

Technical Datasheet



Magnetic Vertical Type Level Switches

Float actuated Chamber mounted type

Key Features

- Various chamber type and material
- No springs in switch mechanism – positive snap action switching
- Genuine hermetically-sealed switch option – totally safe and secure
- Weld procedures approved to EN ISO 15614-1 and ASME IX
- Welders approved to EN 287-1
- All welded low cost bottle construction or flanged construction for periodical inspection

Series Overview

The chamber mounted float type level switches are offered with a wide range of material and configuration, suitable to meet most the application in chemical and petrochemical 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 :

- Direct mount displacer type, level switches
- Direct 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:

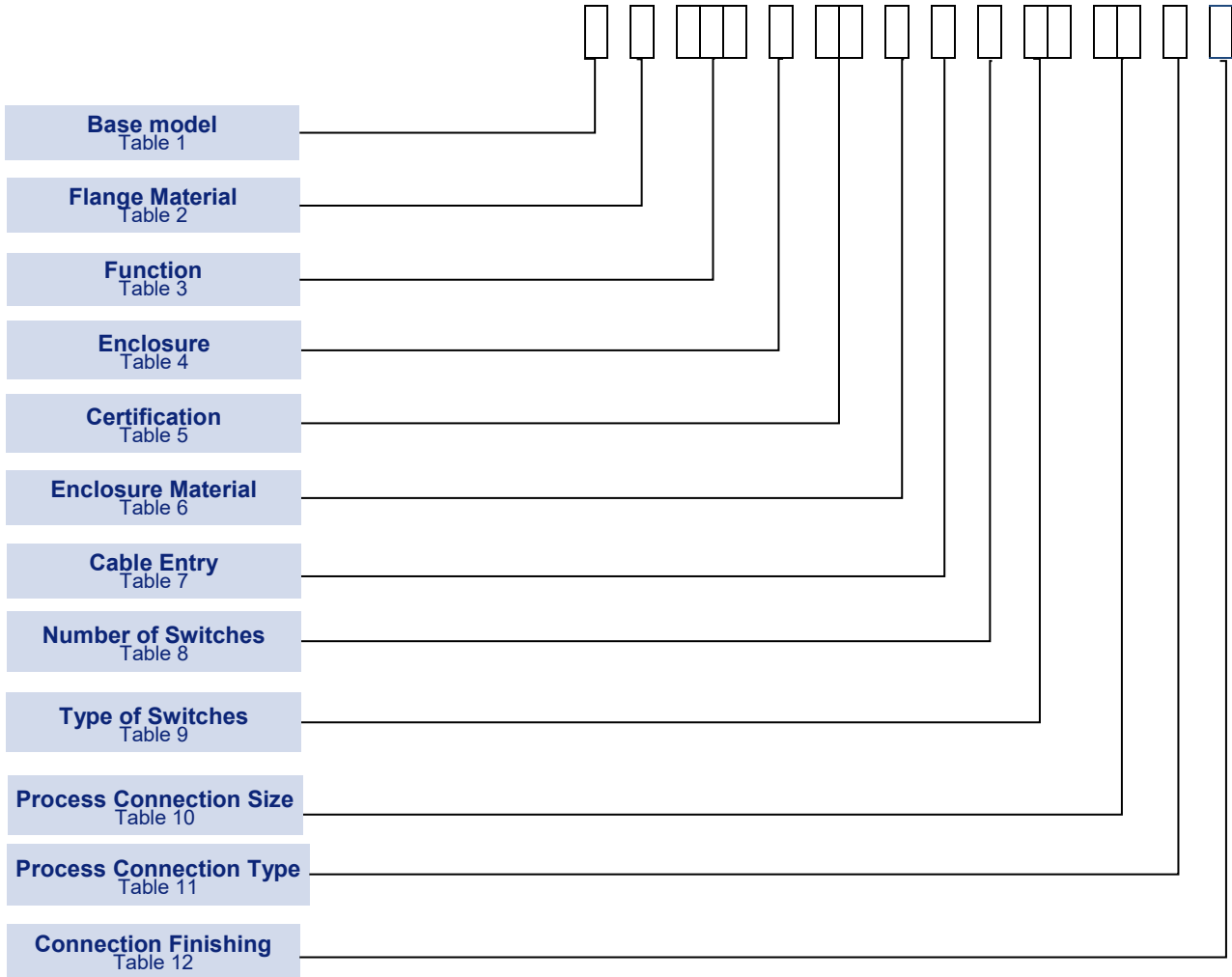
+44 (0)1252 729140

Magnetic Vertical Level Switches

Float actuated , chamber mounted

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.

