

## Float Switches

### Design and Function

BERNSTEIN float switches are designed as contactless magnetic switches. They are used to control level in containers / tanks with non-flowing and / or flowing liquids such as water, oils, caustic solutions etc.

Float switches consist of a connection head, an immersion tube with one to four magnetic sensor elements and a float. Versions with straight or elbow immersion tube are available.

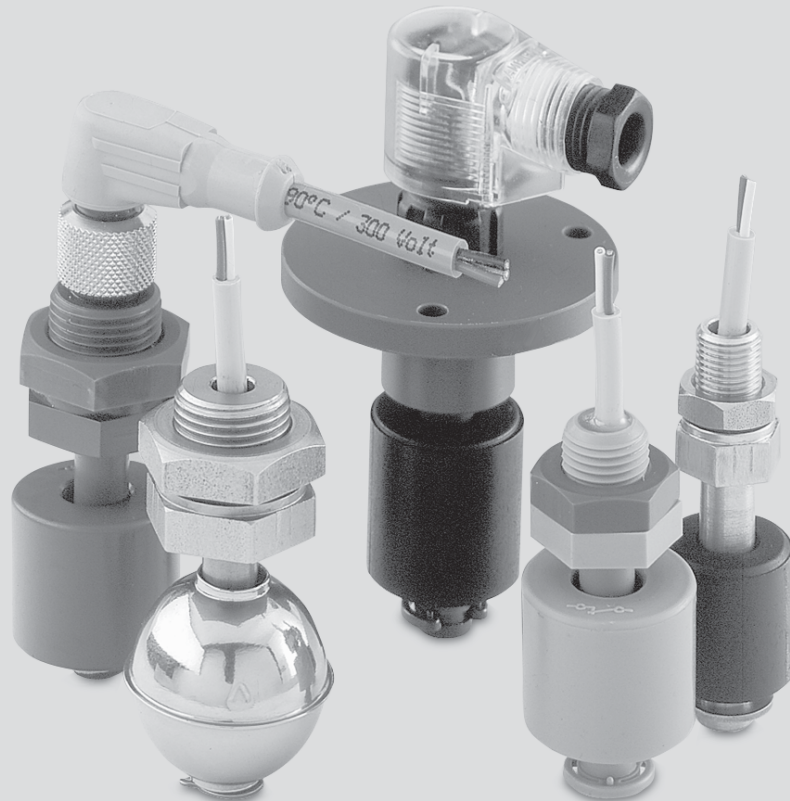
Rising or falling liquid levels carry the float equipped with a ring magnet into the detection zone of a magnetic sensor element, where the magnetic field of the float is evaluated and a switching pulse generated.

The range of BERNSTEIN float switches extends from miniature float switches through to heavy-duty, pressure-proof versions.

The combination options between various enclosure materials, floats and connection heads make it possible to create the optimum configuration for virtually any application.

Based on a comprehensive modular system of adjustable float switches, the product range offers an enormous problem solution potential. It allows the user to adjust the required switching points to individual applications, thus creating a customised product ideally adaptable to specific operating conditions.

BERNSTEIN additionally offers many other specific solutions that cannot all be illustrated in one catalogue. For more demanding applications it is therefore recommended to contact BERNSTEIN using a fax enquiry / Order form at the end of this section.



#### BERNSTEIN miniature float switches

To ensure smooth running operating processes, in many devices and industrial systems it is necessary to monitor product level in the most confined spaces.

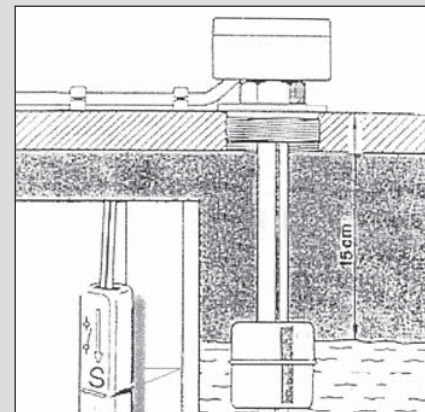
These miniature float switches have been specially developed for small tanks / reservoirs as used in the automotive industry, drinks vending machines, air conditioning systems etc.

The NC / NO contact switching function in many miniature switches can be selected by simply turning the float by 180°.

This type of miniature float switch is also available with individual lengths of immersion tube.

#### BERNSTEIN adjustable float switches

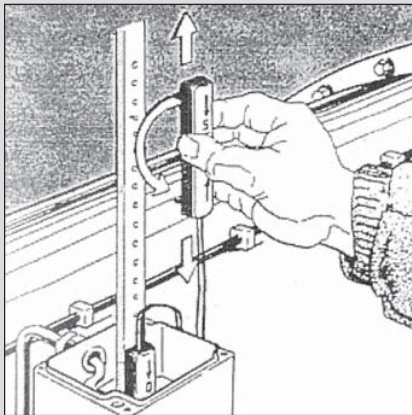
Up to four encapsulated magnetic sensor elements can be placed in any position at 10 mm intervals in the immersion tube of BERNSTEIN adjustable float switches.



Thanks to their extremely user-friendly design, each of these universally used devices can replace several conventional switches.

Instead of keeping a large assortment of different switches in stock, the user requires only one single device.

The NC or NO contact switching function can be easily adapted to specific operating conditions.



All versions are available as standard in four lengths (250, 500, 750 and 1000 mm). Other lengths are possible on request.



### BERNSTEIN standard float switches

For over 25 years it has been hard to imagine fluid level regulation, control and monitoring systems without BERNSTEIN standard float switches. In addition to being used to simply provide a signal when a liquid level drops below or exceeds a defined value, they also ideally serve as signal generators in automatically operating filling systems.

With a wide range of different floats, enclosure materials and connection heads to choose from, the optimum float switch can be configured for virtually any application. Lengths of up to 2 m are possible. Versions are available with an elbow immersion tube in the connection head or even with a specially developed switching device.

# Float Switches

## Terminology and Basic Theory

### Connection cable

Temperature resistant up to +70 °C, special versions up to +150 °C also available. Switches with cables come in the standard length of 1 m, other lengths are also possible on request.

### Radian (y)

The radian is the length measured from the contact surface of the connection head to the neutral phase of the vertical immersion tube.

### Chemical resistance

See "Chemical Resistance" table (Page 133).

### Pressure

Up to 25 bar depending on type of float.

### Disruptive breakdown voltage

Each float switch undergoes a high voltage test in accordance with DIN VDE 0160.

### Maximum making current

From 0.5 A – 5 A depending on type of sensor used.

### Immersion depth (h1)

Designates how far the float is immersed in the medium. This parameter is dependent on the density of the liquid as well as the size and weight of the float. The values listed in the catalogue refer to a density of 1.

### End length (e)

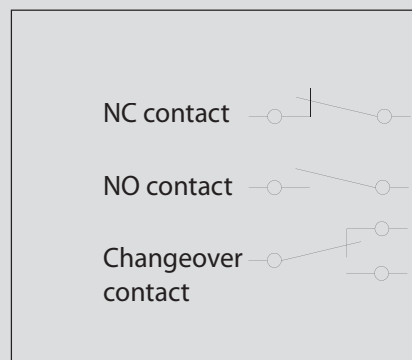
From 36 mm to 50 mm depending on the type of float.

### Electrical service life

To maintain a long service life of the float switches, it is important to ensure the maximum supply voltages and switching currents are not exceeded.

