

# Series PR High-Performance Pressure Regulator

## Applications of Plast-O-Matic Series PR Pressure Regulators

- Convert varying or excessive upstream pressures to a pre-determined maximum downstream pressure in systems handling corrosive or ultra-pure liquids.
- Regulate to the correct pressure range so that a flow system or piece of equipment can operate safely and effectively.
- Ultra-pure system special designs.

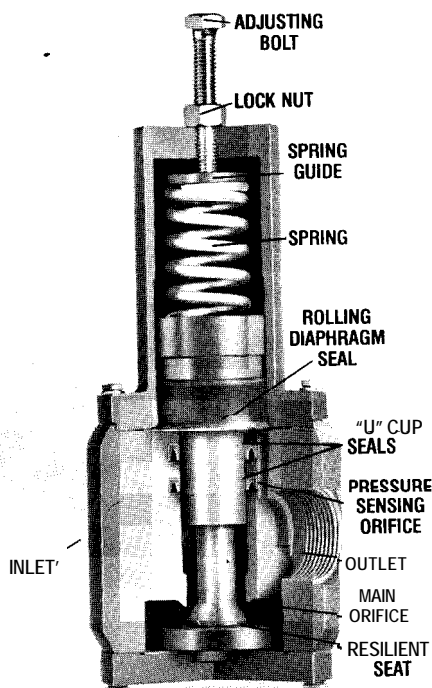
## Advantages of Plast-O-Matic Series PR Pressure Regulators

- Automatically regulate and prevent the downstream pressure from exceeding its set point.
- Wide range of adjustable settings available from 5 to 50 psi. (5 to 75 psi standard on 1/2" PRM)
- Rugged construction with inlet pressure to 150 psi.
- Rolling diaphragm design assures sensitive operation.
- Seal concepts provide non-sticking, design.
- Control spring is not in the liquid.
- Over 30 years of field proven quality.
- One piece body construction eliminates internal leakage that can cause malfunction.
- 100% individual testing.

NOTE: Spigot End Connectors are available for all Series PR Regulators. Consult factory for details.

## MATERIALS OF CONSTRUCTION

PLAST-O-MATIC pressure regulators are available in PVC, Polypropylene, Teflon®, and PVDF. Seals can be either Buna-N, EPDM, or Viton®. For Series PR, the inlet and outlet threads are NPT female. BSP threads are also available on request.



## DESIGN

PLAST-O-MATIC pressure regulators are designed to handle corrosive and ultra-pure liquids with inlet pressures up to 150 psi at 75°F. The standard downstream set pressure range is 5 to 50 psi; 1/2" PRM to 75 psi. For higher ranges, consult Catalog PRH. The design incorporates a poppet seat at the valve orifice to prevent sticking and double U-cup seals on the internal shaft to prevent inlet pressure from affecting the sensing of the downstream line pressure. Also, the one piece body construction eliminates internal leakage that could cause the set pressure to creep beyond a safe limit. A unique rolling diaphragm seal isolates the spring chamber from the downstream pressure sensing liquid. This unique design in conjunction with a pressure balanced shaft assures smooth and stable control.

## PRE-SETTING

If the desired pressure setting is known the valve can be ordered preset at the factory; otherwise, it must be set in the field. When required, the pressure setting can be fixed and made tamperproof. Field setting is a simple task.

## OPERATION

A PLAST-O-MATIC series PR pressure regulator prevents downstream pressure from exceeding the desired set pressure. The regulator will remain closed as long as the set pressure is maintained. As equipment or valves downstream of the regulator begin to open and demand flow, the downstream pressure begins to fall and the regulator opens. It continues to open further as more flow is needed until its maximum opening is reached. If at this point the flow is not sufficient then the regulator is not big enough. Please consult the flow rate and pressure drop charts before selecting the size. As the process is reversed, the downstream pressure begins to increase and the regulator starts closing. When the downstream pressure again reaches the set pressure the regulator closes.

**IMPORTANT:** As can be seen from the preceding explanation, a pressure regulator does not maintain a specific downstream pressure. It can only prevent the downstream pressure from exceeding a set point.

## INSTALLATION

Before installing the regulator in the line, make sure the flow through the regulator will be going in the right direction. All regulators are marked showing the flow direction. Threaded connections should never be made to metal piping and should always be wrapped with Teflon tape or other acceptable pipe sealant to effect a seal. The assembly need only be made hand tight followed by a one-quarter turn more with a strap wrench. DO NOT over-tighten or use a pipe wrench as future fracture could result.

It is advisable to mount pressure gauges both upstream and downstream of the regulator. See Plast-O-Matic Catalog GGM for selection and gauge protectors.

