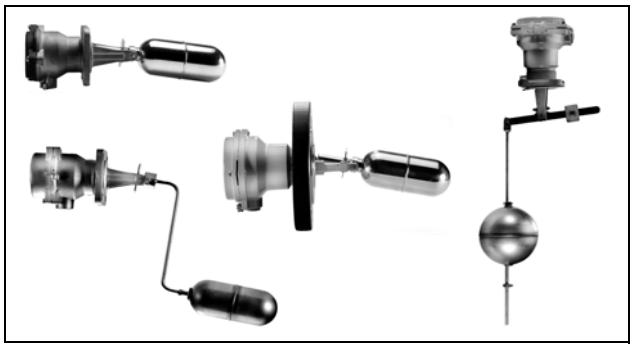
Product Data Sheet
IP101, Rev CD
February 2013

Magnetic Float Switches For Liquid Level Alarm and Pump Control

- *Ideal for industrial applications such as pump control and high or low alarm duty on tanks and pressure vessels*
- *Simple, rugged, and reliable. Low cost of ownership*
- *Direct (side or top) or chamber mounting*
- *Variety of switch mechanisms for electrical or pneumatic switching*
- *Operates in most liquids*
- *Selected models are safety certified to IEC 61508 with proven FMEDA, suitable for Safety Integrity Level 1 (SIL 1)*
- *ATEX and marine approvals*



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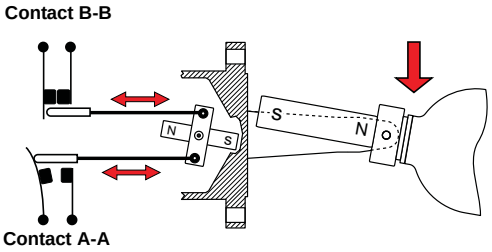
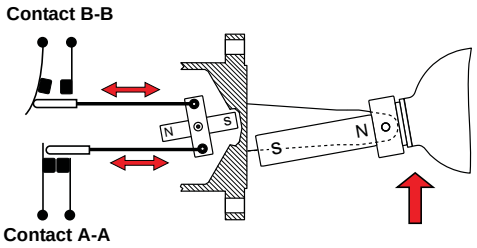
Process Management

Magnetic Float Switches – Proven And Reliable Level Detection, Even In The Harshest Environments



Level Switch Cross-section – Level Below Float



Level Switch Cross-section – Level Passes Float

High and Low Alarm Application

MEASUREMENT PRINCIPLE

Mobrey magnetic float switches are ideal for high and low liquid level alarm, and pump control duties.

The float switch is designed to open or close a circuit (“switch”) as a changing liquid level within a vessel passes the level of the float (the Switch Point).

When the process liquid level is below the Switch Point, contacts B-B are made (together) and contacts A-A are open.

When the process liquid level is above the Switch Point, contacts A-A are made (together) and contacts B-B are open.

BENEFITS OF MOBREY MAGNETIC FLOAT SWITCH TECHNOLOGY

- Over 100 years of experience – a proven design
- “Fit and Forget” – simple, reliable, and cost effective level measurement technology
- Tough, rugged design for long life in aggressive environments
- Operates in almost any liquid at high pressures and temperatures
- Measurement is unaffected by changes in process temperature, dielectric, or the presence of vapors
- Wide range of mounting options and configurations to suit all types of liquid level application and meet site standards

SPECIAL FEATURES OF THE MOBREY DESIGN

- Magnetically coupled
- No glands or linkages that could cause leaks
- No springs means reduced maintenance
- Snap action switching
- No contact hover or bounce for clean make or break
- Hermetically sealed switch mechanism is available to eliminate freezing and corrosion of contacts and all moving parts

Suitable for a Safety Integrity Level 1 (SIL 1) Environment

Mobrey magnetic float switches can be used in a Safety Instrumented System (SIS).

Float switches(1) ordered with the accessory code **L2049** (*page 10*) are supplied with a third party certificate of SIL suitability. They have been externally evaluated and certified in accordance with IEC61508 to attain Safety Integrity Level 1 (SIL 1) for a single device.

(1) ***Selected models only*** *– see Mobrey document M310/FSM on www.mobrey.com for the latest selected models and option codes.*

Float Switches for General Purpose Applications (Aluminum Bronze Wetside)

- Ideal for industrial applications such as pump control, and high or low alarm duty
- Selected models are certified to IEC61508 (*see pages 2 and 10*)
- Marine approvals: Lloyds Register of Shipping (LRS), Germanischer Lloyd, DNV, ABS, BV, RINA, and RMRS

Additional Information

Specification: page 12 Dimensions: page 18

TABLE 1. Ordering Information For General Purpose Magnetic Float Switches (Al Bronze Wetside)

★The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Model	**Product Description**					
S	Switch					
Flange (Head) (1)		**Rating**	**Flange Standard**		**Max. $T_{Process}$** (2)	
Standard						**Standard**
01	Mobrey A (3)	261 psi (18 bar)	Mobrey		410 °F (210 °C)	★
Switch Mechanism(4)						
Standard						**Standard**
DB (5)	Electrical: 2 independent Single Pole Single Throw (SPST) contact sets					★
PB (6)	As Type DB but with *gold plated contacts*					★
Expanded						
D6B (5)	Electrical: 2 independent circuits of double pole changeover contact sets					
P6B (6)	As Type D6B but with *gold plated contacts*					
APA (7)	Pneumatic air pilot valve on/off for switching air circuits					
AMA (7)	Pneumatic air pilot valve for continuous modulating of air controlled circuits – *not compatible with F68/+, F21/+, F264*					
Float (8)			**Max. $T_{Process}$** (2)	**Max. P @ T_{Room}**	**Max. P @ T_{Max}**	
Standard						**Standard**
F84	General purpose e.g. high/low alarm, 316 SST		752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★
F68/+(9)(7)	Horizontal pump control or alarm, 316 SST		752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★
F21/+(9)(7)	Vertical pump control or alarm, 316 SST		752 °F (400 °C)	435 psi (30 bar)	255 psi (17.6 bar)	★
F104/+ (9)	Cranked arm: horizontal or vertical, 316 SST		752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★
F93 (10)	Shrouded for dirty liquids, 316 SST		356 °F (180 °C)	Atmospheric	Atmospheric	★
Expanded						
F185	General purpose e.g. high/low alarm, Alloy 400		752 °F (400 °C)	500 psi (34.5 bar)	345 psi (23.8 bar)	
F264	Horizontal limited differential, Alloy 400		752 °F (400 °C)	464 psi (32 bar)	294 psi (20.3 bar)	
Typical Model Number: S 01 DB / F84						

(1) See page 22 for nozzle and stud lengths.

(2) The maximum process temperature is dependent on the Flange (Head) and selected Float option.

(3) See page 18 for Mobrey flange information.

(4) See "Switch Mechanism Specifications" on page 16 for switch mechanism ratings.

(5) Type DB is for alternative make and break circuits. Type D6B is for switching two independent circuits.

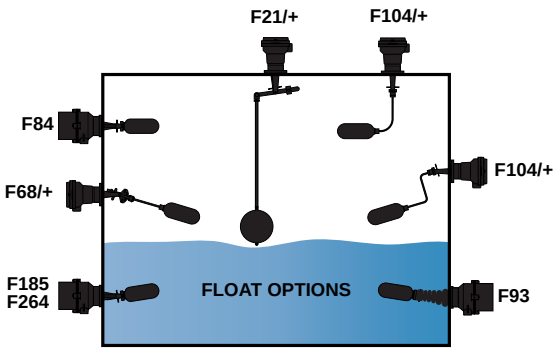
(6) Types PB and P6B are for switching low power (e.g. intrinsically safe) electrical circuits.

(7) The SIL certificate (code L2049 in Table 6 on page 10) is not available with this option.

(8) See Table 9 on page 19 for a comparison of the float options listed here.

(9) See pages 22, 23, and 24 for technical float details and length options.

(10) A silicone rubber gaiter is supplied with the 316 SST shroud.



Float Switches for General Purpose Applications (Stainless Steel Wetside)


S440DA/F84

- Selected models are certified to IEC61508 (*see pages 2 and 10*)
- Marine approvals: Lloyds Register of Shipping (LRS), Germanischer Lloyd, DNV, ABS, and RMRS

Additional Information

Specifications: page 13
Dimensions: page 19

TABLE 2. Ordering Information For General Purpose Magnetic Float Switches (SST Wetside)

★The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Model	**Product Description**					
S	Switch					
Flange (Head) (1)		**Rating**	**Flange Standard**		**Max. $T_{Process}$ (2)**	
Standard						**Standard**
36 (3)	Mobrey A (4)	490 psi (33.8 bar)	Mobrey		752 °F (400 °C)	★
Expanded						
190 (3)(5)	Mobrey A (4)	490 psi (33.8 bar)	Mobrey		356 °F (180 °C)	
440	3 in.	150 RF	ASME B16.5		752 °F (400 °C)	
441	4 in.	150 RF	ASME B16.5		752 °F (400 °C)	
424	3 in.	300 RF	ASME B16.5		752 °F (400 °C)	
425	4 in.	300 RF	ASME B16.5		752 °F (400 °C)	
489	3 in.	600 RF	ASME B16.5		752 °F (400 °C)	
490	3 in.	900 RF	ASME B16.5		752 °F (400 °C)	
428	DN 65	PN 16	EN 1092-1		752 °F (400 °C)	
429	DN 80	PN 16	EN 1092-1		752 °F (400 °C)	
430	DN 100	PN 16	EN 1092-1		752 °F (400 °C)	
431	DN 125	PN 16	EN 1092-1		752 °F (400 °C)	
417	DN 65	PN 40	EN 1092-1		752 °F (400 °C)	
418	DN 80	PN 40	EN 1092-1		752 °F (400 °C)	
419	DN 100	PN 40	EN 1092-1		752 °F (400 °C)	
433	DN 125	PN 40	EN 1092-1		752 °F (400 °C)	
434	DN 150	PN 40	EN 1092-1		752 °F (400 °C)	
488	DN 80	PN 63	EN 1092-1		752 °F (400 °C)	
435	DN 100	PN 63	EN 1092-1		752 °F (400 °C)	
436	DN 125	PN 63	EN 1092-1		752 °F (400 °C)	
437	DN 150	PN 63	EN 1092-1		752 °F (400 °C)	
Switch Mechanism (6)					**Max. $T_{Process}$ (2)**	
Standard						**Standard**
D (7)	Electrical: 2 independent Single Pole Single Throw (SPST) contact sets				752 °F (400 °C)	★
P (8)	As Type D but with *gold plated contacts*				752 °F (400 °C)	★
Expanded						
D6 (9)	Electrical: 2 independent circuits of double pole changeover contact sets				752 °F (400 °C)	
P6 (8)	As Type D6 but with *gold plated contacts*				752 °F (400 °C)	
H6 (10)	As Type D6 but with *gold plated contacts* and *hermetically sealed moving parts*				482 °F (250 °C)	
B6	As Type H6 but *approved for Zone 2 areas*				482 °F (250 °C)	
AP (11)	Pneumatic air pilot valve on/off for switching air circuits				752 °F (400 °C)	
AM (11)(12)	Pneumatic air pilot valve for continuous modulating of air controlled circuits				752 °F (400 °C)	

