Features

- The T7800 Series Transducers provide maximum versatility for precision applications.
- Field Reversible Feature provides output that is inversely proportional to input signal.
- RFI/EMI Protection eliminates susceptibility to electromagnetic and radio interference.
- Internal Electronic Feedback and solid state controlled Piezoelectric Actuator provide precise control of output pressure regardless of vibration or position.
- Damping Adjustment for optimum tuning response.
- Split range operation lets a common signal source control two or more functions.
- Compact size for use in restricted spaces.
- Two temperature range versions available.
- Various mounting configurations allow installation flexibility for most applications.
- NEMA 4X, Type 4 Enclosure and IP65 rated for indoor and outdoor installations.
- Canadian Registration Numbers (CRN) certification for all territories and provinces.

Operating Principles

STANDARD RANGE

The Model T7800 Series converts a DC input signal to a linear proportional pneumatic output. It includes the Primary Converting Section and the pneumatic Relay Section. The Piezoelectric Ceramic Actuator, in the Primary Converting Section, functions as a Flapper. The Flapper and Nozzle work together to control the signal pressure. The signal pressure that sets the output pressure acts on the Upper Control Diaphragm in the Pneumatic Relay Section. The Lower Control Diaphragm in the Pneumatic Relay Section senses the output pressure.

EXTENDED RANGE

In the Extended Range units, an additional Relay Section amplifies the output pressure.
Model TR7800 for use with TR Manifold Rack Kit. TR7800 unit same as TT7800 except terminal block is located on rear.
## Standard Range Specifications

<table>
<thead>
<tr>
<th>psig [BAR] (kPa)</th>
<th>3 [0.2] (20)</th>
<th>9 [0.6] (60)</th>
<th>15 [1.0] (100)</th>
<th>30 [2.0] (200)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Air Consumption All Ranges SCFH</td>
<td>3.5 (.10 m³/HR)</td>
<td>7.0 (.20 m³/HR)</td>
<td>9.5 (.27 m³/HR)</td>
<td>13.5 (.38 m³/HR)</td>
</tr>
<tr>
<td>Flow Rate (SCFM)</td>
<td>2.5 (4.25 m³/HR) @ 25 psig [1.7 BAR], (170 kPa) supply &amp; 9 psig [0.6 BAR], (60 kPa) Output</td>
<td>OR</td>
<td>9.0 (15.3 m³/HR) @ 120 psig [8.0 BAR], (800 kPa) supply &amp; 9 psig [0.6 BAR], (60 kPa) Output</td>
<td></td>
</tr>
<tr>
<td>Temperature Range Operating Storage</td>
<td>40°F to + 160°F (40°C to + 71.2°C)</td>
<td>-40°F to + 180°F (-40°C to + 82.2°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Span/Zero Adjustments</td>
<td>Screwdriver adjustments located on front of unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required Operating Voltages</td>
<td>Two Wire Current Input 7.2 VDC @ 20 mA (4-20 mA signal)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Voltages</td>
<td>Three Wire Voltage Input 7.2-30 VDC, less than 3 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal Impedance</td>
<td>Three Wire Voltage Input 10 Kilohms</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## OUTPUT RANGE

<table>
<thead>
<tr>
<th>psig [BAR] (kPa)</th>
<th>3-15 [0.2-1.0] (20-100)</th>
<th>3-27 [0.2-1.8] (20-180)</th>
<th>6-30 [0.4-2.0] (40-200)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Range</td>
<td>4-20 mA DC, 0-10 VDC, 1-9 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Pressure¹</td>
<td>20-120 [1.5-8.0] (150-900)</td>
<td>32-120 [2.2-8.0] (220-900)</td>
<td>35-120 [2.4-8.0] (240-900)</td>
</tr>
<tr>
<td>Minimum Span</td>
<td>5 [0.35] (35)</td>
<td>10 [0.7] (70)</td>
<td>10 [0.7] (70)</td>
</tr>
<tr>
<td>Frequency Response</td>
<td>-3 db @ 5 Hz per ISA S26.4.3.1 load configuration A.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy (ISA S51.1)</td>
<td>0.25% Full Scale Guaranteed</td>
<td>0.15% Full Scale Typical</td>
<td></td>
</tr>
<tr>
<td>Hysteresis (ISA S51.1)</td>
<td>0.1% Full Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deadband</td>
<td>0.02% Full Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability (ISA S51.1)</td>
<td>0.1% Full Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position Effect</td>
<td>No Measurable Effect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration Effect</td>
<td>Less than +1% of Span under the following conditions: 5-15 Hz @ 0.8 inches constant displacement 15-500 Hz @ 10 Gs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse Polarity Protection</td>
<td>No damage occurs from reversal of normal supply current (4-20 mA) or from misapplication of up to 60 mA.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RF/EMI Effect</td>
<td>Less than 0.5% of span @ 30 ft/m class 3 Band ADC (20-1000 mlz) per GAMA PMC 33.1 1978 and less than 0.5% of Span @ 10 ft/m level, to 2 GHz Band per EN 61000-4-3 1998+A1 EMC Directive 89/336/EEC European Norms EN 61326</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Pressure Effect</td>
<td>No Measurable Effect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Effect</td>
<td>[+0.6% + 0.01% / °F Temperature Change] of Span typical</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Supply Pressure must be no less than 5 psig [0.35 BAR], (35 kPa), above maximum output
## Extended Range Specifications

