



Averaging Pitot Tube

Model : SAP-810



SeoJin Instech Co., Ltd.

www.seojin.biz

SAP-810

Averaging Pitot Tube

Introduction

Averaging pitot tube is a differential pressure flow meter suitable for liquid, gas and steam flow measurement.

Averaging pitot tube is low cost installation and low pressure loss into pipes and ducts.

Fluid passing around a Pitot tube generates a pressure difference between the front and rear of the tube that is proportional to the velocity of the flow.

The holes placed on the front and rear of the tube are used to sense the difference, which is needed to calculate the flow rate. Multiple sets of pressure-sensing holes give a distinct advantage in automatically averaging the nonuniform flow profile across pipe.

Principle

Averaging Pitot tube can be used to indicate flow velocity by measuring the difference between the static and dynamic pressures in fluids.

The principle is based on the Bernoulli Equation where each term can be interpreted as a form of pressure.

$$p + \frac{1}{2} \rho v^2 + \rho y = \text{constant along a streamline} \quad \text{---(1)}$$

where

p = static pressure (relative to the moving fluid) (Pa)

ρ = density (kg/m³)

v = flow velocity (m/s)

$y = p/g$ = specific weight (N/m³)

g = acceleration of gravity (m/s²)

h = elevation height (m)

Flow Velocity

In a measuring point we regard the hydrostatic pressure as a constant, $h_1 = h_2$ and this part can be eliminated. Since v_2 is zero, (2) can be modified to:

$$p_1 + \frac{1}{2} \rho v_1^2 = p_2 \quad \text{---(3) or } v_1 = [2(p_2 - p_1) / \rho]^{1/2} \quad \text{---(4)}$$

where

$p_2 - p_1 = dp$ (differential pressure)

The pitot tube is a simple and convenient instrument to measure the difference between static total and dynamic pressure.

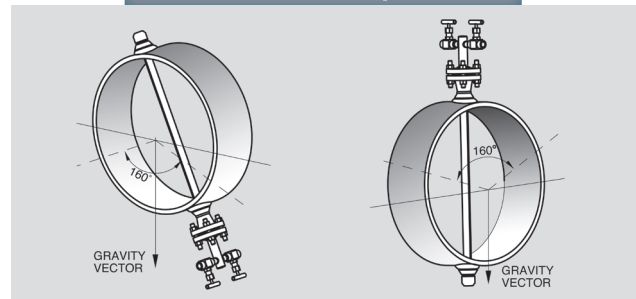


SAP-810

Installation

Note: Other orientations are possible with additional considerations.

