

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 to find your local support centre or call us on:

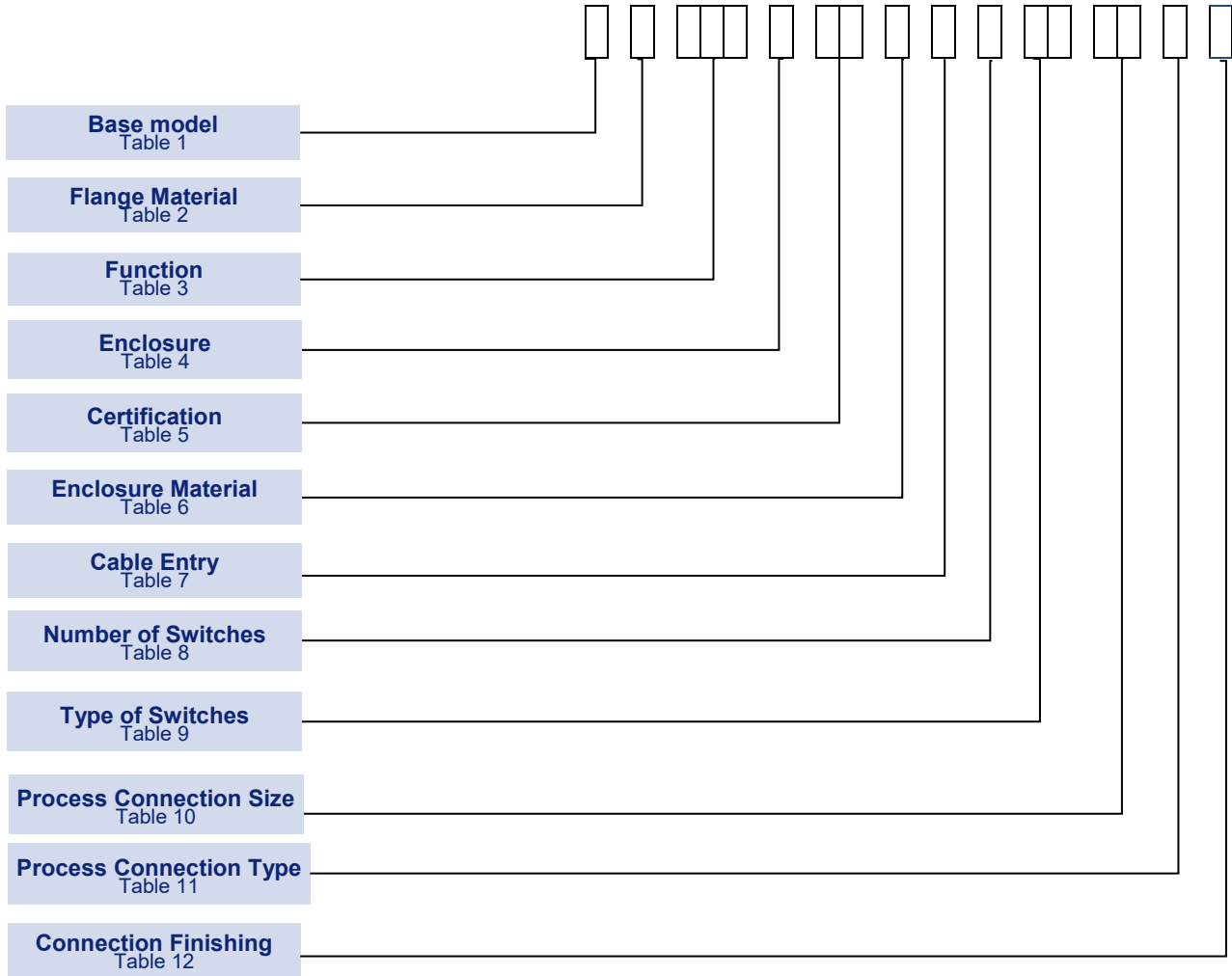
+44 (0)1252 729140

Magnetic Vertical Level Switches

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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

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

Magnetic Vertical Level Switches
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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-MVLSF

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.

| | | | | | |
|--|--|-------------------------|-------------------------|---|---|
| | <p>TYPE 11F</p> <ul style="list-style-type: none"> 3" nominal bore two 4 or 8 contact switch mechanism Application: Single alarm Dead-band: standard narrow <p style="text-align: center;">A= adjustable distance</p> | | | | |
| | <p>4 or 8 contacts</p> | | | <p>Max. distance between switching units</p> | |
| | <p>Switch enclosure & Material</p> | <p>A Minimum</p> | <p>A Maximum</p> | <p>Switch Adjustment</p> | <p>Max. distance between switching units</p> |
| | <p>R : all material (N/A/I)</p> | <p>155mm</p> | <p>315mm</p> | <p>None</p> | <p>20mm</p> |
| <p>S : all material (N/A/I)</p> | <p>155mm</p> | <p>315mm</p> | <p>Up to 94mm</p> | <p>Up to 114mm</p> | |

Magnetic Vertical Level Switches
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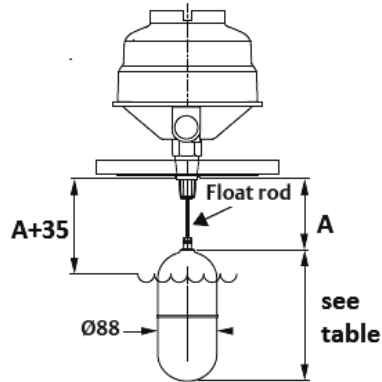
Product Description & Operating Principle




