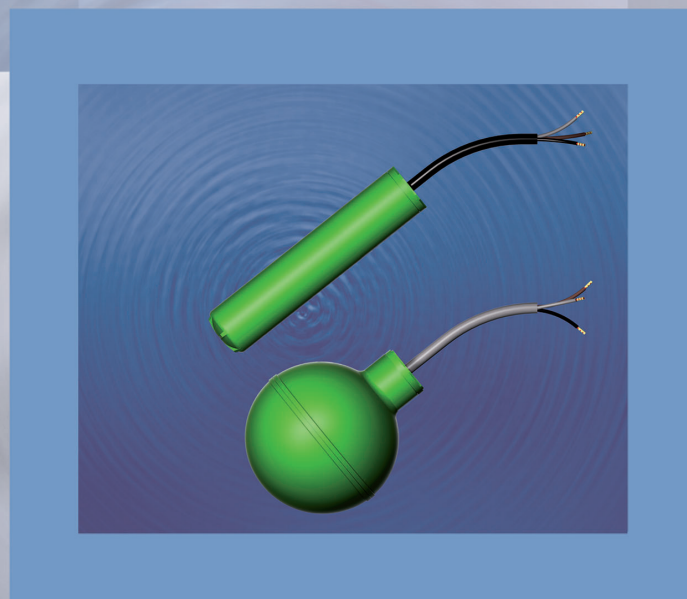




Floating switches and immersion probes

Controlling devices with
microswitch activated
by ball or sliding weight,
for automatic control, regulation
and signalling of liquid levels



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**Jola Spezialschalter GmbH & Co. KG
sells only business-to-business (B2B).**

**The units described in this documentation
may only be installed, connected,
started up, serviced and replaced
by suitably qualified personnel!**

**Subject to deviations from the diagrams
and technical data.**

**The details in this brochure are product
specification descriptions and
do not constitute assured properties
in the legal sense.**



Floating switches and immersion probes

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Floating switches and immersion probes

Application area

Floating switches or immersion probes are binary contact devices / combinations of binary contact devices used for the control of liquids.

Floating switches serve as individual switches for signalling a liquid level at a defined point (e.g. high-level alarm or low-level alarm).

The combination of 2 floating switches or an immersion probe with 2 mounted floating switches serves very often to control a pump (ON-OFF via a suitable external downstream pump controller) or a solenoid valve (OPEN-CLOSE via a suitable external downstream solenoid valve controller).

The use of more than 2 floating switches or one immersion probe with more than 2 mounted floating switches allows to perform more complex switching tasks (e.g. overflow protection, high-level alarm, pump ON, pump OFF, low-level alarm, run-dry protection).

Depending on type, the floating switches are designed for mounting from the side and/or from above, the immersion probes only for mounting from above.

Available electrical versions

For use outside potentially explosive atmospheres, the customer can choose between the versions ... 3/. /... and ... 1/. /... .

	... 3/. /...	... 1/. /...
Switching voltage	between AC/DC 12 V and 250 V	between AC/DC 5 V a. AC 42 V / DC 30 V
Switching current	between AC 100 mA and 3 (1) A or between DC 20 mA and 100 mA	between AC 1 mA and 100 (50) mA or between DC 1 mA and 500 mA
Switching capacity	max. 350 VA	max. 15 VA

The floating switches ... 1/. /... are equipped with a gold-plated contact. One of the characteristic properties of gold-plated contacts is that they can reliably switch the smallest voltages and smallest currents, even after extremely long standstill times.

These gold-plated contacts have the following unfavourable properties:

- The gold layer may become burnt off even after just one-off overload.
- Extremely frequent switching actions can also impair or destroy the gold layer.

In both cases, the contact loses its ability to reliably switch the smallest voltages and smallest currents.

If you need to choose between an ... 1/. /... with gold-plated contact and an ... 3/. /... with AgNi contact for an AC/DC 24 V application, your choice should be based on the following criteria:

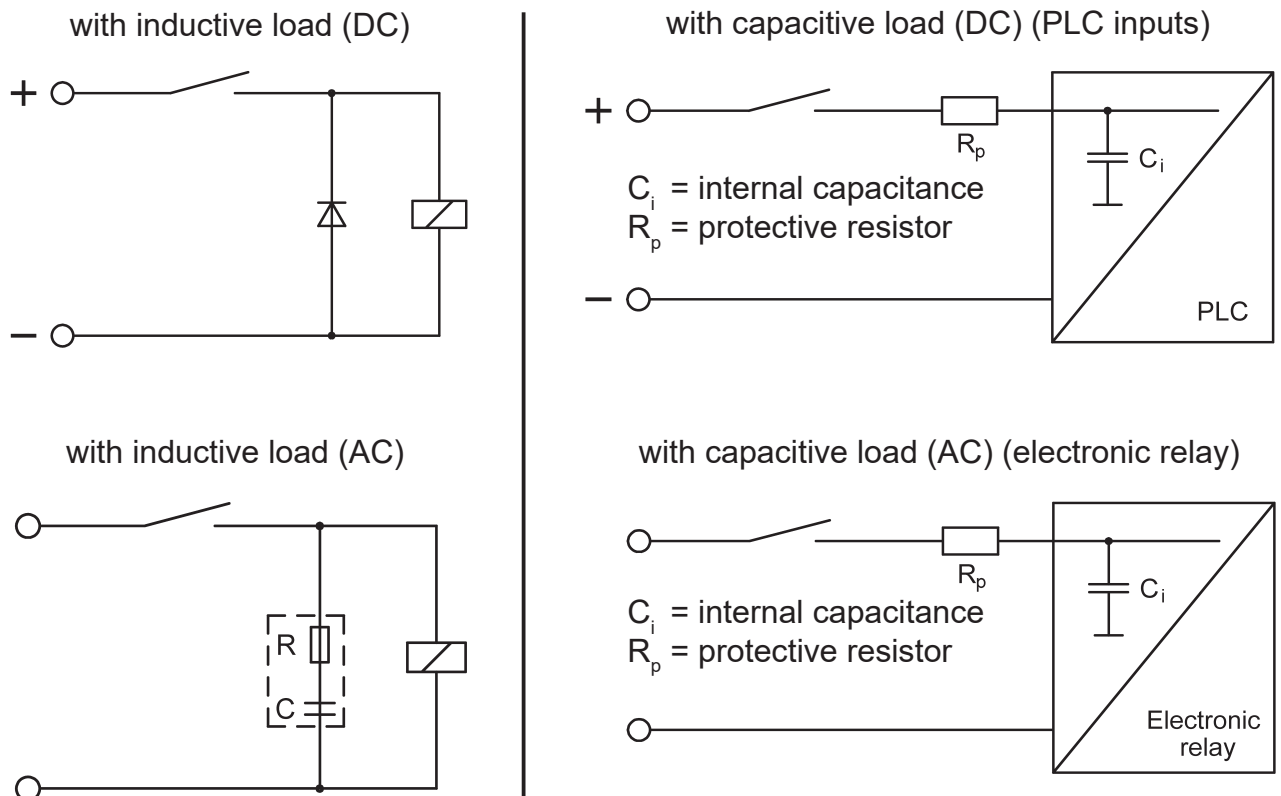
- Floating switch is seldom in operation but should continue to work reliably even after years: ... 1/. /... .
- Floating switch is frequently in operation, is permanently in action: ... 3/. /... .

If a floating switch or an immersion probe is to be used with a KR protection relay, choose the type ... 1/. /... . We recommend this apparatus combination.

Specification for working with capacitive or inductive load

A protective circuit adapted to the electrical installation has to be provided for working with inductive or capacitive loads.

Examples:



Safety regulation

If floating switches or immersion probes with mounted floating switches are supplied with a voltage **that is not a safety extra-low voltage (SELV) in accordance with the applicable standards for the application in question, the tank and the liquid must be connected to the corresponding protective earth (PE). In addition, suitable ground fault circuit interrupters (RCD) must be integrated in the installation.**

Alternatively, the floating switches or immersion probes with mounted floating switches can be operated using safety extra-low voltage (SELV) in accordance with the applicable standards for the application in question.

These units are not suitable for use in turbulent liquids (e.g. in stirrer tanks).



SSP ./K/... floating switches

These floating switches are designed for mounting **from the side** or **from the top**.

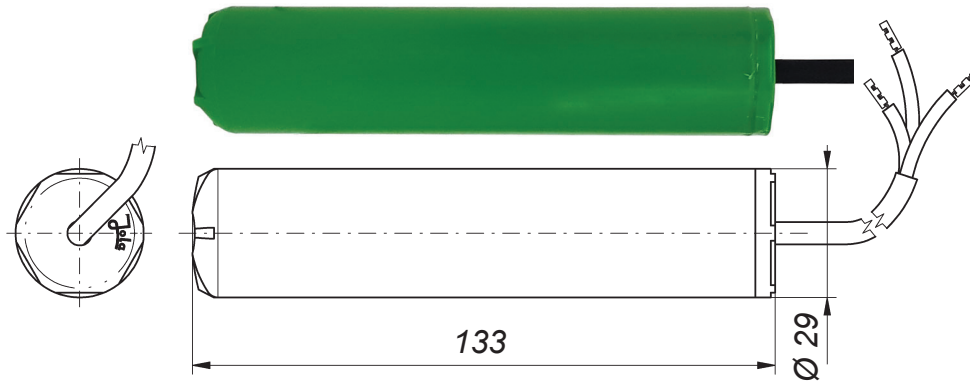
To ensure a correct switching the cable must be fixed at the required height using a

- stuffing gland in case of mounting from the side
- fixing weight or mounting tube in case of mounting from the top

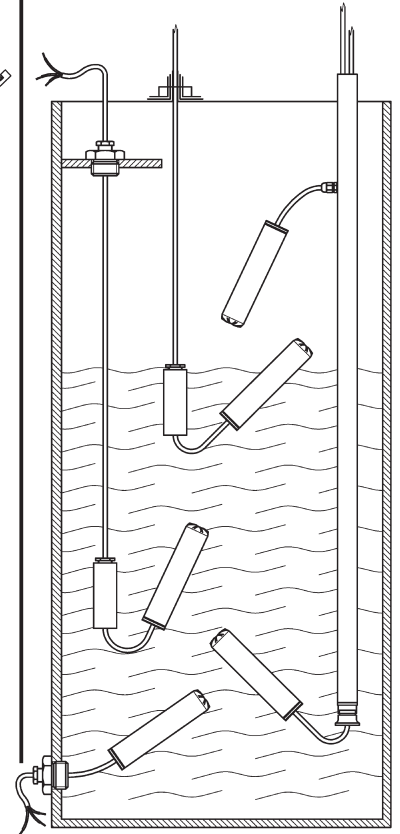
Technical data	SSP 3/K/... ... = TPK, RN, Sil or PUR	SSP 1/K/...
Switching voltage	between AC/DC 12 V and 250 V	between AC/DC 5 V a. AC 42 V / DC 30 V
Switching current	between AC 100 mA and 3 (1) A or between DC 20 mA and 100 mA max. 350 VA	between AC 1 mA and 100 (50) mA or between DC 1 mA and 500 mA max. 15 VA
Switching capacity		
Operating principle	ball-operated microswitch, potential-free changeover contact	
Float: • Material • Seal • Protection class	PP FKM/FPM, on request EPDM IP68	
Electrical connection	connecting cable, see table below length 1 m, longer on request When ordering, please always state the desired cable type and cable length.	
Pressure resistance	max. 3 bar at + 20°C, however only for hydraulic pressures and not suitable for pressures in line with the Pressure Equipment Directive 2014/68/EU	
Optional extras: • Stuffing glands	<ul style="list-style-type: none"> • G½ made of stainless steel 316Ti or PP (floating switch mounting only possible from the inside of a container) • G1 made of stainless steel 316Ti or PP (floating switch mounting possible from the outside of a container) <ul style="list-style-type: none"> • FG 28x80/E made of stainless steel 316Ti • FG 28x82/PP made of PP 	
• Fixing weights		

Connecting cable selection / Possible use depending on the liquid						
Type	Material or cable designation	Number of cores and mm² per conductor	Special aspects	Colour	Required liquid density (g/cm³)	Temperature range (in water)
TPK	TPK	3X0.75	—	black	≥ 0.82	0°C to + 80°C
RN	A05RN-F	3X0.75	—	grey	≥ 1	0°C to + 60°C
Sil	silicone	3X0.75	low mechanical strength	red-brown	≥ 0.82	0°C to + 85°C
PUR	polyurethane	3X0.75	halogen-free + silicon-free	green	≥ 0.92	0°C to + 85°C

SSP .K/TPK

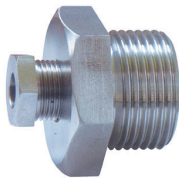


Application examples



Stuffing glands

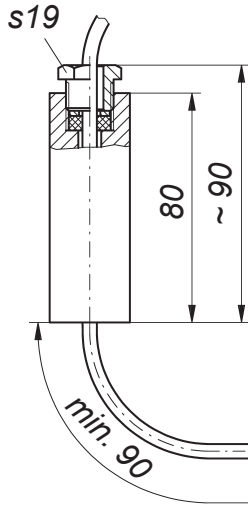
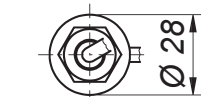
G1
made of stainless steel 316Ti



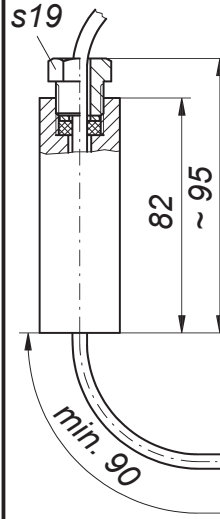
G1
made of PP



FG 28x80/E
fixing weight
made of stainless steel 316Ti

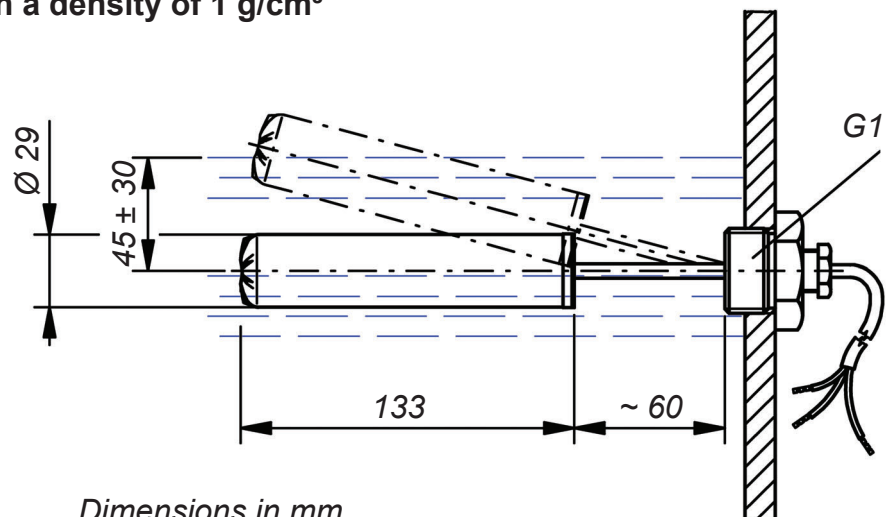
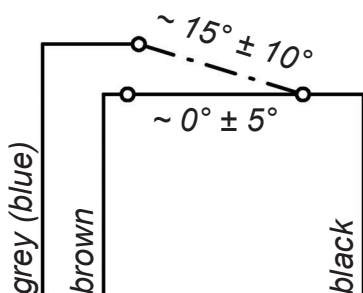


FG 28x82/PP
fixing weight
made of PP



Switching action in liquids with a density of 1 g/cm³

Contact switches over at



Dimensions in mm



SSL ./K/... floating switches

These floating switches are designed for mounting **from the side** or **from the top**.

