INSTALLATION MANUAL FOR AVERAGING BAR

DELTA ENGINEERING

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AVERAGING BAR INSTALLATION

The Averaging Bar is supplied along with a set of mounting hardware and isolation valves. The Averaging Bar is to be installed in the pipeline with sufficient upstream and downstream lengths.

PRECAUTIONS FOR AVERAGING BAR INSTALLATION

1. The edge with the number of sensing ports must be facing upstream side. The corresponding pressure tapping will be the high pressure tap and the other will be low pressure tap.
2. The averaging bar must be installed perpendicular to the centre line of the pipe or duct.
3. Sufficient upstream and downstream straight length of pipe/duct must be kept without any restriction like valves, bypass arrangement, thermo-well pockets etc. Generally 7 times of pipe diameter upstream and 2 times pipe diameter downstream in case of circular pipe is required.
4. In case of a rectangular duct the preferred installation is across the width dimension. A minimum length of 7 times of height or width of duct, upstream and 2 times of height or width of duct downstream is required.

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 ^{0}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. The Transmitter can be directly mounted on the Averaging Bar having a suitable flange. In this case an “H” type three valve manifold can be used for isolation purpose.

The transmitter HP & LP taps must be connected to the respective HP & LP tap of the Averaging Bar.

- 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

A “T” type or “H” type three valve manifolds is required depending on the type of instrument connection provided to the Averaging Bar. In case of flanged instrument connection the “H” type manifold is required. This eliminates impulse tubing and the transmitter is directly mounted on the “H” type manifold.

If the instrument connection is threaded then impulse tubing is required along with “T” type manifold. The manifold is mounted directly on the Transmitter.

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.

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 mm^2 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 FOR ELECTRONIC TRANSMITTER

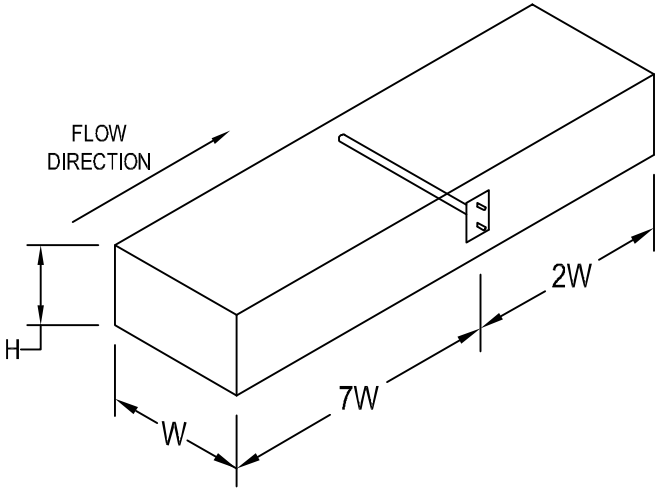
A. Prior to commissioning the system, check the following:
    1. No leakages in impulse piping.
    2. Proper termination of the LP and HP pipes to the Transmitter.

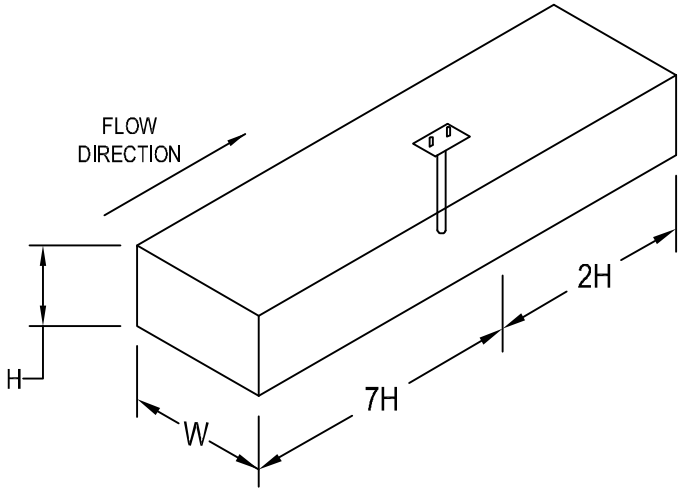
3. Location of orifice plate tapping.
4. Routing of impulse lines.
5. Proper termination of cables at both Transmitter and instrument ends.

