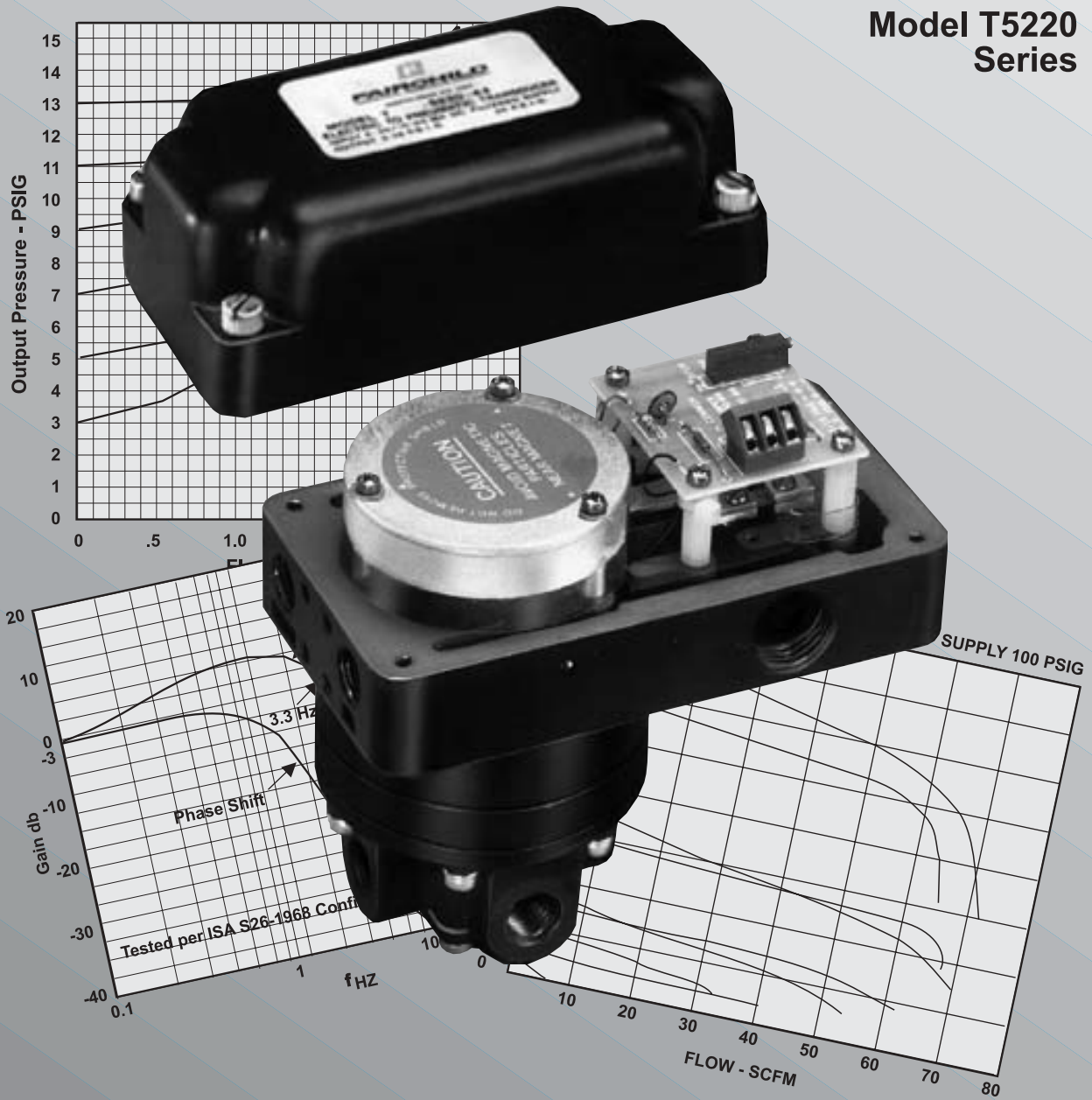


# FAIRCHILD

## ELECTRO-PNEUMATIC I/P, E/P TRANSDUCER

Model T5220  
Series



**FAIRCHILD**  
INDUSTRIAL PRODUCTS COMPANY

### **T5220 SERIES TRANSDUCER**

Electro-Pneumatic (I/P, E/P)

#### **APPLICATIONS**

The T5220 Series Electro-Pneumatic Transducer converts a DC current or voltage input signal to a directly proportional pneumatic output.

