

Pneumatic Division

Richland, Michigan USA

www.parker.com/pneumatics**PRECISION REGULATOR**

Bulletin Number	Bulletin Description		
<input type="checkbox"/> 1R270E	Rev. 7	27R "B" Installation & Service	
<input type="checkbox"/> 2R101G	Rev. 15	27R "C" Installation & Service	
<input type="checkbox"/> 83-528-000-80	Rev. 4	51R, 52R, 53R, 54R Dial Regulator, Installation & Service	
<input type="checkbox"/> 1R205	Rev. 1	3550 Regulator Installation & Service	
<input type="checkbox"/> 35507019	—	3550 Regulator, Installation & Service	
<input type="checkbox"/> 2R409	Rev. 2	P3BA45 Pneumatic Input Signal Amplifier, Installation & Service	
<input type="checkbox"/> 2R408	Rev. 2	P3BA208 Pneumatic Input Signal Amplifier, Installation & Service	
<input type="checkbox"/> 2FR400	Rev. 2	P3EA632 Filter/Regulator, Installation & Service	
<input type="checkbox"/> 2R406	Rev. 2	P3RA102 Standard Regulator, Installation & Service	
<input type="checkbox"/> 2R410	Rev. 2	P3RA102BP Relief Valve, Installation & Service	
<input type="checkbox"/> 2R407	Rev. 2	P3RA171 Vacuum Regulator, Installation & Service	
<input type="checkbox"/> 2R405	Rev. 2	P3RA302 Compact Regulator, Installation & Service	
<input type="checkbox"/> 2R205	Rev. 2	R210 High Precision Regulator, Installation & Service	
<input type="checkbox"/> 2R205	Rev. 2	R220 High Precision Regulator, Installation & Service	
<input type="checkbox"/> 2R206	Rev. 2	R230 High Flow Precision Regulator, Installation & Service	
<input type="checkbox"/> FRL-APP-01	—	Precision Regulators, Application Guide	
<input type="checkbox"/> Safety Guide	—	PDN Safety Guide	



Visit www.pdnplu.com for additional instruction sheets.

⚠ WARNING

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
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 Do not connect regulator to bottled gas.
 Do not exceed maximum primary pressure rating.**

Safety Guide

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The relief flow capacity of relieving type regulators is limited. Under some operating conditions, the secondary (outlet) pressure could increase above the initial setting. If overpressure conditions could cause malfunctions or failure of downstream equipment, additional external pressure relief devices of suitable capacity must be installed.

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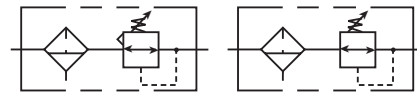
Specifications

- Supply Pressure** 250 PSIG, (17 bar), (1700 kPa) Maximum
- Flow Capacity (SCFM)** 25 (42.5 m³/HR) @ 100 psig, (7 bar), (700 kPa) supply and 20 PSIG, (1.5 bar), (150 kPa) setpoint
- Exhaust Capacity (SCFM)** 0.8 (1.36 m³/HR) where downstream pressure is 5 PSIG, (.35 bar), (35 kPa) above 20 PSIG, (1.5 bar), (150 kPa) setpoint. (0.8 SCFM for 120 # unit)
- Maximum Supply Pressure** 250 PSIG, (14 bar), (1400 kPa)
- Consumption** Undetectable
- Supply Pressure Effect** Less than 1.25 PSIG, (.09 bar), (9 kPa) change for 100 psig, [7.0 BAR], (700 kPa) change in supply pressure (1.90 psig for 120 # unit)
- Sensitivity** 1" (2.50 cm) Water Column
- Temperature Range** -40° F to + 160° F, (-40° C to + 71° C)

Materials of Construction

- Body and Housing** Epoxy Coated Aluminum
- Trim** Stainless Steel, Nickel Plated Steel
- Elastomers** Nitrile

Symbol



Installation

Use the two 23/64 thru holes in the Body to mount the Model 632. Mount the regulator with the Dripwell Drain Plug at the lowest point for adequate drainage.

Clean all pipelines to remove dirt and scale before installation.

Apply a minimum amount of pipe compound to the male threads of the fitting only. Do Not use PTFE tape as a sealant. Start with the third thread back and work away from the end of the fitting to avoid contaminating the regulator. Install the regulator in the air line.

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Introduction

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The Inlet and Outlet ports are labeled “In” and “Out”. Tighten all connections securely. Avoid undersized fittings that limit the flow through the regulator. For more information, see Figure 1.

NOTE: Oil free air must be applied to the regulator. If an air line lubricator is used, it MUST be located downstream of the regulator to avoid interference with performance.

Operation

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 and opens 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.

1. To increase pressure, turn the Adjustment Screw clockwise. To decrease pressure, turn the Adjustment Screw counterclockwise. For more information, see Figure 2.

