

# PROPORTIONAIR

THE FUTURE OF CONTROL™



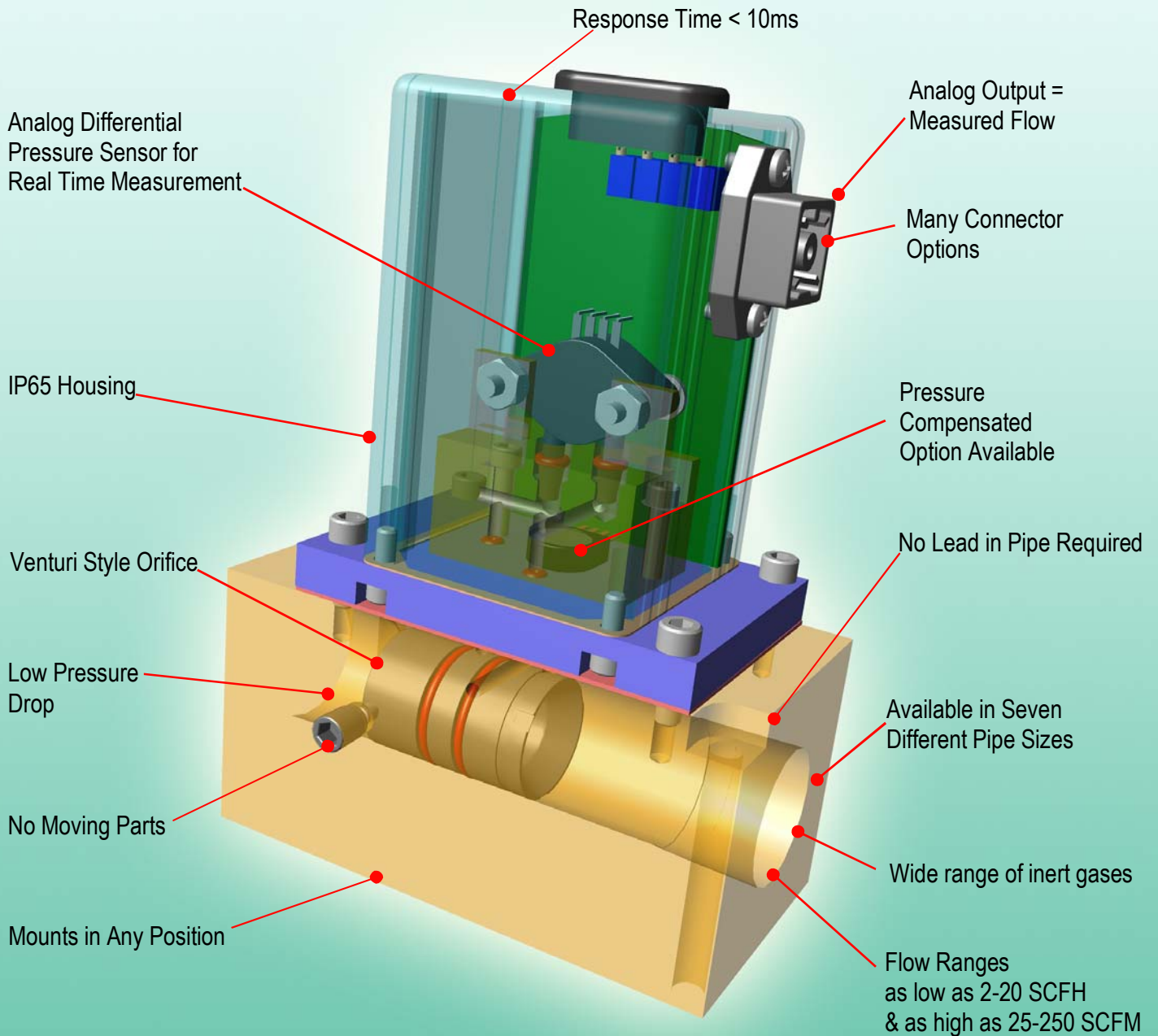
## F-SERIES

### ELECTRO-PNEUMATIC FLOW MONITOR

- \* Real time flow measurement
- \* Ideal for use in active flow control
- \* Differential pressure technology
- \* Pressure compensated models available
- \* Flow ranges as low as 2-20 SCFH
- \* Flow ranges as high as 25-250 SCFM

