

Mobrey Magnetic Level Switches

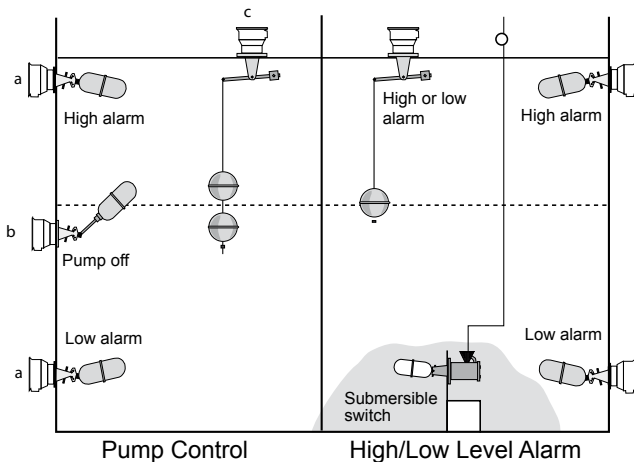
For Liquid Level Alarm and Pump Control Duties



Operation

One permanent magnet forms part of a float assembly which rises and falls with changing liquid level. A second permanent magnet is positioned within the switch or air pilot valve so that the adjacent poles of the two magnets repel each other through a non-magnetic diaphragm. A change of liquid level which moves the float through its permissible travel will cause the float magnet to move and repel the switch magnet to give the snap action operation.

Switching is accomplished by the angular movement of the switch magnet being used to operate "push-rods". These rods bear on contact blades and break one set of contacts while allowing the other set to make. The benefit of this arrangement is that contact force is independent of the magnet.



Switch selection (see diagram below left)

Alarm switching - Electrical or Pneumatic

Horizontal or vertical

High or low alarm switches are of robust construction, making them ideal for a wide range of liquids in industrial applications.

Dirty liquid applications

The shrouded model should be specified, thus eliminating fouling of the float movement due to deposits or large particles becoming wedged.

Submersion

For those applications where the equipment may be subject to occasional or continuous submersion the submersible model should be specified.

Viscous liquids

Cranked arm float units should be specified to enable the operating mechanism to be kept clear of the liquid. Rod extensions shaped to individual requirements are available to fit all Mobrey level switches.

Hoseproof marine applications

Switches have been specifically designed for the requirements of these markets and approval authorities, (for details of approvals contact the factory).

Vacuum applications

All metallic floats are capable of operating in full vacuum conditions.

Pump control - Electrical or Pneumatic

Horizontal mounting

(a) Horizontal large differential, two switches are used to control the pump for emptying or filling requirements.

(b) Horizontal limited differential, (21.85" (555mm) maximum) can be controlled with one switch and a variable differential float unit.

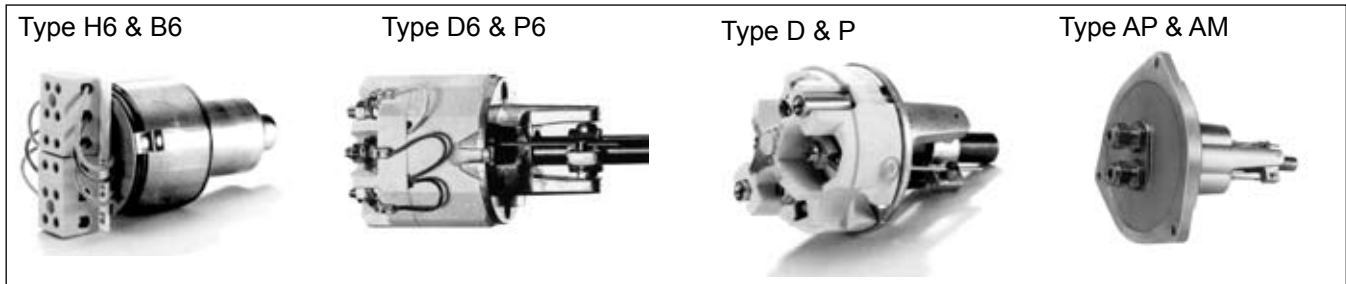
Vertical mounting

(c) Vertical variable differential, controlled by using one switch vertically mounted and the appropriate adjustable variable differential vertical float unit.



Mobrey Float Switches

Choice of switch mechanisms



Electrical

Type D

For alternative make and break circuits.
Function: 2 independent single pole single throw contact sets: "Snap Action".
May be wired S.P.C.O. on site.

Type D6

For switching two independent circuits.
Function: Double pole change over (2 independent circuits): "Snap Action".

Type P & P6

As type D and D6 but with gold plated contacts for switching low power (e.g. intrinsically safe) electrical circuits.

Type H6

For use in corrosive area and/or low temperature applications. As type D6 but with gold plated contacts and all moving parts housed in an inert gas filled hermetically sealed enclosure.

Type B6

For use in Zone 2 Hazardous Areas.
As type H6 but coded ATEX II 3 G,
EExnC IIC T6 -76°F (-60°C) ≤ Ta ≤ +140°F (+60°C)

Pneumatic

Type AP

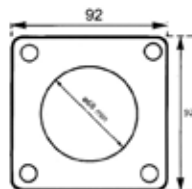
For switching air circuits.
Function: Change over.
Air pressure: Max. air pressure through valve: 100psi (7 bar). Max. air flow through valve: 66 litres/min at 100psi (7 bar). Air must be clean and dry.
Nominal leakage rate 0.2%.
Connections: Brass compression couplings to suit 0.24" (6mm) copper or nylon pipe, coupling thread 1/4" BSP).

