

## Pressure Regulators RP-1065-A, RP-1066-A

*Diaphragm actuated, Spring adjusted type Pressure Regulator and Relief Valve for steam service.*

### FEATURES

- Valve sizes 1/2" through 2" single-seated.  
 2 1/2" through 4" double-seated.
- All valves stainless steel trimmed.
- Choice of setpoint control ranges.
- Nylon-reinforced, molded Buna-N diaphragm.
- Quick-disconnect valve stem feature.
- "Lifetime," spring-loaded, Teflon "Chevron" stem packing.
- Polished stainless steel quick-disconnect type valve stem.
- Ball bearing adjusting wheel.
- Valve designs backed by many years of field service.
- All components from a single manufacturer.

### DESCRIPTION

Sensitive, accurate control of reduced pressures is provided by these simple self-operated pressure regulators. They may be used to control steam pressures for heating systems, industrial processes and steam-driven pumps, as well as many other fluid pressure controlling and limiting applications throughout public buildings, institutions, industrial and chemical plants, shipboard installations, etc.

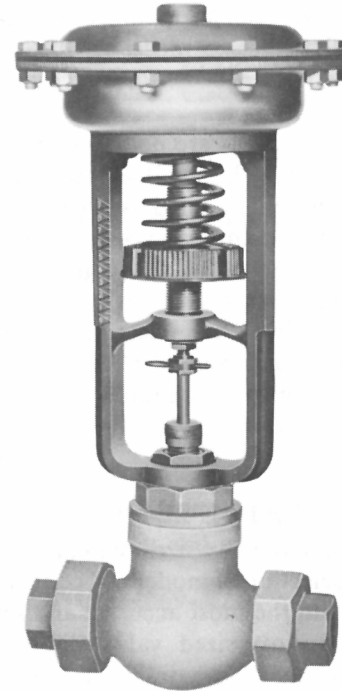
When supplied with reverse-acting valves, these units will open on rising pressure for modulating pressure relief.

These precisely designed pressure regulators are ruggedly constructed, using cast iron alloy of carefully controlled quality for the sturdy frame, molded diaphragms of Buna-N composition, nylon-reinforced for great flexibility and long service life.

Cataloged valves 1/2" through 2" are single-seated, stainless steel trimmed for accurate control on steam applications. The "MA" piston-balanced valves, sizes 3/4" through 1 1/2", permit pressure drops up to the full valve body rating without loss of control accuracy. Sizes 2 1/2" through 4" are fitted with double-seated semi-balanced valves. Double-seated valves are used on services that do not require "dead-end" shutoff. Body material is bronze through 1 1/2" size and cast iron 2" and larger.

### OPERATION

The controlled pressure from the downstream side of the valve is applied to the diaphragm through the tapped case opening. Through the area of the diaphragm, the force exerted by the adjusting spring is balanced by the force created from the pressure. Even small changes in the reduced pressure produce immediate changes in valve position to regulate the pressure downstream.



*Diaphragm Construction for modulating control of pressure.*

The setpoint is changed by varying the load on the adjusting spring. Rotating the ball-bearing adjustment wheel so as to compress the spring and increase its force against the diaphragm raises the setpoint. Rotation in the opposite direction lowers the setpoint. The scale along one side of the frame provides a reference for restoring the setpoint when adjustment wheel position has been changed from its normal setting.

| Regulator No. | Diaphragm Size | Adjustable Pressure Ranges, PSI | Max. Diaphragm Test Pressure, PSIG |
|---------------|----------------|---------------------------------|------------------------------------|
| RP-1065-A     | 5              | 5 - 50<br>10 - 100<br>25 - 150  | 300                                |
| RP-1066-A     | 10             | 3 - 25<br>5 - 50<br>15 - 75     | 150                                |

**ACCURACY OF REGULATION**  
Pressure Change, PSI, at the diaphragm for full valve stroke†

**ACCURACY OF REGULATION**

In general, the greatest accuracy-closest regulation-is obtained with the largest diaphragm and shortest range which will give the required control pressure. For example, a control pressure of 40 psig can be obtained with any of the three ranges in model RP-1065-A and with two of the three ranges in model RP-1066-A. Closest regulation can be expected with the 5 - 50 psi range of model RP-1066-A (size 10 diaphragm). See table for "Accuracy of Regulation."

