TEKTROL

Technology Solutions

TEK-COR 1100A

Coriolis Mass Flowmeter

FLOW

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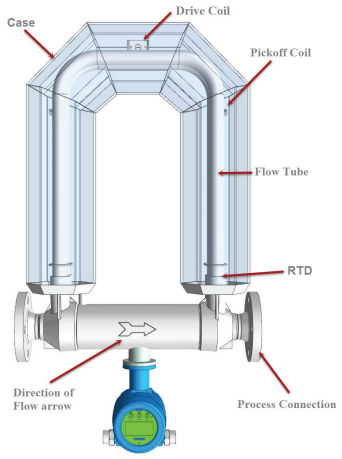
Flow | Level | Temperature | Pressure | Valves | Analyzers | Accessories | TekValSys

Introduction

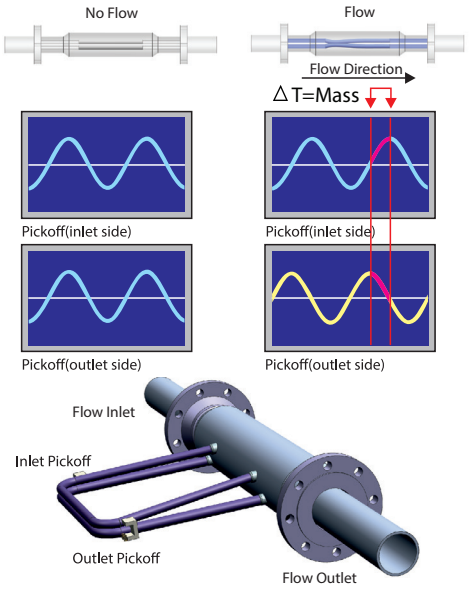
There can often be more than one type of fluid used in your process, each with different properties. Your process and product quality completely depend on the accuracy with which you measure each of these fluids. Our range of Coriolis mass flowmeters are designed to suit your need to measure almost any fluid across any application. Built on the Coriolis principle, these meters measure the mass of the fluids directly, rather than volume and hence they do not require compensations for factors such as temperature and pressure which impact volume and accuracy of measurement.

Measuring Principle

The Coriolis measuring principle refers to the effect that a moving mass has on a body in a rotating frame of reference. The moving mass exerts an apparent force on the body, causing a deformation. This force is called the Coriolis force. It does not act directly on the body, but on the motion of the body. This principle is used in Coriolis flowmeters.



U-Shaped Coriolis Flowmeter



A diagram showing phase shift

Operation

A Coriolis flowmeter consists of two parallel tubes that are made to oscillate using a magnet. These oscillations are recorded by sensors fitted at the inlet and outlet of each tube. In a no-flow state, the oscillations are synchronised, since there is no mass exerting any force on the tubes. On the other hand, any fluid, gas flowing through the tubes generates Coriolis forces, causing the tubes to twist in proportion to the mass flow rate of the medium.

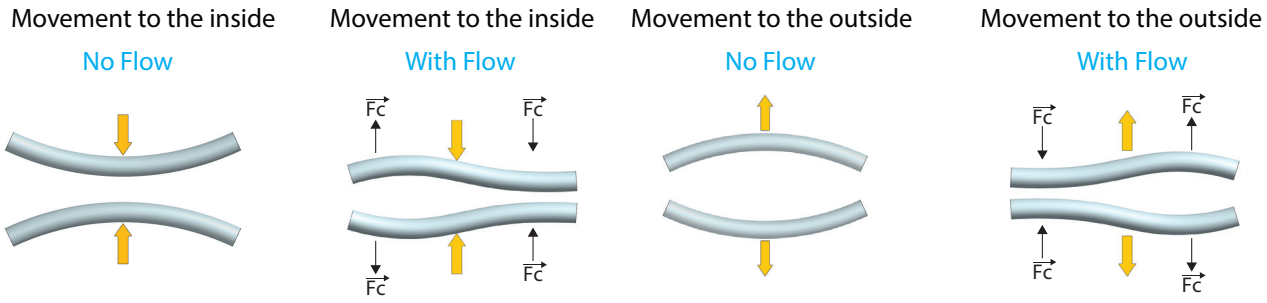


Diagram showing the movement of the flow sensors

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Tek-Cor 1100A Series Coriolis Flowmeter

