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PRODUCT INTRODUCTION

■ INTRODUCTION

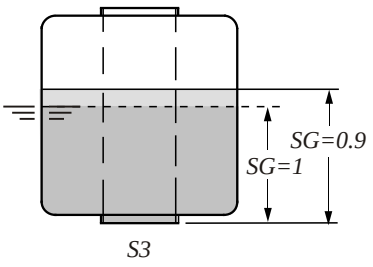
Since technologies of the product have more and more advance, the products need comply with a requirement for more safe, convenient and low cost.
The float switches are extremely compact, simple and are easy to install on any small space.
These switches are not effected by electrical interference. They can withstand to chemicals, high temperatures and pressures if the correct material of float switch is selected by the customers.

■ LIQUID PROPERTIES AND FLOATS

When the liquid specific gravity is less or more than the water, the float on the switch will either increase or decrease the immersion depth. The switch actuation level will also change.

All actuation levels are assumed with the water (SG=1). If your liquid has a different specific gravity, you should not specify the float specific gravity more than liquid, that will not cause the float rise with the liquid level. The reed switch inside the stationary stem will not be activated by the magnet inside the float.

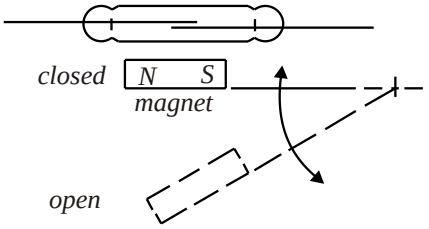
If your liquid has a high viscosity, you should specify largest size float that will provide a greatest buoyant force to ensure the units operate normally.
Because the float switches are activated by the magnetic field of permanent magnet inside the float, make sure the liquid is no iron powder or magnetic material to avoid magnetic interference.



(Fig. 3)

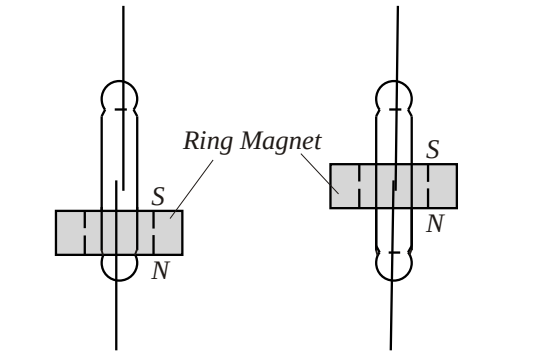
■ PRINCIPLE

Fig. 1 illustrates the method of pivot actuation (such as the FCH TYPE float switches). When the magnetic field of permanent magnet inside the float is moved into to the proximity of the reed switch inside the stationary stem, the reed switch "snaps" the contact together and closes the electrical circuit. When the magnetic field is moved away from the reed switch, the reed switch does not touch. The circuit is open.



(Fig. 1)

Fig. 2 illustrates the method of perpendicular actuation (such as the FC V TYPE float switches). When the magnetic field of ring magnet inside the float is moved into the proximity of reed switch inside the stationary stem, the reed switch "snaps" the contact together and closes the electrical circuit. When the magnetic field is moved away from the reed switch, the reed switch does not touch.
The circuit is open.



(Fig. 2)

CHEMICAL RESISTANCE

● Excellent ○ Good △ Fair × Corroded

Chemical	Concentration %	Temp °C	Temp °F	Plastic PVC	PP	PVDF	PTFE	Rubber NBR	Stainless 304	316
Ammonia Water	10	40	104	●	●	●	●	○		
NH_4OH	10	80	176		○	●	●			
Aque Regia	10	40	104	△	△	●	●			
$3HCl+HNO_3$	10	80	176			●	●			
Benzene	Pure	40	104	×	△	○	●			
C_6H_6		80	176			△	●			
Bleaching Liquor	5	40	104	●		●	●			
$Ca(ClO)_2$	5	80	176			●	●			
	20	40	104	●		●	●			
	20	80	176			●	●			
Boric Acid	Satu	40	104	●	●	●	●	●		
H_3BO_3		80	176		●	●	●	○		
Brine		40	104	●	●	●	●	●		
		80	176		●	●	●			
Butadiene	Gas	40	104	●		●	●			
$CH_2=CH-CH=CH_2$		80	176			●	●			
Butane	Gas	40	104	●	●	●	●			
$CH(CH)_2CH_3$		80	176		●	●	●			
Nitric Acid	10	40	104	●	●	●	●	●	●	●
HNO_3	10	80	176	×	○	●	●		●	
	30	40	104	●	●	●	●		●	●
	30	80	176	×	○	●	●		●	●
	50	40	104	○	○	●	●		●	●
	50	80	176	×	×	○	●			
	70	40	104	○	×	●	●		○	●
	70	80	176	×		○	●			
	98	40	104			○	○			
	98	80	176				△			
Oxalic Acid	20	40	104	●	●	●	●	●		△
HOOCCOOH	20	80	176		●	●	●			
	50	40	104	●	●	●	●			△
	50	80	176		●	●	●			
Phosphoric Acid	10	40	104	●	●	●	●	●	●	●
H_3PO_4	10	80	176		○	●	●	△	●	●
	50	40	104	●	●	●	●	●	●	●
	50	80	176		△	●	●	×	●	●
	80	40	104	●	●	●	●	○	●	●
	80	80	176		△	●	●		●	●
Butane	Gas	40	104	●	●	●	●			
$CH(CH)_2CH_3$		80	176		●	●	●			
Sodium	15	40	104	●	●	●	●	●	●	●
Hydroxide	15	80	176		○	△	●	△	×	×
NaOH	30	40	104	●	●	●	●	●	●	●
	30	80	176		○	△	●	●	×	×
	50	40	104	●	●	○	●	●	●	●
	50	80	176		○	×	●	●	×	×
	70	40	104	○	○	○	●			
	70	80	176		○	×	●			