To ensure a correct switching the cable must be fixed at the required height using a

- stuffing gland in case of mounting from the side
- fixing weight or mounting tube in case of mounting from the top

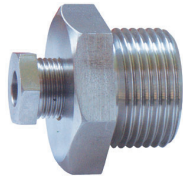
Technical data	SSL 3/K/... ... = FKM or PUR	SSL 1/K/...
Switching voltage	between AC/DC 12 V and 250 V	between AC/DC 5 V a. AC 42 V / DC 30 V
Switching current	between AC 100 mA and 3 (1) A or between DC 20 mA and 100 mA max. 350 VA	between AC 1 mA and 100 (50) mA or between DC 1 mA and 500 mA max. 15 VA
Switching capacity		
Operating principle	ball-operated microswitch, potential-free changeover contact	
Float: • Material • Seal • Protection class	PP FKM/FPM, on request EPDM IP68	
Electrical connection	connecting cable, see table below length 1 m, longer on request When ordering, please always state the desired cable type and cable length.	
Pressure resistance	max. 3 bar at + 20°C, however only for hydraulic pressures and not suitable for pressures in line with the Pressure Equipment Directive 2014/68/EU	
Optional extras: • Stuffing glands • Fixing weights	<ul style="list-style-type: none"> • G½ made of stainless steel 316Ti or PP (floating switch mounting only possible from the inside of a container) • G1 made of stainless steel 316Ti or PP (floating switch mounting possible from the outside of a container) <ul style="list-style-type: none"> • FG 28x80/E made of stainless steel 316Ti • FG 28x82/PP made of PP 	

Connecting cable selection / Possible use depending on the liquid						
Type	Material or cable designation	Number of cores and mm ² per conductor	Special aspects	Colour	Required liquid density (g/cm ³)	Temperature range (in water)
FKM	FKM	3X0.75	—	black	≥ 0.82	0°C to + 85°C
PUR	polyurethane		halogen-free + silicon-free	green		



Stuffing glands

G1 made of stainless steel 316Ti

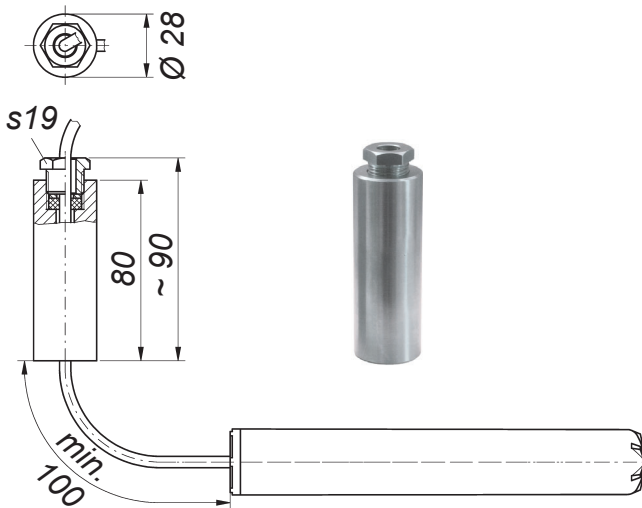


G1 made of PP

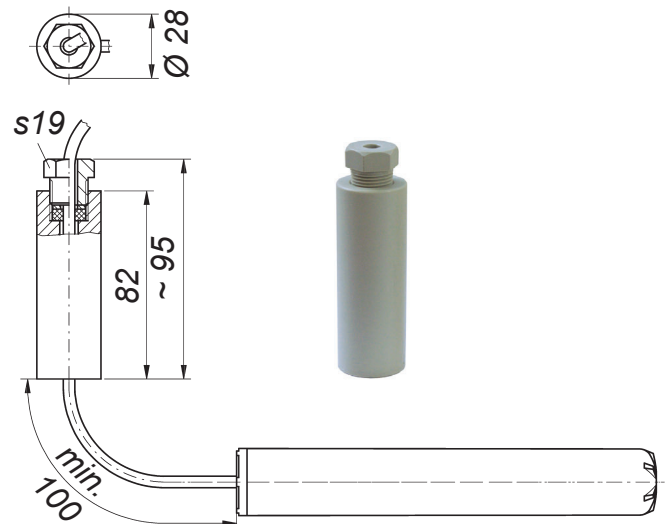


Fixing weights

FG 28x80/E
made of stainless steel 316Ti

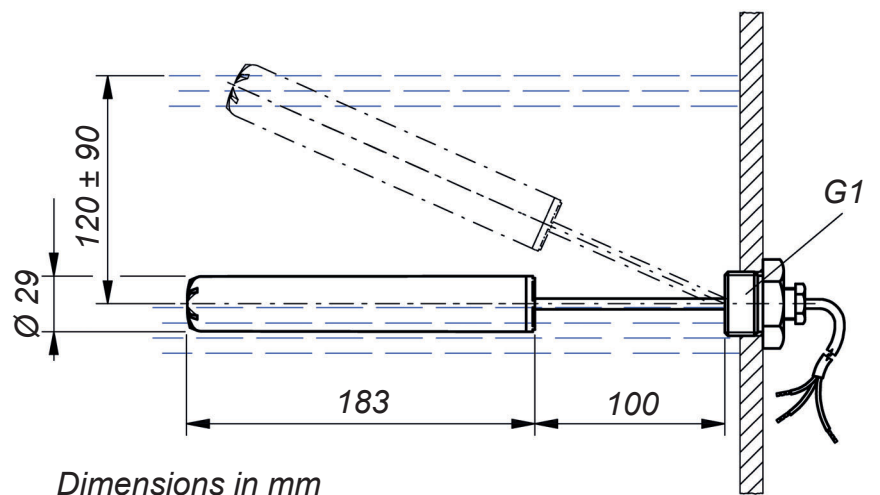
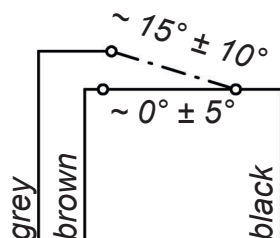


FG 28x82/PP
made of PP



Switching action in liquids with a density of 1 g/cm³

Contact switches over at



Dimensions in mm



SPH ./K/... floating switches

These floating switches are designed for mounting **from the side** or **from the top**.

To ensure a correct switching the cable must be fixed at the required height using a

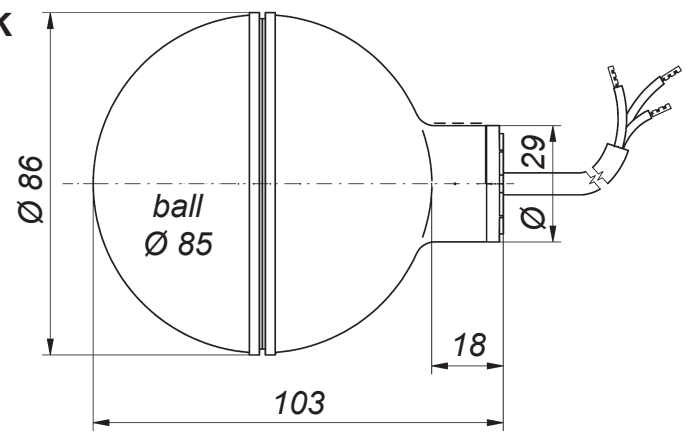
- stuffing gland in case of mounting from the side
- fixing weight or mounting tube in case of mounting from the top

Technical data	SPH 3/K/... ... = TPK, RN, Sil, PUR or PTFE	SPH 1/K/...
Switching voltage	between AC/DC 12 V and 250 V	between AC/DC 5 V a. AC 42 V / DC 30 V
Switching current	between AC 100 mA and 3 (1) A or between DC 20 mA and 100 mA max. 350 VA	between AC 1 mA and 100 (50) mA or between DC 1 mA and 500 mA max. 15 VA
Switching capacity		
Operating principle	ball-operated microswitch, potential-free changeover contact	
Float: • Material • Seal • Protection class	PP FKM/FPM, on request EPDM IP68	
Electrical connection	connecting cable, see table below length 1 m, longer on request When ordering, please always state the desired cable type and cable length.	
Pressure resistance	max. 3 bar at + 20°C, however only for hydraulic pressures and not suitable for pressures in line with the Pressure Equipment Directive 2014/68/EU	
Optional extras: • Fixing weights	<ul style="list-style-type: none"> • FG 45x45/E made of stainless steel 316Ti • FG 50x90/PP made of PP 	

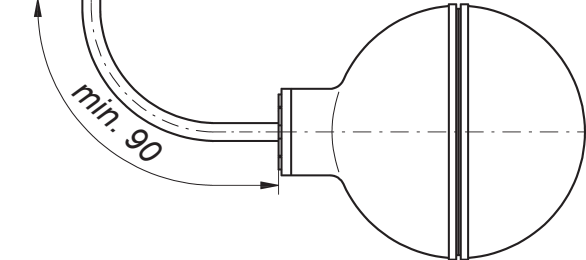
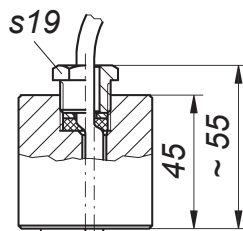
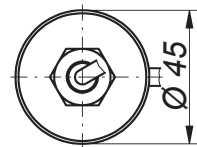
Connecting cable selection / Possible use depending on the liquid						
Type	Material or cable designation	Number of cores and mm ² per conductor	Special aspects	Colour	Required liquid density (g/cm ³)	Temperature range (in water)
TPK	TPK	3X0.75	—	black	≥ 0.7	0°C to + 80°C
RN	A05RN-F	3X0.75	—	grey	≥ 0.7	0°C to + 60°C
Sil	silicone	3X0.75	low mechanical strength	red- brown	≥ 0.7	0°C to + 85°C
PUR	polyurethane	3X0.5	halogen-free	green	≥ 0.7	0°C to + 85°C
PTFE	PTFE	3X0.75	—	white	≥ 0.8	0°C to + 85°C



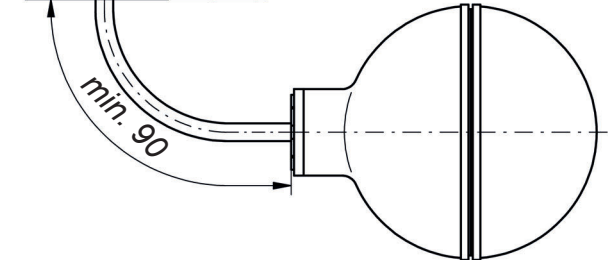
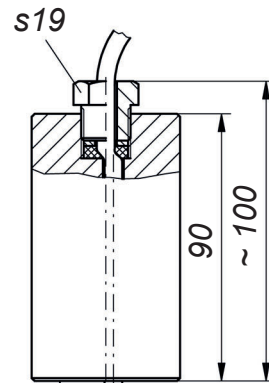
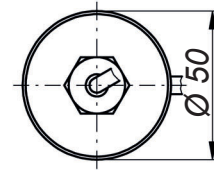
SPH ./K/TPK



FG 45x45/E
fixing weight
made of stainless steel 316Ti

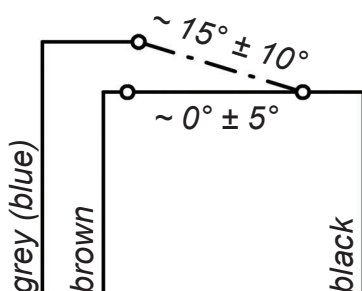


FG 50x90/PP
fixing weight
made of PP

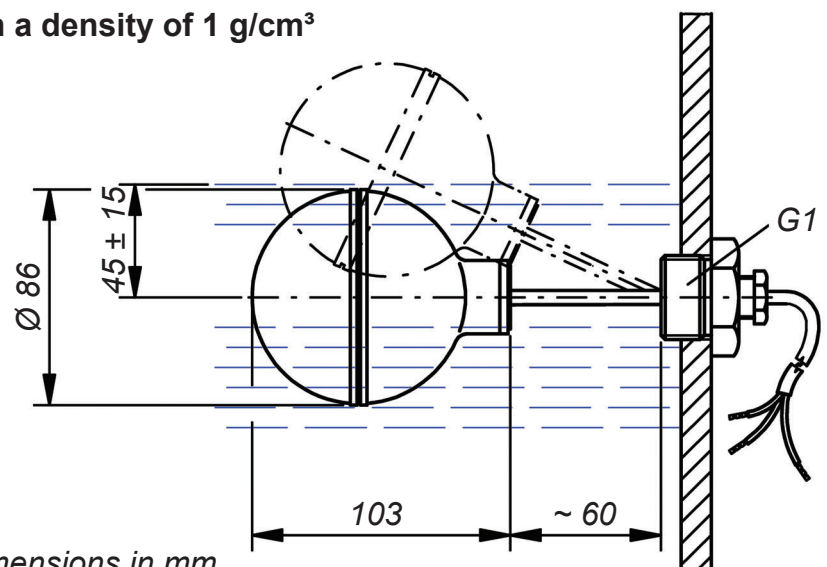


Switching action in liquids with a density of 1 g/cm³

Contact switches over at



Dimensions in mm





SPH ./Z/... floating switches with larger hysteresis

These floating switches are designed for mounting **from the side** or **from the top**.