Type AM

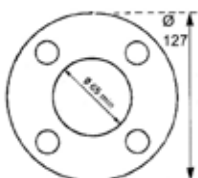
For modulating air controlled circuits.
Function: Continuous modulation.
Air pressure
Max. air pressure through valve: 20psi (1.4 bar).
Modulation: linear: 0 to 20psi (0 to 1.4 bar)
2.9psi (0.2 bar) to 20psi (1.4 bar) available on request
Temperature
Medium +34°F to 752°F (+1°C to 400°C)
Ambient +34°F to 140°F (+1°C to 60°C)
Lower ambient temp. can be tolerated provided the air supply is 100% dry.

WARNING: The plating of gold contact switches may be permanently damaged if this mechanism is used to switch circuits above the following limits:
300V: 12mA Resistive 24V: 2mH/200mA Inductive 24V: 250mA Resistive 24V: 750mH/10mA Inductive
LVD - Low Voltage Directive: Standards applied: EN60947 Parts 1 and 5.1

Mobrey flanges

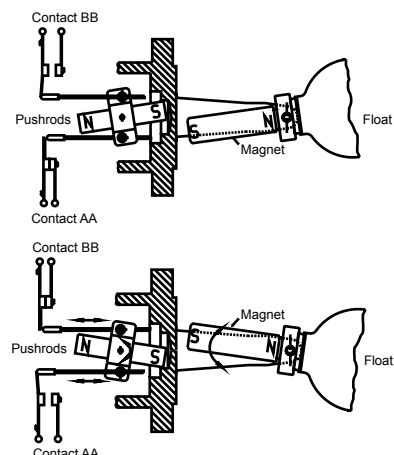


Mobrey 'A' flange
4 off 0.56" (14mm) Ø holes equi-spaced on 3.6" (92mm) PCD



Mobrey 'G' flange
4 off 0.56" (14mm) Ø holes equi-spaced on 3.85" (98mm) PCD

Glandless Magnetic Snap-Action Switching



Product Data Sheet

IP101

Catalog 2008 - 2009

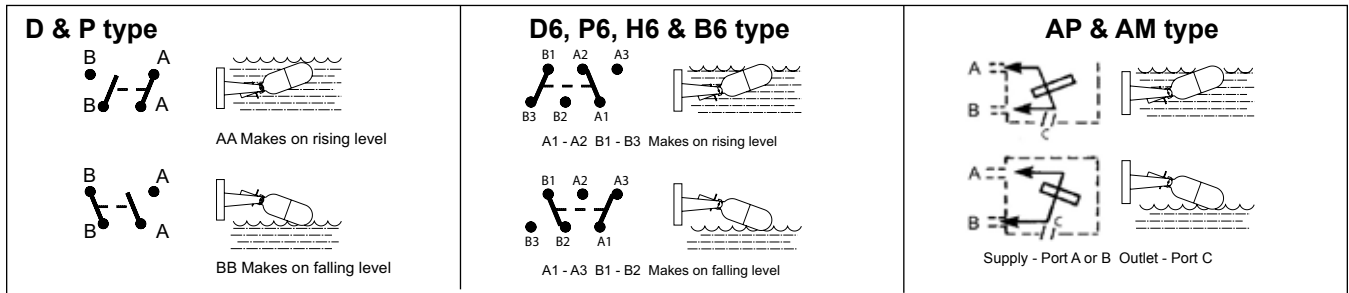
Mobrey Float Switches

Rating

Mechanism type	D & D6	P & P6	H6 & B6
Contact material	Fine silver	Gold plated	Gold plated
Temp. Medium Ambient	-22°F to + 752°F -22°F to + 158°F	(-30°C to + 400°C) (-30°C to + 70°C)	-148°F to + 482°F (-100°C to + 250°C) -76°F to + 158°F (-60°C to + 70°C)
Insulation value	(live to earth) > 100 MEG OHM		
Terminals D,P D6, P6, H6, B6	M4 screws with non-rotational clamp plates 6 way terminal block with pressure plates		
	AC	DC Inductive	DC Resistive
Max. Voltage V	440	240	240
Max. Current A	5.0*	1.0	2.0
Max. Power	2000VA Power factor 0.4 Min	35 Watts Time constant 40ms max.	70 Watts

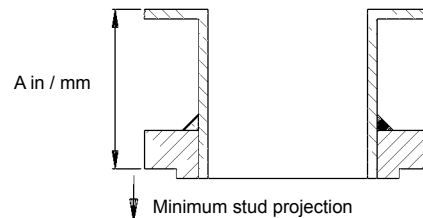
* Note : Max. current for Type D is 8.0A up to 410°F (210°C)

Switch mechanisms



Nozzle and stud lengths

Max. nozzle length allowable (dim. A). See accessories page for flanges and accessories.
 Dimensions are in inches / mm



