PKP Prozessmesstechnik GmbH

Borsigstraße 24

D-65205 Wiesbaden-Nordenstadt

Tel.: ++49-(0)6122-7055-0

Fax: ++49-(0)6122-7055-50

Email: info@pkp.de

Instruction Manual

FS10 - FS11 - FS20

Magnetic Float Switch

The following symboles are be used in this manual:

Warning
Instructions for proper installation and use of magnetic float switches. Disregard may lead to malfunction or destruction of reed contacts.

Danger
Instructions to avoid personal or property damage.

Electrical installations
Instructions for proper electrical installation.

Functional Description

Magnet-operated float switches operate according to the float principle with magnetic transmission. A reed contact built into the slip pipe (5) or contact pipe (8) is activated by the magnetic field of a permanent magnet on reaching a preset switching point. The permanent magnet is located in a float (7) which changes its height with the level of the medium being monitored. The switching state of the reed contact can be evaluated and processed by a series-connected control unit.
The number and arrangement of the floats depends on the number of preset switching points, their contacting function and the distance apart of the switching points.

Area of Application

Magnet-operated float switches are used exclusively for level control and monitoring of liquid media.
The liquids may not be heavily contaminated and should not have a tendency to crystallize. Make sure that the materials of the switch (float, slip pipe) which come into contact with the medium being monitored are suitably resistant.

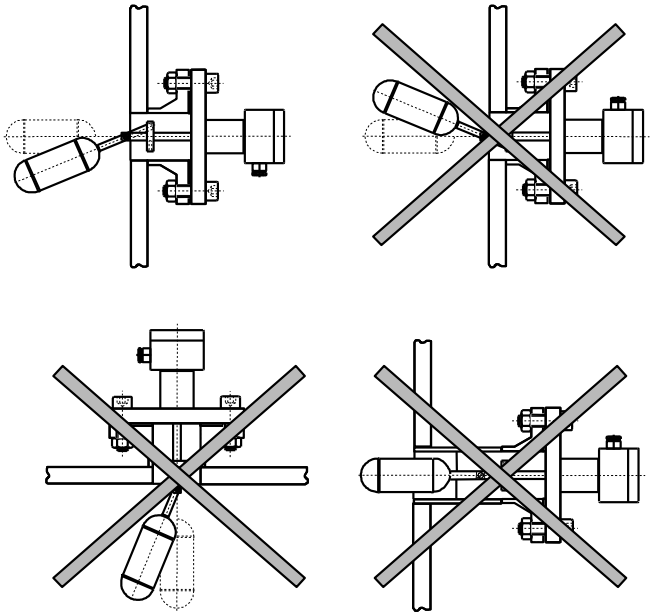
Assembly

Versions for vertical installation (Fig. 1)

- Install magnet-operated float switches according to their type (flange or thread [3]).
- Use the screws and nuts suitable for the flange for flange types. Fit a suitable gasket (4) for sealing. Make sure it is installed in the right position. (Max. deviation from the vertical $\pm$ 30°).
- The float (7) must be removed before installation in openings with a diameter smaller than the diameter of the float.
- Mark the position of the set collars (6) before removing.
- If top and bottom of the floats are not already marked, please do so now.
- Replace the float inside the tank after installing the magnet-operated float switch.
- Then fix the set collars (6) back in the same position.
- The number of floats and position of stop rings are dependent on the switching positions and number of switch points.

Versions for horizontal installation (Fig. 2)

Magnet-operated float switches for horizontal operation must be installed as shown in fig. 2.
Use the screws and nuts suitable for the flange for flange types. Fit a suitable gasket (4) for sealing. Make sure it is installed in the right position. (The float must be tilted downwards in the unactivated state). When installing in the union, make sure that the tilting of the float is not affected.



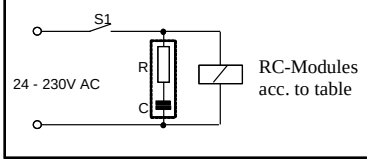
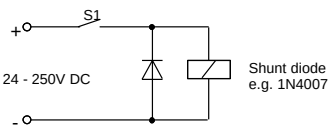
When mounted inside ferromagnetic surroundings the function could be restrained. This may cause a malfunktion and harm to goods.
The magnet operated float switch must be mounted outside ferromagnetic surroundings.

