Level

MESS- UND REGELINSTRUMENTE / MEASUREMENT AND CONTROL

INTRA-AUTOMATION

Vertical magnetic level switches

- Unique 3 magnet latching switch mechanism
- · No springs in switch mechanism
- Weatherproof
- Flameproof
- Direct mount
- · Chamber mount
- Displacer controls

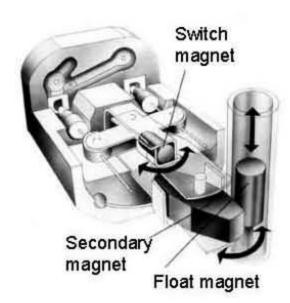
Operation

The float carries a stainless steel sheathed permanent magnet which rises and falls in the glandless pressure tube with changing liquid level. A switch mechanism is mounted inside the enclosure adjacent to the pressure tube. Switching is achieved with the unique Mobrey 'three-magnet' system, giving snap-action 'latch-on' switching.

Vertical movement of the float magnet in the pressure tube simultaneously actuates the secondary and tertiary magnets in the switch mechanism to operate the contacts. This 'threemagnet' system enables the float magnet to pass on and actuate switch mechanisms at other levels. Switch mechanisms already actuated cannot re-set until the return of the primary magnet actuates the magnet system once again.

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Introduction

Whether you require a switch for critical area applications or just general purpose control, the extensive range of Intra switches ensures that we will always have a solution to your particular problem.

A choice of carbon steel chambers is available, or for more vigorous applications we supply a series of 316 stainless steel chambers. A variety of tank and process connections is available to make installation simple and economic. This gives you the choice to meet your application in keeping with your budget.

Intra vertical magnetic level switches for industrial and process control use have been available for over 20 years and have been steadily gaining a reputation for quality and reliability.

Based on the industry standard boiler water level controls these controls employ the same three magnet switch mechanism for snap-action latching switching.

The design of this unique switch mechanism overcomes all the inherent problems of mercury tubes and micro switches. Even under severe vibration conditions there are no springs to cause contact bounce, hover, or even failure. The snap action magnets give positive stable latching time after time after time.

There are two switching functions available: 2 x SPST (SPCO) switching or DPDT (DPCO) switching, and each comes in four variants:-

- General purpose use with silver cadmium oxide contacts for long life.
- Low power circuit with gold plated contacts for use in low current/voltage applications such as I.S. circuits.
- High power circuits giving up to 10A switching capability.
- Hermetically sealed for the ultimate in reliability
 sealed for life.

When controls are required to operate in extreme conditions, the unique Intra hermetically sealed switch provides dependable life long operation that you can rely on. With all its moving parts and contacts completely enclosed, this genuine hermetically sealed switch is suitable for use in corrosive atmospheres and low temperature environments.



Features

- Relevant chambers are supplied CE marked and fully compliant with the Pressure Equipment Directive (97/23/EC)
- Unique switching mechanism totally reliable
- No springs in switch mechanism positive snap action switching
- · Vibration resistant eleminates spurious trips
- Multi-switching models cost effective control
- Genuine hermetically sealed switch option totally safe and secure
- Extensive range of chambers suitable for most applications
- Designed to ASME B31.3
- Weld procedures approved to EN ISO 15614-1 and ASME IX
- · Welders approved to EN 287-1
- Material certification to EN 10204, 3.1
- · Materials to ASTM and B.S. Standards

Approvals

Underwriters Laboratories (UL) Approval
Explosion Proof for Class I, Div 1, Groups B, C & D
Class II, Div 1, Groups E, F & G

General Area, Weatherproof type NEMA 4X

Canadian Standards Association (CSA) Approval Explosion Proof for Class 1, Groups B, C & D

General Area, Weatherproof to NEMA 4X

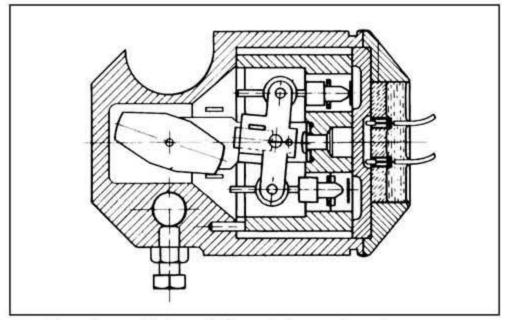
ATEX Approval
Flame Proof ATEX II 1/2G, EExd IIC T6
(-50°C≤Ta≤60°C)

Intrinsically Safe Use

For use in intrinsically safe circuits, gold plated switch contacts are recommended (see page 4). Users are reminded that it is their responsibility to obtain the necessary system approval and licences for such circuits.

EN ISO 9001: 2000

The manufacturer has been assessed and approved by Lloyds Register Quality Assurance against BS EN 9001: 2000 for the design, development, assembly and re-calibration of precision instruments and systems for the measurement and indication of electrical signals, gas and liquid density, viscosity, pressure, level, flow and water/steam systems.



Section through type H4 switch mechanism



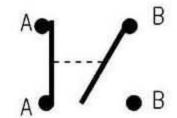
Hermetically sealed switch mechanism

Quality Assurance

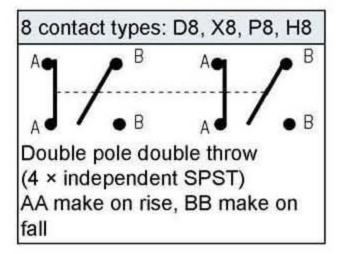
With over 20 years worldwide experience in the major power, nuclear and petro-chemical industries, the manufacturer is able to accommodate testing, surveying and documentation requirements as specified at the time of order. Inspection by customers or nominated inspection agencies can be arranged.



4 contact type: D4, X4, P4, H4



2 × independent SPST AA make on rise: BB Make on fall



Note: For DPDT operation, installer must common any one pair of A and B wires in the terminal block for each of the two ends of the switch mechanism.

Type D4, D8: General purpose switch mechanism.

Type D4U, D8U: General purpose switch mechanism for UL & CSA

Type X4, X8: High current switch mechanism.

Type P4, P8: Switch mechanism with gold plated contacts for use in

low power or intrinsically safe circuits.

Type H4, H8: Hermetically sealed mechanism with gold plated

contacts. All moving parts and contacts enclosed is an inert gas filled stainless steel enclosure. Suitable for use in low temperatures, contaminated atmospheres

and intrinsically safe circuits.

