

# Technical Datasheet



## Magnetic Vertical Type Level Switches



### Float actuated type

#### Key Features

- Unique switching mechanism – totally reliable
- No springs in switch mechanism – positive snap action switching
- Vibration resistant – eliminates spurious trips
- Multiple switch point options – cost effective control
- Genuine hermetically-sealed switch option – totally safe and secure
- Suitable for installation in chamber



#### Series Overview

The float type level switches are offered with a wide range of material to meet most the application in industry.

A choice of different type of floats is available making the instrument suitable for a wide range of liquids and pressure and temperature conditions. The length of the rod, is adjustable to fit the application.

These level switches can be optionally supplied mounted vertically in chambers, in a sealed or removable form. A range of carbon steel chambers are available, and for more vigorous applications there are stainless steel chambers.

There are a variety of instrument and process connection options available to make installation simple and economic. This gives you the choice to meet your application in keeping with your budget.

#### Other products

Other products we can offer :

- Displacer type, level switches
- Chamber mount instruments



#### Product applications

- Unique hermetically-sealed switching mechanism option
- Unique treble-seal pressure tube and union
- Wide range of mounting options
- External chamber options
- Rugged, robust, and trusted all over the world
- Ideal for tough process control duties
- Operates in almost any liquid at high pressures and temperatures
- Multiple switch points
- Unique three-magnet, snap action, and latching switch mechanism

#### 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](http://www.delta-mobrey.com) to find your local support centre or call us on:

