164-4337-F-7P
Process connection	Polyamide flange	Brass flange
Guide tube diameter	12 mm	
Guide tube length L max.	3,000 mm	
Float	Material Buna (NBR) or stainless steel 1.4571 Float diameter from 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 20 and 21)	
Temperature range standard	-10 ... +80 °C	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
max. number of contacts	2 x NO or NC, or 4 x SPDT Silicone cable 5 x NO or NC, or 3 x SPDT	6 x NO or NC, or 4 x SPDT
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)	
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 20 and 21)	
Switching power	Normally open AC 230 V; 100 VA; 1 A Normally closed AC 230 V; 100 VA; 1 A Change-over AC 230 V; 40 VA; 1 A Protective conductor connection on request	DC 230 V; 50 W; 0.5 A DC 230 V; 50 W; 0.5 A DC 230 V; 20 W; 0.5 A
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding	
Mounting position	Vertical ±30°	
Ingress protection	IP 65 per EN 60529 / IEC 60529	
Materials	Stainless steel 1.4571, 1.4404 and others on request	

Magnetic float switch, 8 mm guide tube, model FLS-M

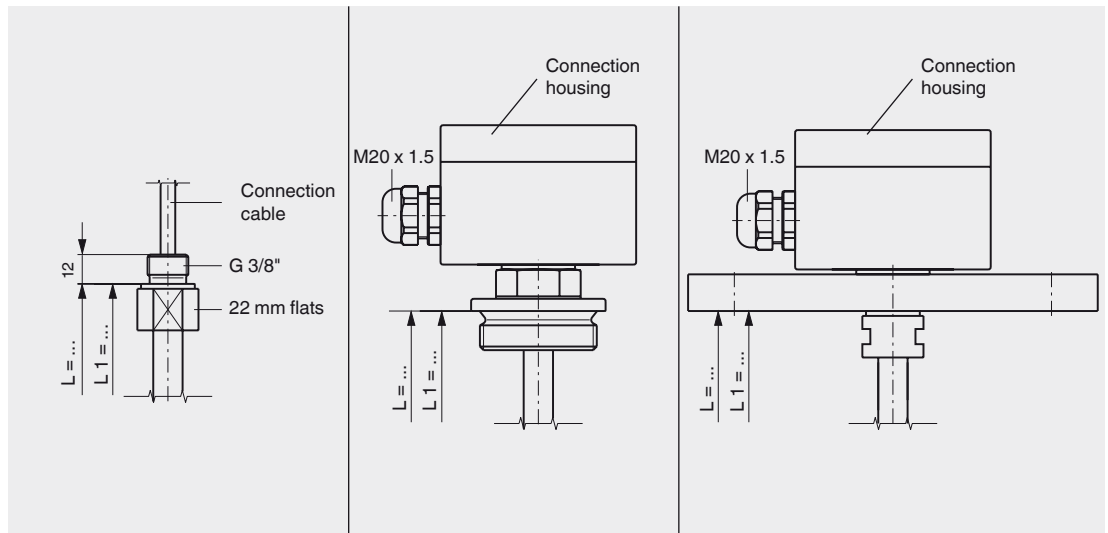
Process connection and guide tube from stainless steel 1.4571 (316Ti)



Mounting thread (without connection housing)		Mounting thread		
Electrical connection	Connection cable <ul style="list-style-type: none"> ■ PVC ■ Silicone ■ PUR 	Connection housing <ul style="list-style-type: none"> ■ Aluminium 64 x 58 x 34 mm 	Coupler connector <ul style="list-style-type: none"> ■ M12, 4-pin (C164-232-F-4P) 	Coupler connector <ul style="list-style-type: none"> ■ M12, 5-pin (C164-332-F-5P) ■ N6R, 7-pin (C164-4337-F-7P)
Process connection	Mounting thread upwards G 1/8" (others on request)	Mounting thread downwards G 3/4", G 1" (others on request)		
Guide tube diameter	8 mm			
Guide tube length L max.	500 mm			
Float	Material stainless steel 1.4571 (option: Buna (NBR), polypropylene, titanium) Float diameter from 20 ... 35 mm Float selection depending on guide tube diameter and process conditions (see page 20 and 21)			
Temperature range	-10 ... +100 °C (float material stainless steel or titanium) -10 ... +80 °C (float material Buna (NBR) or polypropylene)			
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level			
max. number of contacts	3 x NO or NC, or 1 x SPDT			
Switching power	Normally open AC 250 V; 10 VA; 0.5 A Normally closed AC 250 V; 10 VA; 0.5 A Change-over AC 28 V; 6 VA; 0.6 A	DC 250 V; 5 W; 0.25 A DC 250 V; 5 W; 0.25 A DC 28 V; 3 W; 0.3 A	Please observe contact protection measures (see page 23)!	
Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding				
Mounting position	Vertical ±30°			
Ingress protection	IP 54 per EN 60529 / IEC 60529		IP 65 per EN 60529 / IEC 60529	