To ensure a correct switching the cable must be fixed at the required height using a

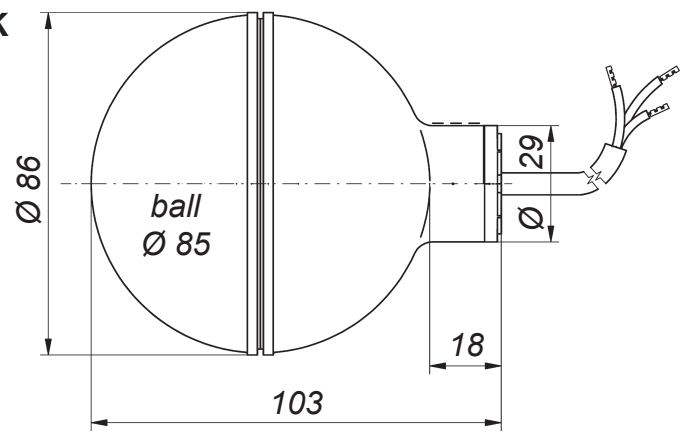
- stuffing gland in case of mounting from the side
- fixing weight or mounting tube in case of mounting from the top

Technical data	SPH 3/Z/... ... = TPK, RN, Sil, PUR or PTFE	SPH 1/Z/...
Switching voltage	between AC/DC 12 V and 250 V	between AC/DC 5 V a. AC 42 V / DC 30 V
Switching current	between AC 100 mA and 3 (1) A or between DC 20 mA and 100 mA max. 350 VA	between AC 1 mA and 100 (50) mA or between DC 1 mA and 500 mA max. 15 VA
Switching capacity		
Operating principle	microswitch operated by a sliding weight, potential-free changeover contact	
Float: • Material • Seal • Protection class	PP FKM/FPM, on request EPDM IP68	
Electrical connection	connecting cable, see table below length 1 m, longer on request When ordering, please always state the desired cable type and cable length.	
Pressure resistance	max. 3 bar at + 20°C, however only for hydraulic pressures and not suitable for pressures in line with the Pressure Equipment Directive 2014/68/EU	
Optional extras: • Fixing weights	<ul style="list-style-type: none"> • FG 45x45/E made of stainless steel 316Ti • FG 50x90/PP made of PP 	

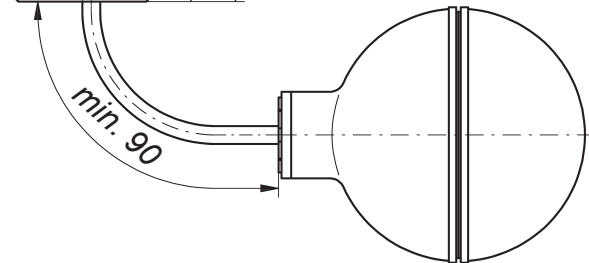
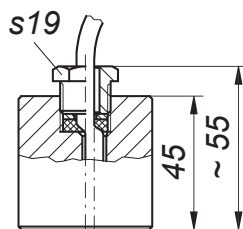
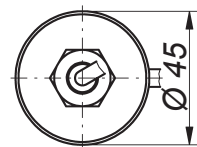
Connecting cable selection / Possible use depending on the liquid						
Type	Material or cable designation	Number of cores and mm ² per conductor	Special aspects	Colour	Required liquid density (g/cm ³)	Temperature range (in water)
TPK	TPK	3X0.75	—	black	≥ 0.7	0°C to + 80°C
RN	A05RN-F	3X0.75	—	grey	≥ 0.7	0°C to + 60°C
Sil	silicone	3X0.75	low mechanical strength	red- brown	≥ 0.7	0°C to + 85°C
PUR	polyurethane	3X0.5	halogen-free	green	≥ 0.7	0°C to + 85°C
PTFE	PTFE	3X0.75	—	white	≥ 0.8	0°C to + 85°C



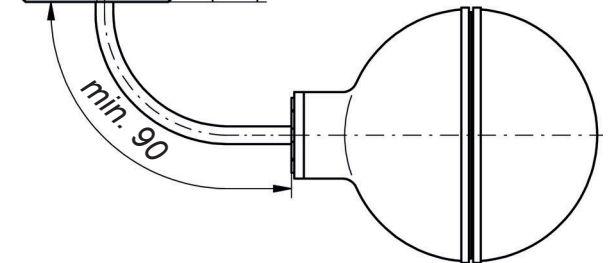
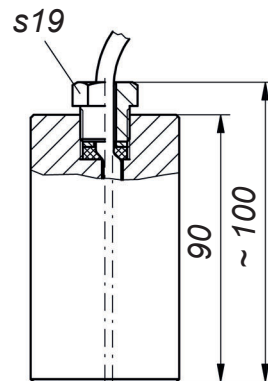
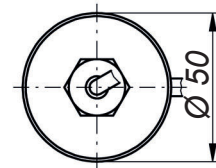
SPH ./Z/TPK



FG 45x45/E
fixing weight
made of stainless steel 316Ti



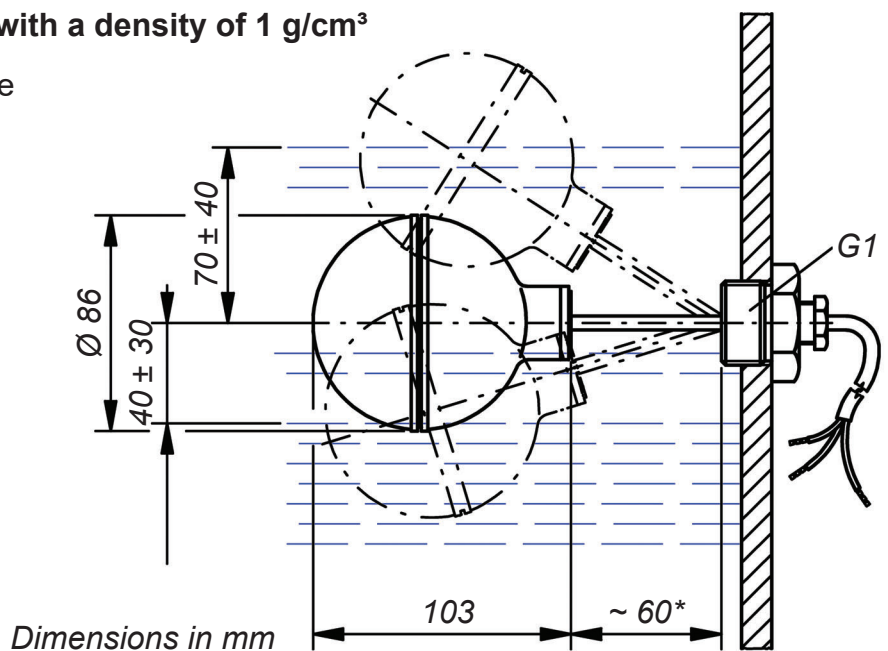
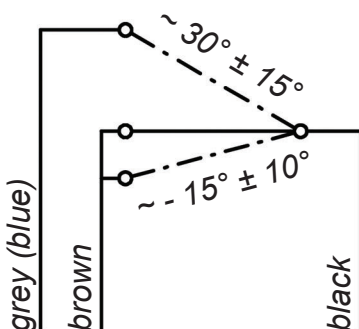
FG 50x90/PP
fixing weight
made of PP



Switching action in liquids with a density of 1 g/cm³

*) ~ 80 mm for the PTFE cable

Contact switches over at



Dimensions in mm



SSX ./K/... floating switches

These floating switches are designed for mounting **from the side** or **from the top**.

To ensure a correct switching the cable must be fixed at the required height using a

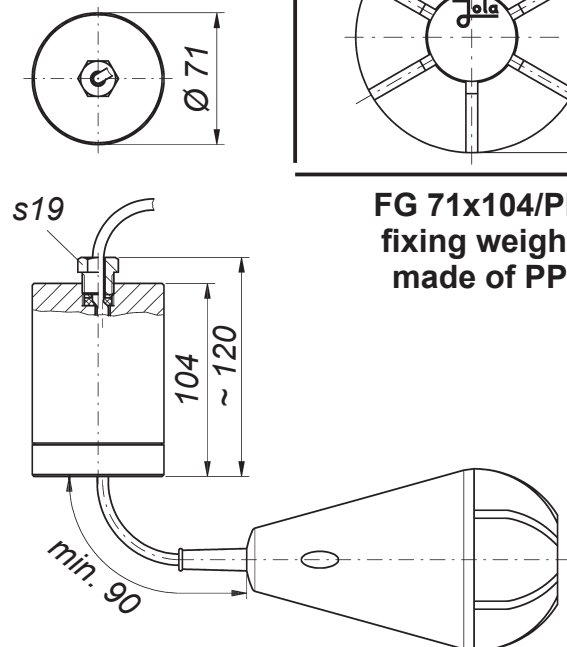
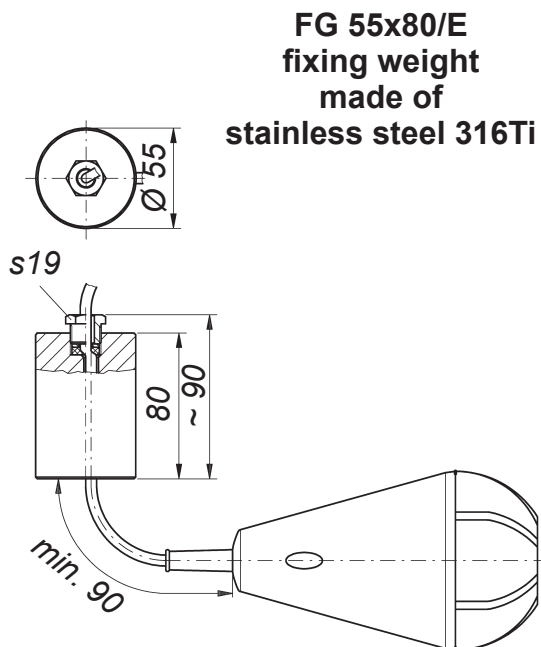
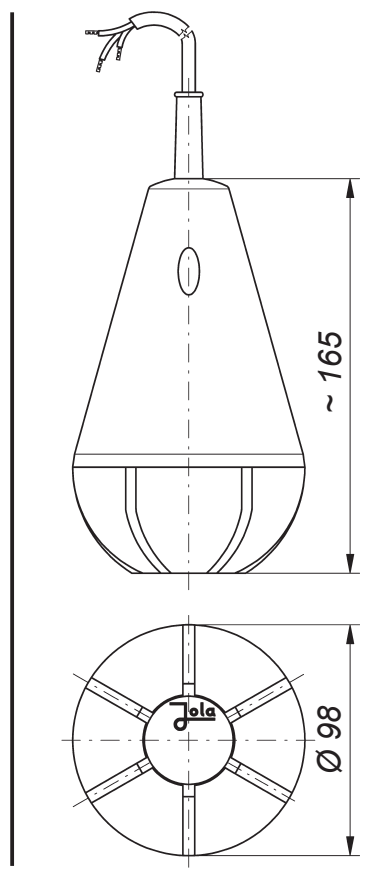
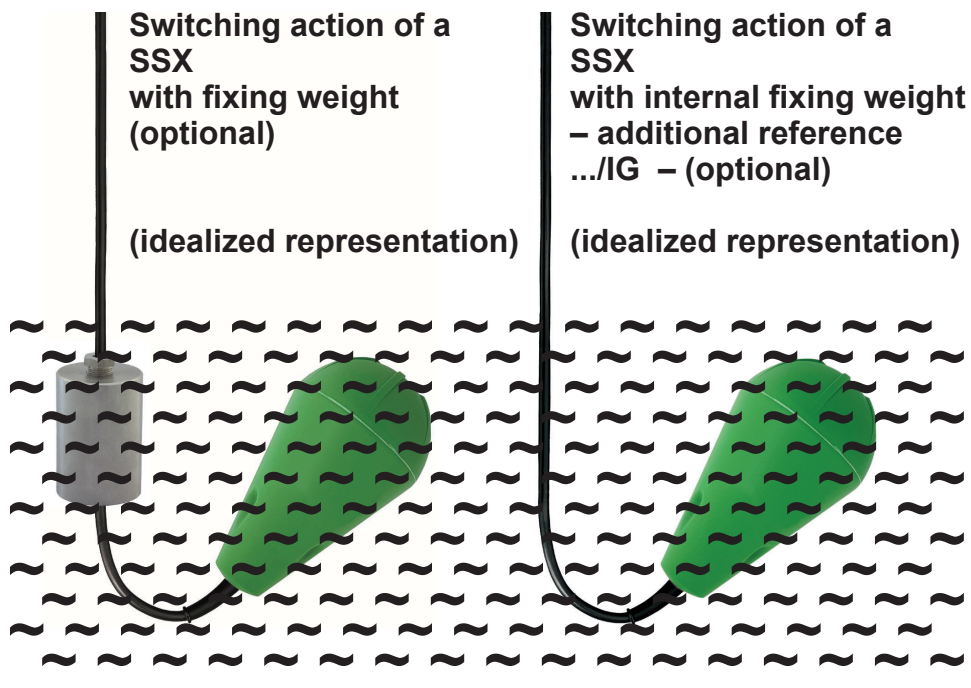
- stuffing gland in case of mounting from the side
- fixing weight or mounting tube in case of mounting from the top

Alternatively, the floating switch can be equipped with an internal weight. In this case, additional fixing at the desired working height is not necessary.