The T5220 Series is designed for precision applications, providing maximum versatility in installations requiring precision operation of actuated valves or final control elements.

The integrated booster in the Model T5220 provides increased output pressure and flow for systems which require output pressures and flows greater than those provided by the Model T5200.

#### **FEATURES**

##### **Performance**

- Fast Response to Input Signal changes results in faster loop control and savings in process materials.
- Integrated Volume Booster Output meets input requirements of final control elements requiring a higher capacity output signal and/or increased output pressure.

##### **Functional**

- Five Input Signal Ranges meet most process and machine requirements.
- Negative Bias Option allows zero pressure based operation.
- Five Booster Ratios meet industrial equipment requirements for higher output pressure ranges.
- Temperature Compensation provides stable operation under environmental changes.

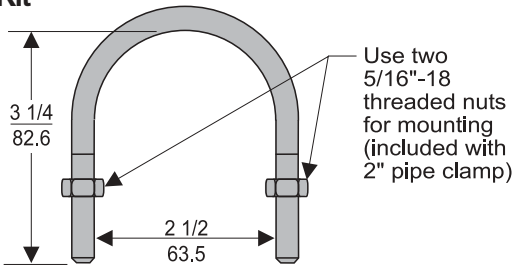
##### **Physical**

- Compact Size permits use in space restricted areas.
- Vibration Resistance maintains set points under adverse vibration conditions.
- Various Mounting Configurations allow installation flexibility for most applications.
- NEMA 3R Enclosure for outdoor and indoor installations.
- Conduit Port for convenient wiring.
- External Zero Adjustment allows ease of calibration.



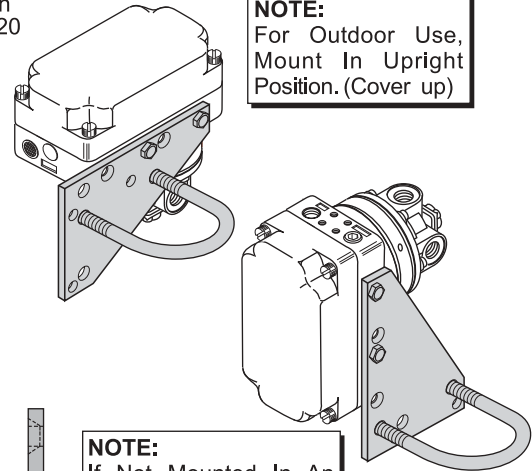
# MOUNTING KIT

## Mounting Kit EA-14596



**2" Pipe Mounting Configuration**  
shown with  
Model T5220

**NOTE:**  
For Outdoor Use,  
Mount In Upright  
Position. (Cover up)



**NOTE:**  
If Not Mounted In An  
Upright Position, Zero &  
Span Adjustments Must  
Be Re-Calibrated For  
Proper Output Range.

**Mounting Kit EA-14596**  
Includes the following:  
Mounting Bracket • Two Lockwashers  
2" Pipe Clamp • Two 1/4-20 x 5/8" Bolts  
Two 1/4-20 x 1/2" Screws

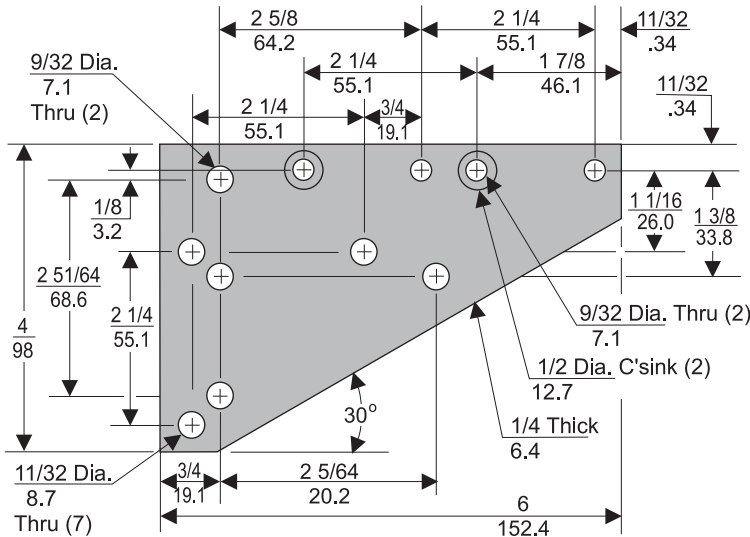


Figure 3. Mounting Kit EA-14596 shown with Model T5220. (Sold Separately)

