Averaging pitot tube
Model : F760

Spec. sheet no. FD07-03

Description

Averaging pitot tube is an energy saving device used to measuring the flow of liquids, gases and steam in pipes, stacks and rectangular ducts.
It provides high, long term stability with low permanent pressure loss. Examples of their applications are precise volumetic flow measurement in batch processes, continuous measurement of liquid ingredients in the process industry, fuel, air, steam and gases as primary energy source as well as in control functions requiring a high degree of stability and repeatability.

Advantages

- Dual averaging for better accuracy
- Short upstream and downstream straight pipe lengths
- Long term accuracy unaffected by wear

Specification

Measuring fluid
Liquid, Gas, Steam and etc.

Max. working temperature
600 ℃

Material
304SS, 316SS, 316L SS and Monel
Special materials are available

Accuracy
±1 % of full scale at calibrated

Pipe size
50 ~ 1000 mm
2" ~ 40"

Max. working pressure
15 MPa

Rangeability
5:1

Main order — Ordering information

1. Base model

F760	Averaging pitot tube

2. Line size

A01	½"	**J01**	15A
A02	¾"	**J02**	20A
A03	1"	**J03**	25A
A04	1½"	**J04**	40A
A05	2"	**J05**	50A
A06	3"	**J06**	80A
A07	4"	**J07**	100A
A08	6"	**J08**	150A
A09	8"	**J09**	200A
A10	10"	**J10**	250A
A11	12"	**J11**	300A
A12	14"	**J12**	350A
A13	16"	**J13**	400A
A14	18"	**J14**	450A
A15	20"	**J15**	500A
A16	24"	**J16**	600A
ZZZ	Other		

3. Mounting connection

A1	2" ANSI 150Lb RF
A2	2" ANSI 300Lb RF
A3	2½" ANSI 150Lb RF
A4	2½" ANSI 300Lb RF
J1	50A JIS 10K RF
J2	50A JIS 16K RF
J3	50A JIS 20K RF
J4	65A JIS 10K RF
J5	65A JIS 16K RF
J6	65A JIS 20K RF
ZZ	Other

4. Support type

1	Single
2	Double

5. Sensor material

4S	304SS
6S	316SS
6L	316L SS
ZZ	Other

6. Tap valve

1	½" NPT, Needle valve
2	½" NPT, Ball valve
O	Other
N	None

7. Option

C	Calibration test
O	Other
N	None

Sample ordering code

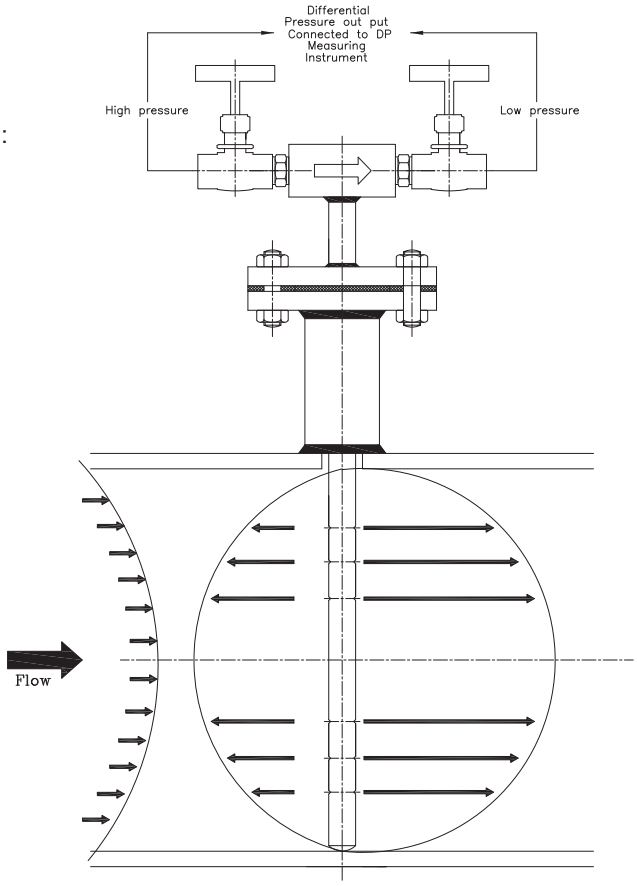
1	2	3	4	5	6	7
F760	**A01**	**A1**	**1**	**4S**	**1**	**C**