This weight is dimensioned in such a way that the float tilts on its own axis when the liquid rises. This tilting action of the float activates the switching process.

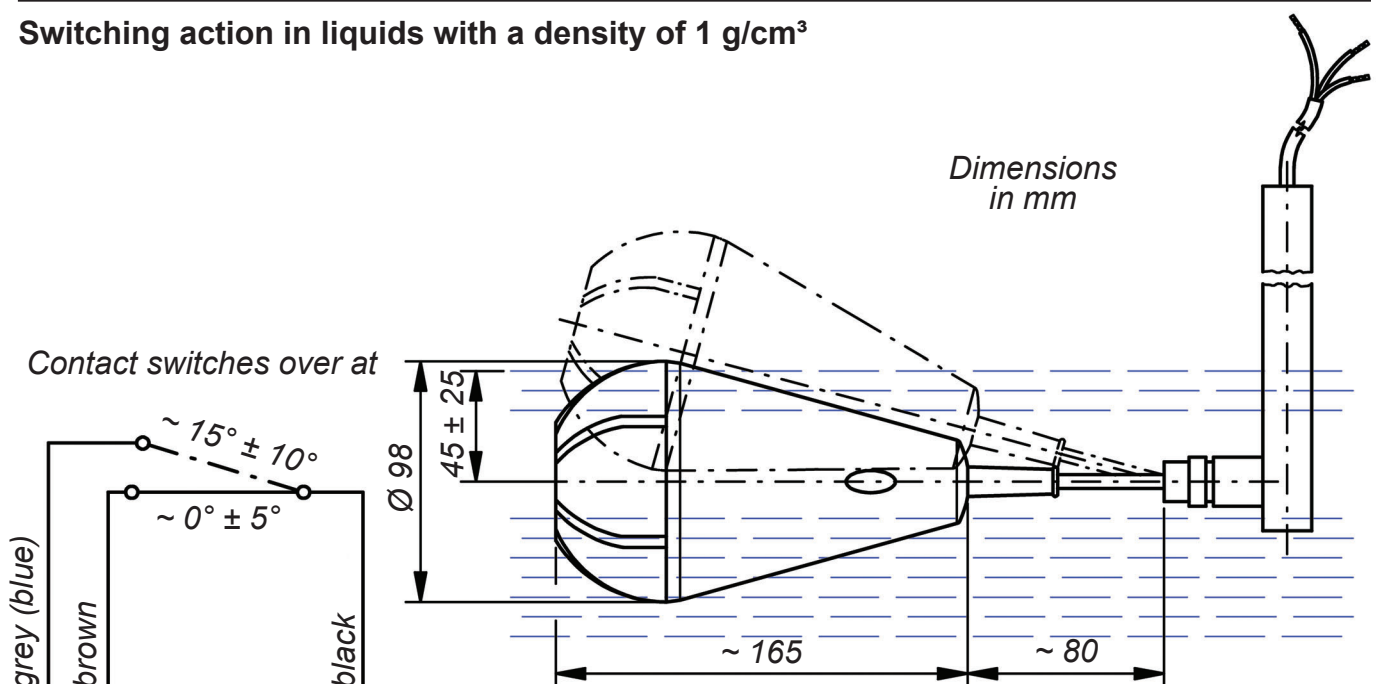
Technical data	SSX 3/K/... ... = TPK, RN, Sil, PUR or PTFE	SSX 1/K/...
Switching voltage	between AC/DC 12 V and 250 V	between AC/DC 5 V a. AC 42 V / DC 30 V
Switching current	between AC 100 mA and 3 (1) A or between DC 20 mA and 100 mA max. 350 VA	between AC 1 mA and 100 (50) mA or between DC 1 mA and 500 mA max. 15 VA
Switching capacity		
Operating principle	ball-operated microswitch, potential-free changeover contact	
Float: • Material • Seal • Protection class	PP FKM/FPM, on request EPDM IP68	
Electrical connection	connecting cable, see table below length 2 m, longer on request When ordering, please always state the desired cable type and cable length.	
Pressure resistance	max. 3 bar at + 20°C, however only for hydraulic pressures and not suitable for pressures in line with the Pressure Equipment Directive 2014/68/EU	
Optional extras: • Fixing weights • Internal weight	<ul style="list-style-type: none"> • FG 55x80/E made of stainless steel 316Ti • FG 71x104/PP made of PP for liquids with a density $\geq 0.7 \text{ g/cm}^3$ additional reference .../IG for liquids with a density between 0.95 and 1.05 g/cm^3	

Connecting cable selection / Possible use depending on the liquid						
Type	Material or cable designation	Number of cores and mm ² per conductor	Special aspects	Colour	Required liquid density (g/cm ³)	Temperature range (in water)
TPK	TPK	3X0.75	—	black	≥ 0.7	0°C to + 80°C
RN	A05RN-F	3X0.75	—	grey	≥ 0.7	0°C to + 60°C
Sil	silicone	3X0.75	low mechanical strength	red-brown	≥ 0.7	0°C to + 85°C
PUR	polyurethane	3X0.5	halogen-free	green	≥ 0.7	0°C to + 85°C
PTFE	PTFE	3X0.75	—	white	≥ 0.8	0°C to + 85°C



FG 71x104/PP
fixing weight
made of PP

Switching action in liquids with a density of 1 g/cm³





FS ./K/... floating switches

with internal weight for fixing of switching point

These floating switches are designed for **mounting from the top**.

They are fitted with an **internal weight for fixing the switching point** at the desired height, this renders **additional fastening** unnecessary.

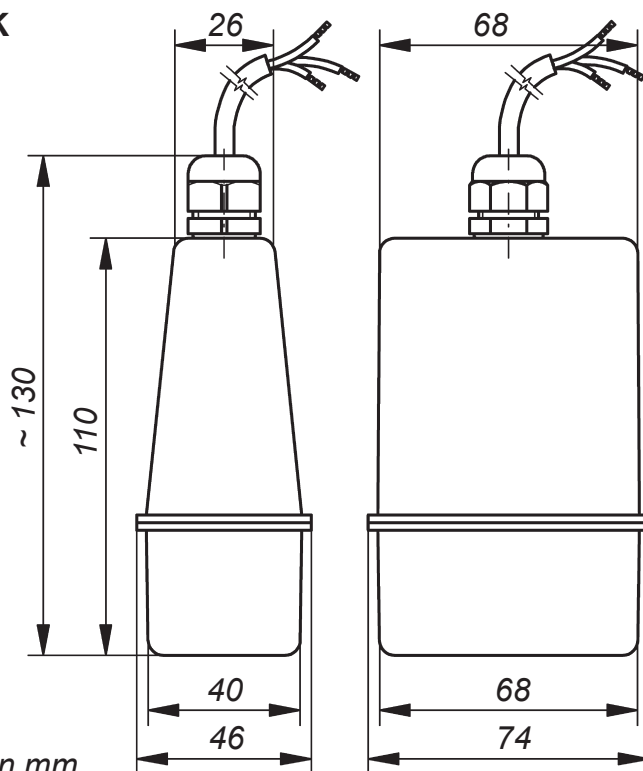
This weight is dimensioned in such a way that the switch tilts around its own axis when the liquid level rises and then follows the rising liquid level (see function diagram on page 1-1-16). This tilting action of the float activates the switching process.

Technical data	FS 3/K/... ... = TPK, RN, Sil or PUR	FS 1/K/...
Switching voltage	between AC/DC 12 V and 250 V	between AC/DC 5 V a. AC 42 V / DC 30 V
Switching current	between AC 100 mA and 3 (1) A or between DC 20 mA and 100 mA max. 350 VA	between AC 1 mA and 100 (50) mA or between DC 1 mA and 500 mA max. 15 VA
Switching capacity		
Operating principle	ball-operated microswitch, potential-free changeover contact	
Float: • Material • Cable entry • Seal • Protection class	PP PVDF FKM/FPM, on request EPDM IP68	
Electrical connection	connecting cable, see table below length 1 m, longer on request When ordering, please always state the desired cable type and cable length.	
Pressure resistance	for pressureless applications, use only under atmospheric conditions	

Connecting cable selection / Possible use depending on the liquid						
Type	Material or cable designation	Number of cores and mm ² per conductor	Special aspects	Colour	Required liquid density (g/cm ³)	Temperature range (in water)
TPK	TPK	3X0.75	—	black	between 0.95 and 1.05	0°C to + 80°C
RN	A05RN-F	3X0.75	—	grey		0°C to + 60°C
Sil	silicone	3X0.75	low mechanical strength	red- brown		0°C to + 85°C
PUR	polyurethane	3X0.5	halogen-free	green		0°C to + 85°C



FS .K/TPK



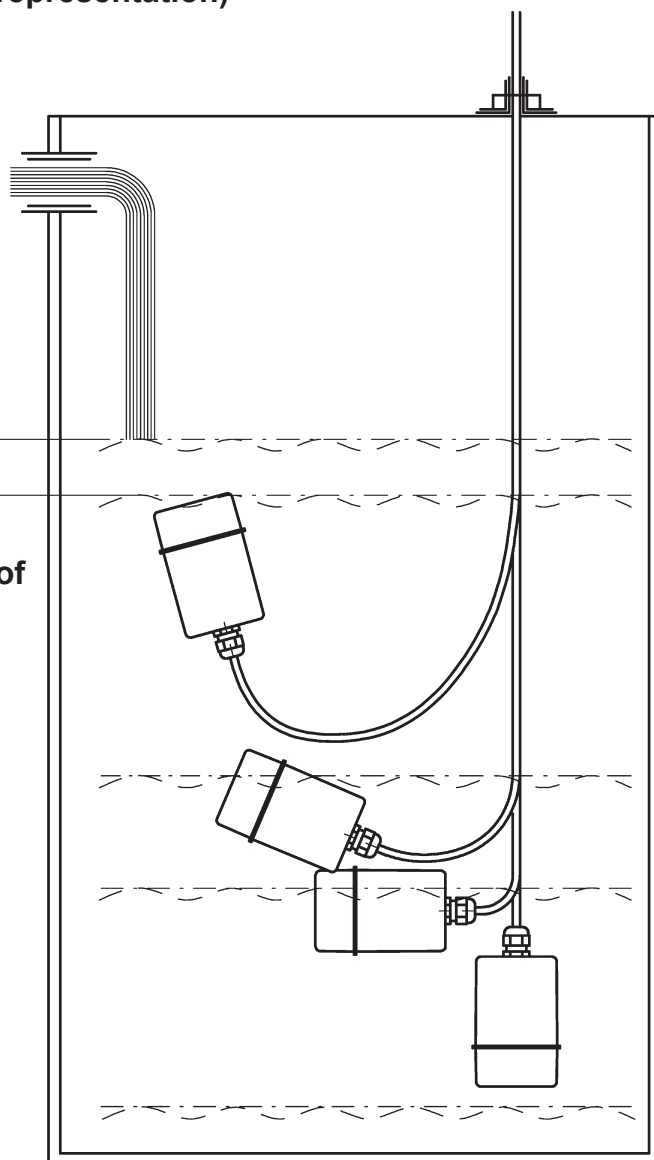
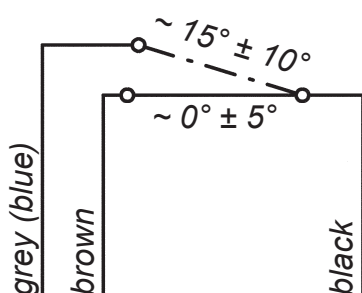
Dimensions in mm

Function diagram of the FS floating switch (idealized representation)

* depends on the cable used and the cable length

Switching action in liquids with a density of 1 g/cm^3

Contact switches over at





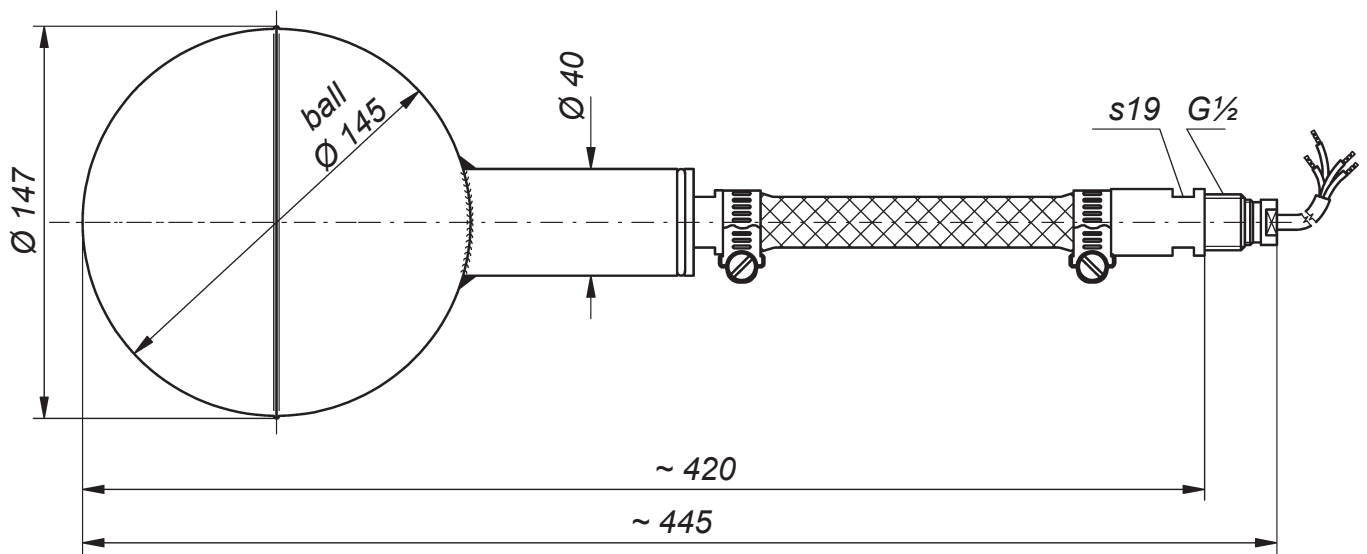
SSR ./K/RN floating switches

These floating switches are designed for mounting **from the side** or **from the top**.