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.





A minimum length (7W or 7H) should be upstream from the Annubar, with a minimum length (2W or 2H) downstream from the Air-bar to assure accurate flow measurement. The preferred installation is across the width (w) dimension.

AVERAGING BAR IN DUCT

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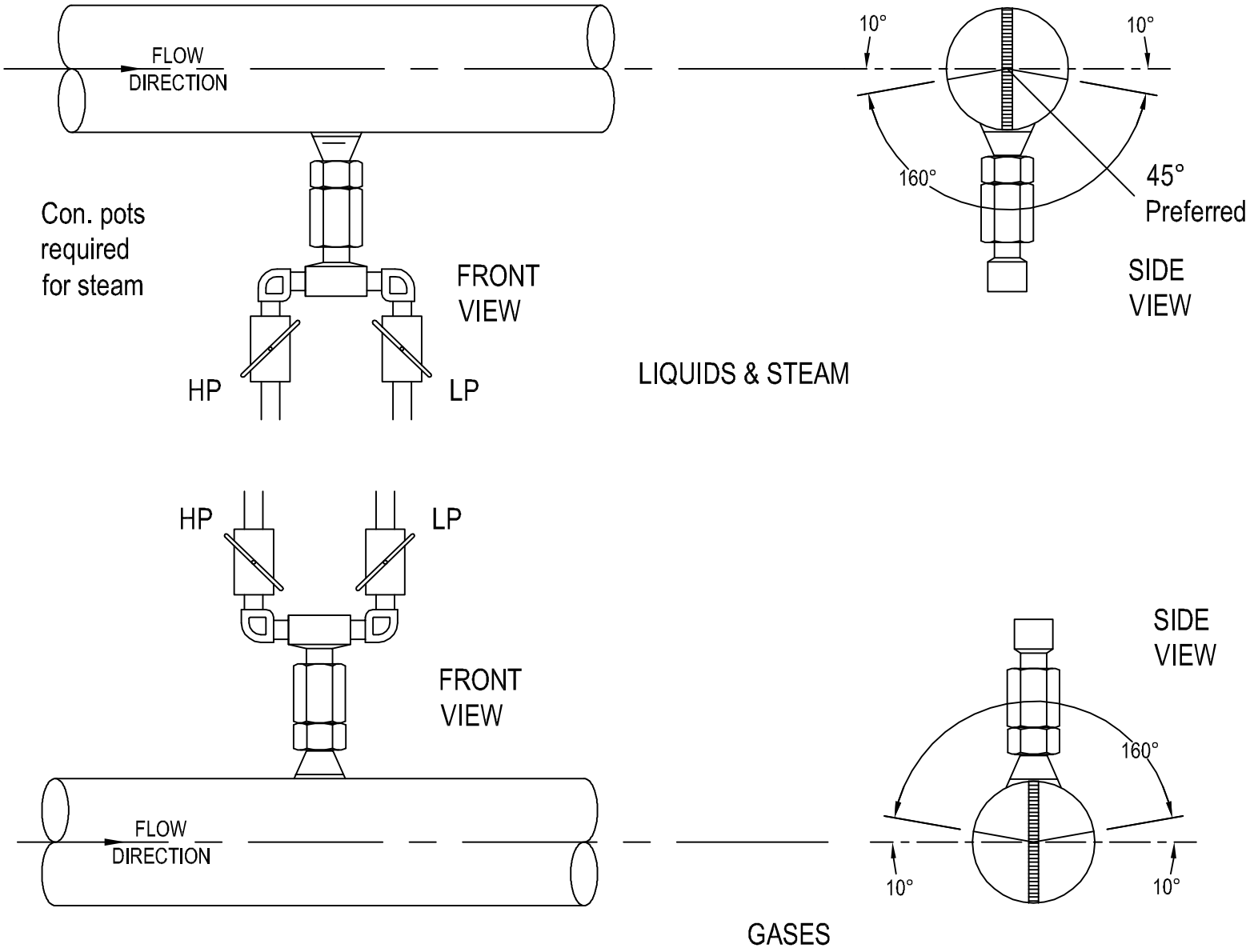