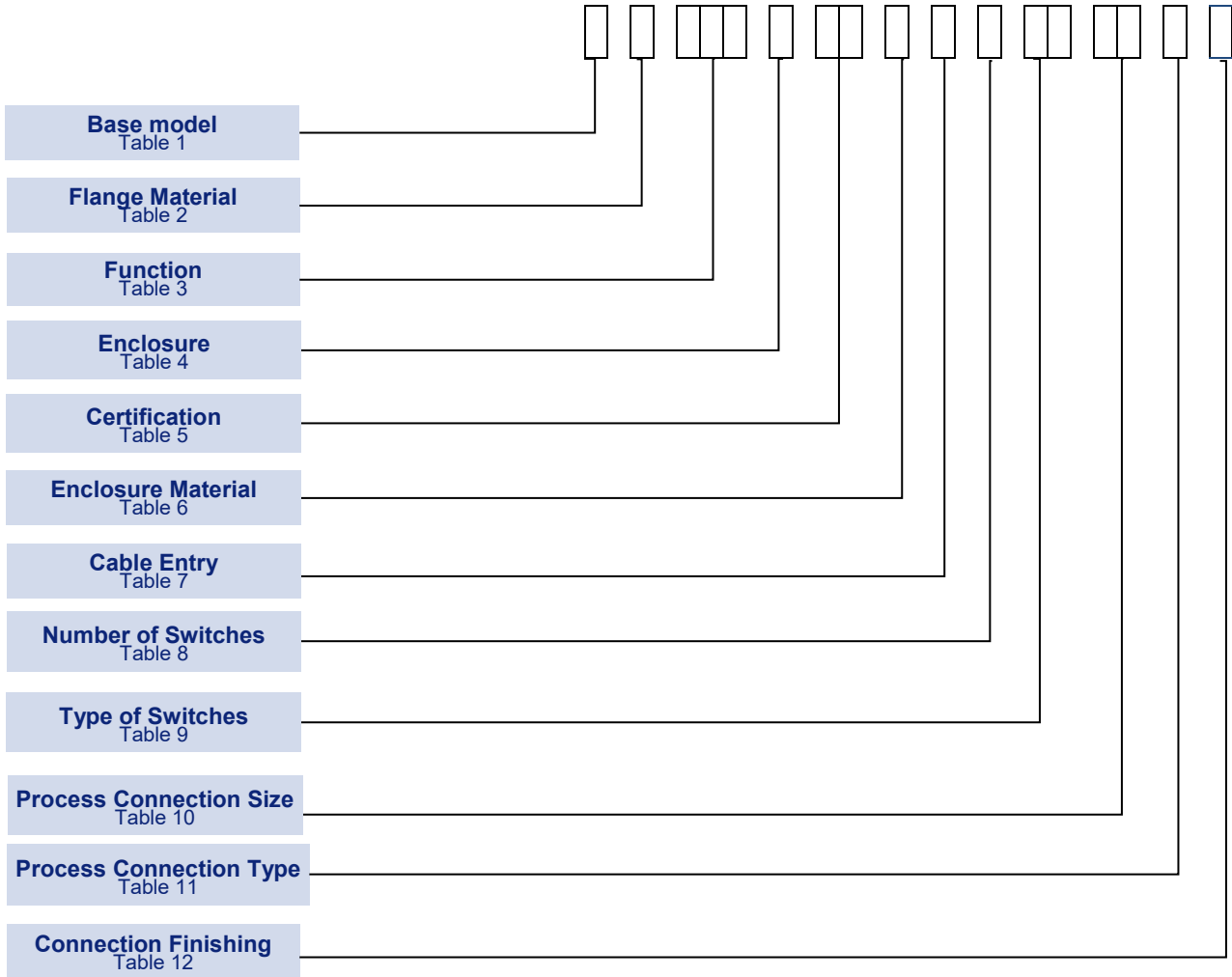
**+44 (0)1252 729140**

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## How to order

Switches can be configured by selecting codes representing the desired features from the tables that follow. The chart below, describes how the model code is built up. For assistance in configuring a switch that best suits your needs, please contact your local sales office.



## Technical Specification

<b>Switching accuracy:</b>	depends by the accuracy in setting the position of the float
<b>Storage Temperature:</b>	-50°C to +60°C
<b>Ambient Temperature:</b>	-50°C to +60°C
<b>Maximum Process Temperature:</b>	-10 to 400°C when fitted with 4/8 contacts type Dn & Pn ; -10 to 250°C when fitted with 4/8 contacts type Xn & Hn
<b>Maximum Process pressure:</b>	see table
<b>Enclosure classification:</b>	Weatherproof / Flameproof (Intrinsically Safe, suitable via Declaration of Simple Apparatus).
<b>Ingress Protection:</b>	IP 66 / NEMA 4
<b>Pollution Degree:</b>	Pollution degree 3 according EN60947-5-1 (For extreme conditions where condensation may readily form, then sealed contacts should be used)
<b>Switch Output:</b>	up not six 2xSPST (N.O.+N.C.) or 4xSPST(2xN.O. + 2xN.C.)
<b>Electrical rating:</b>	See <b>Table 9</b>
<b>Terminal Block:</b>	solid: max 1mm <sup>2</sup> / 16AWG — stranded : MAX 4 mm <sup>2</sup> / 10 AWG
<b>Grounding Connection:</b>	One internal and one external suitable for wire section up to to 4 mm <sup>2</sup> / 11 AWG
<b>Process Connection:</b>	flanged 3" or 4" ANSI B16.5 150/300/600 or 1"NPTM
<b>Approximate Weight:</b>	depending on model
<b>Standard rod &amp; float</b>	316 stainless steel, length see table dimension "A"
<b>Material of enclosure</b>	See description on table below
<b>Material of wetted parts</b>	See description on table below

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## Product Description & Operating Principle



The float type level switches are usually mounted vertically on top of the vessel, but can also be used on a side of the tank, into appropriate sealed chamber. The operating principle also makes them suitable, in a modified form, to a very wide range of applications, including high pressure & temperature or low specific gravity applications.

The instrument is made by a float dimensioned for the liquid to measure, integral with a rod and a magnet on top of the rod. The length of the rod is adjustable within the limit of the type of Float (see below). The float, via the buoyancy principle, is subjected to a lifting force generated by the liquid, that moves up the whole system,

One or more switching units are actuated by the magnet fixed on top of the rod, giving a reliable snap-action “latch-on” switching of the switching unit. The float magnet can continue upwards and activate another switch mechanism at other level points. Switching mechanism already actuated, does not reset until the float magnet returns and falls below the switching mechanism.

