Quick Start Guide
00825-0100-4809, Rev DC
June 2016

Rosemount™ 485 Annubar™ Flanged Assembly

EMERSON™
Process Management

NOTICE

This guide provides basic guidelines for Rosemount 485 Annubar. It does not provide instructions for configuration, diagnostics, maintenance, service, troubleshooting, Explosion-proof, Flameproof, or Intrinsically Safe (I.S.) installations. Refer to Rosemount 485 Annubar Reference Manual for more instruction. This manual is also available electronically on EmersonProcess.com/Rosemount.

If the Rosemount Annubar was ordered assembled to a Rosemount Pressure Transmitter, see the following Quick Start Guides for information on configuration and hazardous locations certifications:

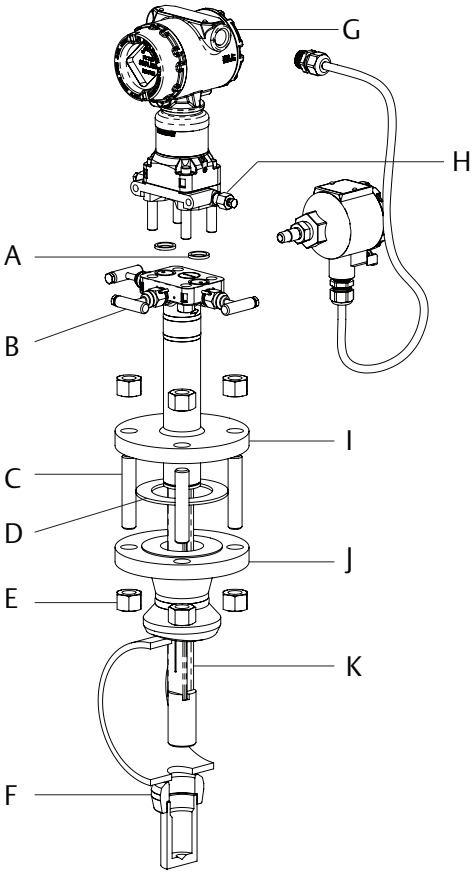
- Rosemount 3051S Series Pressure Transmitter and Rosemount 3051SF Series Flowmeter Quick Start Guide.
- Rosemount 3051S MultiVariable Transmitter and Rosemount 3051SF Series Flowmeter MultiVariable Transmitter Quick Start Guide.
- Rosemount 3051 Pressure Transmitter and Rosemount 3051CF Series Flowmeter Transmitter Quick Start Guide.
- Rosemount 2051 Pressure Transmitter and Rosemount 2051CF Series Flowmeter Transmitter Quick Start Guide.

⚠ WARNING

Process leaks may cause harm or result in death. To avoid process leaks, only use gaskets designed to seal with the corresponding flange and o-rings to seal process connections. Flowing medium may cause the Rosemount 485 Annubar assembly to become hot and could result in burns.

Contents

Figure 1. Rosemount 485 Annubar Flange Assembly Exploded View[1]



A. 2× O-rings
B. Direct mount transmitter connection with valves
C. Studs
D. Gasket
E. Nuts
F. Opposite side support
G. Transmitter
H. Coplanar flange with drain vents
I. Sensor flange
J. Mounting flange assembly
K. Rosemount 485 Annubar Sensor

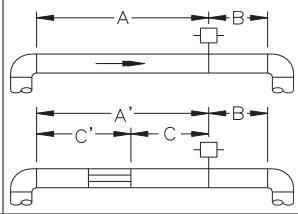
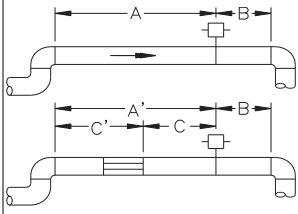
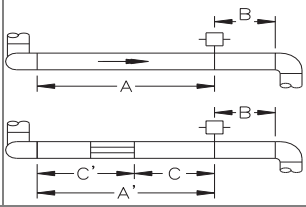
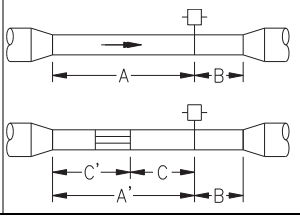
Note
Use an appropriate pipe sealing compound rated for the service temperature on all threaded connections.