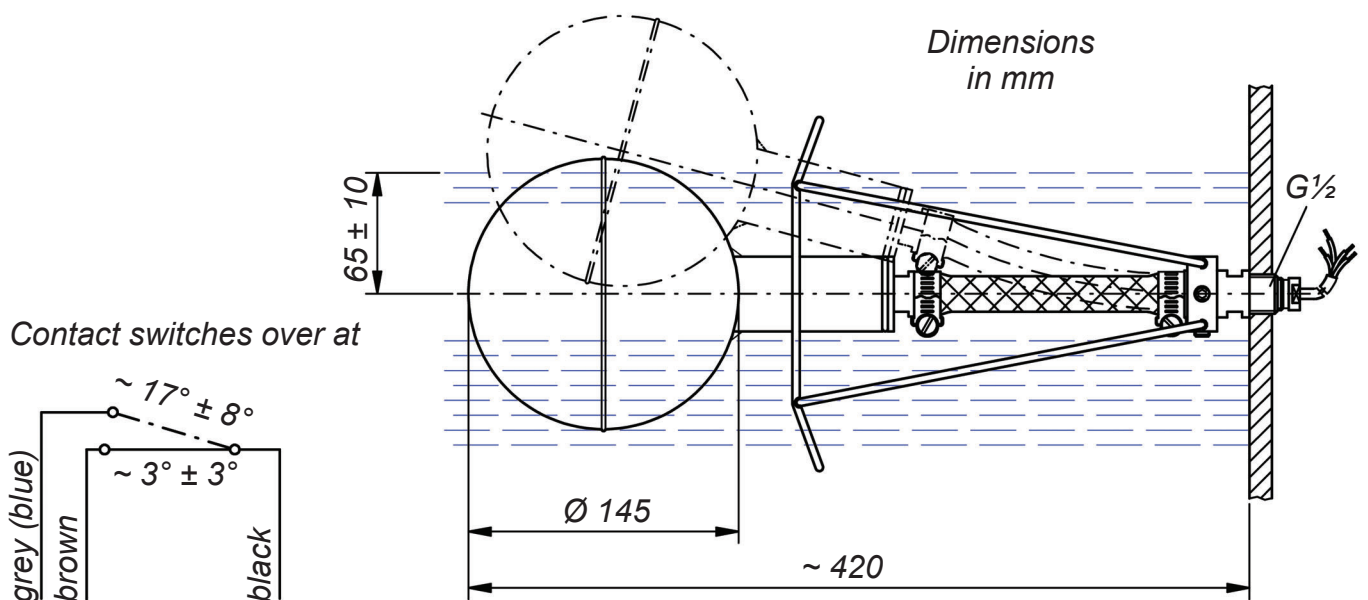
To ensure correct switching the G $\frac{1}{2}$ screw-in nipple must be screwed and tightened in a horizontal G $\frac{1}{2}$ sleeve of a tank or a mounting tube.

Technical data	SSR 3/K/RN	SSR 1/K/RN
Switching voltage	between AC/DC 12 V and 250 V	between AC/DC 5 V a. AC 42 V / DC 30 V
Switching current	between AC 100 mA and 3 (1) A or between DC 20 mA and 100 mA max. 350 VA	between AC 1 mA and 100 (50) mA or between DC 1 mA and 500 mA max. 15 VA
Switching capacity		
Operating principle	ball-operated microswitch, potential-free changeover contact	
Float / protective bellows / screw-in nipple: • Material • Seal • Protection class	stainless steel 316Ti PTFE in installed condition inside the tank: IP68, on the stuffing gland screw fitting outside the tank: IP54	
Electrical connection	connecting cable, see table below The connecting cable is routed through a protective bellows to which a G$\frac{1}{2}$ screw-in nipple is fastened. length 2 m, longer on request When ordering, please always state the desired cable length.	
Pressure resistance	max. 3 bar at + 20°C, however only for hydraulic pressures and not suitable for pressures in line with the Pressure Equipment Directive 2014/68/EU	
Optional extra: • Stirrup	made of stainless steel 316Ti to limit the movement of the float (recommended)	

Connecting cable						
Type	Material or cable designation	Number of cores and mm ² per conductor	Special aspects	Colour	Required liquid density (g/cm ³)	Temperature range (in water)
RN	A05RN-F	4G0.75	—	black	≥ 0.7	0°C to + 70°C



Switching action in liquids with a density of 1 g/cm^3
Diagram of SSR ... with stainless steel stirrup (optional)





SS/PTFE 55/A ./K floating switches

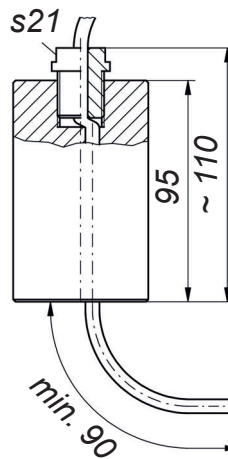
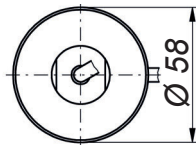
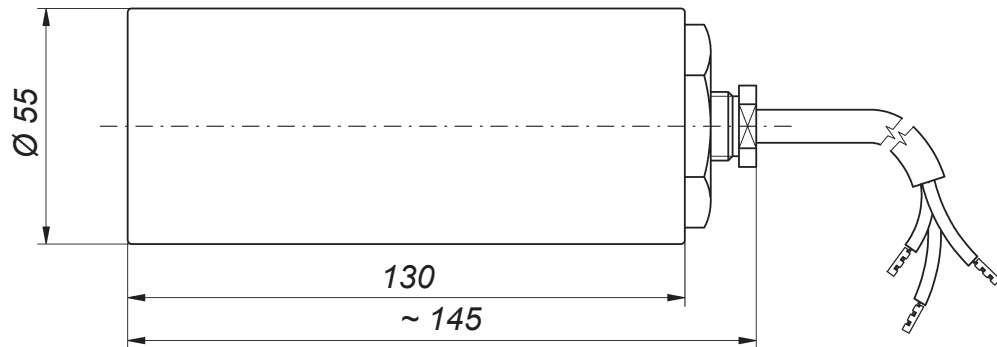
These floating switches are designed **for mounting from the top**.

To ensure a correct switching the cable must be fixed at the required height using a fixing weight or a mounting tube.

Technical data	SS/PTFE 55/A 3/K	SS/PTFE 55/A 1/K
Switching voltage	between AC/DC 12 V and 250 V	between AC/DC 5 V a. AC 42 V / DC 30 V
Switching current	between AC 100 mA and 3 (1) A or between DC 20 mA and 100 mA max. 350 VA	between AC 1 mA and 100 (50) mA or between DC 1 mA and 500 mA max. 15 VA
Switching capacity		
Operating principle	ball-operated microswitch, potential-free changeover contact	
Float: <ul style="list-style-type: none">• Material• Seal• Protection class	PTFE FKM/FPM IP68	
Electrical connection	connecting cable, see table below length 2 m, longer on request When ordering, please always state the desired cable length.	
Pressure resistance	for pressureless applications, use only under atmospheric conditions	
Optional extra: <ul style="list-style-type: none">• Fixing weight	FG 58x95/PTFE made of PTFE	

Connecting cable						
Type	Material or cable designation	Number of cores and mm ² per conductor	Special aspects	Colour	Required liquid density (g/cm ³)	Temperature range (in water)
PTFE	PTFE	3X0.75	—	white	≥ 1	0°C to + 85°C

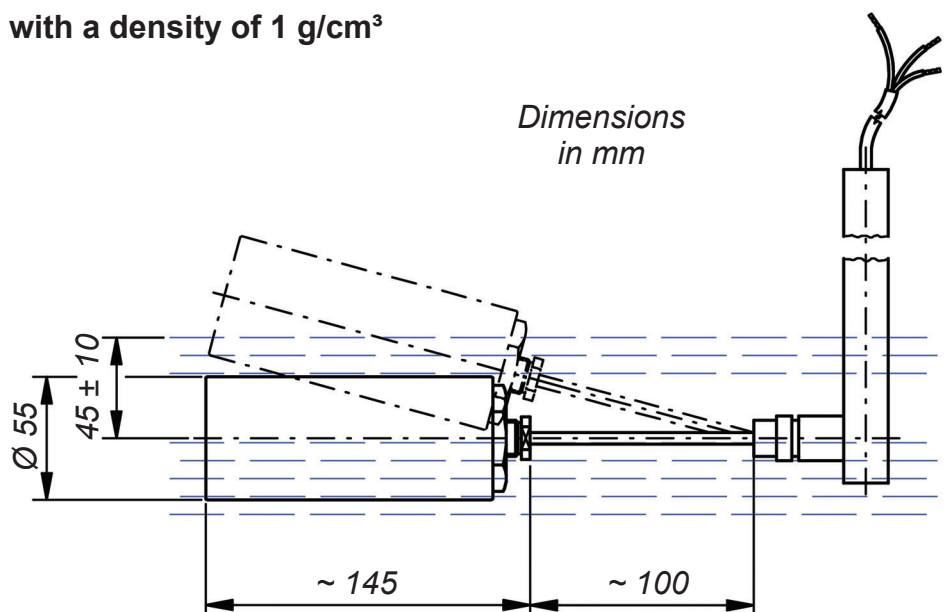
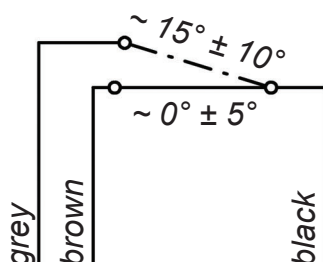
SS/PTFE 55/A .IK



FG 58x95/PTFE
fixing weight
made of PTFE

Switching action in liquids with a density of 1 g/cm³

Contact switches over at

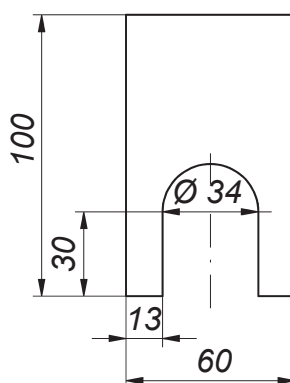
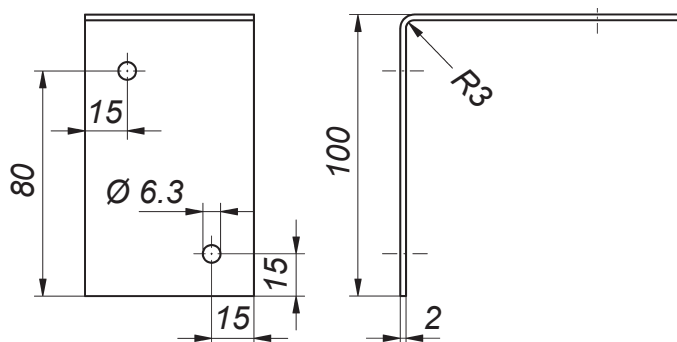




Further mounting accessories

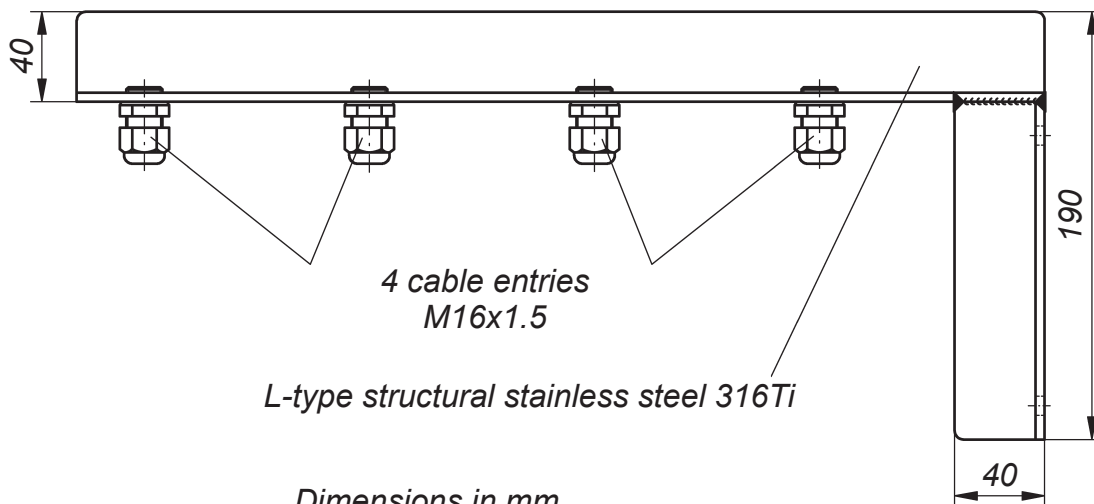
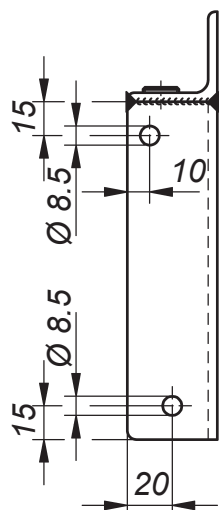
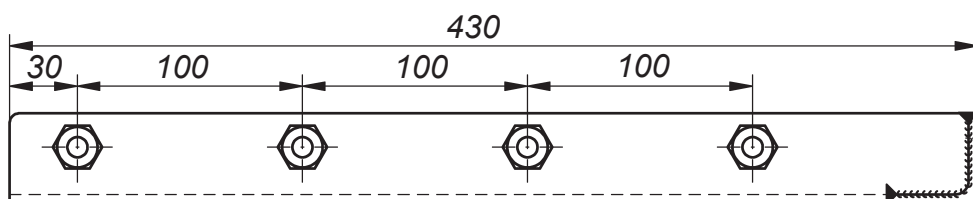
MW 100x100x60/G1/L stainless steel 316Ti mounting bracket with open lateral oblong hole

For G1 stuffing gland or
screw-in nipple
(fixing of the G1 stuffing gland or
screw-in nipple via
a G1 counternut)



Further mounting brackets for
respectively 1 floating switch
see pages 16-1-...

