

Technical Datasheet



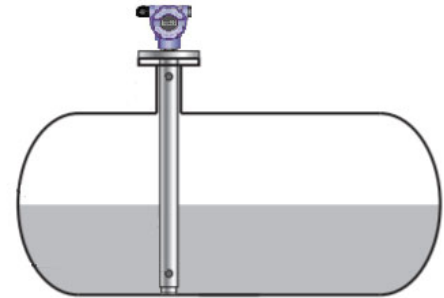
D Series

SMART Level probe for pressurised tanks

Model: D45

Key Features

- ATEX - Flameproof and Intrinsically Safe
- UKEx - Flameproof and Intrinsically Safe
- IECEx - Flameproof and Intrinsically Safe
- High accuracy $\pm 0.16\%$
- Fully HART ® compatible
- 4-20mA analogue with digital communications
- Fully welded sensor guarantees tightness of oil systems for long term usage
- Programmable range, zero shift, characteristic and damping



Series Overview

The D-Series pressure, differential pressure and temperature transmitters offer customers reliable and accurate solutions to their individual process requirements.

Available with a wide range of process connections and easily configurable via the D-Soft software, the D-Series can be used for a variety of applications when pressure, differential pressure, temperature, level or flow measurements are needed.

Other products in the series include:

- SMART Differential Pressure Transmitter
- SMART Ultrasonic Level transmitters
- SMART Pressure Transmitter
- SMART Temperature Transmitter



Product applications

The D Series SMART Level Probe is a Differential Pressure transmitter suitable for measuring level in a pressurised tank:

- Stainless Steel wetted parts
- Compact construction

The choice of models available ensures that the Delta Mobrey Transmitter is suitable for use in:

- Corrosive atmospheres
- Resistant to chemical attack

How can we help you?

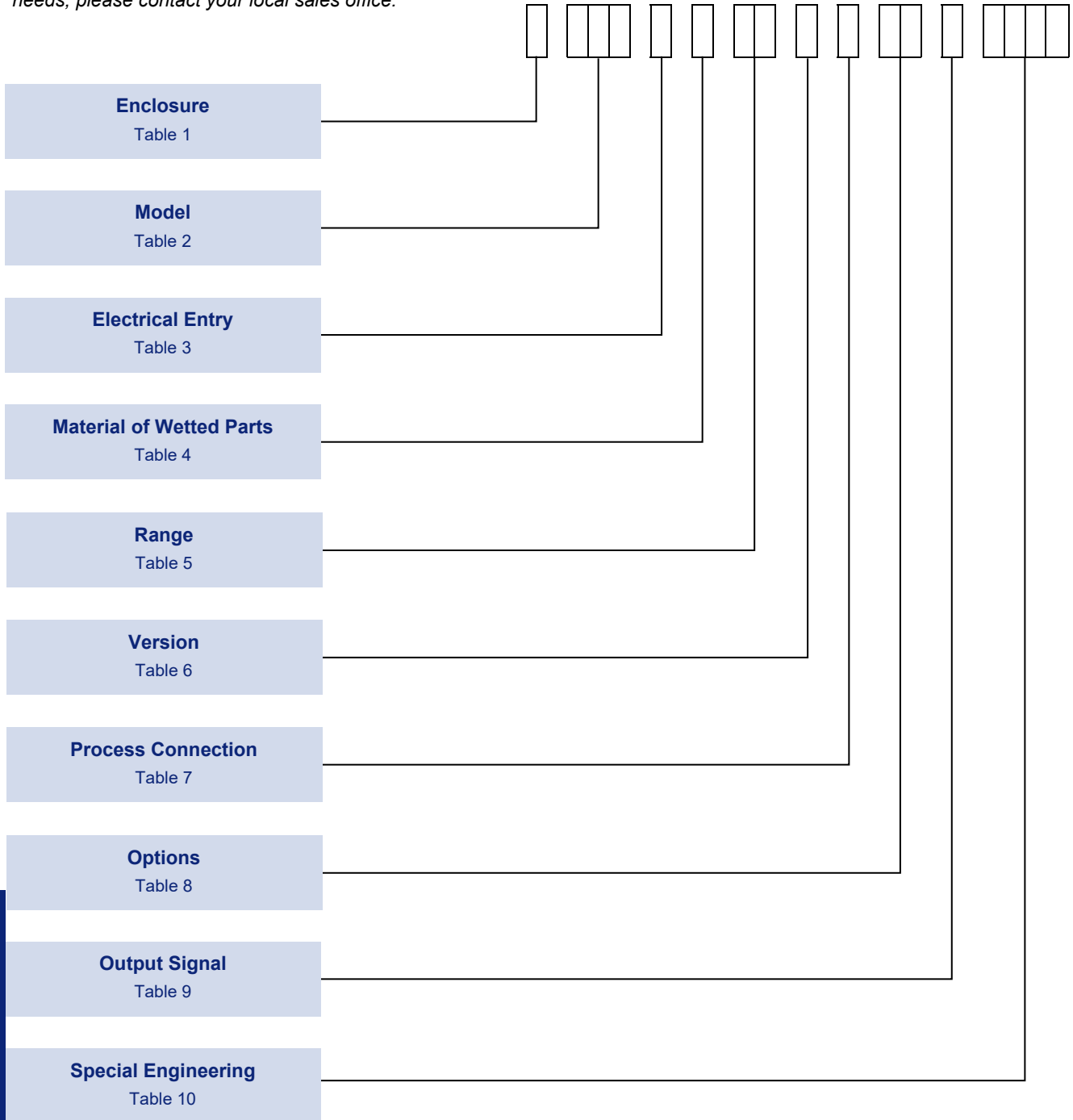
Delta Mobrey's offers fast, efficient and knowledgeable support when and where you need it. Please visit our website at www.delta-mobrey.com to find your local support centre or call us on:

+44 (0) 1252 729140

D-Series
Model: D45

How to order

Transmitters 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 transmitter that best suits your needs, please contact your local sales office.



NOTE 1: Only the most common options are shown in this datasheet. Should you require a feature that is not shown, please contact your local sales office for further details.

NOTE 2: The non-standard option code is shown by "X" in the part number. Should you require any clarification on this codes please contact your local sales office.

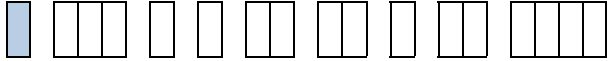
NOTE 3: Please confirm before ordering if the backlight of the display is required to be settled differently from our standard. It cannot be successively settled in field.

- Instruments in Std, Exd, Exi construction are normally supplied with backlight ON.
- instruments in Safety and double certified construction, are supplied with backlight OFF

Enclosure


Refer to the 'Approvals' section for details about the certification on Flameproof & Intrinsically Safe models .

Note 2: For both Ex-ia & Ex-d construction, the protection mode is defined by selecting on the label the correct marking, before the installation of the instrument.

TABLE 1 


ENCLOSURES TYPES	Code
WEATHERPROOF ENCLOSURE	
General Purpose Aluminum housing, IP66, with display.	W
For Aggressive Atmosphere 316 Stainless steel housing, IP66, with display.	A
FLAMEPROOF ENCLOSURES	
Aluminum housing, IP66, with display. (Ex d) // 1/2GD -	H
316 Stainless steel housing, IP66, with display. (Ex d) // 1/2GD - I M2	R
Aluminum housing, IP66, with display. (Ex d) // G	2
316 Stainless steel housing, IP66, with display. (Ex d) // G - I M2	3
INTRINSICALLY SAFE ENCLOSURES	
Aluminum housing, IP66, with display. (Ex ia) // 1/2G	5
316 Stainless steel housing, IP66 with display. (Ex ia) // 1/2G - I M1	4
Aluminum housing, IP66, with display. (Ex ia/Da) // 1/2GD	7
316 Stainless steel housing, IP66 with display. (Ex ia/Da) // 1/2GD - I M1	6
INTRINSICALLY SAFE & FLAMEPROOF ENCLOSURES	
Aluminum housing, IP66, with display. (Ex ia / Ex d according to the installation) // 1/2GD	8
316 Stainless steel housing, IP66 with display. (Ex ia / Ex d according to the installation) // 1/2GD - I M2/M1	9

Model

TABLE 2 

	Code
SMART Level Probe for pressurised tanks For applications standard up to 16 bar (above, on request). Refer Table 5.	D45

Electrical Entry

TABLE 3 

	Code
Packing gland M20x1.5	1
Electrical connection with thread 1/2NPT Female	2

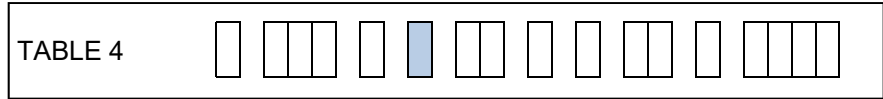
NOTE: Code 0
Available on Enclosure code H & R as standard.