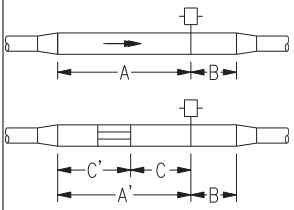
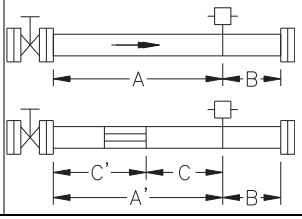
1. *Transmitter and housing are shown for clarity purposes – only supplied if ordered.*

1.0 Location and orientation

Correct orientation and straight run requirements must be met for accurate and repeatable flow measurements. Refer to Table 1 for minimum pipe diameter distances from upstream disturbances.

Table 1. Straight Run Requirements

	In plane / Out of plane	Upstream pipe diameters					Downstream pipe diameters
		Without straightening vanes		With straightening vanes			
		In plane A	Out of plane A	A'	C	C'	B
1		8 N/A	10 N/A	N/A 8	N/A 4	N/A 4	4 4
2		11 N/A	16 N/A	N/A 8	N/A 4	N/A 4	4 4
3		23 N/A	28 N/A	N/A 8	N/A 4	N/A 4	4 4
4		12 N/A	12 N/A	N/A 8	N/A 4	N/A 4	4 4

5		18 N/A	18 N/A	N/A 8	N/A 4	N/A 4	4 4
6		30 N/A	30 N/A	N/A 8	N/A 4	N/A 4	4 4

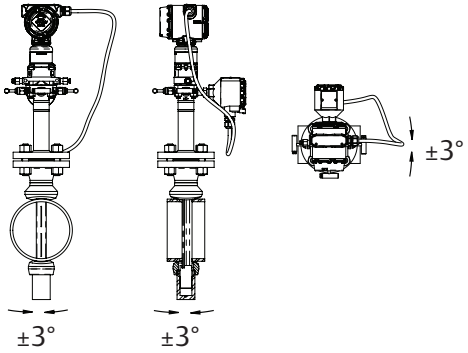
Note

- Consult the factory for instructions regarding use in square or rectangular ducts.
- "In plane A" means the sensor is in the same plane as the elbow. "Out of plane A" means the sensor is perpendicular to the plane of the elbow.
- If proper lengths of straight run are not available, position the mounting such that 80% of the run is upstream and 20% is downstream.
- Use straightening vanes to reduce the required straight run length.
- Row 6 in Table 1 applies to gate, globe, plug, and other throttling valves that are partially opened, as well as control valves.

1.1 Misalignment

Rosemount 485 Annubar installation allows for a maximum misalignment of 3°.

