

Technical Datasheet



Magnetic Horizontal Level Switches For Marine applications



Key Features

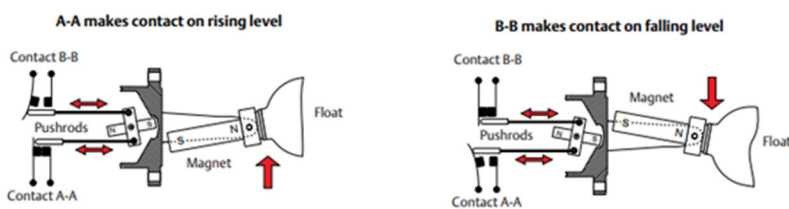
- Operates in almost every liquid
- Tough, rugged design for long life in aggressive environments
- Magnetically coupled
- No glands or linkages that could cause leaks



Series Overview

The Mobrey magnetic horizontal float switch is ideal for high and low liquid level alarm, and pump control duties. It is designed to open or close a circuit as a changing liquid level within a vessel passes the level of the float.

When the process liquid level is below the switch point, contacts B-B are made and contacts A-A are open, but if the liquid level is above the switch point, contacts A-A are made and contacts B-B are open.



Other products

Other products we can offer :

- 003 Gap Sensor



Product applications

- High and low liquid level alarm
- Direct side or top mounting
- Pump control duty
- Submersible
- Dirty Liquids
- Hazardous Area approved versions can be fitted to Zone 0 vessels with process temperatures up to 210°C.

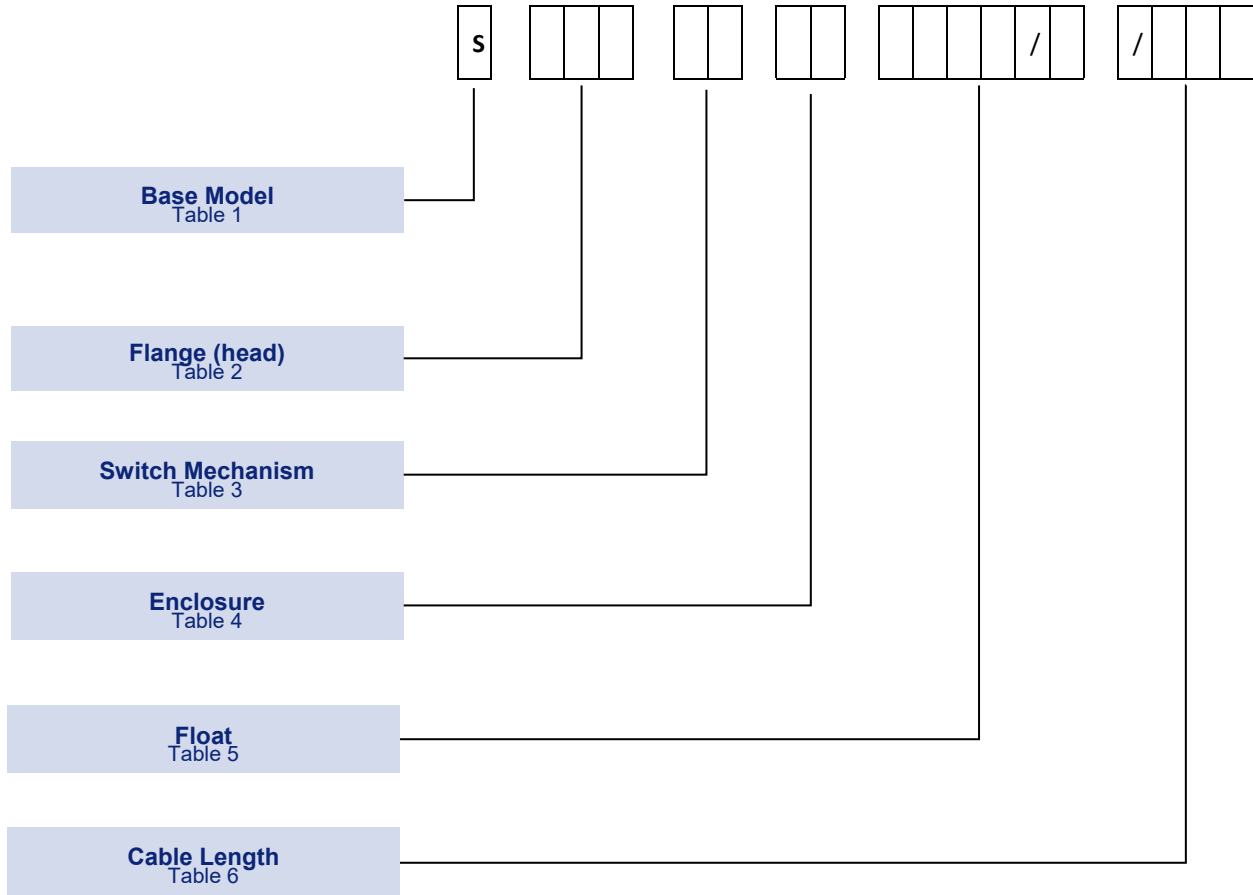
How can we help you?

Delta Mobrey offers fast, efficient and knowledgeable support when and where you need it. Please visit our website at www.delta-mobrey.com to find your local support centre or call us on: **+44 (0)1252 729140**

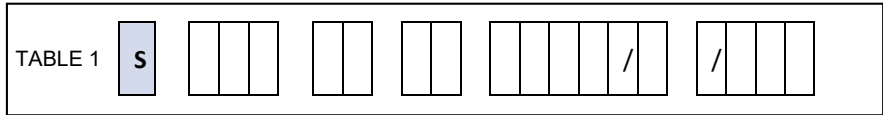
How to order

Instrument can be configured by selecting codes representing the desired features from the tables that follow.

The chart below, describes how the model code is built up. For assistance in configuring a switch that best suits your needs, please contact your local sales office.