Chemical	Concentration %	Temp °C	Temp °F	Plastic PVC	PP	PVDF	PTFE	Rubber NBR	Stainless 304	316
Sodium	3	40	104	●	○	●	●		△	○
Hypochlorite	3	80	176							
NaClO	5	40	104	●	○	●	●		△	○
	5	80	176							
	7	40	104	●	△	○	●		×	×
	7	80	176							
	10	40	104	●	△	●	●		×	×
	10	80	176							
	13	40	104	●	△	●	●		×	×
	13	80	176							
Sulfuric Acid	10	40	104	●	●	●	●	●	●	●
H_2SO_4	10	80	176		●	●	●	○	○	○
	30	40	104	●	●	●	●	●	×	×
	30	80	176		●	●	●	○	×	×
	50	40	104	●	●	●	●	○	×	×
	50	80	176		●	●	●	△	×	×
	60	40	104	●	●	●	●	●	×	×
	60	80	176		○	●	●	○	×	×
	70	40	104	●	●	●	●	○	×	×
	70	80	176		○	●	●	△	×	×
	80	40	104	●	●	●	●	●	×	×
	80	80	176		○	●	●	△		
	90	40	104	○	●	●	●	△	×	×
	90	80	176		○	●	●	△		
	98	40	104	△		●	○		○	○
	98	80	176			△	○			
Toluene		40	104		△	△	●			
$C_6H_5CH_3$		80	176				○			
Chlorine Gas	Wet	40	104	○		●	●			
Cl_2	Wet	80	176			△	●			
	Dry	40	104	●		●	●			
	Dry	80	176			●	●			
Chromic Acid	10	40	104	●		●	●			
H_2CrO_4	10	80	176			●	●			
	20	40	104	△		●	●			
	20	80	176			●	●			
	40	40	104	△		●	●			
	40	80	176			●	●			
	50	40	104	×		●	●			
	50	80	176			△	●			
Hydrochloric	15	40	104	●	●	●	●	○		
Acid	15	80	176		●	●	●			
HCl	25	40	104	●	●	●	●	×		
	25	80	176		●	●	●			
	35	40	104	●	●	●	●	×		
	35	80	176		○	●	●			
	38	40	104	●	●	●	●	×		
	38	80	176		○	●	○			

● Excellent ○ Good △ Fair × Corroded

Chemical	Concentration	Temp		Plastic				Rubber	Stainless	
	%	°C	°F	PVC	PP	PVDF	PTFE	NBR	304	316
Citric Acid	10	40	104	●	●	●	●	●	●	●
$C_6H_8O_7$	10	80	176		○	●	●	●		
Gasoline	10	40	104	●		●	●			
	10	80	176			●	●			
Diesel Fuels		40	104			●	●		●	●
		80	176			●	●		●	●
Ethyl Alchol	Pure	40	104	●	●	●	●	●	○	○
C_2H_5OH	Pure	80	176		○	●	●	○		
Formic Acid	90	40	104	○	○	●	●			
HCOOH	90	80	176			●	●			
Hydrofluric Acid	Dilute	40	104	●	○	●	●			
	Dilute	80	176		○	●	●			
HF	30	40	104	○	○	●	●			
	30	80	176	×	○	●	●			
	40	40	104	△	○	●	●			
	40	80	176		○	●	●			
	50	40	104	△	○	●	●			
	50	80	176		○	●	●			
Hydrogen peroxide	5	40	104	●	●	●	●		○	●
	5	80	176		○	●	●			
H_2O_2	20	40	104	●	●	●	●			
	20	80	176		○	●	●			
	30	40	104	○	○	●	●			
	30	80	176		△	●	●			
	50	40	104	△	×	●	●			
	50	80	176			●	●			
	90	40	104			●	●			
	90	80	176			●	●			
Isopropyl Alcohol	Pure	40	104	●	●	●	●	○		
$(CH_3)CHOH$	Pure	80	176			●	●			
Kerosene		40	104	●	○	●	●			
		80	176			●	●			
Methyl Alcohol		40	104	○	●	●	●	△		
CH_3OH		80	176		○	●	●			
Methyl Ethyl Ketone		40	104		△		●			
$CH_3CO\ C_2H_5$		80	176				●			
Potassium Chromate		40	104	●	●	●	●	●		
K_2CrO_4		80	176		○	●	●	○		