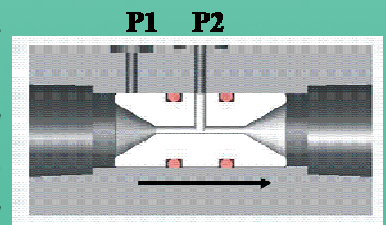
Shown with  
optional  
digital display

## THE INSIDE STORY OF THE F-SERIES:



## FUNCTIONAL DESCRIPTION

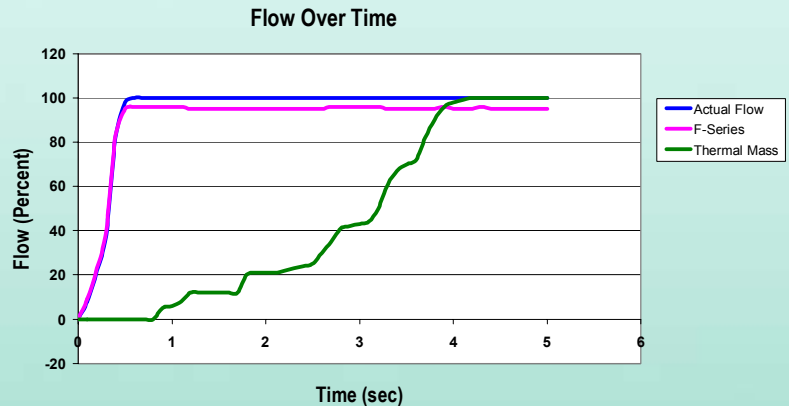
Proportion-Air's F-Series is a line of flow transducers designed specifically to provide real time flow measurement of compressed gasses for many demanding applications. Proportion-Air's F-Series design utilizes differential pressure technology to sense the pressure change across an internal venturi. This differential pressure (DP) measurement is fed into an onboard electronic circuit that converts the DP signal into a linear analog output signal which represents the flow through the F-Series. The DP sensor and circuit are completely analog to offer the fastest possible response time and eliminate digital stepping often seen in flow transducers of other technologies.



Proportion-Air's F-Series product is available in flow ranges from as low as 2 to 20SCFH and as high as 25 to 250SCFM. Pipe sizes range from 1/4" to 1 1/2". Both NPT and BSP threads are available.

The differential pressure technology incorporated in Proportion-Air's F-Series flow transducer is ideally suited for rugged commercial and industrial applications. This technology allows measurements of flows from 10% to 100% of the maximum calibrated range. The benefits of real time measurement make the F-Series a must in many rapid sequence applications. For example, in the chart below, the 0.1% accurate thermal mass flow meter output isn't even close while the F-Series has been providing a 96% accurate signal for over four seconds!

This makes the real accuracy of the F-Series far superior in many fast paced applications. Proportion-Air's F-Series flow transducer is rugged for today's demanding environments. It has an IP65 housing, 25G rating, and its large venturi can digest contaminants and moisture. The F-Series is also insensitive to mounting position and vibration.



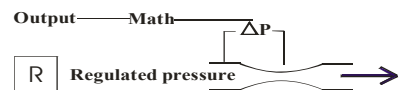
## F-SERIES MODELS

Three models of Proportion-Air's F-Series flow transducers are available for a variety of different applications: Regulated, Pressure Compensated, and Atmosphere models.

### FR MODEL

The FR model is a regulated flow monitor that uses only differential pressure to calculate the compressed gas flow. When the supply pressure of a compressed gas is regulated to a fixed value, the compressibility effect of the gas on gas density can be compensated to allow the output signal to indicate implied mass flow.

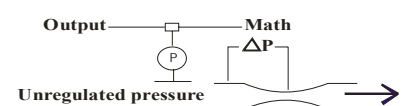
#### FR-Series non-pressure Compensated



### FP MODEL

The FP model is a pressure compensated flow monitor. In addition to a differential pressure sensor, the FP model also uses an absolute pressure sensor to measure the incoming pressure of the compressed gas flow. This absolute pressure allows the FP to mathematically correct the output signal for changes in gas density due to pressure. This model is used in applications where the incoming gas supply pressure either varies and cannot be regulated or when there may be an advantage to eliminating a regulator.

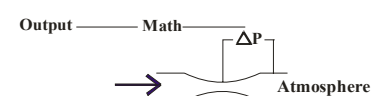
#### FP-Series Pressure Compensated



### FA MODEL

The FA model is an atmosphere flow monitor that is used where the compressed gas flow is venting to atmosphere. Atmospheric pressure becomes the standard against which the DP signal is compared allowing the DP signal to be mathematically converted to implied mass flow.