AVERAGING BAR IN HORRIZONTAL PIPE

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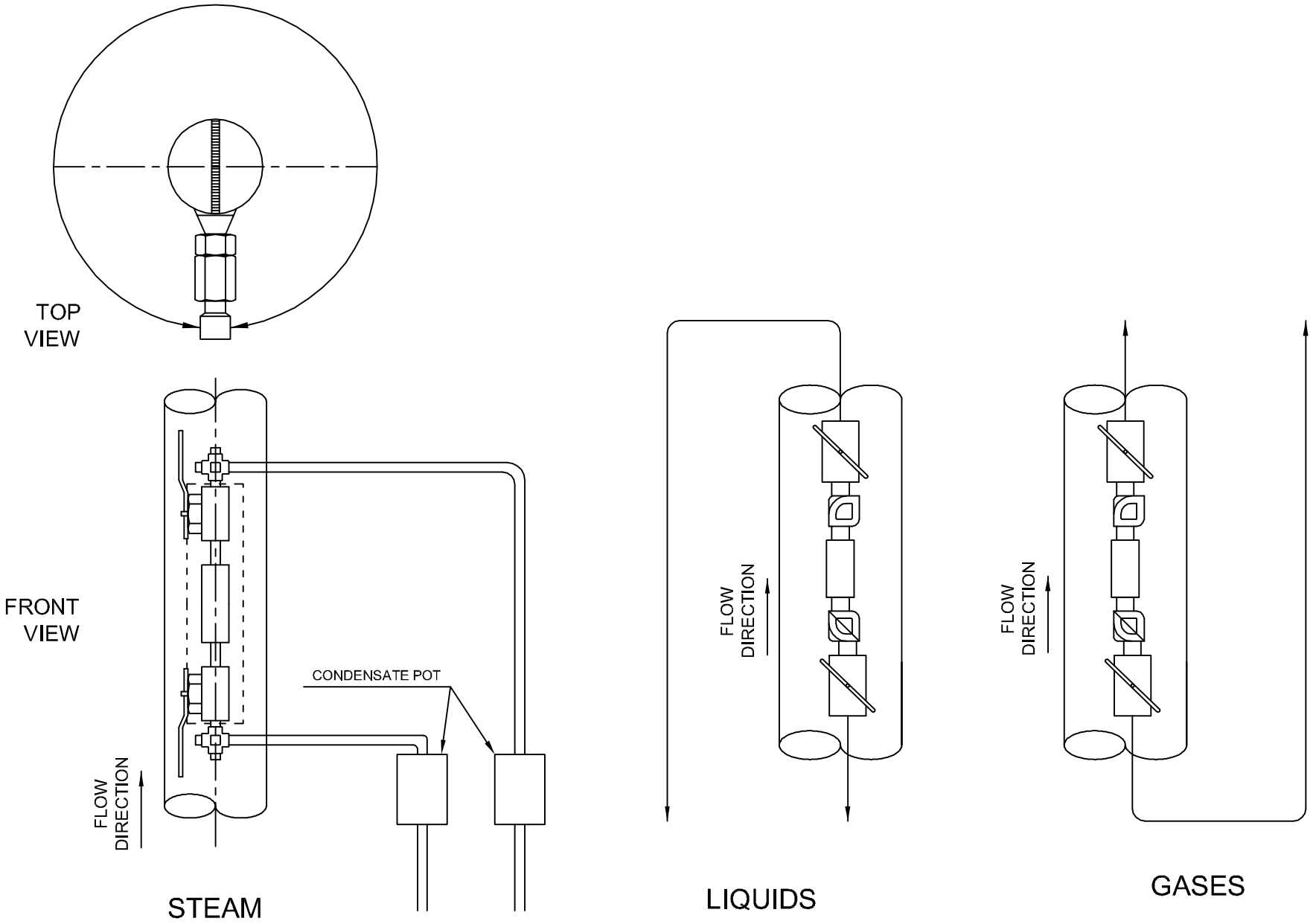

AVERAGING BAR IN VERTICAL PIPE

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