Magnetrol®

C24, C25, Boiler and Water Column Liquid Level Switches

DESCRIPTION

C24, C25, Boiler and Water Column Liquid Level Switches are single or multi-switch units that offer versatility and reliable operation in a variety of applications. Available with up to three switch mechanisms for level alarm, control, and shutdown functions, the boiler and water column controls are designed for use in steam boiler applications while the Models C24 & C25 are for general industrial use.

FEATURES

- Easy inspection of float chamber through removable head
- Cast iron or fabricated steel float chambers
- 316 and 316L stainless steel floats
- Brass chamber liner standard in B24, B25, W24, and W25 models
- Right or left hand water column mounting
- Try cock tappings and sight glass tappings available
- Process temperature to +1000° F (+538° C)
- Multiple switch capability
- Working steam pressure to 600 pounds
- Choice of switch mechanisms:

  Pneumatic Hermetically sealed

  Dry contact
- Choice of switch mechanism enclosures:

  NEMA 1 carbon steel for pneumatic

  TYPE 4X/7/9 Class I, Div. 1, Groups C & D, polymer coated aluminum

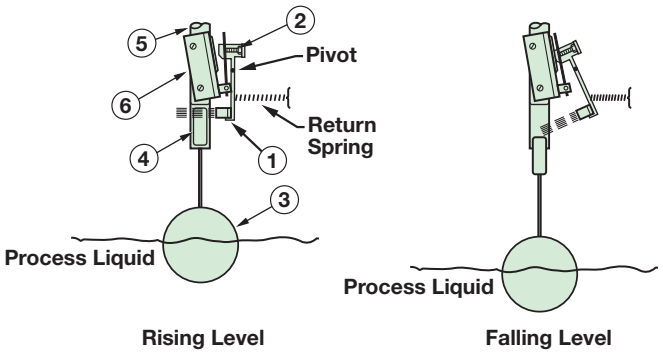
  TYPE 4X/7/9 Class I, Div. 1, Group B, polymer coated aluminum
- Optional high temperature insulation available. See bulletin 41-106.

APPLICATIONS

- Condensate receiver control
- Flash tank high level alarm
- Water tube boiler low water cutoff
- Boiler steam chest high level alarm
- Boiler feedwater pump control
- Day tanks
- Boiler low water cutoff
- Holding tanks

TECHNOLOGY

A permanent magnet ① is attached to a pivoted switch actuator and adjustment screw ②. As the float ③ rises following the liquid level, it raises the attraction sleeve ④ into the field of the magnet, which then snaps against the non-magnetic enclosing tube ⑤, actuating the switch ⑥. The enclosing tube provides a static pressure boundary between the switch mechanism and the process. On a falling level, an inconel spring retracts the magnet, deactivating the switch.



Rising Level **Falling Level**

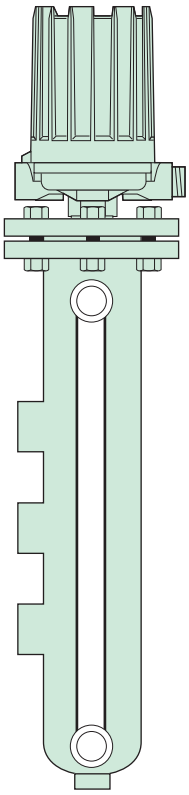
MOUNTING

WATER COLUMN LEVEL SWITCHES

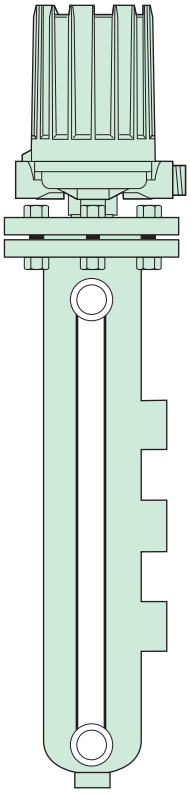
The right- and left-hand mounting arrangement refers to the position of the try cock tappings in relation to the gauge glass connections.

To determine whether the control mounting is right- or left-hand, position the control with the gauge glass connections facing you. If the try cock tappings are to the right, it is a right-hand control, if they are to the left, it is a left-hand control. Refer to illustrations below.