### Series PR

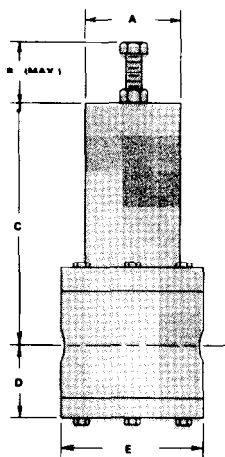
#### FLOW CAPACITY VS. PRESSURE DROP REFERENCE CHART

| 1/4   |              | 1/2   |              | 3/4  |              | 1    |              | 1 1/2 |              | 2    |              | 3    |              |
|-------|--------------|-------|--------------|------|--------------|------|--------------|-------|--------------|------|--------------|------|--------------|
| FLOW  | $\Delta P^*$ | FLOW  | $\Delta P^*$ | FLOW | $\Delta P^*$ | FLOW | $\Delta P^*$ | FLOW  | $\Delta P^*$ | FLOW | $\Delta P^*$ | FLOW | $\Delta P^*$ |
| GPM   | PSI          | GPM   | PSI          | GPM  | PSI          | GPM  | PSI          | GPM   | PSI          | GPM  | PSI          | GPM  | PSI          |
| 1     | 4            | 1 1/2 | 4            | 8    | 4            | 11   | 4 1/2        | 16    | 5            | 20   | 5            | 50   | 6            |
| 3     | 7            | 2 1/2 | 5            | 14   | 6 1/2        | 20   | 7            | 28    | 7            | 40   | 8            | 100  | 9            |
| 4     | 12           | 6     | 6 1/2        | 25   | 10           | 25   | 11           | 36    | 12           | 60   | 12           | 130  | 11           |
| 4 1/2 | 16           | 7     | 9            | 29   | 12           | 40   | 13           | 58    | 14           | 80   | 14           | 160  | 13           |
| 5     | 18           | 10    | 13           | 35   | 14           | 50   | 15           | 70    | 16           | 100  | 16           | 200  | 16           |

NOTE: The generally accepted safe velocity in plastic piping is 5 feet per second. The above flows go beyond this rate.

### SERIES PR & PRD<sup>(a)</sup> PRESSURE REGULATOR DIMENSIONS

| Dim.            | SIZE NPT or BSP |       |         |       |       |       |        |
|-----------------|-----------------|-------|---------|-------|-------|-------|--------|
|                 | 1/4             | 1/2   | 3/4     | 1     | 1 1/2 | 2     | 3      |
| <b>A</b> inches | 2               | 2 1/2 | 2 7/8   | 2 7/8 | 2 7/8 | 2 7/8 | 5 1/4  |
| mm              | 50.8            | 63.5  | 73      | 73    | 73    | 73    | 133.4  |
| <b>B</b> inches | 1 3/8           | 1 3/4 | 2 1/2   | 2 1/2 | 2 1/2 | 2 1/2 | 4      |
| mm              | 34.9            | 44.4  | 63.5    | 63.5  | 63.5  | 63.5  | 101.6  |
| <b>C</b> inches | 4 1/4           | 4     | 7 1/2   | 7 1/2 | 8     | 9 1/8 | 11 1/8 |
| mm              | 108             | 101.6 | 195.0   | 195.0 | 203.2 | 238.1 | 295.3  |
| <b>D</b> inches | 1 1/4           | 2     | 2 13/16 | 2 7/8 | 3 3/8 | 5 1/8 | 6 3/8  |
| mm              | 32              | 51    | 71      | 73    | 86    | 130   | 162    |
| <b>E</b> inches | 2               | 2 1/2 | 4 1/2   | 4 1/2 | 5     | 7     | 8 1/8  |
| mm              | 50.8            | 63.5  | 114.2   | 114.2 | 127   | 177.8 | 219.1  |



**CAUTION:** Quick shutoffs of downstream equipment or valves transmit liquid shock waves back to the regulator with the possibility of damaging it. It is best to close valves or equipment gradually to avoid these shocks. If a valve must be closed quickly it is best to do so upstream of the regulator.

## Special Designs For Ultra-Pure Systems

**Internal Sensing Area Flush:** All Plast-O-Matic pressure regulators can be supplied with an internal sensing area flush (114 NPT) to keep the ultra-pure liquid just below the sensing piston from remaining stagnant. This bleed should be piped back to a pretreatment section of the ultra-pure system.

**High Purity Quality Assurance Procedure:** This cleaning procedure is optionally available for our products used in ultra pure liquid applications. It consists of each valve component being degreased, swabbed and inspected for imperfections prior to assembly, ensuring the absence of any lubrication. Valves will be packed in a Class 1000 or better cleanroom environment. Packing protocol is as follows:

- All parts are physically checked for surface impurities, cracks, and/or any other degradations in the individual items.
- Cleaning and packing procedures are as follows:
  - In a Class 1000 cleanroom, with Class 1000 hoods, all valves are:
    - Swabbed with isopropyl alcohol.
    - RO/DI rinsed (16 Mg Ohm or greater).
    - Blown off with pure Nitrogen.
    - Packed in ultra-clean Polyethylene film 3 mil thick. Valves are blanketed and packed in pure Nitrogen.
    - A secondary heat-sealed film is drawn over the primary film (double bagged, Nitrogen-purged).

Procedure is available at a nominal charge. Specify "CDB Procedure" after the valve model number on your order.