TABLE 2. Ordering Information For General Purpose Magnetic Float Switches (SST Wetside)

★The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Enclosure / Housing					
Standard					**Standard**
A	Aluminum alloy				★
Float (13)		**Max. $T_{Process}$ (2)**	**Max. P @ T_{Room}**	**Max. P @ T_{Max}**	
Standard					**Standard**
F84	General purpose e.g. high/low alarm, 316 SST	752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★
F68/+(11)(14)	Horizontal pump control or alarm, 316 SST	752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★
F21/+(11)(14)	Vertical pump control or alarm, 316 SST	752 °F (400 °C)	435 psi (30 bar)	255 psi (17,6 bar)	★
F104/+(14)	Cranked arm: horizontal or vertical, 316 SST	752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★
F93 (5)(15)	Shrouded for dirty liquids, 316 SST	356 °F (180 °C)	Atmospheric	Atmospheric	★
Expanded					
F96	General purpose e.g. high/low alarm, 316 SST	752 °F (400 °C)	1073 psi (74 bar)	623 psi (43 bar)	
F98	General purpose e.g. high/low alarm, 316 SST	752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	
F106	General purpose e.g. high/low alarm, 316 SST	752 °F (400 °C)	1073 psi (74 bar)	623 psi (43 bar)	
F107	General purpose e.g. high/low alarm, 316 SST	752 °F (400 °C)	2900 psi (200 bar)	1667 psi (115 bar)	
F88	Interface duties, 316 SST	752 °F (400 °C)	1073 psi (74 bar)	623 psi (43 bar)	
Typical Model Number: S 36 D A / F84					

(1) See page 22 for nozzle and stud lengths.

(2) The maximum allowed process temperature is dependent on Flange (Head), Switch mechanism, and Float options chosen.

(3) There is no back flange fitted to the S36 and S190 flange (head).

(4) See page 18 for Mobrey flange information.

(5) The F93 float and S190 flange (head) can only be used together.

(6) See "Switch Mechanism Specifications" on page 16 for switch mechanism ratings.

(7) Type D is for alternative make and break circuits.

(8) Types P and P6 are for switching low power (e.g. intrinsically safe) electrical circuits.

(9) Type D6 is for switching two independent circuits.

(10) Type H6 is for use in corrosive area and low temperature applications.

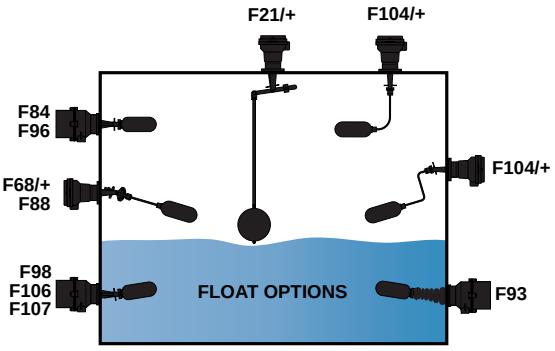
(11) The SIL certificate (code L2049 in Table 6 on page 10) is not available with this option.

(12) Switch mechanism type AM is not compatible with F68/+ or F21/+.

(13) See Table 9 on page 19 for a comparison of the float options listed here.

(14) See pages 22, 23, and 24 for technical float details and length options.

(15) A silicone rubber gaiter is supplied with the 316 SST shroud.



Float Switches for Hazardous Area Applications

S250DA/F84

- ATEX/IECEx Zone 1 Gas Group IIC, CSA Class 1: Group CD, and Lloyds Register of Shipping (LRS) approvals
- Selected models are certified to IEC61508 (*see pages 2 and 10*)

Additional Information

Specifications: page 14
Dimensions: page 20

TABLE 3. Ordering Information For Magnetic Float Switch In Hazardous Areas

★The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Model	**Product Description**					
S	Switch					
Flange (Head) (1)		**Rating**	**Wetside**		**Max. $T_{Process}$ (2)**	
Standard						**Standard**
250 (3)	Mobrey G (4)	304.5 psi (21 bar)	316 Stainless Steel		752 °F (400 °C)	★
275 (3)	Mobrey G (4)	304.5 psi (21 bar)	Gunmetal		392 °F (200 °C)	★
Expanded						
256	3 in.	150 RF	ASME B16.5		752 °F (400 °C)	
257	4 in.	150 RF	ASME B16.5		752 °F (400 °C)	
278	6 in.	150 RF	ASME B16.5		752 °F (400 °C)	
251	3 in.	300 RF	ASME B16.5		752 °F (400 °C)	
254	4 in.	300 RF	ASME B16.5		752 °F (400 °C)	
260	3 in.	600 RF	ASME B16.5		752 °F (400 °C)	
261	3 in.	900 RF	ASME B16.5		752 °F (400 °C)	
253	DN 80	PN 40	EN 1092-1		752 °F (400 °C)	
255	DN 100	PN 40	EN 1092-1		752 °F (400 °C)	
269	DN 125	PN 40	EN 1092-1		752 °F (400 °C)	
272	DN 80	PN 63	EN 1092-1		752 °F (400 °C)	
268	DN 100	PN 63	EN 1092-1		752 °F (400 °C)	
270	DN 125	PN 63	EN 1092-1		752 °F (400 °C)	
271	DN 150	PN 63	EN 1092-1		752 °F (400 °C)	
Switch Mechanism (5)					**Max. $T_{Process}$ (2)**	
Standard						**Standard**
D (6)	Electrical: 2 independent Single Pole Single Throw (SPST) contact sets				752 °F (400 °C)	★
P (7)	As Type D but with *gold plated contacts*				752 °F (400 °C)	★
Expanded						
D6 (8)	Electrical: 2 independent circuits of double pole changeover contact sets				752 °F (400 °C)	
P6 (7)	As Type D6 but with *gold plated contacts*				752 °F (400 °C)	
H6 (9)	As Type D6 but with *gold plated contacts* and *hermetically sealed moving parts*				482 °F (250 °C)	
Enclosure / Housing					**Max. $T_{Process}$ (2)**	
Standard						**Standard**
A	Aluminum alloy				752 °F (400 °C)	★
Expanded						
G	Gunmetal				662 °F (350 °C)	
X (10)	Use ‘AX’ or ‘GX’ for applications with ambient temperatures –4 to –76 °F (–20 to –60 °C)				*As ‘A’ or ‘G’ codes*	

TABLE 3. Ordering Information For Magnetic Float Switch In Hazardous Areas

★The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Float (11)		**Max. $T_{Process}$** (2)	**Max. P @ T_{Room}**	**Max. P @ T_{Max}**	
Standard					**Standard**
F84	General purpose e.g. high/low alarm, 316 SST	752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★
F185	General purpose e.g. high/low alarm, Alloy 400	752 °F (400 °C)	500 psi (34.5 bar)	345 psi (23.8 bar)	★
F68/+ (12)(13)	Horizontal pump control or alarm, 316 SST	752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★
F21/+ (12)(13)	Vertical pump control or alarm, 316 SST	752 °F (400 °C)	435 psi (30 bar)	255 psi (17.6 bar)	★
F104/+ (12)	Cranked arm: horizontal or vertical, 316 SST	752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★
Expanded					
F96	General purpose e.g. high/low alarm, 316 SST	752 °F (400 °C)	1073 psi (74 bar)	623 psi (43 bar)	
F98	General purpose e.g. high/low alarm, 316 SST	752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	
F106	General purpose e.g. high/low alarm, 316 SST	752 °F (400 °C)	1073 psi (74 bar)	623 psi (43 bar)	
F107	General purpose e.g. high/low alarm, 316 SST	752 °F (400 °C)	2900 psi (200 bar)	1667 psi (115 bar)	
F264	Horizontal limited differential, Alloy 400	410 °F (210 °C)	464 psi (32 bar)	398 psi (27.5 bar)	
F88	Interface duties, 316 SST	752 °F (400 °C)	1073 psi (74 bar)	623 psi (43 bar)	
Typical Model Number: S 250 D A / F84					

(1) See page 22 for nozzle and stud lengths.

(2) The maximum allowed process temperature is dependent on the Flange (Head), Switch mechanism, Enclosure/Housing, and Float options chosen.

(3) There is no back flange fitted to the S250 and S275 flange (head).

(4) See page 18 for Mobrey flange information.

(5) See "Switch Mechanism Specifications" on page 16 for switch mechanism ratings.

(6) Type D is for alternative make and break circuits.

(7) Types P and P6 are for switching low power (e.g. intrinsically safe) electrical circuits.