Due to the limited length of the rod, these electro-mechanical switches give a reliable switching output in high or low level alarm application. For high vessels or on/off pump control, the range of displacer type level switches must be considered. See TDS-MVLS D

The simple operation principle, allows several constructions to meet different requirements and application:

### Type of enclosures

Select the enclosures according to the number of Switch mechanism

### Weatherproof Nema4/IP66

Type L\*\*N



Type S\*\*N



Type R\*\*N



### Explosionproof and Flameproof

Type S\*\*A



Type S\*\*I



Type R\*\*A



Type R\*\*I




To fit the application, the float rod length “A” can be adjusted within the limits shown below.

	<b>TYPE 11F</b> <ul style="list-style-type: none"> <li>3" nominal bore</li> <li>two 4 or 8 contact switch mechanism</li> <li><b>Application:</b> Single alarm</li> <li><b>Dead-band:</b> standard narrow</li> </ul> <p style="text-align: center;">A= adjustable distance</p>				
	<b>4 or 8 contacts</b>			<b>Max. distance between switching units</b>	
	<b>Switch enclosure &amp; Material</b>	<b>A Minimum</b>	<b>A Maximum</b>	<b>Switch Adjustment</b>	
	<b>R : all material (N/A/I)</b>	155mm	315mm	None	
<b>S : all material (N/A/I)</b>	155mm	315mm	Up to 94mm	Up to 114mm	

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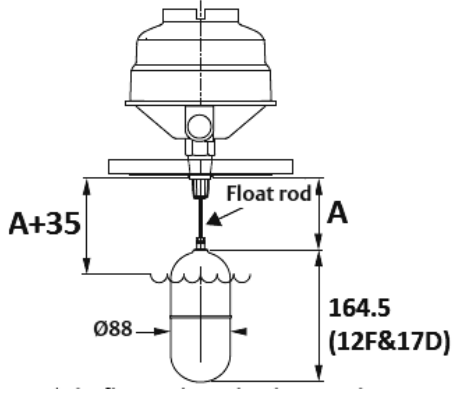
## Product Description & Operating Principle




**TYPE 12F & 17D (single switch only)**

- 4" nominal bore
- two 4 or 8 contact switch mechanism
- **Application:** multiple alarm
- **Dead-band:** wide range

A= adjustable distance



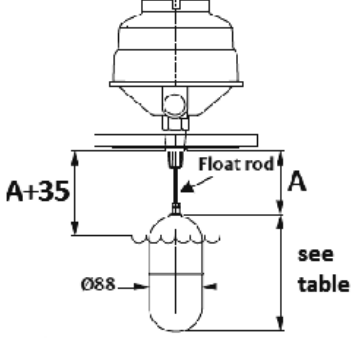
Switch enclosure & Material	4 or 8 contacts			Max. distance between switching units
	A Minimum (12F only)	A Maximum	Switch Adjustment	
R : all material (N/A/I)	155mm	415mm	None	20mm
S : all material (N/A/I)	155mm	415mm	Up to 94mm	Up to 114mm
L : material N only	155mm	415mm	Up to 194mm	Up to 214mm



**TYPE 13F & 14F**

- 4" nominal bore
- two 4 or 8 contact switch mechanism
- **Application:** Single alarm
- **Dead-band:** standard narrow

A= adjustable distance



Switch enclosure & Material	4 or 8 contacts			Max. distance between switching units
	A Minimum	A Maximum	Switch Adjustment	
R : all material (N/A/I)	155mm	415mm	None	20mm
S : all material (N/A/I)	155mm	415mm	Up to 94mm	Up to 114mm
L : all material (N)	155mm	415mm	Up to 199mm	Up to 214mm

Type of float & function	Float diam.	Float length	PRESSURE RATING (in bar)		
			20 °C	250 °C	400 °C
11F	67mm	154mm	34.5	22.5	20.2
12F	88mm	168mm	102.1	66.3	59.2
13F	88mm	160mm	51.1	33.2	29.6
14F	88mm	160mm	19.6	12.7	11.3
17D	88mm	168mm	102.1	66.5	59.2

**Base Model**

TABLE 1	
	<b>Code</b>
Vertical Float type level switch , for direct mount	<b>D</b>

**Flange Material**

TABLE 2	
	<b>Code</b>
Carbon Steel (only for flanged process connection)	<b>C</b>
316L stainless steel (flanged or threaded process connection)	<b>S</b>