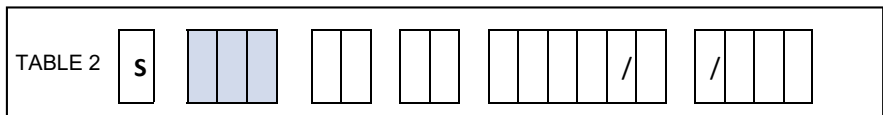


Models



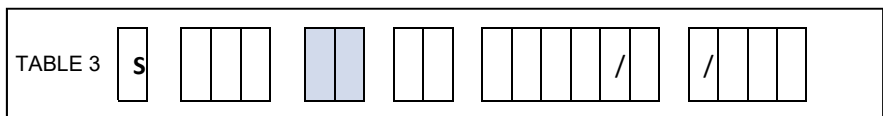
Description	Code
Horizontal float switch	S

Flange (head) ⁽¹⁾



Description	Code
Marine, hoseproof, aluminium bronze wetside, no cable fitted, Mobrey 'A' flange, 261 psi (18 bar)	179
Marine, submersible, aluminium bronze wetside, MICC cable fitted, Mobrey 'A' flange, 261 psi (18 bar)	03
Marine, submersible, aluminium bronze wetside, CSP cable fitted, Mobrey 'A' flange, 261 psi (18 bar)	195
Marine, submersible, stainless steel wetside, MICC cable fitted, Mobrey 'A' flange, 261 psi (18 bar)	163 ⁽⁷⁾
Marine, hoseproof, stainless steel wetside, no cable fitted, Mobrey 'A' flange, 261 psi (18 bar)	181 ⁽⁷⁾
Marine, submersible, flameproof, aluminium bronze wetside, CSP cable fitted, Mobrey 'A' flange, 261 psi (18 bar)	183
Marine, submersible, flameproof, aluminium bronze wetside, MICC cable fitted, Mobrey 'A' flange, 261 psi (18 bar)	187
Marine, hoseproof, flameproof, aluminium bronze wetside, no cable fitted, Mobrey 'A' flange, 261 psi (18 bar)	189

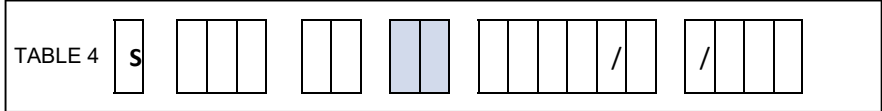
Switch Mechanism ^{(1) (2)}



Description	Max T process ⁽¹⁾	Code
Electrical: 2 independent Single Pole Single Throw (SPST) contact sets	752 °F (400 °C)	D
As type D but with gold plated contacts	752 °F (400 °C)	P
Electrical: 2 independent circuits of Double Pole Double Throw (DPDT) contact sets	752 °F (400 °C)	D6 ⁽³⁾
As type D6 but with gold plated contacts	752 °F (400 °C)	P6 ⁽³⁾

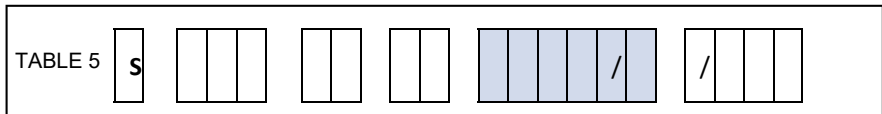
Magnetic Horizontal Level Switches

Switch Enclosure ⁽¹⁾



Description	Switch Type	Code
Aluminium bronze – (code B is required for S179 and S189 models)	All	B
Stainless steel with 10 ft. (3 m) of fitted cable – (code L is required for S163 model)	All except D6 and P6	L
Aluminium bronze with 10 ft. (3 m) of fitted cable – (code BL is required for S03, S195, S183, and S187 models)	All	BL

Float (All ratings at T room) ⁽⁴⁾

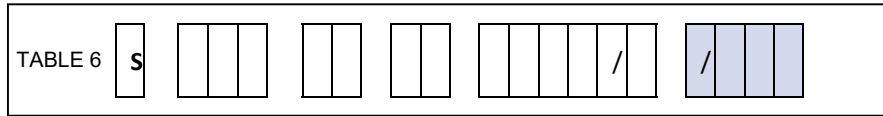


Description	Switch type	Code
General purpose high/low alarm, 316 SST, min. SG 0.65, 500 psi (34.5 bar)	All	F84
Horizontal variable differential for pump control/alarm, 316 SST, min. SG 0.72, 500 psi (34.5 bar)	All	F68/1 ⁽⁵⁾
Horizontal variable differential for pump control/alarm, 316 SST, min. SG 0.85, 500 psi (34.5 bar)	All	F68/4 ⁽⁵⁾
Vertical pump control or alarm, 316 SST, rod length 1524mm, 435 psi (30 bar)	All	F21/1 ⁽⁵⁾
Vertical pump control or alarm, 316 SST, rod length 3048mm, 435 psi (30 bar)	All	F21/2 ⁽⁵⁾
Vertical pump control or alarm, 316 SST, rod length 4570mm, 435 psi (30 bar)	All	F21/3 ⁽⁵⁾
General purpose high/low alarm, 316 SST, min. SG 0.45, 500 psi (34.5 bar)	All	F98
Straight aim, 316 SST, rod length 750mm, 500 psi (34.5 bar)	All	F104/1 ⁽⁵⁾
Cranked arm, horizontal, 316 SST, dimensions to be specified, 500 psi (34.5 bar)	All	F104/2 ⁽⁵⁾
Cranked arm, vertical, 316 SST, dimensions to be specified, 500 psi (34.5 bar)	All	F104/3 ⁽⁵⁾
Shrouded for dirty liquids, 316 SST, min. SG 0.75, atmospheric	All	F93 ^{(6) (7)}
General purpose high/low alarm, Alloy 400, min. SG 0.65, 500 psi (34.5 bar)	All	F185
Horizontal limited differential, Alloy 400, min. SG 0.85, 464 psi (32 bar)	All	F264

Magnetic Horizontal Level Switches

Model: Marine

**Cable Length
(required only if a cable is fitted)**



Description	Code
3m of fitted cable	M03
5m of fitted cable	M05
10m of fitted cable	M10
15m of fitted cable	M15
20m of fitted cable	M20
30m of fitted cable	M30

1. The maximum process temperature is dependent on the flange (head), switch mechanism, cable (if fitted), and float options chosen. See Table 7 below for the IP rating and maximum process temperature.
2. See "Switch mechanism specifications" on page 8 for information about all switch mechanisms.
3. Not available for stainless steel enclosure and wetside models S163 and S181.
4. See Table 10 on page 9 for a detailed comparison of the float types listed here.
5. Refer to pages 11, 12, 13 and 14 for technical float details and length options. See "Nozzle and stud lengths" on page 11 for stud lengths.
6. A silicone rubber gaiter is supplied with the 316 SST shroud
7. Shrouded floats for stainless steel switches S163 and S181 are available on request.