## SPECIFICATIONS

### FUNCTIONAL SPECIFICATIONS

<b>Output Range (1:1 Ratio)</b>	3-15 psig, [0.2-1.0 BAR] (20-100 kPa)	
<b>Supply <sup>1</sup> Pressure</b>	20 ± 2 psig, [1.5 ± 0.15 BAR] (150 ± 15 kPa)	
<b>Air Consumption (SCFM)</b>	0.28 (0.48 m <sup>3</sup> /HR) Max. (dead end) @ 20 psig, [1.5 BAR], (150 kPa) supply.	
<b>Output Capacity (SCFM)</b>	15 (25.5 m <sup>3</sup> /HR) Max. @ 20 psig, [1.5 BAR], (150 kPa) supply. 45 (76.5 m <sup>3</sup> /HR) @ 100 psig, [7.0 BAR], (700 kPa) (with separate supply.)	
<b>Exhaust Capacity (SCFM)</b>	7 (11.9 m <sup>3</sup> /HR) downstream pressure @ 5 psig, [.35 BAR], (35 kPa) above 3 psig,[0.2 BAR], (20 kPa) set point. 14 (23.8 m <sup>3</sup> /HR) downstream pressure @ 5 psig, [.35 BAR], (35 kPa) above 15 psig, [1.0 BAR], (100 kPa) set point.	
<b>Impedance/ Input Signal</b>	<b>Range</b>	<b>OHMS (nominal)</b>
	1-5 mA	2000
	4-20 mA	120 <sup>2</sup>
	10-50 mA	50 <sup>2</sup>
	1-5 VDC	375
	0-6 VDC	375 <sup>3</sup>
	0-12 VDC	2550 <sup>3</sup>
	1-9 VDC	2550

### PERFORMANCE SPECIFICATIONS

<b>Terminal Based Linearity</b>	± 0.50% Full Scale ( <b>T5220 Only</b> ) within 0.6% Output Span( <b>T5222-T5226</b> )
<b>Independent Linearity</b>	within 0.25% Full Scale ( <b>T5220 Only</b> ) within 0.3% Output Span( <b>T5222-T5226</b> )
<b>Hysteresis &amp; Repeatability</b>	within 0.1% Full Scale ( <b>T5220 Only</b> ) within 0.1% Times Ratio of Output Span ( <b>T5222-T5226</b> )
<b>Supply Pressure Effect</b>	+ 0.3% of Span for a 1 psig, [0.07 BAR], (7 kPa) supply change between 18-22 psig, [1.2-14.5 BAR], (120-145 kPa).
<b>Shock &amp; Vibration Effect</b>	Negligible up to 2 g's between 5 Hz and 200 Hz
<b>Ambient Temp.</b>	-40° F to +150° F (-40° C to +65.5° C)
<b>Temp. Coefficient</b>	Less than 1% of Span / 50° F (10° C)
<b>Materials of Construction</b>	Body and Housing . . . . . Aluminum Ball and Orifice . . . . . Sapphire, Brass, Nozzle . . . . . Stainless Steel

<sup>1</sup> Supply Pressure must be no less than 10 psig, [0.7 BAR], (70 kPa) above maximum booster output.

<sup>2</sup> Add 332 OHMS for CSA Unit.

<sup>3</sup> Not Approved for Intrinsically Safe Ratings.