The Tek-Cor 1100A Series Coriolis Flowmeters are available in the following three configurations:

U-Shaped sensor (Size 1 ½" to 8")

• U-Shaped

These flowmeters are comprised of two tubes that are arranged in the shape of the letter 'U', a magnet and coil assembly, and sensors at the inlet and outlet of the tubes. Coriolis forces exerted by the flow medium are used to determine the mass flow rate and density of the medium.

• Micro-bend Shaped

These flowmeters are comprised of two U-Shaped tubes in a casing with a considerably smaller radius than conventional U-Shaped Coriolis flowmeters. The smaller radius ensures a more compact instrument with significantly lower pressure differential values compared to other flowmeters.

Micro-bend Shaped sensor (Size ½" to 8")

Triangle Shaped Sensor (Size ½" to 1")

• Triangle Shaped

The Triangular flowmeter is the most compact in our range of Coriolis mass flowmeters, designed specifically to provide optimum performance in low-flow applications. It is comprised of a single flow tube which is considerably smaller in size than the conventional U-Shaped tube.

Tek-Cor 1100A Transmitter

The Tek-Cor 1100A transmitter is a high-performing transmitter that uses a micro-processor and offers zero calibration, adjustable pulse outputs, an RS485, and a HART communication protocol. It is highly stable and accurate, as well as easy to install and operate. It requires low maintenance which keeps your process downtime to a minimum and covers the cost of ownership over the long term.

Tek-Cor 1100A Transmitter

Benefits

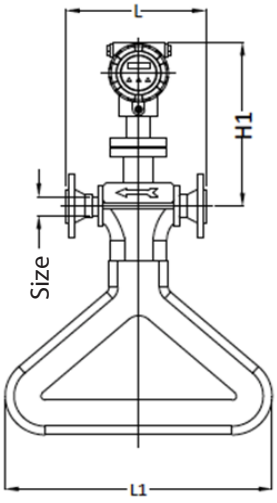
- Suitable for aggressive and contaminated media
- Measurement and display of percent water-cut for oil or water mixtures
- High rotation frequency and well-balanced measuring tubes
- Higher Sampling and Digital Filtering
- Shorter response time
- No moving parts
- Can be used in extremely harsh conditions
- High accuracy for measuring mass flow, density, temperature, and volume flow

Application

- Used to measure steady uniform flow of common viscous fluid, non-Newtonian fluid, slurry containing some solid components, and liquids containing some trace of gases
- Suitable for the bulk measurement of products like syrup, molasses, and raw chemicals

Dimensional Drawings

Outline Dimension for Triangle Shaped



Triangle Shaped Sensor (Size ½" to 1")

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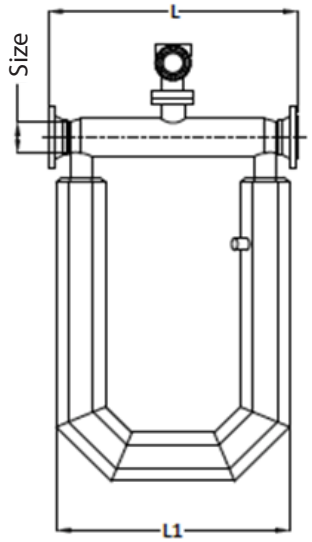
Size	L		L1	H	H1	
	≤300# (4 MPa)	≥600# (6.3 MPa)			Integrated	Remote
½" (15 mm)	7.08" (180 mm)	7.63" (194 mm)	13.77" (350 mm)	11.41" (290 mm)	10.23" (260 mm)	7.48" (190 mm)
1" (25 mm)	7.87" (200 mm)	7.96" (248 mm)	18.03" (458 mm)	15.74" (400 mm)	11.02" (280 mm)	8.26" (210 mm)

