Life Is On | Foxboro by Schneider Electric

Model CO

Compact Orifice Plate for Use With Foxboro Differential Pressure Transmitters

Model CO Description

Get convenient, reliable mounting of your pressure measurement devices with the Foxboro® Model CO wafer-body, compact orifice plate. When mounted directly to your choice of factory-calibrated I/A Series® pressure transmitter and shipped as a unit, this option provides numerous advantages over conventional schemes featuring separate orifice plates and manifolds, remote transmitters, flange unions, etc.

Installation becomes simpler and less expensive. An alignment ring provides easy, accurate centering, without impulse piping or tubing fittings to worry about.

Reliability and performance consistency increase, with close coupling to the transmitter and fewer leaks.

Cost of ownership goes down, with less installation time and effort. You also get an integral three-valve manifold at no extra charge. And chances are our plate/transmitter package lists for less than the competition's.

The rugged Model CO orifice fits a wide range of line sizes with ANSI or DIN flanges, and suits applications from liquid to gas to steam. Unlike competitive offerings, its drain capability even allows application on upward gas flows in vertical piping.

Features/Benefits

- Delivery factory-assembled with a calibrated transmitter
- Easier, economical installation
- Higher reliability
- More accurate, repeatable performance
- Lower cost of purchase and ownership
- Wider choice of transmitter installation and industry applications
- Precise orifice plate centering via standard alignment ring
- Elimination of numerous parts and field connections
- No impulse lines, flange taps, or potential leak points
- Improved response time
- Reduced parts inventory

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Standard Specifications

Orifice Type

Concentric, square edge, corner tap

Process Fluids

Liquid, gas, and steam

Process Temperature Limits

-40 to +232°C (-40 to +450°F)

Maximum Working Pressure

Per ANSI Class 600 or DIN PN 100 flanges

Flow (Discharge) Coefficient Uncertainty

15 to 40 mm (½ to 1½ in) line sizes
1.75% uncertainty

50 to 100 mm (2 to 4 in) line sizes
1.25% uncertainty

Pipeline Sizes

DN 15, DN 25, DN 50, DN 80, or DN 100; ½, 1, 1½ 2, 3, or 4 in

Beta Ratio (ß)

0.40 or 0.65

Process Connections

Mounts between ANSI Class 150, 300, or 600 flanges, or DIN PN 16, PN 40, or PN 100 flanges

Assembly to Transmitter

Delivered assembled to a calibrated Foxboro IDP10, IDP25, or IDP50 d/p Cell transmitter, or an IMV25 or IMV30 multivariable transmitter

Body and Gasket Materials — Process Wetted

Compact Orifice

316 ss with ptfe gaskets

Optional Flange Gaskets

Durlon 8500 Aramid/inorganic fiber with NBR rubber binder

Stud and Nut Material — Not Process Wetted

Compact Orifice-To-Transmitter

316 ss studs, A193 Gr. B8M
316 ss nuts, A194 Gr. 8M

Optional Flange Bolting

Plated carbon steel studs and nuts

Used with Foxboro Transmitters

The compact orifice is used with the following I/A Series d/p Cell transmitters listed below.

Model	Description (a)	Protocol	PSS No.
IDP10	DP	FoxCom™	2A-1C14 A
IDP10	DP	HART®	2A-1C14 B
IDP10	DP	Fieldbus (b)	2A-1C13 E
IDP10	DP	Analog (c)	2A-1C14 C
IDP10	DP	Analog (d)	2A-1C13 D
IDP25	Multirange (DP)	FoxCom, HART, and Fieldbus	2A-1C14 K
IDP50	Premium Performance (DP)	FoxCom, HART, and Fieldbus	2A-1C14 L
IMV25	Multivariable (DP, AP, and T)	FoxCom, HART, and Fieldbus	2A-1C15 B
IMV30	Multivariable (DP, AP, and T)	FoxCom and HART	2A-1C15 A

(a) DP = Differential Pressure; AP = Absolute Pressure; T = Temperature.
(b) Fieldbus = FOUNDATION® Fieldbus.
(c) Analog = 4 to 20 mA dc analog output.
(d) Analog = 1 to 5 V dc (low power).

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Bore Size

The orifice bore size varies with the pipe used and the nominal beta ratio selected (0.40 or 0.65). The beta ratio is defined as d/D, where d is the bore size and D is the I.D. of the pipe. See table below.

Nominal Line Size		Bore Size d for the following ßs: (a)			
		ß = 0.40		ß = 0.65	
mm	in	mm	in	mm	in
15	½	6.32	0.249	10.236	0.404
25	1	10.67	0.420	17.32	0.682
40	1½	16.36	0.644	26.59	1.047
50	2	21.01	0.827	34.14	1.344
80	3	31.17	1.227	50.65	1.994
100	4	40.89	1.610	66.47	2.617

(a) The larger ß is generally selected for reduced pressure loss. The smaller ß is generally selected to increase the measurement differential, or to minimize straight pipe runs upstream and downstream of the orifice. See "Recommended Straight Pipe Requirements" section.

Recommended Straight Pipe Requirements

The use of straight pipe upstream and downstream will reduce the effects of disturbances in the pipeline. The table below lists the recommended straight pipe required in pipe diameters.

Type of Disturbance	Pipe Diameters (a)(b)			
	For a ß = 0.40		For a ß = 0.65	
	Up	Down	Up	Down
Reducer	5	6 (3)	11 (6)	7 (3.5)
90° bend or tee	14 (7)	6 (3)	22 (11)	7 (3.5)
Two or more 90° bends in same plane	18 (9)	6 (3)	32 (16)	7 (3.5)
Two or more 90° bends in different planes	36 (18)	6 (3)	54 (27)	7 (3.5)
Expander	16 (8)	6 (3)	25 (13)	7 (3.5)
Globe valve fully open	20 (10)	6 (3)	28 (14)	7 (3.5)
Gate valve fully open	12 (6)	6 (3)	7 (3.5)	7 (3.5)

(a) Recommended pipe diameters per ISO 5167.
(b) Values in parentheses are associated with an additional 0.5% discharge coefficient uncertainty.

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