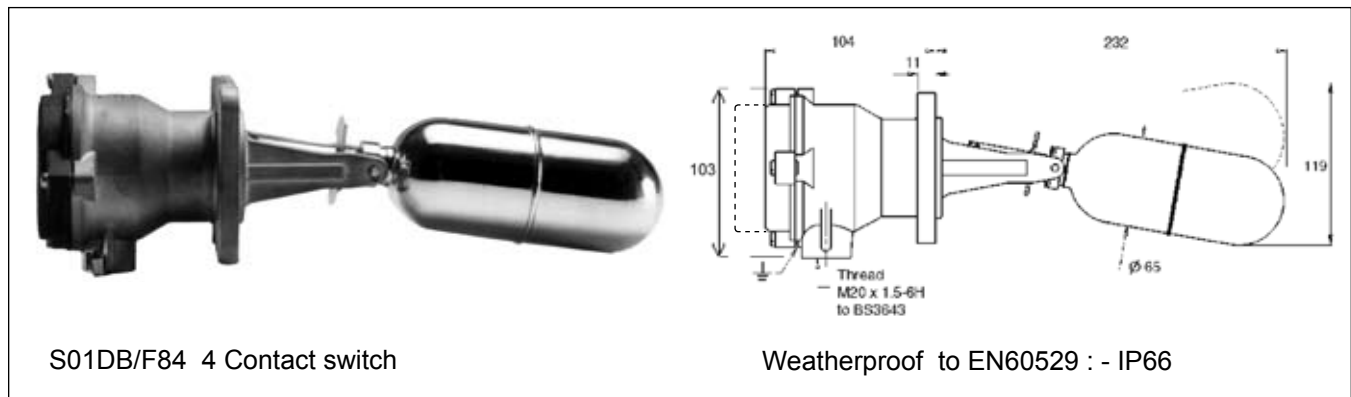
Float Flange	F68+		F84		F185		F88		F93		F96		F98		F106		F107		F264	
Mobrey A	2.5	65	3	75	3	75	5.3	135	3	75	3	75	3.5	90	3.6	92	-	-	3	75
DN65	2.5	65	3	75	3	75	5.3	135	-	-	3	75	3.5	90	3.6	92	-	-	3	75
DN80	2.7	70	3.2	80	3.2	80	6.7	170	-	-	3.2	80	3.5	90	3.9	98	-	-	3.5	90
DN100	3.7	95	4.1	105	4.1	105	8	200	-	-	4.1	105	4.1	105	4.3	110	-	-	4	100
DN125	4.1	105	5.5	140	5.5	140	8	200	-	-	5.5	140	5.5	140	5.5	140	-	-	5.5	140
DN150	8.8	224	7.1	180	7.1	180	8	200	-	-	7.1	180	6.7	170	8	200	-	-	7.5	190
3" 300 & 150	2.7	70	3.2	80	3.2	80	6.7	170	-	-	3.2	80	3.5	90	4	98	-	-	3.5	90
4" 300 & 150	3.7	95	4.1	105	4.1	105	8	200	-	-	4.1	105	4.1	105	4.3	110	-	-	4	100
3" 600	2.4	62	2.7	70	2.7	70	5.1	130	-	-	2.7	70	3.4	85	3.5	89	-	-	2.7	70
3" 900	2.4	62	2.7	70	2.7	70	5.1	130	-	-	2.7	70	3.4	85	3.5	89	4.6	118	2.7	70
Mobrey G	2.5	65	3	75	3	75	5.3	135	-	-	3	75	3.5	90	3.6	92	-	-	3	75
6" 150	8.8	224	-	-	-	-	8	200	-	-	-	-	-	-	-	-	-	-	7.5	190

Minimum stud projection (mm)

Rating	G	A	PN16					PN40					PN64				150	300	600	900		
Size	-	-	65	80	100	125	150	65	80	100	125	150	80	100	125	150	3"	4"	3"	4"	3"	3"
Stud "	1.4	1.2	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.8	2	2.1	2	2.1	2.5	2.6	1.8	1.8	2.1	2.2	2.5	2.9
mm	35	30	40	40	40	40	44	42	42	46	52	54	52	55	62	67	46	46	54	56	64	74

Mobrey Float Switches

Aluminium bronze wetside models for general purpose applications



S01DB/F84 4 Contact switch

Weatherproof to EN60529 : - IP66

Specifications

Electrical models

Enclosure and wetside:	Aluminium bronze to BS1400 - AB1 max. iron content 2.5%	
End cap:	Short	e.g. S01DB Aluminium BS1490 - grade LM24
	Long	e.g. S01D6B Brass BS1400 - DCB3
Maximum temp:	410°F (210°C) except shrouded float. F93 = 356°F (180°C)	

Air pilot valve models

Enclosure:	Aluminium Alloy to BS 1490 : Grade LM24
Valve block:	Aluminium alloy to BS 1490 : Grade LM25
Finish:	All external aluminium surfaces are chromate phosphate treated then externally painted (air pilot valves only)
Maximum temp:	See switch insert

Aluminium bronze wetside models

Enclosure & wetside:	Aluminium bronze to BS1400 - AB1 max. iron content 2.5%
End cap	Brass BS1400 - DCB3
Maximum temp:	410°F (210°C) except shrouded float. F93 = 356°F (180°C)

Stainless steel wetside models

Enclosure & wetside:	Type 316 Stainless steel
Endcap :	Aluminium bronze BS1400 AB1/C
Cable specification	10ft (3m) standard where fitted. Longer lengths available upon request up to max. submersion depths.

MICC	Temperature limit 176°F (80°C) 600V light duty grade mineral insulated copper clad cable.
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CSP	Temperature limit 122°F (50°C) 600/1000V grade ethylene-propylene rubber insulated flexible cable.
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NB: Maximum temperature is dependent upon switch mechanism and gasket

Aluminium bronze wetside/enclosure models

Type No.	Duty	Head IP rating	Max Temp °F	Max Temp °C	Cable	T box IP rating
S03	Submersible	68 (100' 30m)	410	210†	MICC (10' 3m)	44
S179	Hoseproof	66★	410	210	None fitted	-
S195	Submersible	68 (100' 30m)	410	210†	CSP (10' 3m)	44
S187	Submersible	68 (100' 30m)	140	60	MICC	-
S189	Hoseproof	66★	140	60	None	-
S183	Submersible	68 (100' 30m)	122	50	CSP	-

Stainless steel wetside/enclosure models

S163	Submersible	68 (100' 30m)	410	210†	MICC (10' 3m)	44
S181	Hoseproof	66★	410	210	None fitted	-

★ May be submerged to 100ft (30m) head of water with temperatures between 34°F - 212°F (1°C - 100°C).
Fitting and testing of customers supplied cable and gland is the customer's responsibility.
† Totally submerged applications.

