

Technical Datasheet



Magnetic Vertical Type Level Switches



Displacer actuated type

Key Features

- Suitable for installation on high tanks
- Pump control and alarm function
- 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



Series Overview

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

A choice of displacer-type operated level switch is available to fit any requirement of pump control or alarm in field.

These level switches are suitable for vertical installation and for high vessels also. The instrument is supplied with 3mt of cable as standard, to be cut at the required switching point to fit in the tank high. Different lengths could be available.

There are also 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 :

- Float type switches
- Chamber mount float type level switches



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

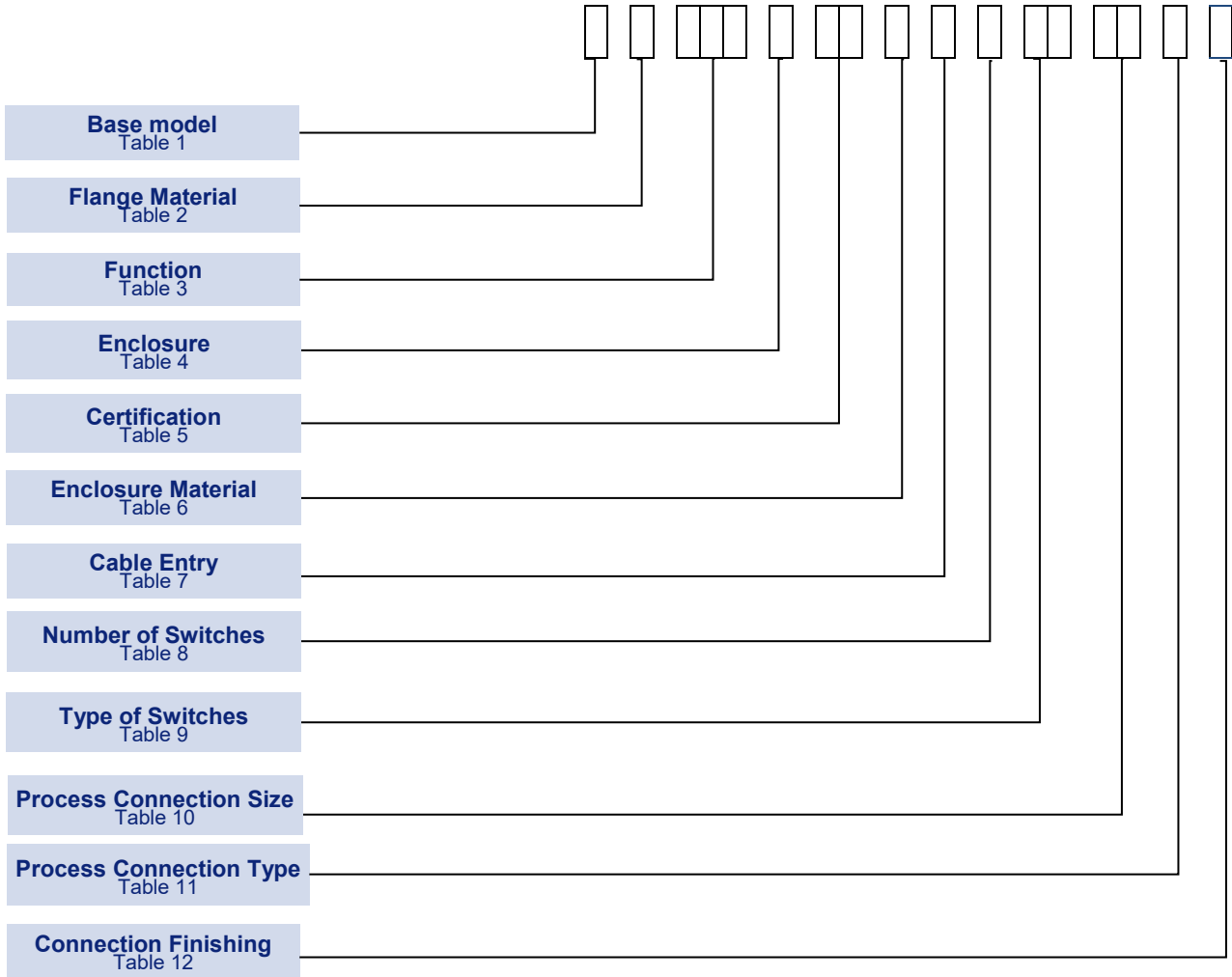
How can we help you?