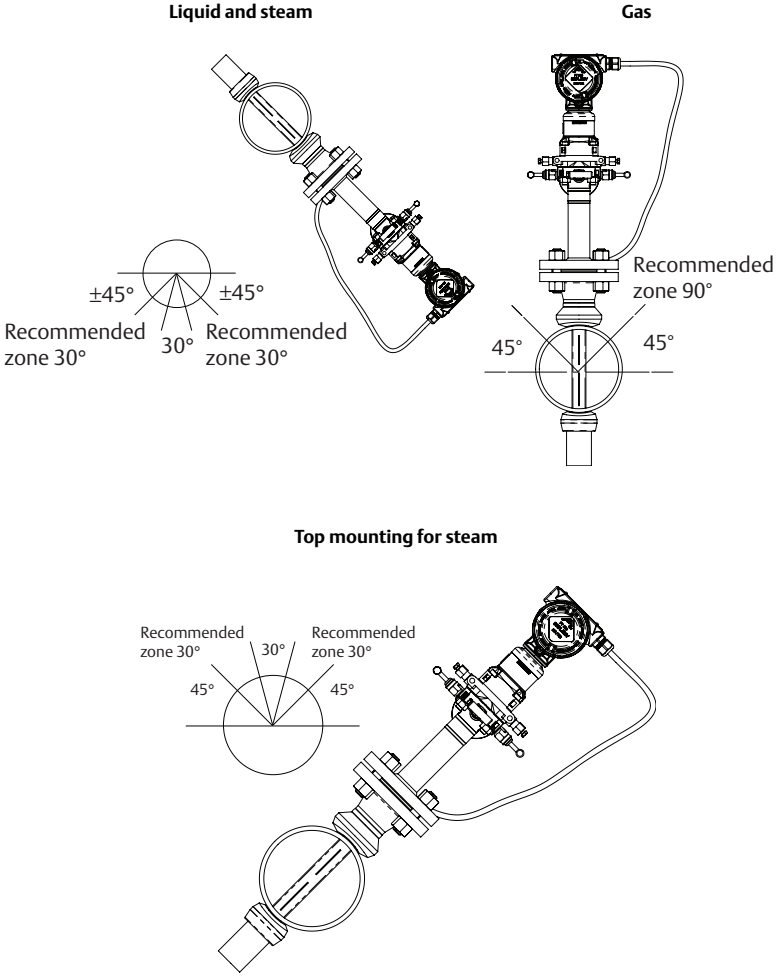
Figure 2. Misalignment



1.2 Horizontal orientation

For proper venting and draining, the sensor should be located in the upper half of the pipe for air and gas applications. For liquid and steam applications, the sensor should be located in the bottom half of the pipe. The maximum temperature for a direct mounted transmitter is 500 °F (260 °C).

Figure 3. Horizontal Orientation



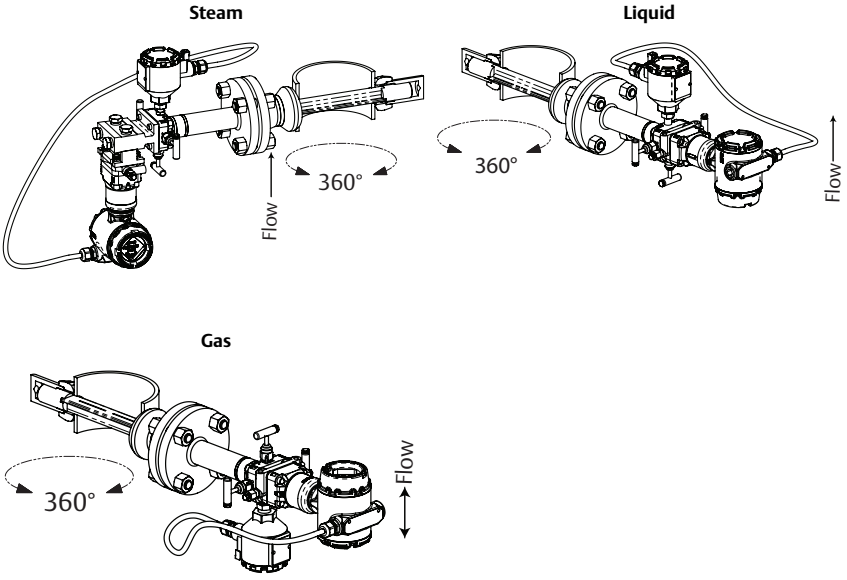
Note

For steam applications with DP readings between 0.75 and 2 inH_2O in horizontal pipes, it is recommended to install the primary element/flowmeter mounting above the pipe.

1.3 Vertical orientation

The sensor can be installed in any position around the circumference of the pipe, provided the vents are positioned properly for bleeding or venting. Optimal results for liquid or steam are obtained when flow is up. For steam applications, a 90° spacer will be added to provide water legs to ensure the transmitter stays within temperature limits. The maximum temperature for a direct mounted transmitter is 500 °F (260 °C).

Figure 4. Vertical Orientation



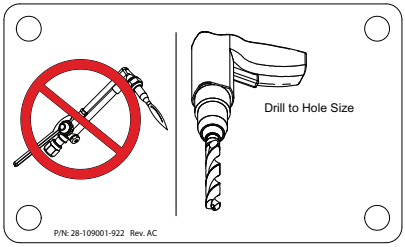
2.0 Drill sensor holes

1. Determine the sensor size based on the probe width (see Table 2).

Table 2. Sensor Size/Hole Diameter Chart

Sensor size	Sensor width	Hole diameter	
1	0.590-in. (14,99 mm)	3/4-in. (19 mm)	+1/32-in (0,8 mm) – 0.00
2	1.060-in. (26,92 mm)	1 5/16-in. (34 mm)	+1/16-in. (1,6 mm) – 0.00
3	1.935-in. (49,15 mm)	2 1/2-in. (64 mm)	+1/16-in. (1,6 mm) – 0.00

2. Depressurize and drain the pipe.
3. Select the location to drill the hole.
4. Determine the diameter of the hole to be drilled according to the specifications in Table 2. Drill the mounting hole into the pipe with a hole saw or drill. DO NOT TORCH CUT THE HOLE.



