



Technology Solutions

# TEK-COR 1100A

## Coriolis Mass Flow Meter



FLOW



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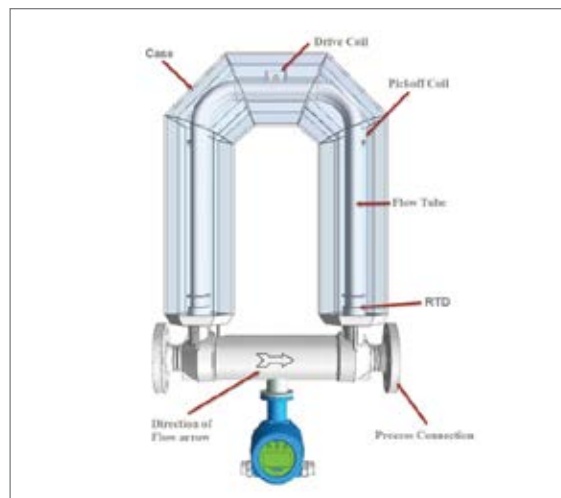
Flow | Level | Temperature | Pressure | Valves | Analyzers | Accessories | TekValSys

## Introduction

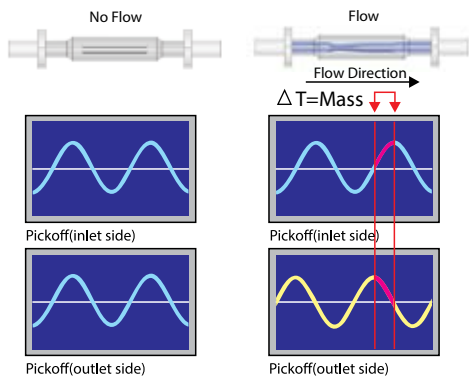
There can often be more than one type of fluid used in your process, each with different properties. Your process and product quality completely depend on the accuracy with which you measure each of these fluids. Our range of Coriolis mass flow meters are designed to suit your need to measure almost 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 flow meters.



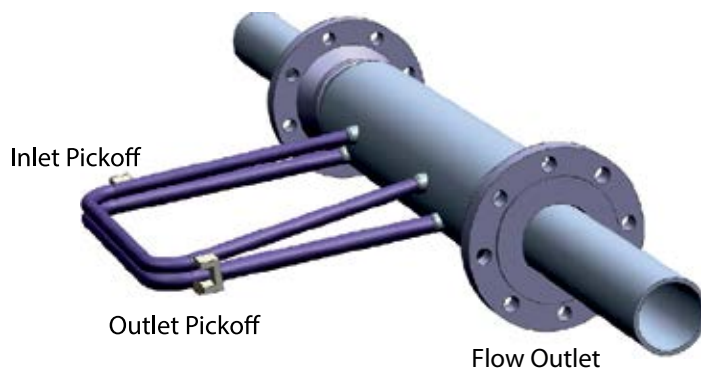
U-Tube Coriolis Flow Meter



Flow Inlet

## Operation

A Coriolis flow meter 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.



A diagram showing phase shift

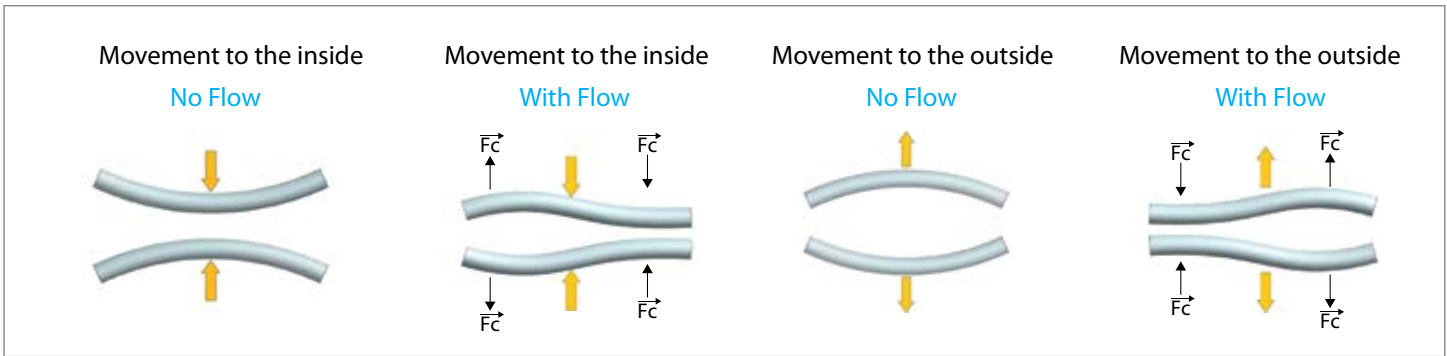


Diagram showing the movement of the flow sensors

## Tek-Cor 1100A Series Coriolis Flow Meter

The Tek-Cor 1100A Series Coriolis Flow meters are available in the following six configurations:



U-Tube (Size 1" to 8")

### 1. U-Tube

These flow meters 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.