Magnetic float switch, plastic version, 12 mm guide tube, model FLS-P

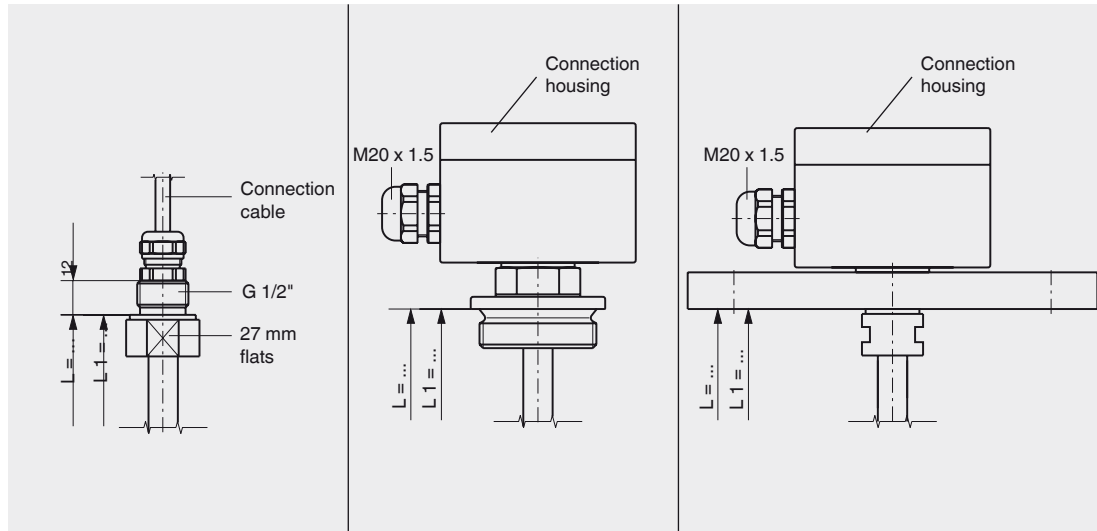
Process connection, guide tube and float from PVC or polypropylene



	Mounting thread (without connection housing)	Mounting thread	Flange
Electrical connection	Connection cable ■ PVC ■ PUR	Connection housing ■ Polypropylene 80 x 82 x 55 mm ■ Polyester 80 x 75 x 55 mm	
Process connection	Mounting thread, upwards G 3/8" (others on request)	Mounting thread, downwards G 1 1/2" or G 2" (others on request)	Mounting flange ■ DIN DN 50 ... DN 125, PN 10, form A ■ ANSI 2" ... 5", class 150 FF
Guide tube diameter	12 mm		
Guide tube length L max.	500 mm		
Float	Material ■ PVC ■ Polypropylene Float diameter from 44 ... 80 mm Float selection depending on guide tube diameter and process conditions (see page 21)		
Temperature range	■ PVC 0 ... +60 °C ■ Polypropylene -10 ... +80 °C		
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level		
max. number of contacts	4 x NO or NC (PP max. 3), or 3 x SPDT (PP max. 2)		
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)		
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 21)		
Switching power	Normally open AC 230 V; 100 VA; 1 A Normally closed AC 230 V; 100 VA; 1 A Change-over AC 230 V; 40 VA; 1 A	DC 230 V; 50 W; 0.5 A DC 230 V; 50 W; 0.5 A DC 230 V; 20 W; 0.5 A	Please observe contact protection measures (see page 23)!
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding		
Mounting position	Vertical ±30°		
Ingress protection	IP 54 per EN 60529 / IEC 60529	IP 65 per EN 60529 / IEC 60529	
Materials	PVC or polypropylene		

Magnetic float switch, plastic version, 16 mm guide tube, model FLS-P

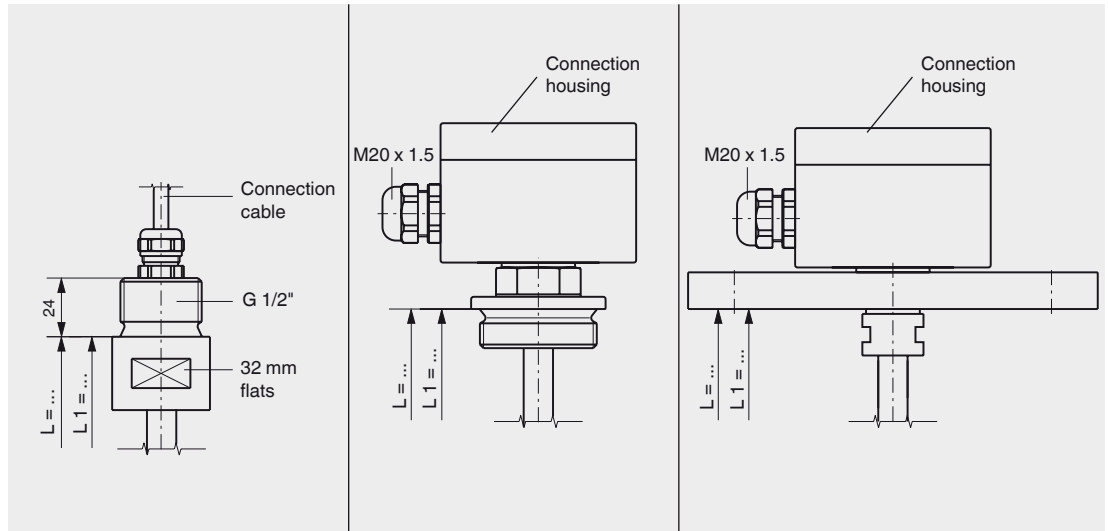
Process connection, guide tube material and float from PVC, polypropylene or PVDF



