

Technical Datasheet



Boiler Water Level Controls

Vertical Air Break Controls

Key Features

- Unique 3 magnet latching switch mechanism
- No spring in switch mechanism
- Glandless construction
- Fail safe design
- Unaffected by foam



Series Overview

Mobrey originally entered the industrial boiler control market in 1923 with a range of steam operated equipment. Since that time, the range has expanded to cover most aspects of control associated with the boiler house.

The Delta Mobrey Vertical Air Break Controls (VABC) are a comprehensive range of magnetically operated water level controls for steam boilers. They are designed to meet all requirements for automatic on/off control of boiler feed pump, burner cut out, high and/or low level alarm or any combination of these.

Models available with Industrial (NEMA4) or Marine Heads. TÜV approved models are available in chambers and for direct mounting.

The Delta Mobrey VABC is a gland-less construction. A primary permanent magnet is attached to the float rod and slides vertically inside a non-magnetic stainless steel centre tube. Movements of the float are transmitted to a secondary magnet in each switch unit.

There are two pairs of contacts which are operated with a snap-action and held by repulsion between the secondary magnet and the tertiary magnet of the switch unit assembly.

Other products

Other products we can offer :

- Boiler feed water modulation level controls and valves
- Sequencing blowdown valves

Product applications

- Water level (pump) control
- First low water alarm and cutout
- Second low water alarm and lockout
- High water alarm

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**

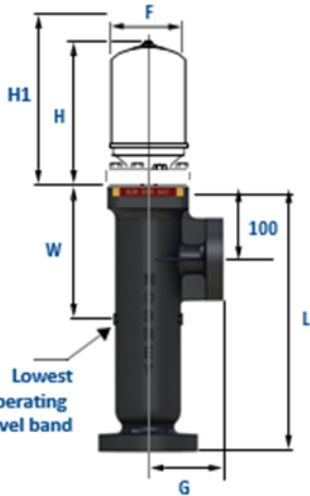
How to order

The instrument can be selected from the table below, which details the specification of each model. For assistance in selecting the model that best suits your needs, please contact your local sales office.

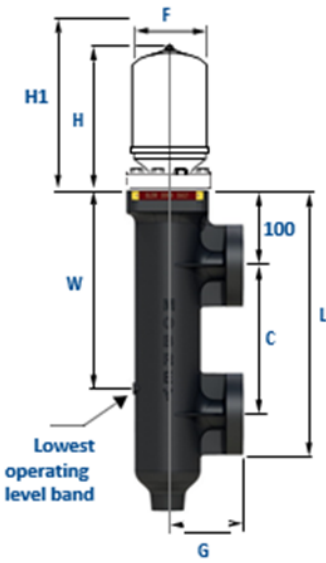
Explanation of type numbers

- The type numbers are arbitrary except that BX denotes chamber mounting and BD denotes direct mounting.
- The stroke number (e.g. ****/n) indicates the number of switch units fitted as standard. When extra switches are required, this stroke number will indicate the total number of switches to be provided.
- When Marine models are required the letter 'M' is inserted after the letters BX and before the number, e.g., the Industrial and NEMA 4 model BX05/2 becomes BXM05/2 when in Marine construction.
- Certain direct mount model have a test facility incorporated. These are identified by the letter 'T' after the letters BD and before the number, e.g. BDT02/2.

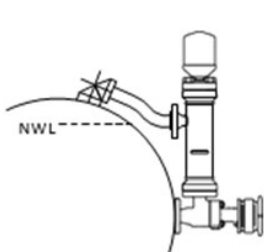
Side and bottom chamber mounted models: dimensional and operating data