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Mobrey Float Switches

Ordering information

Code General purpose, submersible, hoseproof and marine applications

S Switch

Code	Flange (Head) Size	Rating	Standard
01	Mobrey A	18 Bar	Mobrey
03	Mobrey A	18 bar	Mobrey
179	Mobrey A	18 bar	Mobrey
195	Mobrey A	18 bar	Mobrey
163	Mobrey A	18 bar	Mobrey
181	Mobrey A	18 bar	Mobrey
183	Mobrey A	18 bar	Mobrey
187	Mobrey A	18 bar	Mobrey
189	Mobrey A	18 bar	Mobrey

Code Switch mechanism

DB	4 Contact - general ⇒ short end cap
PB	4 Contact - gold plated contacts ⇒ short end cap
D6B	6 Contact - general ⇒ long end cap
P6B	6 Contact - gold plated contacts ⇒ long end cap
D	4 contact - general
P	4 contact - gold plated contacts
D6	6 contact - general (Not for use with SS wetside/enclosure models S163 & S181)
P6	6 contact - gold plated contacts (Not for use with SS wetside/enclosure models S163 & S181)
APA	Pneumatic on/off
AMA	Pneumatic modulating
DBL	4 contact - general. Use with S183 and S187 only
PBL	4 Contact - low power circuits, gold plated contacts. Use with S183 and S187 only
D6BL	6 Contact - general. Use with S183 and S187 only
P6BL	6 Contact - low power circuits, gold plated contacts. Use with S183 and S187 only

Code Float - application information

F84	High or low alarm or 2 off
F185	for pump control wide differential
F68/+	Horizontal pump control
F264	Horizontal limited differential
F21/+	Vertical: pump control or alarm
F104/+	Cranked arm vertical or horizontal
F93	Shrouded for dirty liquids Silicone rubber gaiter with 316ss shroud and float
F98	High or low alarm or 2 off

See accessories page for technical float details and lengths options and nozzle and stud lengths.

Switch / Float combination chart

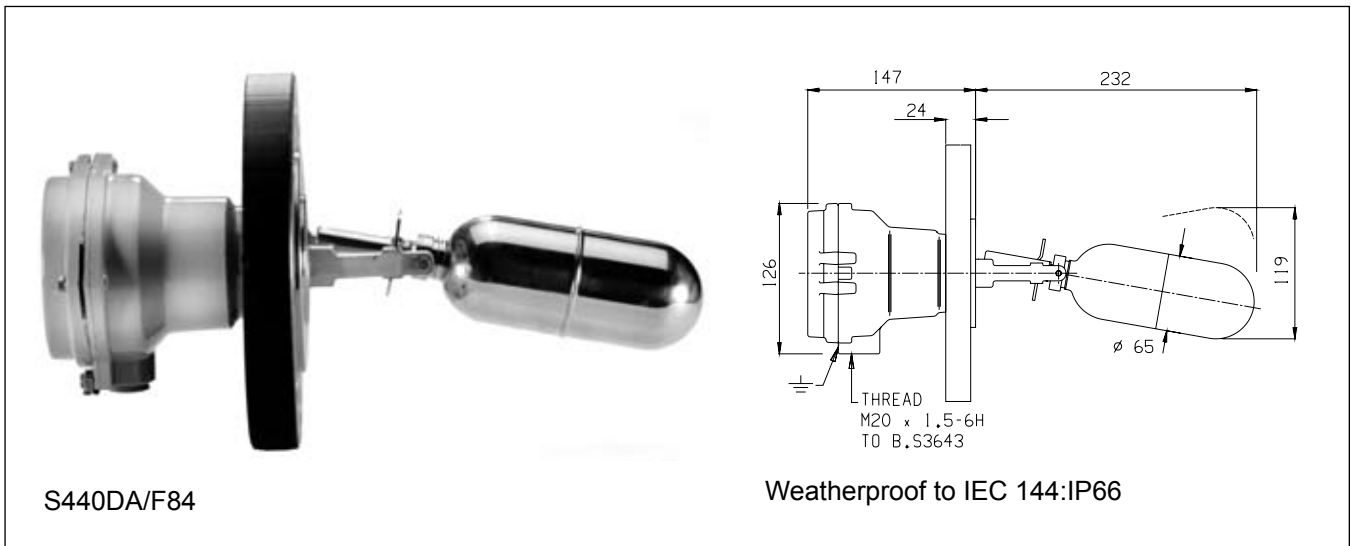
Float	Switch					
	S01	S03	S163	S179	S181	S195
F84	★	★	★	★	★	★
F185	★	★		★		★
F68/+	★	★	★	★	★	★
F264	★	★	★	★	★	★
F21/+	★	★	★	★	★	★
F104	★	★	★	★	★	★
F93	★	★		★		★
F98			★		★	

★ Preferred combination Shrouded floats type F93 may be fitted to any of the aluminium bronze wetside switches type S03, S179 and S195.

Shrouded floats for stainless steel switches S163 and S181 are available only on request.

Mobrey Float Switches

Stainless steel wetside models for general purpose applications



S440DA/F84

Weatherproof to IEC 144:IP66

Specifications

Electrical models

Back flange (where fitted) Carbon steel to BS 1501: 224 Grade 430B LT50. This material has guaranteed properties at both high 750°F (400°C) and low -58°F (-50°C) temperatures. Painted surfaces are stove paint finish.

All unpainted surfaces are corrosive protected.