<table>
<thead>
<tr>
<th></th>
<th>0-30 psig SCFH</th>
<th>0-60 psig SCFH</th>
<th>0-120 psig SCFH</th>
<th>SET POINT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum Air Consumption</strong></td>
<td>3.1 (0.09 m³/HR)</td>
<td>7.8 (0.22 m³/HR)</td>
<td>11.8 (0.33 m³/HR)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.6 (0.4 m³/HR)</td>
<td>4.7 (0.13 m³/HR)</td>
<td>7.8 (0.22 m³/HR)</td>
<td>13.3 (0.37 m³/HR)</td>
</tr>
<tr>
<td></td>
<td>0.5 (0.01 m³/HR)</td>
<td>3.8 (0.11 m³/HR)</td>
<td>7.6 (0.21 m³/HR)</td>
<td>15.1 (0.42 m³/HR)</td>
</tr>
</tbody>
</table>

**Flow Rate (SCFM)**: 11.0 (18.7 m³/HR) @ 150 psig, [10 BAR], (1000 kPa) supply & mid scale output.

**Temperature Range**
- Operating Temperature: -40°F to +160°F, (-40°C to +71°C)
- Storage Temperature: -40°F to +180°F, (-40°C to +82°C)

**Span/Zero Adjustments**: Screwdriver adjustments located on front of unit.

**Required Operating Voltages**
- Two Wire Current Input: 7.2 VDC @ 20 mA (4-20 mA signal)
- Three Wire Voltage Input: 7.2 - 30 VDC, less than 3 mA

**Signal Impedance**: Three Wire Voltage Input, 10 Kilohms

## OUTPUT RANGE

<table>
<thead>
<tr>
<th></th>
<th>0-30 [0-2.0] (0-200)</th>
<th>0-60 [0-4.0] (0-400)</th>
<th>0-120 [0-8.0] (0-800)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Range</strong></td>
<td>4-20 mA DC, 0-10 VDC, 1-9 VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Supply Pressure</strong></td>
<td>35-150 (24-100)</td>
<td>65-150 (480-1000)</td>
<td>125-150 (880-1000)</td>
</tr>
<tr>
<td></td>
<td>[2.4-10] (240-1000)</td>
<td>[4.6-10] (480-1000)</td>
<td>[8.8-10] (880-1000)</td>
</tr>
<tr>
<td><strong>Minimum Span</strong></td>
<td>12.5 [0.85] (85)</td>
<td>25 [1.5] (150)</td>
<td>50 [3.0] (300)</td>
</tr>
</tbody>
</table>

**Frequency Response**: -3 db @ 2 Hz per ISA S26.4.3.1 load configuration A.

**Accuracy (ISA S51.1)**
- 0.25% Full Scale Guaranteed
- 0.15% Full Scale Typical

**Hysteresis (ISA S51.1)**
- 0.25% Full Scale

**Deadband**
- 0.02% Full Scale

**Repeatability (ISA S51.1)**
- 0.1% Full Scale

**Position Effect**: 0.125% @ 90° & 0.25% @ 180°

**Vibration Effect**: Less than +1% of Span under the following conditions: 5-15 Hz @ 0.8 inches constant displacement 15-500 Hz @ 10 g.

**Reverse Polarity Protection**: No damage occurs from reversal of normal supply current (4-20 mA) or from misapplication of up to 60 mA.

**RFI/EMI Effect**: Less than 0.5% of span @ 30 y/m class 3 Band ABC (20-1000 mHz) per SAMA PMC 33.1 1978 and less than 0.5% of Span @ 10 y/m level to 2 GHz Band per EN 61000-4-3:1998 +A1 EMC Directive 89/336/EEC European Norms EN 61326

**Supply Pressure Effect**: < 0.1 psig change for 10 psig supply change

**Temperature Effect**: +0.5% +0.06% / °F Temperature Change of span typical

**Materials of Construction**
- Body and Housing: Chromate Treated Aluminum
- Orifice: Nickel Plated Brass & Sapphire
- Triax: Stainless Steel, Brass & Zinc Plated Steel
- Elastomers: Nitrile
- Finish: Epoxy Powder Coating

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1. Supply Pressure must be no less than 5 psig, [0.35 BAR], (35 kPa), above maximum output.
## Hazardous Area Specifications

<table>
<thead>
<tr>
<th>Factory Mutual (FM) Approvals</th>
<th>Division 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Entity Parameters</strong></td>
<td><strong>TDF7800, TAF7800</strong></td>
</tr>
</tbody>
</table>
| Vmax = 30 VDC | Class I, Division 1, Groups C and D;  
| Imax = 200 mA | Class II, Division 1, Groups E, F, G;  
| CI = Capacitance | Class III, Division 1, Fibers;  
| LI = Inductance | NEMA 4X Enclosure;  
| Temperature Code T5 (-40 °C to +66 °C) | T6 (-40 °C to +40 °C) |