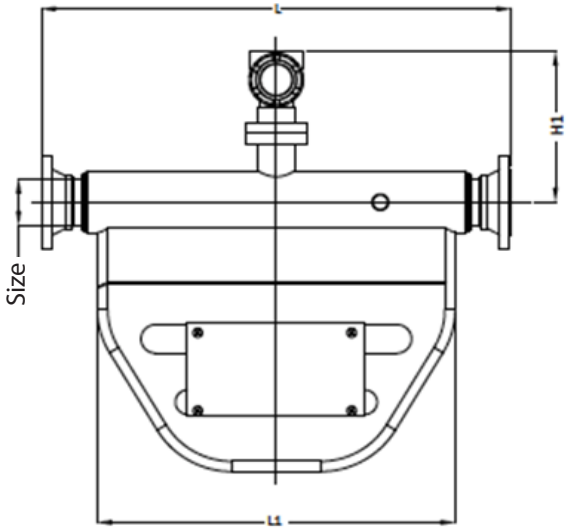
Outline Dimensions for U-Shaped



U-Shaped sensor (Size 1 ½" to 8")

Size	L		L1	H	H1	
	≤300# (4 MPa)	≥600# (6.3 MPa)			Integrated	Remote
1½" (40 mm)	20.47" (520 mm)	21.53" (547 mm)	18.5" (470 mm)	25.98" (660 mm)	11.02" (280 mm)	8.26" (210 mm)
2" (50 mm)	21.96" (558 mm)	23.14" (588 mm)	21.65" (550 mm)	27.95" (710 mm)	11.41" (290 mm)	8.66" (220 mm)
3" (80 mm)	30.70" (780 mm)	31.81" (808 mm)	27.95" (710 mm)	40.94" (1040 mm)	12.59" (320 mm)	9.84" (250 mm)
4" (100 mm)	36.22" (920 mm)	37.32" (948 mm)	33.85" (860 mm)	44.88" (1140 mm)	13.77" (350 mm)	11.02" (280 mm)
6" (150 mm)	43.30" (1100 mm)	44.88" (1140 mm)	41.33" (1050 mm)	59.84" (1520 mm)	14.96" (380 mm)	12.20" (310 mm)
8" (200 mm)	53.70" (1364 mm)	55.51" (1410 mm)	45.66" (1160 mm)	65.15" (1655 mm)	16.53" (420 mm)	13.77" (350 mm)

Outline Dimension of Micro-bend Shaped



Micro-bend Shaped Sensor (Size ½" to 8")

Size	L		L1	H	H1	
	≤300# (4 MPa)	≥600# (6.3 MPa)			Integrated	Remote
½" (15 mm)	15.74" (400 mm)	16.29" (414 mm)	11.02" (280 mm)	7.24" (184 mm)	11.41" (290 mm)	8.66" (220 mm)
1" (25 mm)	19.68" (500 mm)	21.10" (536 mm)	14.17" (360 mm)	9.84" (250 mm)	11.81" (300 mm)	9.05" (230 mm)
1½" (40 mm)	23.62" (600 mm)	24.96" (634 mm)	18.11" (460 mm)	11.81" (300 mm)	12.20" (310 mm)	9.44" (240 mm)
2" (50 mm)	31.49" (800 mm)	32.59" (828 mm)	25.19" (640 mm)	16.14" (410 mm)	12.59" (320 mm)	9.84" (250 mm)
3" (80 mm)	35.43" (900 mm)	36.53" (928 mm)	27.55" (700 mm)	19.29" (490 mm)	13.77" (350 mm)	11.02" (280 mm)
4" (100 mm)	44.48" (1130 mm)	45.51" (1156 mm)	33.85" (860 mm)	25.98" (660 mm)	14.56" (370 mm)	11.41" (290 mm)
6" (150 mm)	55.51" (1410 mm)	57.08" (1450 mm)	47.24" (1200 mm)	35.43" (900 mm)	15.74" (400 mm)	12.99" (330 mm)
8" (200 mm)	70.86" (1800 mm)	72.59" (1844 mm)	57.08" (1450 mm)	46.06" (1170 mm)	16.53" (420 mm)	13.77" (350 mm)