REED SWITCH PROTECTION

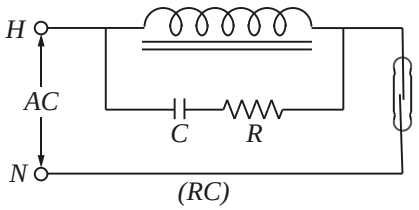
■ INDUCTIVE LOADS

When using reed switches for inductive loads such as motors, relay coil, solenoids, etc., the contacts will be subjected to high induced voltages during opening of the contacts (load circuit). Such high induced voltages (transients) may cause damage to the reed switch or significantly reduce its life.
Therefore, protective circuits such as: RC (snubber), varistor or clamping diodes are recommended. (see Fig. 4a, Fig. 4b, Fig. 4c)

■ It is prohibited to drive directly solenoid valve, motor or magnetic switch.

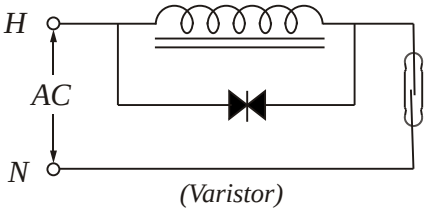
$$C=\frac{I^2}{10}\ (uF)$$

$$R=\frac{E}{10I(1+\frac{E}{50})}$$



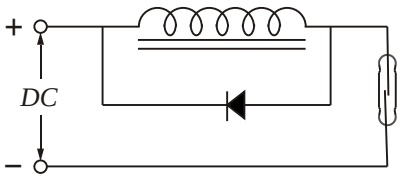
(RC)

Fig. 4 (a)



(Varistor)

Fig. 4 (b)



(Diode)

Fig. 4 (c)

■ CAPACITIVE LOADS

When using reed switches for capacitive loads such as capacitors, incandescent lamps or long cables, the contacts will be subjects to high surge (inrush) current.

Therefore, protective circuits such as: surge suppressors or current limiting resistors are recommended. (Fig. 5a, Fig. 5b)

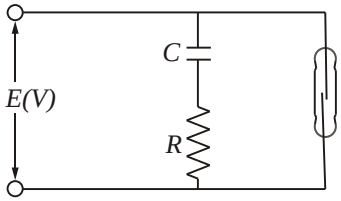


Fig. 5 (a)

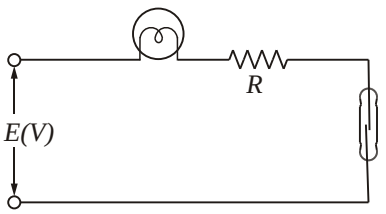
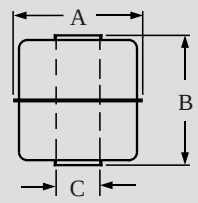
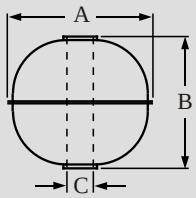
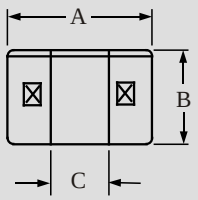
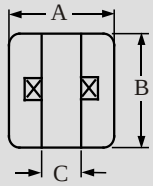
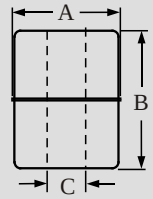


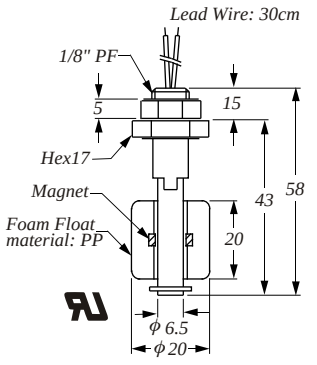
Fig. 5 (b)

FLOAT SPECIFICATIONS

MODEL	TYPE	ϕAxBxϕC	S.G.	Max. Pressure (kg/cm^2)	Weight (g)	Material/Color	Max. Temp. (°C)
	**S1**	28×28×9.5	E>0.8	10	8	SUS 316	200
	S3	45×55×15	E>0.65	12	36	SUS 316	200
	S6	75×108×19	E>0.5	10	145	SUS 304	200
	**S2**	41×38×11	E>0.7	35	19	SUS 316	200
	S4	52×52×15	E>0.55	30	33	SUS 316	200
	S5	75×73×19	E>0.55	30	103	SUS 304	200
	S7	30×28×9.5	E>0.78	30	8	SUS 316	200
 (Hollow)	**P1**	25×15×10	E>0.8	4	4	PP / white black	80
	P2	25×25×10	E>0.7	4	5	PP / white black	80
	P3	48×45×18.5	E>0.6	4	37	PP / black	80
	P4	20×25×10	E>0.8	4	5	PP/black	80
	P5	20×20×8.1	E>0.8	4	4	PP / black	80
	P8	18×15×18	E>0.8	4	7.5	PP / black	80
 (Foam)	**Q6**	20×20×7.5	E>0.8	ATM	3.5	PP / white	80
	Q7	25×25×10	E>0.8	ATM	6.5	PP / white	80
	N1	25×15×10	E>0.8	ATM	4.5	NBR / black	100
	N2	18.5×26×10	E>0.8	ATM	2.6	NBR / black	100
	N3	19×20×10	E>0.8	ATM	2.4	NBR / black	100
	N4	17.5×25×10	E>0.8	ATM	2.4	NBR / black	100
	N5	30×45×10	E>0.5	ATM	11.3	NBR / black	100
 (Hollow)	**F2**	42×44×14	E>0.8	5	20	PP	80
	F3	45×45×20	E>0.5	5	25	PP	80
	F4	48×70×18	E>0.8	5	65	PVDF	120