MW 190x430x40/4xM16-Ms stainless steel 316Ti mounting bracket with 4 cable entries made of nickel-plated brass (on request made of PP or stainless steel) suitable for 4 floating switches



Dimensions in mm

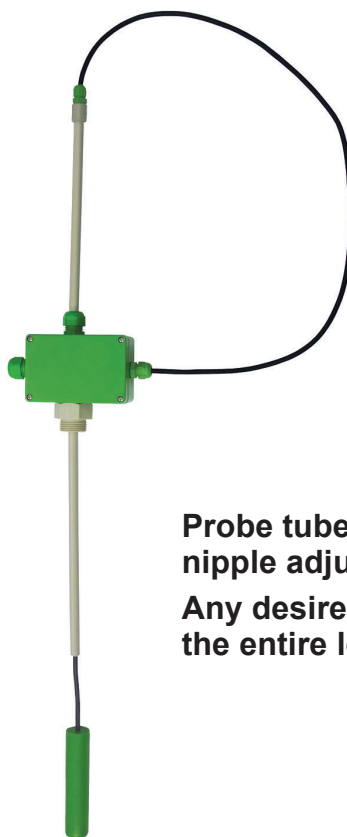


Application example:
MW 190x430x40/4xM16-PP mounting bracket
with 4 cable entries made of PP,
with 4 SSX .K/TPK/IG floating switches
(with internal fixing weight)



TSV/... level monitors

for maximum or minimum display or warning signal



Probe tube in terminal box / screw-in nipple adjustable

Any desired level can be detected along the entire length of the probe tube.

Technical data

TSV/PP/SSP 1/K/...
TSV/PP/SSP 3/K/...

TSV/E/SSP 1/K/...
TSV/E/SSP 3/K/...

... = connecting cable type

Probe tube:

- Material
- Diameter
- Length

PP

I

stainless steel 316Ti

12 mm

approx. 500 mm, longer on request

Screw-in nipple

PP, G1

stainless steel 316Ti, G1

Electrical connection

A 307 terminal box made of PP,
120 x 80 x 55 mm,
IP54

Mounting orientation

vertical

Temperature range

depends on the type of cable used,
see page 1-1-5

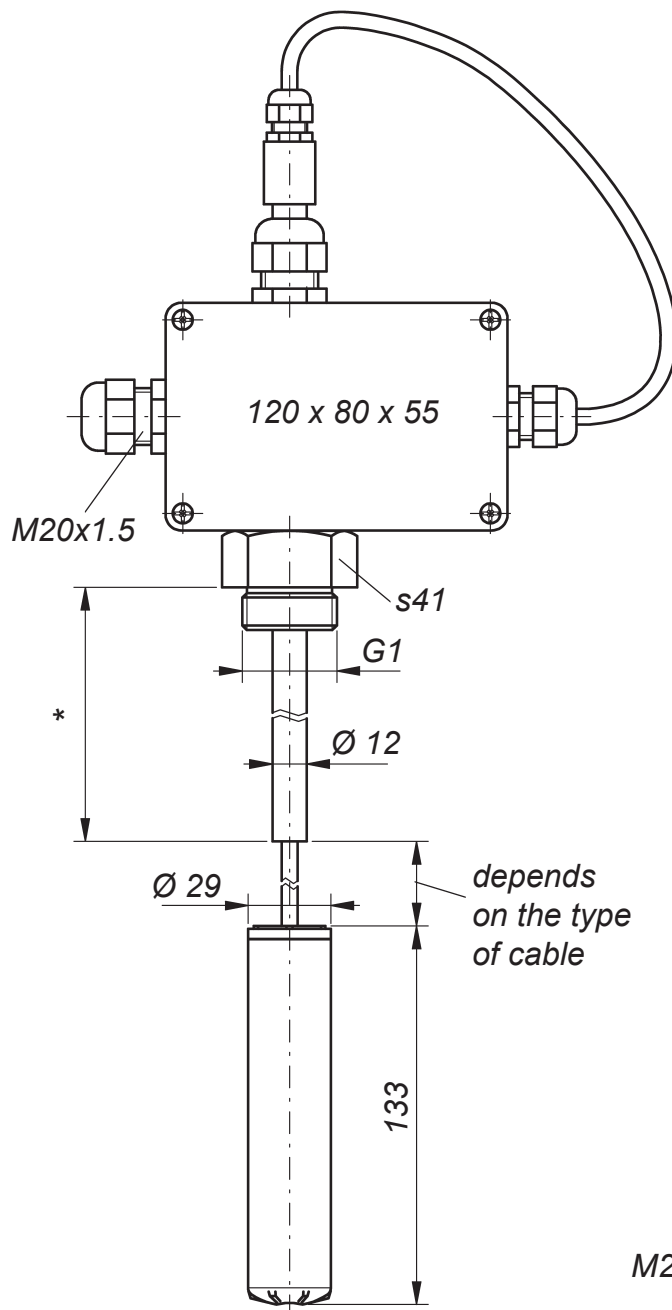
Pressure resistance

for pressureless applications,
use only under atmospheric conditions

Floating switch

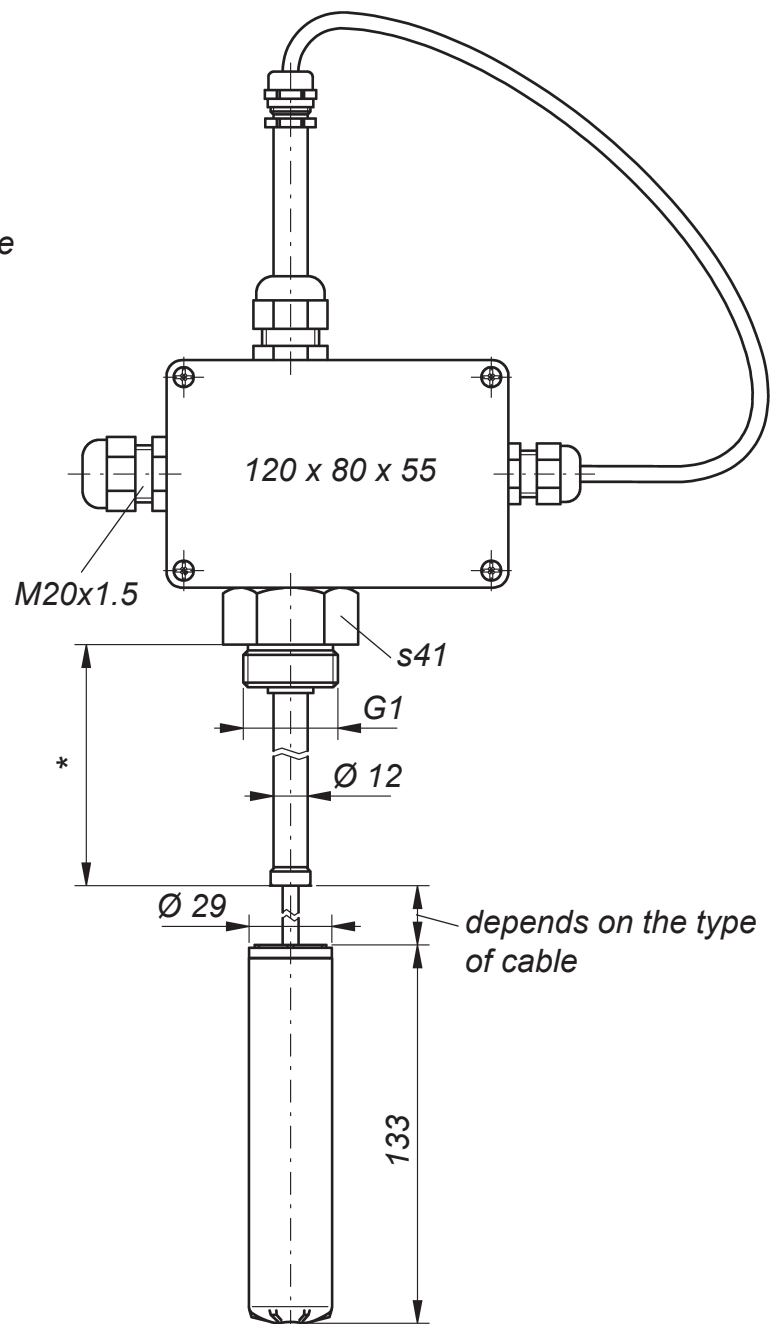
SSP .K/... (to be specified),
see page 1-1-5

TSV/PP/SSP .IK/...



* standard approx. 500 mm,
longer on request

TSV/E/SSP .IK/...





TS/O/. x SSP ./K/... immersion probes

for the automatic regulation of liquid levels

Functional description based on a switching example: Automatic filling of a tank

The bottom floating switch falls together with the liquid to the minimum level and acts on the contactor when it falls below the horizontal.

Liquid is then pumped into the tank. When the maximum level is reached, the top floating switch rises above the horizontal, the contactor holding circuit is interrupted, and the filling process is stopped.

Technical data	TS/O/. x SSP ./K/...
Probe tube: • Material • Diameter • Length	PP see table below on request
Screw-in nipple (on request)	PP (see table below)
Flange	on request
Electrical connection	terminal box, IP65, • A 307 made of PP, for max. 12 terminals, 120 x 80 x 55 mm • A 113 made of polyester, for more than 12 terminals, 160 x 160 x 90 mm
Mounting orientation	vertical
Temperature range	depends on the type of cable used, see page 1-1-5
Pressure resistance	for pressureless applications, use only under atmospheric conditions
Floating switches	SSP ./K/... (to be specified), see page 1-1-5



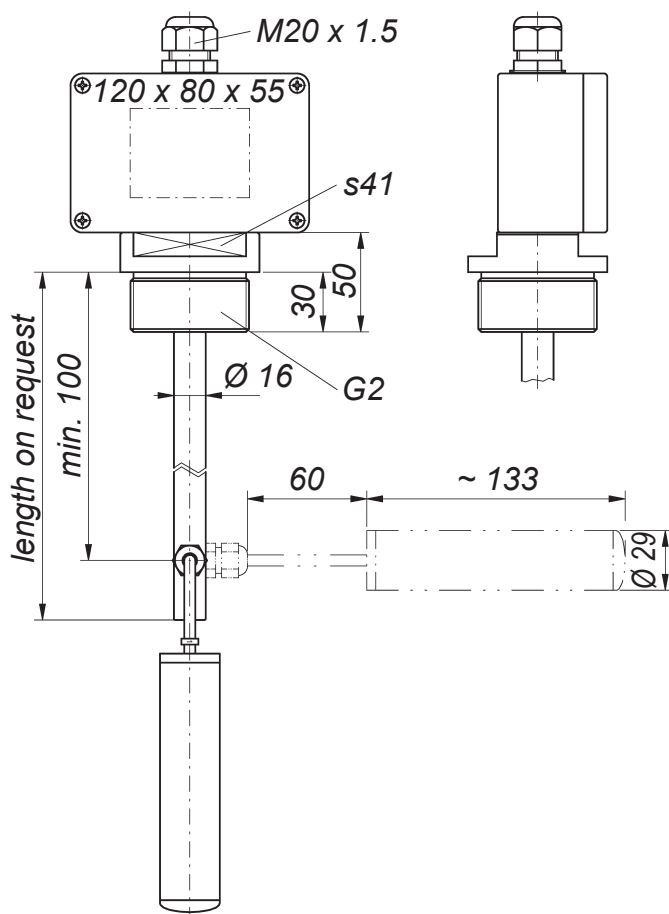
Type designation	Number of mounted floating switches	Floating switches	Probe tube diameter	Screw-in nipple (on request)
TS/O/1 x SSP ...	1	SSP ./K/...	16 mm	G1½ or G2
TS/O/2 x SSP ...	2		20 mm	G2
TS/O/3 x SSP ...	3		25 mm	G2
TS/O/4 x SSP ...	4		25 mm	G2
TS/O/5 x SSP ...	5		25 mm	G2
./K/... = to be specified: see page 1-1-5				

On request: • with more than 5 mounted floating switches
• with adjustable screw-in nipple

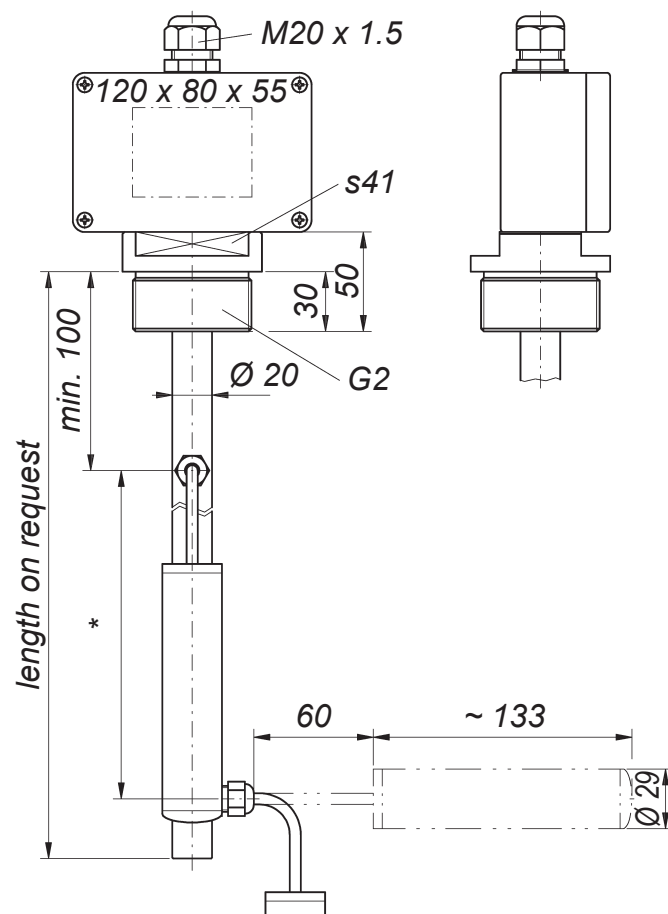
The above equipment will be manufactured in accordance with customer's specifications.