**Function**

TABLE 3	
	<b>Code</b>
3" float suitable for minimum S.G. 0.80	<b>11F</b>
4" float suitable for minimum S.G. 0.75	<b>12F</b>
4" float suitable for minimum S.G. 0.65	<b>13F</b>
4" float suitable for minimum S.G. 0.54	<b>14F</b>
4" float , spring assisted, minimum S.G. 0.40	<b>17D</b>

**Enclosure Type**

TABLE 4	
	<b>Code</b>
62mm high, suitable for <b>single switch mechanism</b> (no set point adjustment allowance)	<b>R</b>
150mm high suitable to fit <b>up to four switch mechanism</b> (set point adjustment allowance 94mm)	<b>S</b>
250mm high suitable to fit <b>up to six switch mechanism</b> (set point adjustment allowance 194mm)	<b>L</b>

**Certification**

TABLE 5	
	<b>Code</b>
FM Certified Explosion Proof (only for enclosure mat. <b>A</b> or <b>I</b> )	<b>E5</b>
CSA Certified Explosion Proof (only for enclosure mat. <b>A</b> or <b>I</b> )	<b>E6</b>
FM ordinary location, Unclassified Safe Area (only enclosure mat. <b>N</b> )	<b>G5</b>
CSA ordinary location, Unclassified Safe Area (only enclosure mat. <b>N</b> )	<b>G6</b>
ATEX/IECEX Certified Flameproof (only enclosure mat. <b>A</b> or <b>I</b> )	<b>KN</b>
No Hazardous location (only enclosure mat. <b>N</b> )	<b>NA</b>

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**Enclosure Material**

TABLE 6	
	<b>Code</b>
Aluminum Alloy base + Drawn steel cover	<b>N</b>
Aluminum Alloy	<b>A</b>
Cast Iron	<b>I</b>

**Cable Entry**

TABLE 7	
	<b>Code</b>
1" -11.5 NPT	<b>A</b>
M20X1.5	<b>B</b>

**Number of Switches**

TABLE 8	
	<b>Code</b>
One switch	<b>1</b>
Two switches	<b>2</b>
Three switches	<b>3</b>
Four switches	<b>4</b>
Five switches	<b>5</b>
Six switches	<b>6</b>

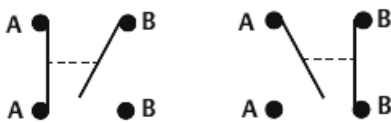
**Type of Switches**

TABLE 9	
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	<b>Code</b>
<b>4 Contact: 2xSPST general purpose</b> 2kVA 440Vac, 5A / 50W 250Vdc 5A resistive	<b>D4</b>
<b>4 Contact: 2xSPST Gold Alloy contact for low power or . I.S. Circuits</b> 6VA 250Vac, 0.25A / 3.6W 250Vdc 0.25A resistive	<b>P4</b>
<b>4 Contact: 2xSPST High Current</b> 2kVA 440Vac, 10A / 50W 250Vdc 10A resistive	<b>X4</b>
<b>4 Contact: 2xSPST Hermetically Sealed in inert Gas, with Gold plated contacts</b> 2kVA 400Vac , 10A / 50W 250Vdc 10A resistive	<b>H4</b>
<b>4 Contact: 2xSPST general purpose</b> 2kVA 440Vac, 5A / 50W 250Vdc 5A resistive	<b>D8</b>
<b>4 Contact: 2xSPST Gold Alloy contact for low power or . I.S. Circuits</b> 6VA 250Vac, 0.25A / 3.6W 250Vdc 0.25A resistive	<b>P8</b>
<b>4 Contact: 2xSPST High Current</b> 2kVA 440Vac, 10A / 50W 250Vdc 10A resistive	<b>X8</b>
<b>4 Contact: 2xSPST Hermetically Sealed in inert Gas, with Gold plated contacts</b> 2kVA 400Vac , 10A / 50W 250Vdc 10A resistive	<b>H8</b>