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
Displacer actuated type

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 300°C for A105 ; -50 to 300°C for 316 stainless steel
Maximum Process Pressure :	102.15bar at 20°C
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:	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 4 mm ² / 11 AWG
Process Connection:	flanged 3" or 4" ANSI B16.5 150/300/600 or 1"-11.5 NPTF
Approximate Weight:	3.2kg / 7lb - 27.8kg / 61.2lb depending on model
Standard Cable & Displacer	316 stainless steel
Material of enclosure	See description on table below
Material of wetted parts	See description on table below

Magnetic Vertical Level Switches
Displacer actuated type

Product Description & Operating Principle



Displacer operated controls, are ideal for sump application and any other top-mounting duties such as low level alarm warning in deep tanks and pump control. The displacer element, made in 316 stainless steel, is suspended on a 3m stainless steel cable from a Nimonic 90 spring. The cable length must be shortened according to the requirements. The element is always heavier than its equivalent volume of the liquid in which it 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 oversteering. Fixed to the spring is the rod and magnet assembly, free to move up and down as the spring extends or contracts. As the liquid rises to cover the displacer element, a buoyancy force is created equal to the weight of the liquid displaced. This force in effect is seen as a reduction of weight causing the spring to contract moving the magnet upwards and actuates the switch mechanism. As the liquid falls to uncover the displacer element, the buoyancy force is reduced and the effect is seen as an increase of weight causing the spring to extend moving the magnet downwards to reset the switch mechanism (dead band). The simple operation principle, allows several constructions to meet different requirements and application.

Standard cable length: 3m

Narrow switching differential

TYPE 11D

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

A= adjustable distance to upper switching
E= switching differential
D=200mm

S.G. = Specific Gravity

	4 contacts				8 contacts		
S.G.	0.6	0.8	1.0	1.2	0.75	1.0	1.2
A min	400mm	425mm	450mm	460mm	350mm	390mm	415mm
E	90mm	70mm	60mm	55mm	135mm	105mm	90mm

Wide switching differential

TYPE 12D

- 3" nominal bore
- **one** 4 or 8 contact switch mechanism
- **Application:** ON/OFF pump control with wide differential
- **Dead-band:** wide range

A= adjustable distance to upper switching
E= switching differential
D=200mm

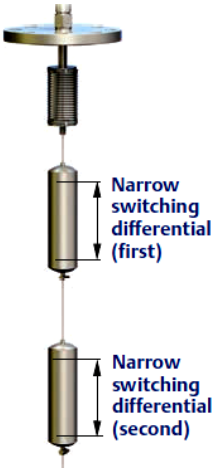
S.G. = Specific Gravity

	4 contacts				8 contacts		
S.G.	0.6	0.8	1.0	1.2	0.75	1.0	1.2
A min	415mm	430mm	430mm	425mm	390mm	400mm	400mm
E	165mm	110mm	95mm	80mm	205mm	165mm	140mm

Magnetic Vertical Level Switches

Displacer actuated type

Product Description & Operating Principle



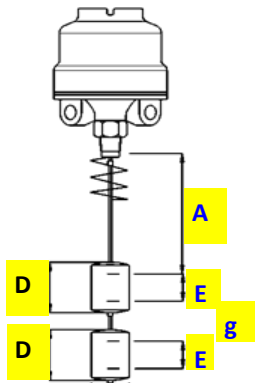
TYPE 18D

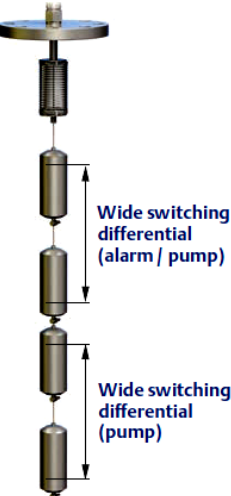
- 3" nominal bore
- **two** 4 or 8 contact switch mechanism
- **Application:** Double alarm
- **Dead-band:** standard narrow