For enquiries or orders, please complete the questionnaire
on page 1-1-31 or 1-1-32.

TS/O/1 x SSP .IK/...

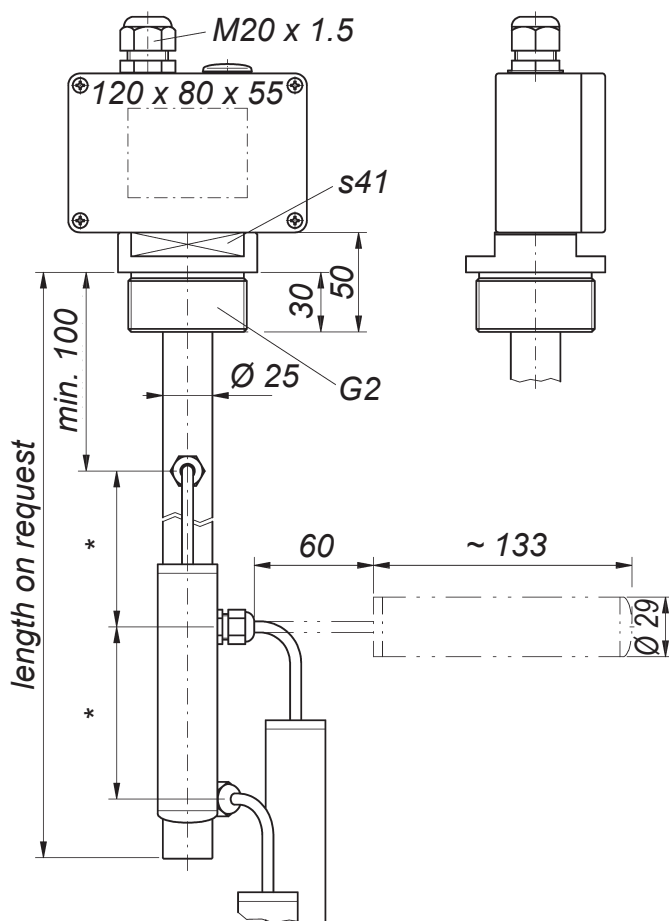


TS/O/2 x SSP .IK/...

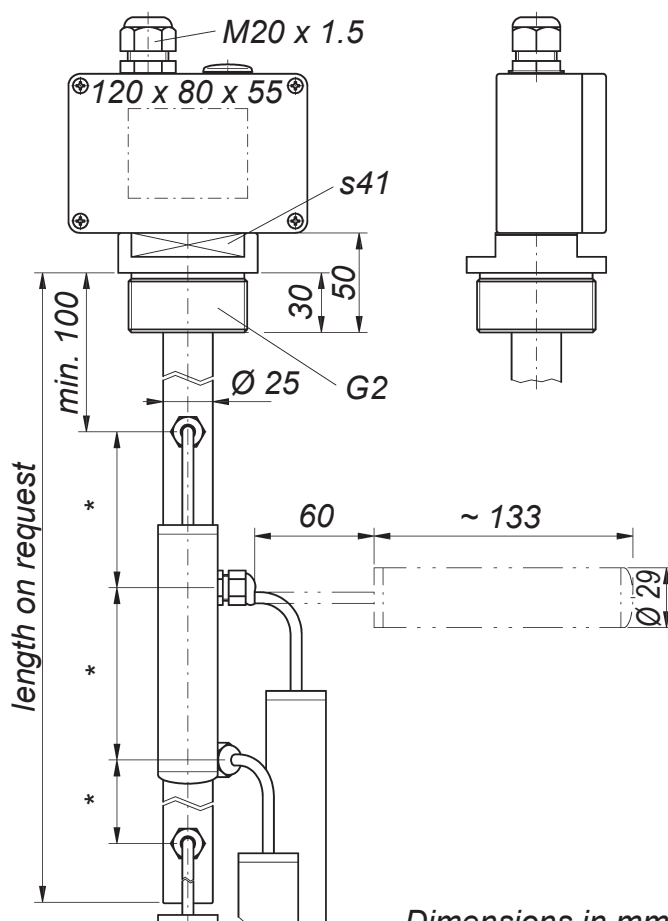


* Min. distance between two SSP .IK/...: 200 mm. In case of smaller distances, the SSP .IK/... must be offset from each other by min. 45° to max. 90°

TS/O/3 x SSP .IK/...



TS/O/4 x SSP .IK/...



Dimensions in mm



TS/O/. x SSL ./K/... immersion probes

for the automatic regulation of liquid levels

Functional description based on a switching example: Automatic filling of a tank

The bottom floating switch falls together with the liquid to the minimum level and acts on the contactor when it falls below the horizontal.

Liquid is then pumped into the tank. When the maximum level is reached, the top floating switch rises above the horizontal, the contactor holding circuit is interrupted, and the filling process is stopped.



Technical data	TS/O/. x SSL ./K/...
Probe tube: • Material • Diameter • Length	PP see table below on request
Screw-in nipple (on request)	PP (see table below)
Flange	on request
Electrical connection	terminal box, IP65, • A 307 made of PP, for max. 12 terminals, 120 x 80 x 55 mm • A 113 made of polyester, for more than 12 terminals, 160 x 160 x 90 mm
Mounting orientation	vertical
Temperature range	0°C to + 85°C
Pressure resistance	for pressureless applications, use only under atmospheric conditions
Floating switches	SSL ./K/... (to be specified), see page 1-1-7

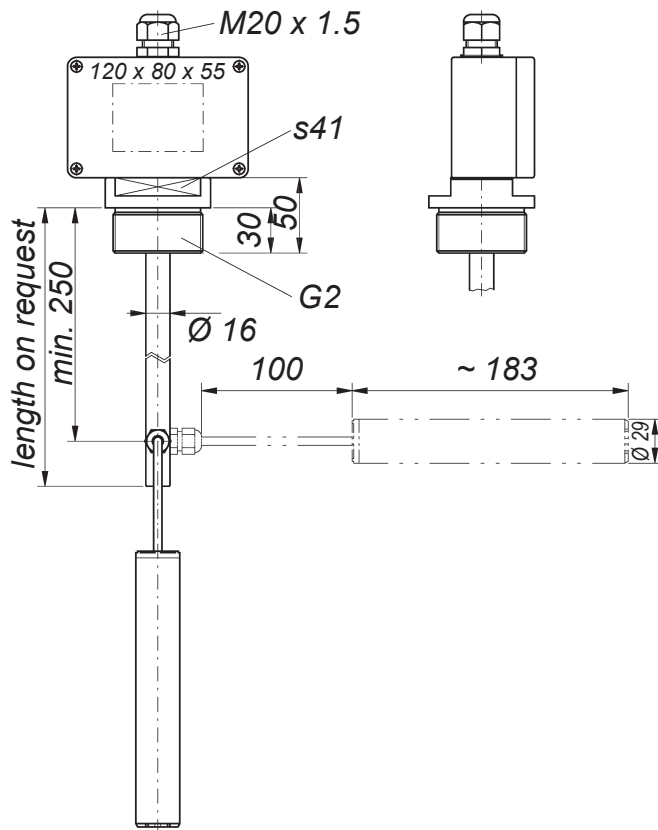
Type designation	Number of mounted floating switches	Floating switches	Probe tube diameter	Screw-in nipple (on request)
TS/O/1 x SSL ...	1	SSL ./K/...	16 mm	G1½ or G2
TS/O/2 x SSL ...	2		20 mm	G2
TS/O/3 x SSL ...	3		25 mm	G2
TS/O/4 x SSL ...	4		25 mm	G2
TS/O/5 x SSL ...	5		25 mm	G2
./K/... = to be specified: see page 1-1-7				

On request: • with more than 5 mounted floating switches
• with adjustable screw-in nipple

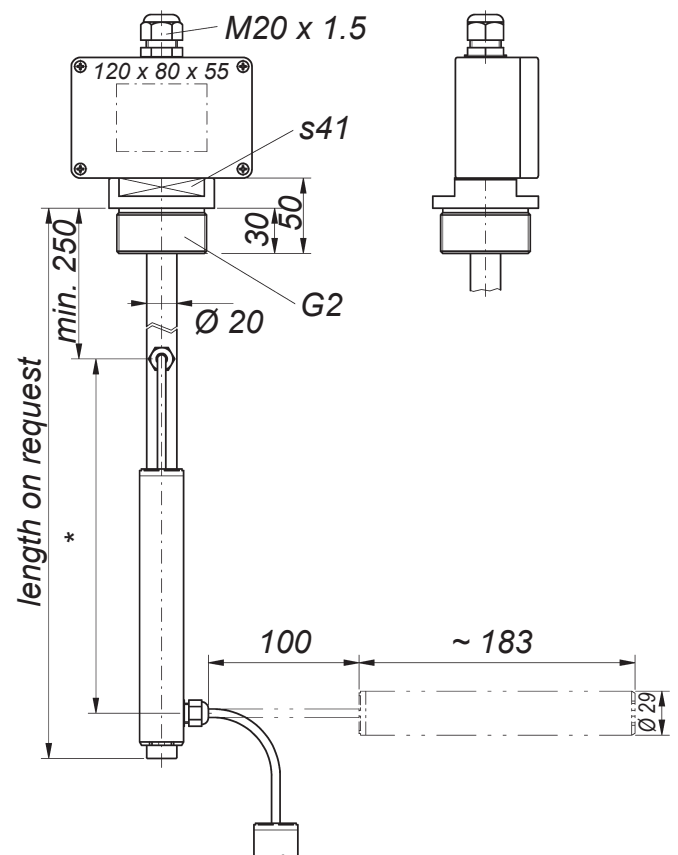
The above equipment will be manufactured in accordance with customer's specifications.

For enquiries or orders, please complete the questionnaire
on page 1-1-31 or 1-1-32.

TS/O/1 x SSL ./K/...

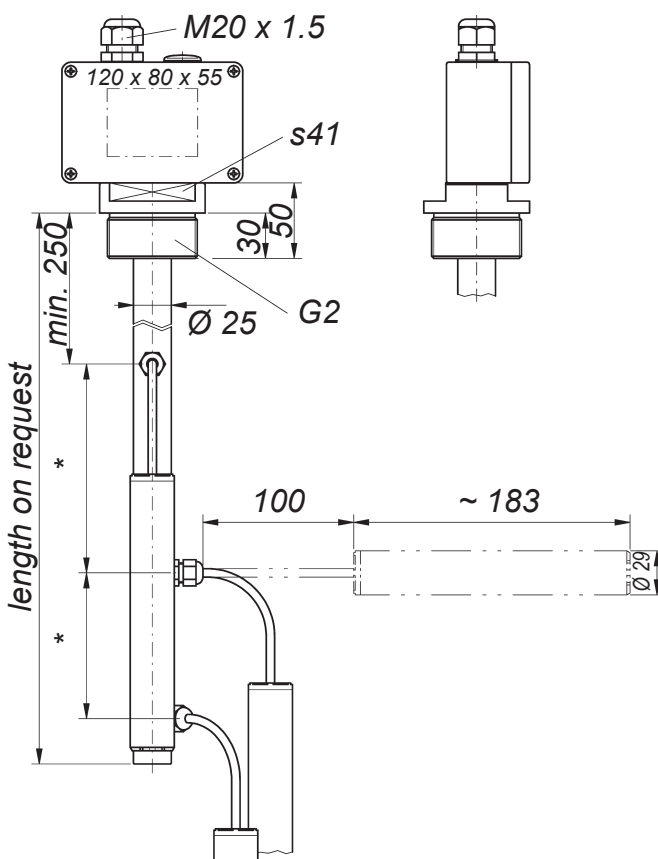


TS/O/2 x SSL ./K/...

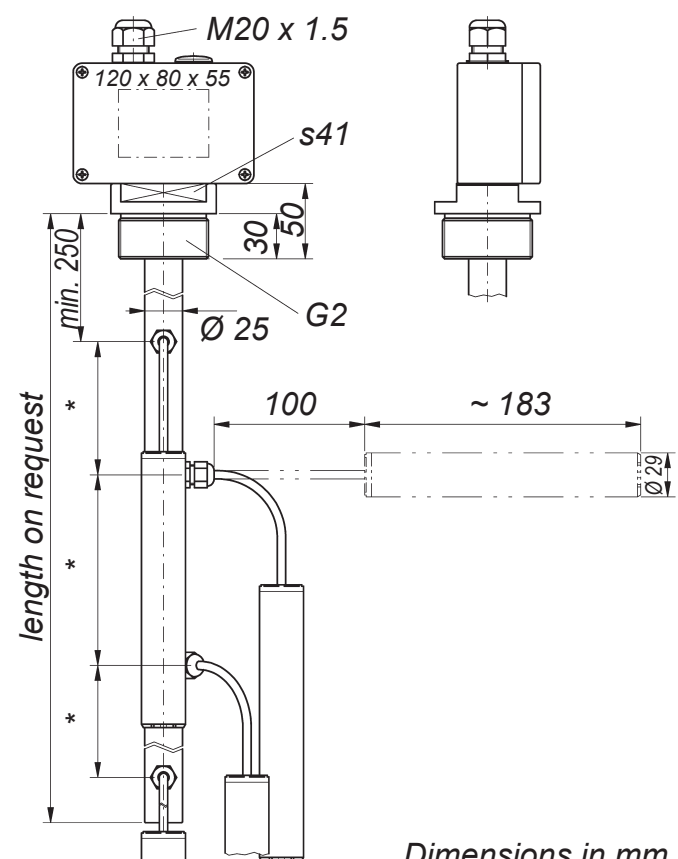


* Min. distance between two SSL ./K/...: 350 mm. In case of smaller distances, the SSL ./K/... must be offset from each other by min. 45° to max. 90°

TS/O/3 x SSL ./K/...



