

## TOP MOUNTING

### Liquid Displacer Level Switches

#### DESCRIPTION

Magnetrol's displacement type level switches offer the industrial user a wide choice of alarm and control configurations. Each unit utilizes a simple buoyancy principle and is well suited for simple or complex applications, such as foaming or surging liquids or agitated fluids, and usually costs less than other types of level switches.

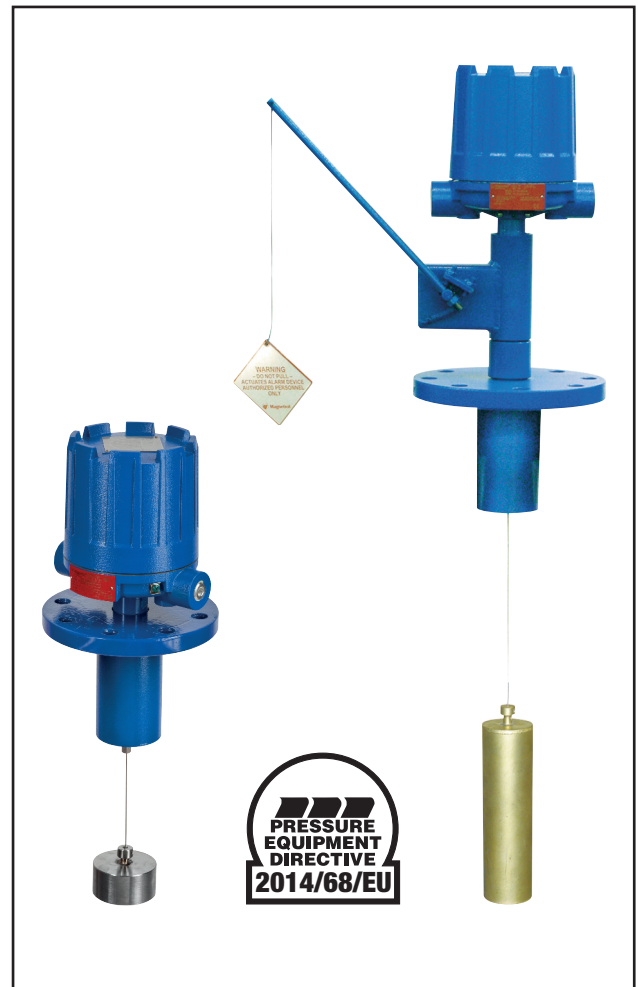
#### FEATURES

- Narrow or wide level ranges achieved through multiple switch mechanism capability
- Maximum process temperature: +260 °C (500 °F).
- Maximum process pressure: 55,1 bar (800 psi).
- S.G. as low as 0.4 kg/dm<sup>3</sup>.
- Displacers adjustable at any point along the suspension cable.
- Anti-surge design eliminates the possibility of switch short cycling.
- Standard 6 m (20 ft) of suspension cable, included for all models.
- Field adjustable set point and switch differential.
- Wide choice of displacer materials.
- Wide choice of housings and switch mechanisms
- Standard anti-corrosive protection.
- Optional:
  - NACE construction (MR-01-75)
  - Proof-er® ground check
  - Floating roof models
  - High pressure models
  - Models for interface.
- Suited for SIL 2 loops (DPDT switch) (full FMEDA report available).

#### APPLICATIONS

- Foaming or surging liquids
- Agitated fluids
- Sewage handling
- Dirty liquids
- Paints
- Varnishes
- Heavy oils
- Liquids with solids

#### Displacer level switches for single or multiple pump control/level alarm



#### AGENCY APPROVALS

Agency	Approval
ATEX	II 2G Ex d IIC T6 Gb, flameproof enclosure II 1G EEx ia IIC T6, intrinsically safe
CCE <sup>①</sup>	explosion proof and intrinsically safe
FM	Class I, Div. 1, Groups C & D Class II, Div. 1, Groups E, F & G, Type NEMA 7/9
FM/CSA <sup>②</sup>	Non-Hazardous area Explosion proof area – Groups B, C, D, E, F & G Type NEMA 4X/7/9
IEC	Ex d IIC T6
LRS	Lloyds Register of Shipping (marine applications)
Russian Authorisation Standards <sup>②</sup>	
Other approvals are available, consult factory for more details	

<sup>①</sup> For CCE approved units, use the ATEX model numbers.

<sup>②</sup> Consult factory for proper model numbers and classifications.

# PRINCIPLE OF OPERATION

## Standard controls

Operation is based upon simple buoyancy, whereby a spring is loaded with weighted displacers which are heavier than the liquid. Immersion of the displacers in the liquid results in buoyancy force change, which moves the spring upward. Since the spring moves only when the level moves on a displacer, spring movement (1) is always a small fraction of the level travel between displacers (2).

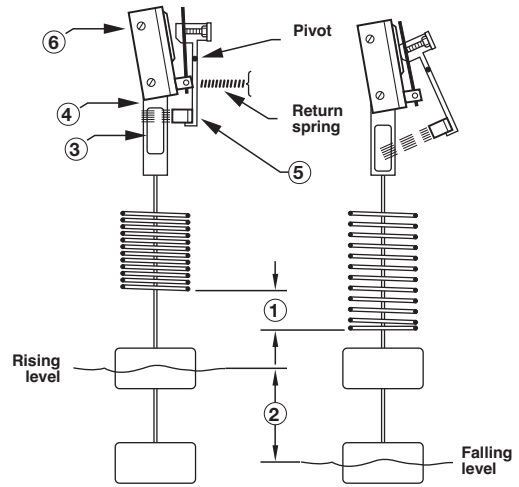
A magnetic sleeve (3) is connected to the spring and operates within a non-magnetic barrier tube (4). Spring movement causes the magnetic sleeve to attract a pivoted magnet (5), actuating a switch mechanism (6) located outside the barrier tube. Built-in limit stops, prevent over stroking of the spring under level surge conditions.

## Proof-er® controls

The purpose of the Proof-er® is to check the operation of a displacer control without having to raise the level in the tank. This is accomplished by pulling downward on the Proof-er® cable. This causes the spring loaded lever arm to lift the switch actuator, simulating a high or high high level condition. When the cable is released, the Proof-er® returns the actuator to its previous position to resume normal operation.