Electrical rating

Type	Temp	Low	AC r	max. va	lues		DC ma	x. value:	S
	wetside	temp						Res	Ind
	°C	use	VA	Volts	Amps	Watts	Volts	amps	amps
D4, D8	400	No	2000	440	5	50	250	5	0.5
D4U,D8U	400	No	2000	440	5	50	250	5	0.5
X4, X8	250	No	2000	440	10	50	250	10	0.5
P4, P8	400	No	6	250	0.25	3.6	250	0.25	0.1
H4, H8	250	-50°C	2000	440	5	50	250	5	0.5

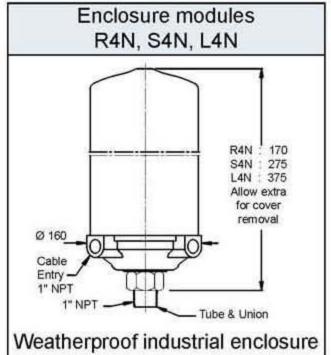
Each switch mechanism has flying leads which are factory wired to ceramic terminal blocks fixed in the switch enclosure.

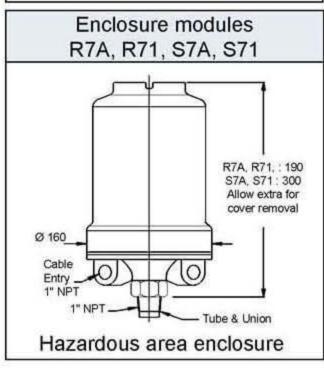
Warning

Gold plating on the contacts of P4 and P8 switch mechanisms may be permanently damaged if the mechanisms are used to switch circuits with values greater than those shown above.

Switches must not be used for the direct starting of motors. Contacts should be wired in series with the operating coils of relays, contactor starters or solenoid valves and fused separately.

Switch enclosures





Weatherprooof NEMA 4X / IP66.

Aluminium alloy based/drawn steel cover.

Type R4N: Fixed switch

Type S4N: 94mm switch adjustment Type L4N: 194mm switch adjustment

Flameproof & Explosion Proof (Weatherproof NEMA 4X / IP66)

Aluminium alloy base and cover "A"

Cast iron base and cover "I"

.

Type R7A/R7I: Fixed switch

Type S7A/S7I: 94mm switch adjustment

Conduit entries

Enclosures supplied with four contact switch mechanisms have a single 1" NPT conduit entry.

Enclosures supplied with eight contact switch mechanisms have 2 × 1" NPT conduit entries.

Tube and Unions: 316 stainless steel throughout. Welded construction with additional swaging technique to ensure maximum integrity. Individually pressure tested to 150 bar (operating pressure will be limited by float or flange specified). 250 bar test is available on request.

Paint Finish: Black stove paint. Epoxy paint finishes available on request.



1.0 Direct mount displacer controls

Intra displacer operated controls are ideal for sump application and other top mounting duties such as low level alarm in deep tanks. Their principle of operation also makes them suitable, in a modified form, for very high pressure or low S.G. applications.

The four most popular displacer arrangements are shown in this schematic diagram, which covers most of the likely applications. However, should you have a different requirement, we would be pleased to quote a model for your particular application.

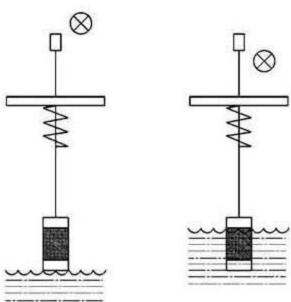
Principle of operation

The displacer element, made of 316 stainless steel, is suspended on a stainless steel cable from a spring. The element is always heavier than its equivalent volume of the liquid in which it is to operate, and so will extend the tension spring at all times. In free air, the spring will be extended to a known length, controlled by a mechanical stop to prevent overstressing. Fixed to the spring is the float rod and magnet assembly, free to move up and down as the spring extends or contracts, and outside the pressure tube in the usual manner is the switch mechanism.

As liquid rises to cover the displacer element, a bouyancy force is created equal to the weight of the liquid displaced. This force in effect is seen by the spring as a reduction in weight, causing the spring to contract, hence moving the magnet upwards inside the pressure tube and actuating the switch mechanism. On a falling liquid level, the displacer element is uncovered and the spring sees an increasing effective weight, causing the spring to extend and move the magnet to re-set the switch mechanism (Fig i and v).

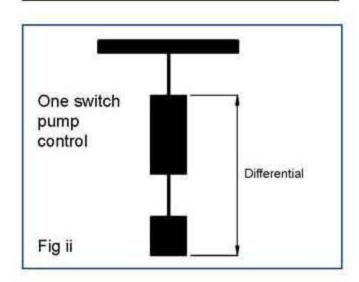
This simple principle can be refined to operate a single switch over a very wide differential by providing the buoyancy force from two elements instead of just one (Fig ii).

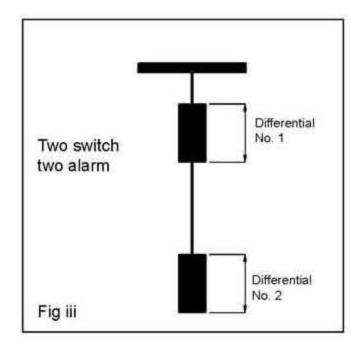
Two switch models are available for either two alarm duty with two narrow differentials (Fig iii) or for pump control/alarm duty with appropriate differentials (Fig iv).

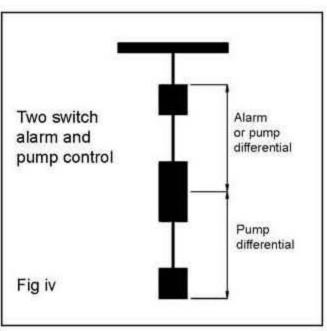


One switch alarm differential

Differential







In all cases, because the elements are suspended on a cable, switching or control levels can be several metres below the mounting flange, and are fully field adjustable by re-setting the elements on the cable.



Displacer control



Displacer controls: ordering information

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Customers must state operating pressure, temperature and specific gravity, together with function of each switch mechanism when ordering.

Due to component tolerances, dimensions DB, E and S given on page 7 are approximate and may vary on each control by up to 10mm. Setting the control to operate at the required level can be achieved on site by adjusting the element up or down on the cable as necessary.

^{1.} Supplied with 3m 316 stainless steel displacer cable as standard. Other lengths available on request.