	Mounting thread (without connection housing)	Mounting thread	Flange
Electrical connection	Connection cable ■ PVC ■ PUR	Connection housing ■ Polypropylene 80 x 75 x 55 mm ■ Polyester 80 x 75 x 55 mm	
Process connection	Mounting thread, upwards G 1" (others on request)	Mounting thread, downwards G 2" (others on request)	Mounting flange ■ DIN DN 65 ... DN 125, PN 10, form A ■ ANSI 2 1/2" ... 5", class 150 FF
Guide tube diameter	16 mm, strengthened with a metallic inner tube		
Guide tube length L max.	3,000 mm		
Float	Material ■ PVC ■ Polypropylene ■ PVDF Float diameter from 44 ... 80 mm Float selection depending on guide tube diameter and process conditions (see page 21)		
Temperature range	■ PVC 0 ... +60 °C ■ Polypropylene -10 ... +80 °C ■ PVDF -10 ... +100 °C		
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level		
max. number of contacts	6 x NO or NC, or 4 x SPDT		
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)		
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 21)		
Switching power	Normally open AC 230 V; 100 VA; 1 A Normally closed AC 230 V; 100 VA; 1 A Change-over AC 230 V; 40 VA; 1 A	DC 230 V; 50 W; 0.5 A DC 230 V; 50 W; 0.5 A DC 230 V; 20 W; 0.5 A	Please observe contact protection measures (see page 23)!
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding		
Mounting position	Vertical ±30°		
Ingress protection	IP 65 per EN 60529 / IEC 60529		
Materials	PVC, polypropylene or PVDF		

Magnetic float switch, plastic version, 22 mm guide tube, model FLS-P

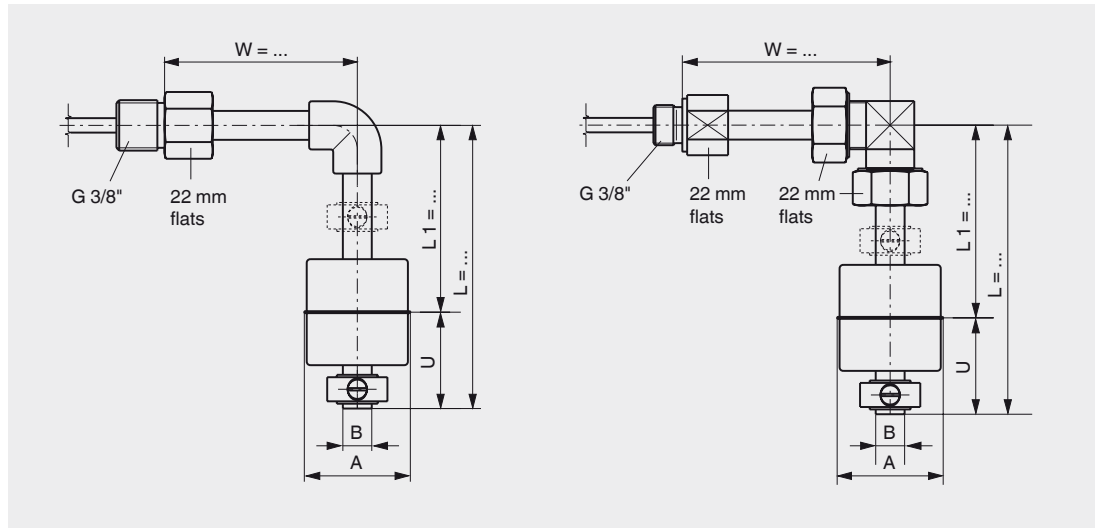
Process connection, guide tube material and float from PVC, polypropylene or PVDF



	Mounting thread (without connection housing)	Mounting thread	Flange
Electrical connection	Connection cable ■ PVC ■ PUR	Connection housing ■ Polypropylene 80 x 75 x 55 mm	
Process connection	Mounting thread, upwards G 1/2" (others on request)	Mounting thread, downwards G 2" (others on request)	Mounting flange ■ DIN DN 65 ... DN 125, PN 10, form A ■ ANSI 2 1/2" ... 4", class 150 FF
Guide tube diameter	20 mm, strengthened with a metallic inner tube		
Guide tube length L max.	5,000 mm		
Float	Material ■ PVC ■ Polypropylene ■ PVDF Float diameter from 44 ... 80 mm Float selection depending on guide tube diameter and process conditions (see page 21)		
Temperature range	■ PVC 0 ... +60 °C ■ Polypropylene -10 ... +80 °C ■ PVDF -10 ... +100 °C		
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level		
max. number of contacts	6 x NO or NC, or 4 x SPDT		
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)		
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 21)		
Switching power	Normally open AC 230 V; 100 VA; 1 A DC 230 V; 50 W; 0.5 A Normally closed AC 230 V; 100 VA; 1 A DC 230 V; 50 W; 0.5 A Change-over AC 230 V; 40 VA; 1 A DC 230 V; 20 W; 0.5 A Please observe contact protection measures (see page 23)!		
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding		
Mounting position	Vertical ±30°		
Ingress protection	IP 65 per EN 60529 / IEC 60529		
Materials	PVC, polypropylene or PVDF		