Wetside material

Stainless steel to type 316 to Mobrey standard

Stainless steel type 316S33 (S489 & S490 models only)

Enclosure housing material:

Aluminium alloy to BS1490: Grade LM24

Air pilot valve models

Valve block

Aluminium alloy to BS 1490: Grade LM25 - chromate phosphate treated.

Finish:

All surfaces are chromate phosphate treated then externally stove painted.

Maximum temperature dependent on switch mechanism, gasket and gland

Switch/float combination chart

F No.	S No.																					
	S36	S190	S417	S418	S419	S424	S425	S428	S429	S430	S431	S432	S433	S434	S435	S436	S437	S440	S441	S488	S489	S490
F84	★		●	●	●	●	●	★	★	★	★	★	●	●	●	●	●	★	★	●	●	●
F96	●		★	★	★	★	★	●	●	●	●	●	★	★	★	★	★	●	●	★	●	●
F98	★		●	●	●	●	●	★	★	★	★	★	●	●	●	●	●	★	★	●	●	●
F106	●		★	★	★	★	★	●	●	●	●	●	★	★	★	★	★	●	●	★	●	●
F107	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	★
F68/+	★		●	●	●	●	●	★	★	★	★	★	●	●	●	●	●	★	★	●	●	●
F21/+	★		●	●	●	●	●	★	★	★	★	★	●	●	●	●	●	★	★	●	●	●
F104/+	★		●	●	●	●	●	★	★	★	★	★	●	●	●	●	●	★	★	●	●	●
F88	★		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	●	●
F93		★																				

Notes: ★ Preferred combination

● Non-preferred combination

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Mobrey Float Switches

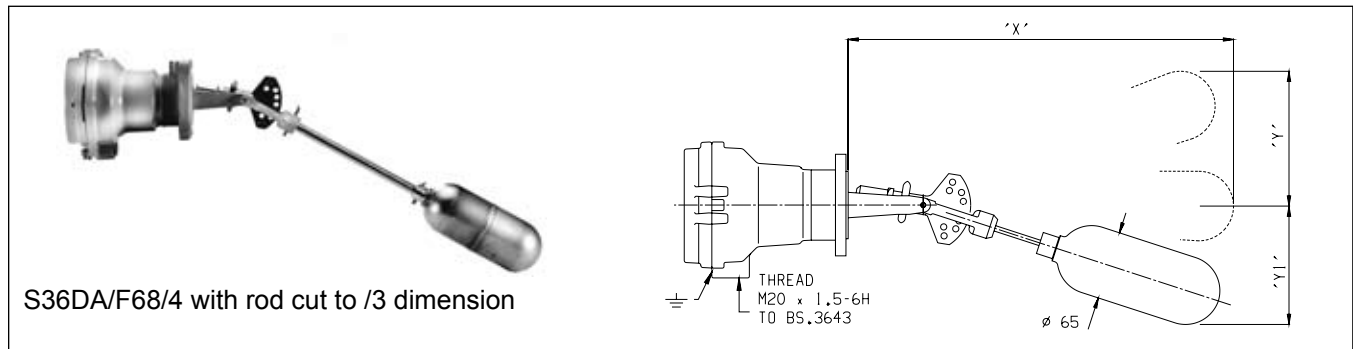
Ordering information

Code General purpose stainless steel wetside models				
S Switch				
Code	Flange (head) size	Rating	Standard	
36	Mobrey A	33.8 bar	Mobrey	
190	Mobrey A	33.8 bar	Mobrey : Use float F93 only	
440	3"	150 RF	To BS 1560 or ASMEI B 16.5	
441	4"	150 RF	To BS 1560 or ASMEI B 16.5	
424	3"	300 RF	To BS 1560 or ASMEI B 16.5	
425	4"	300 RF	To BS 1560 or ASMEI B 16.5	
489	3"	600 RF	To BS 1560 or ASMEI B 16.5	
490	3"	900 RF	To BS 1560 or ASMEI B 16.5	
428	DN 65	PN 16	BS EN 1092-1	
429	DN 80	PN 16	BS EN 1092-1	
430	DN 100	PN 16	BS EN 1092-1	
431	DN 125	PN 16	BS EN 1092-1	
432	DN 150	PN 16	BS EN 1092-1	
417	DN 65	PN 40	BS EN 1092-1	
418	DN 80	PN 40	BS EN 1092-1	
419	DN 100	PN 40	BS EN 1092-1	
433	DN 125	PN 40	BS EN 1092-1	
434	DN 150	PN 40	BS EN 1092-1	
488	DN 80	PN 64	BS EN 1092-1	
435	DN 100	PN 64	BS EN 1092-1	
436	DN 125	PN 64	BS EN 1092-1	
437	DN 150	PN 64	BS EN 1092-1	
Code	Switch mechanism			
D	4 Contact - General			
P	4 Contact - Gold plated contacts			
D6	6 Contact - General			
P6	6 Contact - Gold plated contacts			
H6	6 Contact - Hermetically sealed			
B6	6 Contact - Zone 2 areas			
AP	Pneumatic - On/Off			
AM	Pneumatic - Modulating			
Code	Enclosure / Housing			
A	Aluminium alloy			
Code	Float - Application information			
F84	General purpose			
F96	High alarm or			
F98	Low alarm or			
F106	2 off for pump			
F107	Control wide, differential			
F68/+	Pump control horizontal			
F21/+	Vertical : Pump control or alarm			
F104/+	Cranked arm : horizontal or vertical			
F88	Interface duty			
F93	Shrouded for dirty liquids (S190 only) Silicone rubber gaiter with 316SS shroud and float.			
S	36	D	A	/ F84
Typical ordering information				

+ Refer to technical float details and length options
Refer to nozzle and stud lengths.