Electrical Connection

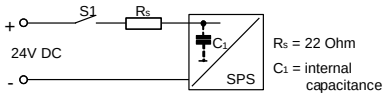
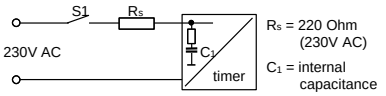
All cabling and electrical connections must be carried out in accordance with the regulations applicable in the country where the equipment is installed and by personnel qualified to do.
Operation on a contact protection relay is recommended to prolong the life of the contacts.

The electrical connection is made according to the wiring diagram printed on the switch.
(Types with only one normally closed or normally open contact contain no wiring diagram.)
The cable bushing (2) in the connection enclosure (1) must be sealed.

Use of magnetic float switches with inductive or capacitive load may lead to the destruction of the reed switch. This may cause a malfuction to the control circuitry and harm to persons or goods.
With inductive load, magnetic switches have to be connected to a RC Network (acc. to appendix).

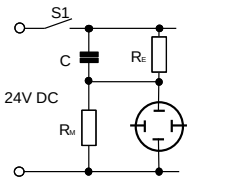
Inductive Load AC	Inductive Load DC
	

With capacitive load, connecting cables longer than 50m or connection to a PLC with capacitive input circuit, a 22Ω resp. 47Ω (10 VA contacts) resistor is required to be connected in series to limit current spikes. A 220Ω resistor shall be used when connected to an electronic timer.

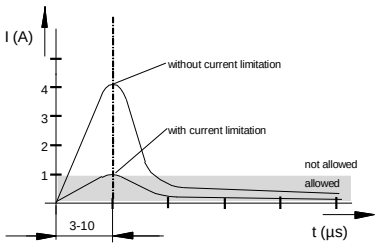
Current limitation with capacitive load e.g. PLC and cables > 50m	**Current limitation with electronic timers**
	

Overloading the magnetic float switches may lead to the destruction of the reed switch, which may cause a malfunktion to the control circuitry and harm to persons or goods. The maximum switch capacity values given in the chapter "Technical data" and the Technical bulletin 1003 must not be exceeded.

Current measurement with oscilloscope



Example: C = 0,33µF/230V AC



Magnetic float switches with connecting cable including no protective earth may be live under fault conditions. Touching the housing may cause harm to persons or even be lethal. These switches must only be used with protective low voltage acc. to VDE 0100 (f. e. use a contact protection relay) or have to be mounted in such way, that the switch is earthed.

Commissioning / Function Test

Switch on the power supply to the connected control unit. Fill the vessel and check the function of the switching points of the magnet-operated float switch.
The function test can also be conducted manually on the removed switch.

Note
Make sure that the function test does not accidentally set any processes in motion.

Maintenance

The magnet-operated float switches operate free of maintenance and wear when used properly.
The switch must be eye-checked within the scope of the necessary inspections under extreme operating conditions.

Notes

The reed contacts must be operated on intrinsically safe circuits when operating in "e" areas of zone 1 or 2.

Float switches made of plastic may not be used in the "e" areas of zone 1 or 2.

Do not operate float switches in the immediate vicinity of strong electromagnetic fields (distance away at least 1m).

The switching points of the magnet-operated float switches cannot be adjusted.

Magnet-operated float switches can only be used in media to which the material of the slip pipe and the float is resistant.

The switches may not be exposed to heavy mechanical stresses (shock, bending, vibrations).

Technical data

Switching behaviour	:Norm close / Norm open
Max. voltage	:250V AC / DC
Max. current	:2A AC / 1A DC
Max. power	:100 VA, cosφ >0,7 / 50 W

Switching behaviour	:change over
Max. voltage	:250V AC / DC
Max. current	:1A AC / 0,5A DC
Max. power	:40 VA, cosφ > 0,7 / 20 W

Magnet operated Mini Float Switches

Switching behaviour	:Norm close / Norm open
Max. voltage	:250V AC / DC
Max. current	:0,5A AC / 0,25A DC
Max. power	:10 VA , cosφ > 0,7 / 5 W

Protective RC-Modules

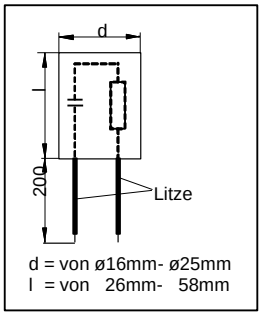
Please use RC-modules according to the table below. Rating of the switches and supply voltage will determine the type to be used.
Other types might lead to destruction or lower service life of the reed contacts.

