

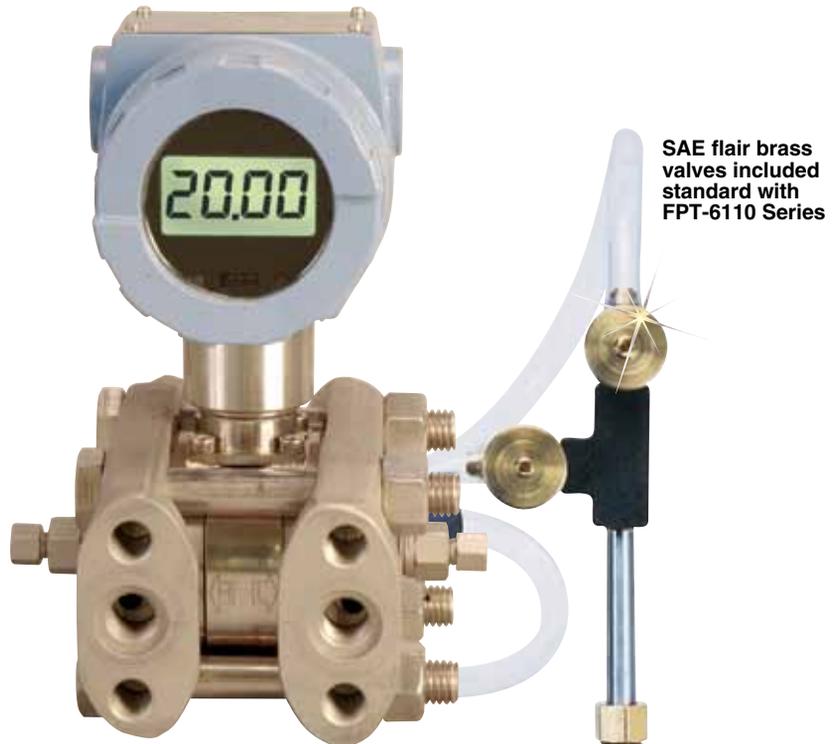
# HIGH ACCURACY PITOT TUBES

## FPT-6000 Series

- ✓ Up to ±1% of Rate Accuracy
- ✓ Easy Installation—Ideal for Retrofits
- ✓ Very Low Pressure Drop
- ✓ Low Maintenance
- ✓ For Clean, Low Viscosity Liquids, Gases, and Steam
- ✓ Valves Included as Standard

The FPT-6110 is a highly accurate averaging pitot tube which generates a pressure differential between its upstream (stagnation) ports and its downstream (static) ports that is proportional to the flowrate squared ( $Q^2$ ). The differential pressure can then be measured by a differential pressure transducer (visit [omega.com/pressure](http://omega.com/pressure)) to provide a 4 to 20 mA output which is proportional to the flowrate squared. This can then be read out as flowrate by devices with square root extraction, such as OMEGA's DPF64-SQRT meter or FC-20 mass flow computer. The FPT-6000 can be used to measure clean, low viscosity liquids, gases and steam in a variety of piping systems and pipe sizes (to 72" and above on special order).

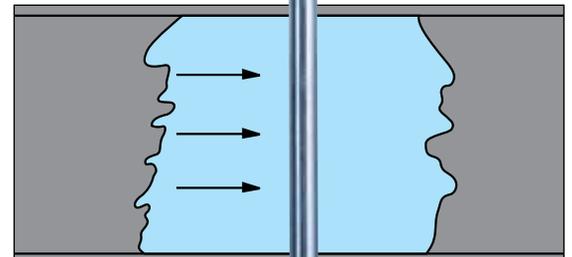
The FPT-6110 offers the following advantages over orifice plates: easy, low-cost installation (weld 1 small coupling into place vs. 2 large flanges); much lower permanent pressure loss; low maintenance (occasionally forcing gas through the pressure ports clears the sensing ports when dirt is a problem); and good resistance to wear. Bi-directional flow measurement capability is standard. And, with special double-mount construction, the flow ranges listed can be extended by up to 4 times (consult Flow Engineering Department for details).