Unbalanced port areas are not considered in the values tabulated. Small amounts of unbalance are present in single-seated 1/2" "A" valves and in semi-balanced double-seated valves 2" through 4". Under conditions of high pressure drop, the forces opposing valve closure will influence selection of the regulator model (diaphragm size). See "Accuracy of Regulation" tabulation for actual port area unbalance.

| Regulator No.                  | Adjustable Range PSIG | Valve Size |       |       |        |        |       |        |     |       |        |     |  |
|--------------------------------|-----------------------|------------|-------|-------|--------|--------|-------|--------|-----|-------|--------|-----|--|
|                                |                       | 1/2*       | 1/2** | 1/2   | 3/4    | 1      | 1 1/4 | 1 1/2  | 2   | 2 1/2 | 3      | 4   |  |
| RP-1065-A1                     | 5-50                  | 2 1/2      | 3     | 4     | 5      | 6 1/2  | 7 1/2 | 9      | 11  | 7 1/2 | 9      | 11  |  |
| RP-1065-A2                     | 10-100                | 5          | 6 1/2 | 7 1/2 | 10     | 12 1/2 | 15    | 17 1/2 | 22  | 15    | 17 1/2 | 22  |  |
| RP-1065-A3                     | 25-150                | 11         | 13    | 16    | 21 1/2 | 27     | 32    | 37     | 48  | 32    | 27     | 48  |  |
| RP-1066-A1                     | 3-25                  | 1 1/2      | 1 1/2 | 2     | 2 1/2  | 3      | 4     | 4 1/2  | 6   | 4     | 4 1/2  | 6   |  |
| RP-1066-A2                     | 5-50                  | 2 1/2      | 3 1/2 | 4     | 5      | 6 1/2  | 7 1/2 | 9      | 11  | 7 1/2 | 9      | 11  |  |
| RP-1066-A3                     | 15-75                 | 5          | 6 1/2 | 8     | 11     | 13     | 16    | 18 1/2 | 24  | 16    | 18 1/2 | 24  |  |
| Port Area Unbalance Sq. Inches |                       | .05        | .12   | .21   | 0      | 0      | 0     | 0      | 0   | .51   | .60    | .81 |  |
| Max. Supply Press., PSIG       |                       | 225        |       |       | 250    |        |       |        | 125 |       |        |     |  |
| Max. Pressure Drop, PSI        |                       | 125        |       |       | 250    |        |       |        | 100 | 100   | 100    | 80  |  |

† Control is modulating around setpoint  
\* 1/4" reduced port.  
\*\* 3/8" reduced port.

**CAPACITIES, VALVE SIZING**

Proper selection of valve size is equally as important as proper selection of model and control range in order to obtain the most accurate and satisfactory control. An oversized valve will result in seat "wiredraw" that increases port leakage and may affect regulation. The smallest valve which will give the required maximum flow in the wide open position should generally be selected regardless of pipeline size.

Valve capacities for various flowing media are tabulated below. Experimentally determined valve constants (Cv), listed for each valve size, form the basis for capacity figures. Capacities for supply pressures and pressure drops other than those tabulated can be determined by substituting in the Cv formula as noted below.

**Steam** - On compressible fluids such as steam or gas, maximum valve capacity is reached at the "critical" pressure drop ( $\Delta P$ ) which equals inlet or supply pressure ( $P_1$ ) divided by downstream or controlled pressure ( $P_2$ ). When the actual pressure drop on an application exceeds the critical pressure drop, the formula  $Q_s = 1.5CvP_1$  is used to calculate capacities. When the actual pressured drop is equal to or less than the critical pressured drop, the formula used is

$$Q_s = 3Cv \sqrt{P_2 \Delta P}, \text{ where:}$$

(Continued next column)

- $Q_s$  = Flow of steam in pounds per hour.
- $C_v$  = Valve constant (see tabulation).
- $P_1$  = Inlet or supply pressure, psia (gage pressure plus 14.7).
- $P_2$  = Outlet (downstream) or controlled pressure (psia).
- $\Delta P$  = Pressure drop through valve (supply pressure minus outlet pressure).