TS/O/4 x SSL ./K/...



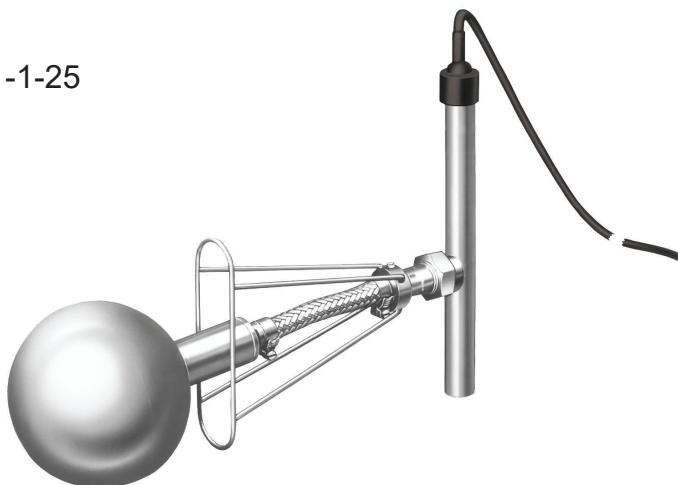
Dimensions in mm



TS/... immersion probes

for the automatic regulation of liquid levels

Mode of operation:
see example on page 1-1-25



TS/E/1 x SSR ./K/...

with stainless steel stirrup to limit float movement and with cable in place of terminal box

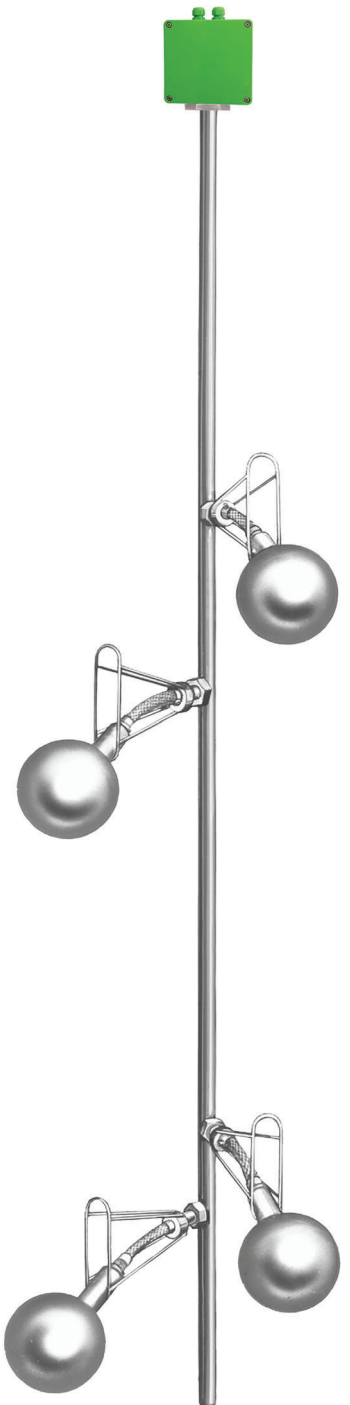
Technical data	TS/PP/. x SSX ./K/...	TS/G/. x SSX ./K/...	TS/E/. x SSR ./K/...
Probe tube: • Material • Diameter • Length	PP	stainless steel 316Ti see table on page 1-1-30 on request	
Flange	on request, but making allowance for the installation dimensions of the mounted floating switches		
Electrical connection	• terminal box, IP65, A 113 made of polyester or A 113b made of cast aluminium, each 160 x 160 x 90 mm, • connecting cable on request		
Mounting orientation	vertical		
Temperature range	depends on the type of cable used, see page 1-1-13 1-1-13 1-1-17		
Pressure resistance	for pressureless applications, use only under atmospheric conditions		
Floating switches	SSX ./K/... 1-1-13	SSX ./K/... (to be specified) see page 1-1-13	SSR ./K/... 1-1-17

The above equipment will be manufactured in accordance with customer's specifications.

For enquiries or orders, please complete the questionnaire on page 1-1-31 or 1-1-32.

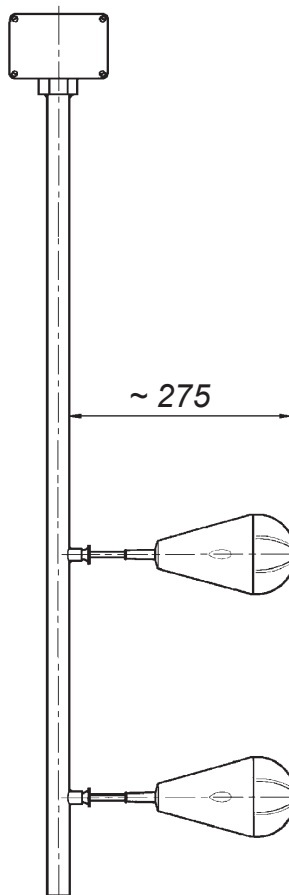
Type overview			
Type designation	Number of mounted floating switches	Floating switches	Probe tube diameter
TS/PP/1 x SSX ./K/...	1	SSX ./K/...	32 mm
TS/PP/2 x SSX ./K/...	2		
TS/PP/3 x SSX ./K/...	3		
TS/PP/4 x SSX ./K/...	4		
TS/PP/5 x SSX ./K/...	5		
TS/G/1 x SSX ./K/...	1	SSX ./K/...	28 mm
TS/G/2 x SSX ./K/...	2		28 mm
TS/G/3 x SSX ./K/...	3		34 mm
TS/G/4 x SSX ./K/...	4		34 mm
TS/G/5 x SSX ./K/...	5		34 mm
TS/E/1 x SSR ./K/...	1	SSR ./K/...	28 mm
TS/E/2 x SSR ./K/...	2		28 mm
TS/E/3 x SSR ./K/...	3		34 mm
TS/E/4 x SSR ./K/...	4		34 mm
TS/E/5 x SSR ./K/...	5		34 mm
./K/... = to be specified: see page 1-1-13 or 1-1-17 On request also with more than 5 mounted floating switches.			

TS/E/4 x SSR ./K/...
with stirrups

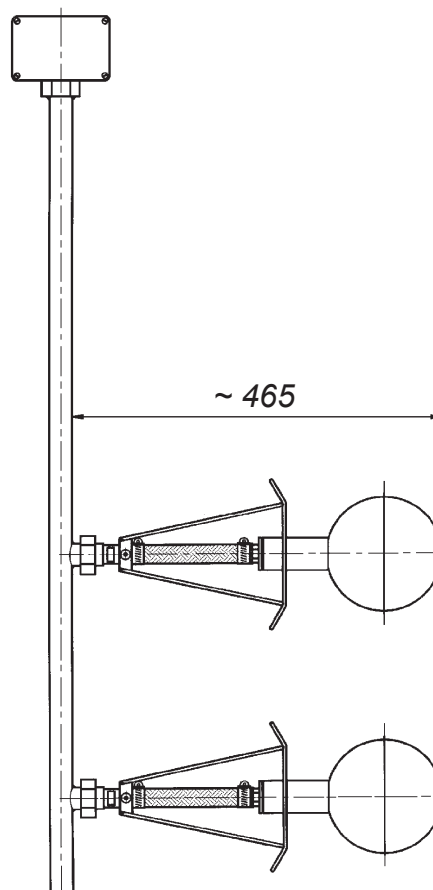


Design examples

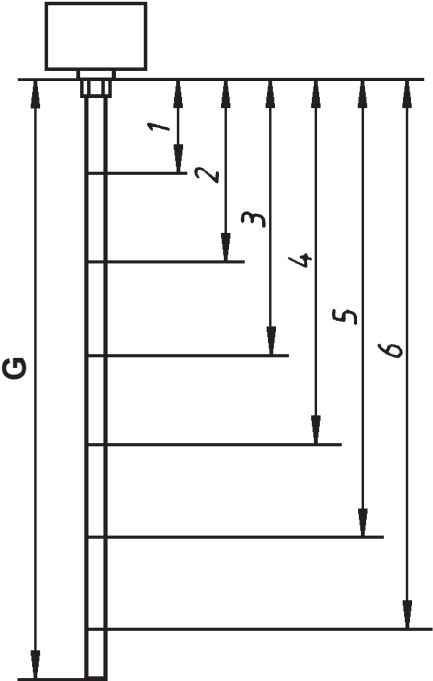
TS/G/2 x SSX ./K/...



TS/E/2 x SSR ./K/...
with stirrups



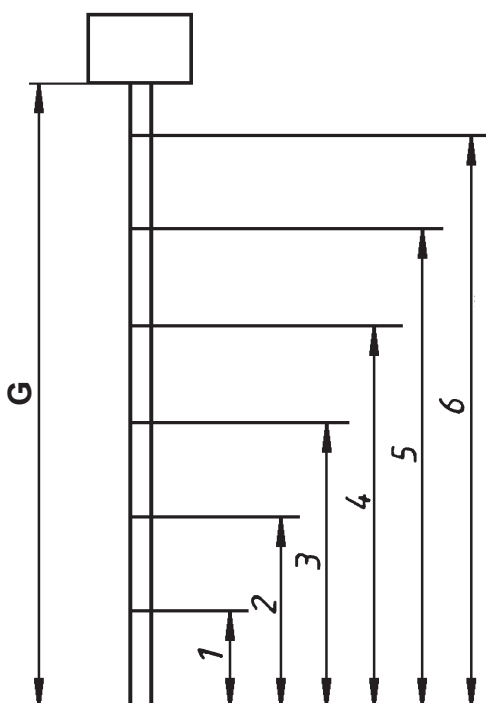
Questionnaire for enquiries and orders for immersion probes <u>with</u> screw-in nipple or flange	
Tank dimensions and installation conditions (sketch if applicable)	
Type of liquid	
Density	
Viscosity	
Temperature	
Desired type	TS/...
Desired probe tube length (dimension G)	



When planning the design of the immersion probes, please consider that **when the liquid level rises**, the contact of the floating switches is not activated when the floating switches **reach the horizontal position**, but is activated as depicted in the diagrams of the various floating switches on page 1-1-6 and on the following pages. **When the liquid level sinks** the contact of the floating switches is activated **approximately at the level of the horizontal**.

	Desired floating switch type	Distance from sealing surface of screw-in nipple or flange in mm	Switching function (e.g. high alarm, pump ON, pump OFF, dry-run protection)	Working direction of the floating switch: rising = ↑ falling = ↓
1				
2				
3				
4				
5				
6				
Desired options:				

Questionnaire for enquiries and orders for immersion probes <u>without</u> screw-in nipple or flange	
Tank dimensions and installation conditions (sketch if applicable)	
Type of liquid	
Density	
Viscosity	
Temperature	
Desired type	TS/...
Desired probe tube length (dimension G)	

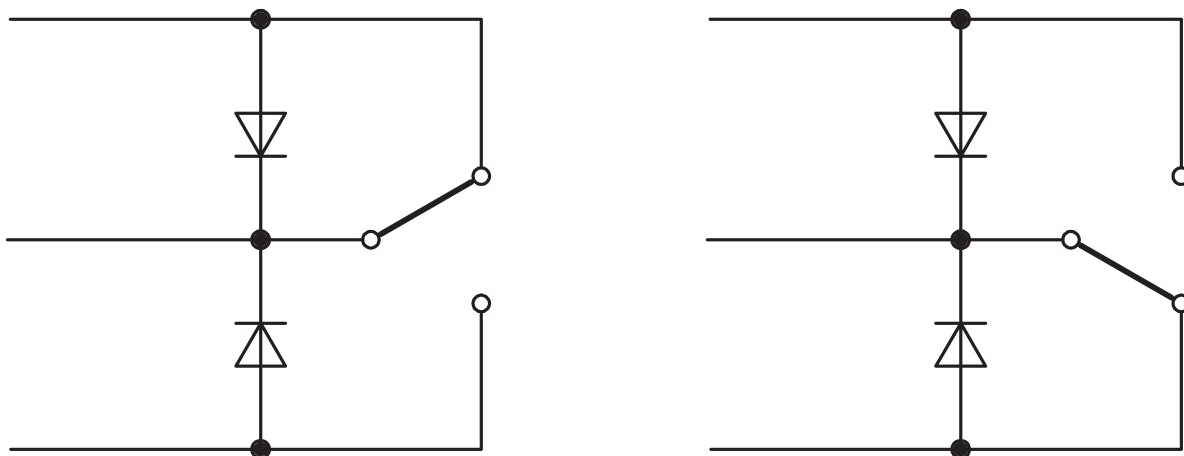


When planning the design of the immersion probes, please consider that **when the liquid level rises**, the contact of the floating switches is not activated when the floating switches **reach the horizontal position**, but is activated as depicted in the diagrams of the various floating switches on page 1-1-6 and on the following pages. **When the liquid level sinks** the contact of the floating switches is activated **approximately at the level of the horizontal**.

	Desired floating switch type	Distance from sealing surface of screw-in nipple or flange in mm	Switching function (e.g. high alarm, pump ON, pump OFF, dry-run protection)	Working direction of the floating switch: rising = ↑ falling = ↓
1				
2				
3				
4				
5				
6				
Desired options:				

Variant 1:

Two diodes of the type 1N4004 or equivalent



Variant 2:

Three resistors

Standard versions:

R 1, R 2 $\geq 2 \text{ k}\Omega$ and $\geq \frac{1}{4} \text{ W}$

R 3 $\geq 330 \Omega$ and $\geq 1 \text{ W}$

NAMUR version:

R 1, R 2 = $15 \text{ k}\Omega$ and $\geq \frac{1}{4} \text{ W}$

R 3 = $1.2 \text{ k}\Omega$ and $\geq 1 \text{ W}$