Table 7. Switch Types Comparison - Marine Application

Type number	Maximum TProcess ⁽¹⁾		Head IP rating	Cable ⁽²⁾
	Submersed	Non-submersed		
S03	176 °F (80 °C)	410 °F (210 °C)	6/68 (100 ft. / 30 m)	MICC
S179	212 °F (100 °C)	410 °F (210 °C)	66 ⁽³⁾	None fitted
S195	122 °F (50 °C)	410 °F (210 °C)	66/68 (100 ft. / 30 m)	CSP
S163	176 °F (80 °C)	410 °F (210 °C)	66/68 (100 ft. / 30 m)	MICC
S183	122 °F (50 °C)	410 °F (210 °C)	66/68 (100 ft. / 30 m)	CSP
S181	212 °F (100 °C)	410 °F (210 °C)	66 ⁽³⁾	None fitted
S187	122 °F (50 °C) ⁽⁴⁾	410 °F (210 °C)	66/68 (100 ft. / 30 m)	MICC
S189	140 °F (60 °C)	410 °F (210 °C)	66 ⁽⁵⁾	None fitted

1. The maximum process temperature is dependent on the Flange (Head), Switch mechanism, and Float options chosen.
2. See page 6 for cable specification.
3. S179 and S181 may be submersed to 100 ft. (30 m) head of water with temperatures between 34 and 212 °F (1 and 100 °C). Fitting and testing of customer supplied cable and cable gland is the customer's responsibility. The cable and cable gland may limit the temperature further.
4. The maximum process temperature for submersed S187 is 176 °F/80 °C (for non-approved) or 122 °F/50 °C (for ATEX approved).
5. S189 may be submersed to 100 ft. (30 m) head of water with temperatures between 34 and 140 °F (1 and 60 °C). Fitting and testing of customer supplied cable and cable gland is the customer's responsibility. The cable and cable gland may limit the temperature further.



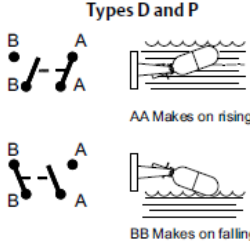
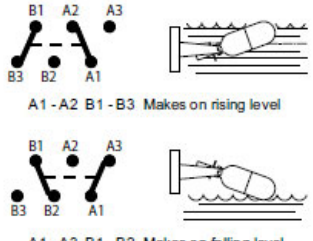
Magnetic Horizontal Level Switches
Model: Marine

Table 8. Float Switch Specifications - Marine Applications

Aluminium bronze wetside models	
Enclosure and wetside	Aluminium bronze to BS1400 – AB1 maximum iron content 2.5%. Enclosure is nickel-plated
IP rating	May be submerged to 100 ft. (30 m) head of water (IP68)
End cap	Brass BS1400 DCB3 (non-hazardous area float switches) Aluminium Bronze BS400 AB, maximum 2.5% iron (hazardous area float switches)
Maximum process temperature	See Table 7
Gasket material	Non-asbestos sheet material gaskets to BS 7531 Grade X, which has upper temperature limits of 482 °F (250 °C) for gas, vapor, and steam, and 824 °F (440 °C) for liquids. If the switch experiences gas vapor or steam temperatures above 482 °F (250 °C), then a suitable alternative gasket must be fitted
Dimensions	See page 9 for dimensional drawings
Stainless steel wetside models	
Enclosure and wetside	Type 316 Stainless steel
IP rating	May be submerged to 100 ft. (30 m) head of water (IP68)
End cap	Aluminium bronze to BS1400 – AB1/C
Maximum process temperature	410 °F (210 °C) Note: See “Gasket Material” and “Cable” below for further temperature limits
Gasket material	Non-asbestos sheet material gaskets to BS 7531 Grade X, which has upper temperature limits of 482 °F (250 °C) for gas, vapor, and steam, and 824 °F (440 °C) for liquids. If the switch experiences gas vapor or steam temperatures above 482 °F (250 °C), then a suitable alternative gasket must be fitted
Dimensions	See page 9 for dimensional drawings
Cable⁽¹⁾	
MICC	Maximum Process Temperature limit: 176 °F (80 °C). 600V light duty grade mineral insulated copper clad cable
CSP	Maximum Process Temperature limit: 122 °F (50 °C). 600V/1000V grade ethylene-propylene rubber insulated flexible cable
Hazardous area approvals⁽²⁾	
ATEX	II 2 G, Ex db IIC T6 Gb (Ta= –20 °C to 60 °C) when submersed in a vented tank application
	II 1/2 G, Ex d IIC T6...T2 Ga/Gb (Ta= –20 °C to 60 °C) when enclosure is outside in a tank mounted application
Approvals⁽³⁾	
Marine	Lloyds Register of Shipping (LRS)
	DNV GL
	ABS
	BV ⁽⁴⁾
	RMRS

1. See Table 7 for marine application switches supplied with a fitted cable.
2. Types S183, S187 and S189 only.
3. Other approvals may be available. Please contact a Delta Mobrey representative for additional information.
4. The BV approval is not available for stainless steel wetside model types S163 and S181.

Table 9. Electrical switch mechanism specification

Electrical type D and P		Electrical type D6 and P6			
					
Electrical switch mechanism					
Type D					
<ul style="list-style-type: none"> For alternative make and break circuits Function: 2 independent Single Pole Single Throw contacts sets and “snap-action” May be wired S.P.C.O. on site 					
Type D6					
<ul style="list-style-type: none"> For switching two independent circuits Function Double Pole change over (2 independent circuits) and “snap-action” 					
Type P and P6					
<ul style="list-style-type: none"> As type D and D6 but with Gold Plated Contacts for switching low power (e.g. Intrinsically Safe) electrical circuits 					
<p>Figure 1. Electrical Switching</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Types D and P</p>  <p>AA Makes on rising level</p> <p>BB Makes on falling level</p> </div> <div style="text-align: center;"> <p>Types D6 and P6</p>  <p>A1 - A2 B1 - B3 Makes on rising level</p> <p>A1 - A3 B1 - B2 Makes on falling level</p> </div> </div>					
Electrical switch specifications		D and D6		P and P6	
Contact material		Fine silver		Gold plated	
Process temperature		-22 to 752 °F (-30 to 400 °C)		-22 to 752 °F (-30 to 400 °C)	
Ambient temperature		-22 to 158 °F (-30 to 70 °C)		-22 to 158 °F (-30 to 70 °C)	
Insulation value		(live to earth) > 100 MEG OHM			
Terminals		D and P: M4 screws with non-rotational clamp plates.			
		D6 and P6, : 6-way terminal block with pressure plates			
Electrical specifications		AC	DC Inductive	DC restrictive	
Maximum voltage V		440	240	240	
Maximum current A		5.0 ⁽¹⁾	1.0	2.0	
Maximum power		2000VA	35 Watts	70 Watts	
		Power factor 0.4 minimum	Time constraints 40ms, maximum		

1. Maximum current for Type D is 8 A up to 410°F (210°C).

Warning

The plating of gold contacts may be permanently damaged when used to switch circuits above the following limits:

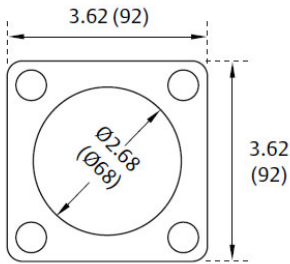
- 300 V: 12 mA Resistive
- 24 V: 2 mH/200 mA Inductive
- 24 V: 250 mA Resistive
- 24 V: 750 mH/10 mA Inductive

Note

LVD (Low Voltage Directive) standards applied: EN60947 Parts 1 and 5.1

Dimensions

Mobrey 'A' flange



Mobrey 'A' flange:
4 off Ø0.55 (Ø14) holes equi-spaced on 3.62 (92) PCD

Note: Dimensions are in inches (mm).