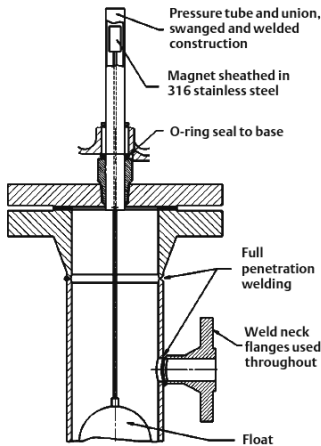


Technical Specification

Switching repeatability:	
Storage Temperature:	-50°C to +60°C
Ambient Temperature:	-50°C to +60°C
Maximum Process Temperature:	-10 to 400°C limited by contacts and chamber materials (see table C)
Maximum Process pressure:	see table A and B , body limited by flange pressure ratings
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 to 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 4 mm ² / 11 AWG
Process Connection:	flanged 3" or 4" ANSI B16.5 150/300/600 or threaded 1"-11.5 NPTF
Approximate Weight:	depending on model
Standard rod & float	316 stainless steel, refer to table dimension A1, A2
Material of enclosure	See description on table 6
Material of wetted parts	See table 2

Magnetic Vertical Level Switches
Float actuated, chamber mounted

Product Description & Operating Principle



These float switches are float operated and are suitable in various version and configuration to fit most of the 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 dimensioned according to the application and the distance between process connections. (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.

All pressure retaining assemblies are hydrostatically pressure tested up to 1.43 x maximum working pressure or flange standard requirements.

Table A1 : Body Pressure Ratings of type 11F; 12F, 13F, 14F, 17D in A105 chamber

Float type	Flanged type Chamber Pmax in Bar			Bottle type Chamber Pmax in bar		
	20 °C	250 °C	400 °C	20 °C	250 °C	400 °C
11F	34.5	22.5	20.0	30.1	22.5	20.0
12F	102.1	66.3	59.2	88.8	66.3	59.2
13F	51.1	33.2	29.6	44.6	33.2	29.6
14F	19.6	12.1	6.5	17.1	12.7	6.5
17D	102.1	66.3	59.2	88.8	66.3	59.2

Table A2 : Body Pressure Ratings of type 11F; 12F, 13F, 14F, 17D in AISI316L Chamber

Float type	Flanged type Chamber Pmax in Bar			Bottle type Chamber Pmax in bar		
	20 °C	250 °C	400 °C	20 °C	250 °C	400 °C
11F	34.5	22.5	20.0	30.1	22.5	20.0
12F	82.7	54.9	48.6	88.8	66.3	59.2
13F	41.4	27.5	24.3	44.6	33.2	29.6
14F	15.9	10.5	6.5	17.1	12.7	6.5
17D	82.7	54.9	48.6	88.8	66.3	59.2

Note: For flanged process connection, the P max is limited by the flange rating. See table B

Table B : Flange Pressure rating

Flange rating	A105 Chamber			AISI 316L Chamber		
	20 °C	250 °C	400 °C	20 °C	250 °C	400 °C
ASME B 16.5 Class 150	19.6	12.1	6.5	15.9	10.5	6.5
ASME B 16.5 Class 300	51.1	41.9	34.7	41.4	27.5	24.3
ASME B 16.5 Class 600	102.1	83.9	69.4	82.7	54.9	48.6
EN 1092-1 PN16	16.0	12.1	9.5	16.0	11.9	10.2
EN 1092-1 PN25	25.0	19.0	14.8	25.0	18.6	16.0
EN 1092-1 PN40	40.0	30.4	23.8	40.0	29.9	25.7

Magnetic Vertical Level Switches
Float actuated , chamber mounted

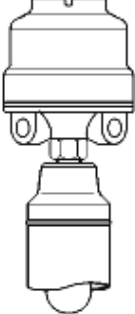
Product Description & Operating Principle