For reed contacts 10-40VA

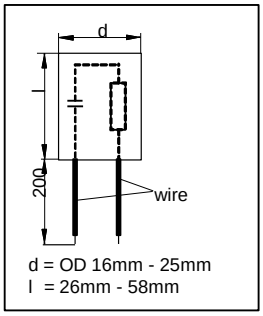
Capacitance	Resistance	Voltage	Type
0,33 µF	100 Ohm	24 V~	A 3/24
0,33 µF	220 Ohm	48 V~	A 3/48
0,33 µF	470 Ohm	115 V~	A 3/115
0,33 µF	1500 Ohm	230 V~	A 3/230

For reed contacts 40-100VA

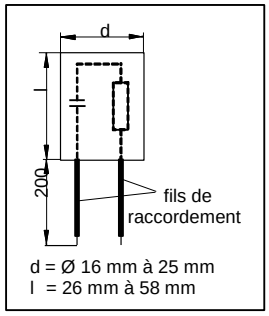
Capacitance	Resistance	Voltage	Type
0,33 µF	47 Ohm	24 V~	B 3/24
0,33 µF	100 Ohm	48 V~	B 3/48
0,33 µF	470 Ohm	115 V~	B 3/115
0,33 µF	1000 Ohm	230 V~	B 3/230