# OUTLINE DIMENSIONS

## Model T5220 Explosion-Proof

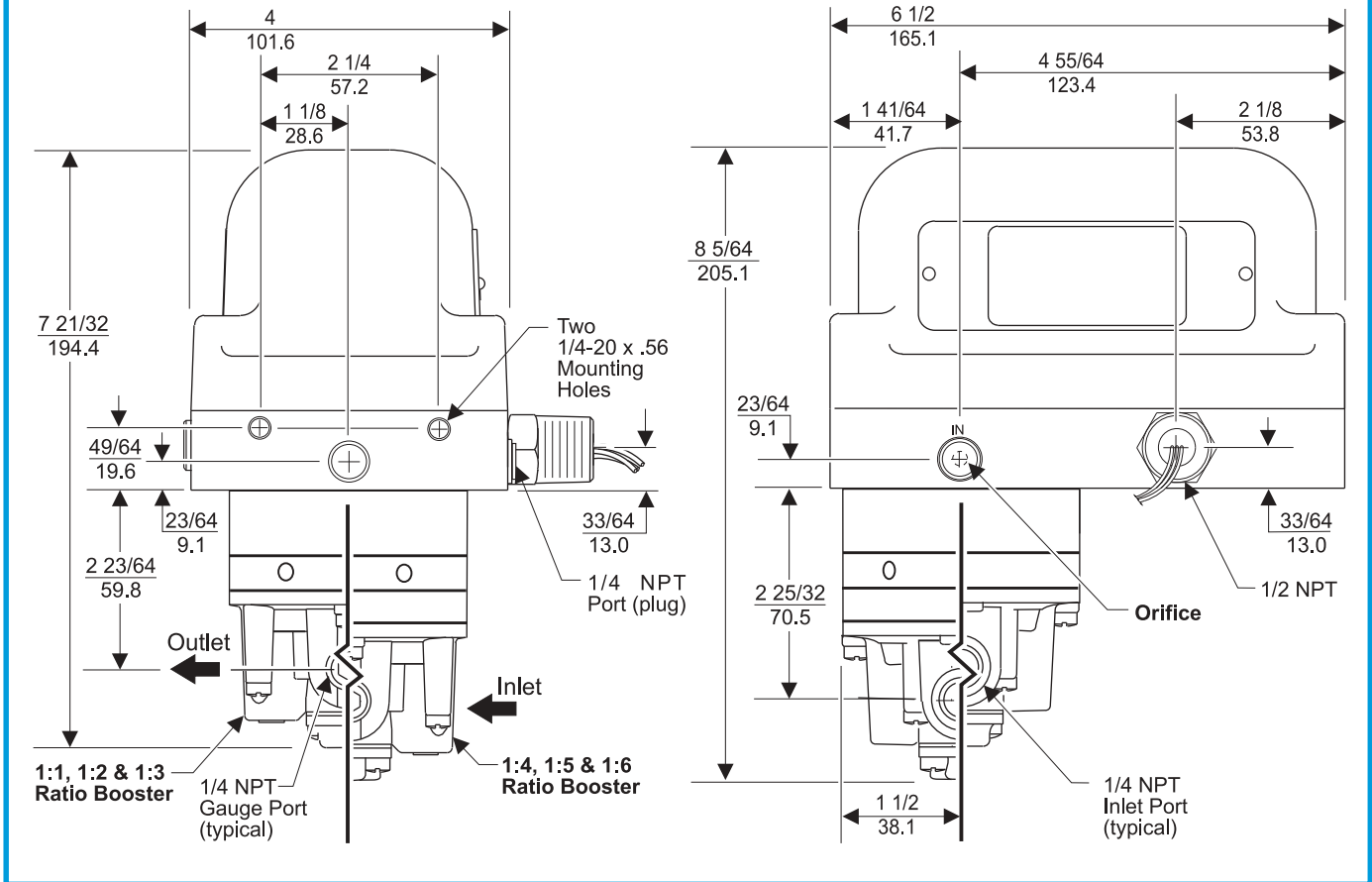


Figure 4. Explosion-Proof Outline Dimensions.

## HAZARDOUS AREA SPECIFICATIONS

### FM (Factory Mutual) Approvals:

#### Explosion-Proof: (TFXPD5220)

Class I, Division 1, Groups B, C and D;  
Class II, Division 1, Groups E, F, and G;  
Maximum Ambient 65° C.

#### (TFXPDI5220)

Class I, Division 1, Groups A, B, C, and D;  
Class II, Division 1, Groups E, F, and G;  
Class III, Division 1, Fibers;  
NEMA 3R Enclosure. **(Upright Position Only)**

### FM (Factory Mutual) Approvals:

#### Intrinsically Safe: (TFN5220)

NEMA 4X Enclosure.