**STEAM CAPACITY**

| Valve size               | 1/4"              | 3/8"  | 1/2" | 3/4"  | 1"    | 1 1/4" | 1 1/2" | 2"     | 2 1/2" | 3"     | 4"     |        |
|--------------------------|-------------------|---|------|-------|-------|--------|--------|--------|--------|--------|--------|--------|
| Valve Cv                 | 1.0               | 1.6   | 2.1  | 10.5  | 12.2  | 17.6   | 26.0   | 47.8   | 82.5   | 130.0  | 226.0  |        |
| Max. Supply Press., PSIG | 250               |   |      |       |       |        |        | 125    |        |        |        |        |
| Supply Press. PSI        | Max. Setpoint PSI | Maximum lbs./hr. Steam based on Supply and Critical Pressure Drop indicated at left |      |       |       |        |        |        |        |        |        |        |
| 5                        | 2.5               | 30  | 55   | 75    | 350   | 450    | 675    | 930    | 1,700  | 2,800  | 4,500  | 9,000  |
| 12                       | 6                 | 42  | 75   | 100   | 415   | 575    | 900    | 1,250  | 2,300  | 4,000  | 6,300  | 10,000 |
| 25                       | 12.5              | 60  | 110  | 150   | 700   | 925    | 1,300  | 1,800  | 3,400  | 6,000  | 9,200  | 17,000 |
| 40                       | 20                | 85  | 155  | 220   | 950   | 1,250  | 1,800  | 2,400  | 4,500  | 8,000  | 13,000 | 32,000 |
| 65                       | 32.5              | 125   | 220  | 300   | 1,400 | 1,800  | 2,300  | 3,600  | 6,500  | 12,000 | 18,500 | 36,000 |
| 100                      | 50                | 180   | 326  | 420   | 2,000 | 2,600  | 3,800  | 5-250  | 10,000 | 17,000 | 26,500 | 47,000 |
| 150                      | 75                | 260   | 450  | 500   | 2,800 | 3,600  | 5,500  | 7,550  |        |        |        |        |
| 185                      | 92.5              | 300   | 550  | 750   | 3,400 | 4,500  | 6,500  | 10,000 |        |        |        |        |
| 250                      | 125               | 500   | 720  | 1,200 | 5,700 | 6,000  | 11,000 | 12,000 |        |        |        |        |

NOTE: For capacities where the setpoint is greater than 50% of the supply pressure, use the valve sizing slide rule or consult a factory representative.

**INSTALLATION**

The regulator may be installed in a horizontal pipeline with the diaphragm either above or below the line. A water seal must be provided when the regulator is used on steam applications to prevent damage to the diaphragm by high steam temperatures.

Reservoir 24669-A2 is recommended to provide the water seal.

An adjustable orifice, such as No. 94204, installed in the feeler line will generally improve control and protect both the valve and diaphragm by damping out pressure pulsations. Both sides of the orifice should be flooded by the water seal at all times.

The feeler line should extend at least 6 ft. to 10 ft. downstream from the valve on applications where the

(Continued next page)

## INSTALLATION (Continued)

regulator is controlling line pressures such as in a steam main. For controlling pressures in a tank or pressure vessel, the regulator should be installed as close to the vessel as possible. The feeler line is connected directly into the vessel or tank.

A hand valve should be installed in the feeler line to protect the diaphragm from downstream pressure buildup on liquid or noncondensable gas service during extended shutdown periods. The regulating valve should be protected by a pipeline strainer. A three-valve by-pass is recommended for ease of servicing.

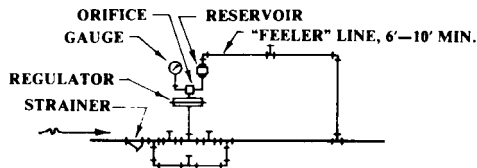


Fig. 1. Typical installation of a Pressure Regulator. Showing feeler pipe connection and pressure gauge. Feler pipe is connected to reduced pressure side of supply line and at point where control is desired.