PX760 pressure transmitter, sold separately. Visit [omega.com/pressure](http://omega.com/pressure) for more information.

SAE flair brass valves included standard with FPT-6110 Series

FPT-6110, shown smaller than actual size.



## SPECIFICATIONS

**Accuracy:** Up to 1% of rate (see sizing). (Accuracy stated is for use in schedule 40 pipe. If used in schedule 80 pipe, add 1% to accuracy or request special construction)

**Repeatability:** ±0.1% of rate

**Maximum Temperature:** FPT-6100: 93°C (200°F); FPT-6200: 204°C (400°F)  
"SS" Models: 427°C (800°F)

**Maximum Pressure:**

FPT-6100: 150 psig;

FPT-6200: 1500 psig

**Unrecoverable Pressure Drop**

(inches H<sub>2</sub>O) = DP x (CP/D) where:

DP = generated differential pressure (inches H<sub>2</sub>O)

CP = pressure loss coefficient

= 0.296 for 3/8" diameter probe

= 0.387 for 1/2"

= 0.757 for 3/4"

= 0.945 for 1"

D = inside pipe diameter (inches)

**Wetted Parts:** FPT-6100: 316SS shaft, brass packing and head, carbon steel weld coupling, 1/4" SAE flair brass valve; FPT-6200: 316SS shaft, packing and head, carbon steel weld coupling, 1/2 FNPT Carbon Steel block valves

**Dimensions**

**For Model FPT-6100:** Add 4 7/8" to line size to determine overall length without valves. Add 7 1/2" to line size to determine clearance required to install unit.

**For Model FPT-6300:** Add 8 1/4" to line size to determine overall length without valves. Add 11 1/2" to line size to determine clearance required to install unit

# HIGH ACCURACY PITOT TUBES

## Sizing Equations

### 1. Any Liquid:

$$\Delta P \text{ (in. H}_2\text{O)} = \frac{Q^2(\text{GPM}) \times S_f}{K^2 \times D_1^4 \times 32.14}$$

### 2. Steam or Any Gas (steam requires min $\Delta P$ of 10" H<sub>2</sub>O):

$$\Delta P \text{ (in. H}_2\text{O)} = \frac{Q^2(\text{lb/hr})}{K^2 \times D^4 \times \rho \times 128,900}$$

### 3. Any Gas:

$$\Delta P \text{ (in. H}_2\text{O)} = \frac{Q^2(\text{scfm}) \times S_s \times (T + 460)}{K^2 \times D_1^4 \times P \times 16,590}$$

Where:

$\Delta P$  = differential pressure  
(in in H<sub>2</sub>O)

Q = flowrate

K = flow coefficient  
(see "how to order")

D<sub>1</sub> = inside diameter of line size  
(in inches for square and rectangular ducts use):

$$D_1 = \sqrt{\frac{4 \times \text{height} \times \text{width}}{\pi}}$$

P = static line pressure (psia)

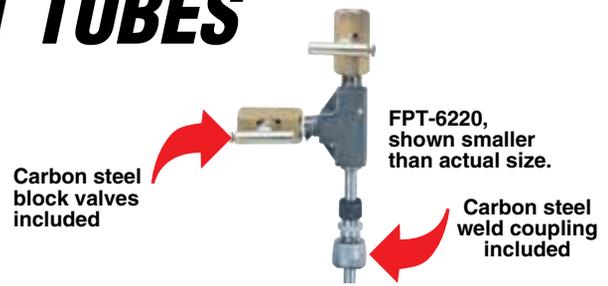
T = temperature (in °F)

$\rho$  = density of medium (in pounds per cubic foot)

S<sub>f</sub> = Sp. Gr. at flowing conditions

S<sub>s</sub> = Sp. Gr. at 15°C (60°F)

**NOTE:** Use of these equations for liquids yields an accuracy of  $\pm 2\%$  of rate. When used for steam, accuracy is  $\pm 10\%$  of rate (when steam tables are used). Gas equation yields  $\pm 2\%$  of rate accuracy from 21 to 204°C (70 to 400°F) and 0 to 150 psig (when gas is not near its critical point). A  $\pm 1\%$  of rate accuracy requires the use of more precise equations which account for shift in K with change in flowrate, gas compressibility, etc. Request a precision flow calibration sheet and please supply the following data: name of fluid, specific gravity, pressure, temperature, inside pipe diameter, viscosity, steam quality, degrees superheat, and ratio of specific heat at constant pressure to that at constant volume (for gas velocities approaching 500 fps).