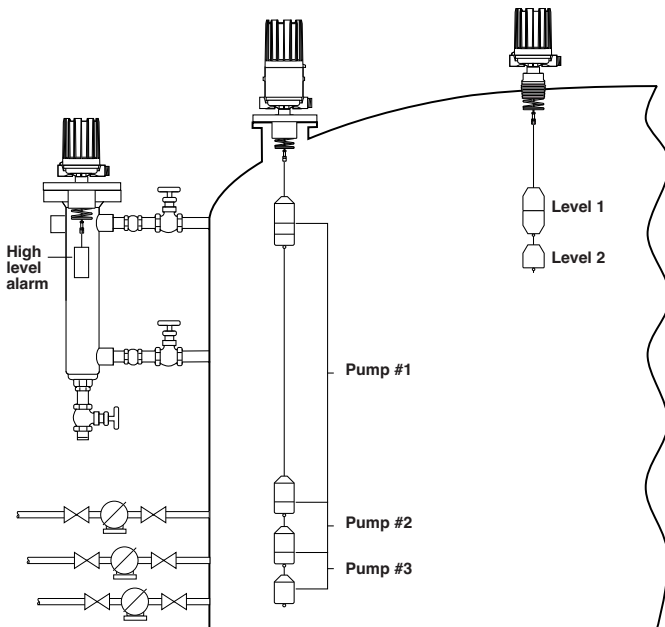
## Floating roof controls

The floating roof control is designed for installation on 'barrier' (floating roof) tanks. The control may be furnished with a brass displacer to prevent sparking. A stainless steel displacer is optionally available.

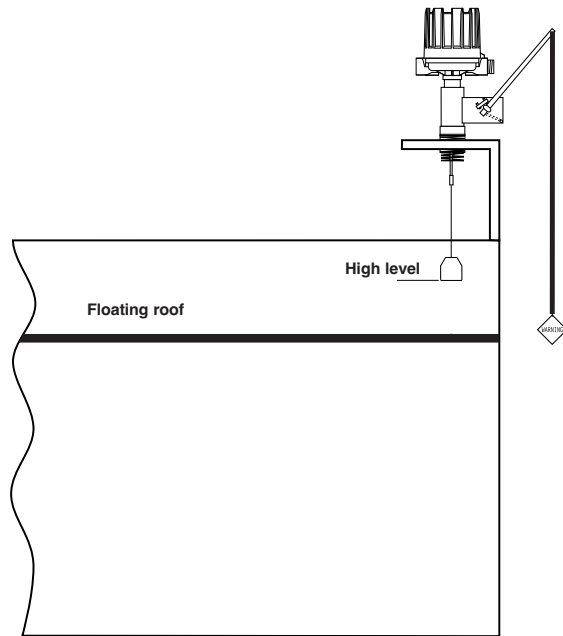


# MOUNTING

## Standard models



## Floating roof models (with Proof-er® as shown below)



## AVAILABLE SWITCH MECHANISMS

Type of switch module <sup>①</sup>	Max. Process Temp. <sup>②</sup>	Switch ratings – A res. <sup>③</sup>			Code
		24 V DC	240 V AC	120 V AC	
Micro switch	max 120 °C (250 °F)	6	15	15	B / Q <sup>⑤</sup>
Micro switch	max 230 °C (450 °F)	6	15	15	C / O <sup>⑤</sup>
Micro switch - DC current	max 120 °C (250 °F)	10	–	10	D
Micro switch with gold alloy contacts	max 120 °C (250 °F)	1	–	1	U
Hermetically sealed micro switch	max 260 °C (500 °F)	5	5	5	HS <sup>④</sup>
Hermetically sealed micro switch with silver plated contacts	max 230 °C (450 °F)	3	1	1	W
Hermetically sealed micro switch with gold plated contacts	max 230 °C (450 °F)	0,5	0,5	0,5	X
Proximity switch - type SJ 3.5 SN	max 100 °C (210 °F)	NA	NA	NA	V
Pneumatic bleed type (open air)	max 200 °C (400 °F)	NA	NA	NA	J
Pneumatic non bleed type (closed circuit)	max 200 °C (400 °F)	NA	NA	NA	K
Hermetically sealed micro switch	max 260 °C (500 °F)	4	–	2,5	F
Hermetically sealed micro switch	max 260 °C (500 °F)	3	–	1	8

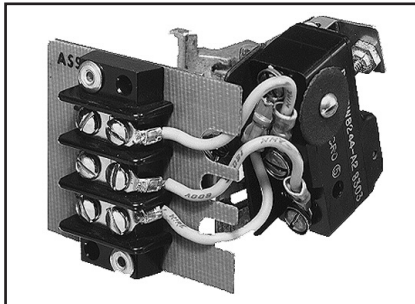
<sup>①</sup> For applications with heavy vibration, consult factory for suited switch modules.

<sup>②</sup> Max process temperature is specified at 40 °C (100 °F) ambient temperature and for non condensing applications.

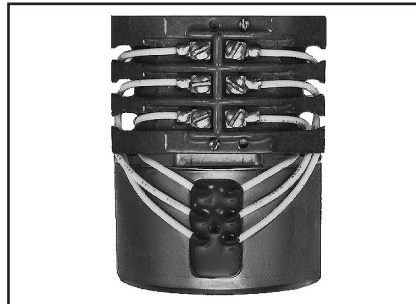
<sup>③</sup> For more details - see bulletin BE 42-120.

<sup>④</sup> For condensing applications, max process temperature is down-rated to 200 °C (400 °F) @ 40 °C (100 °F) ambient.

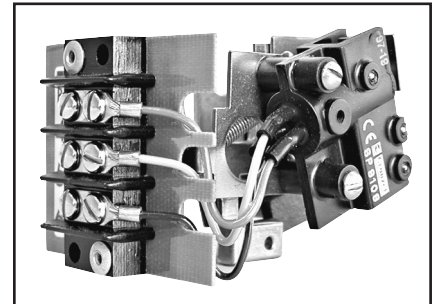
<sup>⑤</sup> Q and O are the equivalent switch modules for models C10/C15.



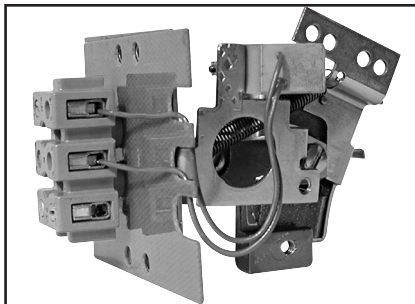
Type B, C, D, O, Q & U



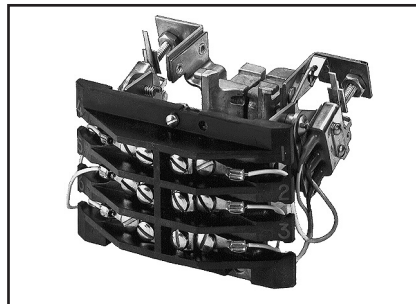
Type HS



Type W & X



Type V



Type F & 8

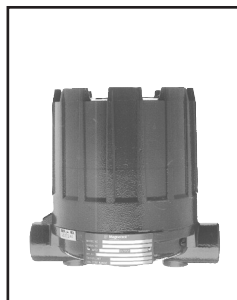


Type J & K

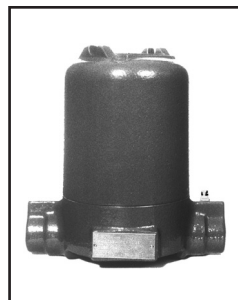
## AVAILABLE HOUSINGS



- For Non Ex use
- IP 66
- Die cast Aluminium
- 2 Entries (one plugged)
- Standard blue anti corrosive coating
- Housing heater/drain available, consult factory