Chamber and switch head	Type number	Operate range (mm)	No. of switches		EN1092 flanged and screwed connections	Dimensions						
			Std.	Max.		C	G	H	H1	L	W	F
	Cast iron chamber (working pressure: 13 kg/cm²)											
	BX02/1	62	1	-	DN25 PN16	-	102	193	303	366	182	160
	BX05/2	150	2	4	DN25 PN16	-	102	293	497	468	277	160
	BX07/2	250	2	6	DN25 PN16	-	102	393	602	557	370	160
	Fabricated steel chamber (working pressure: 21 kg/cm²)											
	BX09/1	62	1	-	DN25 PN40	-	87	193	303	366	182	160
	BX10/2	150	2	4	DN25 PN40	-	87	293	497	468	277	160
	BX11/2	250	2	6	DN25 PN40	-	87	393	602	557	370	160
	Fabricated steel chamber (working pressure: 32 kg/cm²)											
	BX12/1	62	1	-	DN25 PN40	-	102	193	303	366	182	160
	BX13/2	150	2	4	DN25 PN40	-	102	293	497	468	277	160
	BX14/2	250	2	6	DN25 PN40	-	102	393	602	557	370	160

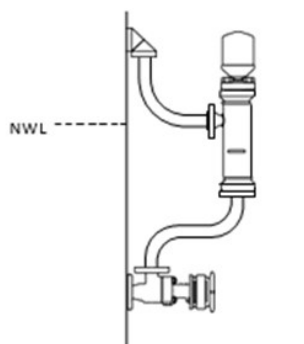
Side and side chamber mounted models: dimensional and operating data

Chamber and switch head	Type number	Operate range (mm)	No. of switches		EN1092 flanged connections	Dimensions						
			Std.	Max.		C	G	H	H1	L	W	F
	Cast iron chamber with 1-in. BSP drain connection (working pressure: 13 kg/cm²)											
	BX03/1	62	1	-	DN 25 PN16	216	102	193	303	448	277	160
	BX15/1	62	1	-	DN20 PN16	180	100	193	303	480	240	160
	BX87/1	62	1	-	DN20 PN16	180	135	193	303	480	240	160
	BX16/2	120	2	4	DN20 PN16	180	100	293	497	480	240	160
	BX88/2	120	2	4	DN20 PN16	180	135	293	497	480	240	160
	BX06/2	150	2	4	DN 25 PN16	216	102	293	497	448	277	160
	BX08/2	250	2	6	DN 25 PN16	317	102	393	597	557	370	160
	Fabricated steel chamber with ½-in. BSP drain connection (working pressure: 21 kg/cm²)											
	BX17/1	62	1	-	DN20 PN40	270	100	193	303	570	335	160
	BX45/1	62	1	-	DN25 PN40	270	100	193	303	570	335	160
	BX18/2	120	2	4	DN20 PN40	270	100	293	497	570	335	160
	BX19/2	150	2	4	DN20 PN40	270	100	293	497	570	335	160
	BX20/2	150	2	4	DN25 PN40	270	100	393	497	570	335	160
	BX21/2	215	2	6	DN20 PN40	270	100	393	602	570	335	160
	BX22/2	215	2	6	DN25 PN40	270	100	393	602	570	335	160
	Fabricated steel chamber with ½-in. BSP drain connection (working pressure: 32 kg/cm²)											
	BX23/1	62	1	-	DN 25 PN40	350	112	193	303	595	372	160
	BX24/2	150	2	4	DN 25 PN40	350	112	293	497	595	372	160
	BX25/2	250	2	6	DN 25 PN40	350	112	393	597	595	372	160

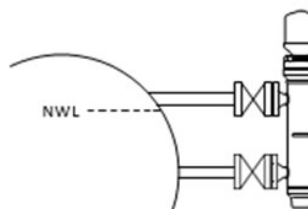
Typical mounting arrangements for chamber mounted controls



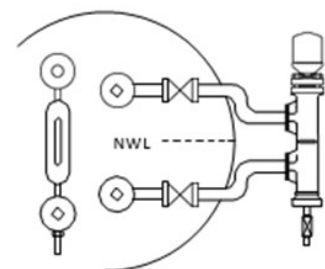
Side and bottom entry chamber with sequencing valve on horizontal boiler