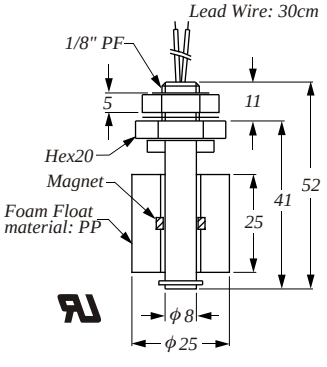
PLASTIC OV TYPES

▶ FC V11QF



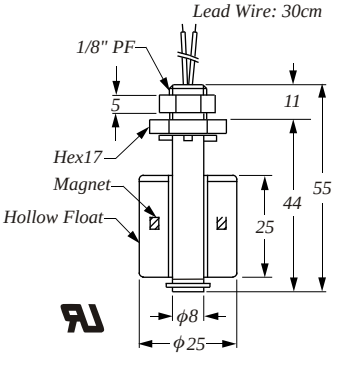
Drill hole ϕ10mm

▶ FC V21QD



Drill hole ϕ10mm

▶ FC V31PD, 33FD, 34YD, 35GD



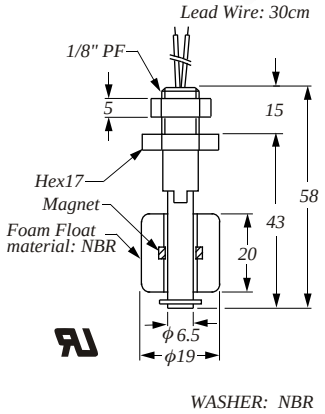
Drill hole ϕ10mm

■ SPECIFICATIONS

Description \ Type	FC V11QF	FC V21QD	FC V31PD	FC V33FD	FC V34YD	FC V35GD
Switching Capacity Max.	10W SPST	50W SPST	50W SPST			
Switching Voltage Max.	100Vac / 100Vdc	240Vac / 200Vdc	240Vac / 200Vdc			
Switching Current Max. (A)	0.5A		0.5A			
Carry Current Max. (A)	1A		1A			
Lead Wire	UL 1007 AWG22 PVC		UL 1007 AWG22 PVC	XLPE AWG22		
Reversible Switch Action	YES		YES			
Max. Pressure (Kg/cm^2)	ATM		4 kg/cm^2	2 kg/cm^2		
Operating Temperature	-20~80℃		-20~80℃	-20~120℃	-20~110℃	-20~120℃
Material	PP		PP	PVDF	Nylon	Polysuphone
Suitable Specific Gravity	0.8		0.7	0.85	0.8	0.85
Weight (g)	12 g	18 g	12.8 g	18 g	15 g	18 g

