

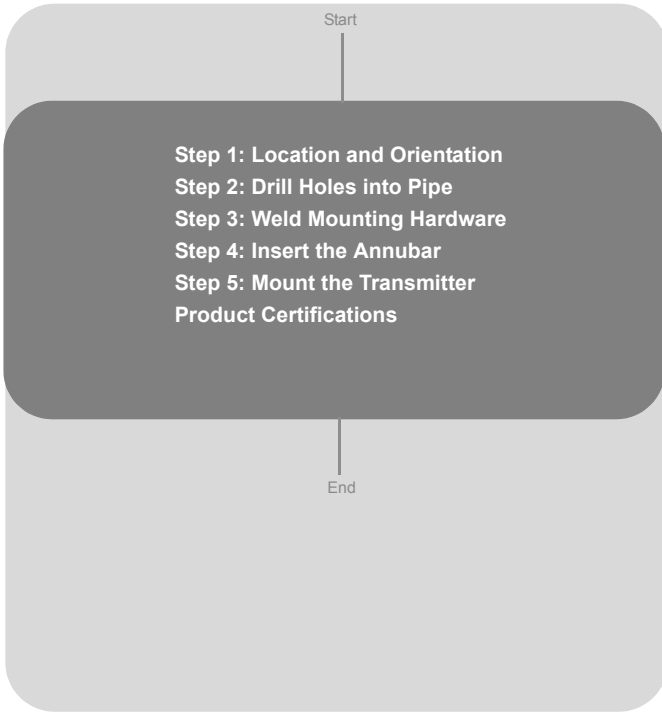
Quick Installation Guide

00825-0100-4028, Rev AA
March 2005

Pak-Lok 285 Annubar

Rosemount 285 Annubar[®] Pak-Lok Assembly

Product Discontinued December 2009



ROSEMOUNT

www.rosemount.com



EMERSON
Process Management

Pak-Lok 285 Annubar

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⚠ IMPORTANT NOTICE

This installation guide provides basic guidelines for Rosemount 285 Annubar. It does not provide instructions for configuration, diagnostics, maintenance, service, troubleshooting, Explosion-proof, Flame-Proof, or intrinsically safe (I.S.) installations. Refer to the 285 Annubar reference manual (document number 00809-0100-4028) for more instruction. This manual is also available electronically on www.rosemount.com.

⚠ WARNING

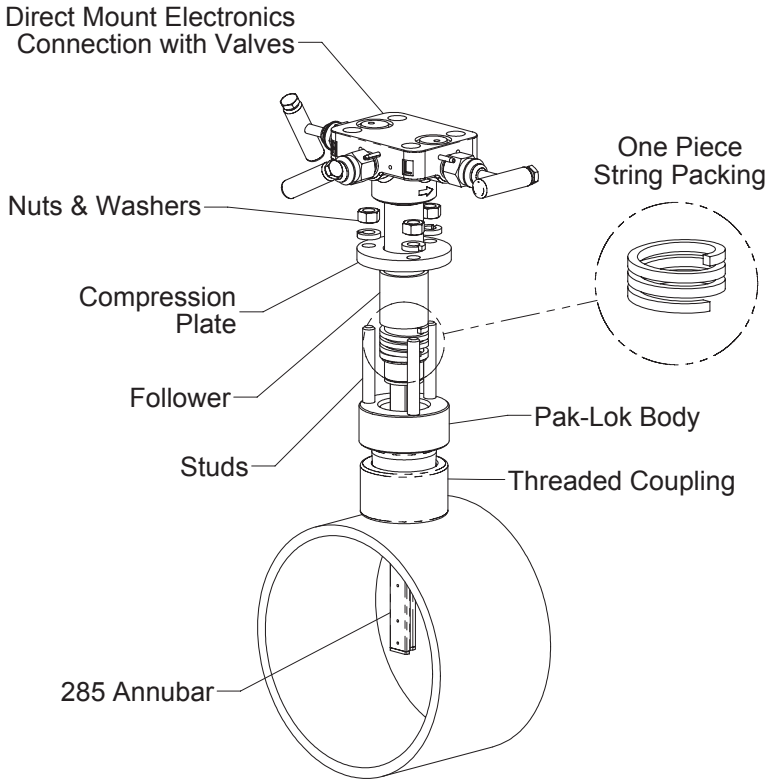
Process leaks may cause harm or result in death. To avoid process leaks, only use gaskets designed to seal with the corresponding flange and o-rings to seal process connections. Flowing medium may cause the 285 Annubar assembly to become hot and could result in burns.