- For Exd/Exi use
- IP 66
- Die cast Aluminium
- 2 Entries (one plugged)
- Standard blue anti corrosive coating
- ATEX II 2G Ex d IIC T6 Gb
- ATEX II 1G EEx ia IIC T6



- For Exd use
- IP 66
- Cast Iron
- One entry (2 entries at request)
- Standard blue anti corrosive coating
- ATEX II 2G Ex d IIC T6 Gb



- For pneumatic switches
- IP 53 (NEMA 3R)
- IP 55 optional at request
- Alu base / cold rolled steel cover
- Standard blue anti corrosive coating



- For Exd use
- IP 66 (NEMA 7/9)
- Die cast Aluminium
- 2 Entries (one plugged)
- Standard blue anti corrosive coating
- FM, Class I, Div. 1, Groups C & D
- FM, Class II, Div. 1, Groups E, F & G

## SINGLE SWITCH MODELS

### **Models A15 – Level alarm applications Narrow differential type**

These instruments are factory calibrated to operate over a narrow level differential band and are ideally suited for liquid level alarm applications, on either high or low level.

The operating level is fully adjustable by simply repositioning the displacer along its suspension cable.

The differential band is  $\pm 51$  mm (2") in water and varies with liquid specific gravity.



### **Models A10 – Pump or valve control Wide differential type**

These wide differential units are factory calibrated to actuate as a liquid level reaches a given displacer and to remain actuated until the level reaches a second displacer.

The minimum differential band is approximately 152 mm (6") in water and varies with liquid specific gravity.

The maximum differential is determined by the length of the displacer suspension cable.



## DUAL SWITCH MODELS

### **Models B15 Narrow differential type**

These instruments utilize two switches, each actuated at a different level and each calibrated with a narrow differential band.



### **Models B10 Wide differential type**

These wide differential tandem units are factory calibrated with a choice of several operating sequences.



## OPERATING SEQUENCES

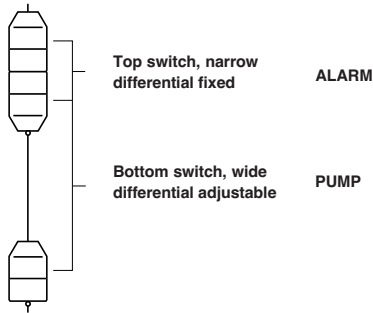
Model B10 units are available factory calibrated with a choice of switch operating sequence. Five of the most popular sequences are described below.

**When ordering B10 units, an operating sequence and specific gravity MUST be provided.**

### PUMP CONTROL PLUS ALARM

#### Arrangement N° 1 — fill with high level alarm

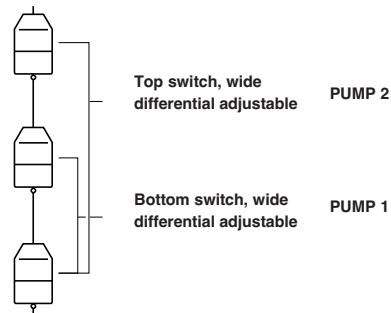
At the lowest level the pump starts. When the level rises to the middle displacer, the pump stops. If the level continues to rise, the upper displacer actuates the alarm switch which remains actuated until the level drops to the middle displacer.



### CONTROL OF 2 PUMPS

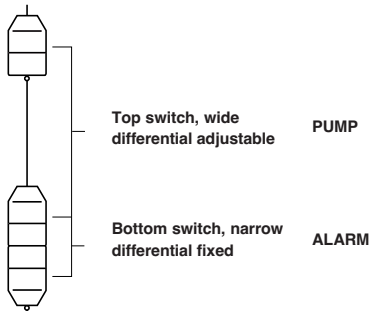
#### Arrangement N° 4

In this sequence N° 1 pump starts as the level rises to the middle displacer. Should the level continue to rise to the upper displacer, N° 2 pump is actuated. Both pumps operate until the level is dropped to the lower displacer.



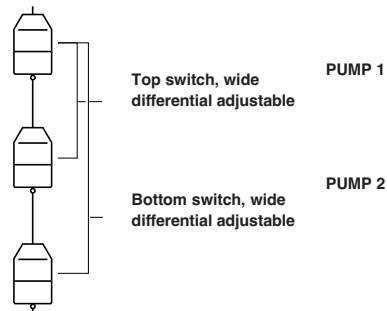
#### Arrangement N° 2 — drain with low level alarm

The sequence of arrangement N° 1 can be reversed to provide pump start at high level and pump stop at low level followed by low level alarm operation.



#### Arrangement N° 5

The pumping sequence of Arrangement N° 4 can be reversed for a pump "fill" application.

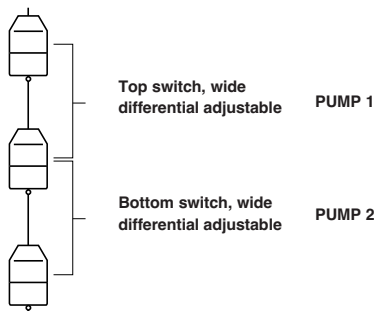


### CONTROL OF 2 PUMPS OF DIFFERENT CAPACITY

#### Arrangement N° 3 — fill or drain

Two pumps are used to keep a tank filled. When the level falls to the middle displacer, a small N° 1 pump starts.

A second larger pump is started should the level continue to fall to the bottom displacer.



## TRIPLE SWITCH MODELS



### **Models C10 Wide differential type**

These wide differential type switches are designed to provide three electrically separate control signals in sequence as liquid level varies. These units are factory calibrated with a choice of several sequences.



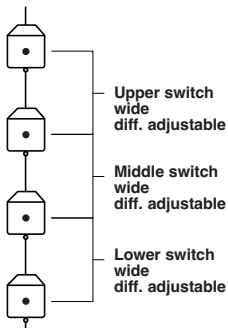
### **Models C15 Narrow differential type**

These instruments are factory calibrated to operate over a narrow level band while providing three electrically separate control signals in sequence as liquid level varies.

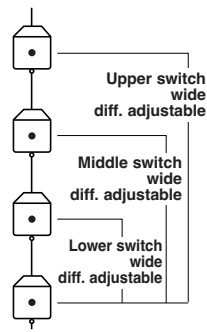
# OPERATING SEQUENCES

Model C10 units are available factory calibrated with a choice of switch operating sequence. Seven of the most popular sequences are described below.

