



INSTALLATION MANUAL FOR AEROFOIL

DELTA ENGINEERING

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AEROFOIL INSTALLATION

The Aerofoil is a differential producer designed for flow measurement in a duct. It is a precisely fabricated component that can be installed in any size duct. A throat pressure tap (low pressure) is connected to the low-pressure side of the Differential Pressure transmitter and the high-pressure front tap is connected to the high-pressure side of Differential Pressure Transmitter. The pressure taps are generally ½" NPTM.

PRECAUTIONS FOR AEROFOIL INSTALLATION

1. Determine the location & orientation. Sufficient upstream and downstream straight length of pipe must be kept without any restriction like dampers, bypass arrangement, etc. to get a fully developed flow profile which helps in obtaining the published accuracy per standard.
2. Upstream straight length required is equal to 2 times the length of the aerofoil while downstream straight length required will be equal to one length of aerofoil.
3. Cut the portion of existing duct equal to the length of Aerofoil assembly.
4. Install the Aerofoil with the flow direction as indicated on the instrument tag plate.
5. One pair of tapping must be plugged or closed with an isolation valve.

LOCATION AND MOUNTING OF DIFFERENTIAL PRESSURE TRANSMITTER

The Transmitter should be located in such a way that it is easily approachable for maintenance and frequent checks. The distance between pressure tapping on the process line and the Transmitter should be as short as possible. The site should be free from excessive vibrations. The ambient temperature around Transmitter should not exceed 100 °C. The Transmitter should be so mounted that features like self drain, self vent, site adjustable span and zero features can be effectively and easily utilized.

The Transmitter is mounted on a 50 NB pipe using a mounting bracket supplied by the Transmitter manufacturer. The Transmitter can be mounted on either a horizontal or vertical pipe.

- If the process fluid is a gas, then as a rule the Transmitter must be located higher than the process pressure taps.
- If the process fluid is a liquid or steam, then as a rule the Transmitter must be located lower than the process pressure taps.

THREE VALVE MANIFOLD

The manifold can be mounted directly on the Transmitter. ½" NPT (F) process connections are provided.

THREE VALVE MANIFOLD MOUNTING PROCEDURE

1. Remove the process connectors and the process connector gaskets from the Transmitter.
2. Ensure that the Ring gaskets with the three-valve manifold are sufficiently thick to provide compression sealing.
3. Mount the flanged side of the manifold on the Transmitter with the Hex bolts supplied with the manifold (7/16" UNF x 1" long).
4. Tighten the Hex bolts equally until required sealing is achieved.
5. After completing the connection of the Transmitter and 3-valve manifold, be sure to close the low pressure and high pressure stop valves, open the equalizing valve, and leave the manifold with equalizing valve open.

IMPULSE PIPING

Piping procedure of impulse piping depend on the type of process fluid and location of Transmitter. There should be no leakage and clogging in the impulse piping. The impulse pipe should be of ½". Three-piece unions should be incorporated in the impulse piping to provide easy maintenance. The length of impulse piping should be as short as possible.

For Gas flow measurement the impulse pipe length should not be more than 15 meter and for steam or liquid flow measurement the length should net be more than 30 meter.

The impulse piping must be routed with only an upward or downward slope. Even for horizontal routing, the impulse piping should have a slope of at least 1/10 to prevent condensate (or gases) from stagnating in the pipes.

Impulse piping should be clamped at a desired span to prevent pipe from vibrating. Drain valves should be provided for flushing and removal of air pockets. The take-outs should be symmetrical. Parallel take-outs are also possible where space is a problem.

If there is a temperature difference between the high and low impulse piping, the density difference of the fluids in the two lines will cause an error in the measurement pressure. When measuring flow, the impulse piping must be routed together so that there is no temperature difference between them.

GAS FLOW MEASUREMENT

The Transmitter should be installed at the upper elevation than the primary element. This prevents condensate collecting in the impulse piping. Incase of corrosive gas, seal pots may be used before Transmitter.

WIRING / LOOP DIAGRAM

The external wiring terminals of the Transmitter are on the field terminal side of the electrical housing (indicated on the label)

The terminals are:

1. A pair of terminal for supply and signal output.
2. A pair of test terminal.
3. 1 terminal for case ground.

The test terminals are provided for connecting the indicating meter or for checking the Transmitter current output signal with an ammeter.

The two-wire Transmitter requires only a single 2 core cable which carries both the 24 V DC power supply necessary to energize the Transmitter and the 4 to 20 mA output signal.

PVC insulated two-core 0.75 to 1.5 mm² armored cable for industrial application should be used for the connection between the Transmitter and the flow indicator. The cable should enter the Transmitter through the conduit opening provided on the housing.

A ½" NPT gland nut with rubber grommet will ensure proper weather-proofing of the enclosure. Alternatively a rubberized sealing compound may be used to prevent water from entering the system.

SYSTEM COMMISSIONING

- A. Prior to commissioning the system, check the following:
 - 1. No leakages in impulse piping.
 - 2. Proper termination of the LP and HP pipes to the Transmitter.
 - 3. Location of flow element tapping.
 - 4. Routing of impulse lines.
 - 5. Proper termination of cables at both Transmitter and instrument ends.

- B. Procedure for commissioning.
 - 1. Check 24 V DC supply to Transmitter.
 - 2. Open both drain plugs of Transmitter to atmosphere.
 - 3. Output at test terminals should be 4 mA. If not, adjust zero point accessible externally on the body of electronic housing.
 - 4. Keep all the three valves of manifold shut.
 - 5. Open isolating valves of both the HP and LP lines and flush the system by opening the drain stop valves.
 - 6. For steam service:

After flushing the lines with steam shut both the isolating valves and the drain valves. Open all the valves of the valve manifold. Unscrew the plugs of both the condensate pots and fill the impulse lines with water. Put on the plugs of condensate pots.
 - 7. Close the LP and HP valves of the manifold but keep the equalizing valve open.
 - 8. Open both the isolating valves.
 - 9. Ensure that the equalizing valve is open. Slowly open the LP valve. Let the pressure equalize in the Transmitter. Open the HP valve of the manifold.
 - 10. Open slightly the drain plus on the Transmitter and drain the condensate to remove any air pockets in the impulse lines. Re-tighten the drain plugs.
 - 11. Shut the equalizing valve.
 - 12. Check the output of Transmitter.