NOTE: Code 1
Available on Enclosure code W, A, 5 & 4 as standard.

D-Series
Model: D45

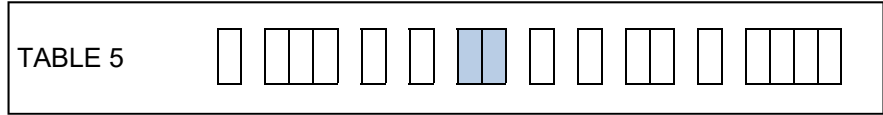
Material of Wetted Parts

Note : Material of wetted parts are available in Stainless Steel and Aluminium. It will be defined in the last 4 digit of the part, the Special Engineering code.



	Code
Not applicable. (SEE NOTE 1)	X

Range



Code	Nominal measuring range (FSO)		Minimum set range	Accuracy for nominal measuring range
XX	0...6000 mmH ₂ O	(0...60 kPa)	600 mm H ₂ O	± 0.16%
XX	0...1600 mmH ₂ O	(0...16 kPa)	160 mm H ₂ O	± 0.2%

NOTE:

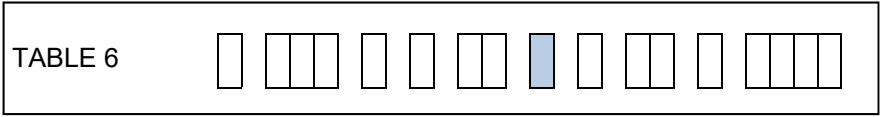
Measuring range is XX because it is specified in the last 4 digit of the part number, as part of the full configuration of the instrument together with the length of the protection tube

Version

A combination of more than one option is available.

NOTE:

Surge arrester is available as standard for Ex d version.

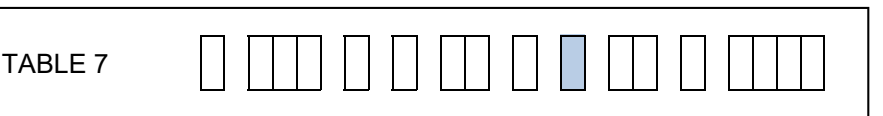


	Code
Applies when no option is required	0
Surge arrester for Ex ia version	1
Protection class IP67	6

Process Connection

NOTE 1:

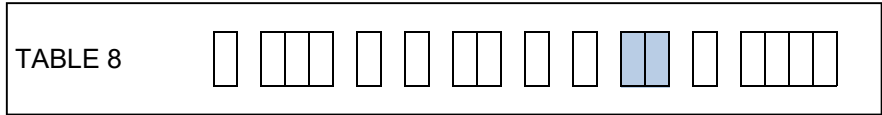
Process connection will be defined in the last 4 digit of the part, the Special Engineering code



	Code
Process connection size and rating. (SEE NOTE 1)	X

Options

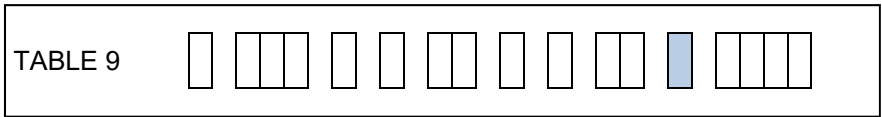
A combination of more than one option is available (i.e. Code 23 - combination of code 20 & 30)



	Code
Applies when no option is required	00
Stainless Steel rating label riveted to the housing	20
Stainless Steel Tag plate mounted on wire	30
Stainless Steel plate riveted to the housing. Stainless Steel tag plate mounted on wire.	A0

Output Signal

Note: Please refer to APPROVALS page for marking & protection.