Mobrey Float Switches

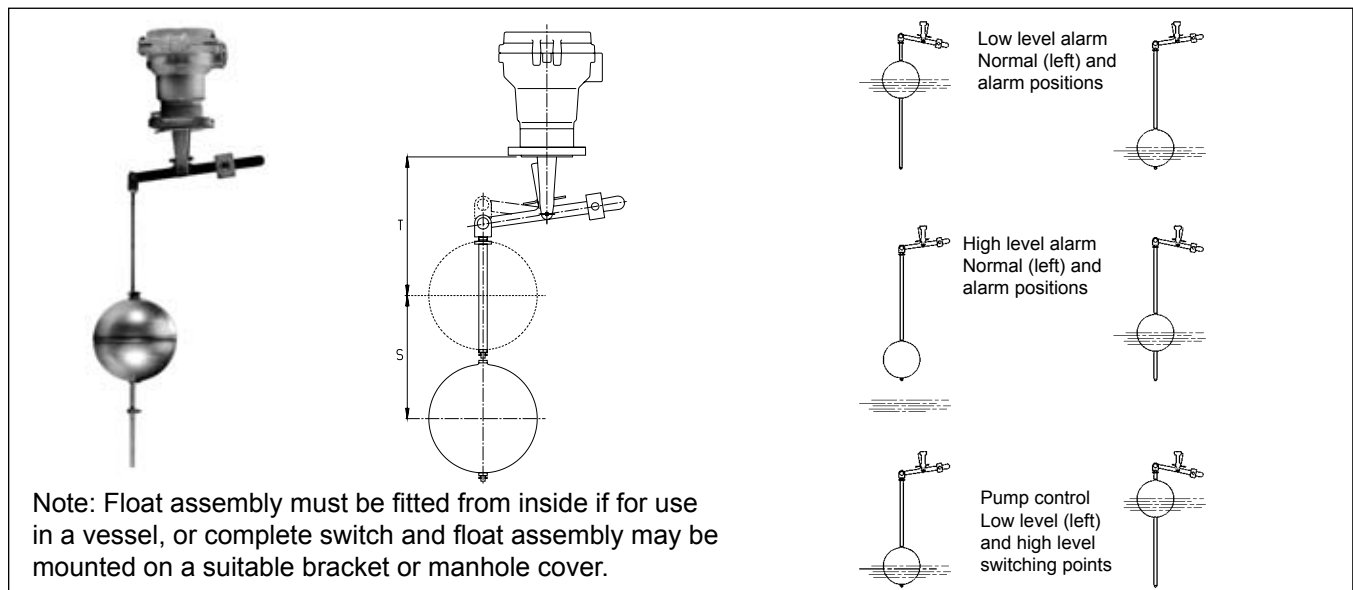
Float specification Horizontal F68 pump control and alarm float



Switches fitted with F68 type float unit may be adjusted on site to meet pump control differential requirements. The float is available as a F68/1 or F68/4. The F68/4 has pre-drilled holes along the rod to allow the user to achieve the 1/2 and 1/3 differentials in the table below. Full details of the operating levels and differentials are in the manual. Note, these dimensions are approximate for cold water and will vary for liquids of different SG.

Maximum intrusion	F68/		F68/2		F68/3		F68/4	
Wetside inches / mm x	14.2	360	18.5	470	23.2	590	25.3	643
Minimum SG	0.72	0.72	0.8	0.8	0.82	0.82	0.85	0.85
Minimum tank dimension above/below centre line inches / mm	8.5	216	11.5	292	14.5	368	16.0	406
Maximum differential inches / mm	9.7	247	14.2	360	19.0	483	21.9	555

Vertical F21 pump control and alarm float



Note: Float assembly must be fitted from inside if for use in a vessel, or complete switch and float assembly may be mounted on a suitable bracket or manhole cover.

Float rod lengths available :
 F21/1: 5ft (1524mm)
 F21/2: 10ft (3048mm)
 F21/3: 15ft (4570mm) max.

Float rods may be cut to length on site and switches set to operate at required level in either pump control or alarm mode by following the setting instructions supplied.

Type number	Pump differential	Alarm levels	
		Minimum 'T'	Maximum 'S'
F21/*	0.5" - 174"* (13-4420mm)*	6.8" (172mm)	173"* (4400mm)*


* When maximum rod length specified

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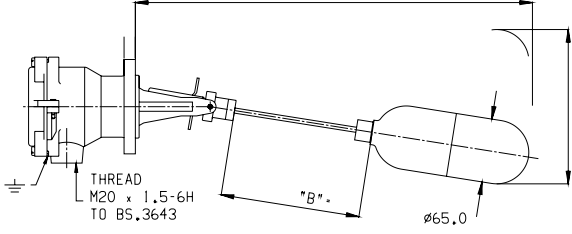
Mobrey Float Switches

Cranked arm floats F104



How to order: Specify - F104 float with:

1. A and B or V and W dimshead type no. (eg.
2. Liquid in contact S01DB/F)
3. Specific gravity of liquid
4. Mobrey magnetic switch
5. State land or marine application

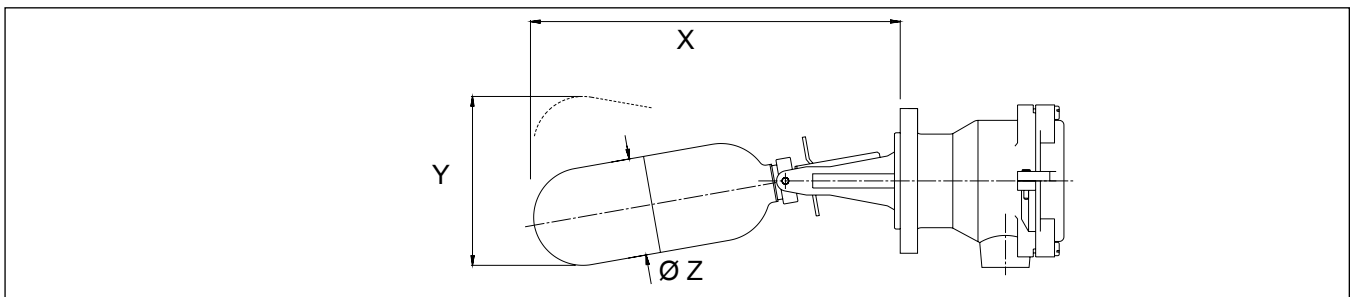


A + B } Must not exceed 750mm
V + W }
A or V } Should not be less than 75mm
B or W }