Measurement principal of pitot tube

Averaging pitot tubes are generally used for large line sizes or ducts where other primary devices become relatively expensive.

Averaging pitot tube comprises of following components :

- Outer impact tube
- Internal averaging tube
- Low pressure chamber
- Head



The outer impact tube has a number of pressure sensing holes facing upstream which are positioned at equal annular points in accordance with a loglinear distribution.

The total pressure developed at each upstream hole by the impact of the flowing medium are firstly averaged within the outer impact tube and then to a second order (and more accurately) averaged within the internal averaging tube.

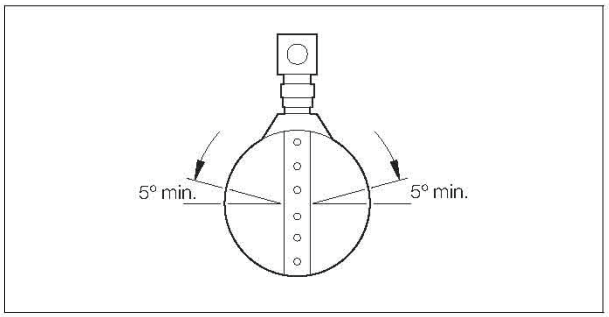
This pressure is represented at the head as the high pressure component of the DP output.
The low pressure compoenet is generated from a single sensing hole located on the downstream side of the outer impact tube.

Stable flow coefficient which is the result of typical diamond shape, makes it a reliable flow measuring primary flow element.

Simple and inexpensive, long term accuracy within acceptable limits over wide range of flow, low permanent pressure loss and minimum operating cost makes it ideal choice of any design engineer.

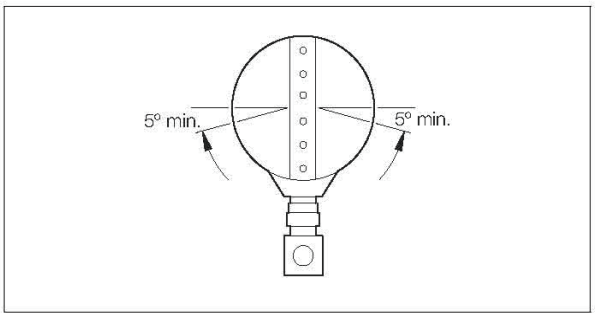
Orientation in pipe

1. Horizontal pipe mounting - Gas
To ensure the instrument lines contain only gas, install APT with the instrument connections above the centre line of the pipe, at least 5° above the horizontal



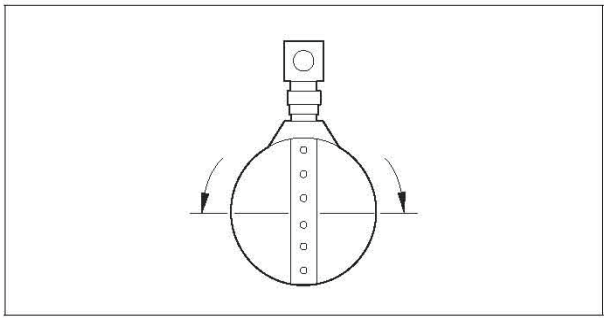
Horizontal pipe mounting - Gas

2. Horizontal pipe mounting - Liquids
To ensure the instrument lines contain only the process liquid, install APT with the instrument connections below the centre line of the pipe, at least 5° below the horizontal