Model W24—Right-hand mounting
Model W25—Right-hand mounting
Model W29—Left-hand mounting
Model W60—Left-hand mounting



Left hand control



Right hand control

SPECIFICATIONS

SWITCH MECHANISMS AND ENCLOSURES

SERIES B, C & D DRY CONTACT SWITCHES

- Dry contact for applications where mercury must be avoided
- Designs for AC and DC current applications
- Process temperatures to +450° F (+232° C)

SERIES F, HS, H1, 8 & 9 HERMETICALLY SEALED SWITCHES

- Ideal for use in salt and other corrosive atmospheres
- Positively pressurized capsules for entire mechanism and contacts
- Process temperatures to +1000° F (+538° C)

SERIES J & K PNEUMATIC SWITCHES

- Suited for applications where electrical power is not available
- Bleed and non-bleed designs
- Process temperatures to +400° F (+204° C)

SWITCH ENCLOSURES

- TYPE 4X/7/9 aluminum enclosures
- Designed to meet Class I, Div. 1, Groups C & D and Class I, Div. 1 Group B
- Optional housing heaters and drains available for some enclosures
- Pneumatic switch mechanisms available with a NEMA 1 enclosure

BASIC ELECTRICAL RATINGS

Voltage	Switch Series and Non-Inductive Ampere Rating								
	B	C	D	F	HS	H1	R	8	9
120 VAC	15.00	15.00	10.00	2.50	5.00	1.00	1.00	1.00	—
240 VAC	15.00	15.00	—	—	5.00	1.00	1.00	—	—
24 VDC	6.00	10.00	10.00	4.00	5.00	1.00	1.00	3.00	0.50
120 VDC	0.50	1.00	10.00	0.30	0.50	0.40	0.40	—	—
240 VDC	0.25	0.50	3.00	—	0.25	—	—	—	—

AGENCY APPROVALS

AGENCY	APPROVED MODEL	APPROVAL CLASSES
FM	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9	Class I, Div 1, Groups C & D Class II, Div 1, Groups E, F & G
	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9 Class I, Div 1, Group B	Class I, Div 1, Groups B, C & D Class II, Div 1, Groups E, F & G
CSA	All with a Series HS, H1, F, 8 or 9 electric switch mechanism and a housing listed as CSA TYPE 4X	Class I, Div 2, Groups B, C & D
	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9	Class I, Div 1, Groups C & D Class II, Div 1, Groups E, F & G
	All with an electric switch mechanism and a housing listed as TYPE 4X/7/9 Class I, Div 1, Group B	Class I, Div 1, Groups B, C & D Class II, Div 1, Groups E, F & G
ATEX / IEC Ex ②	All with an electric switch mechanism and an ATEX housing①	ATEX II 2 G EEx d IIC T6 94/9/EC IEC Ex Ex d IIC T6 IP 66
CE	Low Voltage Directives 2006/95/EC Per Harmonized Standard: EN 61010-1/1993 & Amendment No. 1	Installation Category II Pollution Degree 2

① Dual stage units with “HS” or “H1” switches are not ATEX approved.

② IEC Installation Instructions:

The cable entry and closing devices shall be Ex d certified suitable for the conditions of use and correctly installed.

For ambient temperatures above +55° C or for process temperatures above +150° C, suitable heat resistant cables shall be used.

Heat extensions (between process connection and housing) shall never be insulated.

Special conditions for safe use:

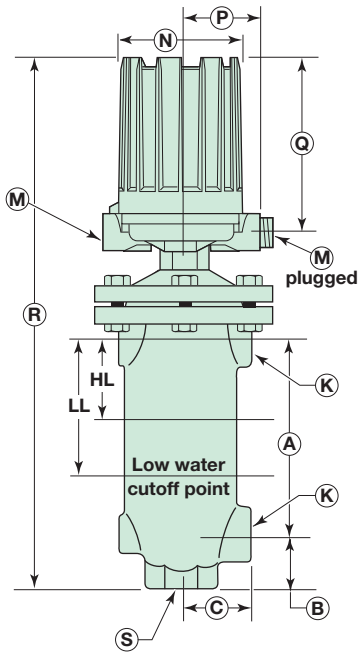
When the equipment is installed in process temperatures higher than +85° C the temperature classification must be reduced according to the following table as per IEC60079-0.