Side and bottom entry chamber with sequencing valve on vertical boiler



Side and side entry chamber on horizontal boiler

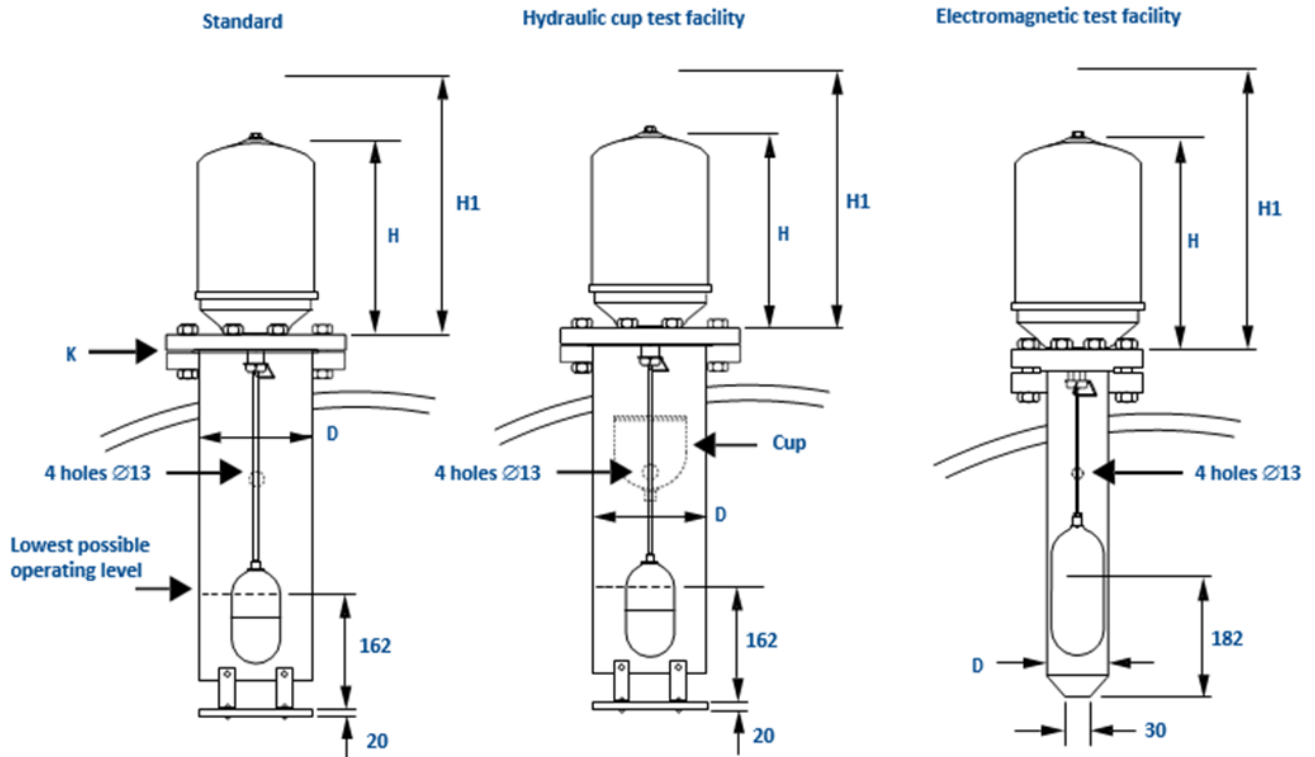


Side and side entry chamber on steam drum of water tube boiler

Direct mounted models: dimensional and operating data

Type number	Working pressure at saturated steam kg/cm ²	Operate range in mm	No of switches		Forged steel flanged connections	Float length x diameter	Dimensions			Max. float rod length
			Std.	Max.			D min.	H	H1	
Standard										
BD01/1	21.0	62	1	1	EN1092 DN100 PN40	152 x 67	77	193	303	765
BD02/2		150	2	4				293	497	
BD03/2		250	2	6				393	597	
BD04/1	32.0	62	1	1	EN1092 DN100 PN40	155 x 90	100	193	303	1016
BD05/2		150	2	4				293	497	
BD06/2		250	2	6				393	597	
BD07/2	21.0	120	2	4	BM115mm Sq	152 x 67	77	293	497	260
BD08/1		62	1	1				193	303	765
BD09/1		62	1	1				193	303	356
BD10/1		62	1	1				193	303	260
BD11/2	21.0	150	2	4	BM115mm Sq	152 x 67	77	293	497	765
BD12/2		150	2	4				293	497	356
BD13/2		150	2	4				293	497	298.5
BD14/2		215	2	6				293	602	356
BD15/2		250	2	6				293	602	765
BD16/2		250	2	6				293	602	394
BD21/2	32.0	150	2	4	EN1092 DN100 PN40	155 x 90	100	293	497	385
BD22/2		250	2	6			100	393	602	385
BD41/2	21.0	62	1	1	EN1092 DN100 PN40	152 x 67	77	193	303	298.5
BD42/2		62	1	1			77	193	303	394
BD43/1	32.0	62	1	1	EN1092 DN100 PN40	155 x 90	100	193	303	1016
BD44/2		150	2	4			100	293	497	1016
Hydraulic cup test facility										
BDT01/1	32.0	62	1	1	EN1092 DN100 PN40	155 x 90	100	193	303	1016