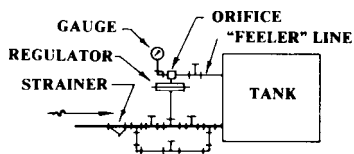


Fig. 2. Showing installation of a Pressure Regulator controlling pressure in a closed vessel. Note regulator is installed as close as possible to the tank.

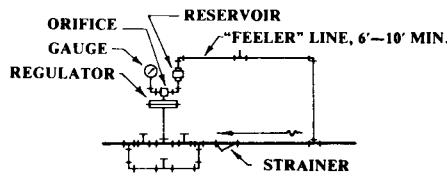


Fig. 3. Showing installation of a modulating Pressure Relief Valve. The feeler pipe is connected to the high pressure or upstream side of the supply line and at point where control is desired.

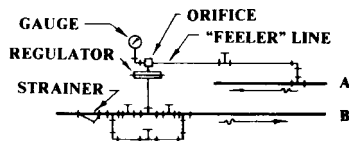
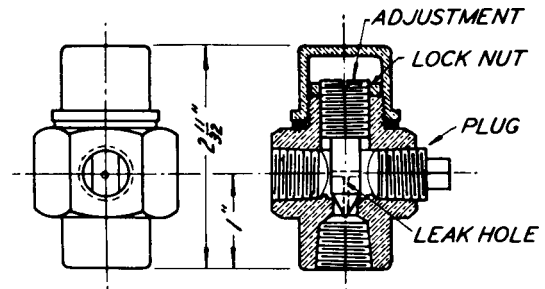


Fig. 4. A typical installation of a Pump Governor. Regulating valve is installed in the steam supply line "B" to pump. Feler pipe is connected in pump outlet line "A" carrying medium being pumped. Adjustable orifice must be used as shown.

## ADJUSTABLE ORIFICE NO. 94204 (With or without leakhole)



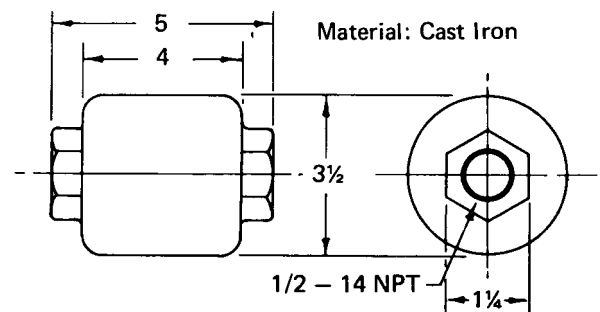
Most types of pressure regulators require a "feeler" pipe for best control. By using this adjustable orifice in the feeler pipe line, rapid pressure fluctuations will be dampened out and more steady control procured.

After the orifice is adjusted for proper flow, the adjustment can be locked by tightening a jam nut as shown in the accompanying drawing. A small passage or leak hole on the 94204-A 1 model is provided in the stem or poppet so that the flow cannot be shut off entirely and thus render the regulator inoperative. The model 94204-A2 does not have a leak hole.

All parts are made of brass. 1/4 " pipe connections. Pipe plug may be removed for installation of pressure gauge.

Supplied only on order and at extra cost.

## RESERVOIR NO. 24669-A2



## HOW TO ORDER

When ordering, specify:

Quantity

Regulator number

Valve size, type, action, etc.

Medium through valve (steam, etc.)

Supply pressure (psig)

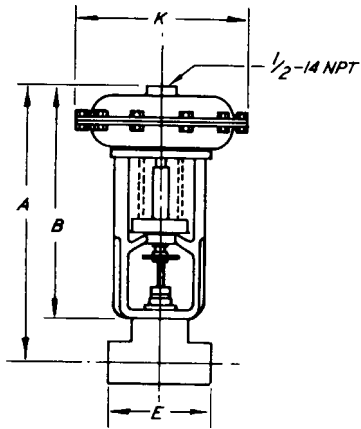
Reduced pressure range (psig)

Special features desired

Invoicing and shipping instructions

If ordered for pressure relief service, specify reverse acting valve and state "Pressure Relief Valve."