^{2.} Base material will be cast iron whenever 8 contact switches are specified



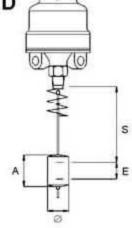
Displacer types and dimensional details

Single switch narrow differential: 11D

Specify for alarm duty.

Switching level can be changed by simply moving the displacer up or down the cable.





Switch types	D4U				D8U		
S.G.	0.6	0.75	1.0	1.2	0.75	1.0 320	1.2
S min	315	335	365	380	275	320	340
E	90	70	60	55	135	105	90

S min = Adjustable distance to upper

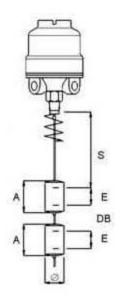
switching level.

E min = Differential

DB = Minimum dead band

Two switch 2 narrow differentials: 18D

The displacers are positioned to form two elements of similar lengths, such that two alarm points may be given. This arrangement is typical of sump application.

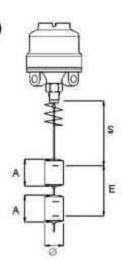


18D St. Steel: A = 216 \emptyset = 60.3

Switch types	D4 D4U	P4	X4	H4	D8 D8U	P8 X8	H8
S.G.	0.6	0.8	1.0	1.2	0.8	1.0	1.2
						350	345
E min					100000000000000000000000000000000000000		
Dead band	200	230	255	310	165	215	250

Single switch wide differential: 12D

The two displacer elements are positioned at any point on the cable to correspond to the switching levels required. When the liquid level drops to the lower displacer the switch is actuated and starts (or stops) a pump; when the liquid rises to the upper displacer the switch is again actuated to stop (or start) the pump.



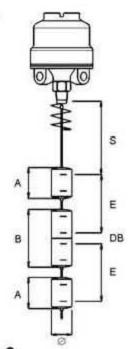
12D St. Steel: A = 216 \emptyset = 60.3

Switch types	D4 D4U	P4	X4	H4	D8 D8U	P8	X8	H8
S.G. S min	0.5	0.8	1.0	1.2	0.75	0.8	1.0	1.2
S min	415	430	430	425	390	390	400	400
E min	165	110	95	80	205	200	165	140

Two switch 2 wide differentials: 13D

A pump is controlled between the middle and the lower pump displacers positioned on the cable at the required levels. Should the level rise to the upper displacer this actuates the upper alarm switch which remains actuated until the level drops to the middle displacer.

Alternatively, the upper switch could control a second pump.



13D St. Steel: A = 152 B = 304 Ø = 60.3

Switch types	and the second	P4	X4	H4	D8 D8U	P8)	X8 H8
S.G.	0.6	8.0	1.0	1.2	8.0	1.0	1.2
S min					The state of the s	350	345
E min	135	110	95	80	200	145	140
Dead band	2 - 2 5 L 1 1 1 1 2 5				165	215	250

Switch m	nechanisms	Switch er	nclosures
4 Contact: D4 D4U P4 X4 H4	8 Contact: D8 D8U P8 X8 H8	Weatherproof: S4N	Flameproof: S7A S7I
A B 2 × independent SPST AA make on rise: BB Make on fall	Double pole double throw (4 × independent SPST) AA make on rise, BB make on fall	S4N: 275 Allow extra for cover removal Cable Entry 1" NPT Tube & Union	S7A, S71 : 300 Allow extra for cover removal Cable Entry 1" NPT Tube & Union



2.0 Direct Mounting Float Switches: Ordering Information

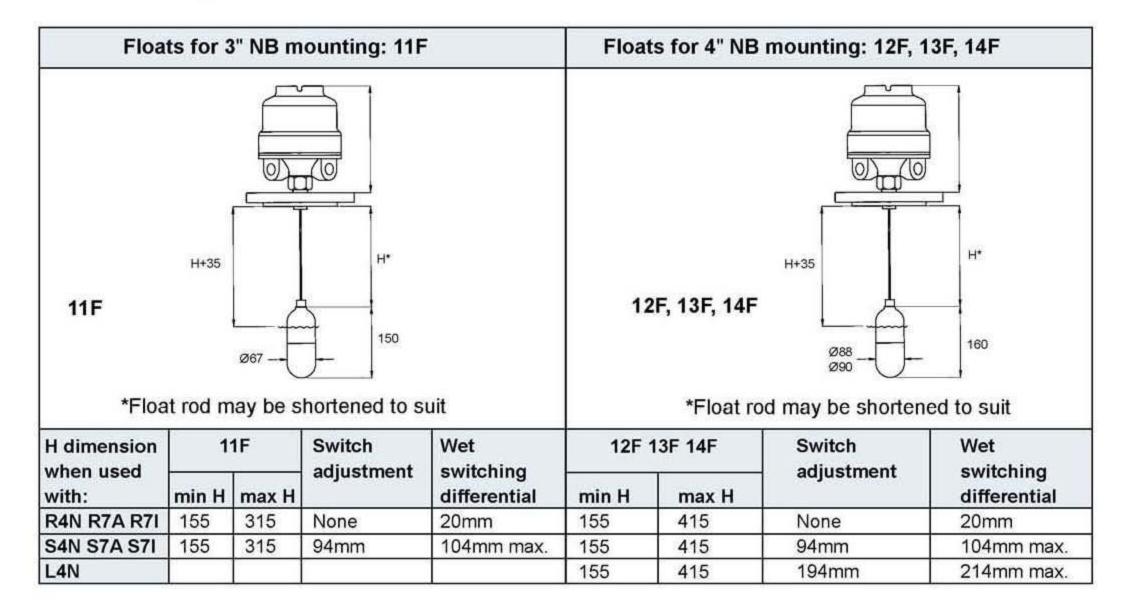
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					D4 D4U P4 X4 H4 D8 D8U P8 X8 H8	Type Switch A con Gener Gen. & CSA Low p High p Herma 8 co Gener Gen. & CSA Low p High p Herma Code 0 60 61 62 65	of switch me ch mechanis duty ntact: 2 x SP ral purpose purpose for la cower circuits etically seale ontact: DPD ral purpose purpose for la cower circuits etically seale ontact: DPD ral purpose purpose for la cower circuits etically seale ower circuits cower circuits ower circuits cower circuits ower circuits	chanism	x. side \(\) \(\	AC r Volts 440 440 440 440 440 440 440	nax va Amps 5 0.25 10 5 0.25 10 5	lues VA 2000 2000 2000 2000 2000 6 2000 2000 2	250 250 250 250 250 250 250 250 250	Res. I 5 0.25 10 5 0.25 10 5 Thes stock Othe sizes are a	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	50 50 50 50 50 50 50 50 50 50 50
					D4 D4U P4 X4 H4 D8 D8U P8 X8 H8	Type Switch A con Gener Gener & CSA Low p High p Herma Rode Code Code Code Code Code Code Code C	of switch me ch mechanis duty ntact: 2 x SP ral purpose purpose for la cower circuits etically seale ontact: DPD ral purpose purpose for la cower circuits etically seale ontact: DPD ral purpose purpose for la cower circuits etically seale ontact: DPD ral purpose purpose for la cower circuits etically seale ontact: DPD ral purpose purpose for la cower circuits cowe	chanism	x. side \(\) \(\	AC r Volts 440 440 440 440 440 440 440	nax va Amps 5 0.25 10 5 0.25 10 5	lues VA 2000 2000 2000 2000 2000 6 2000 2000 2	250 250 250 250 250 250 250 250 250	Res. I 5 0.25 10 5 0.25 10 5 Thes stock Othe sizes are a	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	50 50 50 50 50 50 50 50 50 50 50