Marine float switches

Note: Dimensions are in inches (mm).

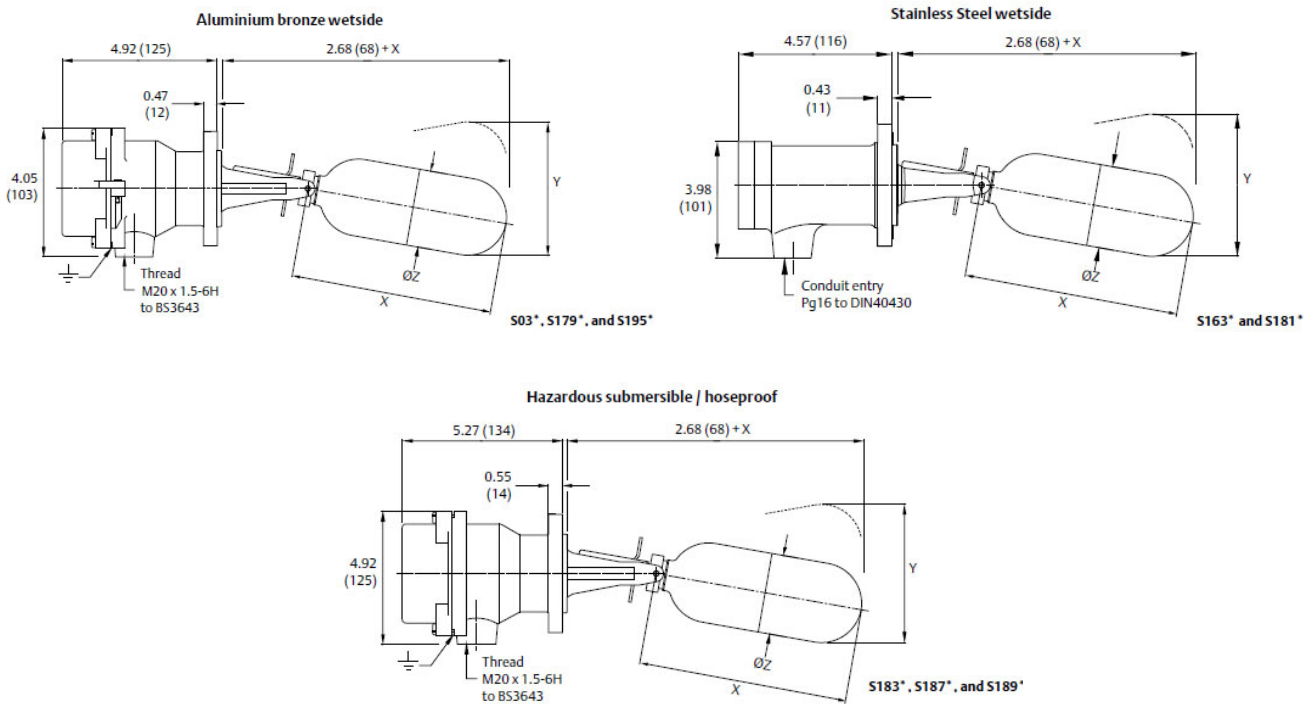


Table 10. Float dimensions X, Y and Z - hazardous and marine float switches

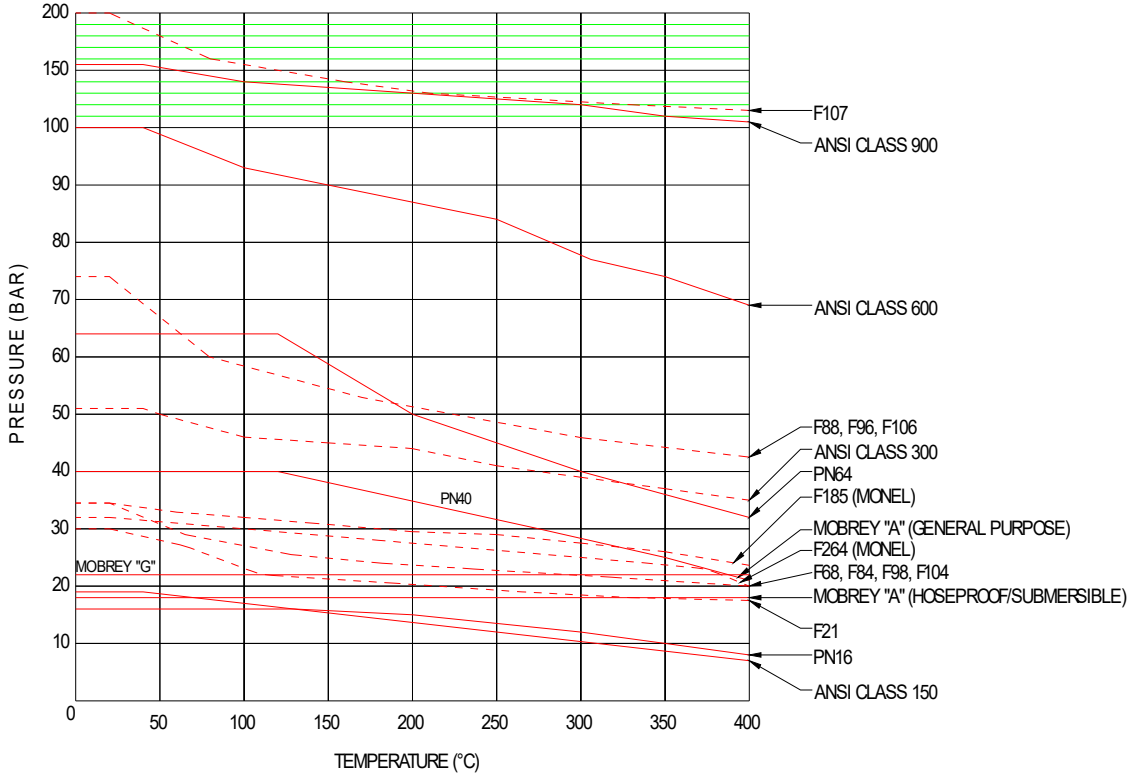
Float Type	Minimum S.G.	Max. P@T Room PSI (Bar)	Max. T Process °F (°C)	Differential in. (mm)	Dimension X in. (mm)	Dimension Y in. (mm)	Dimension ØZ in. (mm)	Float Material
F84	0.65	500 (34.5)	752 (400)	0.51 (13)	6.45 (164)	4.68 (119)	2.56 (65)	316 SST
F68/+ ⁽¹⁾	0.72 to 0.85	500 (34.5)	752 (400)	Variable (See page 11)			2.56 (65)	316 SST
F21/+ ⁽¹⁾	0.70	435 (30)	752 (400)	Variable (See page 12)			5.08 (129)	316 SST
F104/+ ⁽¹⁾	Various	500 (34.5)	752 (400)	As Ordered (See page 13)			2.56 (65)	316 SST
F93	0.75	Atmospheric	356 (180)	0.51 (13)	7.20 (183)	4.88 (124)	2.56 (65)	316 SST
F98	0.45	500 (34.5)	752 (400)	0.55 (14)	7.24 (184)	5.00 (127)	2.56 (65)	316 SST
F185	0.67	500 (34.5)	752 (400)	0.51 (13)	6.45 (164)	4.68 (119)	2.56 (65)	Alloy 400
F264	0.85	464 (32.0)	752 (400)	0.9 (23)/1.14 (29)/1.3 (33)	7.05 (179)	Variable	2.56 (65)	Alloy 400

1. Refer to pages 11, 12, 13 and 14 for technical float details and length options. See "Nozzle and stud lengths" on page 11 for stud lengths.