### Spark quenching

On request, all BERNSTEIN float switches can be equipped with protection circuitry which prevents wear caused by switching sparks when switching inductive or capacitive loads (please refer to protective circuitry for reed contacts).



### Contact function

### Performance diagram

The performance diagram shows the switching capacity as a function of the switching current (please refer to Page 67).

### Miniature float switches

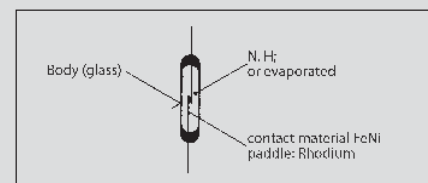
Favourable design and compact dimensions allow these float switches to be used in smallest containers.

### Mechanical wear

Thanks to the contactless operating principle, mechanical wear is not an issue.

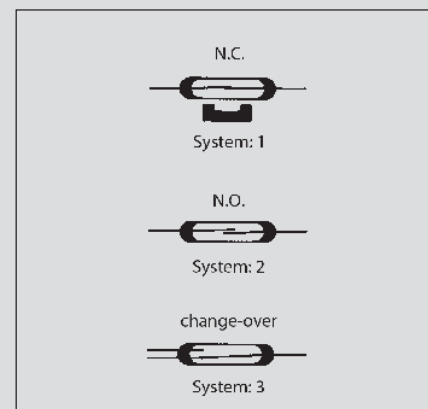
### Reed contact

A reed contact is a magnetically or electromagnetically operated switch. The pair of ferromagnetic contact studs are housed in a hermetically sealed glass tube filled with inert gas. Under the influence of a magnetic field, the contact paddles assume opposing polarity (north and south pole) and close when a sufficient force is applied. This procedure can be repeated millions of times even at extremely short time intervals.



Design of a reed contact

BERNSTEIN float switches are equipped with barium ferrite magnets that are located in the float. Opening and closing of the contact studs is determined by the magnet in the float correspondingly approaching or moving away. The delivery range includes normally-closed contacts, normally-open contacts and changeover contacts.



Versions of reed contacts

**Switching distances (o/m/u)**

The switching distances are defined with

- o = Top
- m = Middle
- u = Bottom

(please refer to Float Switch Enquiry and Order form on Page 134).

**Switch length (x)**

This is the length from the connection head up to the lower end of the tube.  
**x (max.) = 2000 mm**

**Maximum switching power**

3 VA – 250 VA depending on type of reed contact (please refer to Page 130).

**Immersion tube**

Available in PVC, MS63, stainless 1.4571.

**Maximum switching voltage**

100 V – 250 V depending on type of reed contact (please refer to Page 130).

**Switching point**

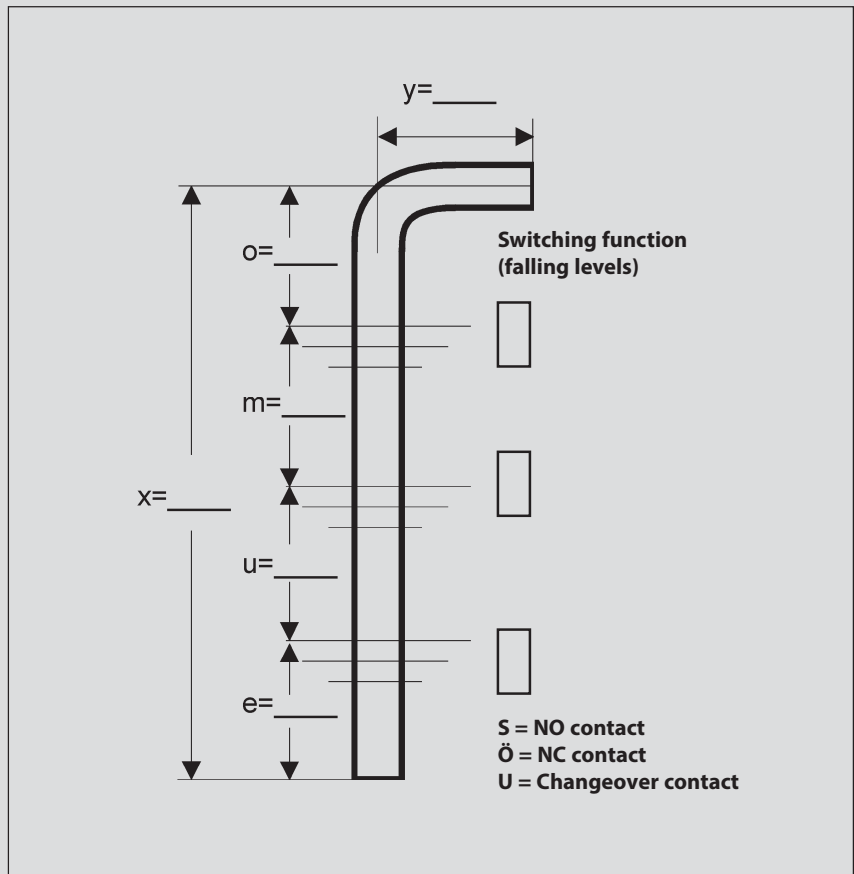
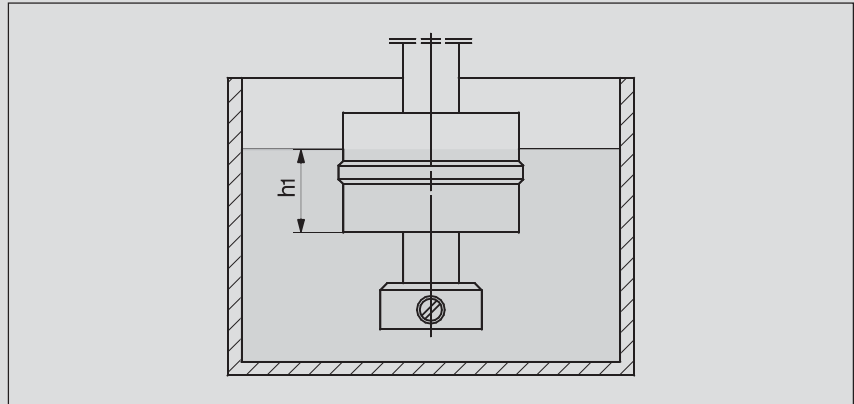
The float magnet initiates a switching signal by magnetising the contact studs of the reed contact. Three switching points per switch are possible (more on request).

**Switching path**

This corresponds to the path, on which the contact remains active while the float is moving in the same direction.

**Protection classes**

Corresponding to their ID code, the switches are dustproof and waterproof in accordance with IP 65 or IP 67 (EN 60529, IEC 529).



# Float Switches

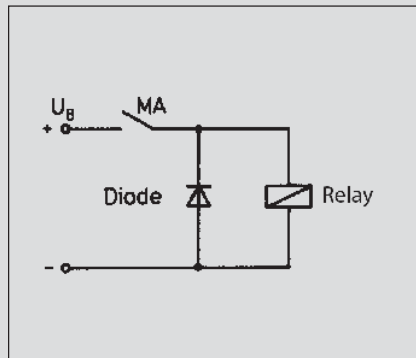
## Guidelines for reed contact protection

The values for current, voltage and power specified in the catalogue apply only to purely resistive loads. Very often, however, these loads are exposed to inductive or capacitive components. In these cases it is advisable to protect the reed contacts against voltage and current peaks. Whilst it is not possible to recommend a safe contact protection concept that applies to all load ranges (each individual case will require its own evaluation), we would like to present general guidelines on how reed contacts may be connected to different loads in order to avoid premature failure.