Note:

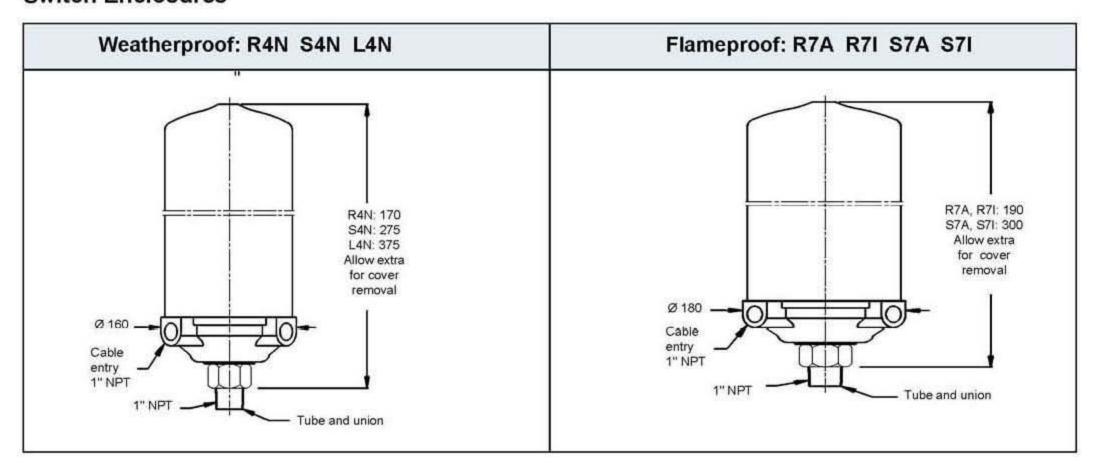
^{*}Base material will be cast iron whenever 8 contact switches specified.
Instrument pressure rating is the lower of either the float or mounting flange