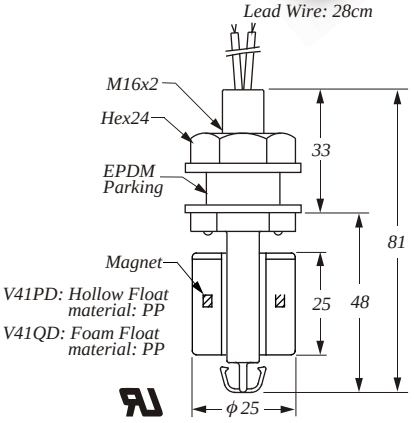
PLASTIC OV TYPES

▶ FC V12NF



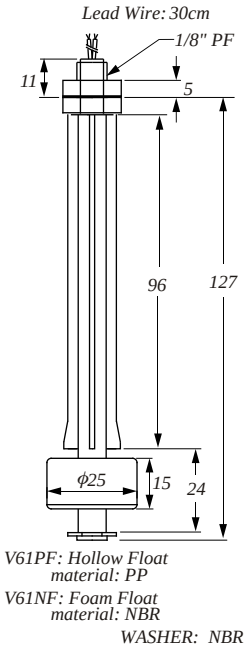
Drill hole ϕ10mm

▶ FC V41PD, V41QD



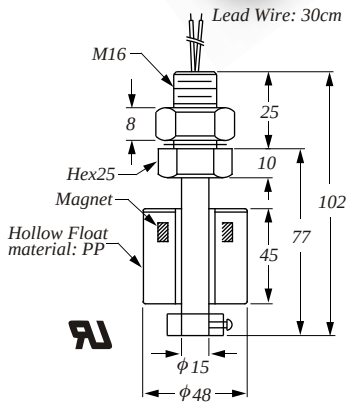
Drill hole ϕ16mm

▶ FC V61PF, V61NF



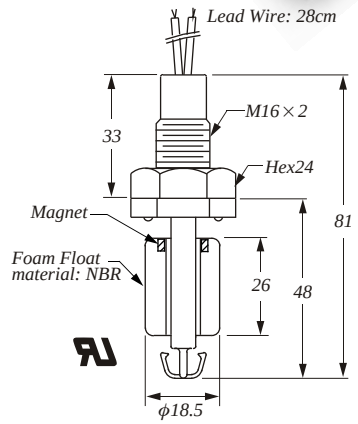
Drill hole ϕ10mm

▶ FC V81PD



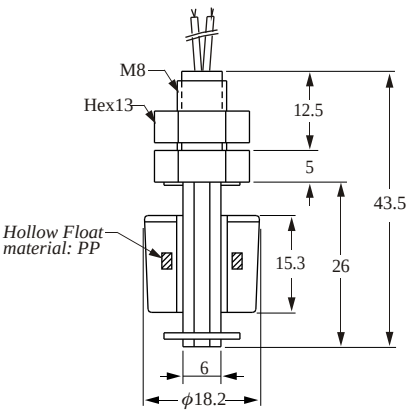
Drill hole ϕ16mm

▶ FC V41ND



Drill hole ϕ16mm

▶ FC V51PD

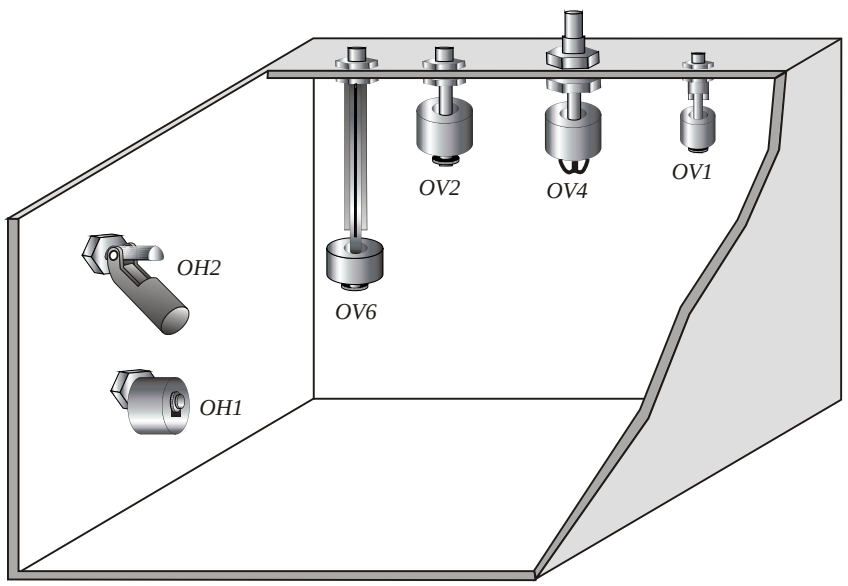


Drill hole ϕ8.5mm

PLASTIC OV TYPES

■ SPECIFICATIONS

Description \ Type	FC V12NF	FC V61PF FC V61NF	FC V41PD FC V41QD	FC V81PD	FC V41ND	FC V51PD
Switching Capacity Max.	10W SPST		50W SPST			
Switching Voltage Max.	125Vac (Break Down 250Vac)		240Vac / 200Vdc			
Switching Current Max. (A)	0.5A					
Carry Current Max. (A)	1A					
Lead Wire	XLPE AWG22	UL 1007 AWG22 PVC			XLPE AWG22	
Reversible Switch Action	NO	NO	YES	NO	YES	NO
Max. Pressure (kg/cm^2)	2 kg/cm^2	V61P: 4kg/cm^2 V61N: ATM	V41P: 4kg/cm^2 V41Q: ATM	4 kg/cm^2	ATM	4 kg/cm^2
Operating Temperature	-20 ~100℃	-20~80℃			-20 ~100℃	-20~80℃
Material	PP (except V11N, V61N, V41N: NBR float)					
Suitable Specific Gravity	0.8	0.7 ~ 0.8		0.6	0.8	0.8
Weight (g)	11 g	16 g	23 g	180 g	17 g	8.2 g



ORDER INFORMATION

FC [ ][ ][ ] [ ] [ ] [ ] [ ][ ] [ ]

Order No./ Model

FC H1~H6: RF-OH Side Mounting
FC V1~V8: RF-OV Top or bottom Mounting

Material of Wetted parts

1 : PP **4 :** Nylon
3 : PVDF **5 :** Polysuphone

Material of Float

F: PVDF **P:** PP (hollow) **Y :** Nylon
N: NBR **Q:** PP (foam) **G:** Polysuphone

Switching Capacity Max.