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285 Annubar® Pak-Lok Assembly Exploded View



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NOTE

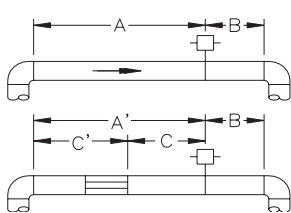
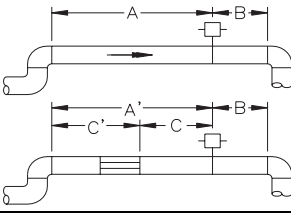
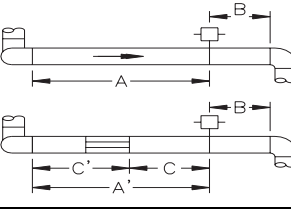
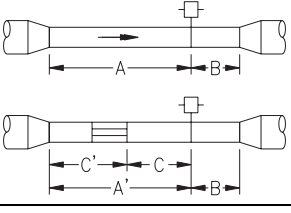
Use an appropriate pipe sealing compound rated for the service temperature on all threaded connections.

STEP 1: 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.

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Table 1. Straight Run Requirements

	Upstream Dimensions					Downstream Dimensions
	Without Vanes		With Vanes			
	In Plane A	Out of Plane A	A'	C	C'	
	8	10	—	—	—	4
	—	—	8	4	4	4
	11	16	—	—	—	4
	—	—	8	4	4	4
	23	28	—	—	—	4
	—	—	8	4	4	4
	12	12	—	—	—	4
	—	—	8	4	4	4

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STEP 1 CONTINUED...

	Upstream Dimensions					Downstream Dimensions	
	Without Vanes		With Vanes				
	In Plane A	Out of Plane A	A'	C	C'		
5		18	18	—	—	—	4
		—	—	8	4	4	4
6		30	30	—	—	—	4
		—	—	8	4	4	4

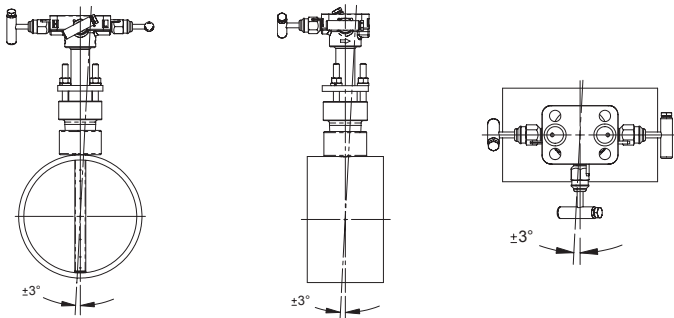
NOTE

- Consult the factory for instructions regarding use in square or rectangular ducts.
- “In Plane A” means the bar is in the same plane as the elbow. “Out of Plane A” means the bar 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.

Misalignment

285 Annubar installation allows for a maximum misalignment of 3°.

Figure 1. Misalignment



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STEP 1 CONTINUED...

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.

Figure 2. Gas

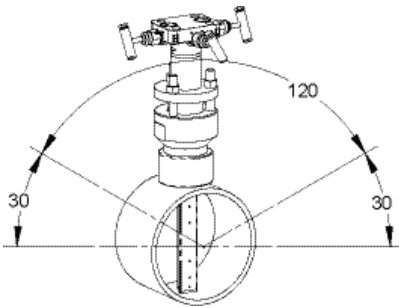
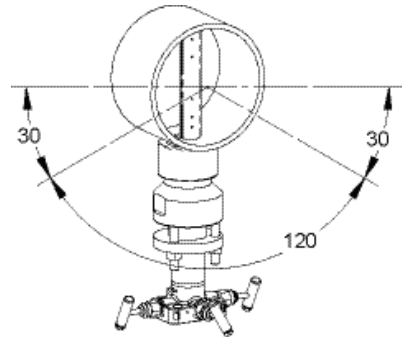


Figure 3. Liquid and Steam



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. The preferred orientation for air or gas is flow down, but upwards flow is acceptable. For steam applications, a 90° spacer will be added to provide water legs to ensure the transmitter stays within temperature limits.