2. To remove entrained liquids from the Dripwell, open the Drain Cock on the bottom of the Dripwell Assembly. The flow through the regulator and the amount of entrained oil or water in the air determine how often you should empty the Dripwell. For more information, see Figure 2.

NOTE: The presence of some diester oils in the air lines can accelerate elastomer deterioration and decrease the life span of this unit.

632 Series Kits

Description	Kit Number
Standard Service Kit	PS19968-NR
Tamper Resistant Kit	PS12165

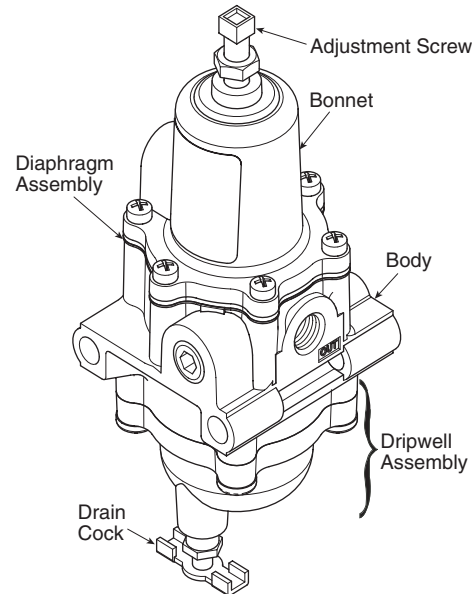


Figure 2

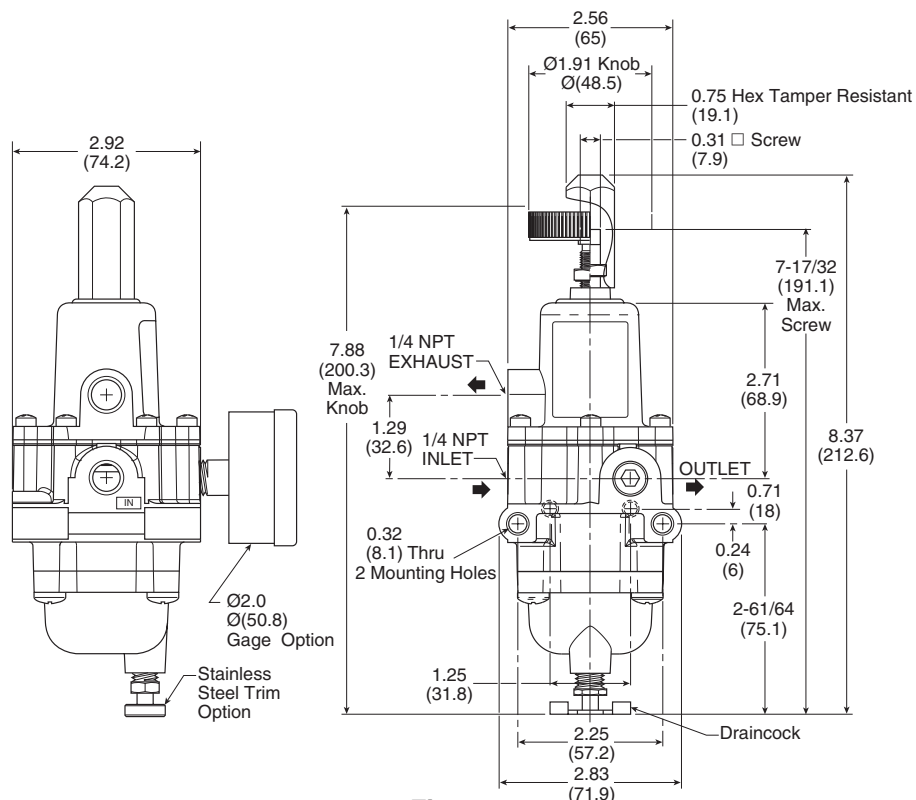


Figure 1

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Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:	kPa	PSIG	bar
PRIMARY – Maximum	3448	500	34.48
SECONDARY – Spring Pressure			
30 PSIG Minimum	3.4	0.5	0.03
Maximum	207	30	20.70
60 PSIG Minimum	7	1	0.07
Maximum	414	60	4.14
150 PSIG Minimum	14	2	0.14
Maximum	1034	150	10.34

Operating Temperature Range:

-40°C * to 93°C (-40°F to 200°F)

* Temperatures below 0°C (32°F) require moisture free air.