### 2. Standard

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



Standard (Size 3/8" to 8")



Nano (Size 3/8" to 1")

### 3. Nano

The Nano flow meter is the most compact in our range of Coriolis mass flow meters, 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.



Super Bend (Size 3/8" to 8")

### 4. Super Bend

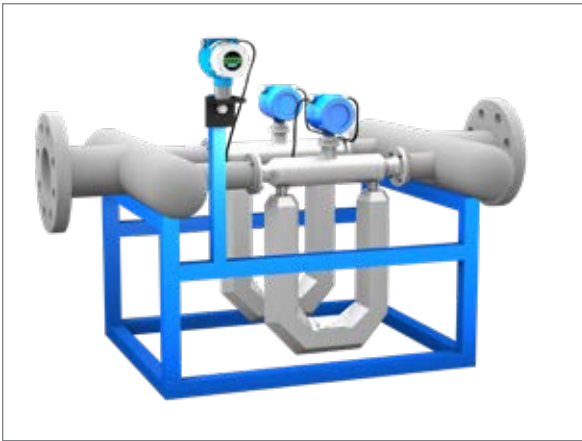
The Super Bend coriolis mass flow meter is used in a wide range of applications to accurately measure the flow media. It consists of a loop-powered dual tube system, capable of withstanding pressures of up to 1450 psi. It is also more cost-efficient compared to conventional flow meters.

### 5. Straight

It is the highest capacity Coriolis Mass Flow Meter for liquid and gases. Its straight tube design is ideal for bunkering operations and custody transfer or fiscal metering in the oil and gas industry. The Straight Coriolis Flow Meter offers excellent corrosion resistance and is self-draining with a plug-resistant flow path.



Straight (Size 3/8" to 1")



Duo (Size 10" to 24")

## 6. Duo

Duo Coriolis Mass Flow Meter is mostly used in custody transfer applications. It provides high accuracy, repeatability, versatility, reliability in fluid measurement. It has a tolerance of solid particles and minimizes pressure drop, which increases the performance. This meter can be installed without long, straight pipe runs upstream and downstream. Duo Coriolis Mass Flow Meter is suitable for high flow rate applications.

## 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-Valsys 8000A FCA

## Benefits

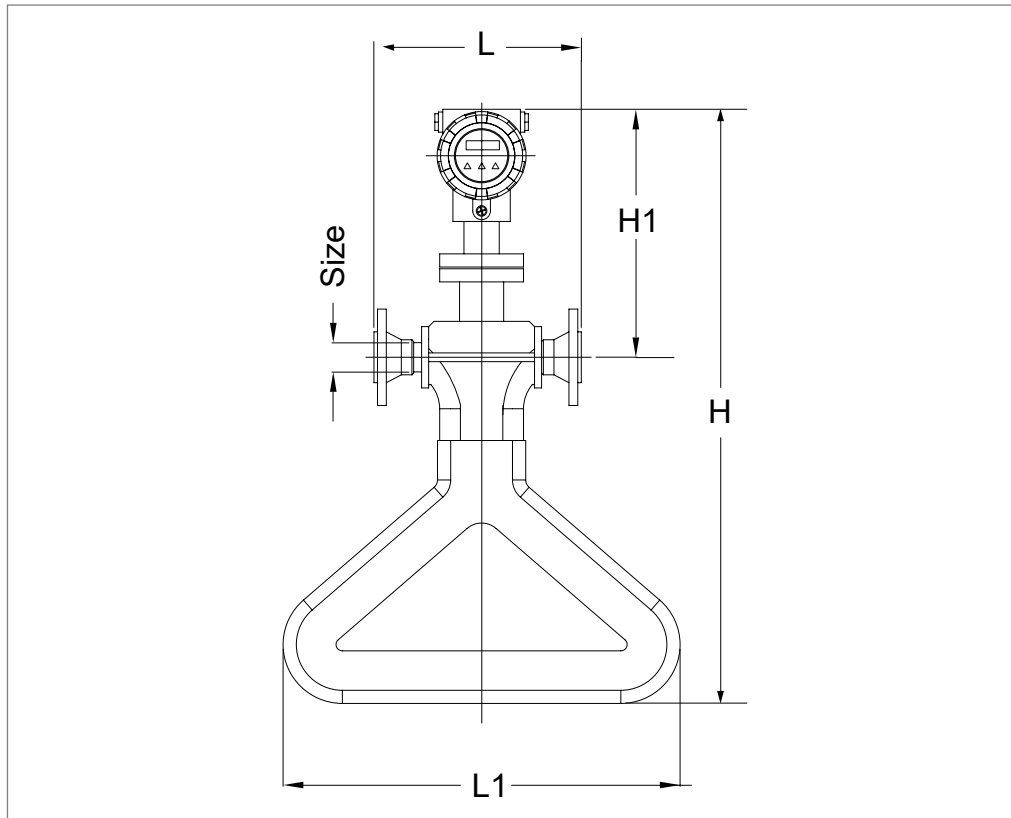
- Suitable for aggressive and contaminated media.
- Measurement and Display of percent water-cut for oil or water mixtures.
- High Phase Shift Frequency.
- Measuring tubes vibrated at natural frequency.
- Higher Sampling and Digital Filtering.
- Short response time.
- No moving parts.
- Full Sensor Diagnostics.
- Measures mass flow, density, temperature, and volume flow with high accuracy.
- OLED with 2 line display.
- Multiple Flange (150# To 900#) and Process Connections.
- Net Oil Measurement.
- Density accuracy upto 0.001 g/cm<sup>3</sup> (Consult Factory for better).
- Suitable for harsh conditions.
- Process Temp Ranges From -200 to 300°F.
- UI Class I Div I and NTEP Approved.
- Certified for use in Fiscal and Custody Transfer Applications.