Pressure/Temperature Relationships

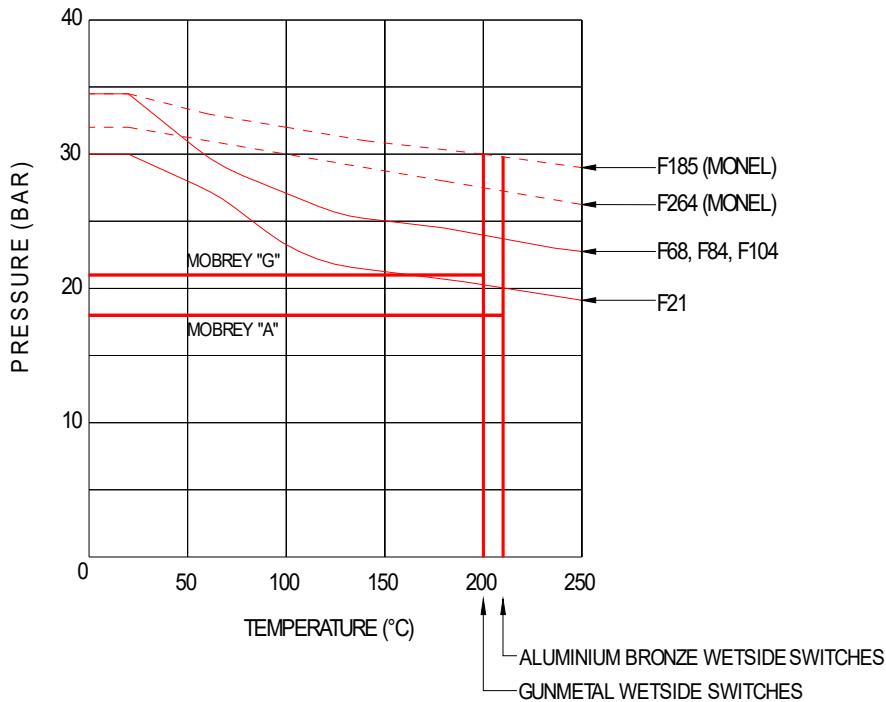
The graphs below show the maximum allowable working pressure of our float assemblies and process connection flanges across their working temperature range.

Stainless Steel Wetside Switches



F93 WORKING PRESSURE: LIMITED TO ATMOSPHERIC UP TO 180°C

Non-Ferrous Wetside Switches



F93 WORKING PRESSURE: LIMITED TO ATMOSPHERIC UP TO 180°C

Magnetic Horizontal Level Switches
Model: Marine

Nozzle and stud lengths

Table 11. Maximum Length in mm (Dimension L)

	F68/*	F84	F185	F88	F93	F96	F98	F107	F106	F264
Mobrey A	65	75	75	135	75	75	90	-	92	75
DN65	65	75	75	135	-	75	90	-	92	75
DN80	70	80	80	170	-	75	90	-	98	90
DN100	95	105	105	200	-	105	105	-	110	100
DN125	105	140	140	200	-	140	140	-	140	140
DN150	224	180	180	200	-	180	170	-	200	190
3 in. 300/150	70	80	80	170	-	80	90	-	98	90
4 in. 300/150	95	105	105	200	-	105	105	-	110	100
3 in. 600	62	70	70	130	-	70	85	80	89	70
3 in. 900	-	-	-	-	-	70	-	80	-	-
Mobrey A	65	75	75	135	-	75	90	-	92	75
6 in. 150	224	180	180	200	-	180	170	-	200	190

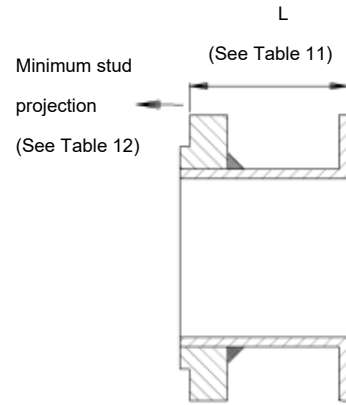
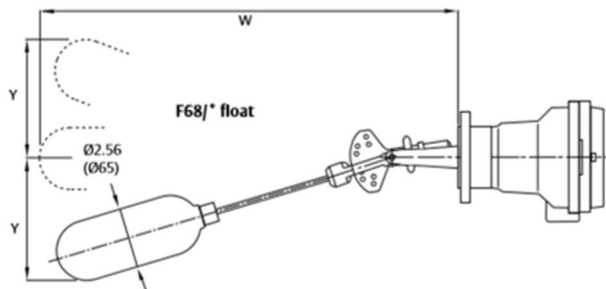


Table 12. Minimum stud projection (in mm)

Rating	G	A	PN 16					PN 40					PN 63				150		300		600		900	
Size	-	-	65	80	100	125	150	65	80	100	125	150	80	100	125	150	3 in.	4 in.	3 in.	4 in.	3 in.	3 in.		
Stud	35	30	40	40	40	44	42	42	46	52	54	52	55	62	67	46	56	54	56	64	73			

Horizontal F68 pump control and alarm float

Note: Dimensions are in inches (mm).



Note

Switches fitted with the F68/+ type float may be adjusted on site to meet pump control differentials. The float is available as F68/1 or F68/4. The F68/4 has pre-drilled holes along the rod to allow the user to achieve the /2 and /3 differentials in Table 13. Full details of the operating levels and differentials are in the product manual (Document Number M310).