Maximum Process Temperature	Temperature Classification
< 85° C	T6
< 100° C	T5
< 135° C	T4
< 200° C	T3
< 300° C	T2
< 450° C	T1

These units are in conformity with IECEx KEM 05.0020X
Classification Ex d IIC T6
$T_{ambient}$ -40° C to +70° C

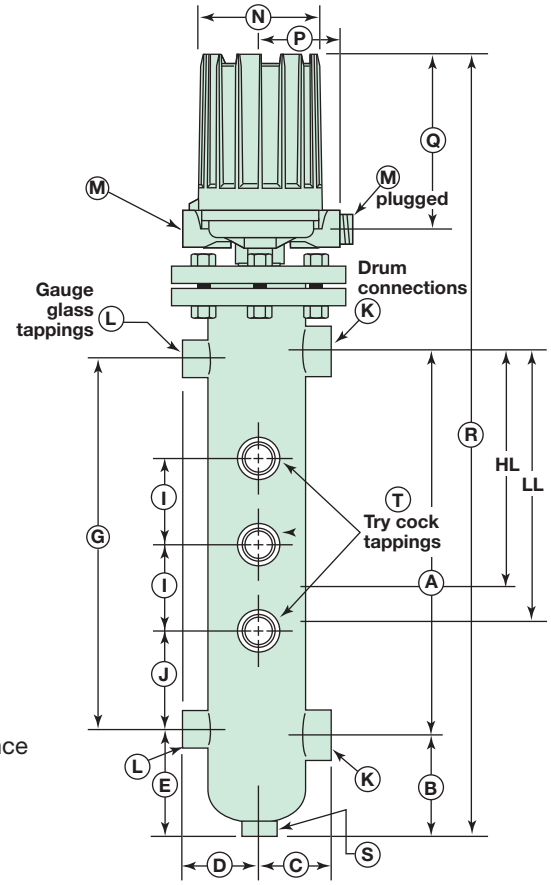
DIMENSIONAL SPECIFICATIONS

INCHES (mm)

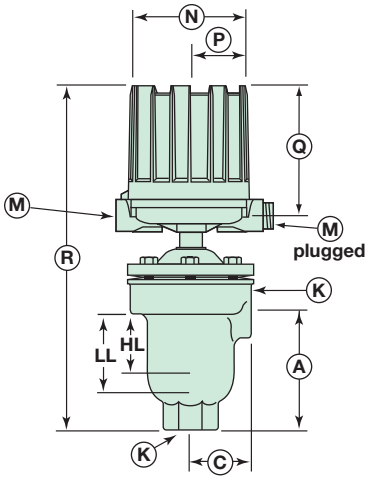


Models B25, C25

Allow 10.00 (254) overhead clearance for cover removal.



Models W24, W25, W29, W60



Models B24, C24

Conduit Connections M	
Electrical Switches:	
TYPE 4X/7/9:	1" NPT
Group B:	1" NPT
Pneumatic Switches:	
NEMA 1:	¼" NPT

All housings rotatable 360°

ACTUATION LEVELS *

Model	Min. S.G.		1.0	
	HL	LL	HL	LL
B24/C24	0.69 (18)	1.56 (40)	0.94 (24)	1.69 (42)
B25/C25	3.69 (94)	4.50 (114)	4.13 (105)	4.88 (124)
W24	11.38 (289)	12.25 (311)	11.88 (302)	12.63 (321)
W25	9.44 (240)	10.25 (260)	9.88 (251)	10.63 (270)
W29	11.00 (279)	11.88 (302)	11.50 (292)	12.25 (311)
W60	10.50 (267)	11.06 (281)	11.19 (284)	11.69 (297)

* Single switch mechanism only. Consult factory for multiple switches.