Magnetic float switch, plastic version, angled version, model FLS-PX

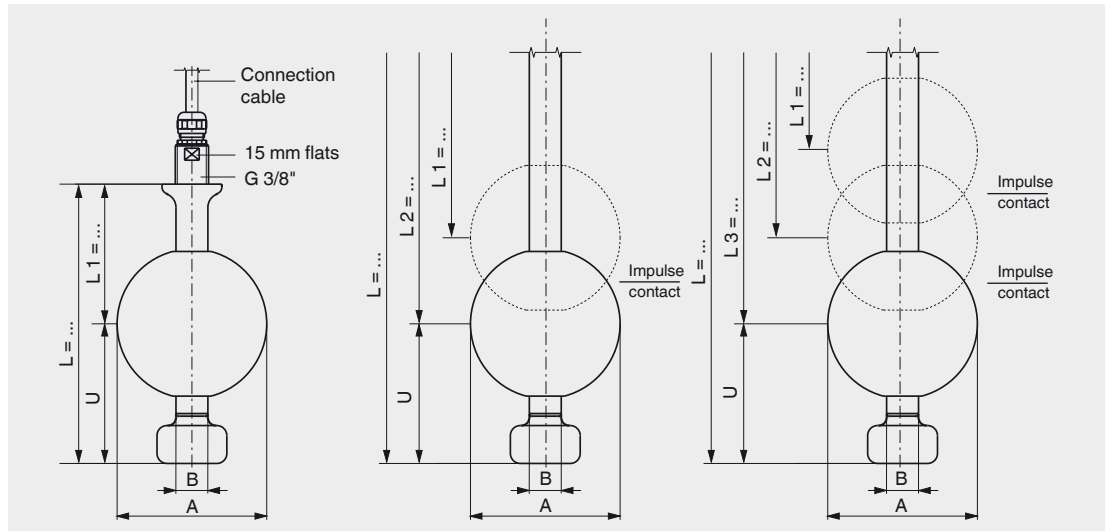
Process connection, guide tube and float from PVC or polypropylene



	Mounting thread, PVC version	Mounting thread, polypropylene version
Electrical connection	Connection cable ■ PVC ■ PUR	
Process connection	Mounting thread, lateral G 3/8" (others on request)	
Guide tube diameter	12 mm	
Guide tube length L max.	1,000 mm	
Float	Material ■ PVC ■ Polypropylene Float diameter from 44 ... 80 mm Float selection depending on guide tube diameter and process conditions (see page 21)	
Temperature range	■ PVC 0 ... +60 °C ■ Polypropylene -10 ... +80 °C	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
max. number of contacts	4 x NO or NC, or 3 x SPDT	
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)	
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 21)	
Switching power	Normally open AC 230 V; 100 VA; 1 A DC 230 V; 50 W; 0.5 A Normally closed AC 230 V; 100 VA; 1 A DC 230 V; 50 W; 0.5 A Change-over AC 230 V; 40 VA; 1 A DC 230 V; 20 W; 0.5 A	
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding	
Mounting position	Vertical ±30°	
Ingress protection	IP 65 per EN 60529 / IEC 60529	
Materials	PVC or polypropylene	

Magnetic float switch, pharmaceutical version, model FLS-H

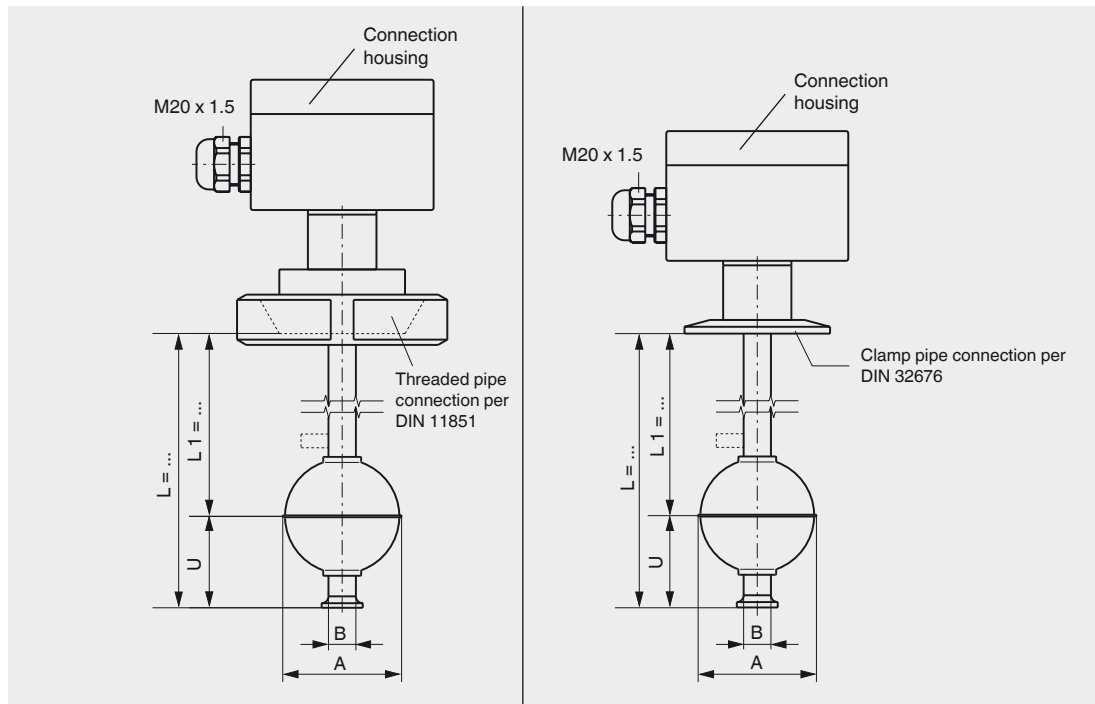
Process connection, guide tube and float from stainless steel



