WRA302 Compact High Precision Regulator

Features
- Control sensitivity of .250" (.63 cm) water column variation allows use in precision applications.
- A compensating diaphragm lets the regulator remain unaffected by supply pressure changes.
- Flow of up to 40 SCFM with 100 PSIG supply allows use in applications with high flow requirements.
- An aspirator tube compensates downstream pressure droop under flow conditions.
- A separate Control Chamber isolates the diaphragm from the main flow to eliminate hunting and buzzing.
- Unit construction lets you service the Regulator without removing it from the line.

The WRA302 Regulator is designed for applications that require high capacity and accurate process control in a small package. A poppet valve which is balanced by utilizing a convoluted diaphragm, insures a constant output pressure even during wide supply pressure variations. Stability of regulated pressure is maintained under varying flow conditions through the use of an aspirator tube which adjusts the air supply in accordance with the flow velocity.

Ordering Information

<table>
<thead>
<tr>
<th>WRA302</th>
<th>4</th>
<th>2</th>
</tr>
</thead>
</table>

- Springs
  - 3 0.5 to 30 PSIG
  - 4 1 to 60 PSIG
  - 5 2 to 100 PSIG
- Options
  - Blank No Options
  - H BSPP
  - N Non-Relieving
- Pipe Size
  - 2 1/4" NPT

Note: Other Spring Ranges, Port Sizes, and Options Available. Please Consult Factory

BOLD ITEMS ARE MOST POPULAR.
**Technical Information**

### Flow Characteristics

**Model WRA302**

2–100 PSIG (13.8–690 kPa) Range

![Flow Characteristics Graph]

### Operating Principles

The WRA302 Regulator uses the force balance principal to control the movement of the valve assembly which in turn controls the output pressure. When the regulator is adjusted for a specific set point, the downward force of the Positive Bias Spring causes the Diaphragm Assembly to move downward. The Supply Valve opens and allows air to pass to the Outlet Port. As the set point is reached, the downward force exerted by the Positive Bias spring is balanced by the upward force of the downstream pressure acting on the bottom of the Diaphragm Assembly. The resultant force moves the supply Valve upward to reduce the flow of air to the Outlet Port.

Outlet pressure is maintained as a result of balance between forces acting on the top and bottom of the Diaphragm Assembly.

### Specifications

- **Supply Pressure:** 250 PSIG, (17.0 bar), (1700 kPa) Maximum
- **Flow Capacity:** 40 SCFM (68 m³/HR) @ 100 PSIG, (7.0 bar), (700 kPa) Supply and 20 PSIG, (1.5 bar), (150 kPa) Setpoint
- **Exhaust Capacity:** 2.0 SCFM (3.4 m³/HR) where Downstream Pressure is 5 PSIG, (.35 bar), (35 kPa) above 20 PSIG, (1.5 bar), (150 kPa) Setpoint

### Supply Pressure Effect

- Less than 0.2 PSIG, (.014 bar), (.14 kPa) for 100 PSIG, (7.0 bar), (700 kPa) change in Supply Pressure

### Sensitivity

- 0.25° (.010 PSIG) (.64 cm) Water Column

### Ambient Temperature

- -40°F to +200°F, (-40°C to 93°C)

### Hazardous Locations

- Acceptable for use in Zones 1 and 2 for Gas Atmosphere:
  - Groups IIA and IIB
- Acceptable for use in Zones 21 and 22 for Dust Atmospheres

### Materials of Construction

- **Body and Housing:** Aluminum
- **Diaphragms:** Nitrile on Dacron
- **Trim:** Brass

---

**WRA302 Kits and Accessories**

**Service Kits**
- 1/2 to 30, 1 to 60, & 2 to 100 PSIG, Nitrile, Standard: PS16116-13
- 1/2 to 30, 1 to 60, & 2 to 100 PSIG, Nitrile, Non-relieving: PS16116-14

**Tamper Resistant Kit:** PS12163

**Mounting Bracket Kit:** PS417B
WRA102 Standard High Precision Regulator

Features

- Control sensitivity of .125" (.32 cm) water column allows use in precision processes.
- Pressure balanced supply valve prevents supply pressure changes from affecting the setpoint.
- Optional check valve permits dumping of downstream pressure when supply is opened to atmosphere.
- Separate control chamber isolates the diaphragm from the main flow to eliminate hunting and buzzing.
- An aspirator tube compensates downstream pressure droop under flow conditions.