⚠WARNING

When drilling the mounting hole(s), Emerson™ Process Management recommends the use of a magnetic drill or pipe clamping fixture to safely drill the hole. Use appropriate personal protective equipment and procedures when drilling and welding.

5. Although it is not commonly selected, if an opposite-side support model is supplied, a second identically sized hole must be drilled opposite the first hole so that the sensor can pass completely through the pipe. (To determine if you have an opposite-side support model, measure the distance from the tip to the first slot or hole. If the distance is greater than 1-in. (25,4 mm), it is the opposite-side support model.) To drill the second hole, follow these steps:
   a. Measure the pipe circumference with a pipe tape, soft wire, or string. (For the most accurate measurement the pipe tape needs to be perpendicular to the axis of flow.)
   b. Divide the measured circumference by two to determine the location of the second hole.
   c. Re-wrap the pipe tape, soft wire, or string from the center of the first hole. Then, using the number calculated in step b, mark the center of what will become the second hole.
   d. Using the diameter determined in step 4, drill the hole into the pipe with a hole saw or drill. DO NOT TORCH CUT THE HOLE.

Drill the appropriate diameter hole through the pipe wall.

Note
Drill the hole 180° from the first hole for opposite- side support models.

6. Deburr the drilled holes on the inside of the pipe.

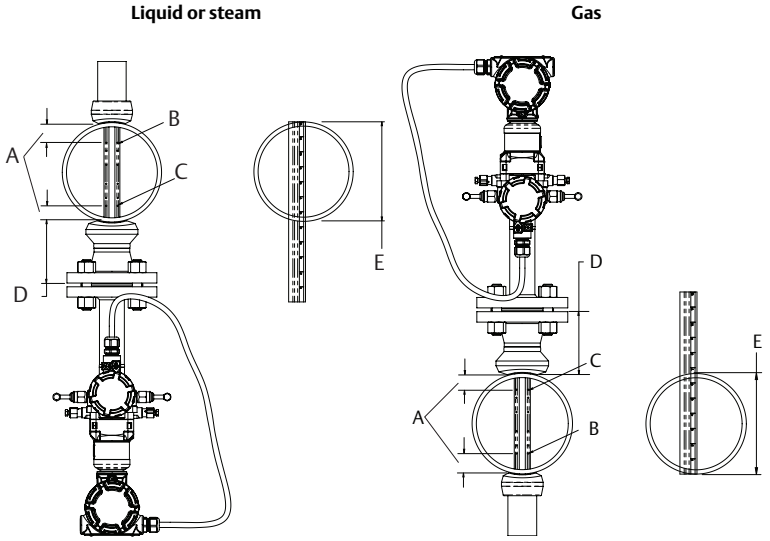
3.0 Assemble and check fit-up

For accurate measurement, use the following steps to ensure that Ports A and B are equal distances from the inside walls of the pipe.

1. Assemble the Rosemount 485 to the mounting hardware with the gaskets and bolts.
2. Hand tighten the bolts just enough to hold the position of the sensor centered in the mounting hardware.
3. Measure the distance from the high point of the butt weld branch connection to the first sensing hole, port B, then subtract $^{1}/_{16}$-in (1,6 mm).
4. Measure the distance from the end of the transferred length in step 3 to the last sensing hole, port A.
5. Compare the numbers obtained in steps 3 and 4.

Small discrepancies can be compensated for with the fit-up of the mounting hardware. Large discrepancies may cause installation problems or error.

Figure 5. Fit-up Check for Rosemount 485 Annubar with Opposite-Side Support



A. The same with 1/8-in. (3 mm)
B. Port A
C. Port B
D. Outer Diameter to Flange (ODF)
E. Pipe outside diameter

4.0 Weld mounting hardware

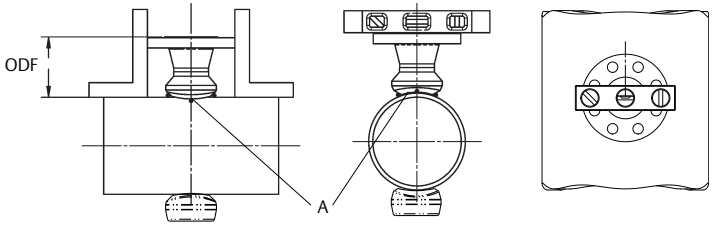
1. Center the flanged assembly over the mounting hole, gap 1/16-in. (1,6 mm), and measure the distance from the outer diameter of the pipe to the face of the flange. Compare this to Table 3 and adjust the gap as necessary.