Table 13. Dimensions and specifications for F68/*

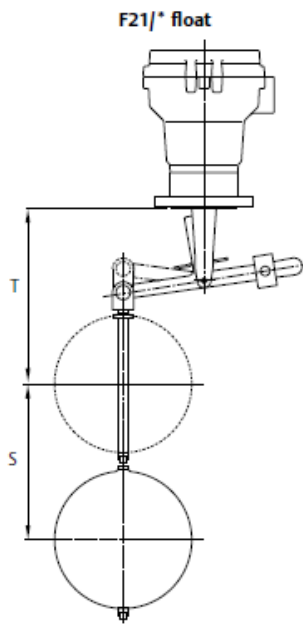
Maximum Intrusions ⁽¹⁾	F68/1	F68/2	F68/3	F68/4
Wetside in. (mm) 'W'	14.2 (360)	18.5 (470)	23.2 (590)	25.3 (643)
Minimum tank dimension above/below centre line (mm) 'Y'	8.5 (216)	11.5 (292)	14.5 (368)	16.0 (406)
Minimum Specific Gravity (S.G.)	0.72	0.8	0.82	0.85
Maximum differential (mm)	9.72 (247)	14.2 (360)	19.0 (483)	21.9 (555)

1. These dimensions in inches (mm) are approximate for cold water and will vary for liquids with a different specific gravity (SG.)

Magnetic Horizontal Level Switches
Model: Marine

Vertical F21 pump control and alarm float

Note: See Table 13 for dimensions S and T.



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 5 ft. (1524 mm)

F21/2 10 ft. (3048 mm)

F21/3 15 ft. (4570 mm) maximum

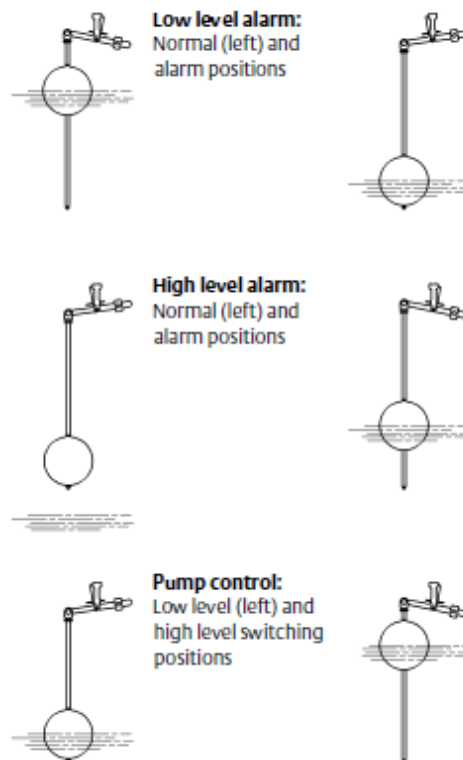
Float rods may be cut to length on site and switches set to operate at required level in either pump control or alarm mode by following the supplied setting instructions.

Table 14. Dimensions S and T for F21/+

Pump differential 'S' in. (mm)	Alarm level in. (mm)	
	Minimum 'T'	Maximum 'S'
0.5 to 174.0 (13 to 4420) ⁽¹⁾	6.77 (172)	173.2 (4400) ⁽¹⁾

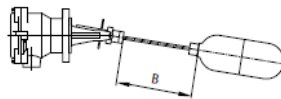
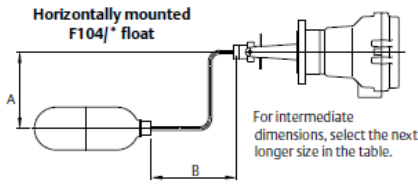
1. When the maximum rod length is specified.

Figure 2. Pump Control and Alarm Applications



Cranked arm floats F104

Note: See Table 15 or Table 16 for dimensions in



A plus B must not exceed 750 mm. A and B should each be equal to or greater than 75 mm, unless it is a straight arm where A is 0 mm (above).

To order, specify the F104 float with these details:

1. A and B (this page) or V and W (next page) dimensions.
(For a straight arm float, state only the 'B' dimension).
2. Liquid in contact.
3. Specific Gravity (SG) of liquid.
4. Magnetic switch head type number (e.g. S01DB/F)
5. State land or marine application.

Table 15. Dimensions A and B with Minimum SG for Horizontally-mounted Switches (Land Applications)

A	B																								
	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675
0 & 75	.64	.64	.65	.66	.67	.67	.68	.69	.70	.71	.72	.73	.73	.74	.75	.76	.77	.78	.79	.80	.81	.81	.82	.83	.84
100	.64	.65	.66	.67	.68	.69	.70	.70	.71	.72	.73	.74	.75	.76	.77	.78	.79	.79	.80	.81	.82	.83	.84	.85	
125	.65	.66	.67	.68	.69	.70	.71	.72	.73	.74	.75	.75	.76	.77	.78	.79	.80	.81	.82	.83	.84	.85	.86		
150	.65	.67	.68	.69	.70	.71	.72	.73	.74	.75	.76	.77	.78	.79	.80	.81	.82	.83	.84	.85	.85	.86			
175	.66	.67	.69	.70	.71	.72	.73	.74	.75	.76	.77	.78	.79	.80	.81	.82	.83	.84	.85	.86	.87				
200	.66	.68	.70	.71	.72	.73	.75	.76	.77	.78	.79	.80	.81	.82	.83	.84	.85	.86	.87	.88					
225	.67	.69	.70	.72	.73	.75	.76	.77	.78	.79	.80	.81	.82	.84	.85	.86	.87	.88	.89						
250	.67	.69	.71	.73	.74	.76	.77	.78	.80	.81	.82	.83	.84	.85	.86	.87	.88	.89							
275	.68	.70	.72	.74	.76	.77	.78	.80	.81	.82	.83	.85	.86	.87	.88	.89	.90								
300	.68	.71	.73	.75	.77	.78	.80	.81	.82	.84	.85	.86	.87	.88	.89	.90									
325	.69	.71	.74	.76	.78	.80	.81	.83	.84	.85	.86	.88	.89	.90	.91										
350	.69	.72	.75	.77	.79	.81	.82	.84	.85	.87	.88	.89	.90	.92											
375	.70	.72	.76	.78	.80	.82	.84	.85	.87	.88	.90	.91	.92												
400	.71	.73	.76	.79	.81	.83	.85	.87	.88	.90	.91	.92													
425	.71	.74	.77	.80	.83	.85	.87	.88	.90	.91	.93														
450	.72	.74	.78	.81	.84	.86	.88	.90	.91	.93															
475	.72	.75	.79	.82	.85	.87	.89	.91	.93																
500	.73	.76	.80	.83	.86	.89	.91	.93																	
525	.74	.77	.81	.85	.88	.90	.92																		
550	.74	.77	.81	.86	.89	.92																			
575	.75	.78	.82	.87	.90																				
600	.76	.79	.83	.88																					
625	.76	.80	.84																						
650	.77	.80																							
675	.78																								

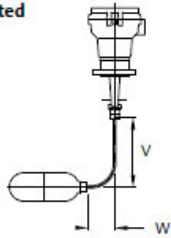
Table 16. Dimensions A and B with Minimum SG for Horizontally-mounted Switches (Marine Applications)