D : 50W 200VDC/240VAC SPST
F : 10W 125VAC SPST
H: 3W 30VAC/60VDC SPDT (available for FCV11 or FCV61)
K: 20W 150VAC/200VDC SPDT

Contact Form

A : Normally Open (N.O.) SPST
B : Normally Close (N.C.) SPST
C : 1AB SPDT
D : NC Reversible
E : NO Reversible

Lead wire Length (L: unit=10cm)

03: 30cm (Standard length) ※except of (FCV4, V5 standard by 28cm)
05: 50cm
10: 100cm (1 Meter)
15: 150cm

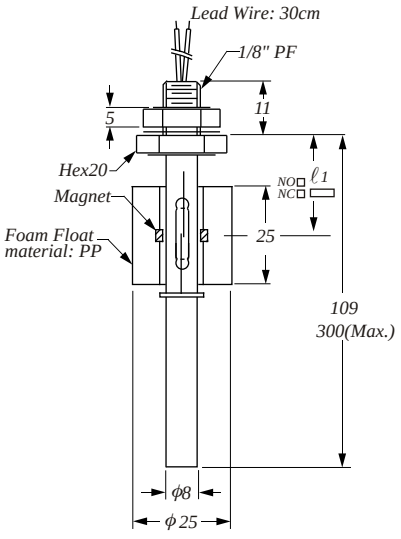
Material of Lead wire

C : PVC cable (80℃) ---- AWG22 x2C xϕ4
D : XLPVC (105℃) ---- AWG22
F : SILICON cable (200℃) ---- AWG24 x2C xϕ4
P : PVC (80℃) ---- AWG22
S : SILICON (200℃) ---- AWG22
T : TEFLON (200℃) ---- AWG24
X : XLPE (125℃) ---- AWG22

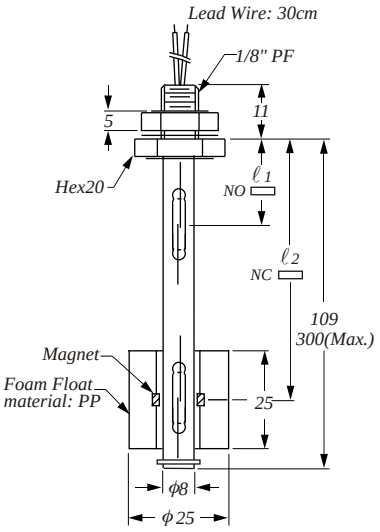
※"A" (Normal Open) contact form is our standard specified switch activation, others contact form and target lead wire length subject to above data, except of above, please refer pages 7, 8, 10, 11and 13.

PLASTIC SPECIAL TYPES

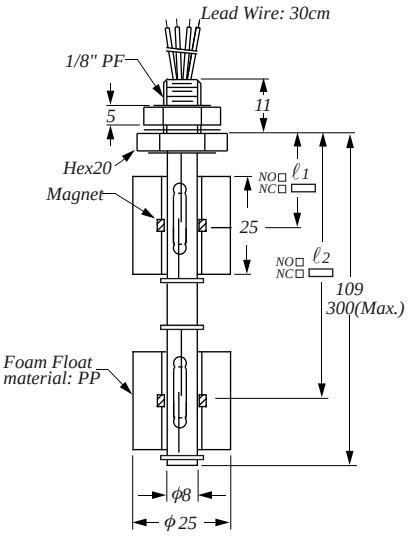
▶ FC PV1



▶ FC PV2



▶ FC PV3



O-RING: VITON

- NOTE: Float material can be optional.

Above items are done by custom-built when the standard specification is unable to be coped with their unique demand. There are with below special benefits:

- FCPV1 One float for one level activation switch location by custom-order.
- FCPV2 One float with 2 reed switches, applicable for high / low two level activation, especial design by one float to drive two contacts activation.
- FCPV3 Two floats drive with two independent reed switches, the compared difference with FCPV2 base on below character : Each one float unit can be performed by N.O. or N.C. level activation as per customer's option.

ORDER INFORMATION

FC **PV1** **2** **D** **A** **05** **P**

Order No./ Model

PV1: RF-PV1 Vertical Mounting, Single Float Single Switch
PV2: RF-PV2 Vertical Mounting, Single Float Dual Switch
PV3: RF-PV3 Vertical Mounting, Dual Float Dual Switch

Material of Wetted parts

1 : PP; Lead wire---PVC---Temp. 80℃
2 : NBR (only float); Lead wire---PVC---Temp. 60℃
Lead wire---XLPE---Temp. 100℃
3 : PVDF; Lead wire---XLPE---Temp. 125℃
4 : Nylon; Lead wire---XLPE---Temp. 125℃

Switching Capacity Max.

D: 50W 200Vdc/240Vac SPST
F : 10W 125Vac SPST

Contact Form

A: Normally Open (N.O.) SPST
B: Normally Close (N.C.) SPST

Lead wire Length (L: Unit=10cm)

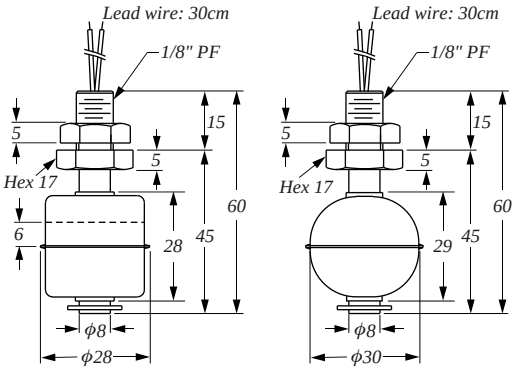
03: 30cm (Standard length)
05: 50cm
15: 150cm
20: 200cm