## To Order

Model No. (Low Pressure)	Nominal Line Size	Probe Dia.	Maximum Differential Pressure (inches H <sub>2</sub> O)*	Max GPM (Liquids)	K	Weight Kg (lb)
FPT-6110	1"	3/8"	1200	115	0.517	0.31 (0.68)
FPT-6112	1 1/4"	3/8"	833	179	0.583	0.31 (0.69)
FPT-6115	1 1/2"	3/8"	668	220	0.580	0.31 (0.69)
FPT-6120	2"	3/8"	459	315	0.638	0.31 (0.70)
FPT-6125	2 1/2"	3/8"	338	410	0.617	0.31 (0.71)
FPT-6130	3"	3/8"	237	552	0.665	0.32 (0.72)
FPT-6135	3 1/2"	3/8"	186	657	0.661	0.32 (0.72)
FPT-6140	4"	3/8"	150	756	0.672	0.33 (0.73)
FPT-6160	6"	3/8"	72	1230	0.706	0.35 (0.77)
FPT-6180	8"	3/4"	164	3109	0.686	0.74 (1.64)
FPT-6181	10"	3/4"	107	4006	0.676	0.80 (1.76)
FPT-6182	12"	3/4"	77	4830	0.683	0.85 (1.88)
(High Pressure)†						
FPT-6220	2"	1/2"	1064	479	0.557	1.0 (2.30)
FPT-6225	2 1/2"	1/2"	713	609	0.598	1.1 (2.32)
FPT-6230	3"	1/2"	510	809	0.645	1.1 (2.34)
FPT-6235	3 1/2"	1/2"	400	963	0.630	1.1 (2.36)
FPT-6240	4"	1/2"	328	1119	0.656	1.1 (2.37)
FPT-6260	6"	1/2"	163	1845	0.662	1.1 (2.45)
FPT-6280	8"	1/2"	100	2428	0.673	1.1 (2.52)
FPT-6281	10"	1/2"	66	3139	0.682	1.2 (2.59)
FPT-6282	12"	1"	140	6565	0.677	3.0 (6.65)
FPT-6283	14"	1"	117	7325	0.665	3.1 (6.78)
FPT-6284	16"	1"	90	8285	0.691	3.2 (6.98)
FPT-6285	18"	1"	72	9683	0.678	3.3 (7.19)
FPT-6286	20"	1"	59	11000	0.705	3.4 (7.40)
FPT-6287	24"	1"	41	13900	0.708	3.5 (7.81)
FPT-6288	36"	1"	18	21400	0.664	4.1 (9.08)

## Options

Add Suffix	Additional Price	Description
-SS	For 3/8" probe diameter	316SS construction includes head, probe, block valves and threadolet
	For 1/2" probe diameter	
	For 3/4" probe diameter	
	For 1" probe dia. and up	

Comes complete with operator's manual.

\* Maximum differential pressure shown is for up to 150°C (300°F). Above 150°C (300°F), reduce value by 4% per 56°C (100°F).

† Please complete and send in questionnaire with your order, from [omega.com/flowq](http://omega.com/flowq).

For units with stainless steel construction add "-SS" to part number and adjust price based on options available at [omega.com/fpt6100\\_6200](http://omega.com/fpt6100_6200).

**Ordering Examples:** FPT-6220, high pressure model pitot tube.

FPT-6160-SS, low pressure, 3/8" diameter pitot tube with 316SS.