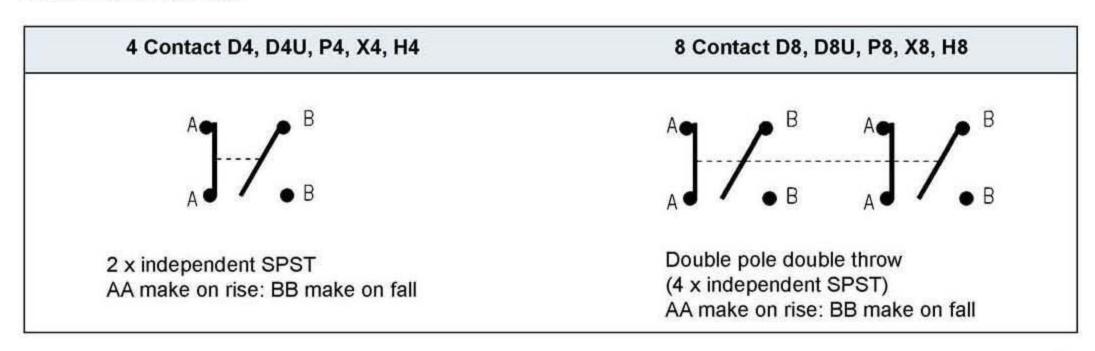
Direct Mounting Float Dimensions



Switch Enclosures



Switch Mechanisms





3.0 Carbon Steel Chamber Mounted Controls: Ordering Information

- 10 miles		10	UCAL	IIIdv	N-	CHILDY	CO III	III CITAL	liber i	or routine mai	ntenance								
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C	100	-	THE RES 100		ра	ge 15													
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			mate		I IV	S.G	ПГа	Name of the last o	37.5%	hambers (X) ting (bar)	Bottle S	ATC	ing (bar	9270 93		peration postule ia a		77.5	ambe
			mate	Cilai		0.0	20	°C	250%		20°C	250%		0°C	on reque	Maria Control of the State of t			oody size
	11F	-			-	0.80		1.5	22.5		30.1	22.5		0.0		5057.55 F. 1556		0000110	' N.B.
	12F		31	16		0.75	2755	2.1	66.3		88.8	66.3	5 7557	9.2		r to pa	277	35	IN.D.
	13F		stain	less		0.65	5	1.1	33.2		44.6	33.2		9.6	for proc			20 20	
	14F		ste	eel		0.54	19	9.6	12.7	11.3	17.1	12.7	7 1	1.3		ratings		4"	' N.B.
	17D					0.40	10	2.1	66.3	59.2	88.8	66.3	5 5	9.2	Note: sii	ngie sw	itch only	/	
			Code	Switc	ch E	Enclos	ure		390.77		272 1141 112	4 2 2							
						V-11072-1-0			Mater		Materia	Sec. (1980)		witch			. no. of		
			22 774			uty		Base		Cover	wetted p	Interested 2	7.700	ıstmer	nt	4 Cont	act	8 Co	ntact
			R4N	VVe		nerprod	of A	Alumini	43.7%	Drawn	316	84-	- D	lone	2	1			1
			S4N		IF	P66		alloy		steel	stainle		DOM	4mm		4		8	2
			R7A		<u> </u>	anroof	- Table 1971	Alumini		Aluminium	stee	4 -		lone		1		57	2
			S7A R71			eproof &	14.7	alloy Cast		alloy Cast		,		4mm Ione	-	4		-4	1
		3.8	S71	Eyn		a ionpro	of \vdash	iron	OF OF	iron		2	60	4mm	Er .	4			2
			-, 1	Cod		Appro	-	11011	-	MINIA:			٥.	accust.	50	- T	1)). 4	100 00
				U				n Proo	f										
				Č			Second Second	ion Pro											
				N						Weatherproo	f type NE	MA 4X							
						ATEX	Flame	ameproof & Weatherproof IP66 depending on switch umber of switch mechanisms						enclos	ure (leav	()			
						Code	Num	per of s	switch	mechanisms									
					1	1 - 4	As re	quired	: see	max. number a	allowable	in switc	ch enclo	sure a	and float	data a	bove		
					8		Code	Туре	of sw	itch mechanis	m			William Charles and		2000 Company of Company (1990)	AARTONIA ACONTONO		
						81		Sw	itch m	echanism	Max. w	/etside	A.C.	max. v	alues	D	.C. max	. valu	es
									d	uty	tempe	rature	Volts	Amps	s VA	Volts	Res. I	Ind. I	Wat
								4 (Conta	ct: 2 × SPST				SOURCE STREET				HALLAUS Y	
							D4	Gene	eral pu	ırpose	400	O°C	440	5	2000	250	5	0.5	50
							D4U	Gen.	purpo	ose for UL &	400	O°C	440	5	2000	250	5	0.5	50
								CSA											
							P4	1	5	r circuits	2007/06/00/	0°C	250	0.25	LOOK.	250	0.25	0.1	3.6
							X4	Contract of the Contract of th		r circuits	26000	0°C	440	10	2000	250	10	0.5	50
							H4			lly sealed	250	0°C	440	5	2000	250	5	0.5	50
							D8	71.75	SACTOR OF THE PARTY OF THE PART	ct: DPDT	400	O°C	440	5	2000	250	5	0.5	50
							D8U			urpose ose for UL &)°C	440	5	2000	250	5	0.5	50
							DOO	CSA		ose for the d	100	, 0	140		2000	200		0.0	00
							P8			circuits	400	O°C	250	0.25	6	250	0.25	0.1	3.6
							X8		8	r circuits	4.7500	0°C	440	10	2000	250	10	0.5	50
							H8	(20 mg/s);	20	lly sealed	250	O°C	440	5	2000	250	5	0.5	50
								Code	Pro	cess connecti	on config	uration							
								1		e/bottom									
								2	77.7702	e/side with 1"	ALABA A TANIH CAMADA MATANA CAMA		rating						
									Coc	de Process of Chamber:	The second second second second			namba	er : 4" N.	R only	These	are)LIF
									01	1" N.P.T.:		-34	STATE OF STREET	DESCRIPTIONS OF THE PROPERTY O	ss 150 F	THE RESIDENCE OF THE PARTY OF T	stocke		
									11	1" Class 1		22			ss 300 F		Other		
									12	1" Class 3		23	500		ss 600 F		sizes	Septimone September	
									13	1" Class 6		25		N40 P			are av		550535
									15	DN25 PN1	6	3		Class	150 RF		on rec	197	
									16	DN25 PN2		32			300 RF		Instru		
									17	DN25 PN4		33			600 RF		pressi		100000000000000000000000000000000000000
									18	DN25 PN6		38	A STATE OF THE STA	N50 PI			rating		
									19	DN25 PN1	100	36		N50 P			of eith		
			\downarrow	•		•	•	_	_			37	וט	N50 P	1140		or pro	COS I	iange
0.2	_					9.34	9.3		-										

State process connection centres when ordering. See page 14 for standard dimensions. Instrument pressure rating is the lower of either the float or the process flange.

^{*} Base material will be cast iron whenever 8 contact switches are specified.

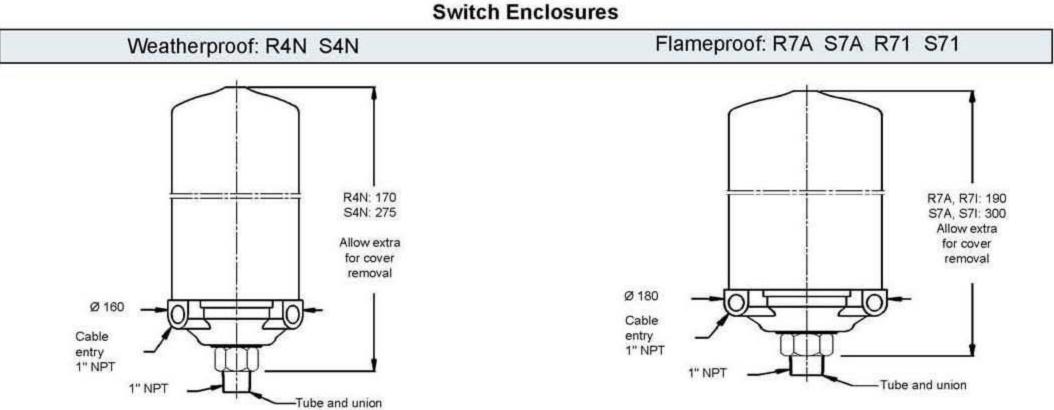


Chamber Type and Material of Construction

Carbon steel: Flanged construction Carbon steel: Bottle construction XC BC

Float is sealed inside chamber during manufacture

Float may be removed from chamber for routine maintenance, cleaning or inspection

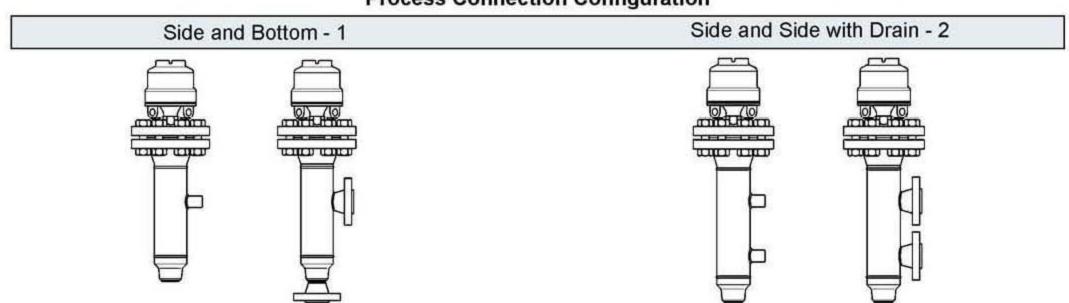


Switch Mechanisms



2 × independent SPST AA make on rise: BB make on fall Double pole double throw (4 × independent SPST) AA make on rise: BB make on fall