d = von ø16mm- ø25mm
l = von 26mm- 58mm



d = OD 16mm - 25mm
l = 26mm - 58mm



d = Ø 16 mm à 25 mm
l = 26 mm à 58 mm

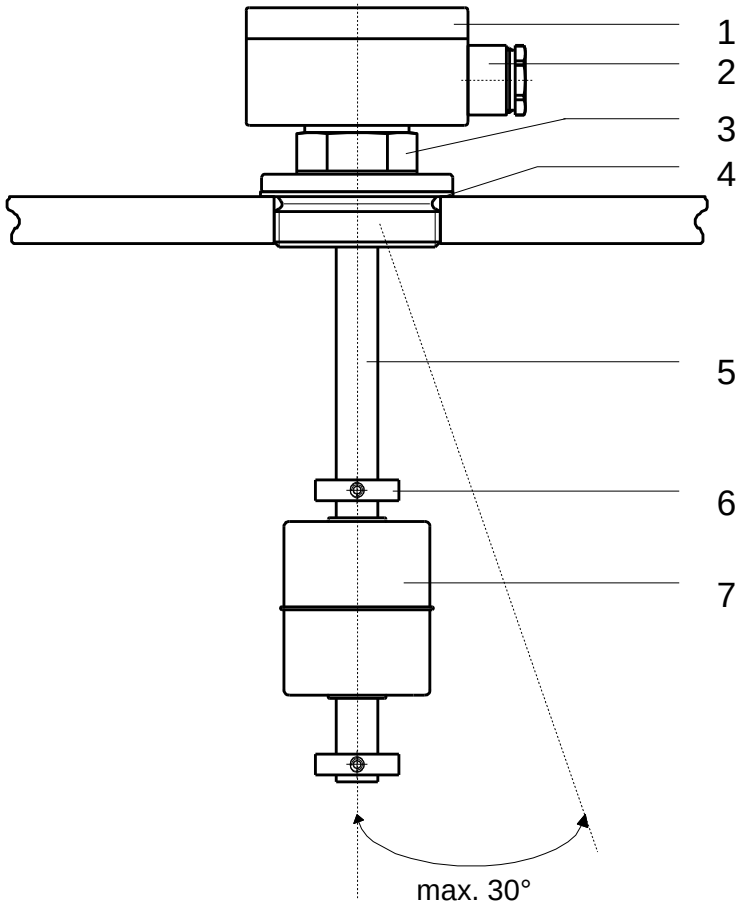


Fig.1

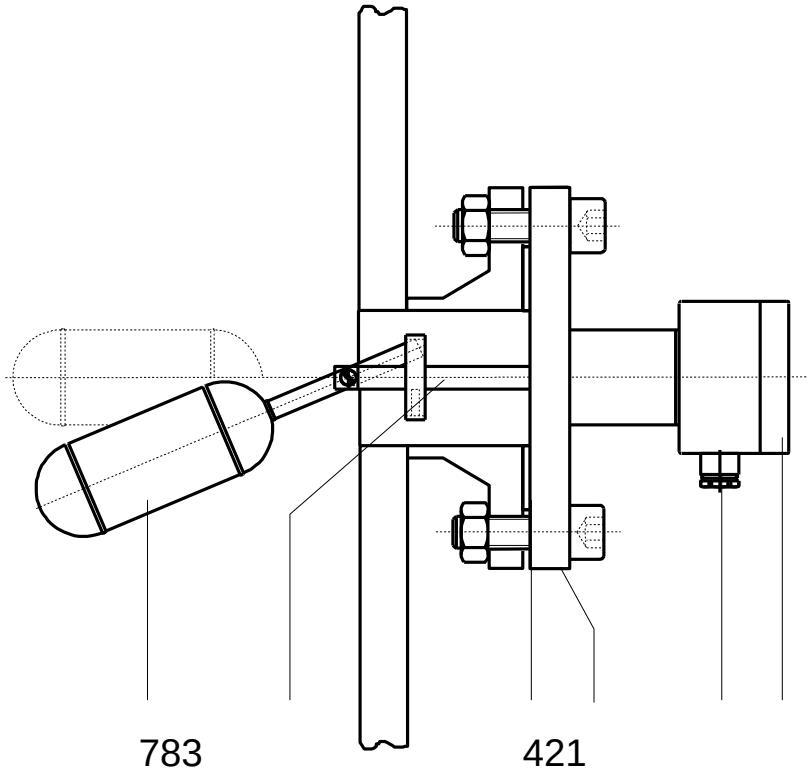


Fig.2

Connection Schemes

Color codes acc. to IEC 757

Cable PVC
max. Temperature 90 °C

N/C or N/O

1 point	
GY	
BN	L1

2 points	
BK	
BK	L1
BN	
GY	L2

3 points	
GN	
BN	L1
YE	
GY	L2
PK	
BU	L3

4 points	
RD	
WH	L1
GN	
BN	L2
YE	
GY	L3
PK	
BU	L4

5 points	
BK	
VT	L1
RD	
WH	L2
GN	
BN	L3
YE	
GY	L4
PK	
BU	L5

6 points	
GY/RD	
BU/RD	L1
BK	
VT	L2
RD	
WH	L3
GN	
BN	L4
YE	
GY	L5
PK	
BU	L6

SPDT

1 point	
GY	
BN	L1
BK	

2 points	
YE	
GN	L1
BN	
BU	
PK	L2
GY	

3 points	
BU/RD	
RD	L1
WH	
YE	
GN	L2
BN	
BU	
PK	L3
GY	

4 points	
GY/RD	
BK	L1
VT	
BU/RD	
RD	L2
WH	
YE	
GN	L3
BN	
BU	
PK	L4
GY	

Cable Silicone
max. Temperature 150 °C

N/C or N/O

1 point	
GY	
BN	L1

2 points	
BK	
BK	L1
BN	
GY	L2

3 points	
BN	
WH	L1
YE	
GN	L2
GY	
RD	L3

SPDT

1 point	
GY	
BN	L1
BK	

2 points	
YE	
GN	L1
BN	
GY	
RD	L2
WH	

Namur scheme

Terminal Housing
max. Temperature 300 °C

N/C or N/O

1 point	
GY 1	
BN 2	L1

2 points	
BK 1	
BK 2	L1
BN 3	
GY 4	L2

3 points	
BN 1	
WH 2	L1
YE 3	
GN 4	L2
GY 5	
RD 6	L3

4 points	
RD 1	
WH 2	L1
GN 3	
BN 4	L2
YE 5	
GY 6	L3
PK 7	
BU 8	L4

5 points	
RD 1	
WH 2	L1
GN 3	
BN 4	L2
YE 5	
GY 6	L3
PK 7	
BU 8	L4
VT 9	
CLEAR 10	L5

6 points	
RD 1	
WH 2	L1
GN 3	
BN 4	L2
YE 5	
GY 6	L3
PK 7	
BU 8	L4
VT 9	
CLEAR 10	L5
BK 11	
OG 12	L6

SPDT

1 point	
GY 1	
BN 2	L1
BK 3	

2 points	
YE 1	
GN 2	L1
BN 3	
GY 4	
RD 5	L2
WH 6	

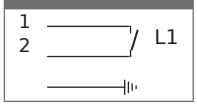
3 points	
WH 1	
BK 2	L1
OG 3	
YE 4	
GN 5	L2
BN 6	
BU 7	
PK 8	L3
GY 9	