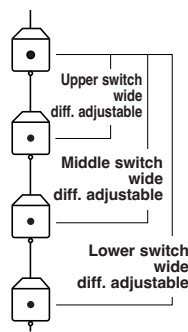
**When ordering C10 units, an operating sequence and specific gravity MUST be provided.**



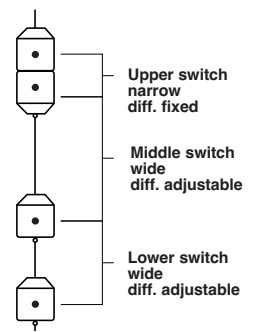
Arrangement A



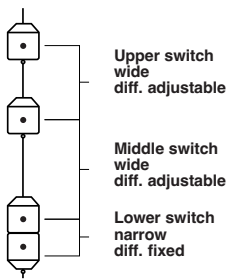
Arrangement B



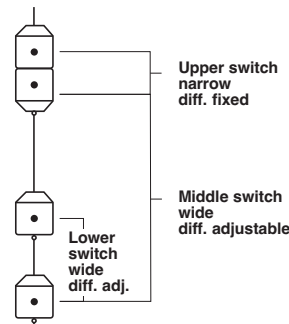
Arrangement C



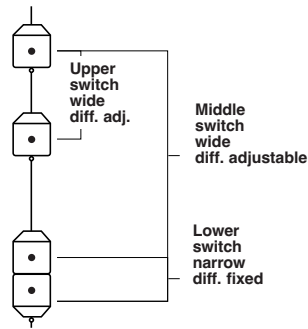
Arrangement D



Arrangement E

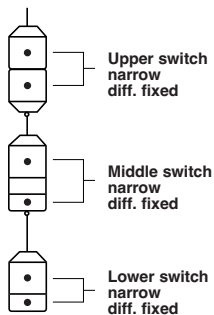


Arrangement F



Arrangement G

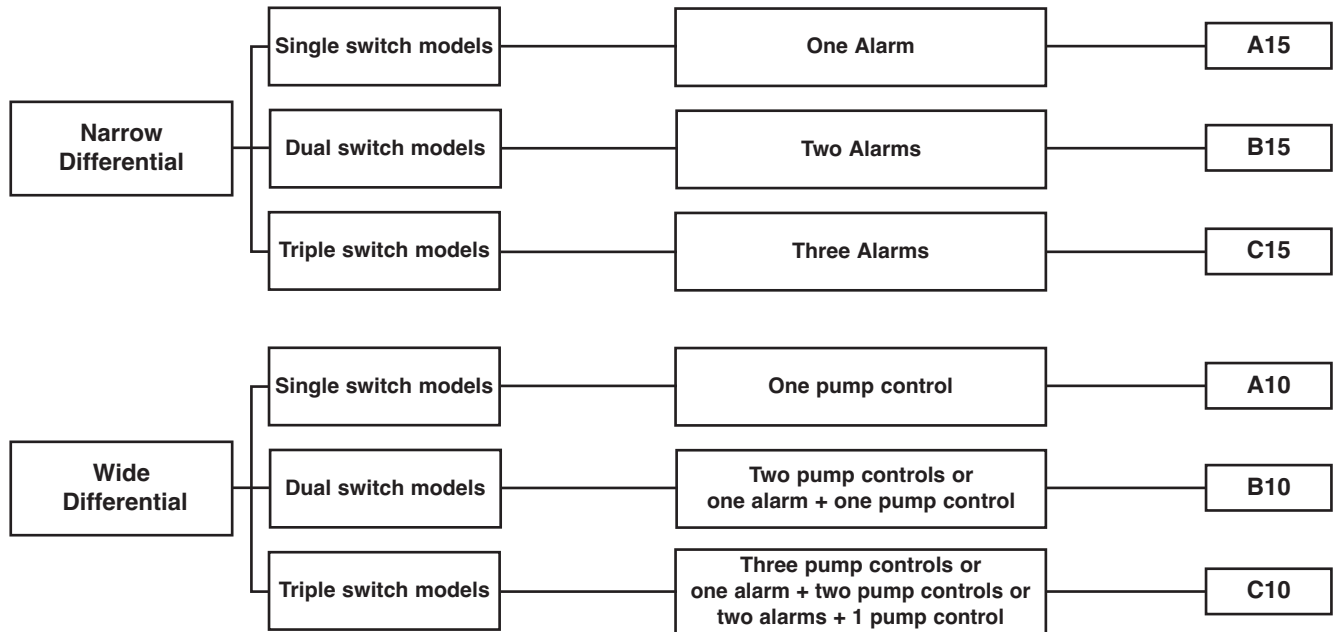
**When ordering C15 units, a specific gravity MUST be provided.**



## SELECTION DATA

Narrow Differential: for actuation of an alarm or system shutdown - up to 3 setpoints.

Wide Differential: switch differential for valve or pump control - up to 3 pump control functions.



**Specific gravity limits – not for floating roof models.**

P.N. code	Liquid temp.		Specific gravity - ranges	
	°C	°F	Porcelain	SST
<b>A10</b>	40	100	0.60 to 1.20	0.60 to 1.20
	90	200	0.70 to 1.20	0.70 to 1.20
	150	300	0.80 to 1.20	0.80 to 1.20
	200	400	1.00 to 1.20	0.90 to 1.20
	260	500	1.10 to 1.20	1.00 to 1.20
<b>A15</b>	40	100	0.60 to 2.40	0.40 to 1.65
	90	200	0.62 to 2.40	0.40 to 1.65
	150	300	0.65 to 2.40	0.50 to 1.65
	200	400	0.70 to 2.40	0.55 to 1.65
	260	500	0.75 to 2.40	0.60 to 1.65

**Specific gravity limits – not for floating roof models.**

P.N. code	Liquid temp.		Specific gravity - ranges	
	°C	°F	Porcelain	SST
<b>B10</b>	40	100	0.60 to 1.50	0.50 to 1.00
	90	200	0.64 to 1.50	0.50 to 1.00
	150	300	0.80 to 1.50	0.60 to 1.00
	200	400	1.00 to 1.50	0.72 to 1.00
	260	500	1.10 to 1.50	0.84 to 1.00
<b>B15</b>	40	100	0.95 to 1.20	0.70 to 1.20
	90	200	1.10 to 1.20	0.80 to 1.20
	150	300	-	0.90 to 1.20
	200	400	-	1.00 to 1.20
	260	500	-	1.04 to 1.20

**Specific gravity limits – not for floating roof models.**

P.N. code	Liquid temp.		Specific gravity - ranges	
	°C	°F	Porcelain	SST
<b>C10</b>	55	130	0.65 to 1.20	0.58 to 1.20
	90	200	0.95 to 1.10	0.76 to 1.00
	150	300	-	0.82 to 1.00
<b>C15</b> <sup>①</sup>	55	130	0.80 to 1.25	0.65 to 1.00

<sup>①</sup> Consult factory for high temperatures

## EXPEDITE SHIP PLAN (ESP)

Several models are available for quick shipment, within max. 4 weeks after factory receipt of purchase order, through the Expedite Ship Plan (ESP).