For straight arm float, suffix float number with 'B' dimension as required

Floats for use with stainless steel wetside switches

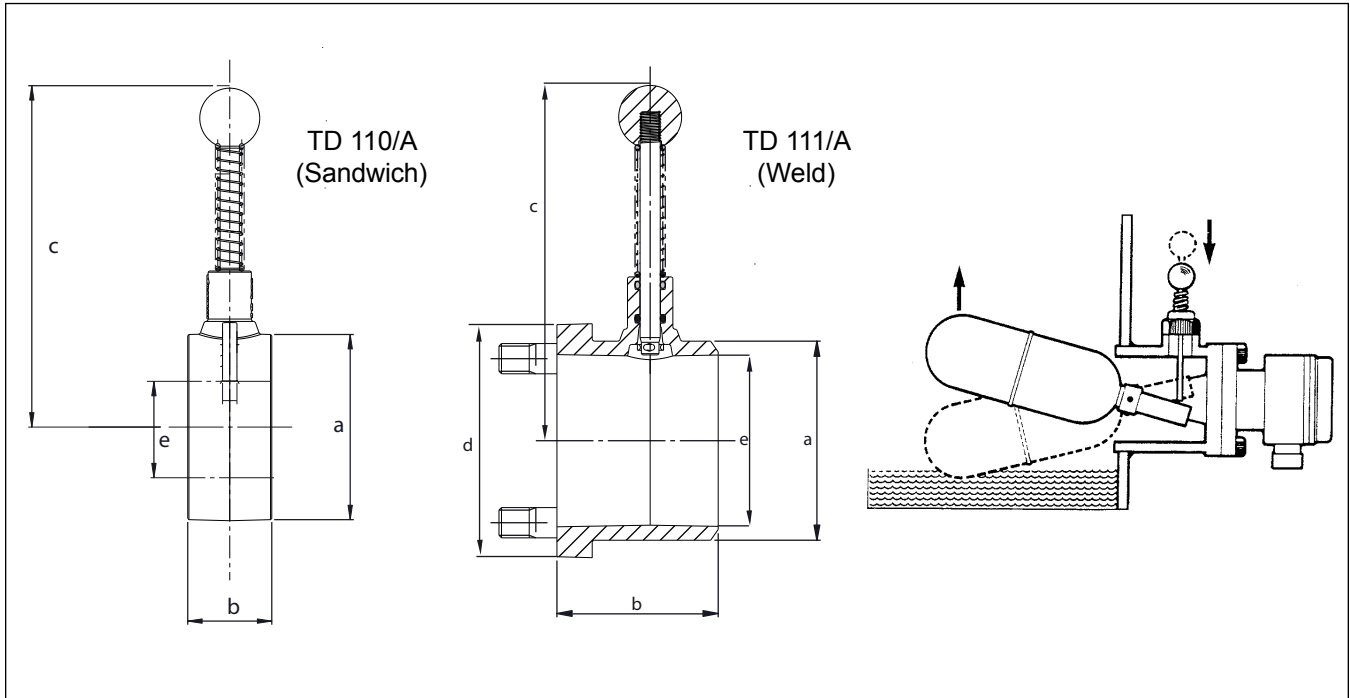
Float Type	Min. S.G.	Max. Pressure at 68°F PSI (20°C bar)		Temp. Max.		Differential		Dimension X Length from Pivot Point		Dimension Y Maximum Travel		Dimension Z Max. External Diameter		Float Material
				°F	°C	Inch	mm							
F84	0.65	500	34.5	752	400	0.5	13	6.5	164	4.7	119	2.6	65	
F96	0.60	1070	74.0	752	400	0.5	13	6.5	164	4.7	119	2.6	65	
F98	0.45	500	34.5	752	400	0.5	14	7.25	184	5.0	127	2.6	65	
F106	0.51	1070	74.0	752	400	0.5	13	7.25	185	4.25	108	2.6	65	
F107	0.71	2900	200.0	752	400	0.5	13	6.77	172	4.72	120	2.6	65	316
F68/+	0.72 - 0.82	500	34.5	752	400	0.5 - 19	15 - 483	11.6 - 20.6	294 - 522	8 - 29	204 - 736	2.6	65	SS
F21/+	0.70	435	30.0	752	400	0.5 - 174	13 - 4420	Variable		-	-	5.1	129	
F104/+	Various	500	34.5	752	400	-	-	As ordered		-	-	2.6	65	
F88	0.8/1.0	1070	74.0	752	400	1	26	14.1	359	7.8"	198	2.6	65	
F93	0.75	Atmospheric		356	180	0.5	13	7.2	183	4.9"	124	2.6	65	
F317	0.7		0.6		60		13		229		112		67	PTFE
F185	0.67	500	34.5	410	210	0.5	13	6.5	164	4.7"	119	2.6	65	Monel
F264	0.85	464	32.0	410	210	0.9, 1.1, 1.3	23, 29, 33	7.1	179	Variable		2.5	63.5	Monel



Mobrey Float Switches

Accessories

Test devices for Mobrey 'A' flanged switches to facilitate mechanical testing of electrical circuit.