Levels are ±0.25" (6 mm)

DIMENSIONS

Model	A	B	C	D	E	G	I	J	K	L	N	P	Q	R	S	T
B24/C24	5.56 (141)	n/a	2.81 (71)	n/a	n/a	n/a	n/a	n/a	1" NPT	n/a	5.93 (150)	3.78 (96)	6.25 (158)	16.25 (412)	n/a	n/a
B25/C25	7.00 (177)	2.00 (51)	2.63 (66)	n/a	n/a	n/a	n/a	n/a	1" NPT	n/a	5.93 (150)	3.78 (96)	8.46 (214)	22.12 (561)	1¼" NPT	n/a
W24	16.00 (405)	3.00 (76)	2.63 (66)	3.06 (77)	3.50 (88)	15.00 (381)	3.50 (88)	4.00 (101)	1¼" NPT	¾" NPT	5.93 (150)	3.78 (96)	8.46 (214)	33.50 (850)	¾" NPT	¾" NPT
W25	13.50 (343)	2.00 (51)	2.63 (66)	3.06 (77)	2.00 (51)	13.50 (343)	3.00 (76)	3.00 (76)	1" NPT	½" NPT	5.93 (150)	3.78 (96)	8.46 (214)	28.62 (726)	1¼" NPT	½" NPT
W29	15.00 (381)	4.50 (114)	2.83 (71)	2.88 (73)	4.50 (114)	15.00 (381)	3.50 (88)	4.00 (101)	1¼" NPT	¾" NPT	5.93 (150)	3.78 (96)	8.46 (214)	33.50 (850)	¾" NPT	¾" NPT
W60	15.00 (381)	4.19 (106)	3.61 (91)	3.66 (92)	4.19 (106)	15.00 (381)	3.50 (88)	4.00 (101)	1¼" NPT	¾" NPT	5.93 (150)	3.78 (96)	8.46 (214)	34.37 (872)	¾" NPT	¾" NPT

MODEL NUMBER

Models available for quick shipment, usually within one week after factory receipt of a complete purchase order, through the Expedite Ship Plan (ESP)

MODEL NUMBER CODE, MATERIALS OF CONSTRUCTION AND TANK CONNECTION

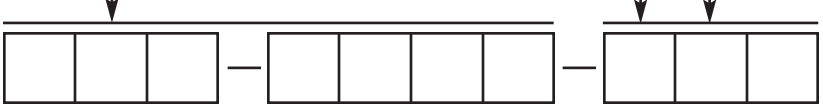
Model Code	Minimum S.G.	Chamber Material	Attraction Sleeve	Float Material	Trim Material	Max. WSP Rating	Max. Pressure @ 100° F (38° C)	Try Cock Mounting
B24-1B10 ②	0.85	Cast Iron ①	400 Series SS	316L SS	316 SS	250 psi @ 406° F (17 bar @ 207° C)	400 psi (28 bar)	N/A
C24-1B10 ③								
B25-1B10 ②	0.84							
C25-1B10 ③								
C25-2B10 ③	0.84	Cast Iron ①	316 SS					Right Hand
W24-1B10 ②	0.84	Cast Iron ①	400 Series SS					
W25-1B10 ②								
W29-1B10	0.84	Fabricated Steel	400 Series SS	316L SS	316 SS	300 psi @ 422° F (21 bar @ 217° C)	500 psi (34 bar)	Left Hand
W60-1B10	0.75					600 psi @ 489° F (41 bar @ 254° C)	900 psi (62 bar)	

ELECTRIC SWITCH MECHANISM AND ENCLOSURE ⑦ (Additional models on next page)

Switch Description	Max. ⑤ Process Temp ° F (° C)	Contacts	Set Points	B24 & C24 only	
				TYPE 4X/7/9 Aluminum Enclosure ⑥	
				Class I, Div. 1, Groups C & D	Class I, Div. 1, Group B
Series B Snap Switch	250 (121)	SPDT	1	BKP	BKT
		DPDT	1	BNP	BNT
Series C Snap Switch	450 (232)	SPDT	1	CKP	CKT
		DPDT	1	CNP	CNT
Series F Hermetically Sealed Snap Switch	750 (399)	SPDT	1	FKP	FKT
		DPDT	1	FNP	FNT