Models covered by ESP service are conveniently colour coded in the selection data charts.

To take advantage of ESP, simply match the colour coded model number codes (standard dimensions apply).

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



# SELECTION DATA

## A complete measuring system consists of:

- Order code for **standard** models (each unit is factory calibrated to operate on a given specific gravity within the min and the max values listed per model) or
- Order code for **floating roof** models.

- Order code for **standard** displacer switches

### BASIC MODEL NUMBER

– units for ALARM use ONLY

A	1	5	One adjustable set point (fixed narrow differential)
B	1	5	Two adjustable set points (fixed narrow differentials)
C	1	5	Three adjustable set points (fixed narrow differentials), specify specific gravity of medium separately

– units for ALARM/PUMP control use

A	1	0	One adjustable wide differential
B	1	0	Two adjustable wide differentials, specify operating sequence and specific gravity separately (see p. 5 & 8)
C	1	0	Three adjustable wide differentials, specify operating sequence and specific gravity separately (see p. 7 & 8)

MATERIALS OF CONSTRUCTION (6 m (20') of suspension cable is standard supplied)

Code	Spring	Trim	Process Connection	Displacer-clamps/cable	Magnetic sleeve	Construction
A	Inconel	316 SST (1.4401)	Carbon steel	316 SST (1.4401)	400 series SST	Standard
B					316 SST (1.4401)	
D					316 SST (1.4401)	
E		316 SST (1.4401)	Carbon steel	Monel (2.4360)	400 series SST	
F				Hastelloy C (2.4819)		
K		316 SST (1.4401)				
L	316 SST (1.4401)	Carbon steel	316 SST (1.4401)	400 series SST		

### PROCESS CONNECTION

– threaded

E	2	2 1/2" NPT
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– ANSI flanges

G	3	3" 150 lbs ANSI RF
G	4	3" 300 lbs ANSI RF
H	3	4" 150 lbs ANSI RF
H	4	4" 300 lbs ANSI RF
K	3	6" 150 lbs ANSI RF
K	4	6" 300 lbs ANSI RF

– EN/DIN flanges

8	A	DN 80, PN 16	EN 1092-1 Type B1
8	B	DN 80, PN 25/40	EN 1092-1 Type B1
1	A	DN 100, PN 16	EN 1092-1 Type B1
1	B	DN 100, PN 25/40	EN 1092-1 Type B1

### DISPLACER MATERIAL AND PROOF-ER® OPTION

(for pressure ratings, refer to physical specifications table)

– without Proof-er®

can be used for NACE models

A	Porcelain
B	316 SST (1.4401)

– with low pressure Proof-er®<sup>①</sup>

not for NACE & not for C10-C15 models

D	Porcelain
E	316 SST (1.4401)

– with medium pressure Proof-er®<sup>①</sup>

not for NACE & not for B10-B15, C10-C15 models

G	Porcelain
H	316 SST (1.4401)

<sup>①</sup> Proof-er® is available in carbon steel only

### SWITCH MECHANISM & ENCLOSURE

Refer to table selections per displacer type A10-A15 (p. 10-11), B10-B15 (p. 11) & C10-C15 (p. 11).



complete order code for standard models

➔ X = product with a specific customer requirement

2. Order code for **floating roof** models (not for NACE constructions)

BASIC MODEL NUMBER – units for ALARM use ONLY

A	1	5	One adjustable set point (fixed narrow differential)
B	1	5	Two adjustable set points (fixed narrow differentials)

MATERIAL OF CONSTRUCTION (6 m (20') of suspension cable is standard supplied)

Code	Spring	Trim	Process Connections	Displacer clamps and cable	Magnetic sleeve	Construction
A	Inconel	316 SST (1.4401)	Carbon steel	316 SST (1.4401)	400 series SST	Standard

PROCESS CONNECTION – size rating (consult factory for EN/DIN flanges)  
– threaded

E	2	2 1/2" NPT
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– ANSI flanges

G	3	3" 150 lbs ANSI RF
G	4	3" 300 lbs ANSI RF
H	3	4" 150 lbs ANSI RF
H	4	4" 300 lbs ANSI RF
K	3	6" 150 lbs ANSI RF
K	4	6" 300 lbs ANSI RF

– EN/DIN flanges

8	A	DN 80, PN 16	EN 1092-1 Type B1
8	B	DN 80, PN 25/40	EN 1092-1 Type B1
1	A	DN 100, PN 16	EN 1092-1 Type B1
1	B	DN 100, PN 25/40	EN 1092-1 Type B1

DISPLACER MATERIAL AND PROOF-ER® OPTION (for pressure ratings, refer to physical specifications table)  
– without Proof-er®

P	Brass
R	Hollow brass (roof and liquid) <sup>①</sup>
M	Stainless steel

– with low pressure Proof-er®<sup>②</sup>

Q	Brass
T	Hollow brass (roof and liquid) <sup>①</sup>
N	Stainless steel

SWITCH MECHANISM & ENCLOSURE

Refer to table selections per displacer type A10-A15 (below) & B10-B15 (p. 11)



**complete order code for floating roof models**

X = product with a specific customer requirement

① Available on model A15 only. Suitable for process liquids with SG ≥ 0,4 and a maximum pressure of 6,9 bar (100 psi)

② Proof-er® is available in carbon steel only

Select electric switch mechanism & enclosure: **A10 – A15 type displacer switches** (see page 3 for switch ratings)