#### (TFI5220)

Class I, Division 1, Groups A, B, C, and D;  
Class II, Division 1, Groups E, F, and G;  
Class III, Division 1, Fibers;  
NEMA 3R Enclosure. **(Upright Position Only)**

#### Entity Parameters

Voc<sup>1</sup> = 40 VDC  
Isc<sup>2</sup> = 125 mA

Ca<sup>3</sup> = 0 μF  
La<sup>4</sup> = 0 mH

<sup>1</sup> Voc = Open Circuit Voltage

<sup>2</sup> Isc = Short Circuit Current

<sup>3</sup> Ca = External Capacitance

<sup>4</sup> La = External Inductance



## MOUNTING KIT

### Mounting Kit EA-14140

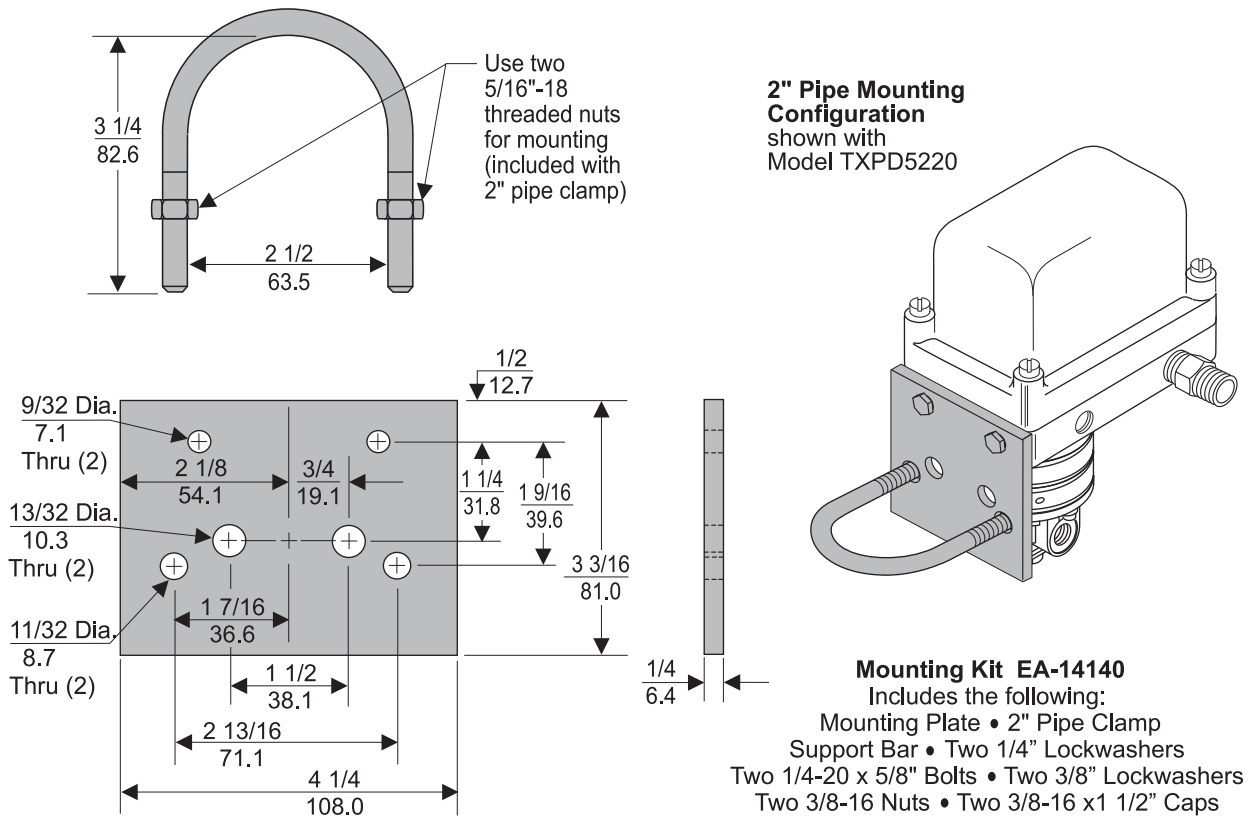


Figure 5. Mounting Kit EA-14140. (Sold Separately)

## HAZARDOUS AREA SPECIFICATIONS

### CSA Approval (continued)

#### Intrinsically Safe:

#### (TCI5220)

Class I, Division 1, Groups A, B, C, and D;  
Class II, Division 1, Groups E, F, and G;  
Type 3 Enclosure;  
Rated 1-5 mA, 4-20 mA, 10-50 mA, 1-5 VDC,  
1-9 VDC;  
Temperature Code T4A.

Approvals are valid when connected through a Shunt Zener Diode Safety Barrier meeting the following parametric requirements:

Rated: 28V Maximum 300 Ohm Minimum

## INSTALLATION

For Installation Instructions refer to the Fairchild T5220 Series Electro-Pneumatic Transducer IOM, IS-500T5220.