## 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

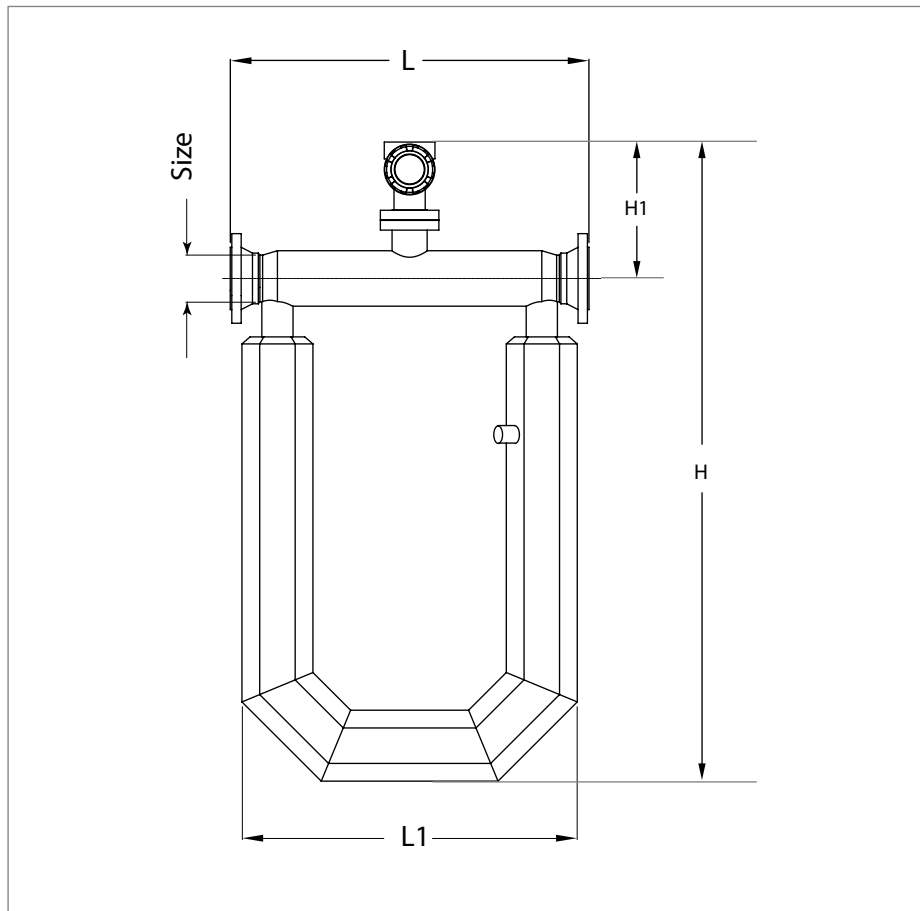
### Outline Dimension for Nano



Nano Sensor (Size ½" to 1")

Size in(mm)	L in(mm)		L1 in(mm)	H in(mm)	H1 in(mm)	
	≤300# (4 MPa)	≥600# (6.3 MPa)			Integrated	Remote
½"(15)	7"(177)	7¾"(190.75)	13¾"(344.25)	11½"(285.25)	10¼"(255.75)	7 ½"(187)
1"(25)	7¾"(196.75)	23¼"(199)	18"(450.75)	15¾"(393.5)	11"(275.5)	8¼"(206.5)