qty and switch type	Switch and Housing codes for A10										Switch and Housing codes for A15									
	Weather proof (IP 66)		ATEX (IP 66)						FM (IP 66)		Weather proof (IP 66)		ATEX (IP 66)						FM (IP 66)	
			II 2G Ex d IIC T6 Gb		II 1G EEx ia II C T6		II 2G Ex d IIC T6 Gb		NEMA 7/9				II 2G Ex d IIC T6 Gb		II 1G EEx ia II C T6		II 2G Ex d IIC T6 Gb		NEMA 7/9	
	cast Aluminium	1" NPT	cast Aluminium	1" NPT	cast Aluminium	1" NPT	cast Iron	1" NPT	cast Alu.	1" NPT	cast Aluminium	1" NPT	cast Aluminium	1" NPT	cast Aluminium	1" NPT	cast Iron	1" NPT	cast Alu.	1" NPT
B	1 x SPDT	B2B	BAB	BK9	BC9	-	-	BK5	BU5	BKB	B2Q	BAQ	BH9	BA9	-	-	BK5	BU5	BKQ	
	1 x DPDT	B8B	BDB	BN9	BF9	-	-	BD5	BW5	BNB	B8Q	BDQ	BJ9	BB9	-	-	BD5	BW5	BNQ	
C	1 x SPDT	C2B	CAB	CK9	CC9	C2T	CAT	CK5	CU5	CKB	C2Q	CAQ	CH9	CA9	C2S	CAS	CK5	CU5	CKQ	
	1 x DPDT	C8B	CDB	CN9	CF9	C8T	CDT	CD5	CW5	CNB	C8Q	CDQ	CJ9	CB9	C8S	CDS	CD5	CW5	CNQ	
D	1 x SPDT	D2B	DAB	DK9	DC9	-	-	DK5	DU5	DKB	D2Q	DAQ	DH9	DA9	-	-	DK5	DU5	DKQ	
	1 x DPDT	D8B	ddb	DN9	DF9	-	-	DD5	DW5	DNB	D8Q	DDQ	DJ9	DB9	-	-	DD5	DW5	DNQ	
HS	1 x SPDT	H7A	HM2	HFC	HA9	-	-	HB3	HB4	HM3	H7A	HM2	HFC	HA9	-	-	HB3	HB4	HM3	
	1 x DPDT	H7C	HM6	HGC	HB9	-	-	HB7	HB8	HM7	H7C	HM6	HGC	HB9	-	-	HB7	HB8	HM7	
U	1 x SPDT	U2B	UAB	UK9	UC9	U2T	UAT	UK5	UU5	UKB	U2Q	UAQ	UH9	UA9	U2S	UAS	UK5	UU5	UKQ	
	1 x DPDT	U8B	UDB	UN9	UF9	U8T	UDT	UD5	UW5	UNB	U8Q	UDQ	UJ9	UB9	U8S	UDS	UD5	UW5	UNQ	
V	-	-	-	-	VCS	VES	-	-	-	-	-	-	-	-	V5S	VBS	-	-	-	
W	1 x SPDT	W2B	WAB	WK9	WC9	W2T	WAT	WK5	WU5	WKB	W2Q	WAQ	WH9	WA9	W2S	WAS	WK5	WU5	WKQ	
	1 x DPDT	W8B	WDB	WN9	WF9	W8T	WDT	WD5	WW5	WNB	W8Q	WDQ	WJ9	WB9	W8S	WDS	WD5	WW5	WNQ	
X	1 x SPDT	X2B	XAB	XK9	XC9	X2T	XAT	XK5	XU5	XKB	X2Q	XAQ	XH9	XA9	X2S	XAS	XK5	XU5	XKQ	
	1 x DPDT	X8B	XDB	XN9	XF9	X8T	XDT	XD5	XW5	XNB	X8Q	XDQ	XJ9	XB9	X8S	XDS	XD5	XW5	XNQ	
F	1 x SPDT	FCB	FAB	FK9	FC9	-	-	FK5	FU5	FKB	F2Q	FAQ	FH9	FA9	-	-	FK5	FU5	FKQ	
	1 x DPDT	FGB	FDB	FN9	FF9	-	-	FD5	FW5	FNB	F8Q	FDQ	FJ9	FB9	-	-	FD5	FW5	FNQ	
8	1 x SPDT	82B	8AB	8K9	8C9	-	-	8K5	8U5	8KB	82Q	8AQ	8H9	8A9	-	-	8K5	8U5	8KQ	
	1 x DPDT	88B	8DB	8N9	8F9	-	-	8D5	8W5	8NB	88Q	8DQ	8J9	8B9	-	-	8D5	8W5	8NQ	

Select pneumatic switch mechanism & enclosure: **A10 – A15 type displacer switches**

Pneumatic switch type	Max supply pressure bar (psi)	Max process temperature °C (°F)	Bleed orifice ø mm (inches)	A10 codes		A15 codes	
				NEMA 3R (IP 53)		NEMA 3R (IP 53)	
Series J (open air)	6,9 (100)	200 (400)	1,60 (0.063)	JGF		JDE	
	4,1 (60)	200 (400)	2,39 (0.094)	JHF		JEE	
Series K (closed circuit)	6,9 (100)	200 (400)	–	KOF		KOE	

Select electric switch mechanism & enclosure: **B10 – B15 type displacer switches** (see page 3 for switch ratings)  
(no pneumatic switch mechanisms available.)

Switch <sup>Ⓞ</sup> Type		Weather proof (IP 66)		ATEX (IP 66)						FM (IP 66)
		cast Aluminium		II 2G Ex d IIC T6 Gb		II 1G EEx ia IIC T6		II 2G Ex d IIC T6 Gb		NEMA 7/9
		cast Aluminium		cast Aluminium		cast Aluminium		cast Iron		cast Alu.
		M20 x 1,5	1" NPT	M20 x 1,5	1" NPT	M20 x 1,5	1" NPT	M20 x 1,5	3/4" NPT	1" NPT
B	SPDT	B4B	BBB	BL9	BD9	–	–	BL5	BV5	BLB
	DPDT	B1B	BEB	BP9	BG9	–	–	BO5	BY5	BOB
C	SPDT	C4B	CBB	CL9	CD9	C4T	CBT	CL5	CV5	CLB
	DPDT	C1B	CEB	CP9	CG9	C1T	CET	CO5	CY5	COB
D	SPDT	D4B	DBB	DL9	DD9	–	–	DL5	DV5	DLB
	DPDT	D1B	DEB	DP9	DG9	–	–	DO5	DY5	DOB
U	SPDT	U4B	UBB	UL9	UD9	U4T	UBT	UL5	UV5	ULB
	DPDT	U1B	UEB	UP9	UG9	U1T	UET	UO5	UY5	UOB
W	SPDT	W4B	WBB	WL9	WD9	W4T	WBT	WL5	WV5	WLB
	DPDT	W1B	WEB	WP9	WG9	W1T	WET	WO5	WY5	WOB
X	SPDT	X4B	XBB	XL9	XD9	X4T	XBT	XL5	XV5	XLB
	DPDT	X1B	XEB	XP9	XG9	X1T	XET	XO5	XY5	XOB
F	SPDT	FFB	FBB	FL9	FD9	–	–	FL5	FV5	FLB
	DPDT	FHB	FEB	FP9	FG9	–	–	FO5	FY5	FOB
8	SPDT	84B	8BB	8L9	8D9	–	–	8L5	8V5	8LB
	DPDT	81B	8EB	8P9	8G9	–	–	8O5	8Y5	8OB

<sup>Ⓞ</sup> Proximity switches (switch type V) are available, consult factory for proper ordering information.

Select electric switch mechanism & enclosure: **C10 – C15 type displacer switches** (see page 3 for switch ratings)  
(no pneumatic switch mechanisms available.)