Process Connection Configuration



Chamber dimensions, operating levels and technical data are given on page 14



4.0 316L Stainless Steel Chamber Mounted Controls: Ordering Information

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S	OI PROPERTY OF THE PARTY OF THE			n of chan	NAME OF THE OWNER O										
5	A STATE OF THE STA	Floats	nendocoktaniestosta (1894 i 1908)	see page	15										
	Code	10.00		Minimum	Tlangad Ct	tula abam	horo (V) Dottle Ct	do obor	mboro (I	2) 1111		•	Cha	- 100
		20	terial	S.G	Flanged St	re rating (1892	S		inbers (i ig (bar)	50 100 100 TO	AND DESCRIPTION OF THE PROPERTY OF THE PROPERT	ion pressure ia available		
		IIIai	.enai	3.0	Fiessu	re raung ((Dai)	20°C	250°C	1 TA		And the second second second	p to 250bar	bod	уз
	12F	3	16	0.75	102.1	66.3	59.2	88.8	66.3	59.2		•		+	
	13F	20 38	nless	0.65	51.1	33.2	29.6	44.6	33.2	29.6	(2	Refer to pro	3775	4"	N
	14F	125	eel	0.54	19.6	12.7	11.3	17.1	12.7	11.3	7,150	2.7	n ratings	0.012	1.4.
	17D			0.40	102.1	66.3	59.2	88.8	66.3	59.2	1 1 2 5 TO	e: single	switch onl	y	
		Code	Switc	h Enclos	E CONTRACTOR DESCRIPTION	1	4770-1000-044	A PARAGONIANA	TELOGRAPHICA CAPICA	***************************************				-1	
		Oodo	Ottico	TI Elicioo		erial of		Material of		Switch	Ť	Max.	no. of sv	vitche	s
			Di	uty	Base	Cove		vetted parts	1,00	justmen	t	4 Con		Conta	
		R4N		erproof	Aluminium	27302304011011			-	None		1		1	S-2472.
		S4N	100000000000000000000000000000000000000	266	alloy*	stee	1701R	316	100	94mm		4		2	
		R7A	7_1		Aluminium	Alumini	um	stainless	23 to 1	None		1		1	
		S7A	Flam	eproof	alloy*	alloy	,	steel	9	94mm		4		2	
		R7I	Evalor	& ionnroof	Cast	Cast				None		1		1	
		S7I	Explos	ionproof	iron	iron			9	94mm		4		2	
		5		Approvals											
					sion Proof osion Proof										
			Sec. 25		A General Ar	ea Weath	ernroo	f type NFM	Α ΔΧ						
					meproof & V					vitch end	closur	e (leave	e blank)		
		9			mber of swit										
				1 - 4 As	required: se	e max. nı	ımber a	allowable in	switch	enclosu	ıre an	d float	data abo	ve	
				Со	de Type of			m				de			
					0.0000000000000000000000000000000000000	mechanis	Mariana Tarana	ax. wetside		max. va	A SANTON AND AND AND AND AND AND AND AND AND AN		C. max	1910.000.000.000.000.00	-
						duty	LOCKSON.	mperature	Volts	Amps	VA	Volts	Res. I	Ind. I	W
				D4	3	ct: 2 × SF purpose	31	400°C	440	5	2000	250	5	0.5	
				D4		purpose pose for l	н	400°C	440 440		2000	250	5	0.5	100
					and CSA			400 0	440	3	2000	200	5	0.0	.89
				P4		<i>r</i> er circuits	5	400°C	440	0.25	6	250	0.25	0.1	
				X4		ver circuit		250°C	250	25 Keep - 1000	2000	250	10	0.5	
				H4	3763 40	ally seale		250°C	440	5	2000	250	5	0.5	
					Janes - American Contract of the Contract	tact: DPD	2009	and the second					~~~		
				D8	General	purpose		400°C	440	5	2000	250	5	0.5	
				D8	U Gen. pur	pose for l	JL	400°C	440	5	2000	250	5	0.5	1
					and CSA										
				P8	The section and the section and	er circuits		400°C	250	0.25	6	250	0.25	0.1	1
				X8	3.000 CA	ver circuit		250°C	440	10	2000	250	10	0.5	
				H8		cally seale		250°C	440	5	2000	250	5	0.5	
					\$100 Jan 11	de/bottom		n configura	uon						
					Table Control	de/side w		PT drain							
						The state of the s	A TROUBLE INC.	nection siz	e & rati	ng					
					01	- December 1	THE COMPANY CONTRACTOR	6 stainless	00 EU VE		22	11/2'	' Class 3	00 RF	3
					11	1" CI	ass 150	ORF			23	11/2'	' Class 6	00 RF	=
					12		ass 300				31	file N	Class 150		
					13	The ANN ALTERNATION OF THE PARTY OF THE PART	ass 600				32	solden V	Class 300		
					21	11/2"	Class 1	50 RF			33	2" 0	Class 600	RF	
						17					-	17.7			
								Other flange	size and ra	itings are a	vailable	on reques	st.		
	•	V		↓ ↓		\		Other flange s	size and ra	itings are a	vailable	on reques	st.		

Note:

^{*} Base material will be cast iron whenever 8 contact switches are specified

State process connection centres when ordering. See page 14 for standard dimensions. Instrument pressure rating is the lower of either the float or the process flange.