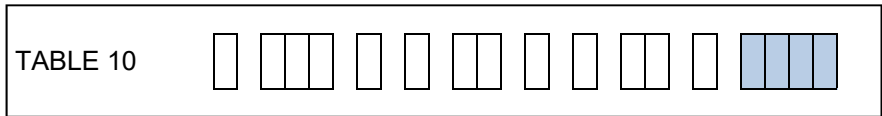
	Code
4 to 20mA (Weatherproof or Hazardous Area with ATEX marking)	0
4 to 20mA (Hazardous Area with IECEx marking only)	6
4 to 20mA (Hazardous Area with UKEx marking)	7

Special Engineering

Last 4 digits of model code identify the construction as below. Each single construction will require a specific part number, identifying the length of the protection tube.

Please specify the requirement of the application

1. Range and calibration required
2. Length of the protection tube.
3. Material of the wetted parts



	Code
Please consult Delta Mobrey sales engineering for special requirements	TBA

Application & Construction

The level measurement is carried out using a differential pressure transmitter, enabling the compensation for static pressure or vacuum in the tank. The value processed is just the hydrostatic pressure of the medium measured at the level of the lower diaphragm connected to "H" side of the instrument. This pressure is the sum of the hydrostatic pressure of the liquid and the vapour pressure phases of the medium. In most practical applications the density of the vapour phase of the medium is negligibly small and therefore the measured hydrostatic pressure relates only to the height of the liquid phase. For media where the density of the vapour phase is significant (e.g. propane), the level measured can be treated as the theoretical level of the liquid level obtained by adding the actual liquid phase to the condensed vapour phase..

Configuration

The settings of the following metrological parameters can be changed:

- The units of pressure in which the range is configured
- Start and end points of the range, time constant
- Inverted characteristics (output signal 20 to 4 mA)

Communication

The transmitter is configured and calibrated using a D-COMM communicator, some other communications (HART) or a PC using and HART/USB converted and D-Soft configuration software.

The data interchange with the transmitters enables the users the transmitter identification, as well as reading of the currently measured differential pressure value, output current and percent of range width.

Technical Data

Metrological parameters

Range of medium density	up to 1.1g/cm ³ Standard constr.) . over 1.1g/cm ³ Special constr.)
Error due to ambient temperature changes	< ±0,4% of basic range for temperatures of -25...+80°C
Error due to supply voltage changes	< ±0,002% of basic range / V
Zero shift error for static pressure	0,08% / 10 bar for lower range 0,1% / 10 bar for range no. 2

Electrical Parameters

As given in the datasheet of D31 SMART Differential Pressure Transmitter.

Approvals

GLOBAL CERTIFICATION

IECEX Certified - output signal code 6 (see table 9)

INTRINSICALLY SAFE:



Certificate No.: **IECEX FTZU 15.0027X**
IEC 60079-0, IEC 60079-11,

For Zone 0/1 models

Enclosure code 7 (refer Table 1)

Ex ia IIC T4/T5 Ga/Gb
Ex ia IIIC T105°C Da (version with PTFE shielded cable)

Enclosure code 8 (refer Table 1)

Ex ia I Ma
Ex ia IIC T4/T5 Ga/Gb
Ex ia IIB T4/T5 Ga/Gb (version with PTFE shielded cable)

Certificate No.: **KDB19ATEX006X**
EN IEC 60079-0, EN 60079-11, EN 60079-26, EN 50303

For Zone 0/1,20 models

Enclosure code 5 SIL version (refer Table 1)

Ex ia IIC T4/T5 Ga/Gb

Enclosure code 4 SIL version (refer Table 1)

Ex ia I Ma
Ex ia IIC T4/T5 Ga/Gb

Enclosure code 7 (refer Table 1)

Ex ia IIC T4/T5 Ga/Gb
Ex ia IIIC T105°C Da

Enclosure code 8 (refer Table 1)

Ex ia I Ma
Ex ia IIC T4/T5 Ga/Gb
Ex ia IIIC T105°C Da

FLAMEPROOF:



Certificate No.: **IECEX KDB 19.006X**
IEC 60079-0, IEC 60079-1, IEC 60079-11, IEC 60079-26, IEC 60079-31

For Zone 0/1, 20/21 models

Enclosure code H (refer Table 1)

Ex ia/db IIC T6/T5 Ga/Gb
Ex ia/tb IIIC T105°C Da/Db

Enclosure code R (refer Table 1)

Ex db ia I Mb
Ex ia/db IIC T6/T5 Ga/Gb
Ex ia/tb IIIC T105°C Da/Db

For Zone 1, 21 models

Enclosure code 2 (refer Table 1)