Table 3. Flange Sizes and ODF per Sensor Size

Sensor size	Flange size	ODF (in. [mm])	Size	ODF (in. [mm])
1	1 1/2-in. 150#	3.88 (98,5)	DN40 PN16	3.09 (78,6)
1	1 1/2-in. 300#	4.13 (104,9)	DN40 PN40	3.21 (81,6)
1	1 1/2-in. 600#	4.44 (112,7)	DN40 PN100	3.88 (98,6)
1	1 1/2-in. 900#	4.94 (125,4)	N/A	N/A
1	1 1/2-in. 1500#	4.94 (125,4)	N/A	N/A
1	1 1/2-in. 2500#	6.76 (171,6)	N/A	N/A
2	2.0-in. 150#	4.13 (104,8)	DN50 PN16	3.40 (86,3)
2	2.0-in. 300#	4.38 (111,2)	DN50 PN40	3.51 (89,3)
2	2.0-in. 600#	4.76 (120,8)	DN50 PN100	4.30 (109,3)
2	2.0-in. 900#	5.88 (149,2)	N/A	N/A
2	2.0-in. 1500#	5.88 (149,2)	N/A	N/A
2	3.0-in. 2500#	9.87 (250,7)	N/A	N/A
3	3.0-in. 150#	4.63 (117,5)	DN80 PN16	3.84 (97,6)
3	3.0-in. 300#	5.00 (126,9)	DN80 PN40	4.16 (105,6)
3	3.0-in. 600#	5.38 (136,6)	DN80 PN100	4.95 (125,6)
3	4.0-in. 900#	8.19 (208,0)	N/A	N/A
3	4.0-in. 1500#	8.56 (217,5)	N/A	N/A
3	4.0-in. 2500#	11.19 (284,2)	N/A	N/A

2. Place four 1/4-in. (6 mm) tack welds at 90° increments. Check alignment of the mounting both parallel and perpendicular to the axis of flow (see Figure 6). If alignment of the mounting is within tolerances, finish weld per local codes. If alignment is outside of specified tolerance, make adjustments prior to making the finish weld.

Figure 6. Alignment



A. Tack welds

3. If opposite-side support is being used, center the fitting for the opposite side support over the opposite side hole, gap 1/16-in. (1,6 mm), and place four 1/4-in. (6 mm) tack welds at 90° increments. Insert the sensor into the mounting hardware. Verify that the tip of the sensor is centered in the opposite side fitting and the plug will fit around sensor. Finish weld per local codes. If alignment of the sensor does not allow enough clearance to insert the opposite side plug, make the necessary adjustments prior to making the finish weld.
4. To avoid serious burns, allow the mounting hardware to cool before continuing.

5.0 Insert the Rosemount Annubar Sensor

1. Align the flow arrow on the head with the direction of flow. Assemble the bar to the mounting flange using a gasket, bolts, and nuts.
2. Tighten the nuts in a cross pattern to allow even compression of the gasket.
3. If opposite side support is threaded, apply an appropriate thread sealing compound to the support plug threads and tighten until no leakage occurs.
4. If opposite side support is a socket weld fitting, insert the plug into the socket-weld outlet fitting until the parts contact. Retract the plug 1/16-in. (1,6 mm) remove the Rosemount Annubar Sensor and apply fillet weld per local codes.

6.0 Mount the transmitter

6.1 Transmitter mounting, direct mount head with valves

It is not necessary to retract the Rosemount Annubar when direct mounting a transmitter with valves.

1. Place PTFE O-rings into grooves on the Rosemount Annubar head.
2. Align the high side of the transmitter to the high side of the sensor (“Hi” is stamped on the side of the head) and install.
3. Tighten the nuts in a cross pattern to 384 in-lb (43 N-m).

6.2 Transmitter mounting with remote mount head

Temperatures in excess of 250 °F (121 °C) at the sensor module diaphragms will damage the transmitter. Remote mounted transmitters are connected to the sensor by means of impulse piping, which allows process temperatures to decrease to a point where the transmitter is no longer vulnerable.

