

Mobrey

Floating roof tank alarm switch



Dead Weight

Flat Ended
Displacer
Element



- Hazardous area certified
- Unique 3 magnet latching switch mechanism
- No springs in switch mechanism

This switch is designed specifically for use on floating roof tanks to signal an alarm if the roof rises too high.

Based on the popular and unique Mobrey switching mechanism, the switch carries Hazardous Area certification from ATEX, UL, and CSA.

Operation

A dead weight is suspended on a cable attached to the extension spring of a switch head. Attached to the bottom of the spring is a vertical rod which carries a magnet that sits below a switching mechanism in the switch head.

As the floating roof rises and comes into contact with the dead weight, the extension spring contracts to lift the rod magnet in the support tube. As the rod magnet passes the switching mechanism, it interacts with the mechanism magnets and drives the contacts to change-over.

This unique switch mechanism offers unrivalled performance with long trouble-free operation and true "snap-action" latch-on switching.

In applications where there can be liquid on the floating roof, a displacer element is available to detect the liquid and prevent an overspill.

As liquid rises to cover the displacer element, a buoyancy force is created equal to the displaced liquid weight. This force is seen by the spring as a weight reduction, causing the spring to contract to lift the rod magnet inside the support tube and actuate the switch mechanism.

On a falling liquid level, the displacer element is uncovered and the spring extends to move the rod magnet and reset the switch mechanism.

The displacer element has a flat end to ensure it still engages with the floating roof, in the same manner as the dead weight, even when there is no liquid present.

Specifying your floating roof tank switch

Select the appropriate enclosure module and switch mechanism using the information below. You may want to include a second failure switch which is

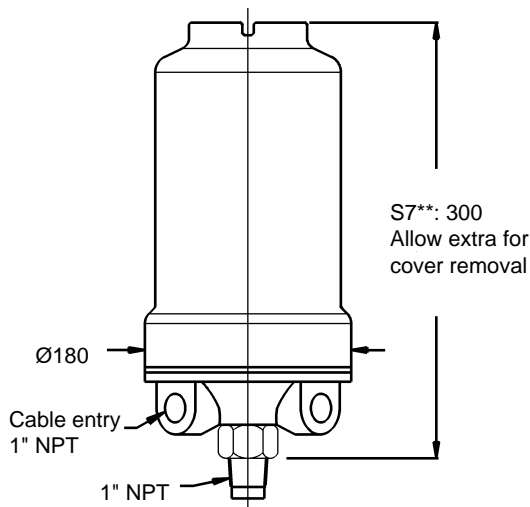
activated if the dead weight or displacer element becomes detached from the extension spring - see below.

Safety features

If the first roof rising detection switch mechanism fails to operate, due to a mechanical problem preventing the rod magnet from rising, the floating roof would make contact with the bottom of the extension spring and the rod magnet would be physically forced upwards to operate the alarm switch mechanism(s).

A second switch mechanism may be specified to operate in the event of the dead weight or displacer becoming detached. If this occurs, the extension spring fully contracts and the rod magnet is driven to the top of the enclosure, thus operating the second switch mechanism. Due to the unique magnetic latching action of the switch mechanisms, the lower switch will also remain in the alarm condition under these circumstances.

Enclosure modules S7A, S7AC, S7AU



Hazardous area enclosure

Explosion-proof CL1 Div1 Grps A, B, C and D
Flameproof ATEX II 1/2 G, EExd IIC T6
Aluminium alloy base and cover

Type S7A, S7AC and S7AU

Conduit entries:

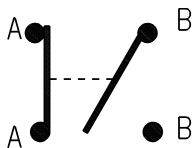
Enclosures supplied with four contact switch mechanisms have a single 1" NPT conduit entry. Enclosures supplied with eight contact switch mechanisms have 2 x 1" NPT conduit entries.

Paint Finish:

Black stove paint. Epoxy paint finishes available on request.

Mobrey switch mechanisms

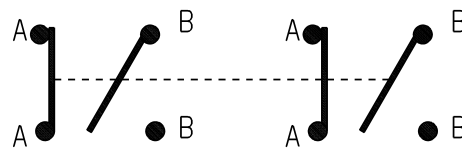
4 Contact types: D4, X4, P4, H4



2 x independent SPST

AA make on rise: BB Make on fall

8 Contact types: D8, X8, P8, H8



Double pole double throw (4 x independent SPST)

AA make on rise, BB make on fall

Type D4, D8:	General purpose switch mechanism.
Type D4U, D8U:	General purpose switch mechanism for use when UL certification is required
Type X4, X8:	High current switch mechanism.
Type P4, P8:	Switch mechanism with gold plated contacts for use in low power or intrinsically safe circuits.
Type H4, H8:	Hermetically sealed mechanism with all moving parts and contacts enclosed in an inert gas filled stainless steel enclosure. Suitable for use in low temperatures, contaminated atmospheres and intrinsically safe circuits.

