

General installation information for differential pressure measuring instruments

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1 Process connection

The process connection needs to be adjusted depending on the operating conditions, such as e.g. pressure, differential pressure or absolute pressure measurements of gas, fluids or steam.

General rule:

The measuring instrument always needs to be connected below the main process connections when measuring fluids or steam!

The measuring instrument always needs to be connected above the main process connections when measuring gases!

If valve blocks are used, they need to be designed for the operating conditions (e.g. rated pressure)!

1.1 Process connection for differential pressure measuring instruments

Inspection of the high and low pressure side

- The measuring instrument connections are marked with "H" or "+" for high pressure and "L" or "-" for low pressure.
- Observe the markings on the instrument

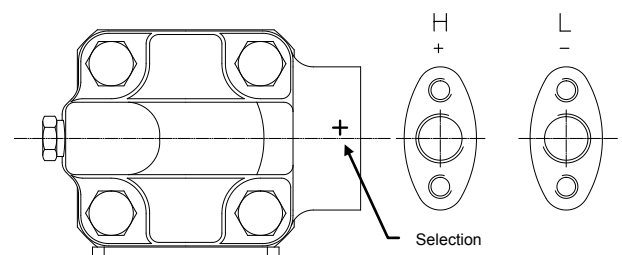


Fig. 1 example

Pressure measuring instrument connection to impulse lines

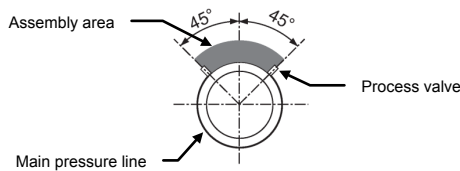
- Mount the valve blocks as defined in the operating instructions and connect the impulse line.
- If a valve block is not required, the impulse line is connected directly to the measuring instrument.

Position of the process valves (main line is horizontal)

The position of the process valves needs to be selected according to the application. Please observe the following illustrations.

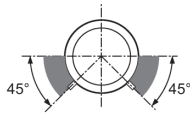
- **Gas measurement**

The pressure connection needs to be placed in the upper half of the main pressure line.



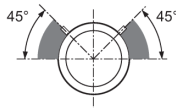
- **Fluid measurement**

The pressure connection needs to be placed in the lower half of the main pressure line.



- **Steam measurement**

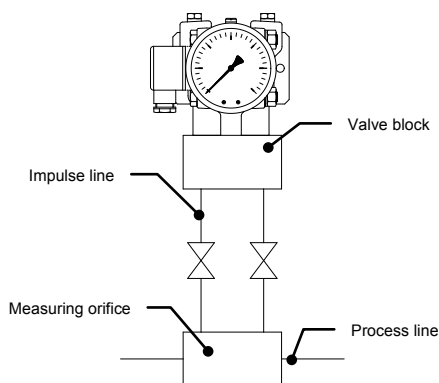
The pressure connection needs to be placed in the upper half of the main pressure line to the side.



2 Typical process connections

2.1 Flow rate measurements for gases

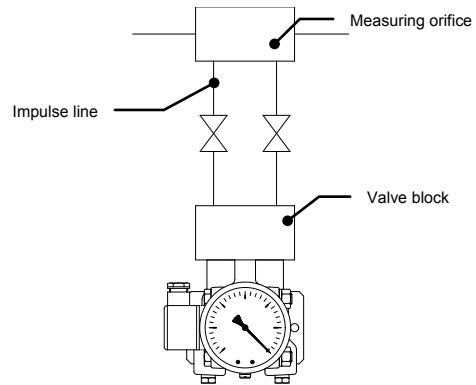
The measuring instrument is mounted above the main line.



2.2 Flow rate measurements for fluids

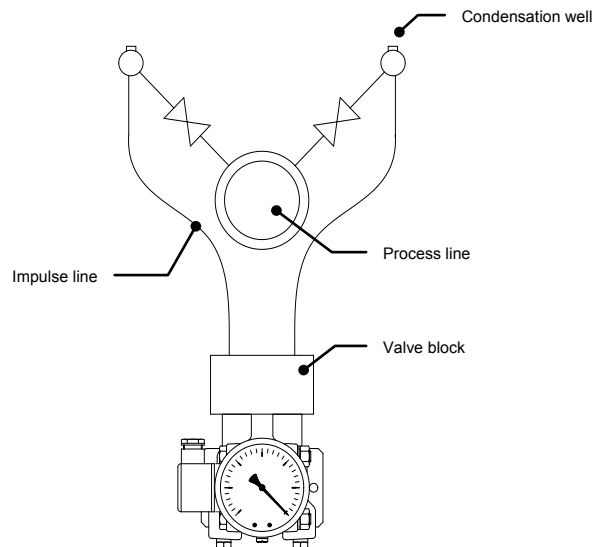
The measuring instrument is mounted below the main line.

The impulse lines are designed so that if any gas forms, the gas bubbles flow back to the main line.