Different impulse piping arrangements are used depending on the process fluid and must be rated for continuous operation at the pipeline design pressure and temperature. A minimum of 1/2-in. (12 mm) outer diameter stainless steel tubing with a wall thickness of at least 0.035-in. (0,9 mm) is recommended including and under 600# ANSI (DN50 PN100). Above 600# ANSI (DN50 PN100), stainless steel tubing with 1/16-in. wall thickness.Threaded pipe fittings are not recommended because they create voids where air can become entrapped and create leakage points.

The following restrictions and recommendations apply to impulse piping location:

1. Impulse piping that runs horizontally must slope at least one inch per foot (83 mm/m).
   - Slope downward (toward the transmitter) for liquid and steam applications.
   - Slope upward (toward the transmitter) for gas applications.
2. Outdoor installations for liquid, saturated gas, or steam may require insulation and heat tracing to prevent freezing.
3. An instrument manifold is recommended for all installations. Manifolds allow an operator to equalize the pressures prior to zeroing and isolates the process fluid from the electronics.

Figure 7. Valve Identification for 5-Valve and 3-Valve Manifolds

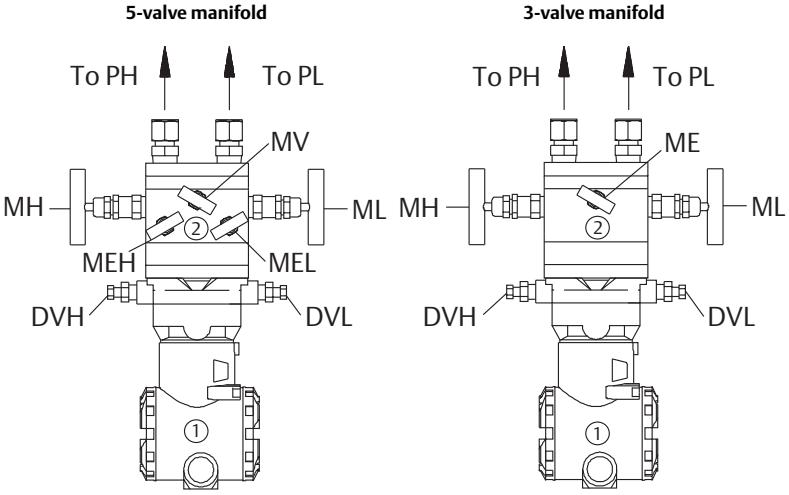


Table 4. Description of Impulse Valves and Components

Name	Description	Purpose
Components		
1	Transmitter	Reads Differential Pressure
2	Manifold	Isolates and equalizes electronics
Manifold and impulse valves		
PH	Primary sensor(1)	High and low side pressure process connections.
PL	Primary sensor(2)	
DVH	Drain/vent valve(1)	Drains (for gas service) or vents (for liquid or steam service) the DP sensor diaphragms
DVL	Drain/vent valve(2)	
MH	Manifold(1)	Isolates high side or low side pressure from the process
ML	Manifold(2)	
MEH	Manifold equalizer(1)	Allows high and low pressure side access to the vent valve, or for isolating the process fluid
MEL	Manifold equalizer(2)	
ME	Manifold equalizer	Allows high and low side pressure to equalize
MV	Manifold vent valve	Vents process fluid

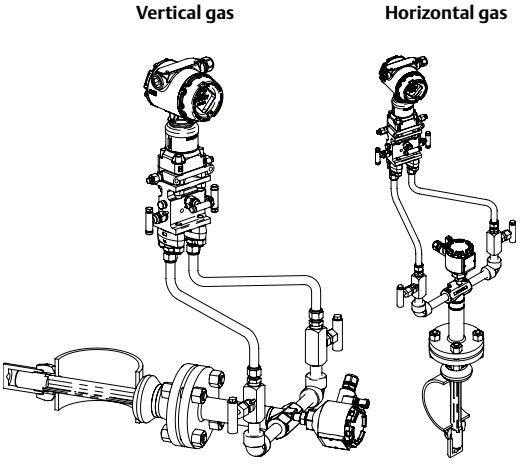
1. High pressure
2. Low pressure

6.3 Recommended installations for remote mount transmitters

Gas service

Secure the transmitter above the sensor to prevent condensable liquids from collecting in the impulse piping and the DP cell.