⚠ WARNING

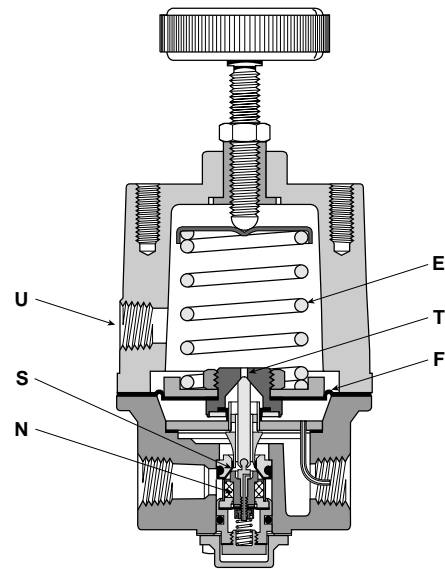
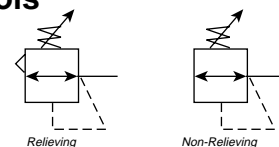
**Product rupture can cause serious injury.
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Installation:

1. Regulator should be installed with reasonable accessibility for service whenever possible — repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe — never into the female port. Do not use PTFE tape to seal pipe joints — pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.

2. Install regulator so that air flows from "IN" to "OUT" as marked on the regulator. Installation must be upstream from devices it is to service (lubricator, valve, cylinder or tool), and mounted closely to these devices. Mounting may be in any position.
3. Gauge ports are located on both sides of the regulator body for your convenience. It is necessary to install a gauge or pipe plug into each port during installation.
4. Remove plastic plug from vent hole in bonnet.
5. For protection against rust, pipe scale and other foreign matter, install a filter on the upstream (high pressure) side as closely to the regulator as possible.

ANSI Symbols



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Operation:

With the adjusting knob turned fully counterclockwise (no spring load), and pressure supplied to the regulator inlet port, the valve poppet assembly (N) is closed. Turning the adjusting knob clockwise applies a load to control spring (E). This load causes the diaphragm (F) and the valve poppet assembly (N) to move downward allowing flow across the seat area (S) created between the poppet assembly and the seat. Pressure in the downstream line is sensed below the diaphragm assembly (F) and offsets the load of control spring (E). As downstream pressure rises, poppet assembly (N) and the diaphragm assembly (F) move upward until the area (S) is closed and the load of the control spring (E) and pressure under the diaphragm assembly (F) are in balance. A reduced outlet pressure has now been obtained, depending on spring load. Creating a demand downstream, such as opening a valve, results in a reduced pressure under the diaphragm assembly (F). The load of control spring (E) now causes the poppet assembly to move downward opening seat area (S) allowing air to flow to meet the downstream demand. The flow of downstream air is metered by the amount of opening (S). Should downstream pressure exceed the desired regulated pressure, the excess pressure will cause the diaphragm assembly (F) to move upward against control spring (E), open vent hole (T), and vent the excess pressure to atmosphere through the hole (U) in the bonnet (C). (This occurs in the relieving type regulator only.)

CAUTION

REGULATOR PRESSURE ADJUSTMENT - The working range of the knob adjustment is designed to permit outlet pressures within their full range. Pressure adjustment beyond this range is also possible because the knob is not a limiting device. This is a common characteristic of most industrial regulators, and limiting devices may be obtained only by special design.

Regulator Spring Conversion

Turn the control knob (A) fully counterclockwise. Remove upstream air supply. Remove downstream air also for non-relieving type regulators.

1. Remove (6) screws (B), bonnet (C) control spring (E) and spring cap (D).
2. Place the control spring (E) and spring cap (D) into position over the diaphragm assembly.
3. Place the bonnet (C) into position over the spring cap (D) and reassemble the (6) screws (B). Tighten screws 3.2 to 3.6 Nm (28 to 32 in-lbs) in progressive steps using a crisscross pattern.

Service:

1. Turn the control knob (A) fully counterclockwise. Remove upstream air supply. Remove downstream air also for non-relieving type regulators.
2. Remove two # 10-32 screws (R) on the bottom of the regulator body (K) releasing the retaining plate (P) and cap (Q). Pull out the valve poppet assembly (N) and screen (M). Discard inner valve assembly and screen.
3. Remove six screws (B) holding the bonnet (C) in place. Remove bonnet, spring cap (D), spring (E) and diaphragm assembly (F). Discard diaphragm assembly.
4. Remove the four screws (G) holding the seal plate and jet tube assembly (H) and carefully lift out the assembly taking precautions not to bend the jet tube. Remove the cork seal plate gasket (J) and discard.
5. Tap the seat ring (L) out of the bottom side of the regulator body (K) using a wooden dowel. Discard seat ring.
6. Clean all retained parts with mild soap and water.
7. Insert the new seat ring (L) into the body making sure the brass side enters first. Press into place being careful not to damage the rubber seat. Note: a small amount of silicone grease applied to the outside of the seat ring is advised for easy assembly.
8. Assemble the new cork gasket (J) and jet tube assembly (H), making sure the jet tube is positioned into the outlet port of the regulator. Insert and tighten the four retaining screws (G) torque 3.2 to 3.6 Nm (28 to 32 in-lbs).
9. Insert the new valve poppet assembly (N) making sure the