The WRA102 Regulator is designed for applications that require high capacity and accurate process control. A poppet valve which is balanced by utilizing a rolling diaphragm, insures a constant output pressure even during wide supply pressure variations. Stability of regulated pressure is maintained under varying flow conditions through the use of an aspirator tube which adjusts the air supply in accordance with the flow velocity.

WARNING

Product rupture can cause serious injury. Do not connect regulator to bottled gas. Do not exceed maximum primary pressure rating.

Ordering Information

WRA102 6 2

Springs

<table>
<thead>
<tr>
<th>Springs</th>
<th>Pressure Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.5 to 30 PSIG</td>
</tr>
<tr>
<td>4</td>
<td>1 to 60 PSIG</td>
</tr>
<tr>
<td>6</td>
<td>2 to 150 PSIG</td>
</tr>
</tbody>
</table>

Pipe Size

| Pipe Size | 2 1/4" NPT |

Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank</td>
<td>No Options</td>
</tr>
<tr>
<td>H</td>
<td>BSPP</td>
</tr>
<tr>
<td>N</td>
<td>Non-Relieving</td>
</tr>
</tbody>
</table>

Note: Other Spring Ranges, Port Sizes, and Options Available. Please Consult Factory

BOLD ITEMS ARE MOST POPULAR.
Technical Information

Flow Characteristics
Model WRA102

Operating Principles
The WRA102 Series regulator use the force balance principal to control the movement of the Valve Assembly that controls the output pressure. When the regulator is adjusted for a specific set point, the downward force of the Positive Bias Spring moves the Diaphragm Assembly downward. The Supply Valve opens and allows air to pass to the Outlet Port. As the set point is reached, the downward force exerted by the Positive Bias Spring is balanced by the force of the downstream pressure that acts on the Diaphragm Assembly. The resultant force moves the Supply Valve upward to reduce the flow of air to the Outlet Port.

Outlet pressure is maintained as a result of balance between forces acting on the top and bottom of the Diaphragm Assembly.

Specifications
Supply Pressure ............. 500 PSIG, (35.0 bar), (3500 kPa) Maximum
Flow Capacity –
40 SCFM (68 m³/HR) @ 100 PSIG, (7.0 bar), (700 kPa) Supply and 20 PSIG, (1.5 bar), (150 kPa) Setpoint
Exhaust Capacity –
5.5 SCFM (9.35 m /HR) where Downstream Pressure is 5 PSIG, (.35 bar), (35 kPa) above 20 PSIG, (1.5 bar), (150 kPa) Setpoint
Supply Pressure Effect –
Less than 0.1 PSIG, (.007 bar), (.7 kPa) for 100 PSIG, (7.0 bar), (700 kPa) change in Supply Pressure
Sensitivity....................... .125" (.005 PSIG) (.32 cm) Water Column
Ambient Temperature .................-40°F to +200°F, (-40°C to 93°C)
Hazardous Locations –
Acceptable for use in Zones 1 and 2 for Gas Atmosphere:
Groups IIA and IIB and Zones 21 and 22 for Dust Atmospheres

Materials of Construction
Body and Housing ......................... Aluminum
Diaphragms.......................... Buna N on Dacron (Standard Unit Only)
Trim.................................. Brass, Zinc Plated Steel
WRA102BP High Precision Relief Valve

Features

- Control sensitivity of 0.125" (.32 cm) water column allows use in precision applications.
- A separate Control Chamber and Aspirator Tube isolate the diaphragm from the main flow to eliminate hunting and buzzing.
- Unit construction lets you service the WRA102BP without removing it from the line.
- Mounting Bracket is available.