4 points	
WH 1	
BK 2	L1
OG 3	
YE 4	
GN 5	L2
BN 6	
BU 7	
PK 8	L3
GY 9	
RD 10	
VT 11	L4
CLEAR 12	

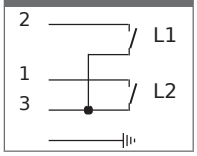
Connection angled plug

N/C
or N/O

1 point

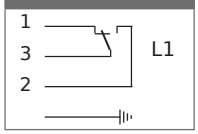


2 pointe



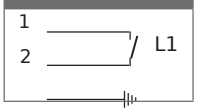
SPDT

1 point



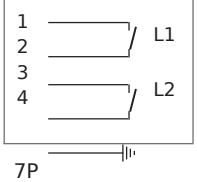
Öff ner
or N/O

1 point



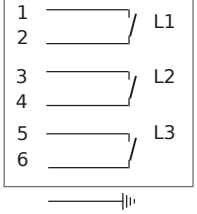
5P und 7P

2 pointe



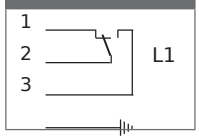
7P

3 pointe



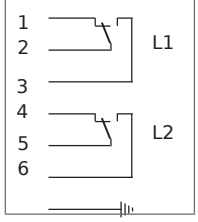
SPDT

1 point



7P

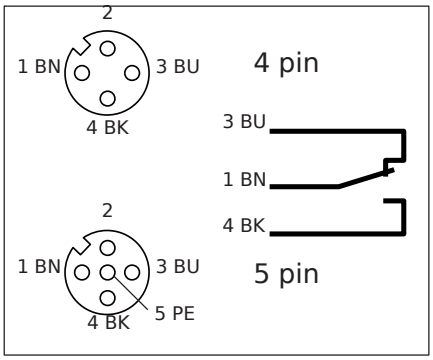
2 pointe



Connection plug M 12x1

Öff ner
or N/O

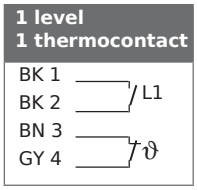
SPDT



Float Switches with Thermocontacts

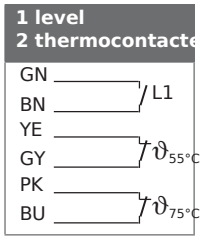
Cable PVC or
Silicone or
Terminal Housing

**1 level
1 thermocontact**



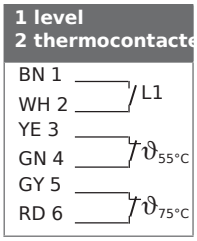
Cable PVC

**1 level
2 thermocontacte**



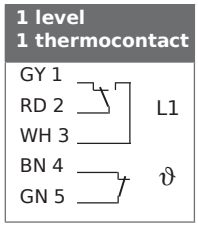
Cable Silicone or
Terminal Housing

**1 level
2 thermocontacte**



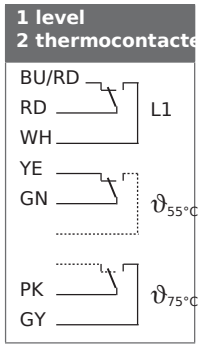
Cable PVC or
Silicone or
Terminal Housing

**1 level
1 thermocontact**



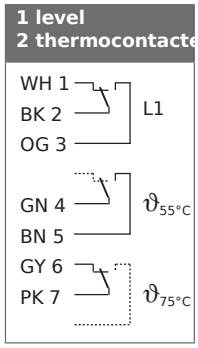
Cable PVC

**1 level
2 thermocontacte**



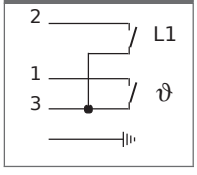
Terminal housing

**1 level
2 thermocontacte**



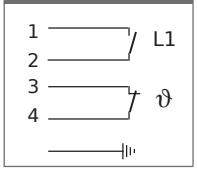
Connection angled plug

**1 level
1 thermocontact**



Connection angled plug or M12 x 1

**1 level
1 thermocontact**



Connection angled plug or M12 x 1

**1 level
1 thermocontact**