Mounting thread											
Electrical connection	Connection cable ■ PVC ■ Silicone ■ PUR Option connection housing										
Process connection	Mounting thread, upwards G 3/8" (others on request) Option ■ Mounting flange per DIN or ANSI ■ Threaded connection per DIN 11851 ■ Clamp pipe connection per DIN 32676 ■ Ingold sanitary fitting										
Guide tube diameter	17.2 mm (stainless steel 1.4435 or 1.4539, surface ground and polished)										
Guide tube length L max.	5,000 mm										
Float	Material stainless steel 1.4435 or 1.4539 Float diameter from 44 ... 80 mm Float selection depending on guide tube diameter and process conditions (see page 21)										
Temperature range	■ PVC and PUR -10 ... +80 °C ■ Silicone -30 ... +150 °C										
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level										
max. number of contacts	PVC and PUR 6 x NO or NC, or 4 x SPDT, silicone 3 x NO or NC, or 2 x SPDT										
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)										
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 21)										
Switching power	<table border="0"> <tr> <td>Normally open</td> <td>AC 230 V; 50 VA; 1 A</td> <td>DC 230 V; 50 W; 0.5 A</td> <td rowspan="3">Please observe contact protection measures (see page 23)!</td> </tr> <tr> <td>Normally closed</td> <td>AC 230 V; 50 VA; 1 A</td> <td>DC 230 V; 50 W; 0.5 A</td> </tr> <tr> <td>Change-over</td> <td>AC 230 V; 50 VA; 1 A</td> <td>DC 230 V; 20 W; 0.5 A</td> </tr> </table>	Normally open	AC 230 V; 50 VA; 1 A	DC 230 V; 50 W; 0.5 A	Please observe contact protection measures (see page 23)!	Normally closed	AC 230 V; 50 VA; 1 A	DC 230 V; 50 W; 0.5 A	Change-over	AC 230 V; 50 VA; 1 A	DC 230 V; 20 W; 0.5 A
Normally open	AC 230 V; 50 VA; 1 A	DC 230 V; 50 W; 0.5 A	Please observe contact protection measures (see page 23)!								
Normally closed	AC 230 V; 50 VA; 1 A	DC 230 V; 50 W; 0.5 A									
Change-over	AC 230 V; 50 VA; 1 A	DC 230 V; 20 W; 0.5 A									
Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding											
Mounting position	Vertical ±30°										
Ingress protection	IP 65 per EN 60529 / IEC 60529										

Magnetic float switch, food version, model FLS-H

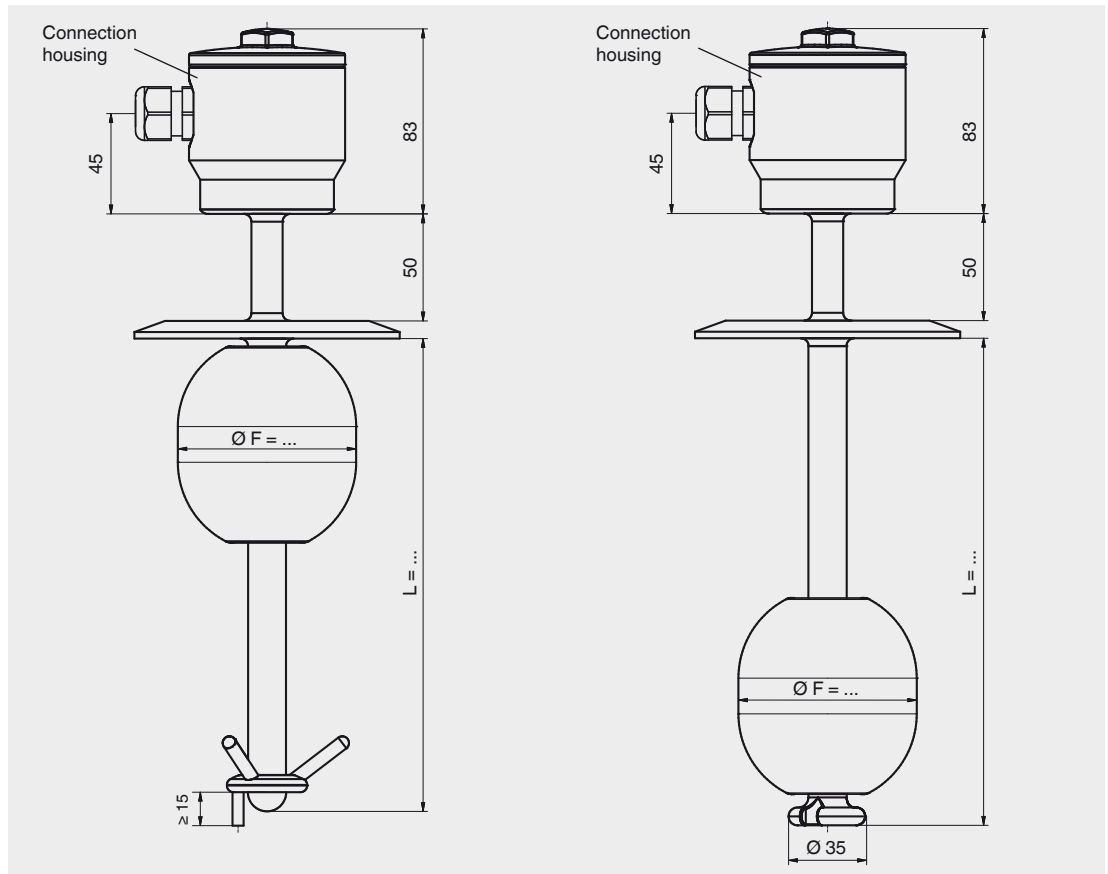
Process connection, guide tube and float from stainless steel