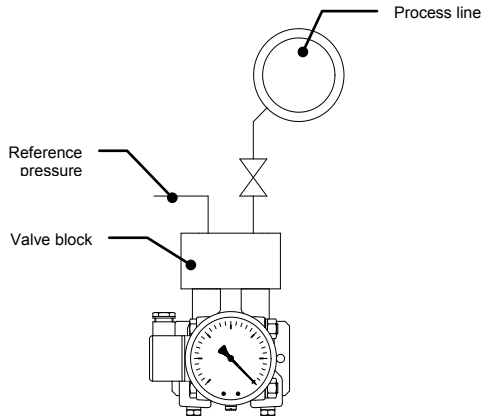
2.3 Flow rate measurements for steam applications

Assembly of condensation wells on the same level between the measuring instrument and the main line. There must be a slight gradient toward the main line between the condensation well and the main line. The impulse line between the condensation well and measuring instrument is filled with water.



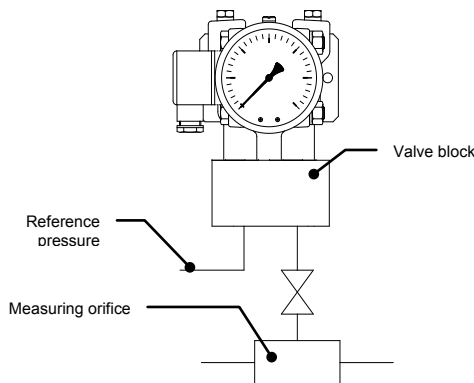
2.4 Pressure measurements for fluids

A zero point setting can be made possible via the valve block.



2.5 Pressure measurements for gases

The measuring instrument is mounted above the connection point of the main line so that any condensation runs back into the main line and does not impair the measurement.



2.6 Filling level measurement

2.6.1 Reference side (LP) for closed tank.

The lower pressure side (reference) is connected to the upper part of the tank and the high pressure side of the measuring instrument is connected to the lower side or below the tank.

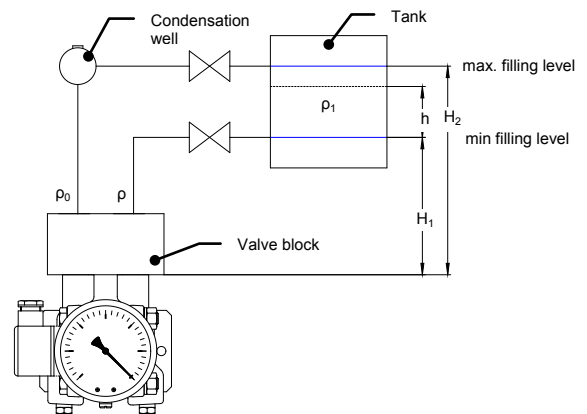
Density : ρ, ρ_0, ρ_1
Filling level min/max : H_1, H_2
Fill level difference : h

Calculation of the zero point and measuring range:

Lower limit of measuring range : $\rho H_1 - \rho_0 H_2$
Upper limit of measuring range : $\rho H_1 + \rho_1 h - \rho_0 H_2$
Measuring range (DP) : $\rho_1 h$

Output signal value for transmitters:

Lower limit of measuring range : 4mA (0% point)
Upper limit of measuring range : 20mA (100% point)



Low-pressure side High-pressure side

2.6.2 Reference side (LP) for open tank.

If the tank is open, a pressure or pressure differential measuring instrument can be used. For a pressure differential instrument, the "L" or "-" side must be set to the atmospheric pressure.

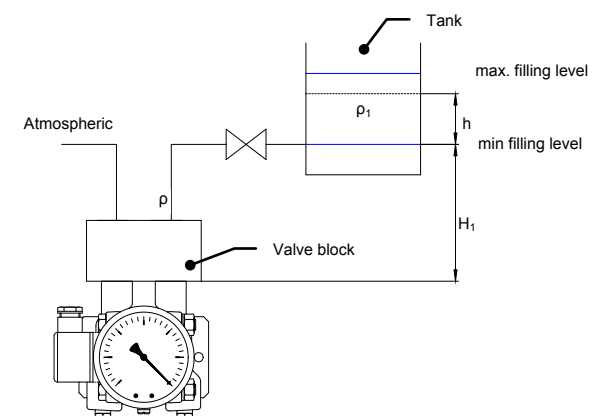
Density : ρ, ρ_1
Filling level min/max : H_1
Fill level difference : h

Calculation of the zero point and measuring range:

Lower limit of measuring range : ρH_1
Upper limit of measuring range : $\rho H_1 + \rho_1 h$
Measuring range (DP) : $\rho_1 h$

Output signal value for transmitters:

Lower limit of measuring range : 4mA (0% point)
Upper limit of measuring range : 20mA (100% point)



Low-pressure side High-pressure side

3 Assembly of the impulse lines

When measuring fluids, a gradient of at least 1/10 is required between the measuring instrument and the main line so that any gas bubbles are fed into the main line and not the measuring instrument. The measuring instrument is mounted below the connection point of the main line.

When measuring gases, a gradient of at least 1/10 is required between the measuring instrument and the main line so that any condensation is fed into the main line and not into the transmitter. The measuring instrument is mounted above the connection point of the main line.

Avoid sharp bends in the impulse line because this can cause gas inclusions or condensation deposits.

Do not exert excessive force on the impulse lines during the connection process.

Avoid installing the measuring instrument at points where vibrations can occur.

The impulse lines need to correspond to the temperature and pressure specifications.

Avoid conditions in which the medium can freeze inside the impulse line or the process flange of the measuring instrument.