BDT02/2		150	2	4				293	497	
BDT03/2		250	2	6				393	597	
Electromagnetic test facility										
BDT04/1	21.0	-	1	-	BM128mm sq	155 x 90	100	293	497	1016
BDT05/1	32.0	-	1	-	DN100 PN40					

Typical mounting arrangements for direct mounted controls



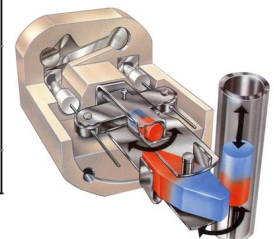
Technical Specifications

Electrical ratings for Single-Pole Double-Throw (SPDT) operation

AC maximum values			DC maximum values				
VA	Volts	Amps	Watts	Volts	Resistive amps	Inductive amps	Inductive time constant
2000 ⁽¹⁾	440	5	50	250	5	0.5 ⁽²⁾	40 ms

(1) Maximum power factor is 0.4.

(2) Maximum up to 2 A dependent upon time constant of circuit. Consult factory.



Note

- Switches must not be used for the direct starting of motors.
- Contacts should be wired in series with the operating coils of relays, contact starters or solenoid valves, and fused separately.
- Two 25 mm BS4568 cable entries are provided for the electrical connections. A sufficient length of flexible cable must be fitted to permit easy removal of the switch head and float assembly for routine maintenance.

Operating Levels

Differentials

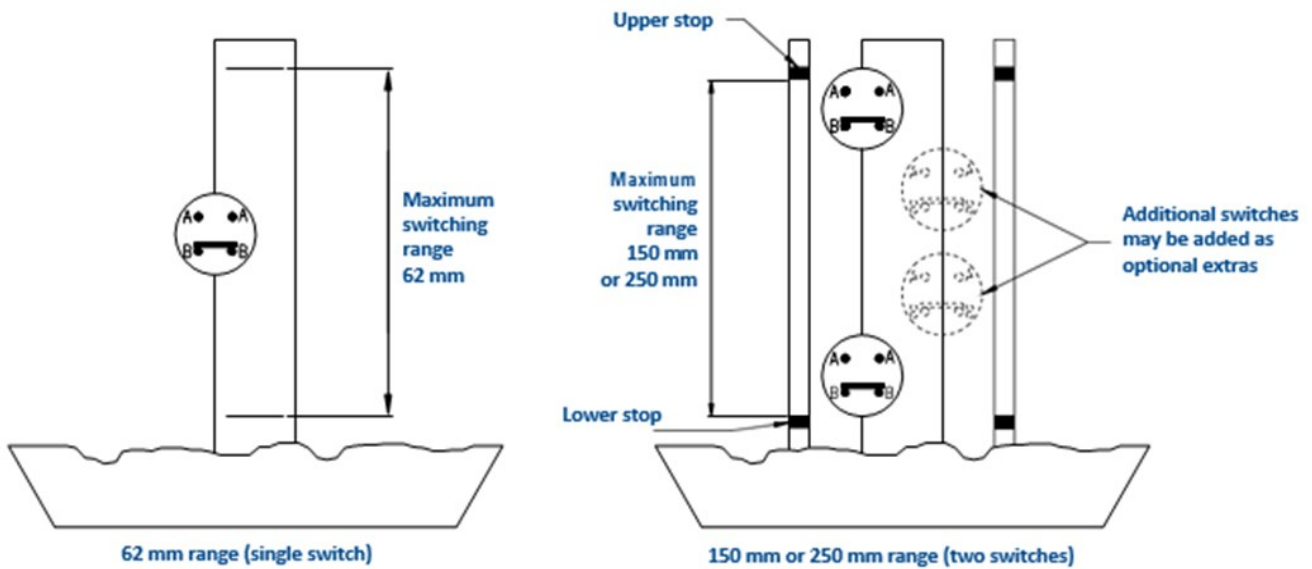
Each level switch has a nominal fixed water level differential of 25 mm between circuits A-A and B-B. To obtain a differential greater than 25 mm, two switch units must be used. The minimum water level differential for two switch units is 33 mm, with switch centres positioned 8 mm apart.