Type of switch mechanism

Code	Switch mechanism duty	Max. °F (°C)	A.C. max. values			D.C. max. values				Certification
			Volts	Amps	VA	Volts	Res. I	Ind. I	Watts	
4 Contact: 2 x SPST										
D4	General purpose	752 (400)	440	5	2000	250	5	0.5	50	ATEX, CSA
D4U	General purpose (UL)	752 (400)	440	5	2000	250	5	0.5	50	UL
P4	Low power circuits	752 (400)	250	0.25	6	250	0.25	0.1	3.6	ATEX, CSA, UL
X4	High power circuits	482 (250)	440	10	2000	250	10	0.5	50	ATEX, CSA, UL
H4	Hermetically sealed	482 (250)	440	10	2000	250	10	0.5	50	ATEX, CSA, UL
8 Contact: DPDT										
D8	General purpose	752 (400)	440	5	2000	250	5	0.5	50	ATEX, CSA
D8U	General purpose (UL)	752 (400)	440	5	2000	250	5	0.5	50	UL
P8	Low power circuits	752 (400)	250	0.25	6	250	0.25	0.1	3.6	ATEX, CSA, UL
X8	High power circuits	482 (250)	440	10	2000	250	10	0.5	50	ATEX, CSA, UL
H8	Hermetically sealed	482 (250)	440	10	2000	250	10	0.5	50	ATEX, CSA, UL

Each switch mechanism has flying leads which are factory wired to ceramic terminal blocks fixed in the switch enclosure.

Intrinsically safe use

For use in intrinsically safe circuits, gold plated switch contacts are recommended. Users are reminded that it is their responsibility to obtain the necessary system approval and licences for such circuits.

Gold plating on the contacts of P4 and P8 switch mechanisms may be permanently damaged if the mechanisms are used to switch circuits with values greater than those shown above.

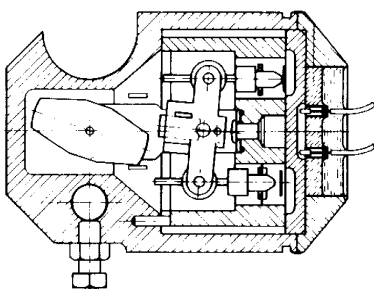
Warning

Switches must not be used for the direct starting of motors. Contacts should be wired in series with the operating coils of relays, contactor starters or solenoid valves and fused separately.

The Mobrey hermetically sealed switch mechanism

When controls are required to operate in extreme conditions, the unique Mobrey hermetically sealed switch provides dependable life long operation that you can rely on. With all its moving parts

and contacts completely enclosed, this genuine hermetically sealed switch is suitable for use in corrosive atmospheres and low temperature environments down to -58 °F (-50 °C).



Section through type H4 switch mechanism



Hermetically sealed switch mechanism

Fixed roof storage tanks

These switches are NOT suitable for use on storage tanks with a fixed roof. A self-checking tuning fork style switch is recommended for fixed roof tanks.

Ideal for these applications is the Rosemount 2100 Series of liquid level switches. See the web site www.rosemount.com for full product details.

Level

Ordering information

Code	Floating roof tank switch					
DS						
Code	Dead weight/Displacer element, and suspension cable					
20D	316SS Dead weight and 3m suspension cable, may be adjusted on site to achieve desired switching level. 316SS trim with Nimonic 90 extension spring					
21D	316SS Displacer element (flat ended) and 3m suspension cable, may be adjusted on site to achieve desired switching level. 316SS trim with Nimonic 90 extension spring Specific Gravity (S.G.) Range 0.45 to 1.2 for 4 contacts, 0.6 to 1.2 for 8 contacts					
Code	Enclosure module*					
S7A	Flameproof, ATEX certified, aluminium alloy painted black					
S7AC	Explosion-proof, CSA certified, aluminium alloy painted black					
S7AU	Explosion-proof, UL certified, aluminium alloy painted black					
Code	Number of switch mechanisms					
1	Single switch for alarm on rising roof level					
2	Two switches, one for alarm on rising roof level and one for indication that deadweight/displacer has become detached					
Code	Type of switch mechanism*					
D4	General purpose					
D4U	General purpose (UL)					
P4	Low power circuits					
X4	High power circuits					
H4	Hermetically sealed					
D8	General purpose					
D8U	General purpose (UL)					
P8	Low power circuits					
X8	High power circuits					
H8	Hermetically sealed					
Code	Mounting arrangement					
/ 0	1" NPT thread: 316 stainless steel standard					
DS	20D	S7A	2	D4	/ 0	Typical model number: ATEX certified with 2 switches
DS	20D	S7AU	1	D4U	/ 0	Typical model number: UL certified with single switch

* **Note:** Ensure correct switch mechanism and enclosure module are specified in accordance with certification requirements

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