## CROSS SECTION

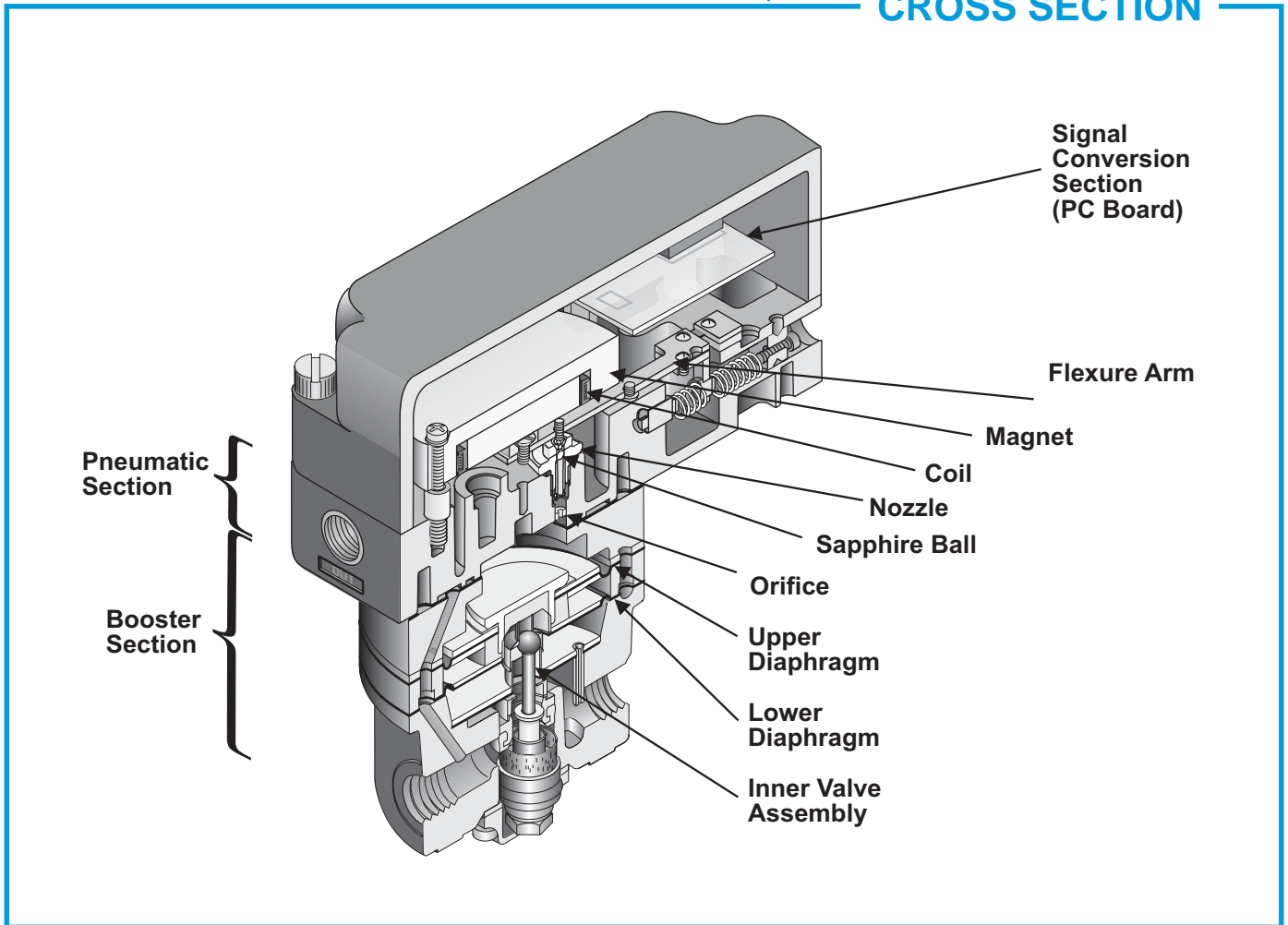


Figure 6. Model T5220 Detail Drawing.

## OPERATING PRINCIPLES

The T5220 Transducer is an electro-pneumatic device that converts a DC current or voltage input signal to a proportional pneumatic output. This device is made up of two sections, the Signal Conversion Section and the Pneumatic Section.

The Signal Conversion Section (PC Board) accepts a DC current or voltage. This signal current is applied to a coil which creates a magnetic force that moves a Flexure Arm.