The WRA102BP is a high capacity relief valve that relieves excess pressure in a pneumatic system.

The WRA102BP provides greater accuracy than standard relief valves over a narrow pressure range. The WRA102BP is an excellent choice for a wide range of precision applications.

Note: Other Spring Ranges, Port Sizes, and Options Available. Please Consult Factory

BOLD ITEMS ARE MOST POPULAR.

WARNING

Product rupture can cause serious injury.
Do not connect regulator to bottled gas.
Do not exceed maximum primary pressure rating.

Ordering Information

<table>
<thead>
<tr>
<th>WRA102</th>
<th>6</th>
<th>2</th>
<th>BP</th>
</tr>
</thead>
</table>

Springs

- 0.5 to 30 PSIG
- 1 to 60 PSIG
- 2 to 150 PSIG

Pipe Size

- 1/4" NPT

Options

- BP Back Pressure
- Blank No Options
- H BSPP
- N Non-Relieving
Operating Principles

The WRA102BP Regulator uses the force balance principle to open the Relief Valve and vent system pressure when the set point is exceeded.

Downstream pressure is transmitted through the Aspirator Tube to the bottom of the Diaphragm Assembly. When you adjust the range screw for a specific set point, the Positive Bias Spring compresses and exerts a force on the top of the Diaphragm Assembly. As long as the pressure acting on the bottom of the Diaphragm Assembly produces a force less than the spring force acting on the top of the Diaphragm Assembly, the Relief Valve remains closed. When system pressure increases, the force on the bottom of the Diaphragm Assembly increases until it reaches the set point. When system pressure increases beyond the set point, the assembly moves upward, lifting the Relief Valve from its seat and vents the downstream air.

If downstream pressure decreases below the set point, the assembly moves downward closing the Relief Valve.
WRA171 High Precision Vacuum Regulator

Features
- Control sensitivity of .125" (.32 cm) water column allows use in precision applications.
- Balanced supply valve minimizes effects of vacuum variation.
- Aspirator tube compensates for downstream pressure droop under flow conditions.
- Separate control chamber isolates the diaphragm from the main flow to eliminate hunting and buzzing.
- Construction allows servicing without removing from the line.

The WRA171 is a high accuracy vacuum regulator that provides uniform vacuum regulation independent of vacuum supply changes and flow demand.

This unit has a diaphragm assembly with three springs to provide a more balanced loading of the diaphragm.

Ordering Information

WRA171 3 2 N N K N

Springs 3 0 to 30 Hg
Pipe Size 2 1/4" NPT
Thread Type N NPT
Options N Nitrile
Options K Knob Assembly
Options N Non-Relieving

Note: Other Spring Ranges, Port Sizes, and Options Available. Please Consult Factory

BOLD ITEMS ARE MOST POPULAR.
Technical Information

Specifications

- Vacuum Supply (Max): 29.92 Hg (760 torr)
- Flow Capacity: 3 SCFM @ 650 torr Supply, 250 torr Setpoint
- Sensitivity: 0.125” (.005 PSIG) (.32 cm) Water Column
- Ambient Temperature: -40°F to +200°F, (-40°C to +93°C)
- Vacuum Supply Effect: Less than 1 torr for 100 torr (.04 Hg for 3.94 Hg) Change in Vacuum Supply

Materials of Construction

- Body and Housing: Aluminum
- Trim: Zinc Plated Steel, Brass
- Elastomers: Nitrile

Operating Principles

The Model WRA171 Series vacuum regulator uses the force balance principle to control the movement of the Valve Assembly that controls output vacuum.

When the regulator is adjusted for a specific set point, the upward force of the Range Springs moves the Diaphragm Assembly upward. The Supply Valve opens and allows air to pass to the inlet port. As the set point is reached, the upward force exerted by the Range Springs is balanced by the force of the vacuum that pulls downward on the Diaphragm Assembly. The resultant force moves the Supply Valve downward to reduce the flow of air to the inlet port. Outlet vacuum is maintained as a result of balance between forces acting on the top and bottom of the Diaphragm Assembly.