#### FA-Series Calibrated to Atmosphere



## F-SERIES GENERAL SPECIFICATIONS & PERFORMANCE CHARACTERISTICS

ELECTRICAL	MINIMUM	TYPICAL	MAXIMUM
Power Requirement	15VDC	-	24VDC
Supply Current	-	80mA	-
Analog Output			
Voltage	1VDC	-	10VDC
Current			
Sinking	5.6mA	-	20mA
Sourcing	5.6mA	-	20mA

MECHANICAL	MINIMUM	TYPICAL	MAXIMUM
MAXIMUM INLET PRESSURE <sup>1</sup>	30 PSIA	-	165 PSIA
CALIBRATED FLOW RANGE	-	See CHART 1	-
ACCURACY	-	+/- 4% F.S.	-
REPEATABILITY	-	+/- 0.25% F.S.	-
RESPONSE TIME	-	< 10 ms	-
SHOCK RATING	-	25 G's	-
TURNDOWN RATIO <sup>2</sup>	-	10 to 1	-
END CONNECTIONS (PORT SIZE)	-	1/4", 3/8", 1/2", 3/4", 1", 1-1/4", 1-1/2" NPT or BSPP	-
MATERIALS	-	Elastomers - Buna-N Manifold - Aluminum anodized Transducer - Silicon, Aluminum	-

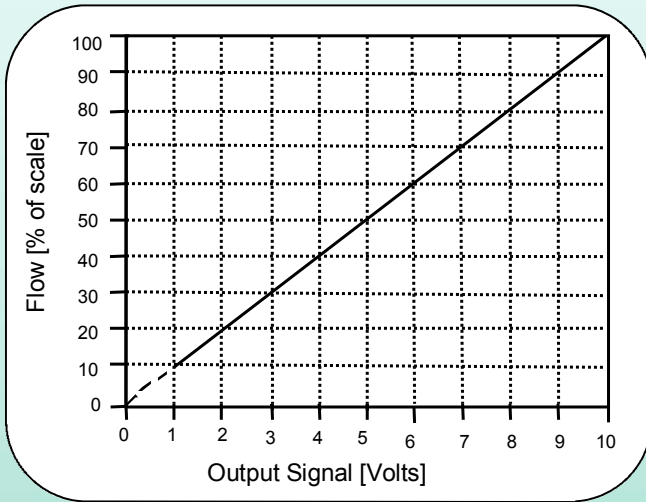
<sup>1</sup> FP Model with set pressure less than 100 psia, have a maximum inlet pressures less than 165 psia.

<sup>2</sup> Turndown ratio of 10:1 allows measurement 10 to 100% of flow range. Zero point is at zero flow.

PHYSICAL	MINIMUM	TYPICAL	MAXIMUM
MEDIA WORKING TEMPERATURE	32°F (0°C)	-	122°F (50°C)
AMBIENT TEMPERATURE	32°F (0°C)	-	158°F (70°C)
TEMPERATURE SENSITIVITY	-	0.25% / °C Relative to reference conditions of 21°C	-
WEIGHT			
1/4"	-	1.3 LBS (0.59 KG)	-
3/8"	-	1.7 LBS (0.77 KG)	-
1/2"	-	1.6 LBS (0.73 KG)	-
3/4"	-	1.9 LBS (0.86 KG)	-
1"	-	1.7 LBS (0.77 KG)	-
1-1/4"	-	2.85 LBS (1.29 KG)	-
1-1/2"	-	2.85 LBS (1.29 KG)	-
ACTUATOR HOUSING RATING	-	IP65	-