The Pneumatic Section operates as a force balance system. A Sapphire Ball floats inside a Nozzle

and controls the output pressure by exhausting air supplied through an Orifice. This Sapphire Ball acts as a piston exerting a force which is balanced against the force transferred to the Flexure Arm by the Coil.

The Booster Section amplifies the output pressure of the transducer. At set point, the force due to transducer output pressure acting on the top of the Upper Diaphragm is balanced by the force due to booster output pressure acting on the underside of the Lower Diaphragm. For more information, see Figure 6. "Model T5220 Detail Drawing" above.



## TYPICAL APPLICATIONS

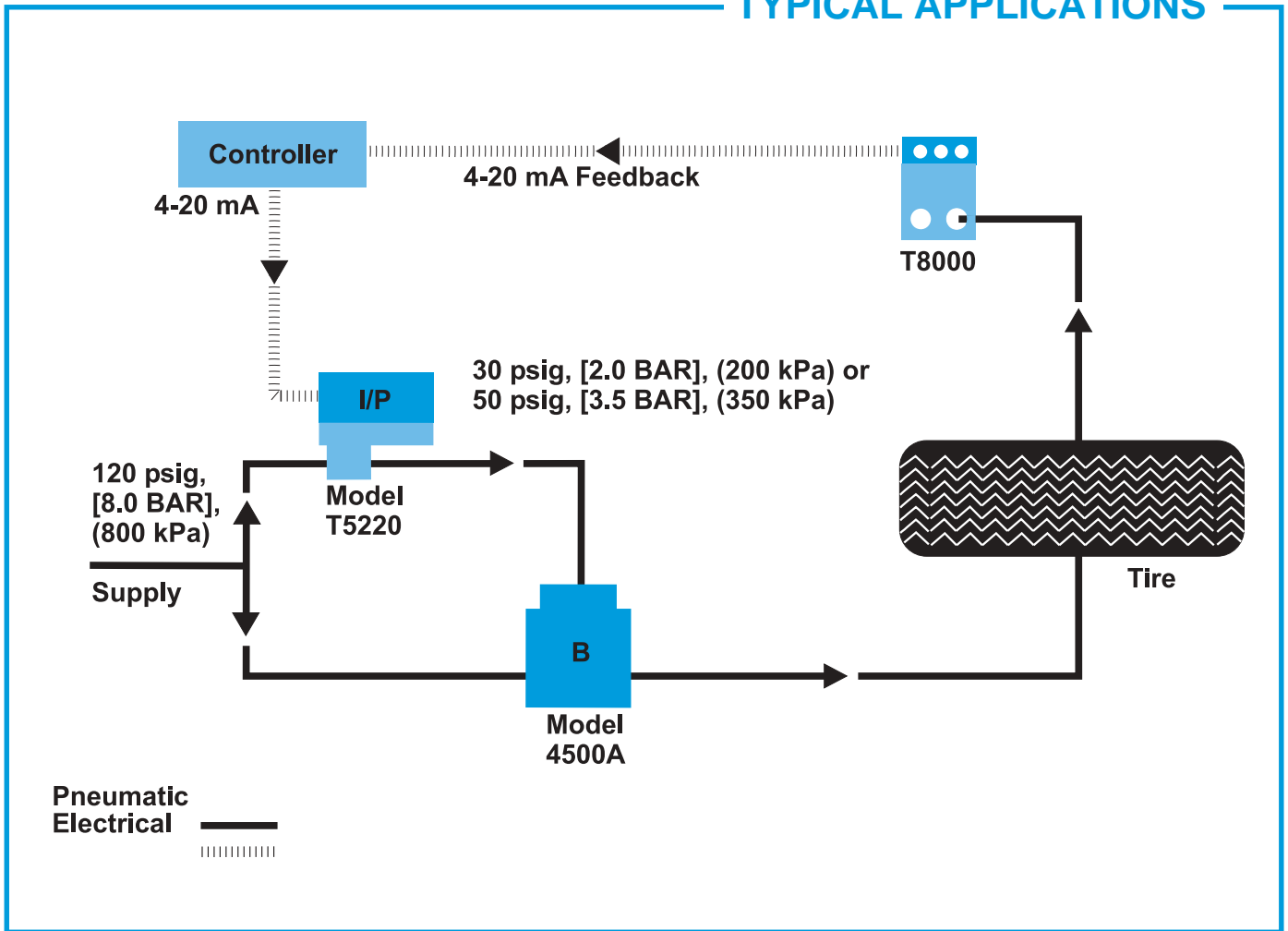


Figure 7. Inflation and Test Pressure Application for the Model T5220 Series.