WRA171 Kits and Accessories

- Mounting Bracket: PS09921
- Service Kits: PS20966-9
- Tamper Resistant Kit: PS20967-1
WEA632 Precision Filter / Regulator

Features
- The no-brass construction is well suited to harsh environments.
- Internal and external epoxy finish for superior corrosion resistance.
- Non-bleed design to reduce consumption.
- Integral Relief Valve.
- A Gauge Port provides convenient pressure gauge mounting.
- The standard 5-micron filter minimizes internal contamination.
- The Filter Dripwell contains a Drain Plug to easily drain trapped liquids.
- Standard Tapped Exhaust.
- Soft Relief Seat minimizes air loss.

Ordering Information

<table>
<thead>
<tr>
<th>Springs</th>
<th>Pipe Size</th>
<th>Thread Type</th>
<th>Adjustment</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 1 to 60 PSIG</td>
<td>2 1/4&quot; NPT</td>
<td>N NPT</td>
<td>S Screw (Std.)</td>
<td>Blank None</td>
</tr>
<tr>
<td>5 2 to 120 PSIG</td>
<td></td>
<td>U BSPP</td>
<td>K Knob</td>
<td>T Tamperproof</td>
</tr>
</tbody>
</table>

Note: Other Spring Ranges, Port Sizes, and Options Available. Please Consult Factory

BOLD ITEMS ARE MOST POPULAR.

WARNING
Product rupture can cause serious injury. Do not connect regulator to bottled gas. Do not exceed maximum primary pressure rating.
Operating Principles

When you turn the Adjustment Screw to a specific setpoint, the Spring exerts a downward force against the top of the Diaphragm Assembly. This downward force opens the Supply Valve. Output pressure flows through the Outlet Port and the passage to the Control Chamber where it creates an upward force on the bottom of the Diaphragm Assembly.

When the setpoint is reached, the force of the Spring that acts on the top of the Diaphragm Assembly balances with the force of output pressure that acts on the bottom of the Diaphragm Assembly and closes the Supply Valve.

When the output pressure increases above the setpoint, the Diaphragm Assembly moves upward to close the Supply Valve and open the Exhaust Valve. Output pressure flows through the Exhaust Valve and out of the Exhaust Vent on the side of the unit until it reaches the setpoint.
WBA208 Precision Pneumatic Input Signal Amplifier

Features
- The WBA208 uses a pneumatic input signal to accurately control output pressure based on a predetermined ratio.
- A balanced Supply Valve minimizes the effects of supply pressure variation.
- An Aspirator Tube compensates downstream pressure droop under flowing conditions.
- Optional Adjustable By-Pass Needle Valve allows tuning for optimum dynamic response (1:1 ratio only).
- Optional Fixed Negative Bias allows operation with pneumatic devices that cannot be adjusted to zero input pressure.
- A separate Control Chamber isolates the diaphragm from the main flow to eliminate hunting and buzzing.
- Unit construction allows servicing without removal.
- Mounting Bracket available.

Ordering Information

<table>
<thead>
<tr>
<th>WBA208</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pilot Ratio</strong></td>
<td>1:1</td>
<td>1:2</td>
</tr>
<tr>
<td><strong>Pipe Size</strong></td>
<td>2</td>
<td>1/4&quot; NPT</td>
</tr>
<tr>
<td><strong>Options</strong></td>
<td>Blank</td>
<td>No Options</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Tapped Exhaust</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>BSPP</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>By-Pass Valve</td>
</tr>
</tbody>
</table>

Note: Other Spring Ranges, Port Sizes, and Options Available. Please Consult Factory

BOLD ITEMS ARE MOST POPULAR.
Operating Principles

The WBA208 Input Signal Amplifier is a pneumatic device capable of high flow and exhaust capacity. This device uses a force balance system to control the movement of the supply and exhaust valves.