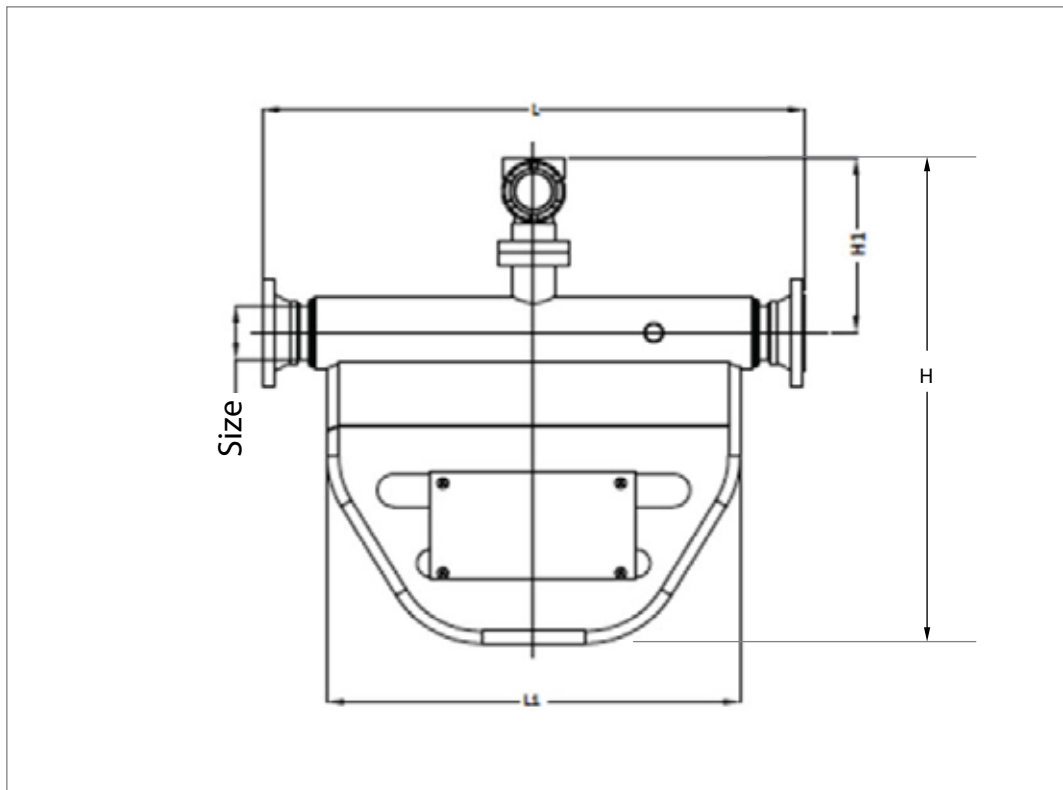
## Outline Dimensions for U-Tube



U-Tube sensor (Size 1 1/2" to 8")

Size in(mm)	L in(mm)		L1 in(mm)	H in(mm)	H1 in(mm)	
	≤300# (4 MPa)	≥600# (6.3 MPa)			Integrated	Remote
1 1/2"(40)	20 1/2"(511.75)	21 1/2"(538.25)	18 1/2"(462.5)	26"(649.5)	11"(275.5)	8 1/4"(206.5)
2"(50)	22"(549)	23 1/4"(578.5)	21 3/4"(541.25)	28"(698.75)	11 1/2"(285.25)	8 3/4"(216.5)
3"(80)	30 3/4"(767.5)	31 3/4"(795.25)	28"(698.75)	41"(1023.5)	12 1/2"(314.75)	9 3/4"(246)
4"(100)	36 1/4"(905.5)	37 1/4"(933)	33 3/4"(846.25)	45"(1122)	13 3/4"(344.25)	11"(275.5)
6"(150)	43 1/4"(1082.5)	45"(1122)	41 1/4"(1033.25)	59 3/4"(1496)	15"(374)	12 1/4"(305)
8"(200)	53 3/4"(1342.5)	55 1/2"(1387.75)	45 3/4"(1141.5)	65 1/4"(1628.75)	16 1/2"(413.25)	13 3/4"(344.25)

## Outline Dimension of Standard

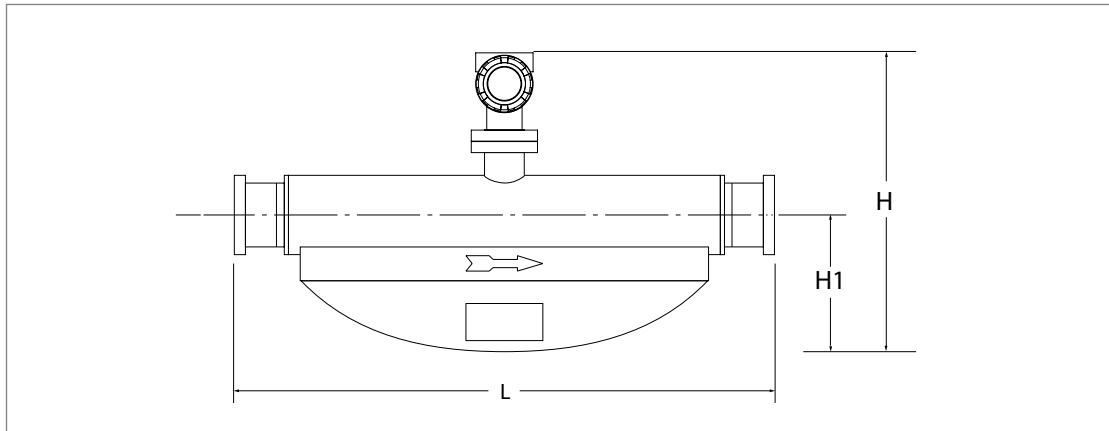


Standard Sensor (Size ½" to 8")