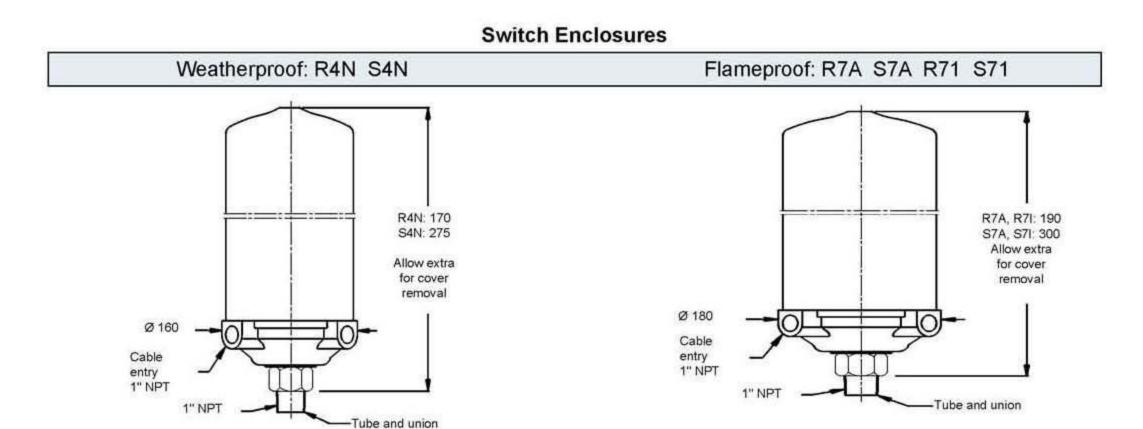


Chamber Type and Material of Construction

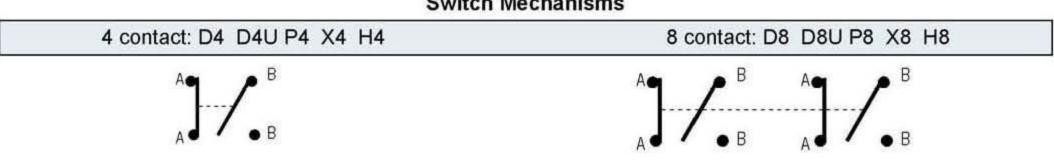
Carbon steel: Flanged construction Carbon steel: Bottle construction XS BS

Float is sealed inside chamber during manufacture

Float may be removed from chamber for routine maintenance, cleaning or inspection

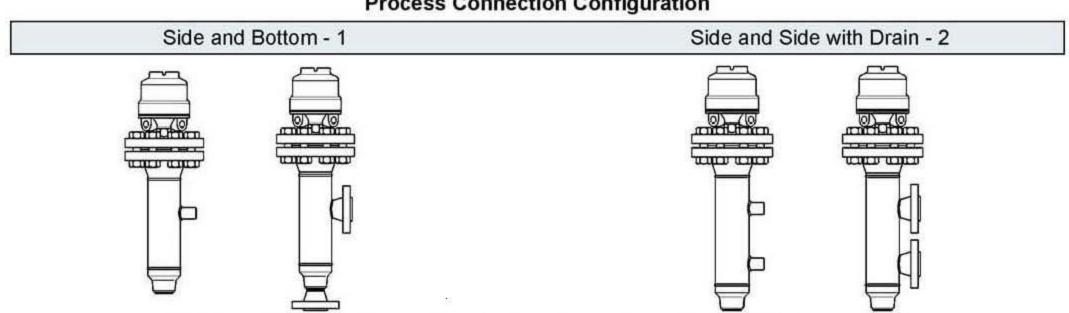


Switch Mechanisms



2 × independent SPST AA make on rise: BB make on fall Double pole double throw (4 × independent SPST) AA make on rise: BB make on fall

Process Connection Configuration



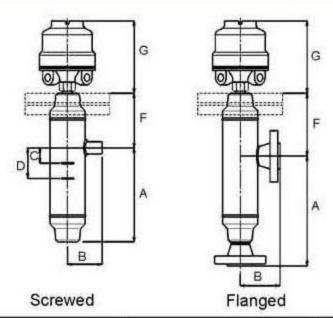
Chamber dimensions, operating levels and technical data are given on page 14

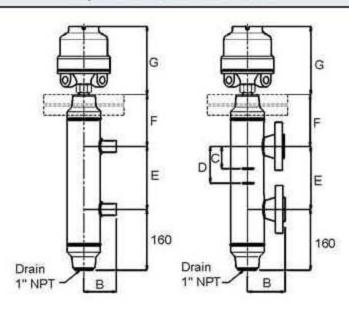


Dimensional and Operating Level Data

Style 1: Side and Bottom

Style 2: Side and Side





- //	· · ·	1	B*	С	D	V	E		F	
Process connections	Single	Multi- type	Chamber type		Single switch	Multi- switch	Single switch	Multi- switch		per type
/# LIST / : : # \	'R' head	'S' head	BC/others		'R' head	'S' head	'R' head	'S' head		
1" NPT (side/bottom)	300	385	76/95	50	70	155	-	-	48/160	
1" NPT (side/side)	-	-	95	50	70	155	271	356	160	225
1" 150	356	441	110	50	70	155	271	356	160	225
1" 300	356	441	117	50	70	155	271	356	160	225
1" 600	356	441	123	50	70	155	271	356	160	225
DN25 PN16	356	441	94	50	70	155	271	356	160	225
DN25 PN25	356	441	96	50	70	155	271	356	160	225
DN25 PN40	356	441	96	50	70	155	271	356	160	225
DN25 PN64	356	441	114	50	70	155	271	356	160	225
DN25 PN100	356	441	114	50	70	155	271	356	160	225
1½" 150	356	441	115	50	70	155	271	356	160	225
1½" 300	356	441	121	50	70	155	271	356	160	225
1½" 600	356	441	126	50	70	155	271	356	160	225
DN40 PN16	356	441	97	50	70	155	271	356	160	225
2" 150	356	441	112	50	70	155	271	356	160	225
2" 300	356	441	118	50	70	155	271	356	160	225
2" 600	356	441	129	50	70	155	271	356	160	225
DN50 PN16	356	441	98	50	70	155	271	356	160	225
DN50 PN25	356	441	101	50	70	155	271	356	160	225
B* Dimension given is fo	r 4" NB char	nber (12F,	13F, 14F & 17	D Floa	ats). For 3"	NB chaml	per (11F F	oat) subtr	act 13mr	n.
Operating levels: Typ	e 17D floa	t in any c	hamber.			l	l	l.	l	
Operating S.G.	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	
Dimension C	65	73	82	91	100	109	118	127	136	
Dimension D	118	122	127	132	137	141	147	152	156	

Notes: C = Highest operating liquid level

D (Single switch) = Reset level

All dimensions in mm.

D (Multi switch) = Lowest operating liquid level D-C = Wet switching differential (max)

NOTE: Dimensions given are for reference only, and must be certified on order.

Dimensional data: enclosures Type		Height G	Conduit thread*	Switch adjustment	Weatherproof rating
R7A, R7I	Flameproof	190	1" NPT	None	IP66 to IEC60529
S7A, S7I	Explosion proof	300	AC 10032-01 301	94	(NEMA 4)
R4N		170		None	IP66 to IEC60529
S4N	Weatherproof	275	1" NPT	94	(NEMA 4)
L4N	1/2	375		194	8 3

^{*}Enclosures for use with 8 contact switch mechanisms have both conduit entries threaded, whilst those for use with 4 contact switch mechanisms have only one conduit entry.