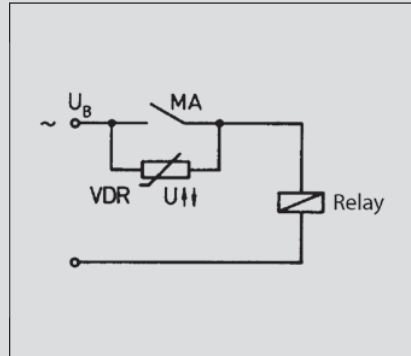
### 1. Inductive loads

In DC applications, contact protection is relatively easy to realise with the aid of a free-wheeling diode connected in parallel to the load. The diode polarity must be selected so that it blocks when normal operating voltage is applied but will short-circuit the voltage induced after the switch is opened (voltage peaks can significantly exceed the operating voltage).

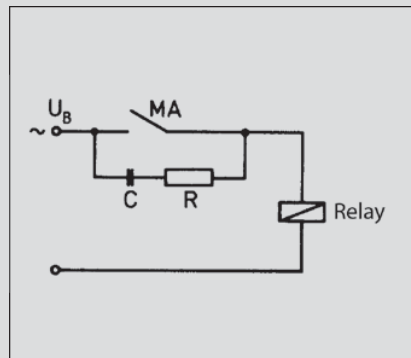
This can amount to a multiple of the operating voltage and initially cause a switching spark between the opening contact studs.



Suppression of voltage peaks with a free-wheeling diode



1) Voltage peaks induced by switching off inductive loads are suppressed by connecting a voltage-dependent resistor (VDR) in parallel to the reed contact.



2) In AC voltage applications effective protection is achieved with a combination of a resistor and a capacitor (RC element).

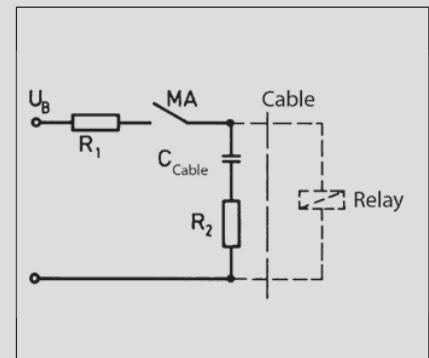
Generally, the RC element is connected in parallel to the contact and therefore in series to the load (vice versa is also possible).

### 2. Capacitive loads

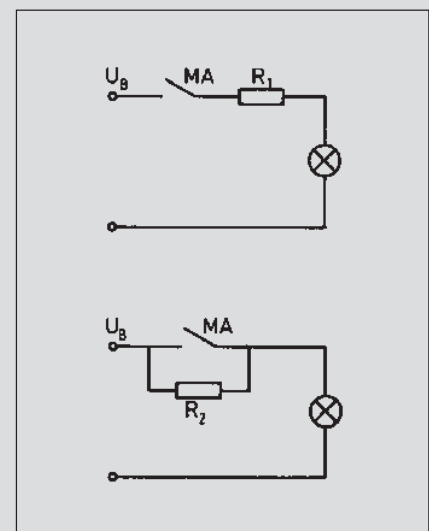
In contrast to inductive loads, an increase of making currents could occur in connection with capacitive loads and lamp loads that can damage and even weld contacts closed. When capacitors are switched (e.g. cable capacitance) a very high peak current occurs with its intensity depending on the capacitance and length of the cable leading to the switch.

A resistor connected in series to the contact will reduce this current. The size of the resistor is determined by the characteristics of the corresponding electric circuit. It should, however, be as large as possible to reduce the current to a permissible value, thus ensuring reliable contact protection.

### Contact protection with resistors for limiting current:

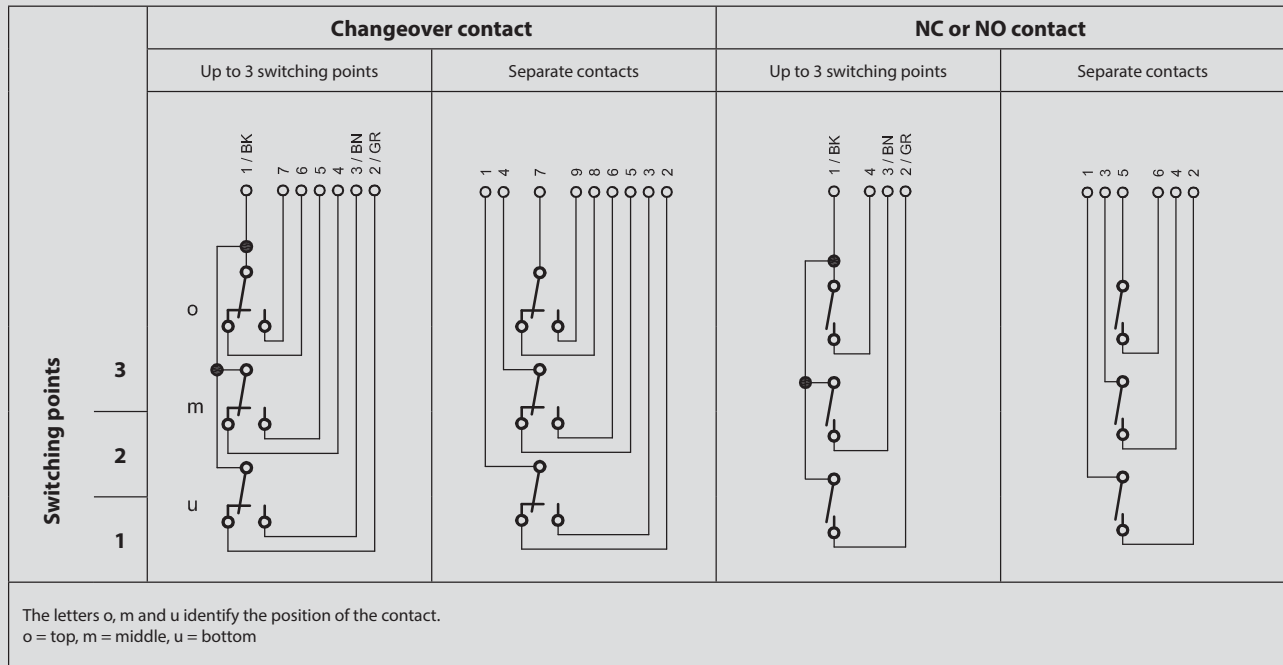


1) Capacitive load




2) Lam load

### Wiring diagram



# Standard float switches

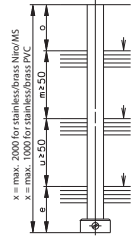
Ordering example:  
See Page 118

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Float switch – float combination	
Type	M	A		—

Min./max. dimensions



Switching distance for falling levels



Float switch – float combination



Half cable gland R3/8"



1.4571	1.4571	A	V	T	R	N	E
MS 59	MS63	M	L	C	S	P	F
PVC	PVC	K	D	I	U	—	—

Cable gland PG9



1.4571	1.4571	A	V	T	R	N	E
MS 58	MS63	M	L	C	S	P	F
PVC	PVC	K	D	I	U	—	—

ø 75 flange with connector



PC	1.4571	A	V	T	R	N	E
PC	MS63	M	L	C	S	P	F
PC	PVC	K	D	I	U	—	—

Float material	POM ø 40 x 27	PVC ø 42 x 44	PP ø 30 x 44	NBR ø 30 x 44	1.4571 ø 45 x 47	1.4571 ø 52
Connection head material						
Float switch material						