Material of Lead wire

P : PVC ---- 80℃
X : XLPE ---- 125℃

METAL TYPES

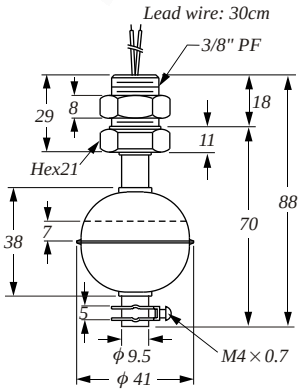
▶ FD 30□1/ FD 35□1



WASHER: NBR

Drill hole ϕ10mm

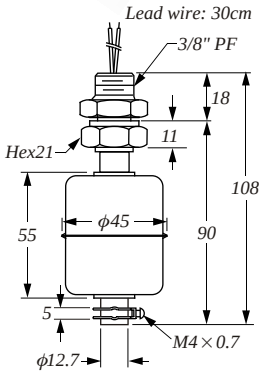
▶ FD 40□1



WASHER: NBR

Drill hole ϕ17mm

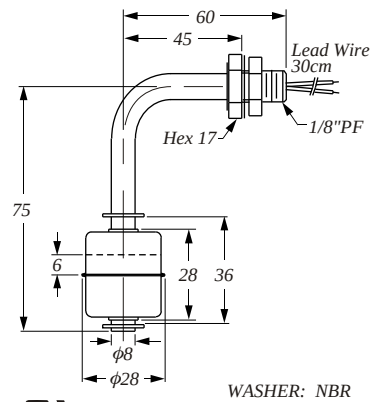
▶ FD 45□1



WASHER: NBR

Drill hole ϕ17mm

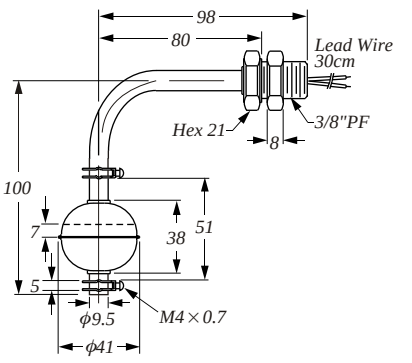
▶ FD 30□2



WASHER: NBR

Drill hole ϕ10mm

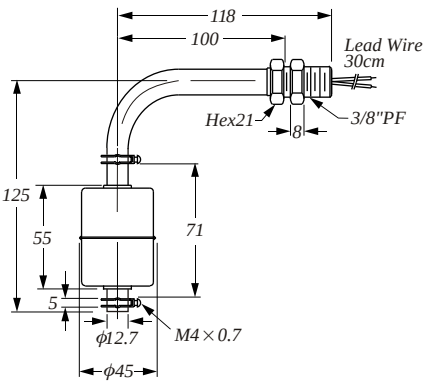
▶ FD 40□2



WASHER: NBR

Drill hole ϕ17mm

▶ FD 45□2



WASHER: NBR

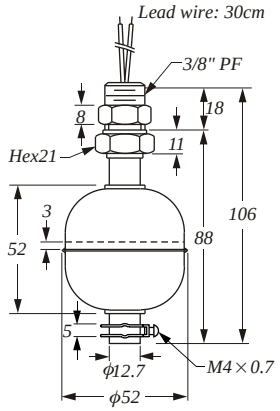
Drill hole ϕ17mm

FineTek

METAL TYPES

▶ FD 50□1

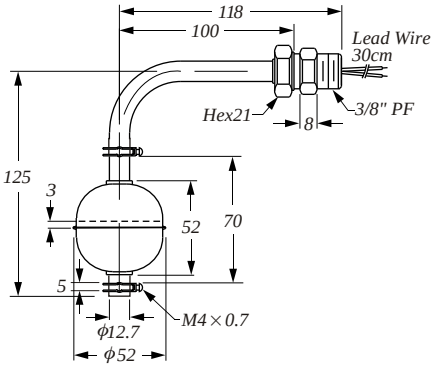
WASHER: NBR



Drill hole ϕ17mm

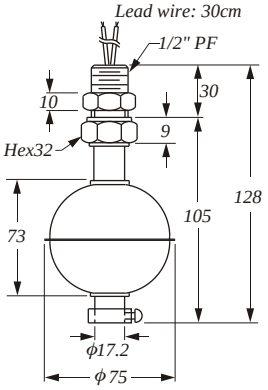
▶ FD 50□2

WASHER: NBR



Drill hole ϕ17mm

▶ FD 75□1



Drill hole ϕ21mm

■ SPECIFICATIONS

Description \ Type	FD30□1D FD30□2D	FD40□1D FD40□2D	FD45□1D FD45□2D	FD50□1D FD50□2D	FD75□1G	FD10□1G
Switching Capacity Max.	50W SPST	50W SPST	50W SPST	50W SPST	60W SPDT	
Switching Voltage Max.	240Vac/200Vdc				220Vac	
Switching Current Max. (A)	0.5A	0.5A	0.5A	0.5A	2A	
Carry Current Max. (A)	1A	1A	1A	1A	3A	
Lead Wire	XLPE (UL3266, AWG22)					
Reversible Switch Action	YES	YES	YES	YES	NO	NO
Max. Pressure (Kg/cm^2)	10	30	12	30	30	10
Operating Temperature	-10~120℃ (OPTION 200℃)					
Material	Stainless Steel SUS304, 316					
Suitable Specific Gravity	0.8	0.7	0.65	0.55	0.55	0.5