### SERIES PR, PRD<sup>(a)</sup> REGULATOR PART NUMBERS

| PIPE SIZE | SERIES PR     |              | SERIES PRD  |             |
|-----------|---------------|--------------|-------------|-------------|
|           | EPDM Seals    | Viton Seals  | EPDM Seals  | Viton Seals |
| 1/4       | PR025EP-PV    | PR025V-PV    | PRD025EP-PV | PRD025V-PV  |
| 1/2       | PR050EP-PV(c) | PR050V-PV(c) | PRD050EP-PV | PRD050V-PV  |
| 3/4       | PR075EP-PV    | PR075V-PV    | PRD075EP-PV | PRD075V-PV  |
| 1         | PR100EP-PV    | PR100V-PV    | PRD100EP-PV | PRD100V-PV  |
| 1 1/2     | PR150EP-PV    | PR150V-PV    | PRD150EP-PV | PRD150V-PV  |
| 2         | PR200EP-PV    | PR200V-PV    | PRD200EP-PV | PRD200V-PV  |
| 3         | PR300EP-PV    | PR300V-PV    | PRD300EP-PV | PRD300V-PV  |

(a) Part Numbers shown are PVC bodies. For Natural Polypro, change -PV to -PP. For Teflon, change -PV to -TF. For Kynar PVDF, change -PV to -PF.

(b) Series PRD is shown on back cover page.

(c) PRM 1/2" size PVC models are molded design. Higher range is standard.

### FLOW REFERENCE CHART FOR SERIES PR

| Pressure Settings | INLET PRESSURES           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |                           |
|-------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|                   | 1/4 NPT or BSP            |                           | 1/2 NPT or BSP            |                           | 3/4 NPT or BSP            |                           | 1 NPT or BSP              |                           | 1 1/2 NPT or BSP          |                           | 2 NPT or BSP              |                           | 3 NPT or BSP              |                           |
|                   | 15 PSI<br>1.04 BARS       | 30 & UP<br>2.07 & UP      | 15 PSI<br>1.04 BARS       | 30 & UP<br>2.07 & UP      | 10 PSI<br>0.69 BARS       | 25 & UP<br>1.73 & UP      | 10 PSI<br>0.69 BARS       | 25 & UP<br>1.73 & UP      | 10 PSI<br>0.69 BARS       | 25 & UP<br>1.73 & UP      | 10 PSI<br>0.69 BARS       | 25 & UP<br>1.73 & UP      | 10 PSI<br>0.69 BARS       | 25 & UP<br>1.73 & UP      |
| PSI BARS          | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. | GPM cm <sup>3</sup> /sec. |
| 5 0.35            | 1.0 63                    | 1.0 63                    | 2 126                     | 3 189                     | 8 505                     | 8 505                     | 11 694                    | 11 694                    | 16 1010                   | 16 1010                   | 20 1262                   | 20 1262                   | 50 3155                   | 50 3155                   |
| 10 0.69           | 3.0 189                   | 3.0 189                   | 6 379                     | 7 442                     | 14 883                    | 18 1136                   | 20 1262                   | 25 1577                   | 28 1767                   | 36 2272                   | 30 1892                   | 50 3154                   | 65 4100                   | 100 6308                  |
| 15 1.04           | 3.5 221                   | 4.0 252                   | 7 442                     | 9 568                     | 18 1136                   | 29 1830                   | 25 1577                   | 40 2524                   | 36 2272                   | 58 3660                   | 40 2523                   | 80 5046                   | 80 5046                   | 160 10093                 |
| 20 1.38           | 3.5 221                   | 4.5 315                   | 7 442                     | 10 631                    | 18 1136                   | 35 2209                   | 25 1577                   | 50 3155                   | 36 2272                   | 70 4418                   | 50 3154                   | 100 6308                  | 100 6308                  | 200 12616                 |
| 25 1.73           | 3.5 221                   | 5.0 315                   | 7 442                     | 10 631                    | 18 1136                   | 35 2209                   | 25 1577                   | 50 3155                   | 36 2272                   | 70 4418                   | 50 3154                   | 100 6308                  | 100 6308                  | 200 12616                 |
| 30 2.07           | 3.5 221                   | 5.0 315                   | 7 442                     | 10 631                    | 18 1136                   | 35 2209                   | 25 1577                   | 50 3155                   | 36 2272                   | 70 4418                   | 50 3154                   | 100 6308                  | 100 6308                  | 200 12616                 |
| 40 2.76           | 3.5 221                   | 5.0 315                   | 7 442                     | 10 631                    | 18 1136                   | 35 2209                   | 25 1577                   | 50 3155                   | 36 2272                   | 70 4418                   | 50 3154                   | 100 6308                  | 100 6308                  | 200 12616                 |
| 50 3.45           | 3.5 221                   | 5.0 315                   | 7 442                     | 10 631                    | 18 1136                   | 35 2209                   | 25 1577                   | 50 3155                   | 36 2272                   | 70 4418                   | 50 3154                   | 100 6308                  | 100 6308                  | 200 12616                 |

NOTE: 5 to 50 psi set range standard. For higher set range of 30-125 psi, specify Series PRH. Contact factory for free Catalog PRH.