(8) Type D6 is for switching two independent circuits.

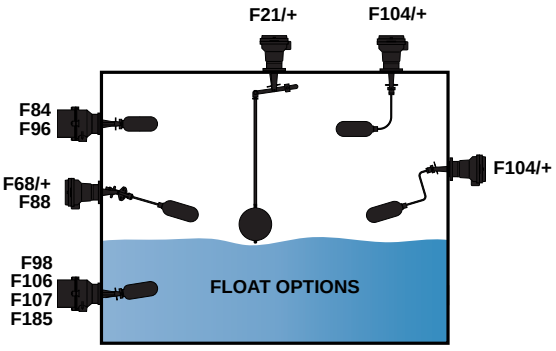
(9) Type H6 is for use in corrosive area and low temperature applications.

(10) The ATEX certification covering –4 to –76 °F (–20 to –60 °C) requires Mechanism Switch code H6 to be selected.

(11) See Table 10 on page 20 for a comparison of the float options listed here.

(12) See pages 22, 23, and 24 for technical float details and length options.

(13) The SIL certificate (code L2049 in Table 6 on page 10) is not available with this option.



Float Switches for Marine Applications

Aluminum Bronze

316 Stainless Steel

Hazardous Area

- **Submersible** (S03, S163 and S195)
- **Hoseproof** (S179 and S181)
- **Hazardous Area Submersible/Hoseproof** (S183, S187, and S189), designed for submersion in vented tanks and mounting from the outside of a tank
- Aluminum bronze or stainless steel enclosure and wetside
- May be submerged to 100 ft. (30 m) head of water (IP68)
- Hazardous Area ATEX approval for Zone 1, Gas Group IIC
- Marine approvals: Lloyds Register of Shipping (LRS), Germanischer Lloyd, DNV, ABS, BV, RINA, and RMRS

Additional Information

Specification: page 15
Dimensions: page 21

TABLE 4. Ordering Information For Magnetic Float Switches In Marine Applications

★The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Model	**Product Description**					
S	Switch					
Flange (Head)		**Wetside/Enclosure**	**Duty**	**IP Rating**	**Max. $T_{Process}$ (1)**	
Standard						**Standard**
179 (2)	Mobrey A, 261 psi/18 bar	Aluminum Bronze	Hoseproof	*See Table 5 on page 9*		★
Expanded						
03 (2)	Mobrey A, 261 psi/18 bar	Aluminum Bronze	Submersible	*See Table 5 on page 9 for the **IP Ratings** and **Maximum Process Temperatures***		
195 (2)	Mobrey A, 261 psi/18 bar	Aluminum Bronze	Submersible			
163 (2)	Mobrey A, 261 psi/18 bar	316 Stainless Steel	Submersible			
181 (2)	Mobrey A, 261 psi/18 bar	316 Stainless Steel	Hoseproof			
183 (2)	Mobrey A, 261 psi/18 bar	Aluminum Bronze	Hazard Submersible			
187 (2)	Mobrey A, 261 psi/18 bar	Aluminum Bronze	Hazard Submersible			
189 (2)	Mobrey A, 261 psi/18 bar	Aluminum Bronze	Hazard Hoseproof			
Switch Mechanism (3)					**Max. $T_{Process}$ (1)**	
Standard						**Standard**
D (4)	Electrical: 2 independent Single Pole Single Throw (SPST) contact sets				752 °F (400 °C)	★
P (5)	As Type D but with *gold plated contacts*				752 °F (400 °C)	★
Expanded						
D6 (4)(6)	Electrical: 2 independent circuits of double pole changeover contact sets				752 °F (400 °C)	
P6 (5)(6)	As Type D6 but with *gold plated contacts*				752 °F (400 °C)	
Enclosure Housing						
Standard						**Standard**
B	Aluminum bronze (*no code is required for stainless steel S163 and S181 models*)					★
Cable					**Max. $T_{Process}$ (1)**	
Standard						**Standard**
L	10 ft. (3 m) of fitted cable (*code is required for S03, S163, S195, S183, and S187 models*)				*See Table 5*	★
Float (7)			**Max. $T_{Process}$ (1)**	**Max. P @ T_{Room}**	**Max. P @ T_{Max}**	
Standard						**Standard**
F84	General purpose e.g. high/low alarm, 316 SST		752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★
F185	General purpose e.g. high/low alarm, Alloy 400		752 °F (400 °C)	500 psi (34.5 bar)	345 psi (23.8 bar)	★
F68/+ (8)	Horizontal pump control or alarm, 316 SST		752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★

TABLE 4. Ordering Information For Magnetic Float Switches In Marine Applications

★The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

F21/+ (8)	Vertical pump control or alarm, 316 SST	752 °F (400 °C)	435 psi (30 bar)	255 psi (17.6 bar)	★
F104/+ (8)	Cranked arm: horizontal or vertical, 316 SST	752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	★
F93 (9)(10)	Shrouded for dirty liquids, 316 SST	356 °F (180 °C)	Atmospheric	Atmospheric	★
Expanded					
F98	General purpose e.g. high/low alarm, 316 SST	752 °F (400 °C)	500 psi (34.5 bar)	290 psi (20 bar)	
F264	Horizontal limited differential, Alloy 400	752 °F (400 °C)	464 psi (32 bar)	294 psi (20.3 bar)	
Typical Model Number: S 03 D B L / F84					

(1) The maximum process temperature is dependent on the Flange (Head), Switch mechanism, Cable (if fitted), and Float options chosen.

(2) See page 18 for Mobrey flange information.

(3) See "Switch Mechanism Specifications" on page 16 for switch mechanism ratings.

(4) Type D is for alternative make and break circuits. Type D6 is for switching two independent circuits.

(5) Types P and P6 are for switching low power (e.g. intrinsically safe) electrical circuits.

(6) Not available for stainless steel enclosure and wetside models S163 and S181.

(7) See Table 10 on page 20 for a detailed comparison of the float types listed here.

(8) Refer to pages 22, 23, and 24 for technical float details and length options. See "Nozzle and Stud Lengths" on page 22 for stud lengths.

(9) A silicone rubber gaiter is supplied with the 316 SST shroud

(10) Shrouded floats for stainless steel switches S163 and S181 are available only on request. Please contact the factory.

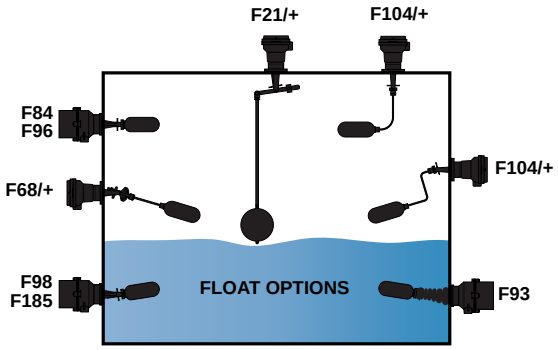


TABLE 5. Switch Type Comparison – *Marine Applications*

Type Number	Maximum $T_{Process}$ (1)		Head IP Rating	Cable (2)
	Submersed	Non-submersed		
S03	176 °F (80 °C)	410 °F (210 °C)	66/68 (100 ft. / 30 m)	MICC (10 ft. / 3 m)
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 (10 ft. / 3 m)
S163	176 °F (80 °C)	410 °F (210 °C)	66/68 (100 ft. / 30 m)	MICC (10 ft. / 3 m)
S183	122 °F (50 °C)	410 °F (210 °C)	66/68 (100 ft. / 30 m)	CSP (10 ft. / 3 m)
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 (10 ft. / 3 m)
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 15 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.

Spare Parts and Accessories

TABLE 6. Spare Parts and Accessories

★The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Spares and Accessories	***Note: See page 18 for dimensions of Mobrey flanges***	
Standard		**Standard**
L2049 (1)	SIL Certificate	★
TD 110/A	316 stainless steel **test device** for Mobrey 'A' flanged switches, sandwich (*see Figure 1*)	★
TD 111/A	Carbon steel **test device** for Mobrey 'A' flanged switches, weld on (*see Figure 1*)	★
Expanded		
71020/107	316 stainless steel **welding pad** for Mobrey 'A' flanged switches (*see Figure 2 on page 11*)	
J184	Carbon steel **welding pad** for Mobrey 'A' flanged switches (*see Figure 2*)	
J786	Carbon steel **welding nozzle** for Mobrey 'A' flanged switches (*see Figure 2*)	
71030/900	316 stainless steel **backing flange** for Mobrey 'A' flanged switches (*see Figure 2*)	
J863	Carbon steel **backing flange** for Mobrey 'A' flanged switches (*see Figure 2*)	
J800	Carbon steel **welding pad** for Mobrey 'G' flanged switches (*see Figure 3*)	
71020/111	316 stainless steel **welding pad** for Mobrey 'G' flanged switches (*see Figure 3*)	
J799	Carbon steel **welding nozzle** for Mobrey 'G' flanged switches (*see Figure 3*)	

(1) Not available with float switches for marine applications, models with pneumatic switch mechanism and some float options. See M310/FSM for full details.