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



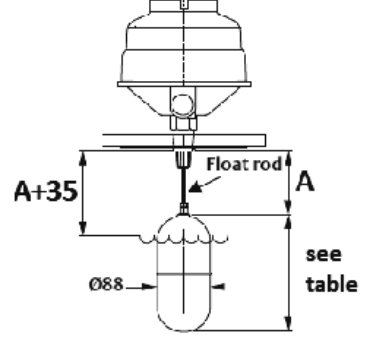
| Switch enclosure & Material | 4 or 8 contacts | | | Max. distance between switching units |
|-----------------------------|----------------------|-----------|-------------------|---------------------------------------|
| | A Minimum (12F only) | A Maximum | Switch Adjustment | |
| R : all material (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 194mm | 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 | |
| | Code |
| Vertical Float type level switch , for direct mount | D |

Flange Material

| | |
|---|-------------|
| TABLE 2 | |
| | Code |
| Carbon Steel (only for flanged process connection) | C |
| 316L stainless steel (flanged or threaded process connection) | S |

Function

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

Enclosure Type

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

Certification

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

Magnetic Vertical Level Switches
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Enclosure Material

| | |
|---|-------------|
| TABLE 6 | |
| | Code |
| Aluminum Alloy base + Drawn steel cover | N |
| Aluminum Alloy | A |
| Cast Iron | I |

Cable Entry

| | |
|--------------|-------------|
| TABLE 7 | |
| | Code |
| 1" -11.5 NPT | A |
| M20X1.5 | B |

Number of Switches

| | |
|----------------|-------------|
| TABLE 8 | |
| | Code |
| One switch | 1 |
| Two switches | 2 |
| Three switches | 3 |
| Four switches | 4 |
| Five switches | 5 |
| Six switches | 6 |

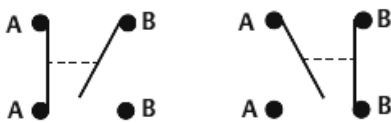
Type of Switches

| | |
|---------|--|
| TABLE 9 | |
|---------|--|

| | |
|--|-------------|
| | Code |
| 4 Contact: 2xSPST general purpose 2kVA 440Vac, 5A / 50W 250Vdc 5A resistive | D4 |
| 4 Contact: 2xSPST Gold Alloy contact for low power or . I.S. Circuits 6VA 250Vac, 0.25A / 3.6W 250Vdc 0.25A resistive | P4 |
| 4 Contact: 2xSPST High Current 2kVA 440Vac, 10A / 50W 250Vdc 10A resistive | X4 |
| 4 Contact: 2xSPST Hermetically Sealed in inert Gas, with Gold plated contacts 2kVA 400Vac , 10A / 50W 250Vdc 10A resistive | H4 |
| 8 Contact: 4xSPST general purpose 2kVA 440Vac, 5A / 50W 250Vdc 5A resistive | D8 |
| 8 Contact: 4xSPST Gold Alloy contact for low power or . I.S. Circuits 6VA 250Vac, 0.25A / 3.6W 250Vdc 0.25A resistive | P8 |
| 8 Contact: 4xSPST High Current 2kVA 440Vac, 10A / 50W 250Vdc 10A resistive | X8 |
| 8 Contact: 4xSPST Hermetically Sealed in inert Gas, with Gold plated contacts 2kVA 400Vac , 10A / 50W 250Vdc 10A resistive | H8 |

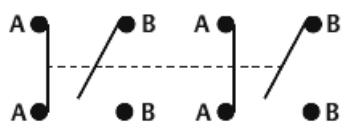
2xSPST (4 contact) configuration

A-A make rising B-B make falling

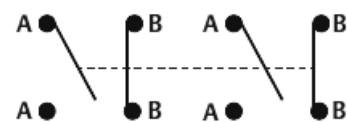


4xSPST (8 contact) configuration

A-A + A-A make rising



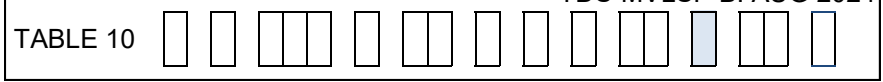
B-B + B-B make falling



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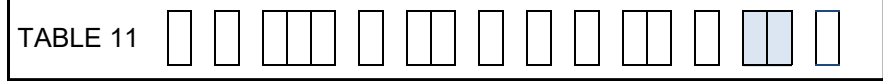
Float actuated type

Process Connection Size



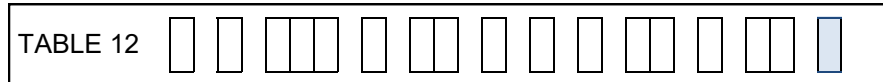
| | Code |
|------------------------------------|------|
| 1" / 25mm (only threaded NN) | 1 |
| 3" / 80mm (only flanged AA/AB/AC) | 3 |
| 4" / 100mm (only flanged AA/AB/AC) | 4 |

Process Connection Type



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

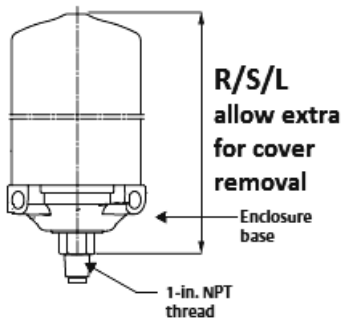
Connection Finishing



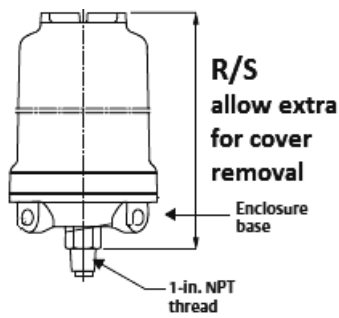
| | Code |
|-----------------------------------|------|
| Raised Face (RF) | R |
| NPT thread in 316 stainless steel | N |

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_H and 2_S

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



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Page 8 of 8