Table C : Wet side temperature limits according to contact type & chamber material		
Contact type	A105 Chamber	AISI 316L Chamber
D4 / P4 & D8 / P8	400 °C	400 °C
X4 / H4 & X8 / H8	250 °C	250 °C

Table D : Wet side material		
part	A105 Chamber	316L St.St.Chamber
Chamber Tube	ASTM A106 Gr.B	ASTM A312 TP316L
Top casting	ASTM A216	-
Top/Bottom caps	ASTM A105	ASTM A182 F316L/A403 WP316L
Flanges/Fittings	ASTM A105	ASTM A182 F316L
Studs	ASTM A193-B7	ASTM A320-L7
Nuts	ASTM 194 2H	ASTM A194 Gr. 7 + S3
Float	AISI316	AISI316
Rod	AISI316	AISI316

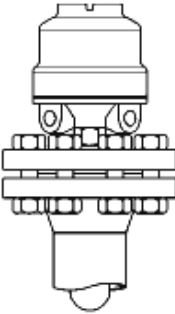
Bottle type: B

Cost effective, all welded construction suitable on fluid and application on clean fluids.



Flanged Type: X

Dismountable version allowing periodical maintenance and cleaning of the internal parts (float, rod)



Magnetic Vertical Level Switches
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Base Model

Note: See table A1, A2, B for pressure ratings respectively for Bottle or Flanged type chamber

TABLE 1	
	Code
Bottle type chamber all welded, vertical level switch	B
Flanged type chamber, suitable for inspection, vertical level switch	X

Flange Material

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

Function

Note: S.G. = Specific Gravity

TABLE 3	
	Code
3" float suitable for minimum S.G. 0.80 (chamber body min. 3")	11F
4" float suitable for minimum S.G. 0.75 (chamber body min. 4")	12F
4" float suitable for minimum S.G. 0.65 (chamber body min. 4")	13F
4" float suitable for minimum S.G. 0.54 (chamber body min. 4")	14F
4" float , spring assisted, minimum S.G. 0.40 (chamber body min. 4")	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

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

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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

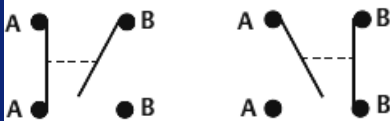
TABLE 8	
	Code
One switch	1
Two switches	2
Three switches	3
Four switches	4

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

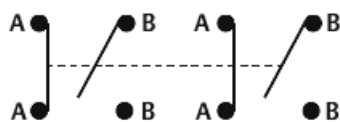
2xSPST (4 contact) configuration

A-A make rising B-B make falling

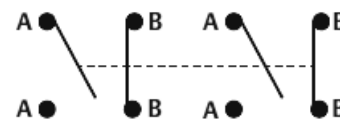


4xSPST (8 contact) configuration

A-A + A-A make rising



B-B + B-B make falling



Magnetic Vertical Level Switches

Float actuated , chamber mounted

Process Connection

TABLE 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
													Code
	Flange RF Finish												R
	Thread NPT, for 316 stainless steel bottle type chamber												N

Connection Configuration

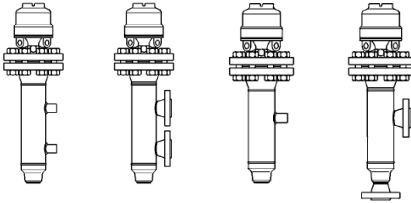


TABLE 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
													Code
	Side-Side with 1"-11.5 NPT-F drain												B
	Side-Bottom												C

Process Connection Size

TABLE 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
													Code
	1" / DN25												1
	1.5" / DN40												5
	2" / DN50												2

Process Connection Type

TABLE 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
													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