Pressure tube & union.

Swaged & welded

Magnet sheathed in

'0' ring seal to base

Full

penetration

Weld neck flanges used

throughout

welding

Float

construction

316 st. steel

Technical Data

Intra vertical level controls are manufactured to the highest standards of quality with only certified materials: BS EN 10204: 2004-3.1. Design of hte chambers is in accordance with ASME B31.3. Relevant chambers are supplied CE marked and fully compliant with the Pressure Equipment Directive (97/23/EC).

Weld procedures approved to EN ISO 15614-1 and ASME IX, welders approved to BSEN 287-1. Circumferential and set-on branch welds are full penetration welds, with visual inspection in accordance with ASME B31.3 "normal service" requirements and our company standard 417.

All pressure retaining assemblies are hydrostatically pressure tested to a minimum of 1.43 × maximum working pressure or to flange standard requirements.

Radiography or other NDT techniques can be accommodated provided that they are specified at time of order entry.

Inspection

Whilst the manufacturer employs inspectors in house, unconnected with production, customers frequently ask for outside inspection. We are happy to accommodate nominated inspectors if agreed at order entry.

Some specifications require a quality control plan detailing inspection points and hold points. Intra will produce these QC plans for customer approval if agreed at order entry.

Pressure Ratings (bar)

Material Car		bon steel: A105		Stainless steel: 316L		
	20°C	250°C	400°C	20°C	250°C	400°C
ASME B16.5 Class 150	19.6	12.1	6.5	15.8	10.1	6.5
ASME B16.5 Class 300	51	41.7	34.5	41.3	26.6	23
ASME B16.5 Class 600	102	83.6	69	82.7	53.4	46.1
BS EN 1092-1 PN16	16	14.4	10.8	12.3	7.9	6.8
BS EN 1092-1 PN25	25	22.5	16.9	19.2	12.4	10.7
BS EN 1092-1 PN40	40	36	27	30.6	19.8	17.1

Materials of construction	Carbon steel chamber	Stainless steel chamber		
Chamber tube	ASTM A106 grade B	ASTM A312 TP316L		
Top casting	ASTM A216	-		
Top/bottom caps	ASTM A105	ASTM A182 F316L / A403 WP316L		
Top cover	ASTM A105	ASTM A182 F316L		
Flanges/fittings	ASTM A105	ASTM A182 F316		
Studs	ASTM A193-B7	ASTM A320-L7		
Nuts	ASTM A194-2H	ASTM A194 Grade 7+S3		

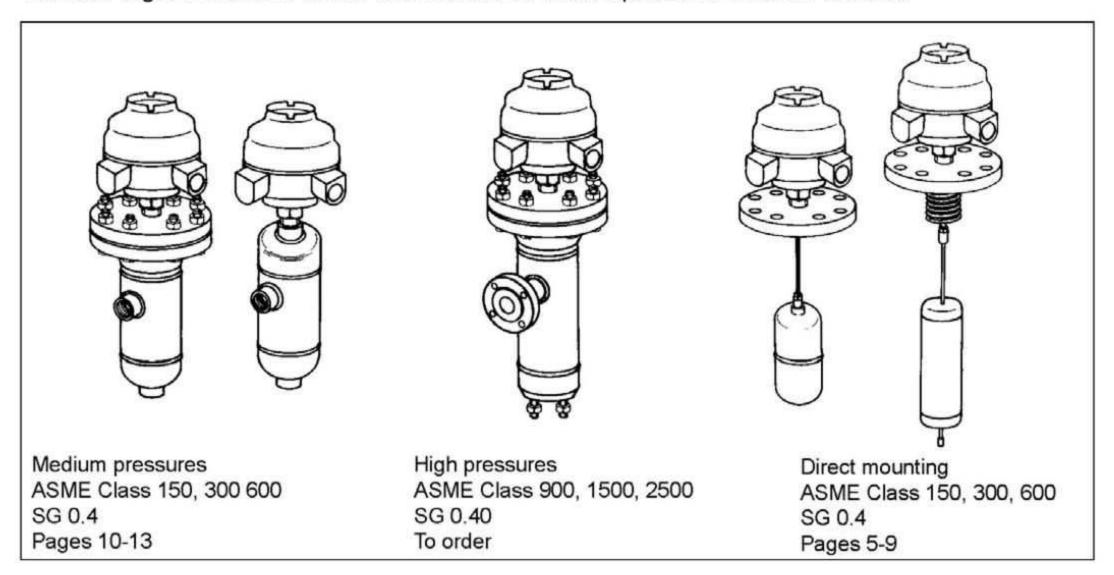
Options

- Low temperature carbon steel
- Process connections to specification
- Duplex UNS31803

- Ratings up to ASME Class 2500
- Cr. mo. steels
- · 3.1 Identifiable certification
- N.A.C.E. requirements
- N.D.T. to your specifications
- · Vent and drain connections



"Fit and Forget" Products Provide The Solution To Your Liquid Level Control Problems



You can rely on us

Our range of vertical liquid level controls is designed for operation in a wide variety of applications.

Typical Applications

Separators	Water Sumps
Compressors	Scrubbers
Knock-out Pots	Fractioning Columns
Condensors	Flash Vessels
De-aerators	Process Vessels
Storage Tanks	Condensate Tanks
Service Tanks	Drainpots
Header Tanks	Accumulators
Effluent Sumps & Tanks	Fuel Tanks
Heat Exchangers	Feedwater Heaters
Lude Oil Tanks	Surge Drums

Our level switches are used for the control of liquids by companies all over the world.

Shell	Bechtel
Exxon	Bellili
Amoco	Ontario Hydro
Fluos	Nissaei-Sangyo
Hyundai	Foster Wheeler
British Petroleum	Siemens
Mobil	Mannesmann-Demag
Texaco	Catalytic
Ingersoll Rand	Techni
Compair	Technipetrol
Honeywell	Nuovo Pignone
Wemco	Dresser



Intra-Automation GmbH Otto-Hahn-Str. 20 41515 Grevenbroich GERMANY www.intra-automation.com
info@intra-automation.de

** +49-(0)2181-75665-0 ** +49-(0)2181-64492