Test Devices

Figure 1. Test Devices for Mobrey 'A' Flanged Switches

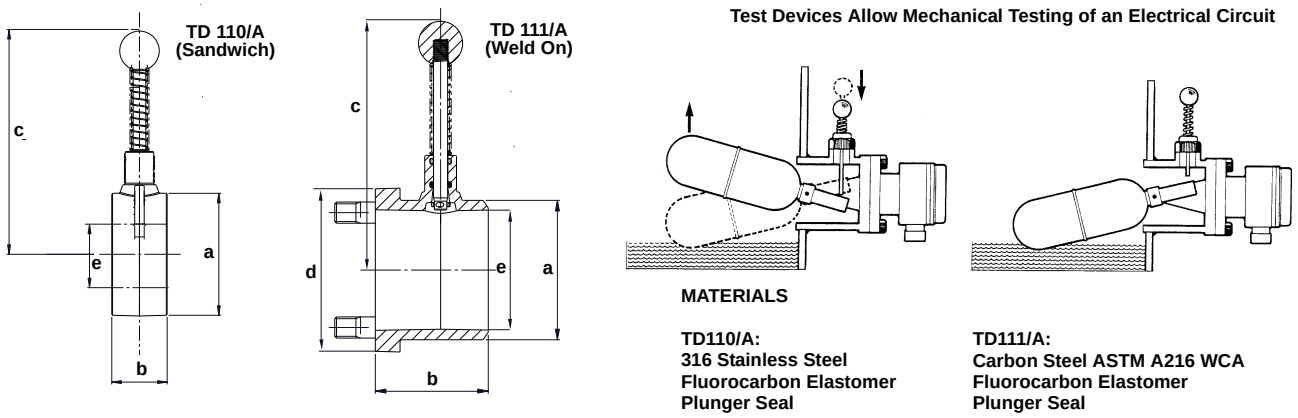


TABLE 7. Test Device Specification and Dimensions

Type	Vessel Flange	Maximum Pressure(1)	Maximum $T_{Process}$	øa in. (mm)	øb in. (mm)	øc in. (mm)	d^2 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)	3.62^2 (92^2)	2.64 (67)

(1) 182 psi (12.6 bar) at maximum temperature of 410 °F (210 °C)

Float Chambers

Float chambers are used to facilitate the external mounting of a Mobrey Magnetic Level 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 the factory for further information.

Fabricated Chamber

Cast Chamber

Companion Flanges

Figure 2. Companion Flanges for Mobrey ‘A’ Flange Switches

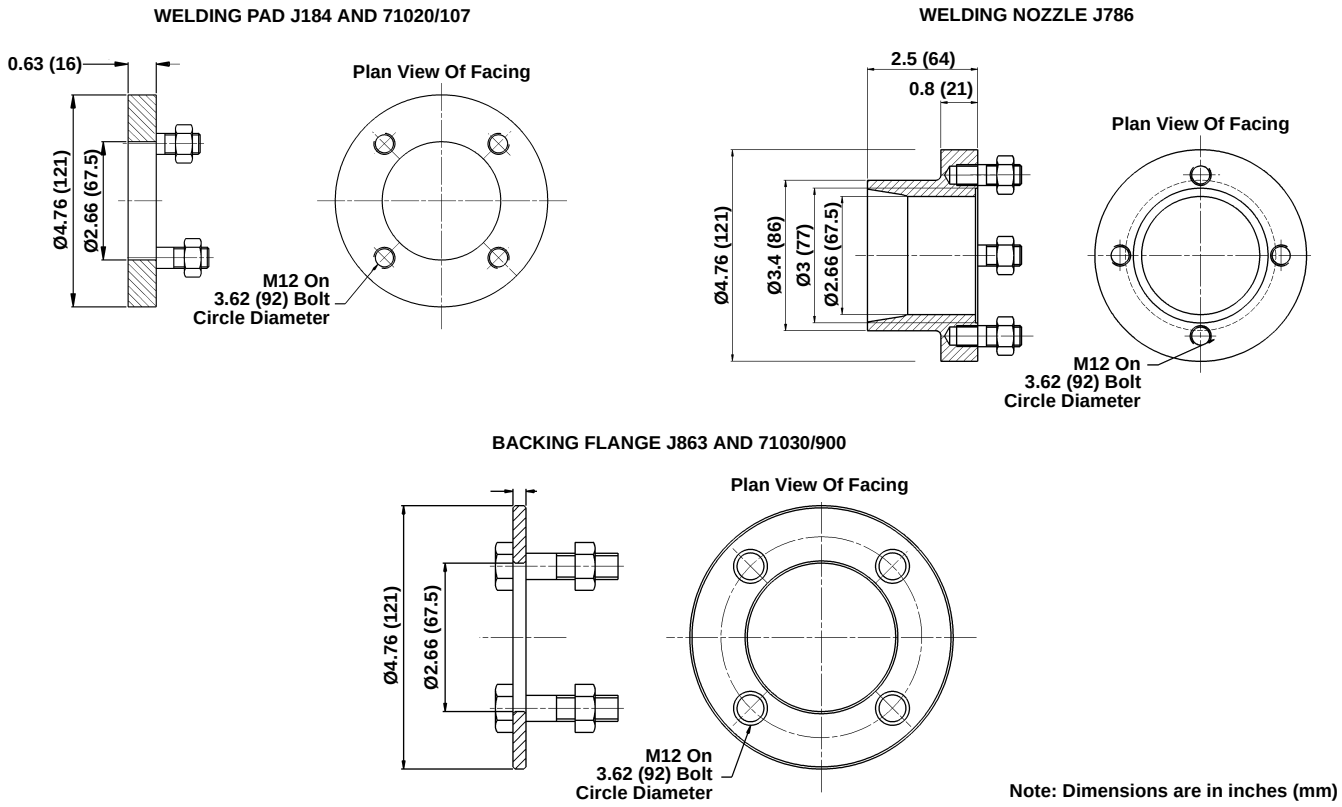
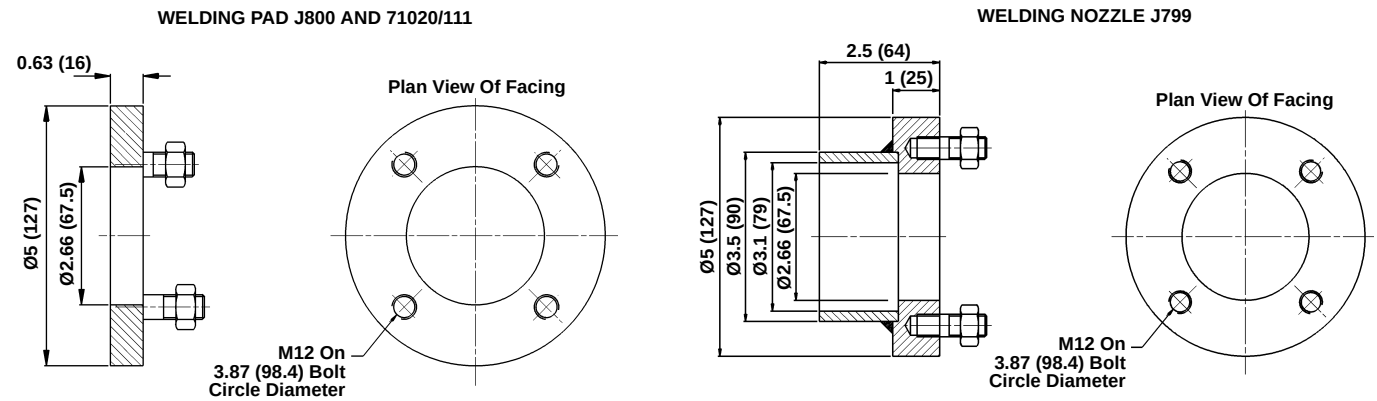


Figure 3. Companion Flanges for Mobrey ‘G’ Flange Switches



NOTE:

- Backing flange J863 is zinc plated and passivated
- Welding types supplied complete with studs and nuts
- Backing type supplied complete with bolts, sealing washers, and full face gasket
- Other materials available upon request

Specifications

FLOAT SWITCH SPECIFICATIONS

Float Switch Specification – General Applications (Aluminum Bronze Wetside)

Electrical Models	
Enclosure and Wetside	Aluminum bronze to BS1400 – AB1 maximum iron content 2.5%
IP Rating	Weatherproof to IEC60529 (IP66)
End Cap	Short (4 contacts) e.g. S01DB, Aluminum BS1490 – grade LM24
	Long (6 contacts) e.g. S01D6B, Brass BS1400 – DCB3
Cable Gland (*Supplied With S01DB Only*)	Nickel-plated brass gland with a fully insulated polychloroprene-nitrile rubber CR/NBR gasket seal. Clamping range for 8 to 13 mm OD cable
	Maximum ambient temperature is 176 °F (80 °C)
Maximum Process Temperature	410 °F (210 °C). *If shrouded float F93 used, maximum is 356 °F (180 °C)*
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
Dimensions	See “General Purpose Magnetic Float Switches (Aluminum Bronze Wetside)” on page 18
Air Pilot Valve Models	
Enclosure	Aluminum Alloy to BS 1490: Grade LM24
Valve Block	Aluminum Alloy to BS 1490: Grade LM25
Finish	All external aluminum surfaces are chromate phosphate treated, and then externally painted
Maximum Process Temperature	410 °F (210 °C). *If shrouded float F93 used, maximum is 356 °F (180 °C)*
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
Dimensions	See “General Purpose Magnetic Float Switches (Aluminum Bronze Wetside)” on page 18
Approvals[(1)]	
UK	Lloyds Register of Shipping (LRS)
Germany	Germanischer Lloyd
Canada	CSA (Special order, contact factory)
USA	ABS
France	BV
Italy	RINA
Russia	RMRS
Norway	DNV

(1) Other approvals available. Please contact us with your requirements.