Figure 4. Gas

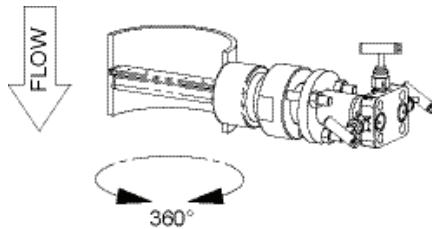
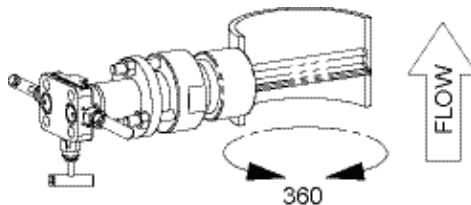


Figure 5. Liquid and Steam



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STEP 2: DRILL HOLES INTO PIPE

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

Table 2. Sensor Size / Hole Diameter Chart

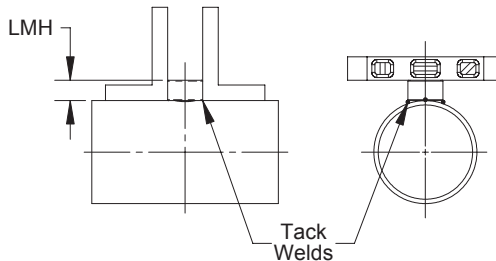
Sensor Width	Sensor Size	Hole Diameter
0.590-in. (14.99 mm)	1	$\frac{3}{4}$ -in. (19 mm) + 1/32-in (1 mm) - 0.00
1.060-in. (26.92 mm)	2	$1\frac{5}{16}$ -in. (34 mm) + 1/16-in. (1 mm) - 0.00

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

STEP 3: WELD MOUNTING HARDWARE

1. Center the threaded coupling over the mounting hole, gap $\frac{1}{16}$ -in. (1.5 mm), and place four $\frac{1}{4}$ -in. (6-mm) tack welds at 90° increments.
2. Check alignment of the threaded coupling both parallel and perpendicular to the axis of flow (see Figure 6). If alignment of mounting is within tolerances, finish weld per local codes. If alignment is outside of specified tolerance make adjustments prior to finish weld.

Figure 6. Alignment



- (1) LMH values are as follows:
Sensor Size 1: 2.89-in. (73 mm)
Sensor Size 2: 3.92-in. (100 mm)

3. To avoid serious burns, allow the mounting hardware to cool before continuing.

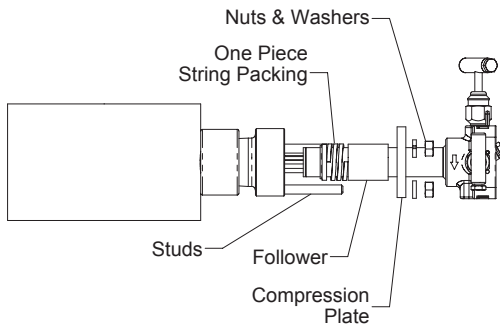
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STEP 4: INSERT THE ANNUBAR

1. Remove the packing gland from the Annubar, and thread it into the threaded coupling, using teflon tape or pipe sealant.
2. Remove the packing from the envelope and wrap it around the Annubar three full turns. Insert the Annubar into the mounting until the packing is completely contained within the gland, and the tip of the Annubar is contacting the opposite side wall. Place the lock washers over the studs on the packing gland and hand tighten the nuts.
3. Align the flow arrow on the Annubar with the flow direction in the duct and tighten the nuts on the packing. Tighten only until washer is flat. See table below for torque ratings.

Figure 7. Packing Ring Detail



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Sensor Size	Torque
1	40-in. / lb
2	100-in. / lb

4. Inspect the unit for leakage. If any exists, tighten the nuts in one-quarter turn increments until there is no leakage.

NOTE

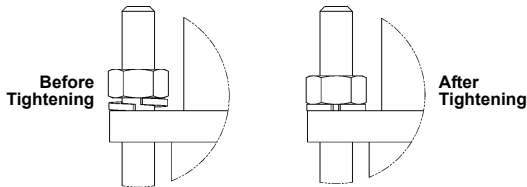
On sensor size (1), failure to use the split-ring Lock washers, improper washer orientation, or over-tightening the nuts may result in flowmeter damage.

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Figure 8. Split-Ring Lock Washer Orientation



NOTE

Pak-Lok sealing mechanisms generate significant force at the point where the sensor contacts the opposite pipe wall. Caution needs to be exercised on thin-walled piping (ANSI Sch 10 and lower) to avoid damage to the pipe.

STEP 5: MOUNT THE TRANSMITTER

Transmitter Mounting, Direct Mount Head with Valves

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

1. Place Teflon[®] (PTFE) O-rings into grooves on the face of head.
2. Align the high side of the transmitter to the high side of the sensor ("H" is stamped on the side of the head) and install.
3. Tighten the nuts in a cross pattern to 400 in•lb (45 N•m).