## TYPICAL APPLICATIONS

This application of the T5220 Series controls the inflation pressure and test pressure of a tire in a testing machine. An electronic controller provides a 4-20 mA signal to a T5224-4 transducer.

The output of this transducer is used as the signal to a Model 4516 booster, which provides 50 psig, [3.5 BAR], (350 kPa) to set the tire on the bead and then reduces the pressure to 30 psig, [2.0 BAR],

(200 kPa), where it is accurately controlled during the testing of the tire.

A T8000 P/I measures the pressure in the tire during testing and provides a 4-20 mA feedback signal to the controller for closed loop control. For more information, see Figure 7. "Inflation and Test Pressure Application for the Model T5220 Series." above.



# — ORDERING INFORMATION —

**Catalog Number** T     522

**Underwriting Group** \_\_\_\_\_  
 Factory Mutual (F)  
 Canadian Standard (C)

**Approval Class** \_\_\_\_\_  
 Explosion-Proof <sup>1</sup> (XPD)  
 NEMA 4X/IP65 <sup>1</sup> (N)  
 None (leave blank) ( )

Intrinsically Safe <sup>2</sup> (I)  
 None (leave blank) ( )

**Options** \_\_\_\_\_  
 Negative Bias- 3 psig, (B)  
 [0.2 BAR], (20 kPa)  
 High Option <sup>3</sup> (HI)

**Booster Ratio** <sup>4</sup> \_\_\_\_\_  
 1:1 (Standard) (0)  
 1:2 (2)  
 1:3 (3)  
 1:4 (4)  
 1:5 (5)  
 1:6 (6)

**Input** \_\_\_\_\_  
 1-5 mA (1)  
 4-20 mA (4)  
 10-50 mA <sup>5</sup>  
 1-5 VDC (5)  
 0-6 VDC <sup>6</sup> (6)  
 0-12 VDC <sup>6</sup> (8)  
 1-9 VDC (9)

**Output** \_\_\_\_\_  
 psig (0)  
 [BAR] (1)  
 (kPa) (2)

**Option** \_\_\_\_\_  
 Tapped Exhaust - 1:1, 1:2, or 1:3 Ratios Only. (E)

**Table 1. Output Pressure Ranges**

Ratio	Standard Output			Negative Bias Output (B) Option		
	psig	[BAR]	(kPa)	psig	[BAR]	(kPa)
1:1 <sup>1</sup>	3-15	[0.2-1.0]	(20-100)	0-12	[0-0.8]	(0-80)
1:2 <sup>2</sup>	6-30	[0.3-2.0]	(30-200)	0-24	[0-1.5]	(0-150)
1:3 <sup>2</sup>	9-45	[0.6-3.0]	(60-300)	0-36	[0-2.5]	(0-250)
1:4 <sup>2</sup>	12-60	[0.9-4.0]	(90-400)	0-48	[0-3.0]	(0-300)
1:5 <sup>2</sup>	15-75	[1.0-5.0]	(100-500)	0-60	[0-4.0]	(0-400)
1:6 <sup>2</sup>	18-90	[1.2-6.0]	(120-600)	0-72	[0-5.0]	(0-500)

<sup>1</sup> Standard unit is configured for common supply to transducer and booster.

<sup>2</sup> Units require 20 psig, [1.5 BAR], (150 kPa) for transducer and a separate supply for booster. A common supply of up to 110 psig, [7.7 BAR], (770 kPa) can be used provided the prefix Z147 is added to the original order, & the supply pressure is noted.

- <sup>1</sup> Factory Mutual Approval Only.
- <sup>2</sup> Intrinsically Safe Units cannot be set for Reverse Acting Mode in field.
- <sup>3</sup> If high flow (SCFM) is required for the standard 1:1 ratio, select HI Option.
- <sup>4</sup> Refer to Table 1. for Pressure Ranges.
- <sup>5</sup> Units shipped calibrated 4-20 mA; 10-50 mA units must be calibrated in field.
- <sup>6</sup> Not approved for intrinsically safe ratings.



ISO 9001:2000  
 FM NO. 25571

[www.fairchildproducts.com](http://www.fairchildproducts.com)

CS-500T5220  
 Litho in USA  
 Rev. AA 9/03