Specifications

Accuracy	±0.1%, ±0.2%, ±0.5%	
Repeatability	± 0.05% (for 0.1% accuracy), ± 0.1% (for 0.2% accuracy), ±0.25% (for 0.5% accuracy)	
Sensor Options	U-Series Shaped/Micro-bend Shaped/Triangle Shaped	
Process Media	Liquid, Gas	
Transmitter	Digital type/Analog type	
Power Supply	18-28 VDC, 85-220 VAC	
Maximum Pressure	3770 PSI (26 MPa)	
Signal Output	4-20 mA or Pulse Output or RS485 or HART	
Process Connections	DIN, ANSI Flanges	
Electronics	Direct Mount or Remote Mount	
Diagnostic Functions	Reset Totalizer	
Graphic Display	LED Display	
Operating Elements	3 optical keys for operator	
Additional Features	Low Flow Cut-off, Oil and Water Content Analysis, Zero Calibration, Flow Calibration, Long-Term Stability, Zero Point Adjustment, Conforms IEC 61362 (Industrial) EMC Directive, Useful for all type of sensors i.e. U-Shaped, Triangle Shaped, Micro-bend Shaped	
Temperature Range	Direct Mount	-58 °F to 257 °F (-50 °C to 125 °C)
	Remote Mount	-58 °F to 392 °F (-50 °C to 200 °C)

Size	Maximum Pressure						
	232 PSI (1.6 MPa)	363 PSI (2.5 MPa)	580 PSI (4.0 MPa)	914 PSI (6.3 MPa)	1450 PSI (10 MPa)	2321 PSI (16 MPa)	3626 PSI (25 MPa)
½" (15 mm)	✓	✓	✓	✓	✓	✓	✓
1" (25 mm)	✓	✓	✓	✓	✓	✓	—
1½" (40 mm)	✓	✓	✓	✓	✓	—	—
2" (50 mm)	✓	✓	✓	✓	✓	—	—
3" (80 mm)	✓	✓	✓	✓	—	—	—
4" (100 mm)	✓	✓	✓	✓	—	—	—
6" (150 mm)	✓	✓	✓	—	—	—	—
8" (200 mm)	✓	✓	✓	—	—	—	—

Flow Ranges

Flow Range for liquid (U-Shaped)

Size (Inch)	Allowable Flow Range (lb/h)	Normal Flow Range for Accuracy 0.1% (lb/h)	Normal Flow Range for Accuracy 0.2%, 0.5% (lb/h)
1½"	706 – 70547	4410 – 70547	3307 – 70547
2"	1103 – 110231	6614 – 110231	5512 – 110231
3"	3087 – 308647	13228 – 308647	12126 – 308647
4"	4410 – 440924	33070 – 440924	26456 – 440924
6"	11024 – 1102311	77162 – 1102311	66139 – 1102311
8"	22047 – 2204622	154324 – 2204622	154324 – 2204622

Flow Range for liquid (Micro-bend Shaped)

Size (Inch)	Allowable Flow Range (lb/h)	Normal Flow Range for Accuracy 0.1% (lb/h)	Normal Flow Range for Accuracy 0.2%, 0.5% (lb/h)
½"	45 – 6613	441 – 6613	331 – 6613
1"	177 – 17636	1323 – 17636	882 – 17636
1½"	530 – 52910	5292 – 52910	2646 – 52910
2"	1103 – 110231	11024 – 110231	5512 – 110231
3"	1764 – 264554	17631 – 264554	17637 – 264554
4"	3307 – 440924	33070 – 440924	22047 – 440924
6"	11024 – 1102311	110232 – 1102311	55116 – 1102311
8"	22047 – 2204622	220463 – 2204622	1102312 – 2204622