	Threaded pipe connection	Clamp pipe connection
Electrical connection	Connection housing ■ Aluminium 64 x 58 x 34 mm, with 1 contact ■ Aluminium 80 x 75 x 57 mm, 2 or more contacts Option: Polypropylene, polyester, stainless steel	
Process connection	Threaded pipe connection per DIN 11851, downwards DN 50 ... DN 150 (others on request)	Clamp pipe connection per DIN 32676, DN 25 ... DN 100 or 1" ... 4" (others on request)
Guide tube diameter	12 or 14	18 mm
Guide tube length L max.	3,000 mm	6,000 mm
Float	Material stainless steel 1.4435 or 1.4404, option electropolished Float diameter from 44 ... 80 mm Float selection depending on guide tube diameter and process conditions (see page 21)	
Temperature range	-30 ... +150 °C	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
max. number of contacts	6 x NO or NC, or 4 x SPDT	
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)	
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts, see page 21)	
Switching power	Normally open AC 230 V; 100 VA; 1 A DC 230 V; 50 W; 0.5 A Normally closed AC 230 V; 100 VA; 1 A DC 230 V; 50 W; 0.5 A Change-over AC 230 V; 40 VA; 1 A DC 230 V; 20 W; 0.5 A	Please observe contact protection measures (see page 23)!
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding	
Mounting position	Vertical ±30°	
Ingress protection	IP 65 per EN 60529 / IEC 60529	

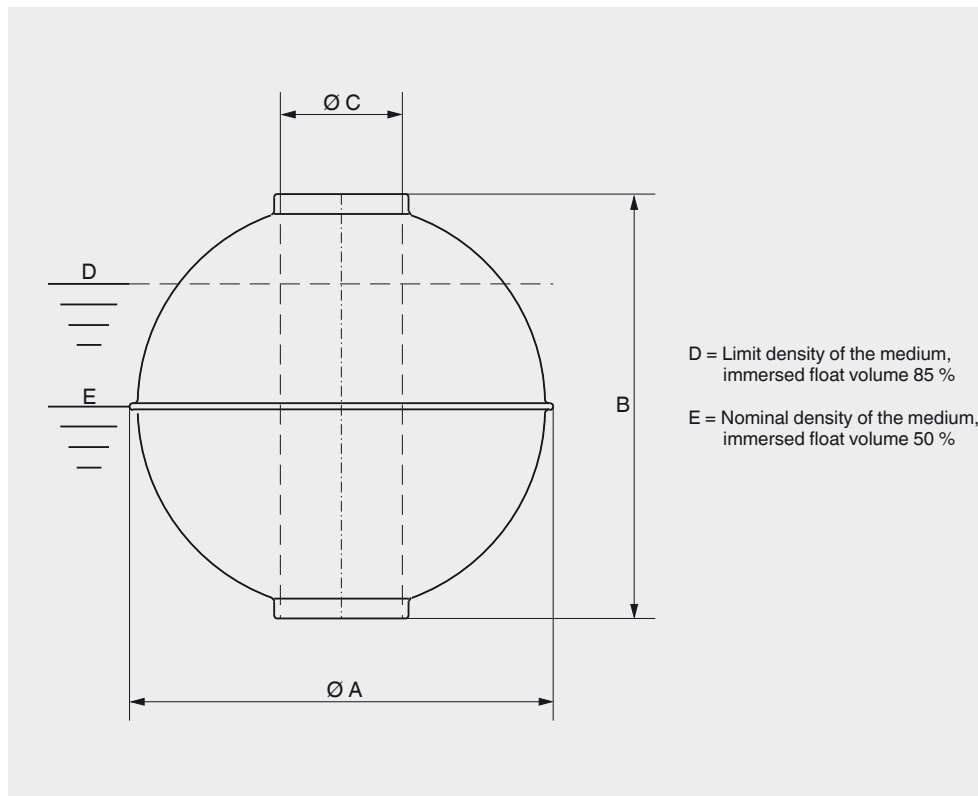
Magnetic float switch, 3-A hygienic version, model FLS-H

Process connection, guide tube and float from stainless steel



	Version with separate float bracket	Version with welded pipe end
Electrical connection	Connection housing	Stainless steel
Process connection	<ul style="list-style-type: none"> ■ Clamp connection ISO 2852 (DN 32 ... DN 100 or 1.5" ... 4") ■ Clamp connection DIN 32676 (DN 32 ... DN 100 or 1.5" ... 4") ■ Aseptic mounting thread downwards DIN 11864-1 (DN 32 ... DN 100 or 1.5" ... 4") ■ Aseptic collar connecting sleeve DIN 11864-1 (DN 32 ... DN 100 or 1.5" ... 4") ■ Aseptic flange connection DIN 11864-2 (DN 32 ... DN 50 or 1.5" ... 2") ■ Aseptic clamp connection DIN 11864-3 (DN 32 ... DN 100 or 1.5" ... 4") ■ VARIVENT® (form F, N and G) ■ BioConnect® threaded connection (DN 32 ... DN 100 or 1.5" ... 2") ■ BioConnect® flange connection (DN 32 ... DN 100 or 1.5" ... 2") ■ BioConnect® clamp connection (DN 32 ... DN 100 or 1.5" ... 2") 	
Guide tube diameter	12, 14 or 17.2 mm (stainless steel 1.4435 or 1.4539, surface ground and polished, Ra < 0.8 µm)	
Guide tube length L max.	5,000 mm	
Float	Material stainless steel 1.4435 or 1.4404 Float diameter 50 or 80 mm Float selection depending on guide tube diameter	
Temperature range	<ul style="list-style-type: none"> ■ Medium standard -40 ... +200 °C ■ Sensor housing -40 ... +85 °C 	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
max. number of contacts	3 x NO, NC or SPDT	
Switch position	Dimensions L ₁ , L ₂ , L ₃ ... (from sealing face, starting from top)	
Distance between switch points	Minimum 50 mm (depending on the selection of the float and the contacts, see page 21)	
Switching power	Normally open AC 230 V; 50 VA; 1 A normally closed AC 230 V; 50 VA; 1 A Change-over AC 230 V; 50 VA; 1 A	DC 230 V; 50 W; 0.5 A DC 230 V; 50 W; 0.5 A DC 230 V; 20 W; 0.5 A
	Please observe contact protection measures (see page 23)!	
	Attention: Versions without protective conductor connection - operation only at safety extra-low voltage e.g. KSR contact protection relay or external grounding	
Mounting position	Vertical ±30°	
Ingress protection	IP 65 per EN 60529 / IEC 60529	