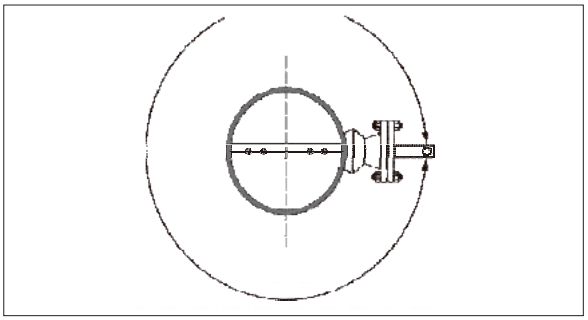
Horizontal pipe mounting - Liquid

3. Horizontal pipe mounting - Steam
To ensure the instrument lines contain only steam, install APT with the instrument connections at or below the centre line of the pipe



Horizontal pipe mounting - Steam

4. Vertical pipe mounting - All applications
Any lateral - mounting angle is suitable

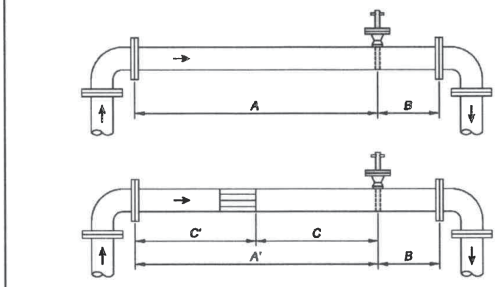
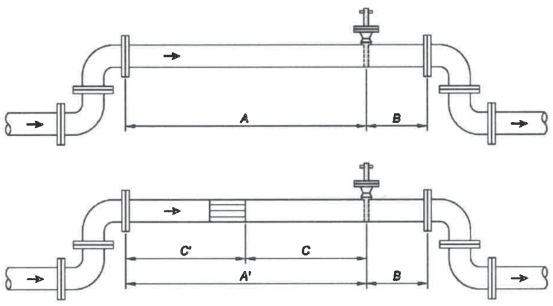
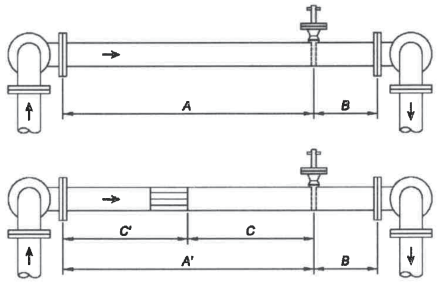
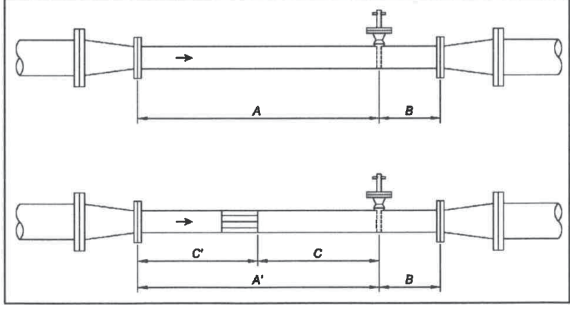


Vertiacl pipe mounting - All applications

Recommended straight run

In common with other differential pressure primary flow elements, averaging pitot tubes require a well developed flow profile. Disturbances created by various pipe configurations can reduce measurement accuracy.
Recommeded upstream and downstream straight pipe lengths are shown below, in terms of multiples of the pipe diameter.

Averaging pitot tubes installed with shorter pipe lengths can still provide an repeatable flow measurment.

Minimum Length of a Straight Run	Upstream					Down stream
	Without vanes		With vanes			
	In plane	Out of plane	A'	C	C'	B
	A	A				
	7	9				3
			6	3	3	
	9	14				3
			8	4	4	
	19	24				4
			9	4	5	
	8	8				3
			8	4	4	

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