Switch Type		Weather proof (IP 66)		FM (IP 66)
		cast Aluminium		NEMA 7/9
		M20 x 1,5	1" NPT	cast Aluminium
O	SPDT	O6B	OCB	OMB
	DPDT	O1B	OEB	OKB
Q	SPDT	Q6B	QCB	QMB
	DPDT	Q1B	QEB	QKB

## PHYSICAL SPECIFICATIONS

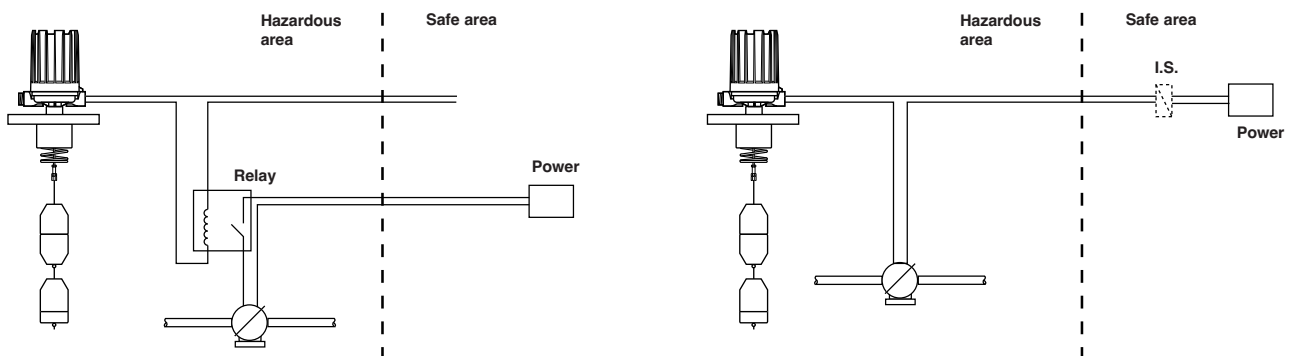
Description		Specification
Measured variable		Liquid level
Physical range		Standard 6 m cable (field adjustable)
Process temperature Process pressure (for higher ratings consult factory)	Threaded models Flanged models	<u>Porcelain displacers:</u> <sup>①</sup> 55,1 bar @ 40 °C (800 psi @ 100 °F) 260 °C @ 17,2 bar (500 °F @ 250 psi) <u>Stainless steel displacers:</u> 49,6 bar @ 40 °C (720 psi @ 100 °F) 260 °C @ 34,5 bar (500 °F @ 500 psi) Flanged models are downrated to the design pressure of the selected flange <u>Hollow brass displacers:</u> 6,9 bar @ 40 °C (100 psi @ 100 °F)
	Medium pressure Proof-er® models	8,6 bar @ 150 °C (125 psi @ 300 °F)
	Low pressure Proof-er® models	1,7 bar @ 90 °C (25 psi @ 200 °F)
Wetted materials	Spring	Inconel
	Displacer(s)	Porcelain <sup>①</sup> , 316 SST (1.4401) or brass
	Cable and clamps	316 SST (1.4401), Monel (2.4360) or Hastelloy C (2.4819)
Process connection material		Carbon steel or stainless steel

<sup>①</sup> Do not use porcelain displacers on non-vented boiler water condensate systems over 90 °C (200 °F).

## ELECTRICAL SPECIFICATIONS

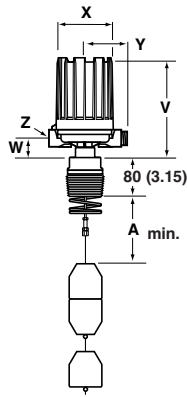
Description	Specification
Switch ratings	Up to 15 A @ 240 V AC (depending on switch mechanism) Up to 10 A @ 120 V DC (depending on switch mechanism)
Signal output	Single, dual or triple SPDT or DPDT contacts or single pneumatic
Switch types (see table on page 3)	Dry contact with standard or gold alloy contacts, Hermetically sealed, Hermetically sealed with gold or silver plated contacts, Proximity switch, or single pneumatic bleed and non bleed
Approvals (see table on page 1)	ATEX II 2G Ex d IIC T6 Gb, flameproof enclosure ATEX II 1G EEx ia IIC T6, intrinsically safe FM/CSA, explosion proof LRS, Lloyds Register of Shipping (marine applications) Russian Authorisation standards Other approvals are available, consult factory.

## ELECTRICAL CONNECTION

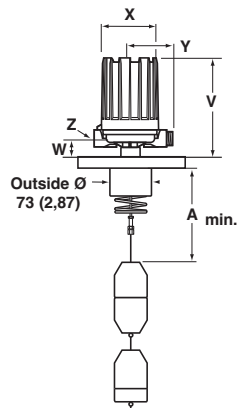


# DIMENSIONS IN mm (inches) – housings

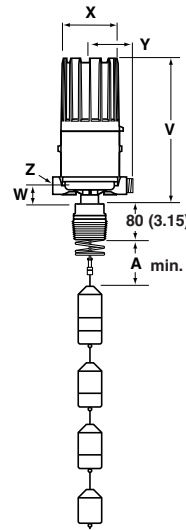
**Models A10/A15/B10/B15**  
Threaded mounting



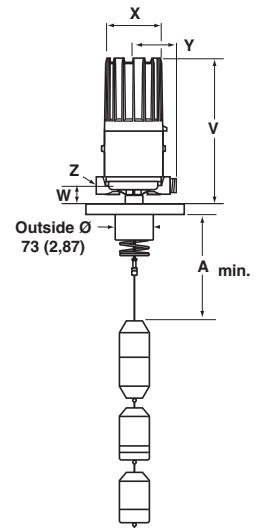
**Models A10/A15/B10/B15**  
Flanged mounting



**Models C10/C15**  
Threaded mounting



**Models C10/C15**  
Flanged mounting



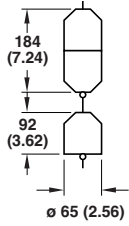
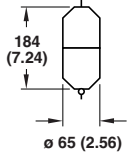
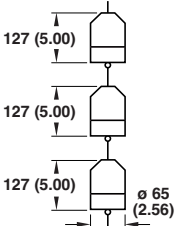
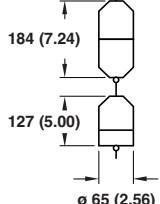
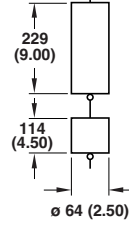
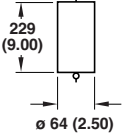
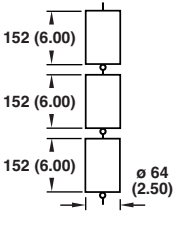
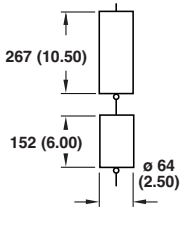
Housing type	Models	V		W		ø X		Y		Z
		mm	inches	mm	inches	mm	inches	mm	inches	
Weatherproof - FM (NEMA 7/9) - ATEX (Cast Alu)	A10	257	10.12	45	1.77	151	5.93	109	4.29	M20 x 1,5 (*) or 1" NPT (2 entries - 1 plugged)  (*) not for FM (NEMA 7/9)
	A15 with HS-switch									
	B10									
	B15									
	A15 excl. HS-switch									
Weatherproof	C10 / C15	376	14.81							
ATEX (Cast Iron)	A10 / A15 / B10 / B15	249	9.80	45	1.77	143	5.63	110	4.33	M20 x 1,5 or 3/4" NPT (single entry - 2 entries at request)
Pneumatics Switch Module J	A10	216	8.50	39	1.54	118	4.65	110	4.33	1/4" NPT (1 entry)
	A15	165	6.50							
Pneumatics Switch Module K	A10	216	8.50					130	5.12	1/4" NPT (2 entries)
	A15	165	6.50							