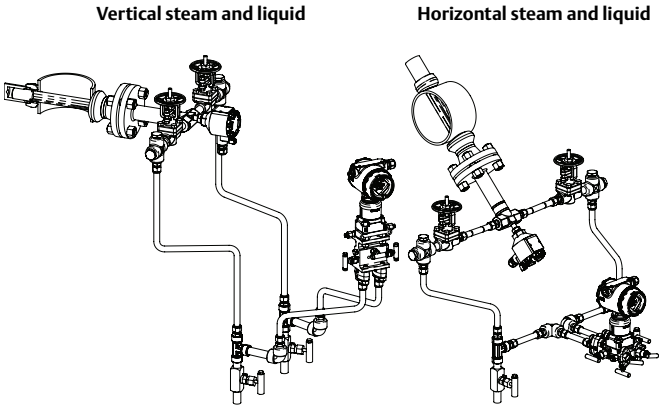
Figure 8. Gas Service



Steam or liquid service

Mount the transmitter below the process piping, adjust 10 to 15 degree above direct vertical down. Route the impulse piping down to the transmitter and fill the system with water through the two cross fittings.

Figure 9. Steam or Liquid Service



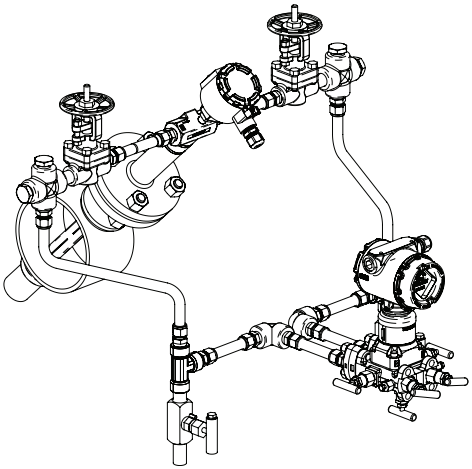
Note

Ensure the drain legs are long enough to capture the dirt particles and sediment.

Top mounting for steam service

This orientation can be used for steam at any temperature. However, it is required for installations above 600 °F (315 °C). For remote mount installations the impulse piping should slope up slightly from the instrument connections on the Rosemount Annubar to the cross fittings allowing condensate to drain back into the pipe. From the cross fittings, the impulse piping should be routed downward to the transmitter and the drain legs. The transmitter should be located below the instrument connections of the Rosemount Annubar. Depending on the environmental conditions, it may be necessary to insulate the mounting hardware.

Figure 10. Horizontal Top Mounting for Steam



7.0 Product certifications

7.1 Approved Manufacturing Locations

Rosemount Inc. – Shakopee, Minnesota USA

Rosemount DP Flow Design and Operations – Boulder, Colorado USA

Emerson Process Management GmbH & Co. OHG – Wessling, Germany

Emerson Process Management Asia Pacific Private Limited – Singapore

Emerson Beijing Instrument Co., Ltd – Beijing, China

7.2 European Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at www2.EmersonProcess.com/en-us/brands/Rosemount/pages/index.aspx. A hard copy may be obtained by contacting our local sales office.

European Pressure Equipment Directive (PED) (97/23/EC)

Rosemount 485 Annubar — Refer to EC declaration of conformity for conformity assessment

Pressure Transmitter — See appropriate Pressure Transmitter QSG

7.3 Hazardous Locations Certifications

For information regarding the transmitter product certification, see the appropriate transmitter QSG:

- Rosemount 3051S Series Pressure Transmitter and Rosemount 3051SF Series Flowmeter Quick Start Guide.
- Rosemount 3051S MultiVariable Transmitter and Rosemount 3051SF Series Flowmeter MultiVariable Transmitter Quick Start Guide.
- Rosemount 3051 Pressure Transmitter and Rosemount 3051CF Series Flowmeter Transmitter Quick Start Guide.
- Rosemount 2051 Pressure Transmitter and Rosemount 2051CF Series Flowmeter Transmitter Quick Start Guide.

Figure 11. Rosemount Primary Element Declaration of Conformity

EMERSON. Process Management

EU Declaration of Conformity

No: DSI 1000 Rev. L

CE

We,

Rosemount, Inc.
8200 Market Boulevard
Chanhassen, MN 55317-9685
USA

declare under our sole responsibility that the products,

Rosemount Primary Elements: 405x, 485, 585, 1195, 1495, 1595
Rosemount DP Flowmeters: 2051CFx, 3051CFx, 3051SFx

manufactured by,

Rosemount / Dieterich Standard, Inc.
5601 North 71st Street
Boulder, CO 80301
USA

to which this declaration relates, is in conformity with the provisions of the European Union Directives as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Union notified body certification, as shown in the attached schedule.