Size in(mm)	L in(mm)		L1 in(mm)	H in(mm)	H1 in(mm)	
	≤300# (4 MPa)	≥600# (6.3 MPa)			Integrated	Remote
½"(15)	15¾"(393.5)	16¼"(407.25)	11"(275.5)	7¼"(181)	11½"(285.25)	8¾"(216.5)
1"(25)	19¾"(492)	21"(527.5)	14¼"(354.25)	9¾"(246)	11¾"(295.25)	9"(226.25)
1½"(40)	23½"(590.5)	25"(624)	18"(452.75)	11¾"(295.25)	12¼"(305)	9½"(236)
2"(50)	31½"(787.25)	32½"(814.75)	25¼"(629.75)	16¼"(403.5)	12½"(314.75)	9¾"(246)
3"(80)	35½"(885.75)	36½"(913.25)	27½"(688.75)	19¼"(482.25)	13¾"(344.25)	11"(275.5)
4"(100)	44½"(1112)	45½"(1137.75)	33¾"(846.25)	26"(649.5)	14½"(364)	11½"(285.25)
6"(150)	55½"(1387.75)	57"(1427)	47¼"(1181)	35½"(885.75)	15¾"(393.5)	13"(325)
8"(200)	70¾"(1771.5)	72½"(1814.75)	57"(1427)	46"(1151.5)	16½"(413.25)	13¾"(344.25)



## Outline Dimensions for Super Bend

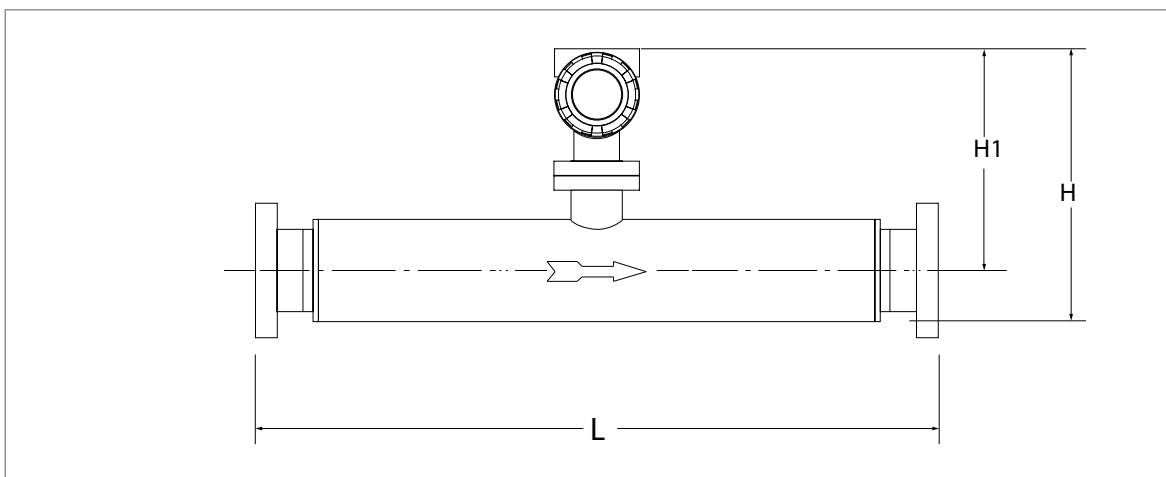


Super Bend sensor (Size 3/8" to 8")

Line Size in(mm)	L in (mm)	H in (mm)	H1 in (mm)
3/8" (10)	15 1/4" (385)	13 3/4" (345)	10 3/4" (270)
1/2" (15)	15 1/4" (385)	13 3/4" (345)	10 3/4" (270)
1" (25)	21" (525)	15 1/2" (386)	11 1/4" (282.87)
1 1/2" (40)	23" (576)	15 1/2" (386)	11 1/4" (282.87)
2" (50)	28 1/2" (715)	16 3/4" (416)	11 3/4" (291)
3" (80)	36 1/2" (910)	-	-
4" (100)	42 1/2" (1060)	-	-
6" (150)	52" (1300)	-	-

\*Other sizes available on request

## Outline Dimensions for Straight



Straight sensor (Size 3/8" to 1")

Line Size in (mm)	L in (mm)	H In (mm)	H1 in (mm)
3/8" (10)	13 3/4" (347)	10 3/4"(268.75)	9 1/4" (233)
1/2" (15)	16 1/4" (409)	10 3/4"(268.75)	9 1/4" (233)
3/4" (20)	22" (548)	12" (296.87)	9 3/4" (247)
1" (25)	26 1/2" (665)	13 1/8" (328.12)	10 1/2"(260)