A= adjustable distance to upper switching
g= minimum deadband
E= switching differential
D=200mm

S.G. = Specific Gravity

	4 contacts				8 contacts		
S.G.	0.6	0.8	1.0	1.2	0.8	1.0	1.2
A min	390mm	385mm	375mm	365mm	355mm	350mm	345mm
E	90mm	70mm	60mm	55mm	135mm	105mm	90mm
g	200mm	230mm	255mm	310mm	165mm	215mm	250mm





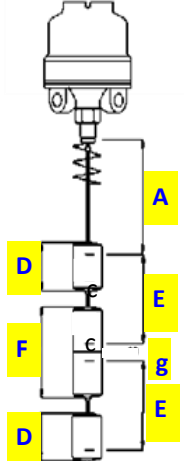
TYPE 13D

- 3" nominal bore
- **two** 4 or 8 contact switch mechanism
- **Application:** ON/OFF pump control and alarm with wide dead-band
- **Dead-band:** wide range

A= adjustable distance to upper switching
g= minimum deadband
F= 286mm
E= switching differential
D=200mm

S.G. = Specific Gravity

	4 contacts				8 contacts		
S.G.	0.6	0.8	1.0	1.2	0.8	1.0	1.2
A min	390mm	385mm	375mm	365mm	355mm	350mm	345mm
E	135mm	110mm	95mm	80mm	200mm	145mm	140mm
g	220mm	255mm	285mm	310mm	165mm	215mm	250mm





Type of enclosures
Weatherproof Nema4/IP66
Type S



Explosionproof and Flameproof
Type S

Magnetic Vertical Level Switches
Displacer actuated type

Base Model

TABLE 1	
	Code
Vertical Displacer 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
Single alarm, one switch, narrow switching differential	11D
Single alarm, one switch, wide switching differential	12D
Double alarm, two switches, narrow switching differential;	18D
Double alarm, two switches, wide switching differential	13D

Enclosure Type

TABLE 4	
	Code
150mm high suitable to fit one or two switches, material see certification	S

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

Enclosure Material

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

Cable Entry

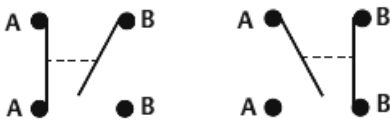
TABLE 7	
	Code
1" -11.5 NPT	A
M20X1.5	B

Number of Switches

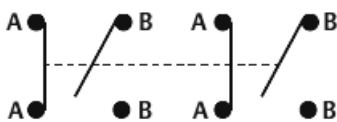
TABLE 8	
	Code
One switch	1
Two switches	2

Type of Switches

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

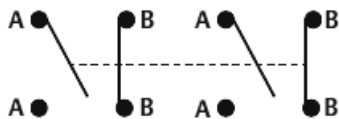


TABLE 9	
	Code
4 Contact: 2xSPST general purpose 2kVA 440Vac, 5A / 50W 250Vdc 5A resistive	D4
4 Contact: 2xSPST Gold Alloy contact for low power or . I.S. Circuits 6VA 250Vac, 0.25A / 3.6W 250Vdc 0.25A resistive	P4
4 Contact: 2xSPST High Current 2kVA 440Vac, 10A / 50W 250Vdc 10A resistive	X4
4 Contact: 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

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

Magnetic Vertical Level Switches
Displacer actuated type

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)

In the interest of development and improvement Delta Mobrey Ltd, reserves the right to amend, without notice, details contained in this publication. No legal liability will be accepted by Delta Mobrey Ltd for any errors, omissions or amendments.

Delta Mobrey Limited

Hudson House, Albany Park Camberley Surrey, GU16 7PL, UK.

T+44 (0)1252 729140 F+44 (0)1252 729168 E sales@delta-mobrey.com W www.delta-mobrey.com



ISO9001

FM00720

Magnetic Vertical Level Switches
Displacer actuated type