5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching power	Connection head	Standard range		Special features (see Page 119)
<b>7</b>						<b>S</b>		

		Number of switching points	Switching function	Switching power	Connection head			
		↓	↓	↓	↓			
		1 Switching point 2 Switching points 3 Switching points	1 NC contact 2 NO contact 3 Changeover contact 4 Mixed version (CO, NC, NO)	max. 0.5 A – 30 VA – 250 V  max. 1 A – 60 VA – 250 V min. switching power = 3 VA	<b>Straight type</b> Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC and brass versions.	<b>Elbow version</b> Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC versions.		
B	G	1/2/3	1/2/3/4	K	L	A		
O	H	1/2/3	1/2/3/4	K	L	A		
—	—	1/2/3	1/2/3/4	K	L	A		
B	G	1/2/3	1/2/3/4	K	L	V		
O	H	1/2/3	1/2/3/4	K	L	V		
—	—	1/2/3	1/2/3/4	K	L	V		
B	G	1/2/—	1/2/3/4	K	L	T		
O	H	1/2/—	1/2/3/4	K	L	T		
—	—	1/2/—	1/2/3/4	K	L	T		



# Standard float switches

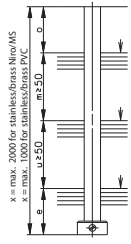
Ordering example:  
See Page 118

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Float switch – float combination	
Type	M	A		—

Min. / max. dimensions



Switching distance for falling levels



Float switch – float combination



Float material	POM ø 40 x 27	PVC ø 42 x 44	PP ø 30 x 44	NBR ø 30 x 44	1.4571 ø 45 x 47	1.4571 ø 52
Connection head material						
Float switch material						

Oval flange with connector








PC	1.4571	A	V	T	R	N	E
PC	MS63	M	L	C	S	P	F
PC	PVC	K	D	I	U	—	—

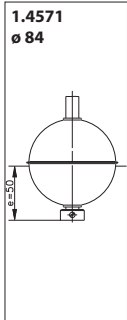
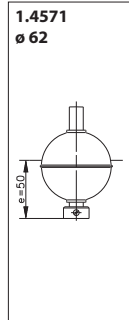
Flange enclosure ø 78



G-Al Si 12	1.4571	A	V	T	R	N	E
G-Al Si 12	MS63	M	L	C	S	P	F
G-Al Si 12	PVC	K	D	I	U	—	—

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching power	Connection head	Standard range		Special features (see Page 119)
<b>7</b>						<b>S</b>		

Number of switching points  
Switching function  
Switching power  
Connection head



1 Switching point  
2 Switching points  
3 Switching points

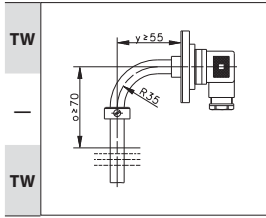
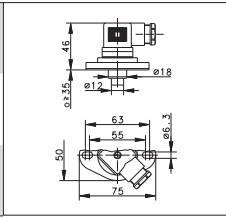
1 NC contact  
2 NO contact  
3 Changeover contact  
4 Mixed version (CO, NC, NO)

max. 0.5 A – 30 VA – 250 V  
max. 1 A – 60 VA – 250 V  
min. switching power = 3 VA

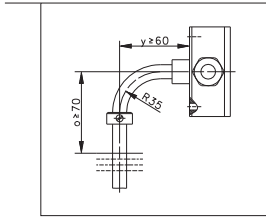
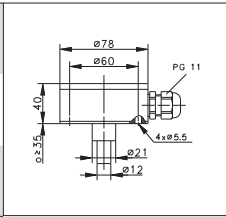
ID letter for connection head  
**Straight type**  
Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC and brass versions.

ID letter for connection head  
**Elbow version**  
Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC versions.

B	G	1/2	1/2/3/4	K	L	TO
O	H	1/2	1/2/3/4	K	L	TO
—	—	1/2	1/2/3/4	K	L	TO




B	G	1/2/3	1/2/3/4	K	L	S
O	H	1/2/3	1/2/3/4	K	L	S
—	—	1/2/3	1/2/3/4	K	L	S



# Standard float switches

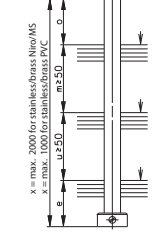
Ordering example:  
See Page 118

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Float switch – float combination	
Type	M	A		—

Min. / max. dimensions

Float switch – float combination

↓



**Switching distance for falling levels**

x = max. 2000 for stainless-steel Ni60/MS  
x = max. 1000 for stainless-steel PVC

↓

Float material	POM ø 40 x 27	PVC ø 42 x 44	PP ø 30 x 44	NBR ø 30 x 44	1.4571 ø 45 x 47	1.4571 ø 52
Connection head material						
Float switch material						

**Flange enclosure DN50  
ø 165**



1.4571/ G-Al Si 12	1.4571	A	V	T	R	N	E
PVC/ G-Al Si 12	PVC	K	D	I	U	—	—

**Flange enclosure DN65  
ø 185**



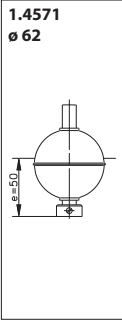
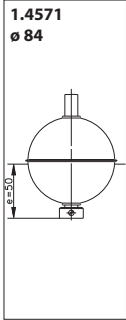
1.4571/ G-Al Si 12	1.4571	A	V	T	R	N	E
PVC/ G-Al Si 12	PVC	K	D	I	U	—	—

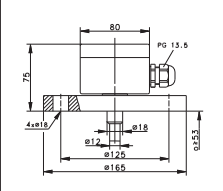
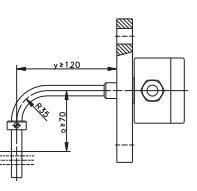
**Tank cable gland R1,5"**

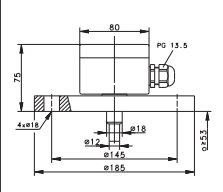
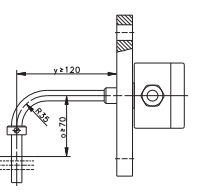


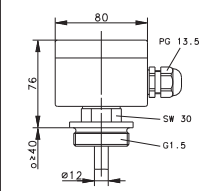
G-Al Si 12	1.4571	A	V	T	R	N	E
PVC/ Polyester	PVC	K	D	I	U	—	—

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching power	Connection head	Standard range		Special features (see Page 119)
<b>7</b>	□	□		□	□	<b>S</b>		□


	Number of switching points	Switching function	Switching power	Connection head
 <p>1.4571 ø 62</p>	 <p>1.4571 ø 84</p>	1 Switching point 2 Switching points 3 Switching points	1 NC contact 2 NO contact 3 Changeover contact 4 Mixed version (CO, NC, NO)	max. 0.5 A – 30 VA – 250 V max. 1 A – 60 VA – 250 V min. switching power = 3 VA
<b>ID letter for connection head</b>				<b>Straight type</b> Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC and brass versions.
<b>ID letter for connection head</b>				<b>Elbow version</b> Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC versions.