PNEUMATIC SWITCH MECHANISM AND ENCLOSURE

Switch Description	Maximum Supply Pressure		Maximum Process Temp.		Bleed Orifice Diameter		All except B24, C24	Code B24, C24
	psig	bar	° F	° C	Inches	mm	NEMA 1	NEMA 1
Series J Bleed Type	100	7	400	204	.063	1.6	JDE	—
	60	4	400	204	.094	2.3	JEE	JEG
Series K Non-Bleed Type	100	7	400	204	—	—	KOE	—
	40	3	400	204	—	—	KOG	KOG



① Cast iron models limited to maximum service temperature of +406° F (+207° C) or switch mechanism temperature rating if lower.

② Models B24, B25, W24, and W25 include brass inner liners.

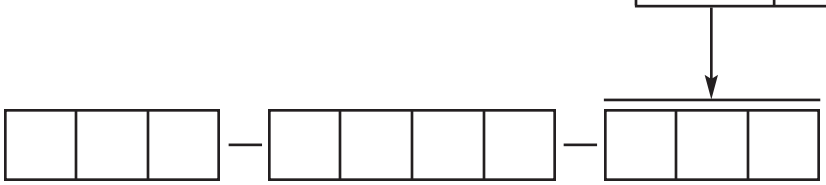
③ Models C24 & C25 are intended for non-boiler service as they do not contain a chamber liner.

④ Process temperature based on +100° F (+38° C) ambient

⑤ Consult factory for manual reset switches.