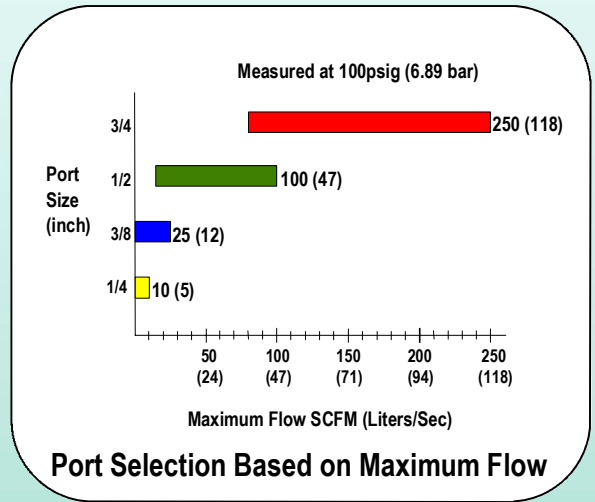
# F-SERIES PERFORMANCE CHARACTERISTICS

## LINEARITY



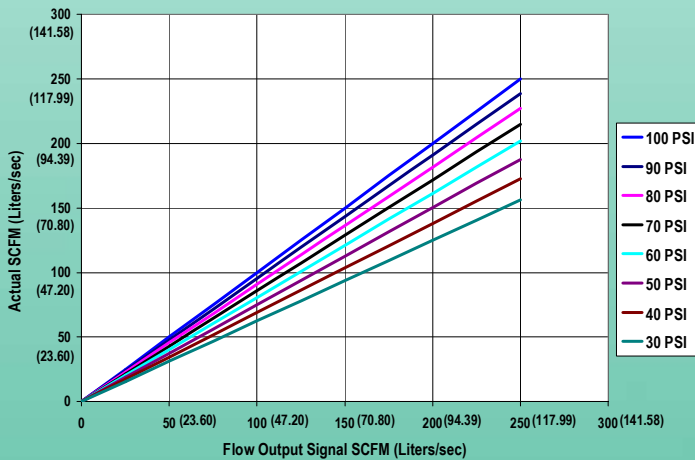
This chart shows linear characteristics of the F-Series flow monitor with a signal output of 1-10 volts. Characteristics would be similar for 5.6-20 mA units.

## CHART 1



Use CHART 1 to select the appropriate port size based on your applications maximum flow.

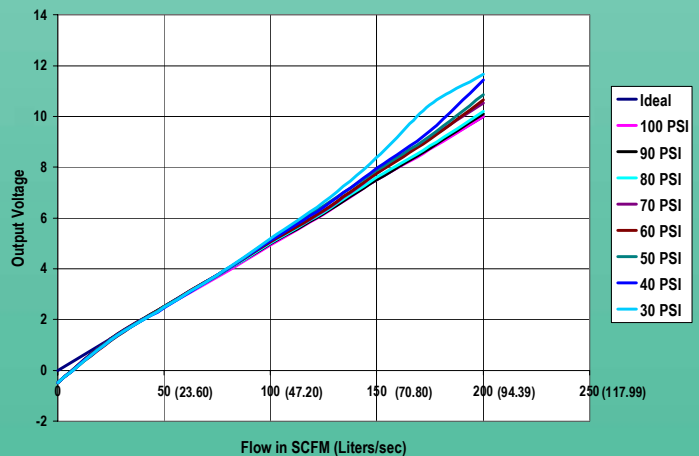
## NON-PRESSURE COMPENSATED



This graph illustrates how effectively the FP model flow transducer automatically corrects the flow output signal when the supply pressure varies over a wide range. Compare this to the results of a traditional non-pressure compensated flow transducer as shown in the "NON-PRESSURE COMPENSATED" graph. 165 psia model is shown.

This graph illustrates the effect of varying supply pressures on the flow output signal of an FR model flow transducer. This graph can be used to correct for variations in gas density due to temperature or the specific gravity of different gasses by purposely altering the supply pressure with a Proportion-Air pressure control valve. Fixing the inlet pressure to a constant value by regulating it to one pressure produces a linearly proportional signal.