Float Switch Specification – General Purpose Applications (Stainless Steel Wetside)

Electrical Models	
Enclosure Housing Material	Aluminum alloy to BS 1490: Grade LM24
IP Rating	Weatherproof to IEC60529 (IP66)
Wetside material	316 Stainless steel (to Mobrey Standard) 316S33 Stainless steel for S489 and S490 switch types
Back Flange (*Excludes S36 and S190*)	Carbon steel to BS 1501: 224 Grade 430B LT50
	This material has guaranteed properties at high 752 °F (400 °C) and low –58 °F (–50 °C) temperatures
Cable Gland (*Supplied With S36 only*)	Nickel-plated brass gland with a fully insulated polychloroprene-nitrile rubber CR/NBR gasket seal. Clamping range for 8 to 13 mm OD cable
	Maximum ambient temperature is 176 °F (80 °C)
Maximum Process Temperature	Dependent upon Flange (Head), Switch mechanism, and Float options chosen(1). **Note:** See “Gasket Material” below for gasket temperature limits
Gasket Material	Float switches with AMSE B16.5 Class 600 and Class 900 flanges are fitted with spiral wound non-asbestos filled gaskets rated to 752 °F (400 °C)
	Otherwise 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 “General Purpose Magnetic Float Switches (Stainless Steel Wetside)” on page 19
Air Pilot Valve Models	
Enclosure	Aluminum Alloy to BS 1490: Grade LM24
Valve Block	Aluminum Alloy to BS 1490: Grade LM25
Finish	All external aluminum surfaces are chromate phosphate treated, and then externally painted
Maximum Process Temperature	Dependent upon Flange (Head), Switch mechanism, and Float options chosen(1). **Note:** See “Gasket Material” below for gasket temperature limits
Connection	Brass compression couplings to suit 0.02 in. (6 mm) copper or nylon pipe (coupling thread $^1/_2$-in BSP)
Gasket Material	Float switches with AMSE B16.5 Class 600 and Class 900 flanges are fitted with spiral wound non-asbestos filled gaskets rated to 752 °F (400 °C)
	Otherwise 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 “General Purpose Magnetic Float Switches (Stainless Steel Wetside)” on page 19
Approvals(2)	
UK	Lloyds Register of Shipping (LRS)
Germany	Germanischer Lloyd
Canada	CSA (Special order, contact factory)
USA	ABS
Russia	RMRS
Norway	DNV

(1) See “Float Switches for General Purpose Applications (Stainless Steel Wetside)” on page 4 for maximum process temperature ratings of these options.

(2) Other approvals available. Please contact us with your requirements.

Float Switch Specification – Hazardous Area Applications

General	
Enclosure/Housing Materials	Aluminum Alloy to BS 1490: Grade LM24 All external aluminum surfaces are chromate phosphate treated, and then externally stove painted
	Gunmetal to BS1400: LG2 Natural finish
IP Rating	Weatherproof to IEC60529 (IP66)
Wetside Material	316 Stainless steel to Mobrey Standard (316S33 Stainless steel for S260 and S261 switches)
	Gunmetal to BS1400: LG2
Back Flange (*Excludes S250 and S275*)	Carbon steel to BS 1501: 224 Grade 430B LT50
	This material has guaranteed properties at high (752 °F/400 °C) and low (–58 °F/–50 °C) temperatures
Maximum Process Temperatures	Aluminum enclosure: 752 °F (400 °C); Gunmetal enclosure: 662 °F (350 °C) **Note:** See “Gasket Material” below for gasket temperature limits
	S275: 392 °F (200 °C)
Gasket Material	Float switches with AMSE B16.5 Class 600, Class 900, and EN 1092-1 PN 63 flanges are fitted with spiral wound non-asbestos filled gaskets rated to 752 °F (400 °C)
	Otherwise 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 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
Ambient Temperatures Below 0°C	(i) Down to –4 °F (–20 °C) Standard enclosure/housing codes A or G are suitable
	(ii) Down to –76 °F (–60 °C) Specify Enclosure/Housing order codes “AX” or “GX” which are as standard but with ATEX certification to use down to –76 °F (–60 °C). **Note:** This is downrated to –76 °F (–50 °C) unless a Mobrey ‘G’ flange is fitted or low temperature back flange is specified
Dimensions	See “Hazardous Area Magnetic Float Switches” on page 20
Approvals[1]	
ATEX	II 1/2 G, Exd IIC T6 (Ta = –20 °C to 60 °C) Housing code AX or GX II 1/2 G, Ex d IIC T6 (Ta = –60 °C to 60 °C)
IECEx	Ex d IIC T6 (Ta = –20 °C to 60 °C) Housing code AX or GX, Ex d IIC T6 (Ta = –60 °C to 60 °C)
CSA[2]	Canadian Standards Association, Class 1: Group CD
LRS	Lloyds Register of Shipping

(1) Other approvals available. Please contact us with your requirements.

(2) CSA certified products are available to special order.

Float Switch Specification – Marine Applications

Aluminum Bronze Wetside Models	
Enclosure and Wetside	Aluminum bronze to BS1400 – AB1 maximum iron content 2.5%
IP Rating	May be submerged to 100 ft. (30 m) head of water (IP68)
End Cap	Brass BS1400 DCB3 (non-hazardous area float switches)
	Aluminum Bronze BS400 AB, maximum 2.5% iron (hazardous area float switches)
Maximum Process Temperature	See Table 5 on page 9
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 “Marine Magnetic Float Switches” on page 21.
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	Aluminum bronze to BS1400 – AB1/C
Maximum Process Temperature	410 °F (210 °C) **Note:** See “Gasket Material” and “Cable” below for further temperature limits
Cable Gland(1)	Nickel-plated brass gland with a fully insulated polychloroprene-nitrile rubber CR/NBR gasket seal. Clamping range for 8 to 13 mm OD cable
	Maximum ambient temperature is 176 °F (80 °C)
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 “Marine Magnetic Float Switches” on page 21
Cable(2)	
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(3)	
ATEX	II 2 G, Ex d IIC Ga T6 (Ta= –20 °C to 60 °C) when submersed, in a vented tank application
	II 1/2 G, Ex d IIC Ga/Gb T6 (Ta= –20 °C to 60 °C) when enclosure is outside in a tank mounted application
Approvals(4)	
UK	Lloyds Register of Shipping
Germany	Germanischer Lloyd
USA	ABS
France	BV
Italy	RINA
Russia	RMRS
Norway	DNV

(1) For S179 only, cable gland is supplied loose in the box. Fitting of the gland is the customer's responsibility. Types S03, S195, S163, S183, and S187 are supplied with a pre-fitted cable gland.

(2) See Table 5 on page 9 for marine application switches supplied with a fitted cable.

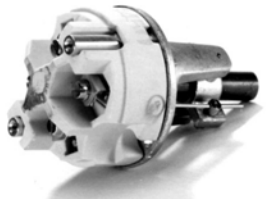
(3) Types S183, S187, and S189 only.

(4) Other approvals available. Please contact us with your requirements.

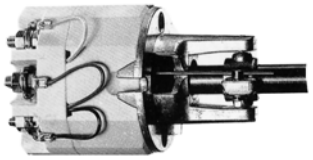
Horizontal Float Switches

SWITCH MECHANISM SPECIFICATIONS

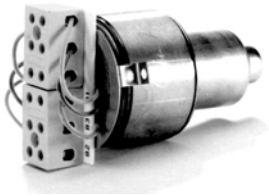
Electrical Types D and P



Electrical Types D6 and P6



Electrical Types H6 and B6



Pneumatic Types AP and AM

Electrical Switch Mechanisms

Type D

- For alternative make and break circuits
- Function: 2 independent single pole single throw contact sets and “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) and “Snap-Action”

Types P & P6

- As types 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 are 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 Switch Mechanisms

Type AP

- For switching air circuits
- Function: Change over
- Air pressure:

  Max. air pressure through valve: 100 psi (7 bar).

  Max. air flow through valve: 66 litres/minute at 100 psi (7 bar). Air must be clean and dry
- Nominal leakage rate of 0.2%
- Connections: Brass compression couplings to suit 0.24-in. (6 mm) copper or nylon pipe, coupling thread ¼-in. BSP.

Type AM

- For modulating air controlled circuits
- Function: Continuous modulation
- Air pressure

  Max. air pressure through valve: 20 psi (1.4 bar).

  Modulation: linear: 0 to 20 psi (0 to 1.4 bar). 2.9 psi (0.2 bar) to 20 psi (1.4 bar) available on request
- Temperature:

  Medium: 34 to 752 °F (1 to 400 °C)
  Ambient: 34 to 140 °F (1 to 60 °C)

  A lower ambient temperature can be tolerated if the air supply is 100% dry

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

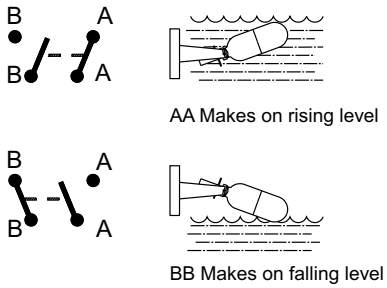
24 V: 750 mH/10 mA Inductive

NOTE:

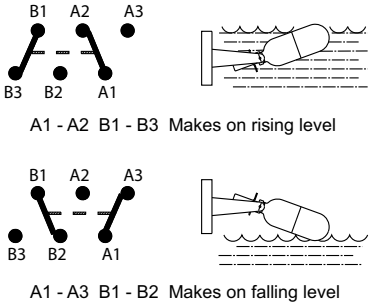
LVD (Low Voltage Directive) standards applied: EN60947 Parts 1 and 5.1