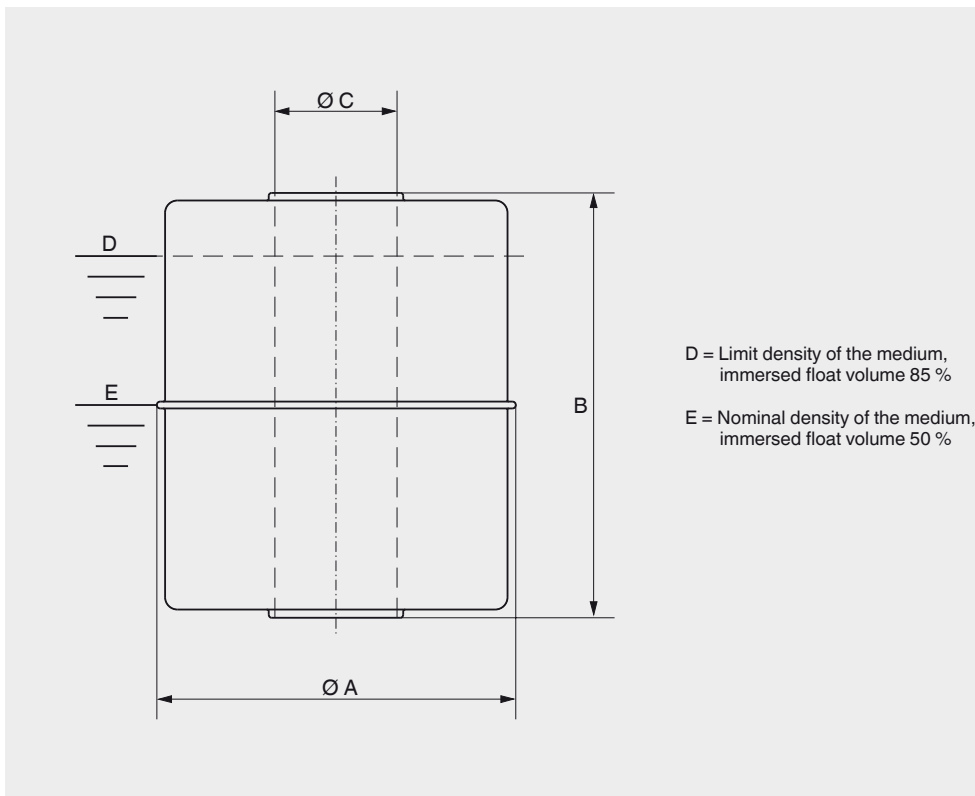
Spherical floats (K)



Material	Suits guide tube \varnothing mm	$\varnothing A$ mm	B mm	$\varnothing C$ mm	Max. operating pressure bar	Max. operating temperature °C	Limit density 85 % kg/m ³	Order no.
Stainless steel 1.4571	8	29	28	9	6	100	977	005454
	8	29	28	9	25	100	1069	027355
	12	52	52	15	40	300	769	005462
	12	62	61	15	32	300	597	005511
	12	83	81	15	25	300	408	005485
	18	80	76	23	25	300	679	005478
	18	98	96	23	25	300	597	005489
	18	105	103	23	25	300	533	020652
	18	120	117	23	25	300	389	021721
Titanium 3.7035	8	29	28	9	30	100	822	005522
	12	52	52	15	25	300	707	005526
	12	52	52	15	60	300	852	-
	12	52	52	15	80	300	1060	-
	12	62	62	15	25	300	505	005536
	12	83	81	15	25	300	278	005544
	18	80	76	23	25	300	665	112263
	18	98	96	23	25	300	495	-
	18	105	103	23	25	300	369	-
	18	120	117	23	25	300	329	-
Stainless steel 1.4571 E-CTFE coated	12	53	53	14	25	depending on medium	745	-
	12	63	62	14	25	depending on medium	591	-
	12	84	82	14	25	depending on medium	403	-
	18	81	77	22	25	depending on medium	718	-
	18	99	97	22	25	depending on medium	675	-
	18	106	104	22	25	depending on medium	633	-
	18	121	118	22	25	depending on medium	459	-

Note: The optimum float will be selected after a feasibility test carried out by KSR.