At set point, the force due to signal pressure that acts on the top of the Upper Diaphragm balances with the force due to output pressure acting on the bottom of the Lower Diaphragm.
WBA45 Precision Pneumatic Input Signal Amplifier

Features
- Five signal to output ratios meet most control element requirements.
- Control sensitivity of water column allows use in precision applications.
- Large Supply and Exhaust Valves provide high forward and exhaust flows.
- Soft Supply and Exhaust Valve seats minimize air consumption.
- A balanced Supply Valve minimizes the effect of supply pressure variation.
- An Aspirator Tube compensates downstream pressure droop under flow conditions.
- A separate Control Chamber isolates the diaphragm from the main flow to eliminate hunting and buzzing.
- Optional remote feedback port minimizes pressure drop at final control element under flow conditions.
- The optional adjustable By-pass Valve lets you tune for optimum dynamic response. (1:1 ratio only)
- Unit construction lets you service the WBA45 without removing it from the line.

Ordering Information

<table>
<thead>
<tr>
<th>Pilot Ratio</th>
<th>Pipe Size</th>
<th>Type</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:1</td>
<td>1/2” NPT</td>
<td>A 45</td>
<td>Blank No Options</td>
</tr>
<tr>
<td>1:2</td>
<td>3/4” NPT</td>
<td></td>
<td>E Tapped Exhaust</td>
</tr>
<tr>
<td>1:3</td>
<td></td>
<td></td>
<td>H BSPP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>I By-Pass Valve</td>
</tr>
</tbody>
</table>

Note: Other Spring Ranges, Port Sizes, and Options Available. Please Consult Factory

BOLD ITEMS ARE MOST POPULAR.
Operating Principles

When signal pressure on the top of the Signal Diaphragm creates a downward force on the Diaphragm Assembly, the Supply Valve opens. Output pressure flows through the Outlet Port and the Aspirator Tube to the Control Chamber to create an upward force on the bottom of the Control Diaphragm. When the setpoint is reached, the force of the signal pressure that acts on the top of the Signal Diaphragm balances with the force of the output pressure that acts on the bottom of the Control Diaphragm to close the Supply Valve.

When the output pressure increases above the signal pressure, the Diaphragm Assembly moves upward to close the Supply Valve and open the Exhaust Valve. Because the Poppet Valve is closed, pressure flows down the Connecting Tube to the bottom of the Motor Diaphragm. This pressure keeps the Supply Valve tightly closed while in the exhaust mode. The Poppet Valve opens and excess output pressure exhausts through the vent in the side of the unit until it reaches the setpoint.

Materials of Construction

Body and Housing ....................................................... Aluminum
Diaphragm .......................................................... Nitrile on Dacron Fabric
Trim .......................................................... Zinc Plated Steel, Brass

Specifications

<table>
<thead>
<tr>
<th>Ratio</th>
<th>1:1</th>
<th>1:2</th>
<th>1:3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Output Pressure, PSIG (bar)</td>
<td>150 (10.0)</td>
<td>150 (10.0)</td>
<td>150 (10.0)</td>
</tr>
<tr>
<td>Maximum Supply Pressure, PSIG (bar)</td>
<td>250 (17.0)</td>
<td>250 (17.0)</td>
<td>250 (17.0)</td>
</tr>
<tr>
<td>Flow Capacity SCFM, (m³/HR)</td>
<td>150 (255)</td>
<td>150 (255)</td>
<td>150 (255)</td>
</tr>
<tr>
<td>Exhaust Capacity SCFM, (m³/HR)</td>
<td>40 (62.5)</td>
<td>40 (62.5)</td>
<td>40 (62.5)</td>
</tr>
<tr>
<td>Downstream Pressure 5 PSIG, (.35 bar) Above 20 PSIG, (1.5 bar) Setpoint</td>
<td>1.0&quot; (2.54 cm)</td>
<td>2.0&quot; (5.08 cm)</td>
<td>3.0&quot; (7.62 cm)</td>
</tr>
<tr>
<td>Sensitivity (water column)</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>% of Output Span with 100 PSIG (7.0 bar) Input Span</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Supply Pressure Effect, PSIG (bar) for change of 100 PSIG, (7.0 bar), (700 kPa),</td>
<td>0.10 (.007)</td>
<td>0.20 (.014)</td>
<td>0.30 (.021)</td>
</tr>
<tr>
<td>Ambient Temperature, °F (°C)</td>
<td>-40 to +200 (-40 to +93)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazardous Locations</td>
<td>Acceptable for use in Zones 1 and 2 for gas atmosphere; Groups IIA and IIB and Zones 21 and 22 for dust atmospheres.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WBA45 Kits and Accessories