Transmitter Mounting, Direct Mount Head without Valves

1. Place Teflon (PTFE) O-rings into grooves on the face of head.
2. Orient the equalizer valve(s) so they are easily accessible. Install a manifold with the smooth face mating to the face of the head. Tighten in cross pattern to a torque of 400 in•lb (45 N•m).
3. Place Teflon (PTFE) O-rings into grooves on the face of the manifold.
4. Align the high side of the transmitter to the high side of the sensor ("H" is stamped on the side of the head) and install.
5. Tighten the nuts in a cross pattern to 400 in•lb (45 N•m).

Transmitter Mounting with Remote Mount Head

Temperatures in excess of 250 °F (121 °C) at the electronics will damage the transmitter. Remote mounted electronics are connected to the sensor by means of impulse piping, which allows service flow temperatures to decrease to a point where the electronics are 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. (1 mm) is recommended. 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 electronics) for liquid and steam applications
 - Slope upward (toward the electronics) for gas applications.

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2. For applications with temperature below 250 °F (121 °C), impulse piping should be as short as possible to minimize temperature changes. Insulation may be required.
3. For applications above 250 °F (121 °C), impulse piping should have a minimum length of one foot (0.3048 m) for every 100 °F (38°C) temperature increase over 250 °F (121 °C). Impulse piping must be non-insulated to reduce fluid temperature. Any threaded connections should be checked after the system reaches the intended temperature because connections may come loose with contraction and expansion caused by temperature change.
4. Outdoor installations for liquid, saturated gas, or steam may require insulation and heat tracing to prevent freezing.
5. When impulse piping is longer than six feet (1.8 m) the high and low impulse lines must be positioned together to maintain equal temperature. They must be supported to prevent sagging and vibration.
6. Impulse lines should be positioned in protected areas or against walls or ceilings. Use appropriate pipe sealing compound rated for the service temperature on all threaded connections. Do not place the impulse piping near high temperature piping or equipment.

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 9. Valve Identification for 5-valve and 3-Valve Manifolds

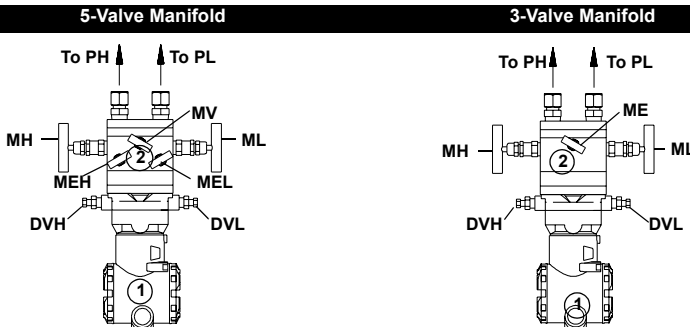


Table 3. Description of Impulse Valves and Components

Name	Description	Purpose
Components		
1	Electronics	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 electronics chambers
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

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STEP 5 CONTINUED...

Recommended Installations

Gas Service

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

Liquid Service (up to 250 °F (121 °C))

Secure the electronics below the sensor to ensure that air will not be introduced into the impulse piping or the electronics.

Figure 10. Gas

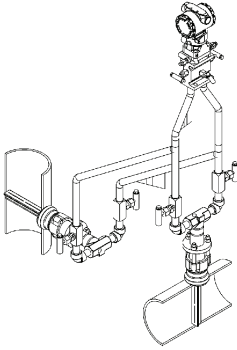
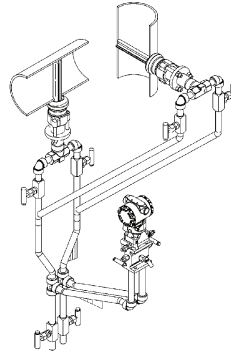


Figure 11. Liquid



Steam or Liquid Service (above 250 °F (121 °C))

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

Figure 12. Horizontal Line

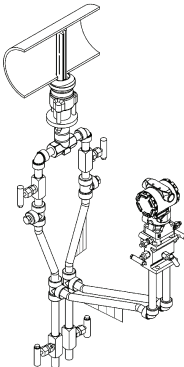
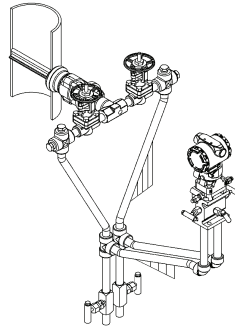


Figure 13. Vertical Line



PRODUCT CERTIFICATIONS

Approved Manufacturing Locations

Rosemount Inc. — Chanhassen, Minnesota USA

European Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at www.rosemount.com. A hard copy may be obtained by contacting our local sales office.

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

Rosemount 285 Annubar — Refer to EC declaration of conformity for conformity assessment

Pressure Transmitter — See appropriate Pressure Transmitter QIG