Horizontal Float Switches

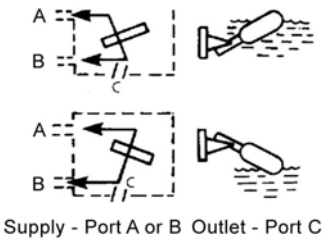
Types D and P



Types D6, P6, H6, and B6

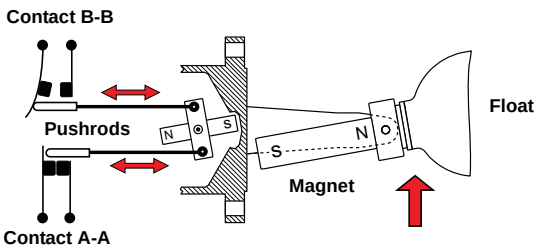


Type AP and AM



Glandless Magnetic Snap-Action Switching

A-A Makes Contact On Rising Level



B-B Makes Contact On Falling Level

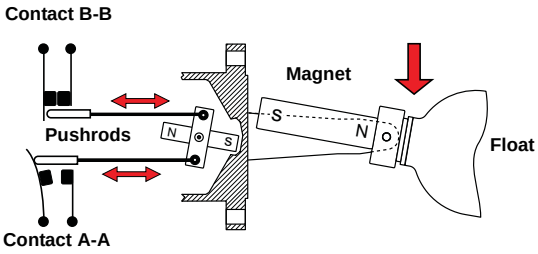


TABLE 8. Electrical Switch Mechanisms

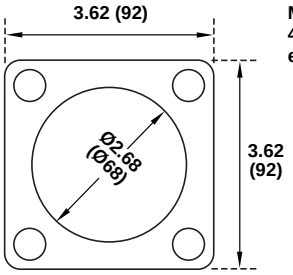
Electrical Switch Specification	D and D6	P and P6	H6 and B6
Contact Material	Fine Silver	Gold Plated	Gold Plated
Process Temperature	–22 to 752 °F (–30 to 400 °C)	–22 to 752 °F (–30 to 400 °C)	–148 to 482 °F (–100 to 250 °C)
Ambient Temperature	–22 to 158 °F (–30 to 70 °C)	–22 to 158 °F (–30 to 70 °C)	–76 to 158 °F (–60 to 70 °C)
Insulation Value	(live to earth) > 100 MEG OHM		
Terminals	D and P: M4 screws with non-rotational clamp plates.		
	D6, P6, H6, and B6: 6-way terminal block with pressure plates		

Electrical Specification	AC	DC Inductive	DC Resistive
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 Constant 40 ms Maximum	

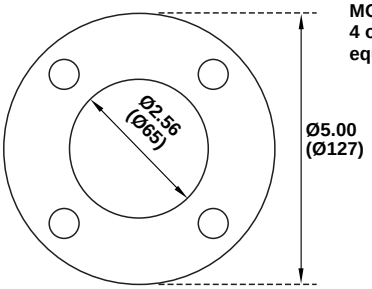
(1) Maximum current for Type D is 8 A up to 410 °F (210 °C).

Dimensional Drawings

Mobrey ‘A’ and ‘G’ Flanges



MOBREY ‘A’ FLANGE:
4 off Ø0.55 (Ø14) holes
equi-spaced on 3.62 (92) PCD



MOBREY 'G' FLANGE:
4 off Ø0.55 (Ø14) holes
equi-spaced on 3.97 (98.4) PCD

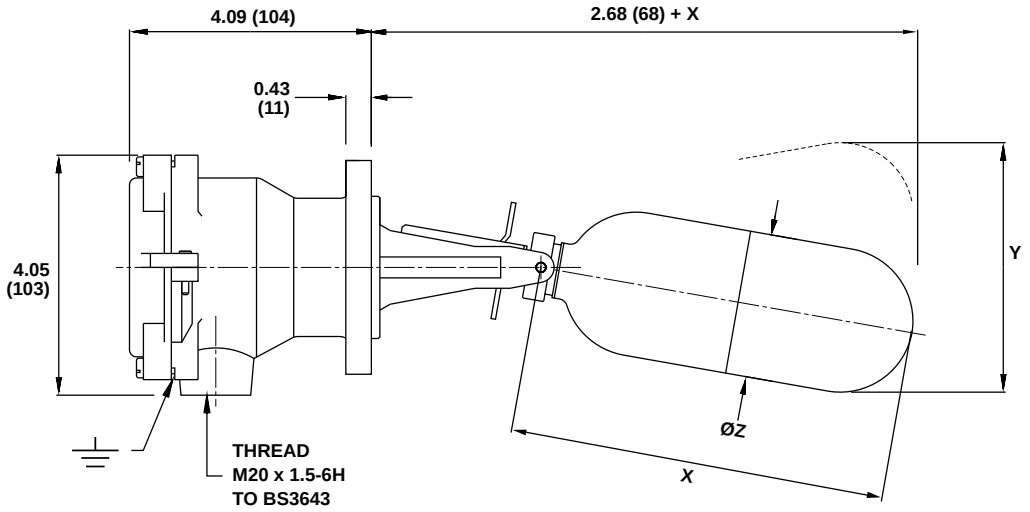
Note: Dimensions are in inches (mm)

General Purpose Magnetic Float Switches (Aluminum Bronze Wetside)

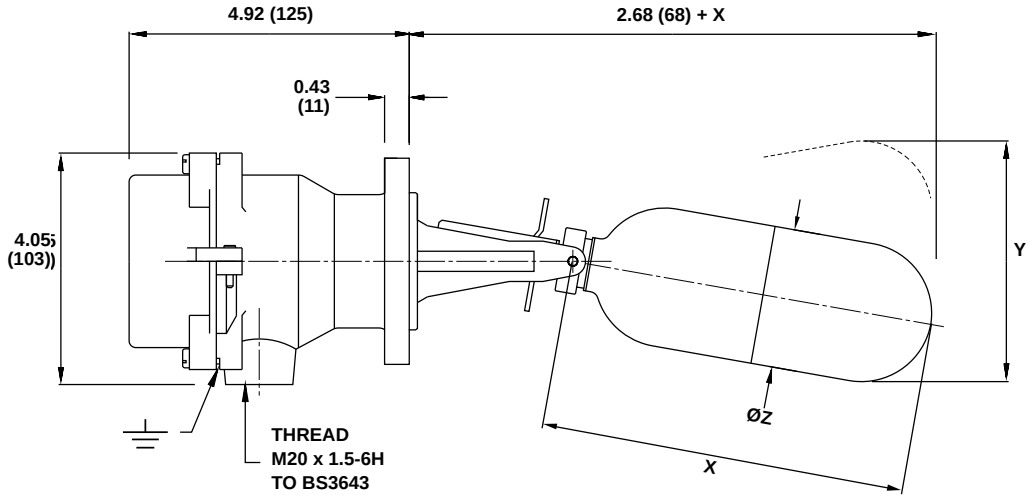
Note: See Table 9 on page 19 for dimensions X, Y, and Z

Note: Dimensions are in inches (mm)

SWITCH MECHANISM TYPES DB AND PB



SWITCH MECHANISM TYPES D6B AND P6B

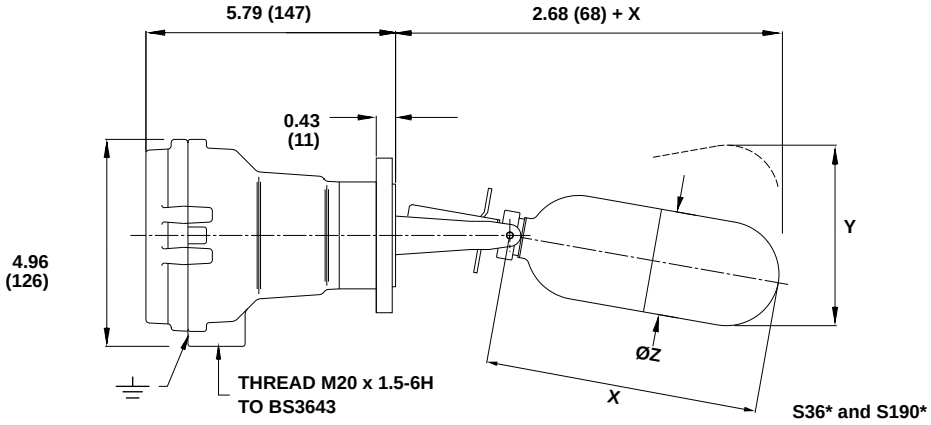


General Purpose Magnetic Float Switches (Stainless Steel Wetside)

Note: See Table 9 for dimensions X, Y, and Z

Note: Dimensions are in inches (mm)

MOBREY FLANGE



ASME B16.5 / EN1092-1 FLANGE

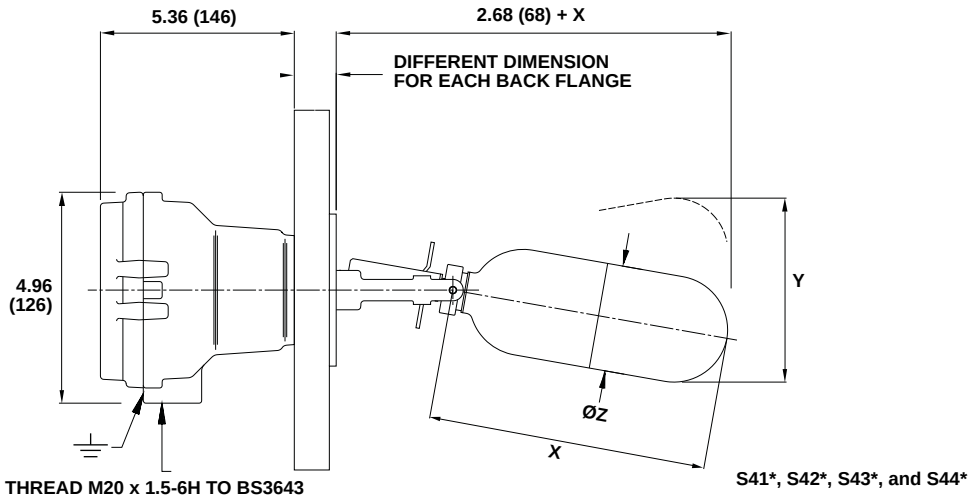


TABLE 9. Float Dimensions X, Y, and Z – *General Purpose Switches*

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
F96	0.60	1073 (74)	752 (400)	0.51 (13)	6.45 (164)	4.68 (119)	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
F106	0.51	1073 (74)	752 (400)	0.51 (13)	7.28 (185)	4.25 (108)	2.56 (65)	316 SST
F107	0.71	2900 (200)	752 (400)	0.51 (13)	6.77 (172)	4.72 (120)	2.56 (65)	316 SST
F68/+(1)	0.72 to 0.85	500 (34.5)	752 (400)	*Variable (See page 22)*			2.56 (65)	316 SST
F21/+(1)	0.70	435 (30)	752 (400)	*Variable (See page 23)*			5.08 (129)	316 SST
F104/+(1)	*Various*	500 (34.5)	752 (400)	*As Ordered (See page 24)*			2.56 (65)	316 SST
F88	0.8/1.0	1073 (74)	752 (400)	1.02 (26)	14.13 (359)	7.79 (198)	2.56 (65)	316 SST
F93	0.75	Atmospheric	356 (180)	0.51 (13)	7.20 (183)	124	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

(1) Refer to pages 22, 23, and 24 for technical float details and length options. See "Nozzle and Stud Lengths" on page 22 for stud lengths.