B	G	1/2/3	1/2/3/4	K	L	DN 50		WDN 50 
—	—	1/2/3	1/2/3/4	K	L	DN 50		

B	G	1/2/3	1/2/3/4	K	L	DN 65		WDN 65 
—	—	1/2/3	1/2/3/4	K	L	DN 65		

B	G	1/2/3	1/2/3/4	K	L	R 1,5		
—	—	1/2/3	1/2/3/4	K	L	R 1,5		

# Standard float switches

Ordering example:  MAK-721 KR2S

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Float switch - float combination	
Type	M	A		-

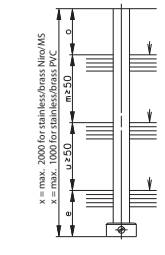
Min. / max. dimensions

Float switch - float combination

↓

↓

**Switching distance for falling levels**



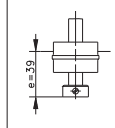
x = max. 2000 for stainless-steel Niro/MS  
x = max. 1000 for stainless-steel PVC  
a = max. 50  
m = 50  
u = 50  
e = 50

**Float material**

Connection head material

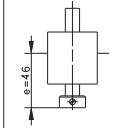
Float switch material

**POM**  
ø 40 x 27



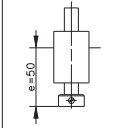
e = 39

**PVC**  
ø 42 x 44



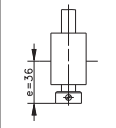
e = 46

**PP**  
ø 30 x 44



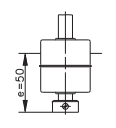
e = 50

**NBR**  
ø 30 x 44



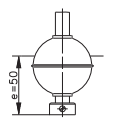
e = 36

**1.4571**  
ø 45 x 47




e = 50

**1.4571**  
ø 52



e = 50

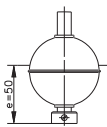
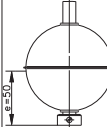


1.4571/ G-Al Si 12	1.4571	A	V	T	R	N	E
PVC/ Polyester	PVC		D	I	U	-	-

With specification o = \_\_\_\_ ; u = \_\_\_\_ (see Order form on Page 134)

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching power	Connection head	Standard range		Special features (see below)
7	2	1		K	R2	S		

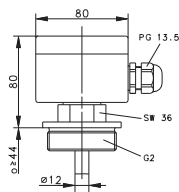
Number of switching points	Switching function	Switching power	Connection head
↓	↓	↓	↓

<p>1.4571 ø 62</p> 	<p>1.4571 ø 84</p> 	<p>1 Switching point 2 Switching points 3 Switching points</p>	<p>1 NC contact 2 NO contact 3 Changeover contact 4 Mixed version (CO, NC, NO)</p>	<p>max. 0.5 A – 30 VA – 250 V  max. 1 A – 60 VA – 250 V min. switching power = 3 VA</p>	<p>ID letter for connection head</p>	<p><b>Straight type</b> Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC and brass versions.</p>
--	--	--	--	---	--------------------------------------	---

**Special features**

- Temperature monitoring PT100 (P1)/ PT1000 (P10)
- Bi-metal switch

We can produce tailor-made designs for specific applications to suit individual customer requirements.

B	G	1 / 2 / 3	1 / 2 / 3 / 4	K	L	R2	
—	—	1/2/3	1/2/3/4	K	L	R2	

# Miniature float switches

Ordering example:  
See Page 118

Position	1	2	3
Version	Miniature float switches	Float	
Type	MS		—

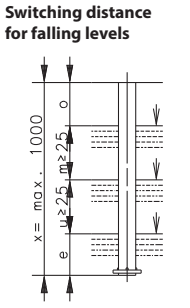
Min. / max. dimensions

Float

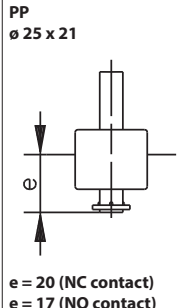
↓

↓

**Switching distance for falling levels**

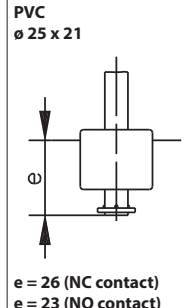


**PP**  
ø 25 x 21



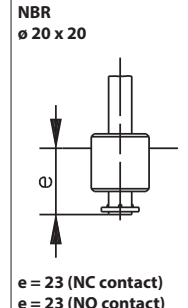
e = 20 (NC contact)  
e = 17 (NO contact)

**PVC**  
ø 25 x 21



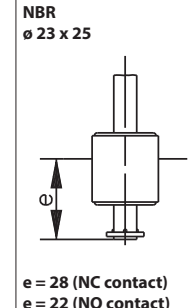
e = 26 (NC contact)  
e = 23 (NO contact)

**NBR**  
ø 20 x 20



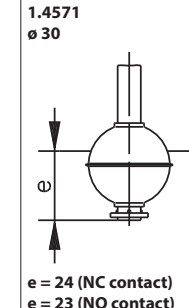
e = 23 (NC contact)  
e = 23 (NO contact)

**NBR**  
ø 23 x 25



e = 28 (NC contact)  
e = 22 (NO contact)

**1.4571**  
ø 30



e = 24 (NC contact)  
e = 23 (NO contact)

**Connection thread R1/8"**



K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—

**Connection thread R3/8"**



K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—

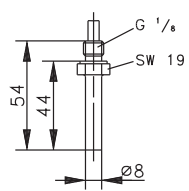
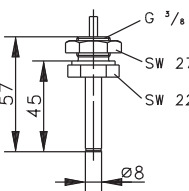
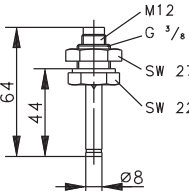
**Connection thread R3/8" with connector**



K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—



4	5	6	7	8	9	10
Enclosure material		Connection head		Switching function		Special features (see Page 119)
□	—	□	—	□		□

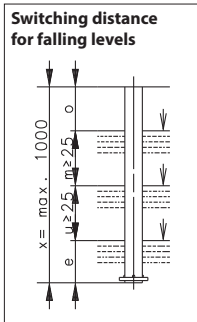
Enclosure material	Connection head	Switching function			
<p>Ni (stainless) = 1.4571</p> <p>MS (brass) = MS63</p> <p>PP = Polypropylene</p> <p>PVC = Polyvinyl chloride</p>	Version	<p>S = NO contact (250 V; 0.5 A; 10 VA) max. = 10 VA</p> <p>O = NC contact (100 V; 0.3 A; 3 VA)</p> <p>U = Changeover contact (100 V; 0.3 A; 3 VA)</p>	X = max. overall length (mm)	Max. number of switching points	Cable length (m)
Ni	<p>R 1/8</p> 	S O U	1000	3	1
MS		S O U	1000	3	1
PP		S O U	40,5	1	1
PVC		S O U	500	3	1
Ni	<p>R 3/8</p> 	S O U	1000	3	1
MS		S O U	1000	3	1
PP		S O U	40,5	1	1
PVC		S O U	500	3	1
Ni	<p>R 3/8ST</p> 	S O U	1000	3	—
MS		S O U	1000	3	—
PP			40,5	1	—
PVC			500	3	—