**DIMENSIONS, SHIPPING WEIGHTS**



|                 |                        |       |        |                                  |       |       |                           |                  |       |       |        |  |
|-----------------|------------------------|-------|--------|----------------------------------|-------|-------|---------------------------|------------------|-------|-------|--------|--|
| Valve Size      | 1/2*                   | 1/2** | 1/2    | 3/4                              | 1     | 1 1/4 | 1 1/2                     | 2                | 2 1/2 | 3     | 4      |  |
| Valve Type      | A†                     |       |        | MA-Single-Seated Piston Balanced |       |       |                           | FA-Double-seated |       |       |        |  |
| Body Material   | Bronze                 |       |        |                                  |       |       |                           | Cast Iron        |       |       |        |  |
| Valve Trim      | Stainless Steel        |       |        |                                  |       |       |                           |                  |       |       |        |  |
| End Connections | Female Threaded Unions |       |        |                                  |       |       | 125 lb. Cast Iron Flanges |                  |       |       |        |  |
| E               | 4 3/4                  |       | 6 5/16 |                                  | 7 1/8 | 7 1/2 | 8 1/2                     | 7                | 7 3/4 | 8 5/8 | 10 1/4 |  |

**Regulator No. RP-1065-A**

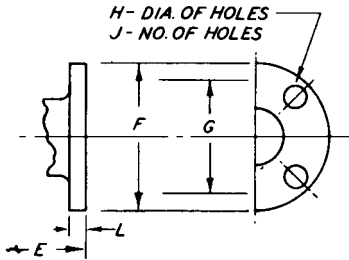
|                 |         |    |    |        |          |        |    |    |    |     |     |
|-----------------|---------|----|----|--------|----------|--------|----|----|----|-----|-----|
| A               | 13 3/16 |    |    | 14 3/4 | 14 15/16 | 15 5/8 | 16 | 17 |    |     |     |
| B               | 11 1/4  |    |    |        |          |        |    |    |    |     |     |
| K               | 4 3/4   |    |    |        |          |        |    |    |    |     |     |
| Shipping Weight | 19      | 19 | 20 | 22     | 26       | 30     | 34 | 78 | 86 | 106 | 154 |

**Regulator No. RP-1066-A**

|                 |         |    |    |        |          |        |    |    |    |     |     |
|-----------------|---------|----|----|--------|----------|--------|----|----|----|-----|-----|
| A               | 13 3/16 |    |    | 14 3/4 | 14 15/16 | 15 5/8 | 16 | 17 |    |     |     |
| B               | 11 1/4  |    |    |        |          |        |    |    |    |     |     |
| K               | 6 5/16  |    |    |        |          |        |    |    |    |     |     |
| Shipping Weight | 21      | 21 | 23 | 24     | 28       | 32     | 36 | 80 | 88 | 108 | 156 |

- \* 1/4" reduced port.
- \*\* 3/8" reduced port.
- † Single Seated

NOTE: On special order, bronze body valve with bronze trim can be furnished in 2", 2 1/2", 3" and 4" sizes, with class 150 flanges.



**FLANGE DIMENSIONS**

| Valve Size, Inches | F     | G     | H   | J | L     |
|--------------------|-------|-------|-----|---|-------|
| 2                  | 6     | 4-3/4 | 3/4 | 4 | 1/2   |
| 2-1/2              | 7     | 5-1/2 | 3/4 | 4 | 3/4   |
| 3                  | 7-1/2 | 6     | 3/4 | 4 | 3/4   |
| 4                  | 9     | 7-1/2 | 3/4 | 8 | 15/16 |

**Robertshaw**

**U.S.A. and CANADA**

Robertshaw Industrial Products Division

1602 Mustang Drive

Maryville, TN 37801

Phone: (865) 981-3100 Fax: (865) 981-3168

<http://www.robertshawindustrial.com>

**Exports**

Invensys Appliance Controls

2809 Emerywood Parkway

P.O. Box 26544

Richmond, Virginia 23261-6544

Phone: (804) 756-6500 Fax: (804) 756-6561