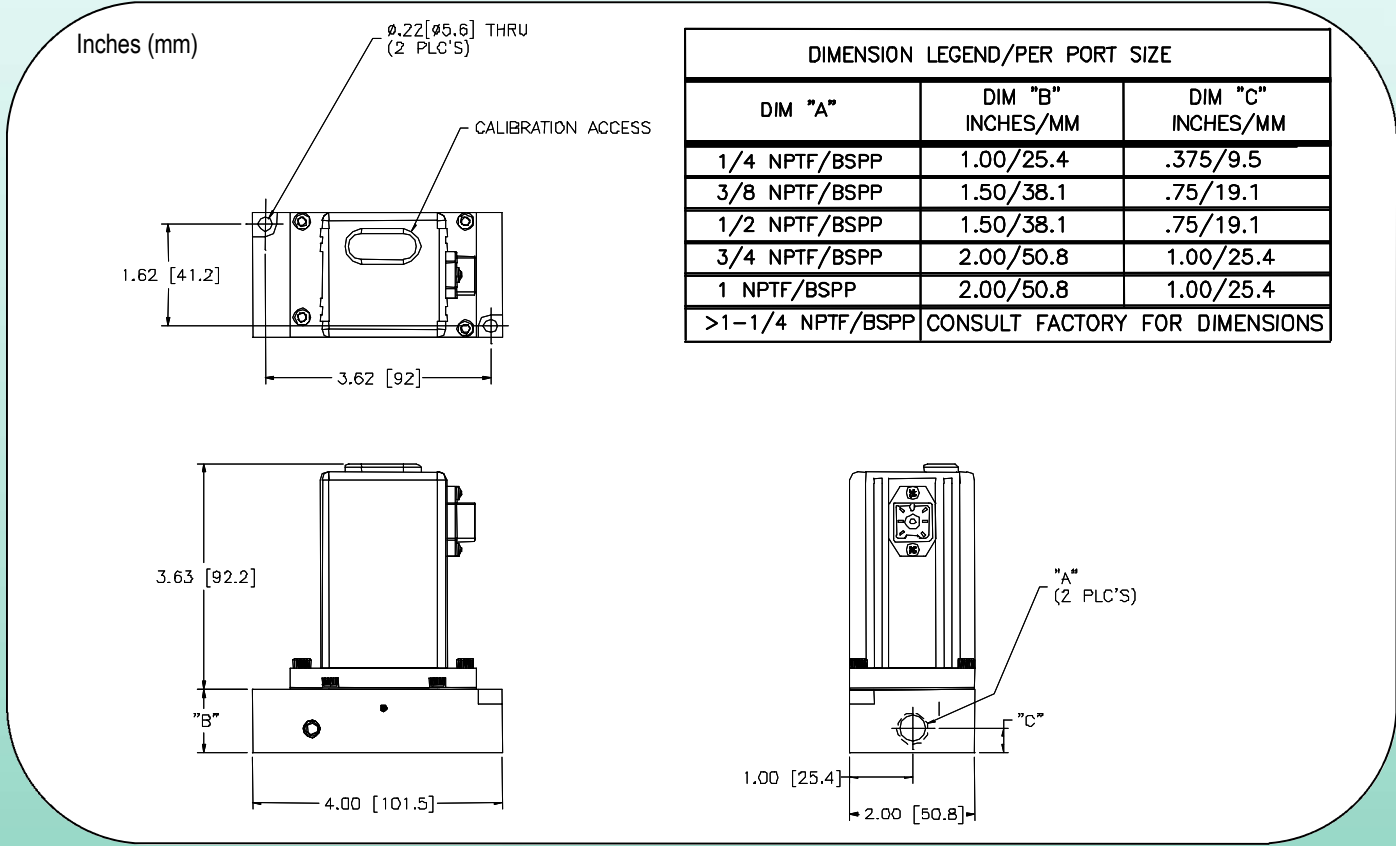
## PRESSURE COMPENSATED





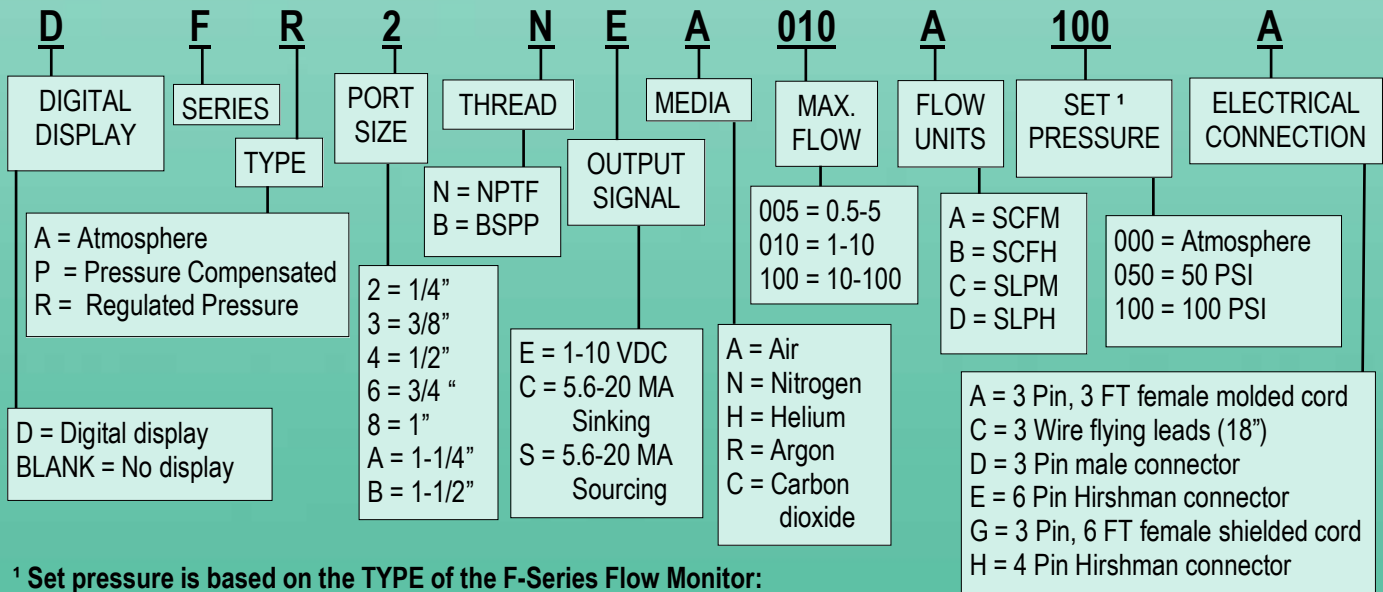
# F-SERIES DIMENSIONS

DIMENSIONS ARE FOR REFERENCE USE ONLY



DIMENSION LEGEND/PER PORT SIZE		
DIM "A"	DIM "B" INCHES/MM	DIM "C" INCHES/MM
1/4 NPTF/BSPP	1.00/25.4	.375/9.5
3/8 NPTF/BSPP	1.50/38.1	.75/19.1
1/2 NPTF/BSPP	1.50/38.1	.75/19.1
3/4 NPTF/BSPP	2.00/50.8	1.00/25.4
1 NPTF/BSPP	2.00/50.8	1.00/25.4
>1-1/4 NPTF/BSPP	CONSULT FACTORY FOR DIMENSIONS	

## ORDERING INFORMATION



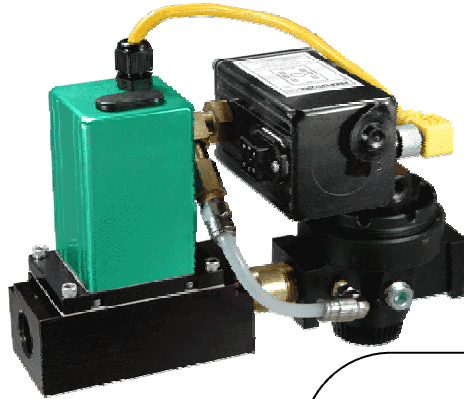
<sup>1</sup> Set pressure is based on the TYPE of the F-Series Flow Monitor:

TYPE	SET PRESSURE
A	0 psig
P	Maximum system pressure, psia
R	Required regulated supply pressure, psig

## CLOSED LOOP FLOW CONTROL OPTIONS

F-Series flow monitor coupled to various Proportion Air, Inc controls to provided closed loop flow control.

F-Series with QB/PSR ASSEMBLY  
FLOW CONTROL APPLICATIONS UP TO 250 SCFM



DF-Series with FQB3  
FLOW CONTROL APPLICATIONS UP TO 30 SCFM



DF-Series with FQPV  
FLOW CONTROL APPLICATIONS LESS THAN 1 SCFM



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**WE MAKE ONE PRODUCT THOUSANDS OF WAYS**

Proportion-Air products are warranted to the original purchaser only against defects in material or workmanship for one (1) year from the date of manufacture. The extent of Proportion-Air's liability under this warranty is limited to repair or replacement of the defective unit at Proportion-Air's option. Proportion-Air shall have no liability under this warranty where improper installation or filtration occurred.

All specifications are subject to change without notice. **THIS WARRANTY IS GIVEN IN LIEU OF, AND BUYER HEREBY EXPRESSLY WAIVES, WARRANTIES OR LIABILITIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION ANY OBLIGATION OF PROPORTION-AIR WITH REGARD TO CONSEQUENTIAL DAMAGES, WARRANTIES OF MERCHANTABILITY, DESCRIPTION, AND FITNESS FOR A PARTICULAR PURPOSE.**

**WARNING:** Installation and use of this product should be under the supervision and control of properly qualified personnel in order to avoid the risk of injury or death.