Ex ia/db IIC T6/T5 Gb
Ex ia/tb IIIC T105°C Db

Enclosure code 3 (refer Table 1)

Ex db ia I Mb
Ex ia/db IIC T6/T5 Gb
Ex ia/tb IIIC T105°C Db

INTRINSICALLY SAFE & FLAMEPROOF (*):

(*) According to the selection on the label



Certificate No.: **IECEX KDB 19.0006X**
IEC 60079-0, IEC 60079-1, IEC 60079-11, IEC 60079-26, IEC 60079-31

For Zone 0/1, 20/21 or 0/1, 20 models

Enclosure code 8 (refer Table 1)

Ex ia/db IIC T6/T5 Ga/Gb
Ex ia/tb IIIC T105°C Da/Db
Or

Enclosure code 9 (refer Table 1)

M2 Ex db ia I Mb
Ex ia/db IIC T6/T5 Ga/Gb
Ex ia/tb IIIC T105°C Da/Db
Or

Ex ia IIC T5/T4 Ga/Gb
Ex ia IIIC T105°C Da

Ex ia I Ma
Ex ia IIC T5/T4 Ga/Gb
Ex ia IIIC T105°C Da

Approvals

EUROPEAN DIRECTIVE)

ATEX Directive 2014/34/EU - output signal code O (see table 9)

INTRINSICALLY SAFE:



Certificate No.: **FTZU 19ATEX0111X**
EN IEC 60079-0, EN 60079-11, EN 50303

For Zone 0/1 models



Enclosure code 5 (refer Table 1)

II 1/2G Ex ia IIC T4/T5 Ga/Gb
II 1D Ex ia IIIC T105°C Da (version with PTFE shielded cable)

Enclosure code 4 (refer Table 1)

I M1 Ex ia I Ma
II 1/2G Ex ia IIC T4/T5 Ga/Gb
II 1D Ex ia IIIC T105°C Da (version with PTFE shielded cable)

Certificate No.: **KDB19ATEX0045X**
EN IEC 60079-0, EN 60079-11, EN 60079-26, EN 50303

For Zone 0/1,20 models

Enclosure code 5 SIL version (refer Table 1)

II 1/2G Ex ia IIC T4/T5 Ga/Gb

Enclosure code 4 SIL version (refer Table 1)

I M1 Ex ia I Ma
II 1/2G Ex ia IIC T4/T5 Ga/Gb

Enclosure code 7 (refer Table 1)

II 1/2G Ex ia IIC T4/T5 Ga/Gb
II 1D Ex ia IIIC T105°C Da

Enclosure code 8 (refer Table 1)

I M1 Ex ia I Ma
II 1/2G Ex ia IIC T4/T5 Ga/Gb
II 1D Ex ia IIIC T105°C Da

FLAMEPROOF:



Certificate No.: **KDB19ATEX0045X**
EN IEC 60079-0, EN 60079-1, EN 60079-11, EN 60079-26, EN 60079-31, EN50303

For Zone 0/1, 20/21 models



Enclosure code H (refer Table 1)

II 1/2G Ex ia/db IIC T6/T5 Ga/Gb
II 1/2D Ex ia/tb IIIC T105°C Da/Db

Enclosure code R (refer Table 1)

I M2 Ex db ia I Mb
II 1/2G Ex ia/db IIC T6/T5 Ga/Gb
II 1/2D Ex ia/tb IIIC T105°C Da/Db

For Zone 1, 21 models

Enclosure code 2 (refer Table 1)

II 2G Ex ia/db IIC T6/T5 Gb
II 2D Ex ia/tb IIIC T105°C Db

Enclosure code 3 (refer Table 1)

I M2 Ex db ia I Mb
II 2G Ex ia/db IIC T6/T5 Gb
II 2D Ex ia/tb IIIC T105°C Db

INTRINSICALLY SAFE & FLAMEPROOF (*):

(*): According to the selection on the label



Certificate No.: **KDB19ATEX0045X**
EN IEC 60079-0, EN 60079-1, EN 60079-11, EN 60079-26, EN 60079-31, EN50303

For Zone 0/1, 20/21 or 0/1, 20 models



Enclosure code 2 (refer Table 1)

II 1/2G Ex ia/db IIC T6/T5 Ga/Gb
II 1/2D Ex ia/tb IIIC T105°C Da/Db
Or
II 1/2G Ex ia IIC T5/T4 Ga/Gb