The maximum adjustable differential for two switch mechanisms varies with the operating range of each model, i.e. the distance between a rising and falling level which is required to operate the switches positioned at the extreme ends of their adjustments.

Switches have adjustments as follows:

- 62 mm range: 37 mm adjustment + 25 mm fixed differential = 62 mm
- 150 mm range: 125 mm adjustment + 25 mm fixed differential = 150 mm
- 250mm range: 225 mm adjustment + 25 mm fixed differential = 250mm



Chamber mounted models

Float chambers are manufactured in these approved materials:

Cast iron equal to BS1452 Grade 17
– for up to 13 kg/cm² rating.

Fabricated steel BS3602 - HFS 27
– for both 21 kg/cm² and 32 kg/cm² ratings.

For chamber dimensions and process connections arrangement refer to the ordering information above.

Switch heads contain one or more switching mechanism units mounted in a housing comprising die-cast base with a zinc coated mild steel casing.

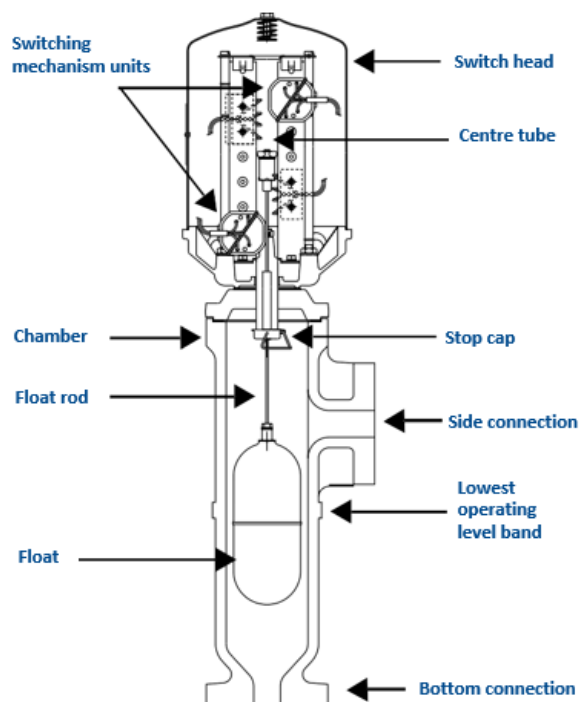
Two 25mm BS.4568 cable entries are provided.

Switching mechanism units have single pole double throw contacts, are latching and are positioned and held in place by clamp screws.

The centre tube is made of non-magnetic stainless steel and expanded into the top cover flange. It is fitted with a stop cap which also acts as a guide for the float rod carrying the primary magnet.

Floats are manufactured in Monel metal.

Float rods are manufactured in stainless steel.



The Chamber band mark indicates the lowest adjustment position of the low level alarm. We recommend that the positioning of the boiler control chamber is relative to the water level gauge glass and that, even at the lowest operating band level, the N.W.L. is such that there is always water visible in a gauge glass. Arrangements of Delta Mobrey Vertical Air Break Controls on various types of boiler are shown below.

Direct mounted models (standard models)

Direct Mounted Vertical Air Break Controls have the same principles of operation and piece parts as the chamber-mounted equivalents, except that the chamber is exchanged for (1) a large round flange and (2) the tube assembly for mounting the control directly on to the boiler shell connection.