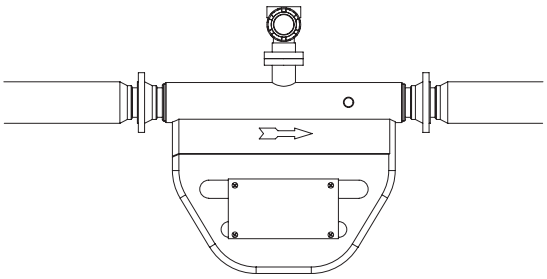
Flow Range for Gas

Size (Inch)	Measurable Flow Range (lb/h)	Flow Range with 0.5% (lb/h)
½"	34 – 6613	166 – 6613
1"	89 – 17636	445 – 17635
1½"	706 – 70547	1770 – 70545
2"	1103 – 110231	2760 – 110230
3"	1544 – 308647	7720 – 308647
4"	2205 – 440924	11025 – 440924
6"	5512 – 1102311	27560 – 1102311

Installation

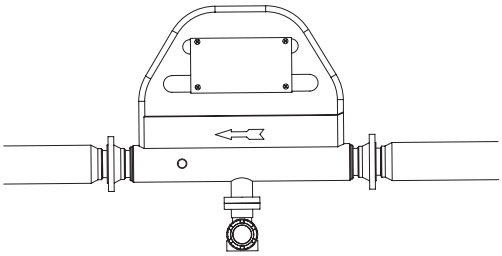
Micro-bend Shaped installation

For Liquid or Slurry



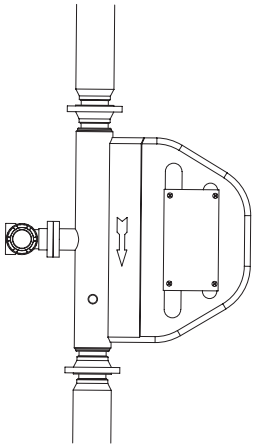
Picture-1

For Gas



Picture-2

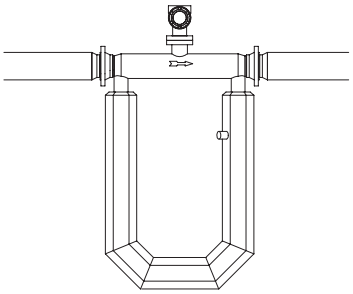
For Liquid, Slurry, or Gas



Picture-3

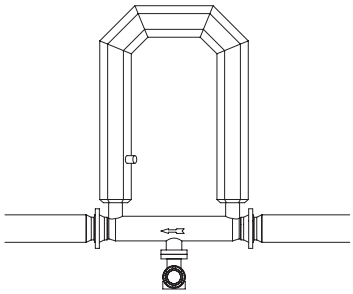
U-Shaped Installation

For Liquid or Slurry



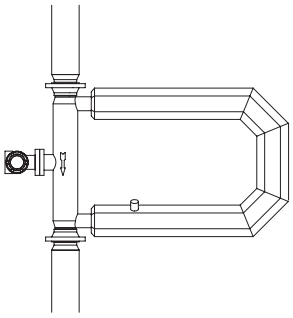
Picture-1

For Gas



Picture-2