Type	Vessel flange	Max. press.		Max. temp.		inches / mm									
		PSI	Bar	°F	°C	a		b		c		d		e	
TD 110/A	Mobrey 'A'	260*	18*	410	210	3	77	1.4	35	5.6	142	-	-	2.6	67
TD111/A	Weld on	260*	18*	410	210	3.1	79	2.4	64	5.6	142	3.6	92	2.6	67

* 12.6 bar at maximum temperature 410°F (210°C)

Materials

TD 110/A 316 Stainless Steel Fluorocarbon Elastomer
 TD 111/A Carbon Steel STM A216 WCA Fluorocarbon Elastomer

Product Data Sheet

IP101

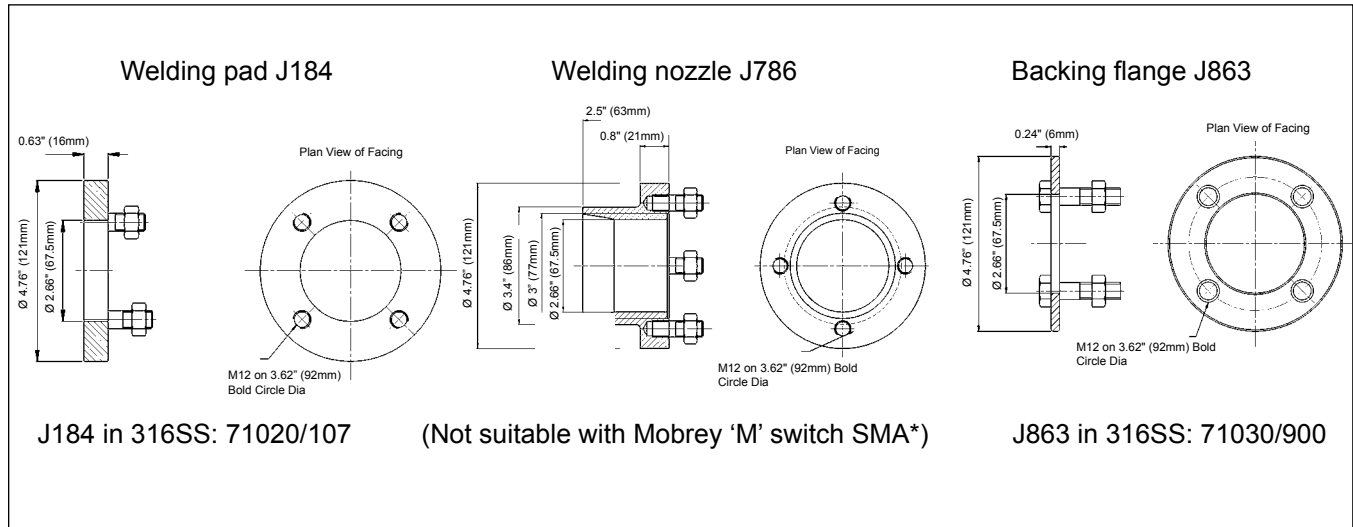
Catalog 2008 - 2009

Mobrey Float Switches

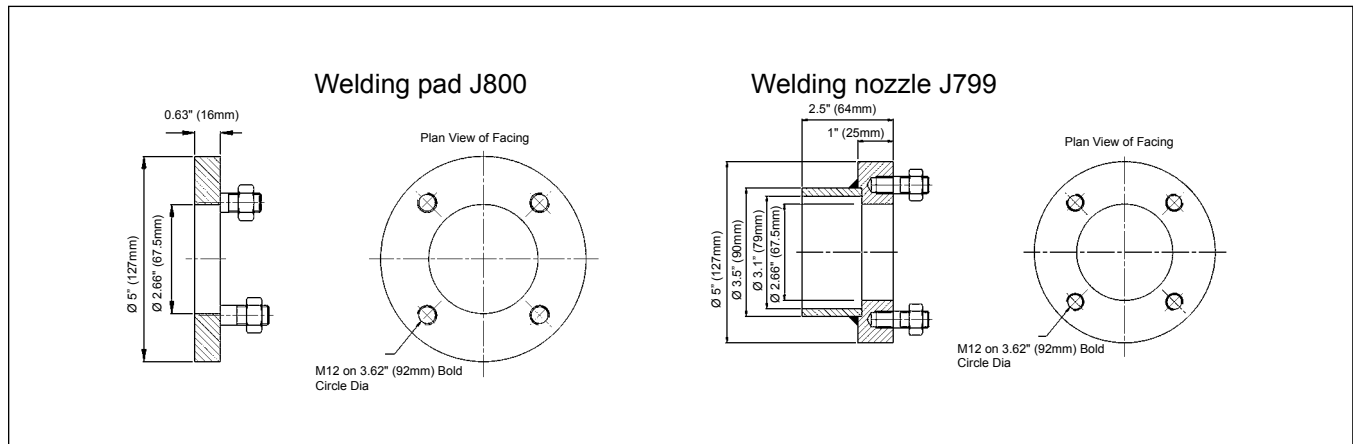
Companion flanges

Welding and backing companion flanges are available as extra items to facilitate the direct mounting of Mobrey A and G flange switches.

'A' flange models



'G' flange models



- All flanges manufactured in mild steel.
- Backing flange zinc plated and passivated.
- Welding types supplied complete with studs and nuts.
- Backing type supplied with bolts, sealing washers and full face gasket.
- Welding Pad J800 in 316SS: 71020/111
- Other materials available upon request.

Mobrey Float Switches

Standard Terms and Conditions of Sale can be found at www.rosemount.com/terms_of_sale

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