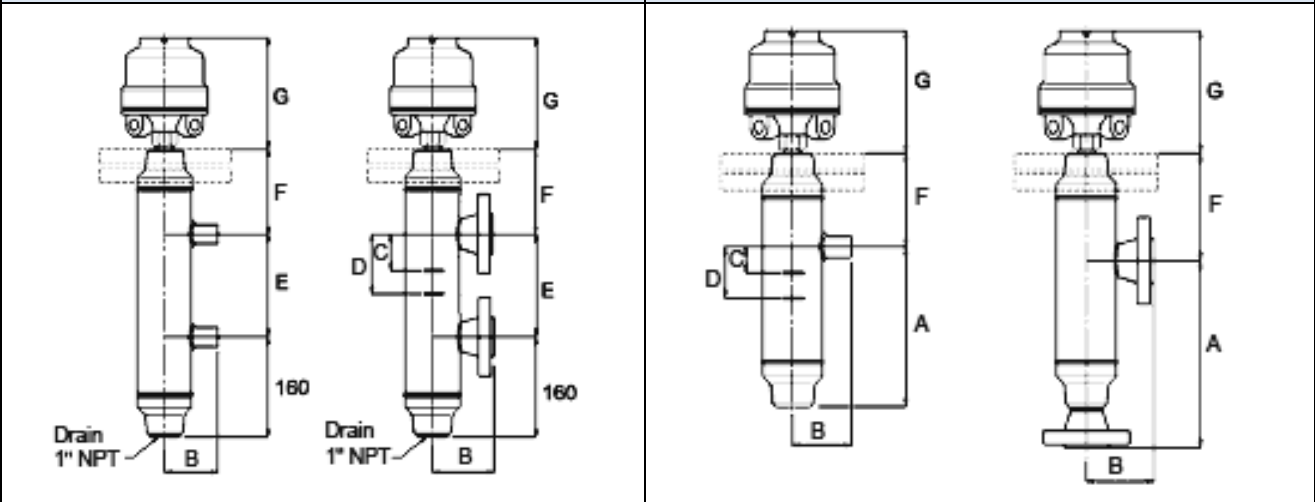
TABLE 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
													Code
	Raised Face (RF)												R
	NPT thread in 316 stainless steel												N

Magnetic Vertical Level Switches
Float actuated, chamber mounted

DIMENSIONAL DRAWINGS

Connections configuration type B: SIDE-SIDE

Connections configuration type C: SIDE-BOTTOM



FUNCTION 11F/12F/13F/14F, CHAMBER DIMENSIONS AS BELOW

Process Connection	A		B	C	D		E		F	
	Enclosure R	Enclosure S	Bottle type in C.S/ any other		Single Switch Encl. R	Multi Switch Encl. S	Single Switch Encl. R	Multi Switch Encl. S	Bottle type	Flanged Type
1" NPT Side-Bottom	300	385	76/95	50	70	155	/	/	48/160	225
1" NPT Side-Side	/	/	95	50	70	155	271	356	160	225
1"ANSI150	356	441	110	50	70	155	271	356	160	225
1"ANSI300	356	441	117	50	70	155	271	356	160	225
1"ANSI600	356	441	123	50	70	155	271	356	160	225
1-1/2" ANSI150	356	441	115	50	70	155	271	356	160	225
1-1/2" ANSI300	356	441	121	50	70	155	271	356	160	225
1-1/2" ANSI600	356	441	126	50	70	155	271	356	160	225
2"ANSI150	356	441	112	50	70	155	271	356	160	225
2"ANSI300	356	441	118	50	70	155	271	356	160	225
2"ANSI600	356	441	129	50	70	155	271	356	160	225

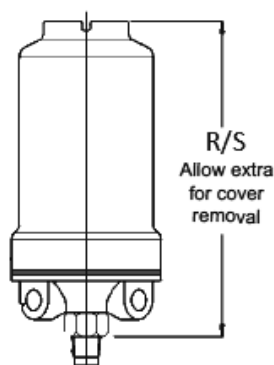
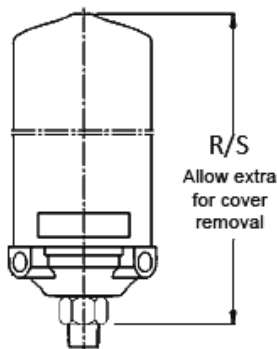
FUNCTION 17D, ANY CHAMBER

S.G.	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	/
Dim. C	65	73	82	91	100	109	118	127	136	/
Dim. D	118	122	127	132	137	141	147	152	156	/

Type of enclosures

Select the enclosures according to the number of Switch mechanism

Weatherproof Nema4/IP66 Explosionproof and Flameproof



ENCLOSURE dim. G

Type	Diam	Material		
		N	A	I
R	φ163	170	190	190
S	φ180	275	300	300

Magnetic Vertical Level Switches
Float actuated, chamber mounted

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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