# Miniature float switches

Ordering example:  
See Page 118

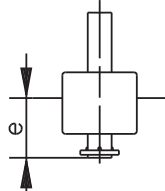
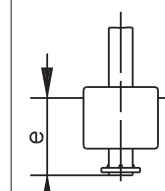
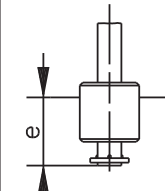
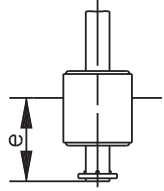
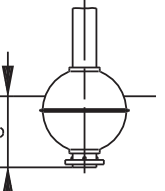
Position	1	2	3
Version	Miniature float switches	Float	
Type	MS		—

Min. / max. dimensions



Float



<p><b>PP</b> ø 25 x 21</p>  <p>e = 20 (NC contact) e = 17 (NO contact)</p>	<p><b>PVC</b> ø 25 x 21</p>  <p>e = 26 (NC contact) e = 23 (NO contact)</p>	<p><b>NBR</b> ø 20 x 20</p>  <p>e = 23 (NC contact) e = 23 (NO contact)</p>	<p><b>NBR</b> ø 23 x 25</p>  <p>e = 28 (NC contact) e = 22 (NO contact)</p>	<p><b>1.4571</b> ø 30</p>  <p>e = 24 (NC contact) e = 23 (NO contact)</p>
---	--	--	--	--

Connection thread PG7



K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—



—	—	—	—	—
---	---	---	---	---

4	5	6	7	8	9	10
Enclosure material		Connection head		Switching function		Special features (see Page 119)
□	—	□	—	□		□

Enclosure material



Ni (stainless) = 1.4571  
 MS (brass) = MS63  
 PP = Polypropylene  
 PVC = Polyvinyl chloride

Connection head



Version

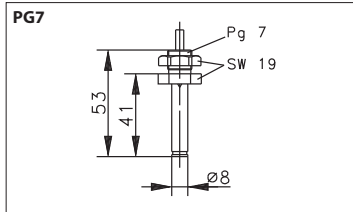
Switching function



S = NO contact (250 V- 0.5 A- 10 VA)  
 max. = 10 VA  
 O = NC contact (100 V; 0.3 A; 3 VA)  
 U = Changeover contact  
 (100 V; 0.3 A; 3 VA)

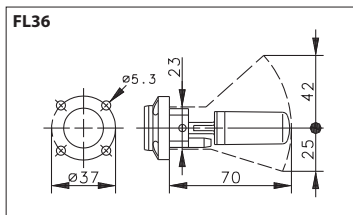
X = max. overall length (mm)  
 Max. number of switching points  
 Cable length (m)

Ni  
 MS  
 PP  
 PVC



S	O	U	1000	3	1
			45 (fixed length)	1	
S	O	U	40,5	1	1
S	O	U	500	3	1

PA12  
 (Enclosure & float)




S  
 O  
 (with 1 m cable)

For lateral mounting

# Adjustable float switches

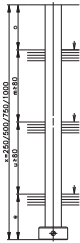
Ordering example:  
See Page 118

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Float switch - float combination	
Type	M	A		-

Min./max. dimensions



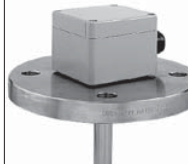
Switching distance for falling levels



Flange enclosure DN50  
ø 165



Flange enclosure DN65  
ø 185



Tank cable gland R1,5"

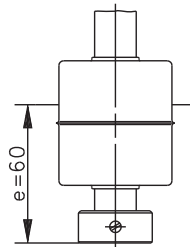


Float switch - float combination

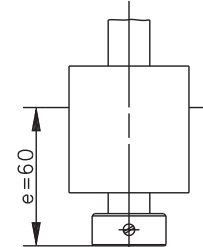


Float material

1.4571  
ø 52 x 55



PVC  
ø 52 x 55





Connection head material

Float switch material

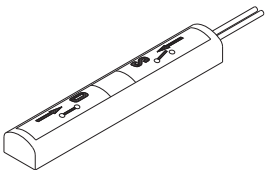
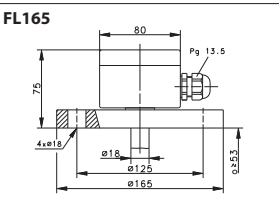
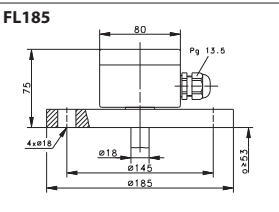
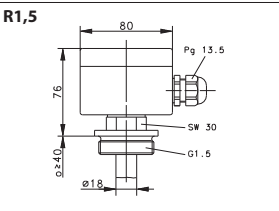
1.4571/ G-Al Si 12	1.4571	N	V
PVC/ Polyester	PVC	-	D

1.4571/ G-Al Si 12	1.4571	N	V
PVC/ Polyester	PVC	-	D

G-Al Si 12	1.4571	N	V
PVC/ Polyester	PVC	-	D


5	6	7	8
Adjustable	Connection head		Length
VST		/	

Important! Please order switching devices without switching modules separately!

Connection head	Length	Switching module	Max. number of switching modules / switching devices		
↓	↓	↓	↓	↓	
Version	Other lengths (mm) on request		NC / NO contact	Changeover contact	
		NC / NO contact Bistable      Changeover contact	Lengths 250 mm 500 mm 750 mm 1000 mm	Lengths 250 mm 500 mm 750 mm 1000 mm	
<b>FL165</b> 	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
<b>FL185</b> 	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
<b>R1,5</b> 	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3

# Adjustable float switches

Ordering example:  
See Page 118


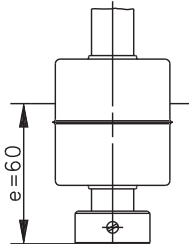
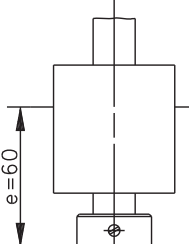

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Float switch - float combination	
Type	M	A		—



Min. / max. dimensions

Float switch - float combination

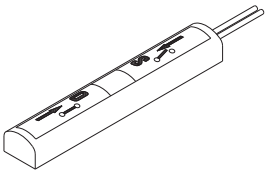
↓

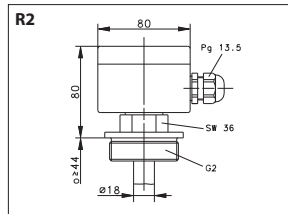
↓

<p><b>Switching distance for falling levels</b></p> 	<p><b>Float material</b></p> <hr/> <p><b>Connection head material</b></p> <hr/> <p><b>Float switch material</b></p>	<p>1.4571 ø 52 x 55</p> 	<p>PVC ø 52 x 55</p> 						
<p><b>Tank cable gland R2"</b></p> 	<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 15%;">1.4571/ G-Al Si 12</td> <td style="width: 15%;">1.4571</td> <td style="width: 15%;">N</td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;">V</td> </tr> </tbody> </table>			1.4571/ G-Al Si 12	1.4571	N			V
1.4571/ G-Al Si 12	1.4571	N			V				
	<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 15%;">PVC/ Polyester</td> <td style="width: 15%;">PVC</td> <td style="width: 15%;">—</td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;">D</td> </tr> </tbody> </table>			PVC/ Polyester	PVC	—			D
PVC/ Polyester	PVC	—			D				

5	6	7	8
Adjustable	Connection head		Length
VST		/	

Important! Please order switching devices without switching modules separately!