ORDER INFORMATION

FD □□ □ □ □ □ □□

Order No./ Model

FD10 Float : **RF-10** ϕ75x108, Screw : 1/2"PF
FD30 Float : **RF-30** ϕ28x28, Screw : 1/8"PF
FD35 Float : **RF-35** ϕ30x29, Screw : 1/8"PF
FD40 Float : **RF-40** ϕ41x38, Screw : 3/8"PF
FD45 Float : **RF-45** ϕ45x55, Screw : 3/8"PF
FD50 Float : **RF-50** ϕ52x52, Screw : 3/8"PF
FD75 Float : **RF-75** ϕ75x70, Screw : 1/2"PF

Material of Wetted parts

0 : SUS304
6 : SUS316

Mounting

1 : Top or Bottom Mounting
2 : Side Mounting

Switching Capacity Max.

D: 50W 200Vdc /240Vac SPST
F : 10W 125Vac SPST
G: 60W 220Vac SPDT (only use for tude ≧ϕ12.7)
H: 3W 30Vac / 60Vdc SPDT (only use for tude ≦ϕ9.5)

Contact Form

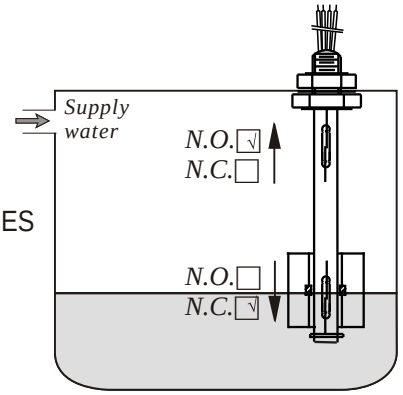
A: Normal Open (N.O.) SPST
B: Normal Close (N.C.) SPST
C: 1C SPDT
D: N.C. Reversible
E: N.O. Reversible

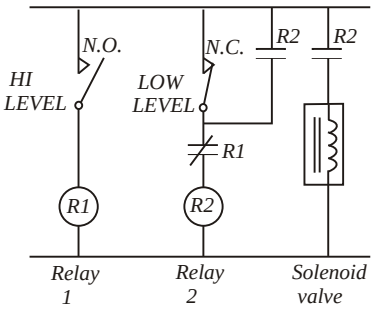
Lead wire Length (XLPE 125℃) **L:** Unit=10cm

03: 30cm (Standard length)
05: 50cm
15: 150cm

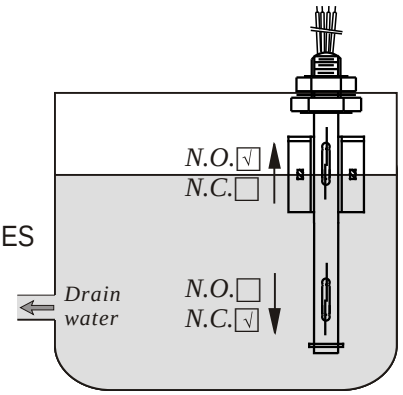
TYPICAL WIRING DIAGRAMS

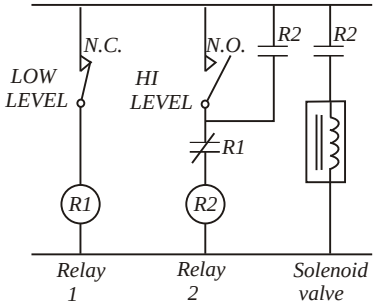
✻ AUTO SUPPLY CASE:
SINGLE FLOAT DUAL SWITCHES



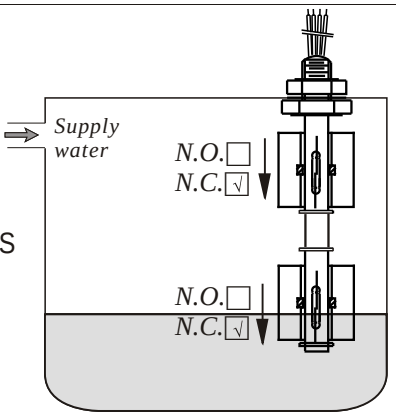


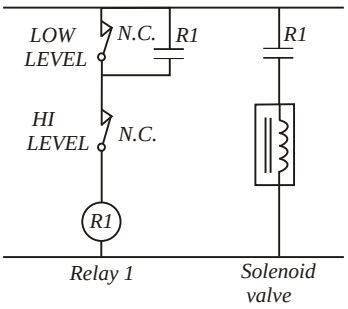
✻ AUTO DRAIN CASE:
SINGLE FLOAT DUAL SWITCHES





✻ AUTO SUPPLY CASE:
DUAL FLOATS DUAL SWITCHES





✻ AUTO DRAIN CASE:
DUAL FLOATS DUAL SWITCHES