Cylindrical floats (Z)



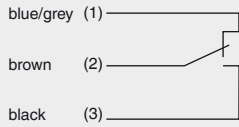
Material	Suits guide tube \varnothing mm	$\varnothing A$ mm	B mm	$\varnothing C$ mm	Max. operating pressure bar	Max. operating temperature $^{\circ}C$	Limit density 85 % kg/m^3	Order no.
Stainless steel 1.4571	8	27	31	10	16	100	787	009679
	12	44	52	15	16	300	818	009681
Titanium 3.7035	12	44	52	15	16	300	720	009744
Buna (NBR)	8	20	20	9	3	80	939	009719
	8	23	25	9	3	80	802	009721
	8	25	14	9	3	80	787	009720
	8	30	45	13	3	80	683	034047
	12	40	30	15	3	80	581	009728
	12	40	120	15	3	80	409	-
	18	50	45	19	3	80	498	009725
PVC	12	44	44	14	3	60	651	033790
	16	55	54	22	3	60	798	-
	20	55	80	26	3	60	919	-
	16	55	70	22	3	60	674	-
	20	80	79	25	3	60	573	033796
Polypropylene	8	27	29	9	3	80	755	015516
	8	35	33	9	3	80	675	100347
	12	44	44	14	3	80	478	015514
	16	55	54	22	3	80	582	033792
	20	55	80	26	3	80	669	-
	20	80	79	25	3	80	431	033795
PVDF	12	44	55	14	3	100	782	033791
	16	55	69	22	3	100	821	116235
	20	55	80	26	3	100	1140	-
	20	80	79	25	3	100	681	033797
Stainless steel 1.4571 E-CTFE coated	12	45	53	14	16	depending on medium	782	-

Note: The optimum float will be selected after a feasibility test carried out by KSR.

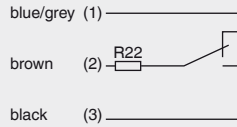
Electrical connections

Reed contact

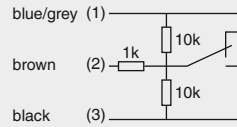
1 switch point



1 switch point
Wiring for operation
with a PLC

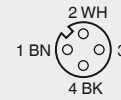


1 switch point
NAMUR circuit per
DIN EN 60947-5-6

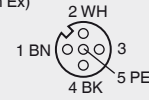


Connector, pin assignment

4-pin



5-pin
(only with Ex)



Connection cable

Connection cable	Cross-section
PVC	4 x 0.5 mm ²
Silicone	4 x 0.75 mm ²
Armoured silicone	4 x 0.75 mm ²
LMGSG	3 x 1.5 mm ²

Colour coding per IEC 60757

Colour	Short symbol
Black	BK
Brown	BN
Red	RD
Orange	OG
Yellow	YE
Green	GN
Blue	BU
Violet	VT
Grey	GY
White	WH
Pink	PK
Turquoise	TQ
Green-Yellow	GNYE

Contact protection measures

The reed contacts should be protected against any voltage or current spikes that might occur.

Depending on the different load types different protective circuits are used.

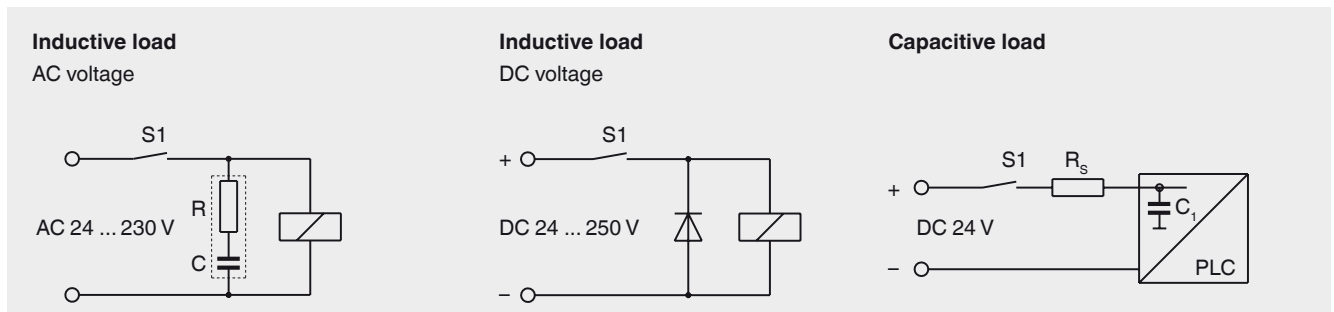


Model KR 24

RC module

Contact protection relays	Contacts	Input	Power supply	Approval number	Order no.
KR 24	1 x change-over AC 250 V, 2 A	2 x contacts	DC 20 ... 30 V		112941
KR 24-EX	2 x change-over AC 253 V, 2 A	2 x contacts	DC 20 ... 30 V	II 1 GD EEx ia IIC, PTB 02 ATEX 2073	112944
KR 230	1 x change-over AC 250 V, 2 A	2 x contacts	AC 230 V		112942
KR 230-EX	2 x change-over AC 253 V, 2 A	2 x contacts	AC 230 V	II 1 GD EEx ia IIC, PTB 02 ATEX 2073	112943

RC module	Capacitance	Resistance	Voltage	Order no.
B3/115	0.33 μ F	470 Ohm	AC 115 V	110446
B3/230	0.33 μ F	1,000 Ohm	AC 230 V	110460



Ordering information

To order the described product the order number (if available) is sufficient.

Alternatively:

Model / Version / Electrical connection / Process connection / Guide tube diameter / Guide tube length L / Information about contact (switching function, number of switch points, switch position) / process details (operating temperature and working pressure, Limit density) / Options

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