Allow 200 mm (7.87") overhead clearance / All housings are 360 ° rotatable

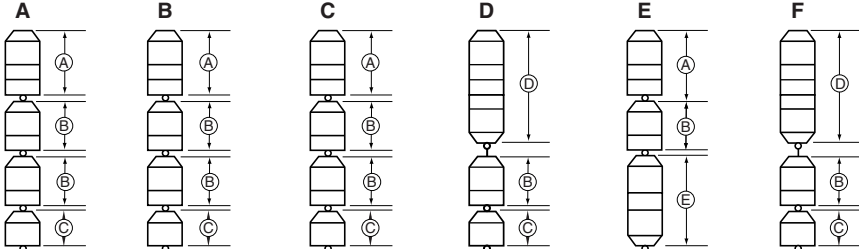
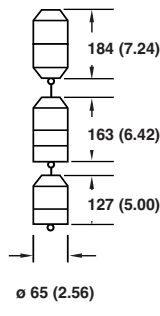
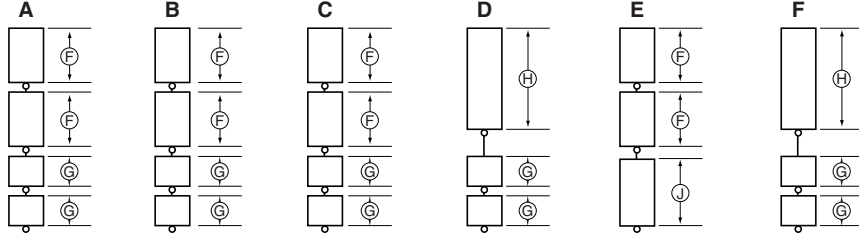
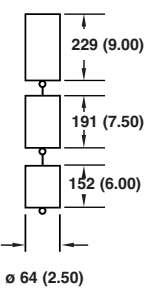
Min. distance between mounting connection and top of displacer		A			
		Threaded		Flanged	
Models	Displacer Type	mm	inches	mm	inches
A10	Porcelain	127	5.00	178	7.00
	Stainless steel	121	4.75	171	6.75
A15	Porcelain	143	5.62	194	7.62
	Stainless steel	143	5.62	194	7.62
B10	Porcelain	124	4.88	175	6.88
	Stainless steel	121	4.75	171	6.75
B15	Porcelain	140	5.50	191	7.50
	Stainless steel	149	5.88	200	7.88
C10	Porcelain	162	6.38	213	8.38
	Stainless steel	146	5.75	197	7.75
C15	Porcelain	197	7.75	248	9.75
	Stainless steel	184	7.25	235	9.25

DIMENSIONS IN mm (inches) – displacers

Models A10/A15/B10/B15 - Standard models

	A10	A15	B10	B15
Porcelain				
Stainless steel				

Models C10 & C15 - Standard models

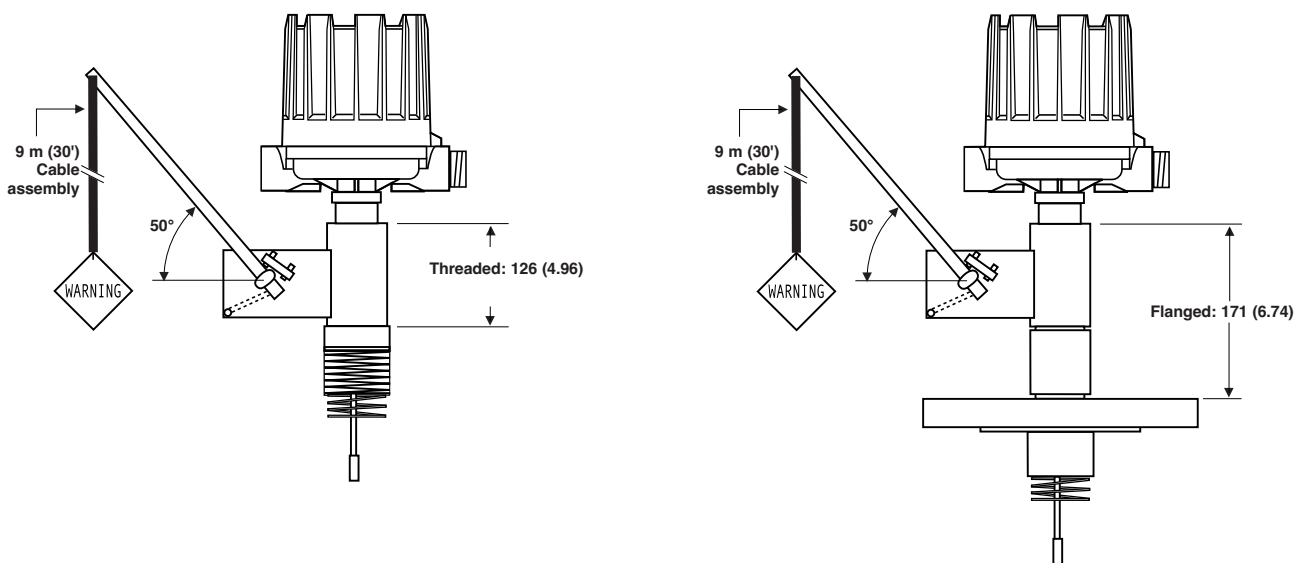
	C10 operating sequence	C15 operating sequence
Porcelain	<p><b>Arrangements (see page 7)</b></p>  <p>(A) 163 (6.42)    (B) 127 (5.00)    (C) 92 (3.62)    (D) 291 (11.44)    (E) 219 (8.64)</p> <p><b>Note:</b> All displacers <math>\varnothing</math> 65 (2.56).</p>	 <p><math>\varnothing</math> 65 (2.56)</p>
Stainless steel	<p><b>Arrangements (see page 7)</b></p>  <p>(F) 152 (6.00)    (G) 114 (4.50)    (H) 305 (12.00)    (J) 229 (9.00)</p> <p><b>Note:</b> All displacers <math>\varnothing</math> 64 (2.50).</p>	 <p><math>\varnothing</math> 64 (2.50)</p>

DIMENSIONS IN mm (inches) – displacers

Models A15/B15 - Floating roof models

	A15	B15
Brass		
Hollow Brass		
Stainless steel		

DIMENSIONS IN mm (inches) – Proof-er®





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SUPERSEDES: April 2012

**UNDER RESERVE OF MODIFICATIONS**

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