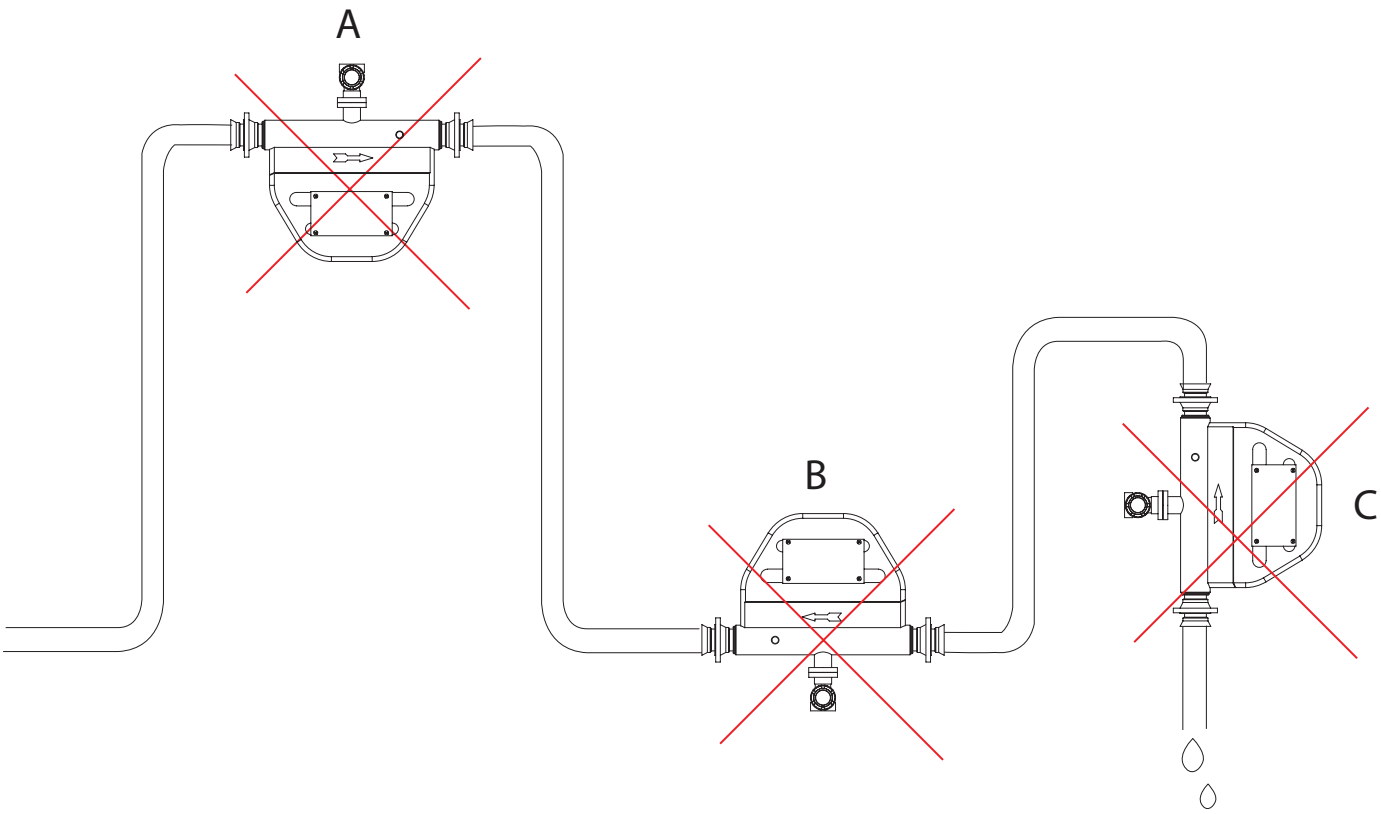
For Liquid, Slurry, or Gas



Picture-3

For the horizontal installation, the measuring tube should be installed downside of the pipeline when the process medium is liquid or slurry (shown in Picture 1) and upside of the pipeline when the process medium is gas (shown in Picture 2). For vertical installation, the measuring tube should be installed beside the pipeline when the process medium is liquid, slurry, or gas (shown in Picture 3).

If gas bubbles are expected, the meters must not be mounted at the highest point of the tubing (A). If solid particles are expected the meters must not be mounted at the lowest point (B) of the pipeline. The meters must not be mounted in a drop line near the open end (C), as this can cause the meters to run empty.