Connection head	Length	Switching module	Max. number of switching modules / switching devices	
↓	↓	↓	↓	↓
Version	Other lengths (mm) on request	 NC / NO contact Bistable      Changeover contact	NC / NO contact Lengths 250 mm 500 mm 750 mm 1000 mm	Changeover contact Lengths 250 mm 500 mm 750 mm 1000 mm

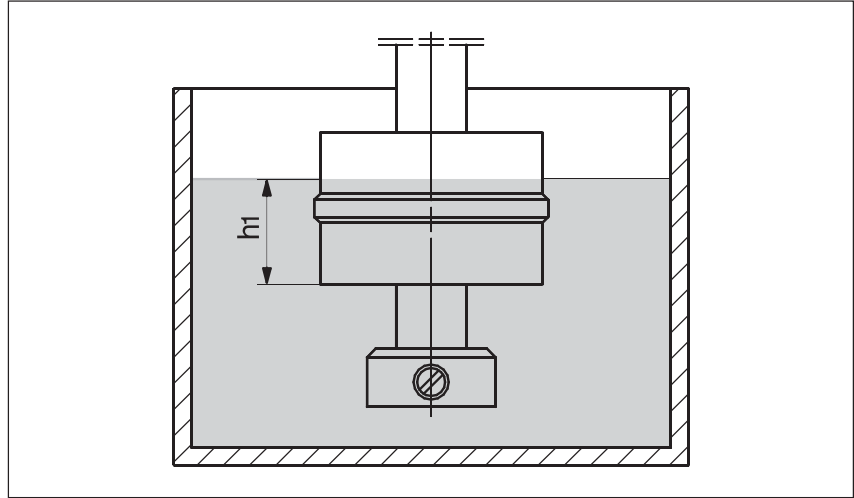


250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3



# Range of Floats

## Floats Standard Float Switches



<b>ID letter</b>	<b>A/M/K</b>
Dimensions (mm)	Ø 40 x 27
Material	POM

Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
18	1
20	0.9
22,5	0.8
26	0.7

**Art. No.:** 4945206009



<b>ID letter</b>	<b>T/C/I</b>
Dimensions (mm)	Ø 30 x 44
Material	PP

Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
27,5	1
30,5	0.9
34,5	0.8
39,5	0.7

**Art. No.:** 4945203019



<b>ID letter</b>	<b>R/S/U</b>
Dimensions (mm)	Ø 30 x 44
Material	NBR

Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
19,5	1
22	0.9
24,5	0.8
28	0.7

**Art. No.:** 4945203031



<b>ID letter</b>	<b>V/L/D</b>
Dimensions (mm)	Ø 42 x 44
Material	PVC

Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
25	1
27,5	0.9
30,5	0.8
35	0.7

**Art. No.:** 4945215029



<b>ID letter</b>	<b>N/P</b>
Dimensions (mm)	Ø 44 x 45
Material	1.4571

Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
32	1
35	0.9
39	0.8
45	0.7

**Art. No.:** 4942104002



<b>ID letter</b>	<b>E/F</b>
Dimensions (mm)	Ø 52
Material	1.4571

Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
32	1
34	0.9
37	0.8
43	0.7

**Art. No.:** 4942105003



<b>ID letter</b>	<b>B/O</b>
Dimensions (mm)	Ø 62
Material	1.4571

Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
33	1
35	0.9
38	0.8
42	0.7

**Art. No.:** 4942102001



<b>ID letter</b>	<b>G/H</b>
Dimensions (mm)	Ø 84
Material	1.4571

Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
33	1
35	0.9
38	0.8
42	0.7


**Art. No.:** 4942101004



## Floats

### Adjustable Float Switches

ID letter	V/L/D
Dimensions (mm)	Ø 52 x 55
Material	PVC
Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
29	1
32	0.9
36	0.8
42	0.7
<b>Art. No.: 4945216032</b>	




ID letter	N/P
Dimensions (mm)	Ø 52 x 55
Material	1.4571
Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
33	1
36	0.9
40,5	0.8
46	0.7
<b>Art. No.: 4942299023</b>	




## Floats

### Miniature Float Switches


ID letter	K1
Dimensions (mm)	Ø 25 x 21
Material	PP
Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
12	1
13	0.9
14,5	0.8
16,5	0.7
<b>Art. No.: 4945207021</b>	




ID letter	K2
Dimensions (mm)	Ø 25 x 21
Material	PVC
Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
15	1
16	0.9
18,5	0.8
-	0.7
<b>Art. No.: 4945207022</b>	




ID letter	K4
Dimensions (mm)	Ø 23 x 25
Material	NBR
Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
16	1
17,5	0.9
19,5	0.8
22	0.7
<b>Art. No.: 4945211024</b>	



ID letter	K3
Dimensions (mm)	Ø 20 x 20
Material	NBR
Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
15	1
17	0.9
-	0.8
-	0.7
<b>Art. No.: 4945210020</b>	



ID letter	N1
Dimensions (mm)	Ø 30
Material	1.4571
Immersion depth h1 (mm)	Density $\rho$ (g/cm <sup>3</sup> )
18	1
19	0.9
21	0.8
24	0.7
<b>Art. No.: 4942109018</b>	



# Technical data

## Standard Float switches



### Electrical data

Switching function
Contact ID letter
Switching voltage (max)
Switching current (max)
Switching power (max)
Switching power (min)

Changeover / NC / NO contacts	Changeover / NC / NO contacts
<b>K</b>	<b>L (min. Switching power 3 VA)</b>
250 V AC/DC	250 V AC/DC
0.5 A	1 A
30 VA	60 VA
	3 VA

### Mechanical data

Container connection options

Flange enclosure RD 77 mm	Flange enclosure RD 77 mm
Flange enclosure RD 165 mm	Flange enclosure RD 165 mm
Flange enclosure RD 185 mm	Flange enclosure RD 185 mm
Cable gland PG9	Cable gland PG9
Cable gland R3/8"	Cable gland R3/8"
Cable gland R1/5" with connector DIN 43650	Cable gland R1/5" with connector DIN 43650
Oval flange 75 x 50 mm with connector DIN 43650	Oval flange 75 x 50 mm with connector DIN 43650

Float switch material

Stainless steel 1.4571	Stainless steel 1.4571
Brass MS63	Brass MS63
PVC	PVC

Float variants

A/M/K Cylinder float	RD 40 x 27 mm (POM)	A/M/K Cylinder float	RD 40 x 27 mm (POM)
T/C/I Cylinder float	RD 30 x 44 mm (PP)	T/C/I Cylinder float	RD 30 x 44 mm (PP)
V/D Cylinder float	RD 42 x 44 mm (NBR)	V/D Cylinder float	RD 42 x 44 mm (NBR)
R/S Cylinder float	RD 30 x 44 mm (NBR)	R/S Cylinder float	RD 30 x 44 mm (NBR)
N/P Cylinder float	RD 44 x 45 mm (stainless steel)	N/P Cylinder float	RD 44 x 45 mm (stainless steel)
E/F Ball float	RD 52 mm (stainless steel)	E/F Ball float	RD 52 mm (stainless steel)
B/O Ball float	RD 62 mm (stainless steel)	B/O Ball float	RD 62 mm (stainless steel)
G/H Ball float	RD 84 mm (stainless steel)	G/H Ball float	RD 84 mm (stainless steel)