Enclosure code 3 (refer Table 1)

M2 Ex db ia I Mb
II 1/2G Ex ia/db IIC T6/T5 Ga/Gb
II 1/2D Ex ia/tb IIIC T105°C Da/Db
or

II 1D Ex ia IIIC T105°C Da

I M1 Ex ia I Ma
II 1/2G Ex ia IIC T5/T4 Ga/Gb
II 1D Ex ia IIIC T105°C Da



EMC Directive 2014/30/EU

Conformity assessment procedure: module A
The following standards were applied: EN 61326-1:2013; EN61326-2-3:2013

2014/68/EU Pressure Equipment Directive

For Nameplate Parameter **PS>200 bar**: The transmitters in PED version according to Module A of Directive 201/68/EU have specified on the nameplate parameters PS>200bar, P(range).....T(amb.).....

For Nameplate Parameter **PS< 200bar**, P(range).....T(amb.).... are manufactured on the basis of Article 4, Clause 3 of Directive 2014/68/EU in accordance with the sound engineering practice

Restriction of hazardous substances (RoHS 2) 2011/65/EU

Compliant to RoHS. The following standard was applied: EN IEC 63000:201

Approvals

UK REGULATIONS

Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016
Output signal code 7 (see table 9)

INTRINSICALLY SAFE:



Certificate No.: **ExVeritas 22UKEX1416X**
EN IEC 60079-0, EN 60079-11, EN60079-26 , EN 50303

For Zone 0/1, 20 models



Enclosure code 5 SIL version (refer Table 1)
II 1/2G Ex ia IIC T4/T5 Ga/Gb

Enclosure code 7 (refer Table 1)
II 1/2G Ex ia IIC T4/T5 Ga/Gb
II 1D Ex ia IIIC T105°C Da

Enclosure code 4 SIL version (refer Table 1)

I M1 Ex ia I Ma
II 1/2G Ex ia IIC T4/T5 Ga/Gb

Enclosure code 8 (refer Table 1)
I M1 Ex ia I Ma
II 1/2G Ex ia IIC T4/T5 Ga/Gb
II 1D Ex ia IIIC T105°C Da

FLAME-PROOF:



Certificate No.: **22UKEX1416X**
EN IEC 60079-0, EN 60079-1, EN 60079-11, EN 60079-26, EN 60079-31, EN50303

For Zone 0/1, 20/21 models



Enclosure code H (refer Table 1)
II 1/2G Ex ia/db IIC T6/T5 Ga/Gb
II 1/2D Ex ia/tb IIIC T105°C Da/Db

For Zone 1, 21 models

Enclosure code 2 (refer Table 1)
II 2G Ex ia/db IIC T6/T5 Gb
II 2D Ex ia/tb IIIC T105°C Db

Enclosure code R (refer Table 1)

I M2 Ex db ia I Mb
II 1/2G Ex ia/db IIC T6/T5 Ga/Gb
II 1/2D Ex ia/tb IIIC T105°C Da/Db

Enclosure code 3 (refer Table 1)

I M2 Ex db ia I Mb
II 2G Ex ia/db IIC T6/T5 Gb
II 2D Ex ia/tb IIIC T105°C Db

INTRINSICALLY SAFE & FLAMEPROOF (*):

(* According to the selection on the label)



Certificate No.: **22UKEX1416X**
EN IEC 60079-0, EN 60079-1, EN 60079-11, EN 60079-26, EN 60079-31, EN50303

For Zone 0/1, 20/21 or 0/1, 20 models



Enclosure code 2 (refer Table 1)
II 1/2G Ex ia/db IIC T6/T5 Ga/Gb
II 1/2D Ex ia/tb IIIC T105°C Da/Db
or