ELECTRIC SWITCH MECHANISM AND ENCLOSURE

Switch ⑤ Description	Process ④ Temperature Range °F (°C)	Contacts	Set Points	All models except B24, C24 and C25-2B10			Model C25-2B10 only		
				TYPE 4X/7/9 Aluminum Enclosure					
				Class I, Div 1 Groups C&D	Class I, Div 1 Group B	ATEX Ex II 2 G EEx d IIC T6	Class I, Div 1 Groups C&D	Class I, Div 1 Group B	ATEX Ex II 2 G EEx d IIC T6
Series B Snap Switch	-40 to +250 (-40 to +121)	SPDT	1	BKA	BKJ	BCC	BKB	BKK	BC9
			2	BLA	BLJ	BDC	BLB	BLK	BD9
			3	BMA	BMJ	BEC	BMB	BMK	BE9
		DPDT	1	BNA	BNJ	BFC	BNB	BNK	BF9
			2	BOA	BOJ	BGC	BOB	BOK	BG9
Series C Snap Switch	-40 to +450 (-40 to +232)	SPDT	1	CKA	CKJ	CCC	CKB	CKK	CC9
			2	CLA	CLJ	CDC	CLB	CLK	CD9
			3	CMA	CMJ	CEC	CMB	CMK	CE9
		DPDT	1	CNA	CNJ	CFC	CNB	CNK	CF9
			2	COA	COJ	CGC	COB	COK	CG9
Series D DC Current Snap Switch	-40 to +250 (-40 to +121)	SPDT	1	N/A			DKB	DKK	DC9
			2				DLB	DLK	DD9
			3				DMB	DMK	DE9
		DPDT	1				DNB	DNK	DF9
			2				DOB	DOK	DG9
Series F Hermetically Sealed Snap Switch	-50 to +750 (-46 to +399)	SPDT	1	FKA	FKJ	FCC	FKB	FKK	FC9
			2	FLA	FLJ	FDC	FLB	FLK	FD9
		DPDT	1	FNA	FNJ	FFC	FNB	FNK	FF9
			2	FOA	FOJ	FGC	FOB	FOK	FG9
Series HS Hermetically Sealed 5-amp Snap Switch with Wiring Leads	-50 to +550 (-46 to +288)	SPDT	1	N/A			HMJ	HMK	N/A
			2				HMN	HMP	
		DPDT	1				HMS	HMT	
			2				HMY	HMZ	
Series HS Hermetically Sealed 5-amp Snap Switch with Terminal Block	-50 to +550 (-46 to +288)	SPDT	1	N/A			HM3	HM4	HA9
		DPDT	1				HM7	HM8	HB9
Series H1 Hermetically Sealed 1-amp Snap Switch with Wiring Leads	-50 to +750 (-46 to +399)	SPDT	1	N/A			HKJ	HKK	N/A
		DPDT	2				HKN	HKP	
Series R High Temperature Snap Switch	-40 to +750 (-40 to +399)	SPDT	1	N/A			RKB	RKK	RC9
			2				RLB	RLK	RD9
		DPDT	1				RNB	RNK	RF9
			2				ROB	ROK	RG9
Series 8 Hermetically Sealed Snap Switch	-50 to +750 (-46 to +399)	SPDT	1	8KA	8KJ	8CC	8KB	8KK	8C9
			2	8LA	8LJ	8DC	8LB	8LK	8D9
			3	8MA	8MJ	8EC	8MB	8MK	8E9
		DPDT	1	8NA	8NJ	8FC	8NB	8NK	8F9
			2	8OA	8OJ	8GC	8OB	8OK	8G9
Series 9 High Temperature Hermetically Sealed Snap Switch	-50 to +750 (-46 to +399)	SPDT	1	9KA	9KJ	9CC	9KB	9KK	9C9
			2	9LA	9LJ	9DC	9LB	9LK	9D9
			3	9MA	9MJ	9EC	9MB	9MK	9E9
		DPDT	1	9NA	9NJ	9FC	9NB	9NK	9F9
			2	9OA	9OJ	9GC	9OB	9OK	9G9
Switch ⑤ Description	**Process ④ Temp. Range °F (°C)**	**Contacts**	**Set Points**	**CS/Aluminum**	**Cast Iron**		**CS/Aluminum**	**Cast Iron**	
				NEMA 4X	Class I, Div 1 Groups C&D	Class I, Div 1 Group B	NEMA 4X	Class I, Div 1 Groups C&D	Class I, Div 1 Group B
Series R High Temperature Snap Switch	-40 to +1000 (-40 to +538)	SPDT	1	N/A			R1M	RKM	RKW
			2				R3M	RLM	RLW
		DPDT	1				RDM	RNM	RNW
			2				REM	ROM	ROW
Series 9 High Temperature Hermetically Sealed Snap Switch	-50 to +1000 (-46 to +538)	SPDT	1	9AD	9KD	9KV	9AM	9KM	9KW
			2	9BD	9LD	9LV	9BM	9LM	9LW
			3	9CD	9MD	9MV	9CM	9MM	9MW
		DPDT	1	9DD	9ND	9NV	9DM	9NM	9NW
			2	9ED	9OD	9OV	9EM	9OM	9OW



QUALITY

MAGNETROL REGISTERED TO ISO 9001 Your Assurance of Quality and Service

The quality assurance system in place at Magnetrol guarantees the highest level of quality throughout the company. Magnetrol is committed to providing full customer satisfaction both in quality products and quality service.

The Magnetrol quality assurance system is registered to ISO 9001 affirming its commitment to known international quality standards providing the strongest assurance of product/service quality available.

ESP

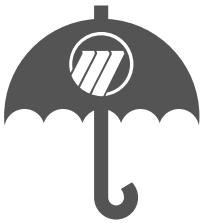
Expedite
Ship
Plan

Several Level Switches are available for quick shipment, usually within one week after factory receipt of a complete purchase order, through the Expedite Ship Plan (ESP).

To take advantage of ESP, match the color coded model number codes in the selection charts (standard dimensions apply).

ESP service may not apply to orders of ten units or more. Contact your local representative for lead times on larger volume orders, as well as other products and options.

WARRANTY



All Magnetrol mechanical level and flow controls are warranted free of defects in materials or workmanship for five full years from the date of original factory shipment.

If returned within the warranty period; and, upon factory inspection of the control, the cause of the claim is determined to be covered under the warranty; then, Magnetrol will repair or replace the control at no cost to the purchaser (or owner) other than transportation.

Magnetrol shall not be liable for misapplication, labor claims, direct or consequential damage or expense arising from the installation or use of equipment. There are no other warranties expressed or implied except special written warranties covering some Magnetrol products.

Magnetrol®

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