### Ambient conditions

Protection class (DIN 40050)
Temperature range
Pressure

IP 65 (up to IP 68 on request)	IP 65 (up to IP 68 on request)
-5 °C to +60 °C (from -30 °C to +150 °C on request)	-5 °C to +60 °C (from -30 °C to +150 °C on request)
5 bar (up to 25 bar on request)	5 bar (up to 25 bar on request)

## Miniature Float Switches



### Electrical data

Switching function	NO contacts	Changeover / NC contacts
Contact ID letter	<b>B</b>	<b>X</b>
Switching voltage (max)	250 V AC/DC	150 V AC/DC
Switching current (max)	0.5 A	1 A
Switching power (max)	10 VA	20 VA

### Mechanical data

Container connection options	Cable gland PG7	Cable gland PG7
	Cable gland R1/8"	Cable gland R1/8"
	Cable gland R3/8"	Cable gland R3/8"
	Cable gland R3/8" with connector	Cable gland R3/8" with connector

Float switch material	Stainless steel 1.4571	Stainless steel 1.4571
	PP	PP
	PVC	PVC
	Brass MS63	Brass MS63

Float variants	K1	Cylinder float	RD 25 x 20 mm (PP)	K1	Cylinder float	RD 25 x 20 mm (PP)
	K2	Cylinder float	RD 25 x 20 mm (PVC)	K2	Cylinder float	RD 25 x 20 mm (PVC)
	K3	Cylinder float	RD 20 x 20 mm (NBR)	K3	Cylinder float	RD 20 x 20 mm (NBR)
	K4	Cylinder float	RD 23 x 25 mm (NBR)	K4	Cylinder float	RD 23 x 25 mm (NBR)
	N1	Ball float	RD 30 mm (stainless steel)	N1	Ball float	RD 30 mm (stainless steel)

### Ambient conditions

Protection class (DIN 40050)	IP 65 (up to IP 68 on request)	IP 65 (up to IP 68 on request)
Temperature range	-5 °C to +60 °C (from -30 °C to +150 °C on request)	-5 °C to +60 °C (from -30 °C to +150 °C on request)
Pressure	5 bar (up to 15 bar on request)	5 bar (up to 15 bar on request)

# Technical data

## Adjustable Float Switches



### Electrical data

Contact ID letter
Switching module, type designation
<b>Article number</b>
Switching function
Switching voltage (max)
Switching current (max)
Switching power (max)

<b>P</b>
REEDK. KPL. F. MA
<b>4910007069</b>
NC / NO contact (bi)
250 V AC / DC
5 A
250 VA

<b>L</b>
REEDK. KPL. F. MA
<b>4916007075</b>
Changeover contact (bi)
250 V AC / DC
1 A
60 VA

### Mechanical data

Container connection options

Flange DN 50 (PVC/stainless steel)
Flange DN 65 (PVC/stainless steel)
Cable gland R1.5" (PVC/stainless steel)
Cable gland R2" (PVC/stainless steel)

Flange DN 50 (PVC/stainless steel)
Flange DN 65 (PVC/stainless steel)
Cable gland R1.5" (PVC/stainless steel)
Cable gland R2" (PVC/stainless steel)

Float switch material

Stainless steel 1.4571
Brass MS63
PVC

Stainless steel 1.4571
Brass MS63
PVC

Float variants

N/P Cylinder float RD 52 x 55 mm (stainless steel)
V/D/L Cylinder float RD 52 x 55 mm (PVC)

N/P Cylinder float RD 52 x 55 mm (stainless steel)
V/D/L Cylinder float RD 52 x 55 mm (PVC)

### Ambient conditions

Protection class (DIN 40050)
Temperature range
Pressure

IP 65 (up to IP 68 on request)
-5 °C to +60 °C (from -30 °C to +150 °C on request)
5 bar (up to 15 bar on request)

IP 65 (up to IP 68 on request)
-5 °C to +60 °C (from -30 °C to +150 °C on request)
5 bar (up to 15 bar on request)

## Chemical Resistance

### Float switch materials at +20 °C

Chemical substance	Conc. in %	POM	PP	NBR	PVC	Brass MS63 1.4571	
Acetone	100	+	+	U	U	+	+
Aluminium sulphate	10	/	+	+	+	U	+
Aluminium chloride	10	/	+	+	+	U	+
Formic acid	85	+	+	U	+	U	+
Ammonia	10	+	+	U	O	U	+
Aniline	100	/	+	U	U	O	+
Ethyl acetate	100	O	O	U	U	+	+
Ethyl ether	100	+	+	U	/	+	+
Ethylene chloride	100	/	U	U	U	/	+
Benzine	100	+	U	+	+	+	+
Benzene	100	+	U	O	U	+	+
Boric acid	10	/	+	+	+	+	+
Butyl acetate	100	+	O	U	U	/	+
Calcium chloride	10	+	+	+	+	U	+
Chlorobenzene	100	+	+	U	U	/	+
Chlorine water	-	/	+	U	O	U	+
Chloroform	100	/	U	U	U	+	+
Chromic acid	10	O	+	U	+	U	+
Ferrous chloride	10	O	+	+	+	U	U
Acetic acid	10	+	+	U	+	U	+
Acetic acid	80	O	+	U	+	U	+
Formaldehyde	20	+	+	+	+	O	+
Glycerine	90	+	+	+	+	+	+
Urea	10	/	+	+	+	/	+
Iodine	-	/	+	+	U	/	+
Potassium bichromate	5	/	+	O	+	U	+
Potassium nitrate	10	/	+	+	+	/	+
Potassium permanganate	1	+	+	O	+	/	+
Copper sulphate	10	/	/	+	+	U	+
Magnesium chloride	10	/	+	+	+	U	+
Methylene chloride	100	U	U	U	O	/	+
Lactic acid	10	+	+	O	+	O	+
Mineral oil	100	+	+	+	+	+	+
Sodium bisulphite	10	/	+	U	O	U	+
Sodium carbonate	10	+	+	+	+	O	+
Sodium chloride	10	+	+	+	+	O	+
Sodium sulphate	10	/	+	+	+	+	+
Oxalic acid	40	/	O	U	+	O	O
Phenol, aqueous	10	U	+	U	+	/	+
Phosphoric acid	10	+	+	O	+	U	+
Mercury	100	/	+	+	+	U	+
Mercuric chloride	5	/	+	+	O	U	+
Nitric acid	65	U	U	U	+	U	+
Nitric acid	10	U	O	U	+	U	+
Hydrochloric acid	10	U	+	U	+	U	U
Hydrochloric acid	2	U	+	U	+	U	U
Carbon disulphide	100	+	U	U	U	+	+
Sulphuric acid	10	+	+	+	+	U	+
Sulphuric acid	98	U	O	U	O	U	+
Hydrogen sulphide	2	/	+	+	+	O	+
Soap solution	1	+	+	+	+	+	+
Carbon tetrachloride	100	+	U	U	O	+	+
Trichloroethylene	100	O	O	U	U	O	+
Wine	-	/	+	+	+	O	+
Zinc chloride	10	/	+	+	+	U	+

#### + = Resistant

The material remains fully resistant to the medium or is minimally affected. The effect of pressure and temperature changes on the materials must be taken into account.

#### O = Conditionally resistant

The material is affected by the medium; sealing materials swell. Application may be possible if concentration, pressure, temperature, service life or other influencing factors are restricted.

#### U = Non-resistant

The material may not be used in the specified medium or at the given temperature unless under very clearly defined preconditions.

#### / = No data available