II 1/2G Ex ia IIC T5/T4 Ga/Gb
II 1D Ex ia IIIC T105°C Da

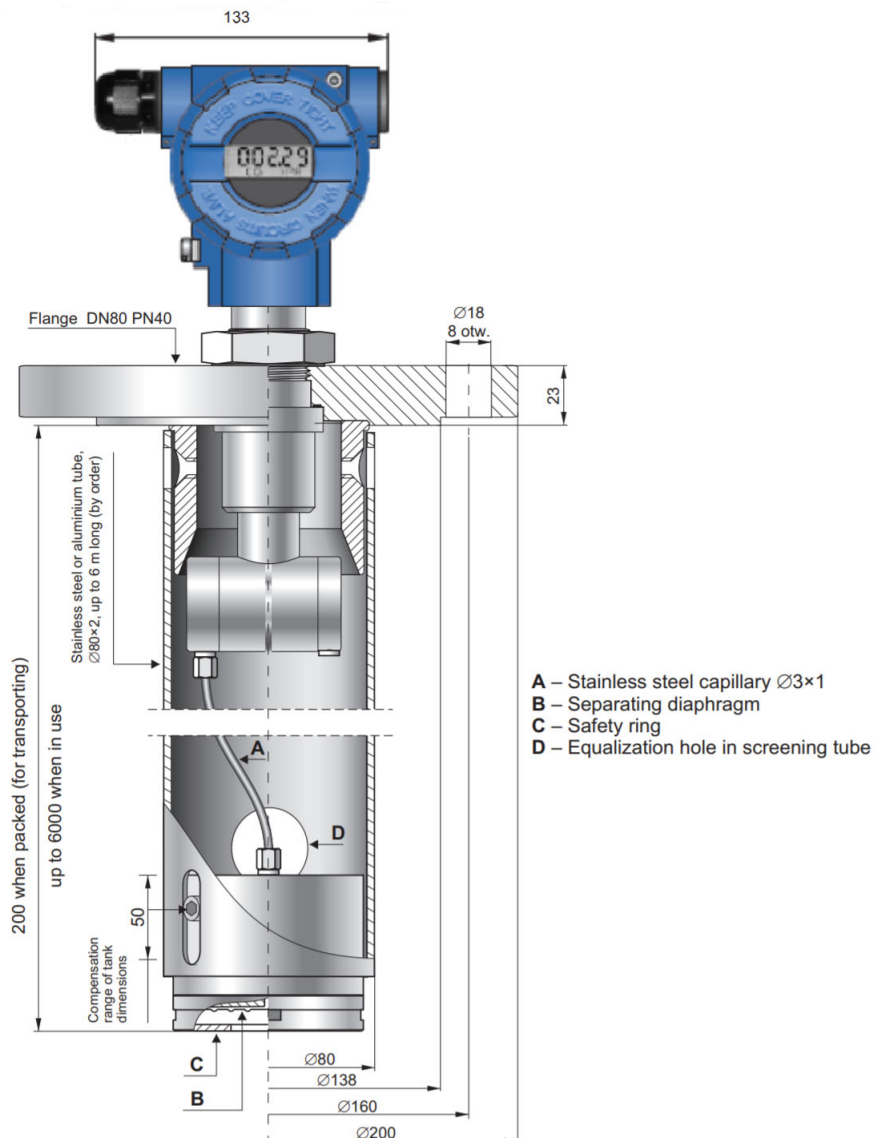
Enclosure code 3 (refer Table 1)

M2 Ex db ia I Mb
II 1/2G Ex ia/db IIC T6/T5 Ga/Gb
II 1/2D Ex ia/tb IIIC T105°C Da/Db
or

I M1 Ex ia I Ma
II 1/2G Ex ia IIC T5/T4 Ga/Gb
II 1D Ex ia IIIC T105°C Da

Installation

1. Installation of the instrument on pressurised tank



An example of configuration via Hand Held Communicator

To convert a rise in the level of liquid with **density 0.87** from **0 to 3200 mm** height to a current change from 4 to 20 mA. 1.

- Install the transmitter in working position, place the seal at the appropriate height (tank empty).
- Calculate the width of the measurement range in mmH₂O (4°C): $3200 \text{ mm} \times 0.87 \text{ g/cm} = 2784 \text{ mmH}_2\text{O}$.
- Using the communicator, set the transmitter to use the units mmH₂O at 4°C.
- To determine the start of the measurement range, read off via the communicator the hydrostatic pressure produced by the manometric fluid in the capillary (e.g. **-4250 mmH₂O**).
- To determine the end-point of the measurement range, add the value (**-4250 mmH₂O**) and the width of the measurement range (**-4250 mmH₂O + 2784 mmH₂O = -1466 mmH₂O**).
- Using the communicator enter the calculated start (**-4250 mmH₂O**) and end-point (**-1466 mmH₂O**) of the measurement range and send as a block to the transmitter. After receiving these parameters the transmitter will perform measurements as required.