<table>
<thead>
<tr>
<th><strong>Non-Incendive Field Wiring Parameters</strong></th>
<th><strong>TDF7800, TAF7800</strong></th>
</tr>
</thead>
</table>
| Vmax = 30 VDC | Class I, Division 1, Groups C and D;  
| Imax = 200 mA | Class II, Division 1, Groups E, F and G;  
| CI = Capacitance | Class III, Division 1, Fibers;  
| LI = Inductance | NEMA 4X Enclosure;  
| Temperature Code T5 (-40 °C to +66 °C) | T6 (-40 °C to +40 °C) |

<table>
<thead>
<tr>
<th><strong>Canadian Standards Association (CSA) Approvals</strong></th>
<th><strong>TDF7800, TAF7800</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Type 1:</strong> Single Channel Polarized</td>
<td><strong>TTF7800, TRF7800</strong></td>
</tr>
</tbody>
</table>
| TTC7800, TRC7800 | Class I, Division 1, Groups C and D;  
| I = 40 mA, 30 Ohm Min. | Temperature Code T5 (-40 °C to +66 °C)  
| **System Type 2:** Dual Channel Polarized | T4A (Ta -40 °C to +66 °C) |
| TCF7800, TCF7800 | Rated 4-20 mA, 30 VDC maximum;  
| Omh Min. and 10V | Temperature Code T6 (Ta -40 °C to +66 °C)  
| **System Type 3:** Dual Channel Polarized | T4A (Ta -40 °C to +66 °C) |
| TCF7800, TCF7800 | Rated 28.5V Max. 300 Ohm Min.  
| 28.5V Max. 300 Ohm Min. and 28V Diodo | Return per channel |
| TCF7800, TCF7800 | Type 4 Enclosure;  
| **ATEX Approvals** | **TDF7800, TTF7800** |
| Transducer Parameters | Class I, Division 2, Groups A, B, C and D;  
| Umax = 38 V | Rated 4-20 mA, 30 VDC maximum;  
| I = 100 mA | Temperature Code T6 (Ta +66 °C)  
| PI = Power | T4A (Ta -40 °C to +66 °C) |
| CI = Capacitance | T4A (Ta -40 °C to +66 °C) |
| LI = Inductance | T4A (Ta -40 °C to +66 °C) |

<table>
<thead>
<tr>
<th>IECEx Approvals</th>
<th><strong>TAE7800, TDE7800</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transducer Parameters</strong></td>
<td><strong>TAE7800, TDE7800</strong></td>
</tr>
</tbody>
</table>
| U = 28 V | Ex ib IIB, T4, Gb  
| I = 100 mA | Ta = -40 °C to +64 °C  
| PI = Power | Ex ib IIB T135°C Db  
| CI = Capacitance | Ta = -40 °C to +55 °C  
| LI = Inductance | IP65 Enclosure |

| TAE7800, TDE7800 | Ex ib IIB, T4, Gb  
| I = 100 mA | Ta = -40 °C to +64 °C  
| PI = Power | Ex ib IIB T135°C Db  
| CI = Capacitance | Ta = -40 °C to +55 °C  
| LI = Inductance | IP65 Enclosure |

**Manufacturers: Fairchild**

**www.fairchildproducts.com**
Model T7800 Electro-Pneumatic I/P, E/P Transducer

Mounting Kits

Catalog Information

Electrical Connections
- 1/2 NPT Conduit
- Fitting with Pigtail
- DIN43650 Connection
- Rack Mount
- Terminal Block

Underwriting Group
- Canadian Standards
- ATEX
- Factory Mutual
- None (leave blank)

Approval Class
- Intrinsically Safe
- Non-Incendive (Division 2)
- None (leave blank)

Temperature Range
- -10°F to +180°F

Input
- 4-20 mA
- 1-5 VDC
- 0-5 VDC
- 1-9 VDC
- 0-10 VDC

Output
- 3-15 psig
- 3-27 psig
- 6-30 psig
- 0-30 psig
- 0-60 psig
- 0-120 psig
- 0-2-1.0 BAR
- 0-2-1.8 BAR
- 0-4-2.0 BAR
- 0-8-2.0 BAR
- 0-4-0 BAR
- 0-8-0 BAR
- (20-100 kPa)
- (20-180 kPa)
- (40-200 kPa)
- (0-200 kPa)
- (0-400 kPa)
- (0-800 kPa)

Options
- BSPT Thread

Model T7800 Transducer Kits & Accessories

Mounting Kits
- 16799-1 (included with unit)
- 16893 (included with unit)
- 19254-1 (sold separately)

Installation

For installation instructions, refer to the Fairchild T7800 Standard Range Electro-Pneumatic Transducer Installation, Operation and Maintenance Instructions, IS-5077800S and IS-5077800E.

Optional manifolds are available to mount 3, 5, 10 or 15 transducers. An optional rack kit is available to mount 10 transducers in a standard 19" rack. For more information, see the Fairchild Manifold and Rack Kit, CS-4000MRKT.