A fixed or removable stilling or guide tube should be provided to ensure that the float rod is not damaged and the correct vertical movement is achieved.

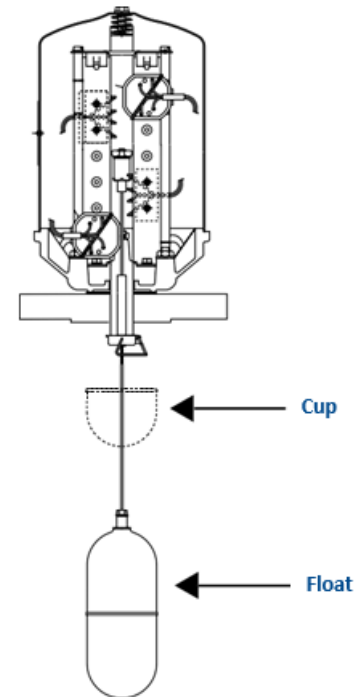
Direct mounted controls incorporating test facilities

These controls have the provision for testing the operation of the mechanism without lowering the level of water in the boiler. Testing can be initiated manually or by a timer. U.K. Patent 1279504 or 1473939 and international equivalents.

Hydraulic cup test facility

The test is achieved by lowering the float to the low water alarm level, by the following means:

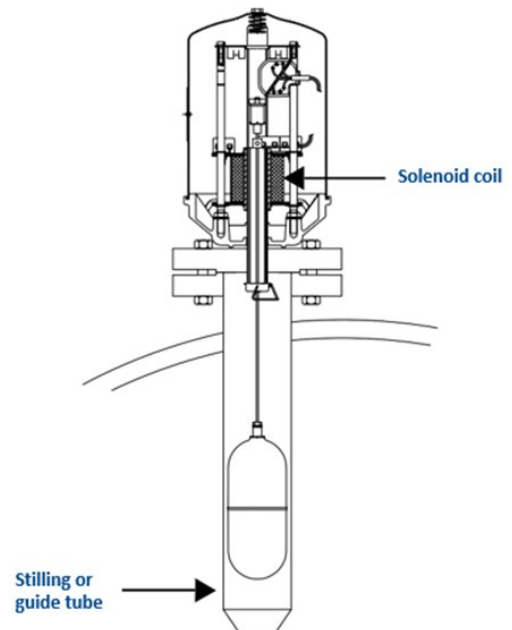
The float rod includes a cup, above the float, which is fed with water from the boiler feed pump via small bore pipework and valves through the control mounting flange for approximately 24 seconds. The additional weight overcomes the buoyancy of the float, causing it to sink, stop the burner firing and operate the alarm system. After closing the test valve in the supply from the feed pump to the control, a small hole in the bottom of the cup drains off the water, permitting the float to rise to the normal operating position. Control of the water supply to the cup can alternatively be by means of a solenoid valve, which can be initiated by a timer or a manually operated push button. In this design the alarm switch remains fully adjustable.



Electromagnetic test facility

The switch head includes an inductive coil below the single switch subassembly. This surrounds an armature located inside the stainless steel centre tube and fixed to the float rod.

To initiate the test cycle, the coil can be energised by a timer or a manually operated push button and the float will be thrust downwards to stop the burner firing and operate the alarm system. When the coil is de-energised the float rises to its normal level. In this design the alarm switch unit is not adjustable.



Approvals

EUROPEAN DIRECTIVES

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

The level controls and cast chambers are categorised as Sound Engineering Practice (SEP) under Article 4.3.

The fabricated chambers are category 1 under Article 4.1(c)(i) for Group 2 fluids and CE marked under Module H

Marine Type Approvals

American Bureau of Shipping

Bureau Veritas

Det Norske Veritas, Germanischer Lloyd

Russian Maritime Register of Shipping

TUV approved models (side and side connections only) are available on request.

Before ordering, please contact us. If the models shown here do not meet your specific requirements, please contact us for assistance.

In the interest of development and improvement Delta Mobrey Ltd, reserves the right to amend, without notice, details contained in this publication. No legal liability will be accepted by Delta Mobrey Ltd for any errors, omissions or amendments.

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