(signature)	Vice President of Global Quality (function)
Kelly Klein (name)	19 Apr 2016 (date of issue)

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EU Declaration of Conformity

No: DSI 1000 Rev. L

CE

PED Directive (97/23/EC) ***This directive is valid until 18 July 2016***
PED Directive (2014/68/EU) ***This directive is valid from 19 July 2016***

Summary of Classifications		
Model/Range	PED Category	
	Group 1 Fluid	Group 2 Fluid
Rosemount 585 - 150#-900# All Lines	SEP	SEP
Rosemount 585 - 1500# & 2500# All Lines	III	SEP
Rosemount 405C, 405A, x051xFC	SEP	SEP
Rosemount 1195, x051xFP with 150#, 1-1/2" Flange	I	SEP
Rosemount 1195, x051xFP with 300# or 600#, 1" or 1-1/2" Flange	II	I
Rosemount 1195, x051xFP with 1" or 1-1/2" Threaded & Welded Connection	II	I
Rosemount 485/x051SxFA: 1500# & 2500# All Line Sizes, Flanged	III	SEP
Rosemount 485/x051xFA: Sensor Size 2, 150#, 6"to 24" Line Sizes, FloTap	I	SEP
Rosemount 485/x051xFA: Sensor Size 2, 300#, 6"to 24" Line Sizes, FloTap	II	I
Rosemount 485/x051xFA: Sensor Size 2, 600#, 6"to 16" Line Sizes, FloTap	II	I
Rosemount 485/x051xFA: Sensor Size 2, 600#, 18"to 24" Line Sizes, FloTap	III	II
Rosemount 485/x051xFA: Sensor Size 3, 150#, 12"to 44" Line Sizes, FloTap	II	I
Rosemount 485/x051xFA: Sensor Size 3, 150#, 46"to 72" Line Sizes, FloTap	III	II
Rosemount 485/x051xFA: Sensor Size 3, 300#, 12" to 72" Line Sizes, FloTap	III	II
Rosemount 485/x051xFA: Sensor Size 3, 600#, 12"to 36" Line Sizes, FloTap	III	II
Rosemount 485/x051xFA: Sensor Size 3, 600#, 48" to 72" Line Sizes, FloTap	IV*	III
All other Rosemount Primary Elements and DP Flowmeters	SEP	SEP

Certificate of Assessment – CE-0041-H-RMT-001-13-USA

IV* *Category IV Flo Tap requires a B1 Certificate for design examination and H1 Certificate for special surveillance*

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EU Declaration of Conformity

No: DSI 1000 Rev. L

CE

Pressure Equipment Directive Notified Body:

Bureau Veritas UK Limited [Notified Body Number: 0041]
Parklands, Wilmslow Road, Didsbury
Manchester M20 2RE
United Kingdom

表格 1B: 含有 China RoHS 管控物质超过最大浓度限值的部件型号列表 Rosemount 485
Table 1B: List of Rosemount 485 Parts with China RoHS Concentration above MCVs

部件名称 Part Name	有害物质 / Hazardous Substances					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr +6)	多溴联苯 Polybrominated biphenyls (PBB)	多溴联苯醚 Polybrominated diphenyl ethers 多溴联苯醚 (PBDE)
铝制温度传感器外壳组件 Aluminum RTD Housing Assembly	O	O	O	X	O	O

本表格系依据 SJ/T11364 的规定而制作.
This table is proposed in accordance with the provision of SJ/T11364
O: 意为该部件的所有均质材料中该有害物质的含量均低于 GB/T 26572 所规定的限量要求.
O: Indicate that said hazardous substance in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.
X: 意为在该部件所使用的所有均质材料里，至少有一类均质材料中该有害物质的含量高于 GB/T 26572 所规定的限量要求.
X: Indicate that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

上述申明仅适用于选择铝制外壳组件的产品。其他所有差压流量一次元件的组件所含有的 China RoHS 管控物质浓度均低于 GB/T 26572 所规定的限量要求。关于差压流量计变送器组件的管控物质浓度的申明，请参看变送器的快速安装指南。
The disclosure above applies to units supplied with aluminum connection heads. No other components supplied with DP Flow primary elements contain any restricted substances. Please consult the transmitter Quick Start Guide (QIG) for disclosure information on transmitter components.

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Quick Start Guide
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