## Specifications

<b>Accuracy</b>	±0.05%, ±0.1%, ±0.2% or ±0.5%	
<b>Density Accuracy</b>	0.001g/cm <sup>3</sup> (Consult Factory for Better)	
<b>Repeatability</b>	± 0.05% (for 0.1% accuracy), ± 0.1% (for 0.2% accuracy), ±0.25% (for 0.5% accuracy) or ± 0.05% (for 0.05% accuracy)	
<b>Sensor Type</b>	Standard, U Tube, Nano, Super Bend, Straight Tube, Dual Path	
<b>Process Media</b>	Liquid or Gas	
<b>Transmitter</b>	Digital type/Analog type	
<b>Power Supply</b>	18-28VDC, 85-220VAC	
<b>Maximum Pressure</b>	For 3/8" to 1/2"	3600psi (25MPa),
	For 1"	2300psi (16MPa)
	For 1 1/2" to 2"	1500psi (10MPa)
	For 3" to 4"	900psi (6MPa)
	For 6" to 24"	580psi (4mpa)
<b>Signal Output</b>	4-20 mA and Pulse , Optional: HART, Modbus RS485 or Ethernet	
<b>Process Connections</b>	DIN, ANSI Flanges, NPT, Flare, Tri-Clamp	
<b>Electronics</b>	Direct Mount or Remote Mount	
<b>Diagnostic Functions</b>	Reset Totalizer	
<b>Graphic Display</b>	OLED	
<b>Operating Elements</b>	3 optical keys for operator	
<b>Additional Features</b>	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-Tube, Nano, Standard	
<b>Temperature Range</b>	Direct Mount	-60°F to 260°F (-50°C to 125°C)
	Remote Mount	-300°F to 400°F (-180°C to 200°C)

## Engineering Units

Program	Units
Mass flow rate	Lb/m, lb/h, kg/m, kg/h, t/h, t/D
Total mass flow	Lb, Kg, T
Volume flow rate	GPM, GPH, M <sup>3</sup> /m, M <sup>3</sup> /h, M <sup>3</sup> /d, Bl/D
Total volume flow	Gal, M <sup>3</sup> , Bbl
Density	G/ml, Kg/l, Kg/M <sup>3</sup> , Lb/Gal, g/cm <sup>3</sup> , Lb/f
Temperature	°C, °F
Low flow cut off	Lb/h

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" (0.04 ft)	✓	✓	✓	✓	✓	✓	✓
1" (0.08 ft)	✓	✓	✓	✓	✓	✓	—
1½" (0.13 ft)	✓	✓	✓	✓	✓	—	—
2" (0.16 ft)	✓	✓	✓	✓	✓	—	—
3" (0.26 ft)	✓	✓	✓	✓	—	—	—
4" (0.32 ft)	✓	✓	✓	✓	—	—	—
6" (0.49 ft)	✓	✓	✓	—	—	—	—
8" (0.65 ft)	✓	✓	✓	—	—	—	—

## Flow Ranges

### Flow Range for liquid (U-Tube)

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 (Standard)

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

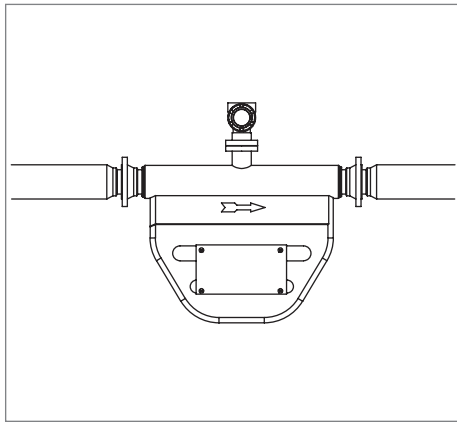
Size (Inch)	Measurable Flow Range (lb/h)	Flow Range with 0.5% (lb/h)
½"	34 – 6613	166 – 6613
1"	89 – 17636	445 – 17635
1½"	706 – 70547	1770 – 70545
2"	1103 – 110231	2760 – 110230
3"	1544 – 308647	7720 – 308647
4"	2205 – 440924	11025 – 440924
6"	5512 – 1102311	27560 – 1102311