Model Chart

EXAMPLE	Tek-Cor 1100A	1	1	025B	1	S	150	1	E	Tek-Cor 1100A-1-1-025B-1-S-150-1-E
Series	Tek-Cor 1100A									Coriolis Mass Flow Meter
Type		1								U-Shaped
		2								Micro-bend Shaped
		3								Triangle Shaped
Process Media			1							Liquid or Gas
Size and Accuracy				015A						½", ± 0.5% Accuracy (M and T type only)
				025A						1", ± 0.5% Accuracy (M and T type only)
				040A						1-½", ± 0.5% Accuracy (M and U type only)
				050A						2", ± 0.5% Accuracy (M and U type only)
				080A						3", ± 0.5% Accuracy (M and U type only)
				100A						4", ± 0.5% Accuracy (M and U type only)
				150A						6", ± 0.5% Accuracy (M and U type only)
				200A						8", ± 0.5% Accuracy (M and U type only)
				015B						½", ± 0.2% Accuracy (M and T type only)
				025B						1", ± 0.2% Accuracy (M and T type only)
				040B						1-½", ± 0.2% Accuracy (M and U type only)
				050B						2", ± 0.2% Accuracy (M and U type only)
				080B						3", ± 0.2% Accuracy (M and U type only)
				100B						4", ± 0.2% Accuracy (M and U type only)
				150B						6", ± 0.2% Accuracy (M and U type only)
				200B						8", ± 0.2% Accuracy (M and U type only)
				015C						½", ± 0.1% Accuracy (M and T type only)
				025C						1", ± 0.1% Accuracy (M and T type only)
				040C						1-½", ± 0.1% Accuracy (M and U type only)
				050C						2", ± 0.1% Accuracy (M and U type only)
				080C						3", ± 0.1% Accuracy (M and U type only)
				100C						4", ± 0.1% Accuracy (M and U type only)
				150C						6", ± 0.1% Accuracy (M and U type only)
				200C						8", ± 0.1% Accuracy (M and U type only)
Electronics					1					Direct Mount
					2					Remote Mount
Output						I				4-20 mA, HART, Pulse
						S				4-20 mA, Modbus RS485,Pulse
Process Connection							025			DIN 2.5 MPa Flange
							040			DIN 4 MPa Flange
							100			DIN 10 MPa Flange
							160			DIN 16 MPa Flange
							260			DIN 26 MPa Flange
							150			150# ANSI Flange
							300			300# ANSI Flange
							600			600# ANSI Flange
Power Supply								1		18-28 VDC
								2		85-220 VAC
Approvals									E	UL Class I Div. I

Popular Models

MODEL NO.	DESCRIPTION
1100A-2-1-015A-1-S-150-1-E	Explosion-proof ½", 0.5%, 150# ANSI Flange
1100A-2-1-025A-1-S-150-1-E	Explosion-proof 1", 0.5%, 150# ANSI Flange
1100A-2-1-040A-1-S-150-1-E	Explosion-proof 1.5", 0.5%, 150# ANSI Flange
1100A-2-1-050A-1-S-150-1-E	Explosion-proof 2", 0.5%, 150# ANSI Flange
1100A-2-1-080A-1-S-150-1-E	Explosion-proof 3", 0.5%, 150# ANSI Flange
1100A-2-1-015B-1-S-150-1-E	Explosion-proof ½", 0.2%, 150# ANSI Flange
1100A-2-1-025B-1-S-150-1-E	Explosion-proof 1", 0.2%, 150# ANSI Flange
1100A-2-1-040B-1-S-150-1-E	Explosion-proof 1.5", 0.2%, 150# ANSI Flange
1100A-2-1-050B-1-S-150-1-E	Explosion-proof 2", 0.2%, 150# ANSI Flange
1100A-2-1-080B-1-S-150-1-E	Explosion-proof 3", 0.2%, 150# ANSI Flange

Customer Service and Support

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