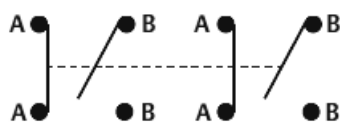
**2xSPST (4 contact) configuration**

A-A make rising      B-B make falling

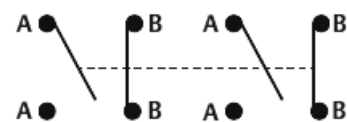


**4xSPST (8 contact) configuration**

A-A + A-A make rising



B-B + B-B make falling



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**Process Connection Size**

TABLE 10

	Code
1" / 25mm (only threaded NN)	1
3" / 80mm (only flanged AA/AB/AC)	3
4" / 100mm (only flanged AA/AB/AC)	4

**Process Connection Type**

TABLE 11

	Code
Flanged ASME B16.5 Class 150	AA
Flanged ASME B16.5 Class 300	AB
Flanged ASME B16.5 Class 600	AC
Threaded	NN

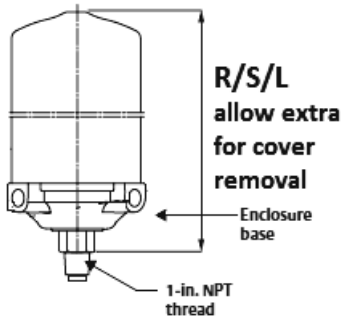
**Connection Finishing**

TABLE 12

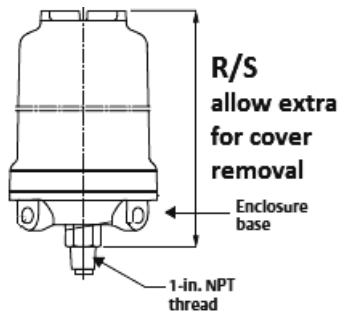
	Code
Raised Face (RF)	R
NPT thread in 316 stainless steel	N

**Dimensions**

Enclosure for Safe Area



Enclosure for Hazardous Area



ENCLOSURE				
Type	Diam.	Material		
		N	A	I
R	φ163	170	190	190
S	φ180	275	300	300
L	φ180	375	/	/

For float dimensions, please see page 3 & 4

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## Approvals

### GLOBAL CERTIFICATION



#### IECEX

FLAMEPROOF Certificate No. IECEX SIR 09.0038X  
Ex d IIC T6....T1 Ga/Gb (Ta = -50°C to +60°C)



#### Functional Safety Certified

Meets the requirements of IEC 61508-2:2010 for use in safety related systems.  
Systematic capability: SC 2;  
Random Capability: Type A element  
SIL1, 2 capable with HFT 0 (1oo1); Route 2<sub>H</sub> and 2<sub>S</sub>  
SIL Capability (Low Demand Mode) = SIL2 ; SIL Capability (High demand mode) = SIL1  
Certificate No. CSA FSP 22002

**Note:** the associated full package of Safety Documentation must be listed on the order acknowledgement.



### NORTH AMERICA

#### Canadian Standards Association

Class I Div. 1 , Group B,C and D  
C22.2 NO 14  
CSA Enc 4



#### Factory Mutual

Explosionproof for Class I Div. 1 , Group B,C and D , Ta = -50°C to +60°C  
Dust-Ignitionproof for Class II/III Div. 1 , Group E,F and G , Ta = -50°C to +60°C  
Flameproof for Class I, Zone 0\*\*/1 AEx d IIC, \* Ta = -50°C to +60°C, Type 4, IP66

### EUROPEAN DIRECTIVES



#### Low voltage Directive (LVD) 2014/35/EU.

Compliant to LVD

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

The product has been designed and manufactured according to Sound Engineering Practice (SEP)



#### ATEX Directive 2014/34/EU

Sira 03ATEX1189X  
II 1/2 G Ex d IIC T6....T1 Ga/Gb (Ta = -50°C to +60°C)

### UK REGULATION



#### Electrical Equipment (Safety) Regulations 2016 .

Conform to UK SI 2016 No 1101 as amended

#### Pressure Equipment (Safety) Regulations UK SI 2016 No 1105, as amended

The product has been designed and manufactured according to Sound Engineering Practice (SEP)



#### Equipment and protective system for use in Potentially Explosive Atmospheres Regulation 2016

II 1/2G Certificate no. CSAE 21UKEX1616X  
Ex db IIC T6...T1 Ga/Gb (Ta = -50°C to +60°C)

ISO9001



FM00720

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