# Installation

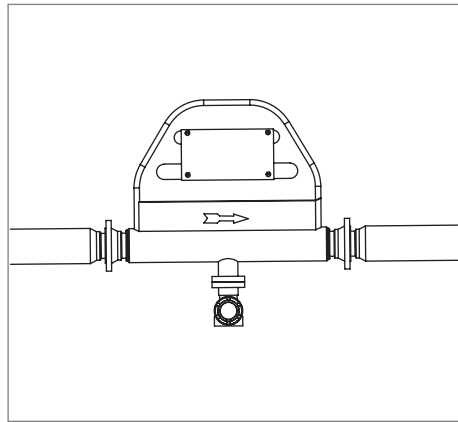
## Standard installation

For Liquid



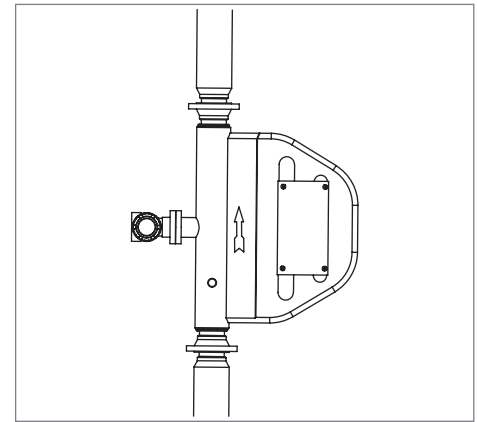
Picture-1

For Gas



Picture-2

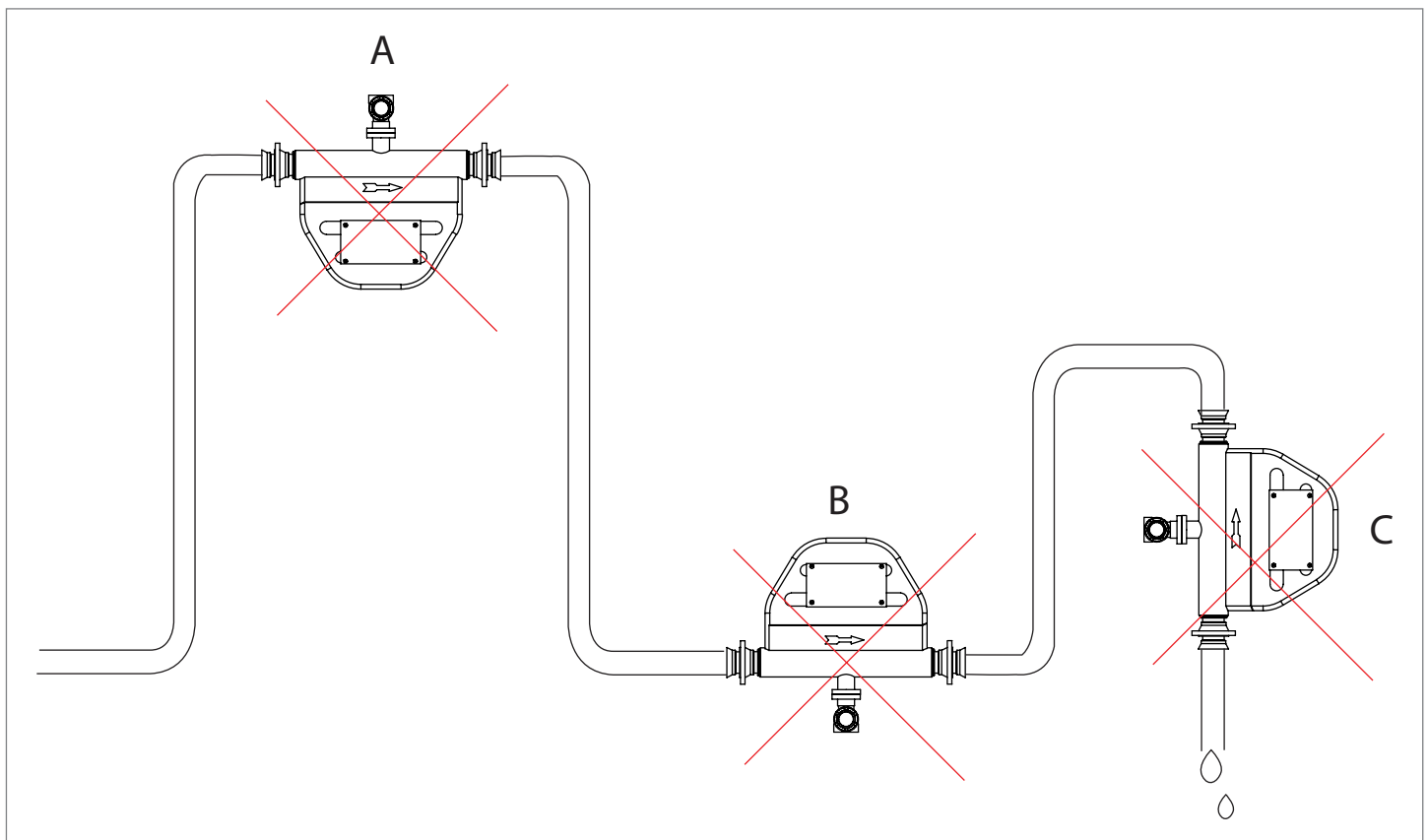
For Slurry



Picture-3

For the horizontal installation, the measuring tube should be installed downside of the pipeline when the process medium is liquid (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 slurry (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