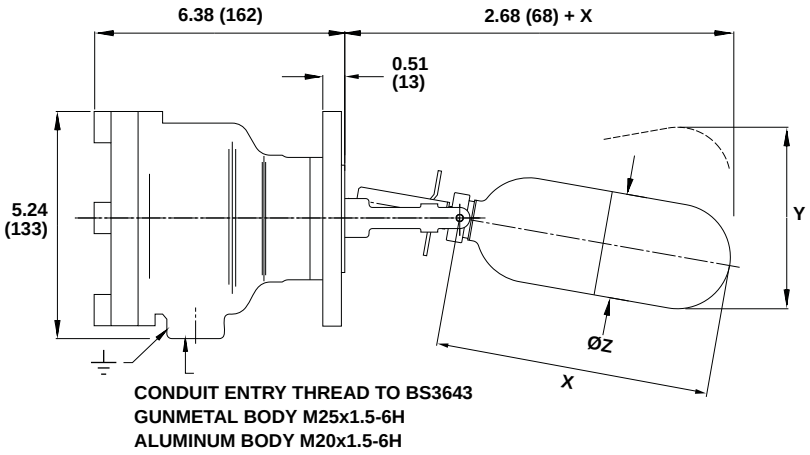
Horizontal Float Switches

Hazardous Area Magnetic Float Switches

Note: See Table 10 for dimensions X, Y, and Z

Note: Dimensions are in inches (mm)

MOBREY FLANGE



ASME B16.5 / EN1092-1 FLANGE

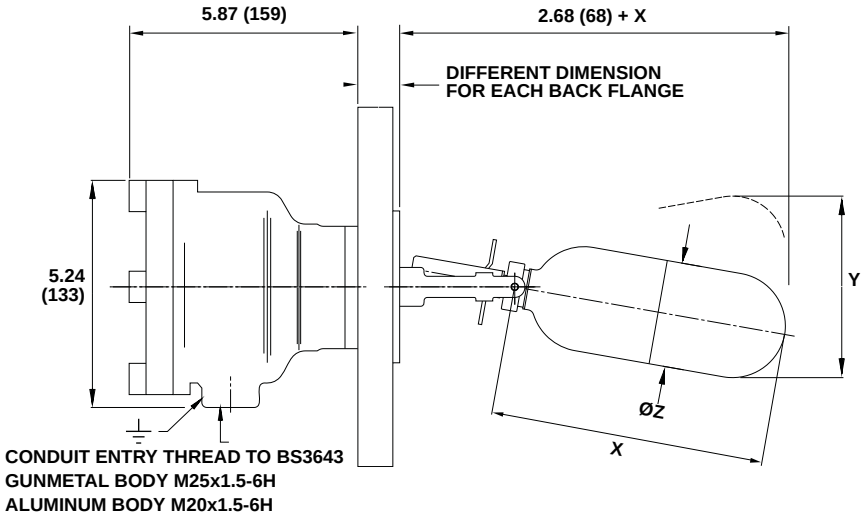


TABLE 10. Float Dimensions X, Y, and Z – *Hazardous Area and Marine Switches*

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
F98	0.45	500 (34.5)	752 (400)	0.51 (14)	7.24 (184)	5.00 (127)	2.56 (65)	316 SST
F106	0.51	1073 (74)	752 (400)	0.51 (13)	7.28 (185)	4.25 (108)	2.56 (65)	316 SST
F107	0.71	2900 (200)	752 (400)	0.51 (13)	6.77 (172)	4.72 (120)	2.56 (65)	316 SST
F68/+(1)	0.72 to 0.85	500 (34.5)	752 (400)	*Variable (See page 22)*			2.56 (65)	316 SST
F21/+(1)	0.70	435 (30)	752 (400)	*Variable (See page 23)*			5.08 (129)	316 SST
F104/+(1)	*Various*	500 (34.5)	752 (400)	*As Ordered (See page 24)*			2.56 (65)	316 SST
F88	0.8/1.0	1073 (74)	752 (400)	1.02 (26)	14.13 (359)	7.79 (198)	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
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*	2.5 (63.5)	Alloy 400

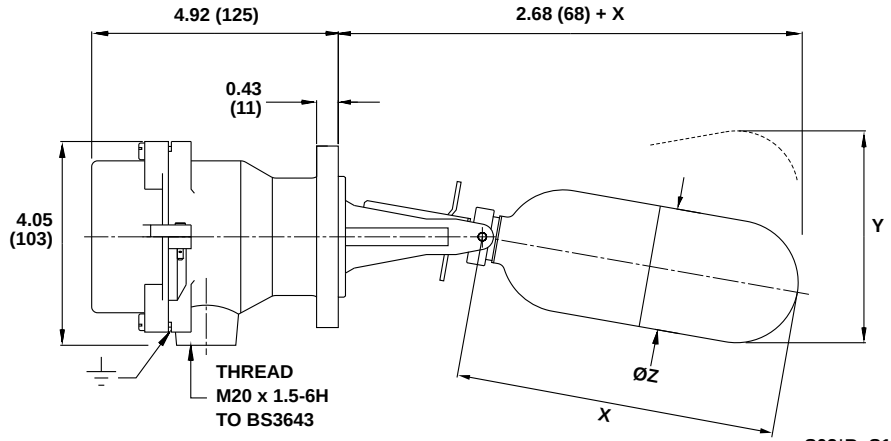
(1) Refer to pages 22, 23, and 24 for technical float details and length options. See "Nozzle and Stud Lengths" on page 22 for stud lengths.

Marine Magnetic Float Switches

Note: See Table 10 on page 20 for dimensions X, Y, and Z

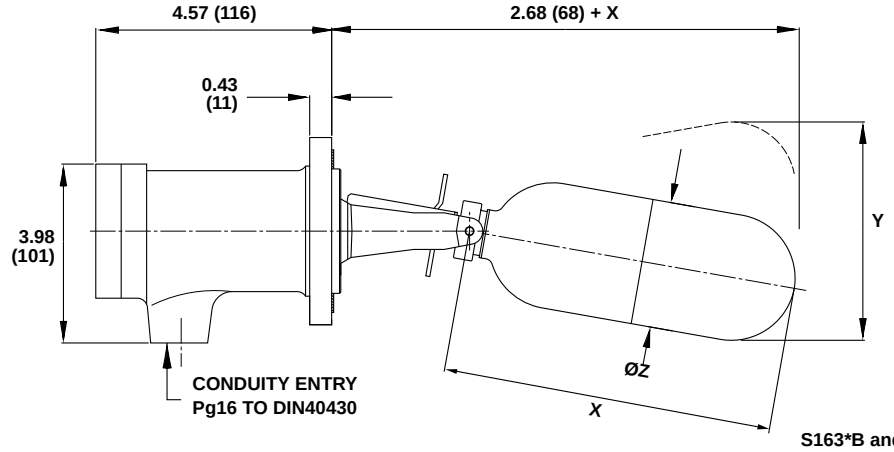
Note: Dimensions are in inches (mm)

ALUMINUM BRONZE WETSIDE



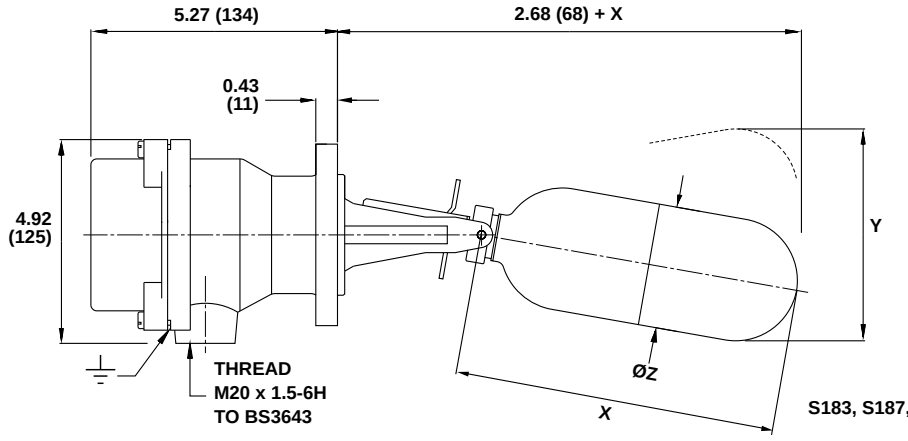
S03*B, S179*B, and S195*B

STAINLESS STEEL WETSIDE



S163*B and S181*B

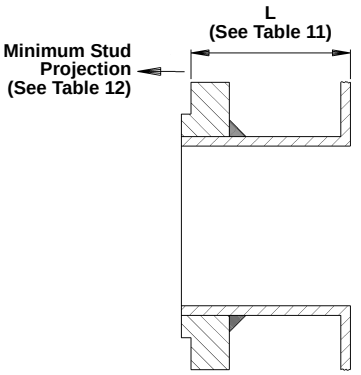
HAZARDOUS SUBMERSIBLE / HOSEPROOF



S183, S187, and S189

Horizontal Float Switches

Nozzle and Stud Lengths



Note:
See Table 6 on page 10 for companion flanges and

TABLE 11. Max. Length in mm (Dimension L)