A	B																								
	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675
0 & 75	.67	.67	.68	.68	.69	.69	.70	.71	.72	.73	.73	.74	.75	.76	.77	.78	.79	.79	.80	.81	.82	.83	.84	.85	.86
100	.68	.68	.69	.70	.70	.71	.72	.73	.74	.74	.75	.76	.77	.78	.79	.80	.81	.81	.82	.83	.84	.85	.86	.87	
125	.69	.70	.71	.71	.72	.73	.74	.75	.76	.76	.78	.77	.79	.80	.81	.82	.83	.84	.84	.85	.86	.87	.88		
150	.71	.71	.72	.73	.74	.75	.76	.77	.78	.78	.79	.80	.81	.82	.83	.84	.85	.86	.87	.88	.89	.89			
175		.73	.74	.75	.76	.77	.78	.79	.80	.81	.82	.83	.83	.84	.85	.86	.87	.88	.89	.90	.91				
200			.76	.77	.78	.79	.80	.81	.82	.83	.84	.85	.86	.87	.88	.89	.90	.90	.91	.92					
225			.79	.80	.81	.82	.83	.84	.85	.86	.86	.87	.88	.89	.90	.91	.92	.93	.94						
250				.83	.84	.85	.86	.87	.87	.88	.89	.90	.91	.92	.93	.94	.95	.95							
275					.88	.88	.89	.90	.91	.91	.92	.93	.94	.95	.96	.96	.97								
300					.93	.93	.93	.93	.94	.95	.95	.96	.97	.98	.99	.99									
325						.98	.98	.98	.98	.98	.99	1.0	1.0	1.01	1.02										
350							1.04	1.03	1.02	1.03	1.03	1.03	1.04	1.04											
375								1.09	1.08	1.07	1.07	1.07	1.08												
400									1.15	1.13	1.12	1.12													
425										1.20	1.18														

Magnetic Horizontal Level Switches

Note: See Table 17 or Table 18 for dimensions in mm.

Vertically mounted
F104 float



For intermediate dimensions, select the next longer size in the table.



V plus W must not exceed 750 mm. V and W should each be equal to or greater than 75 mm.

Table 17. Dimensions V and W with Minimum SG for Vertically-mounted Switches (Land Applications)

V	B																											
	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675			
75	.67	.67	.66	.66	.66	.66	.67	.67	.68	.68	.68	.70	.70	.71	.72	.73	.73	.74	.75	.76	.77	.77	.78	.79	.80			
100	.67	.66	.66	.66	.66	.66	.67	.67	.68	.68	.69	.70	.70	.71	.72	.73	.73	.74	.75	.76	.77	.77	.78	.79				
125	.67	.66	.66	.66	.66	.66	.67	.67	.68	.68	.69	.70	.70	.71	.72	.73	.74	.74	.75	.76	.77	.78	.78					
150	.67	.66	.66	.66	.66	.66	.67	.67	.68	.68	.69	.70	.71	.71	.72	.73	.74	.74	.75	.76	.77	.78						
175	.67	.66	.66	.66	.66	.66	.67	.67	.68	.69	.69	.70	.71	.71	.72	.73	.74	.75	.75	.76	.77							
200	.67	.66	.66	.66	.66	.67	.67	.68	.68	.69	.69	.70	.71	.72	.72	.73	.74	.75	.75	.76								
225	.66	.66	.66	.66	.66	.67	.67	.68	.68	.69	.70	.70	.71	.72	.72	.73	.74	.75	.76									
250	.66	.66	.66	.66	.67	.67	.67	.68	.68	.69	.70	.70	.71	.72	.73	.73	.74	.75										
275	.67	.66	.66	.67	.67	.67	.68	.68	.69	.69	.70	.71	.71	.72	.73	.73	.74											
300	.67	.67	.66	.67	.67	.67	.68	.68	.69	.69	.70	.71	.71	.72	.73	.74												
325	.67	.67	.67	.67	.67	.67	.68	.68	.69	.70	.70	.71	.72	.72	.73													
350	.67	.67	.67	.67	.67	.68	.68	.69	.69	.70	.70	.71	.72	.72														
375	.68	.67	.67	.67	.67	.68	.68	.69	.69	.70	.71	.71	.72															
400	.68	.67	.67	.67	.68	.68	.68	.69	.70	.70	.71	.71																
425	.68	.68	.68	.68	.68	.68	.69	.69	.70	.70	.71																	
450	.68	.68	.68	.68	.68	.68	.69	.69	.70	.71																		
475	.69	.68	.68	.68	.69	.69	.69	.70	.70																			
500	.69	.69	.68	.68	.69	.69	.69	.70																				
525	.69	.69	.69	.69	.69	.69	.70																					
550	.70	.69	.69	.69	.69	.70																						
575	.70	.70	.69	.69	.70																							
600	.70	.70	.70	.70																								
625	.71	.70	.70																									
650	.71	.71																										
675	.72																											

Table 18. Dimensions V and W with Minimum SG for Vertically-mounted Switches (Marine Applications)

V	W																											
	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675			
75	.75	.72	.70	.69	.68	.68	.68	.68	.68	.69	.70	.71	.71	.72	.73	.74	.74	.75	.76	.77	.78	.79	.79	.80	.81			
100	.76	.72	.70	.68	.67	.68	.68	.68	.69	.70	.70	.71	.72	.73	.73	.74	.75	.76	.77	.77	.78	.79	.80	.81				
125	.77	.72	.69	.67	.67	.68	.68	.69	.69	.70	.71	.72	.72	.73	.74	.75	.75	.76	.77	.78	.79	.80	.80					
150	.79	.72	.68	.67	.67	.68	.69	.69	.70	.71	.71	.72	.73	.74	.74	.75	.76	.77	.78	.78	.79	.80						
175		.71	.67	.67	.68	.68	.69	.70	.70	.71	.72	.73	.73	.74	.75	.76	.76	.77	.78	.79	.79							
200			.67	.68	.68	.69	.70	.70	.71	.72	.72	.73	.74	.75	.75	.76	.77	.78	.79	.79								
225				.68	.69	.70	.70	.71	.72	.72	.73	.74	.74	.75	.76	.77	.77	.78	.78									
250				.69	.70	.70	.71	.71	.72	.73	.74	.74	.75	.76	.77	.77	.78	.78										
275					.70	.71	.71	.72	.73	.73	.74	.75	.76	.76	.77	.78	.79											
300						.71	.73	.73	.73	.74	.75	.76	.76	.77	.78	.79												
325							.73	.73	.74	.75	.75	.76	.77	.78	.78													
350								.74	.75	.75	.76	.77	.78	.78														
375									.75	.76	.77	.77	.78															
400										.77	.77	.78																
425											.78																	