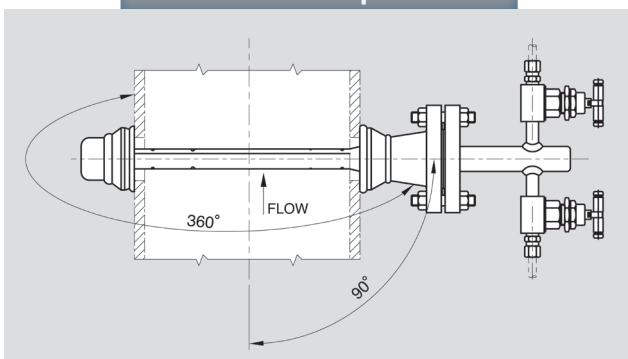
Horizontal Pipes



Liquids Services

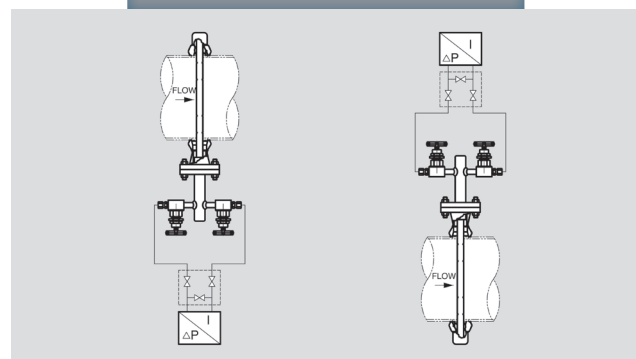
Gas, Steam Services

Vertical Pipes



Liquids, Gas, Services, except Steam

Transmitter Location



Liquids Services

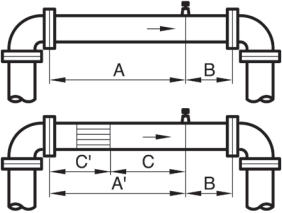
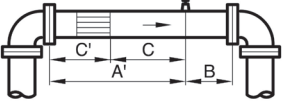
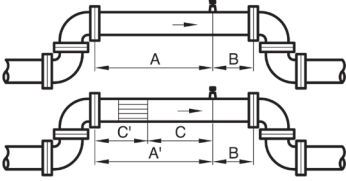
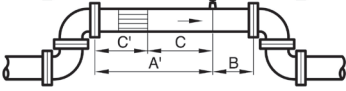
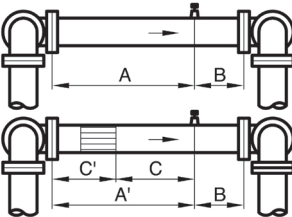
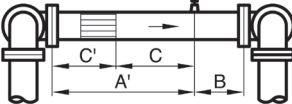
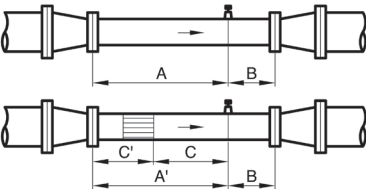
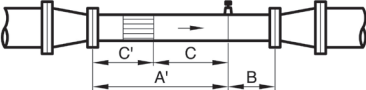
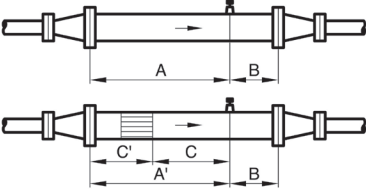
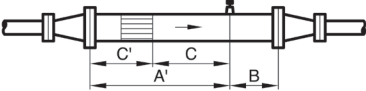
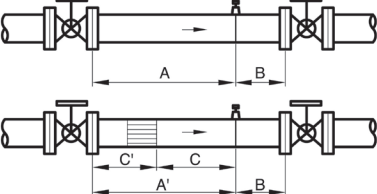
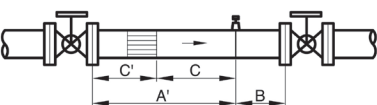
Gas, Steam Services

Installation

Straight Run Requirements

Use of recommended straight pipe lengths of uniform diameter upstream and downstream ensures that flow measurement will be made in flow with fully developed characteristics. The flowing chart describes the minimum number of pipe diameters upstream and downstream of the SAP. Longer lengths are always preferred (if available) for accurate flow measurement.

Note: Straight runs listed below are for water. Multiply times 1.5 for gases or steam.

Minimum Diameters Straight Pipe	Upstream Dimension					Downstream Dimension
	Without Vanes		With Vanes			B
	In Plane A	Out Plane A	A'	C	C'	
	8D	10D				4D
			8D	4D	4D	
	11D	16D				4D
			8D	4D	4D	
	23D	28D				4D
			8D	4D	4D	
	12D	12D				4D
			8D	4D	4D	
	18D	18D				4D
			8D	4D	4D	
	30D	30D				4D
			8D	4D	4D	

Ordering Information

■ AVERAGING PITOT TUBE

SAP - 810

1

A

1

A

1

A

1

FLUID

1 = Liquid
2 = Air (Gas or Steam)

MATERIAL FOR MOUNTING HARDWARE

A = Carbon steel
B = 304LSS
C = 316LSS
D = etc.

MATERIAL FOR SENSOR TUBE

1 = 304LSS
2 = 316LSS
3 = MONEL
4 = etc.

FLANGE MATERIAL

A = 304LSS
B = 316LSS
C = MONEL
D = etc.

FLANGE RATING

1 = JIS 10K
2 = JIS 20K
3 = JIS 30K
4 = ANSI #150
5 = ANSI #300
6 = ANSI #600
7 = ANSI #900
8 = etc.

LINE SIZE

A = 15A (1/2")
B = 20A (3/4")
C = 25A (1")
D = 32A (1-1/2")
E = 50A (2")
F = 65A (2-1/2")
G = 80A (3")
H = 100A (4")
I = 125A (5")
J = 150A (6")
K = 200A (8")
L = etc.

TYPE

1 = Single support
2 = Double support

■ When placing an order, selected ordering number should be indicated on the purchase order sheet.



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■ Specifications subject to change without notice