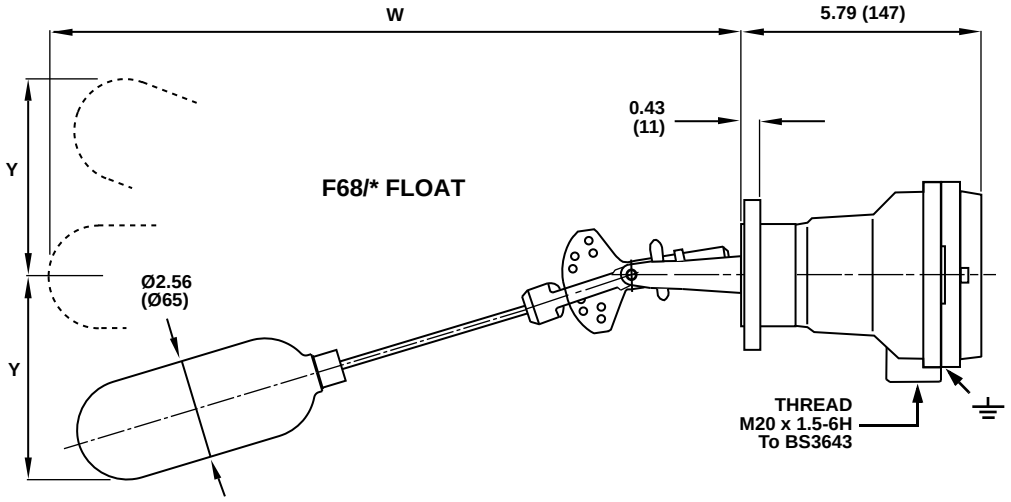
	F68/*	F84	F185	F88	F93	F96	F98	F107	F106	F264
Mobrey A	65	75	75	135	75	75	90	-	92	75
DN65	65	75	75	135	-	75	90	-	92	75
DN80	70	80	80	170	-	75	90	-	98	90
DN100	95	105	105	200	-	105	105	-	110	100
DN125	105	140	140	200	-	140	140	-	140	140
DN150	224	180	180	200	-	180	170	-	200	190
3 in. 300/150	70	80	80	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	-	89	70
3 in. 900	62	70	70	130	-	70	85	118	89	70
Mobrey A	65	75	75	135	-	75	90	-	92	75
6 in. 150	224	-	-	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	40	44	42	42	46	52	54	52	55	62	67	46	46	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.

NOTE:
Full details of the operating levels and differentials are in the product manual (Mobrey 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)

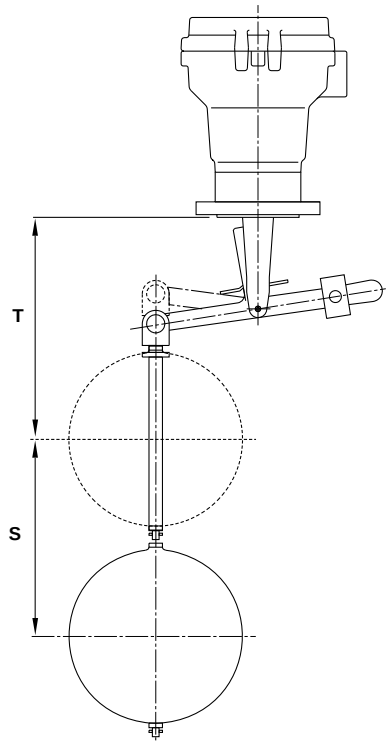
(1) These dimensions in inches (mm) are approximate for cold water and will vary for liquids with a different specific gravity (SG.)

Horizontal Float Switches

Vertical F21
Pump Control And Alarm Float

Note: See Table 14 for dimensions S and T

F21/* 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 5 ft. (1524 mm)

F21/2 10 ft. (3048 mm)

F21/3 15 ft. (4570 mm) maximum

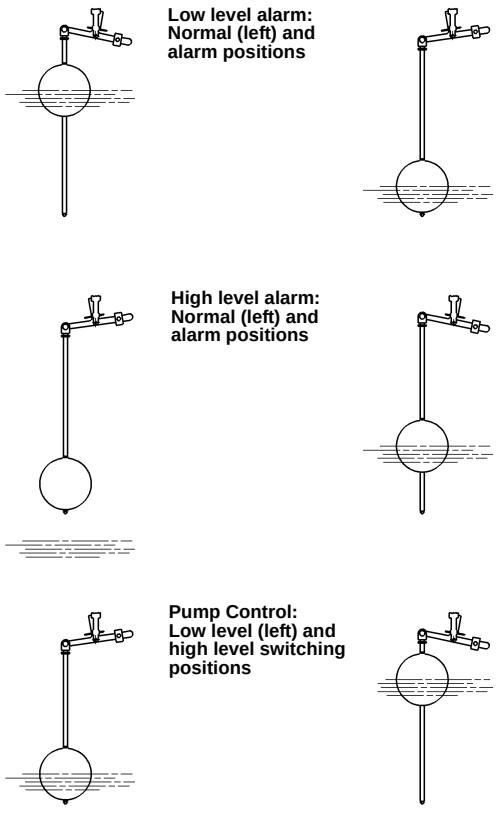
Float roads may be cut to length on site and switches set to operate at required level in either pump control or alarm mode by following the supplied setting instructions.

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 4. Pump Control And Alarm Applications

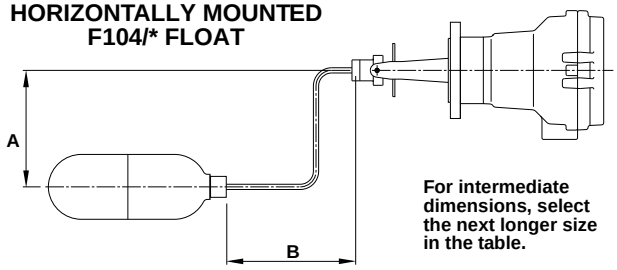


Horizontal Float Switches

Cranked Arm Floats F104

Note: See Table 15 or Table 16 for dimensions in mm

HORIZONTALLY MOUNTED F104/* FLOAT



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

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 (see right).

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.

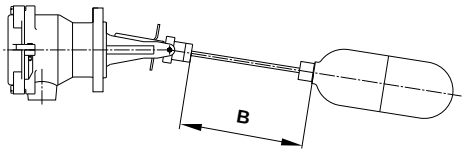


TABLE 15. Dimensions A and B with Min. SG for Horizontally-mounted Switches (Land Applications)

	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
A																									
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																								

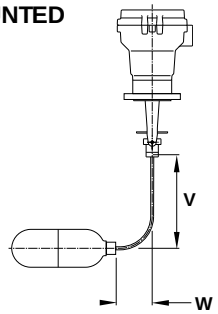
TABLE 16. Dimensions A and B with Min. SG for Horizontally-mounted Switches (Marine Applications)

	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
A																									
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	.77	.78	.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														

Horizontal Float 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)

	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
V																									
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	.68	.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 Min. SG for Vertically-mounted Switches (Marine Applications)

	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
V																									
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	.80				
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	.78	.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														

Horizontal Float Switches

Product Data Sheet
IP101, Rev CD
February 2013

Mobrey Level Solutions

Emerson provides a wide range of Mobrey products for level measurement applications.

POINT LEVEL DETECTION

Vibrating Fork Liquid Level Switches

For high and low alarms, overfill protection, pump control, including wide pressure and temperature requirements, and hygienic applications. Flexible mounting. Immune to changing process conditions and suitable for most liquids.

- Mobrey Mini-Squing (Compact)
- Mobrey Squing 2 (Full-featured)

Ultrasonic Gap Sensor Liquid Level Switches

For use in non-hazardous industrial processes to detect high or low liquid levels and liquid interface. Immune to changing density, and wide dielectric and pH variations. Suitable for use in most clean and non-aerated liquids, with options for sludges and slurries.

Float and Displacer Liquid Level Switches

Mobrey electromechanical float and displacer level switches are ideal for alarm and pump control duties, especially in critical applications or hazardous areas.

- Mobrey Horizontal Level Switches
- Mobrey Vertical Level Switches

Chambers are available for external mounting of these level switches on process vessels.

Dry Products Level Switches

For high and low level alarms. Including threaded mounting connections, extended lengths, high temperature capability, and multiple detection techniques. Suitable for a wide variety of powders, granules, and free flowing solids with wide variations in bulk densities.

- Mobrey VLS Series – Vibrating Rod Level Switch
- Mobrey PLS Series – Paddle Level Switch

CONTINUOUS MEASUREMENT

Ultrasonic Continuous Level Transmitters and Controllers

Top mounted, non-contacting for simple tank and open-air process level measurements. Unaffected by fluid properties such as density, viscosity, dirty coating, and corrosiveness. Intrinsically Safe versions are available for operating in hazardous areas.

- Mobrey MSP Series Ultrasonic Level and Flow Transmitters
- Mobrey MCU900 Series Universal Controllers

Ultrasonic Sludge Density Blanket Monitoring and Control

Ultrasonic in-line pipe or tank mounted sensors for sludge density measurement and control, and top mounted ultrasonic sensors for continuous measurement of sludge blanket level in Industrial and Municipal effluent treatment processes.

- Mobrey MSM400 – Sludge Density Monitor
- Mobrey MSL600 – Sludge Blanket Level Monitor

Displacer Continuous Level Measurement

Top mounted in a vessel or externally mounted in a vertical chamber. For use in hazardous areas.

- Mobrey MLT100 – Displacer Level Transmitter

Hydrostatic Continuous Level Transmitter

For level measurements in non-pressurized tanks where in-tank problems such as foaming, vapor layers, and temperature gradients prohibit the use of other instrumentation.

- Mobrey 9700 Series hydrostatic electronic level transmitters

SPECIALIZED CONDUCTIVITY

Conductivity Water and Steam Interface Monitoring

Steam/water interface level gauges using specialized, high performance conductivity probes in external columns and manifolds, ideal for steam plants where reliable and redundant indication of boiler water level and turbine protection is critical.

- Hydratect 2462 – Water/Steam detection Systems
- Hydrastep 2468 – Water/Steam Monitoring Systems

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