Service Kits
1:1 Ratio .......................................................... PS19549-1
1:1 Ratio w/ Tapped Exhaust ................................. PS19549-1E
1:3 Ratio .......................................................... PS19549-3
1:2 Ratio .......................................................... PS19549-2
1:1 w/ Tapped Exhaust, I Option ............................ PS19549-20E
Precision Regulators Application Guide

Pneumatic pressure regulators are designed to provide a constant pressure output from a fluctuating supply pressure – much the way an electronic voltage regulator works. Pressure regulators provide varying degrees of accuracy with regard to their reduced pressure output. General Purpose pressure regulators work for most fluid power applications. However, for more pressure-critical applications precision regulators can provide the customer with the control they need.

A partial listing of things that can potentially cause regulator output pressure variation are:

- Temperature changes
- Inlet pressure changes
- Variations in flow
- Excess downstream pressure
- Cycling
- Time
- Leakage

Who needs precision regulators?

**Design level applications:**
When designing a pneumatic system it is important to determine not only the air flow that the application will require but also the acceptable level of pressure variation. Some pneumatic applications cannot tolerate fluctuations in pressure. These applications can include static situations with only a steady pressure maintained, or dynamic flow situations involving any number of changing variables in play while trying to maintain a constant pressure.

**Problem solving device for existing applications:**
Sometimes an existing pneumatic application does not meet the customer’s needs with regards to pressure control and/or stability. Any or all of the variables listed above can cause issues with pressure stability. As applications are expanded, added on to, or modified the pressure and flow requirements can change.

How do precision regulators differ from general purpose pneumatic regulators?

<table>
<thead>
<tr>
<th>Examples→</th>
<th>High Precision Regulators: WRA302, WRA102, WRA102BP, WRA171</th>
<th>Precision Regulators: P12, P15 / P16, Dial Air</th>
<th>General Purpose Regulators: R18, R28, R39, R30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity: Reduced pressure repeatability/variation under no-flow condition</td>
<td>.005 to .010 PSIG (1/8” to 1/4” of water column)</td>
<td>.5 to 1 PSIG</td>
<td>2 to 4 PSIG</td>
</tr>
<tr>
<td>Regulator’s ability to control back pressure accurately: *key for cylinder applications</td>
<td>Begins to relieve at .005 to .010 PSIG overpressure</td>
<td>Begins to relieve at .5 to 2 PSIG overpressure</td>
<td>Begins to relieve at 5 to 10 PSIG overpressure</td>
</tr>
<tr>
<td>Regulator’s ability to maintain set pressure under varying flow, input pressure, temperature conditions:</td>
<td>High</td>
<td>Medium</td>
<td>Standard</td>
</tr>
<tr>
<td>Constant Bleed - does the regulator constantly bleed a small volume of air to the atmosphere to maintain stability?</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

1” Water Column = .0360 PSI
1PSI = 27.7612 Inches Water Column
# Application Chart