<b>Example</b>	Tek-Cor 1100A	2	1	025	B	1	S	150	1	E	L	Tek-Cor 1100A-2-1-025-B-1-S-150-1-E-L
<b>Series</b>	Tek-Cor 1100A											Coriolis Mass Flow Meter
<b>Type</b>		1 2 3 4 5 6										U - Tube Standard Nano Super Bend Straight Duo
<b>Process Temp</b>			1 2 3									Standard (-60 to 260 deg F) Low (-300 to 260 deg F) High (-60 to 400 deg F)
<b>Size</b>				008 015 025 040 050 080 100 150 200 250 300 350 400 500 600								3/8" (3600psi Max Pressure)(Type 2,3,4,5) 1/2" (3600psi Max Pressure)(Type 2,3,4,5) 1" (2300psi Max Pressure)(Type 1,2,3,4,5) 1-1/2" (1500psi Max Pressure)(Type 1,2,4) 2" (1500psi Max Pressure)(Type 1,2,4) 3" (900psi Max Pressure)(Type 1,2,4) 4" (900psi Max Pressure)(Type 1,2,4) 6" (580psi Max Pressure)(Type 1,2,4) 8" (580psi Max Pressure)(Type 1,2,4) 10" (580psi Max Pressure)(Type 6) 12" (580psi Max Pressure)(Type 6) 14" (580psi Max Pressure)(Type 6) 16" (580psi Max Pressure)(Type 6) 20" (580psi Max Pressure)(Type 6) 24" (580psi Max Pressure)(Type 6)
<b>Accuracy</b>					A B C D							0.50% 0.20% 0.10% 0.05%(Custody Transfer)
<b>Electronics</b>						1 2 3 4						Direct Mount Remote Mount Remote CT Flow Computer F1001 NTEP Flow Computer
<b>Output</b>							I S D E					4-20 mA, HART, Pulse 4-20 mA, Modbus RS485, Pulse Two 4-20mA, Pulse Ethernet, 4-20mA, HART RS-485
<b>Process Connection</b>								150 300 600 900 001 002 003 025 040				150# ANSI Flange 300# ANSI Flange 600# ANSI Flange 900# ANSI Flange NPT Flare Fitting Tri-Clamp DIN 2.5 MPa Flange DIN 4 MPa Flange

									100			DIN 10 MPa Flange
									160			DIN 16 MPa Flange
									260			DIN 26 MPa Flange
									XXX			Special
Power Supply									1			18-28 VDC
									2			85-220 VAC
Approvals										E		UL Class I Div I
Options											FC	Factory Configuration
											JK	Jacketed (Welded)
											HC	Hastelloy Wetted Material
											316	316SS Watted Material
											CPC	Special Calibration

## Popular Models

MODEL NO.	DESCRIPTION
1100A-2-1-015A-1-S-150-1-E	Explosion-proof ½", 0.5%, 150# ANSI Flange Standard sensor
1100A-2-1-025A-1-S-150-1-E	Explosion-proof 1", 0.5%, 150# ANSI Flange Standard sensor
1100A-2-1-040A-1-S-150-1-E	Explosion-proof 1.5", 0.5%, 150# ANSI Flange Standard sensor
1100A-2-1-050A-1-S-150-1-E	Explosion-proof 2", 0.5%, 150# ANSI Flange Standard sensor
1100A-2-1-080A-1-S-150-1-E	Explosion-proof 3", 0.5%, 150# ANSI Flange Standard sensor
1100A-2-1-015B-1-S-150-1-E	Explosion-proof ½", 0.2%, 150# ANSI Flange Standard sensor
1100A-2-1-025B-1-S-150-1-E	Explosion-proof 1", 0.2%, 150# ANSI Flange Standard sensor
1100A-2-1-040B-1-S-150-1-E	Explosion-proof 1.5", 0.2%, 150# ANSI Flange Standard sensor
1100A-2-1-050B-1-S-150-1-E	Explosion-proof 2", 0.2%, 150# ANSI Flange Standard sensor
1100A-2-1-080B-1-S-150-1-E	Explosion-proof 3", 0.2%, 150# ANSI Flange Standard sensor
1100A-2-1-025A-1-S-300-1-E	Explosion Proof 1", 0.5%, 300# ANSI Flange, Standard Sensor
1100A-2-1-050A-1-S-300-1-E	Explosion Proof 2", 0.5%, 300# ANSI Flange, Standard Sensor
1100A-1-1-025A-2-S-300-1-E	Explosion Proof 1", 0.5%, 300# ANSI Flange, U-Tube
1100A-1-1-050A-2-S-300-1-E	Explosion Proof 2", 0.5%, 300# ANSI Flange, U-Tube
1100A-2-1-025B-1-S-300-1-E	Explosion Proof 1", 0.2%, 300# ANSI Flange, Standard Sensor
1100A-2-1-050B-1-S-300-1-E	Explosion Proof 2", 0.2%, 300# ANSI Flange, Standard Sensor
1100A-1-1-025B-2-S-300-1-E	Explosion Proof 1", 0.2%, 300# ANSI Flange, U-Tube
1100A-1-1-050B-2-S-300-1-E	Explosion Proof 2", 0.2%, 300# ANSI Flange, U-Tube
1100A-2-1-025 B-1-S-600-1-E	Explosion Proof 1", 0.2%, 600# ANSI Flange, Standard Sensor
1100A-2-1-050B-1-S-600-1-E	Explosion Proof 2", 0.2%, 600# ANSI Flange, Standard Sensor

# Customer Service & Support




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