Magnetic Horizontal Level Switches
Model: Marine

Ordering Accessories

Table 19. Ordering Information for Accessories

Accessories	Note: See page 8 for dimensions of Mobrey flanges
TD 110/A	316 stainless steel test device for Mobrey 'A' flanged switches, sandwich (see below) *
TD 111/A	Carbon steel test device for Mobrey 'A' flanged switches, weld on (see below) *
71020/107	316 stainless steel welding pad for Mobrey 'A' flanged switches (see below)
J184	Carbon steel welding pad for Mobrey 'A' flanged switches (see below)
J786	Carbon steel welding nozzle for Mobrey 'A' flanged switches (see below)
71030/900	316 stainless steel backing flange for Mobrey 'A' flanged switches (see below)
J863	Carbon steel backing flange for Mobrey 'A' flanged switches (see below)

Testing Device

Figure 3. Test Devices for Mobrey 'A' Flanged Switches

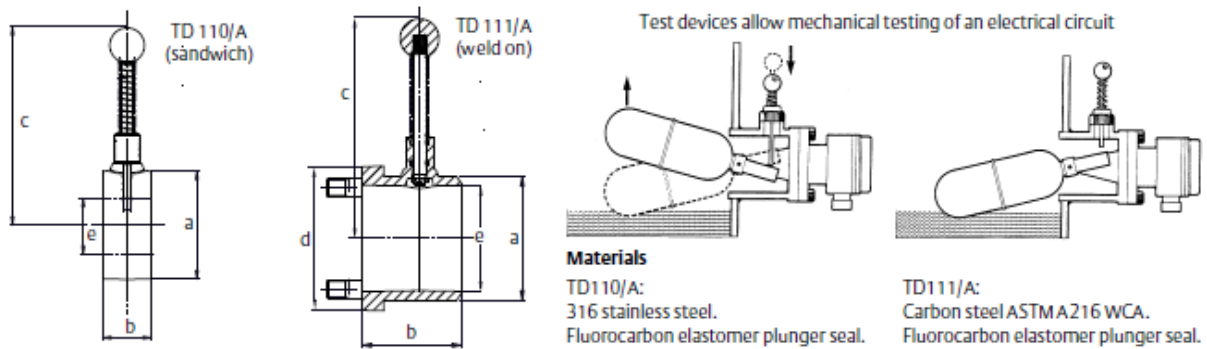


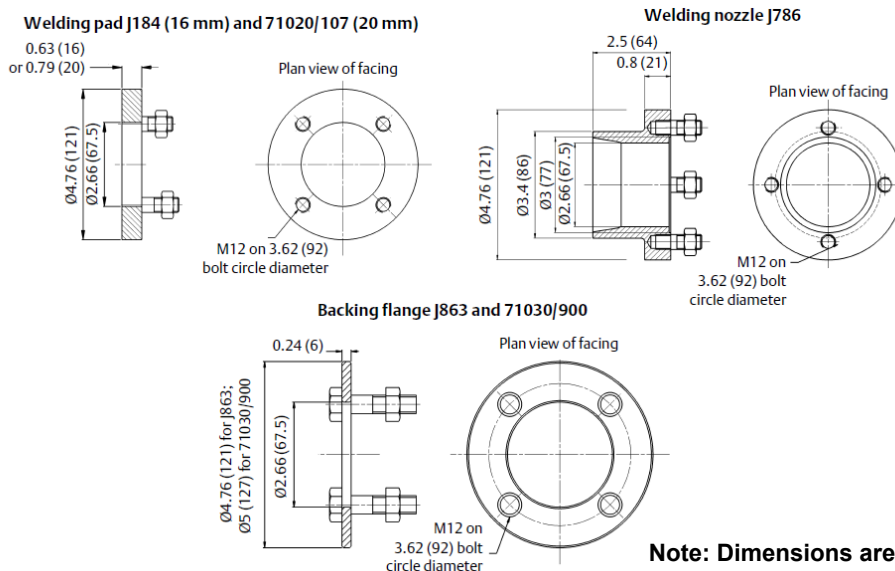
Table 20. Test Device Specifications and Dimensions

Type	Vessel flange	Maximum pressure ⁽¹⁾	Maximum T process	Øa in. (mm)	b in. (mm)	c in. (mm)	d in. (mm)	Øe in. (mm)
TD 110/A	Mobrey 'A'	261 psi (18 bar)	410°F (210°C)	3.02 (77)	1.38 (35)	5.59 (142)	N/A	2.64 (67)
TD 111/A	Weld on	261 psi (18 bar)	410°F (210°C)	3.11 (79)	2.52 (64)	5.59 (142)	3.62 (92) ⁽²⁾	2.64 (67)

- 182 psi (12.6 bar) at maximum temperature of 410 °F (210 °C).
- See Mobrey 'A' flange dimension 3.62 x 3.62 in., (92 x 92 mm) on page 9.

Companion Flanges

Figure 4. Companion Flanges Mobrey 'A' Flanged Switches



Approvals

GLOBAL CERTIFICATION



Functional Safety Certified

Meets the requirements of IEC 61508-2:2010 for use in safety related systems.

Systematic capability: SC 2;

Random Capability: Type A element

SIL1, 2 capable with HFT 0 (1001); Route 2_H and 2_S

SIL Capability (Low Demand Mode) = SIL2 ; SIL Capability (High demand mode) = SIL1

Certificate No. CSA FSP 22001

MARINE

Lloyd's Register

Certificate no. 88/00224

LR Test Specification No. 1

ENV1, ENV2

Bureau Veritas

Certificate no. 04795/F1 BV

BV Rules for the classification of steel ships

American Bureau of Shipping

Certificate no. 19-GD1906187-1 IACS UR E10

DNV GL

Certificate no. TAA00002GZ

DNV GL rules for classification –Ships, offshore units, and high speed and light craft

Location classes: Temperature – A; Humidity – B; Vibration – B; Enclosure- D

RINA

Certificate no. ELE270819CS001

Rules for the classification of ships



Canadian Standards Association

C22.2 NO 14

CSA Enc 4

EUROPEAN DIRECTIVES



Low voltage Directive (LVD) 2014/35/EU.

Compliant to LVD

Pressure Equipment Directive (PED) 2014/68/EU:

This product is outside the scope of the PED directive

ATEX Directive 2014/34/EU

FLAMEPROOF Models S183, S187, S189

Certificate No. Sira 06ATEX1115X

EN 60079-0, EN 60079-1, EN 60079-26, EN13463-1

For Zone 0/1 outside tank mounted applications Ex db IIC T6...T2 Ga/Gb (-20°C ≤ T_{amb} ≤ +60°C)

For Zone 1 submerged in vented tank applications Ex db IIC T6 Gb (-20°C ≤ T_{amb} ≤ +60°C)



II 1/2 G

II 2 G

Float chambers

Float chambers are used to facilitate the external mounting of the float switch onto a tank or pressure vessel, particularly where space inside the vessel is restricted or where the control must be isolated for routine maintenance whilst the plant is in operation. A wide range of cast or fabricated chambers is available. Exotic materials are also available. Process connections may be specified as top-and-bottom or side-and-side, and can be flanged, screwed or butt welded in a choice of sizes to suit most plant installations. Please contact Delta Mobrey for further information.



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