## Original Equipment Manufacturers (OEMs)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Gauging</td>
<td>Manufacturers of Air Gauging Equipment.</td>
</tr>
<tr>
<td>Anesthesia Equipment</td>
<td>Manufacturers</td>
</tr>
<tr>
<td>Calibration Stands</td>
<td>Similar to Test Stands</td>
</tr>
<tr>
<td>Clamping Pressure Control</td>
<td>End Effect Grippers, Roll Loading</td>
</tr>
<tr>
<td>Control Panels</td>
<td>Manufacturers and Users</td>
</tr>
<tr>
<td>Coordinate Measuring Machines</td>
<td>Manufacturers use in Force Counterbalance Applications in Z-axis</td>
</tr>
<tr>
<td>Dispensing Equipment</td>
<td>Adhesive, Paint, or any other form of Liquid or Gas</td>
</tr>
<tr>
<td>Food Process Machinery</td>
<td>Manufacturers</td>
</tr>
<tr>
<td>Gas Analyzers</td>
<td>Used for Reference and Calibration Air Pressures</td>
</tr>
<tr>
<td>Ink or Paint Robotics Spraying Systems</td>
<td>Manufacturers use to Maintain an Even Pressure on System</td>
</tr>
<tr>
<td>Leak Testing Equipment</td>
<td>Manufacturers of Equipment that Detects Leaks (i.e., Plastic Bottles)</td>
</tr>
<tr>
<td>Medical Equipment</td>
<td>Manufacturers that Utilize for Blood Processing and Sampling as Examples</td>
</tr>
<tr>
<td>Oxygen Ventilators</td>
<td>Manufacturers</td>
</tr>
<tr>
<td>Pharmaceutical Process Machinery</td>
<td>Pill or Tablet Making Machines</td>
</tr>
<tr>
<td>Phone Cable Pressurization Systems</td>
<td>Manufacturers</td>
</tr>
<tr>
<td>Polishing Machinery</td>
<td>Used to Maintain Even Pressure on Polishing Head</td>
</tr>
<tr>
<td>Semi-conductor Manufacturing Machinery</td>
<td>Manufacturers</td>
</tr>
<tr>
<td>Smoke Stack Analyzers</td>
<td>Used for Reference and Calibration Air Pressures</td>
</tr>
<tr>
<td>Soil or Environmental Analysis Equipment</td>
<td>Used for Reference and Calibration Air Pressures</td>
</tr>
<tr>
<td>Tank Blanketing</td>
<td>Maintain Pressure on Top Level of a Tank or Storage Vessel</td>
</tr>
<tr>
<td>Test Equipment</td>
<td>Similar to Test Stands</td>
</tr>
<tr>
<td>Test Stands</td>
<td>Manufacturers of Test Stands, Laboratory Test Stands, Engineering Test Stands, Production Test Stands</td>
</tr>
<tr>
<td>Tool Balancers</td>
<td>Manufacturers of Tool Balancers, Manipulators, and Articulating Arms use High Relief Capacity Precision Regulators in a Force-balancing Application. Used as part of a Pneumatic Counter-balance System, the Regulator helps suspend the tool in the air and then makes it easy to move out of the way when not in use.</td>
</tr>
</tbody>
</table>

## System Integrators

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automation Integrators</td>
<td>Anyone Involved in Designs or Projects that Automate Processes</td>
</tr>
</tbody>
</table>

## Energy Controls Systems

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC</td>
<td>Anyone who would be involved in Designs that would include Damper and Louvre Control for HVAC Applications</td>
</tr>
</tbody>
</table>

## End Users

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumentation Supervisors</td>
<td></td>
</tr>
<tr>
<td>Instrumentation Technicians</td>
<td></td>
</tr>
<tr>
<td>Project Engineers</td>
<td></td>
</tr>
<tr>
<td>Store Room Supervisors</td>
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</table>

## MRO

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Chemical</td>
<td></td>
</tr>
<tr>
<td>Petrochemical</td>
<td></td>
</tr>
<tr>
<td>Pulp &amp; Paper</td>
<td></td>
</tr>
<tr>
<td>Food &amp; Drug</td>
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</tr>
<tr>
<td>Refineries</td>
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<tr>
<td>Power</td>
<td></td>
</tr>
<tr>
<td>Mining</td>
<td></td>
</tr>
<tr>
<td>Oil &amp; Gas</td>
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</tbody>
</table>