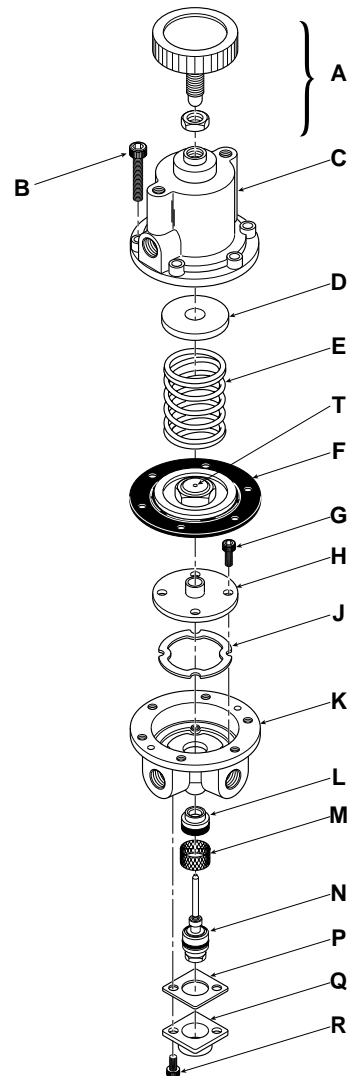
screen (M) is centrally located in the groove on the top side of the valve body. Replace the retaining plate (P) and cap (Q), and securely tighten using the two #10-32 screws (R) torque 3.2 to 3.6 Nm (28 to 32 in-lbs).

10. Place the new diaphragm assembly (F) over the valve stem and pilot bushing. Align the screw holes in the diaphragm with those in the regulator body (K). Place the control spring (E) and spring cap (D) into position on top of the diaphragm assembly.
11. Place the bonnet (C) into position over the spring cap (D) and reassemble the (6) screws (B). Tighten screws 3.2 to 3.6 Nm (28 to 32 in-lbs) in progressive steps using a crisscross pattern.
12. Admit inlet pressure and turn the adjusting knob (A) to obtain the desired pressure.

NOTE: A slight flow of air through the bonnet vent hole is necessary for proper operation of the regulator.

Service Kits / Accessories:

Relieving Service Kit	03550 8000
Non-Relieving Service Kit	03550 8009
Control Springs (Color)	
0.5-30 PSIG (Red)	03550 7101
1-60 PSIG (Blue)	03550 7116
2-150 PSIG (Green)	03550 7117
Gauges	
0-30 PSIG	03560 0030
0-60 PSIG	03560 0100
0-160 PSIG	03560 0200
Mounting Brackets	
Pipe Mounting	00902 0400
Right Angle Mounting	03550 0400



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Operating Pressure:

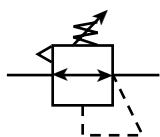
	kPa	PSIG	bar
Maximum Inlet Pressure	1720	250	17.2

Ambient Temperature Range: 0°C to 80°C (32°F to 175°F)

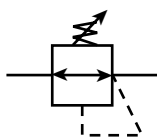
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Symbols



Relieving Regulator Adjustable



Non-Relieving Regulator Adjustable

Installation

1. This unit should be installed with reasonable accessibility for service whenever possible - repair service kits are available. Keep pipe and tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe - never into the female port. Do not use PTFE tape to seal pipe joints - pieces have a tendency to break off and lodge inside unit, possibly causing malfunction.
2. Install unit so that air flow is in the direction of arrow. Installation must be upstream of and close to the devices it is to service (valve, cylinder, tool, etc.). Mounting may be in any position.
3. Gauge ports are located on both sides of the regulator body for your convenience. It is necessary to install a gauge or pipe plugs into each port during installation.
4. For protection against rust, pipe scale, and other foreign matter, install a filter on the upstream (high pressure) side as close to the regulator as possible.

Operation

1. Before turning on the air supply, turn the adjusting knob counterclockwise until compression is released from the control spring. Then turn on air supply and adjust regulator to desired secondary pressure by turning adjusting knob clockwise. This permits pressure to build up slowly, preventing any unexpected operation of the valve, cylinders, tools, etc., attached to the line. Adjustment to desired secondary pressure can be made only with primary pressure applied to the regulator.
2. To decrease regulator pressure setting, always reset from a pressure lower than the final setting desired. For example, lowering the secondary pressure from 550 to 410 kPa (80 to 60 PSIG) is best accomplished by dropping the secondary pressure to 350 kPa (50 PSIG), then adjusting upward to 410 kPa (60 PSIG).

Tighten the lock knob against the bonnet to lock the pressure setting.

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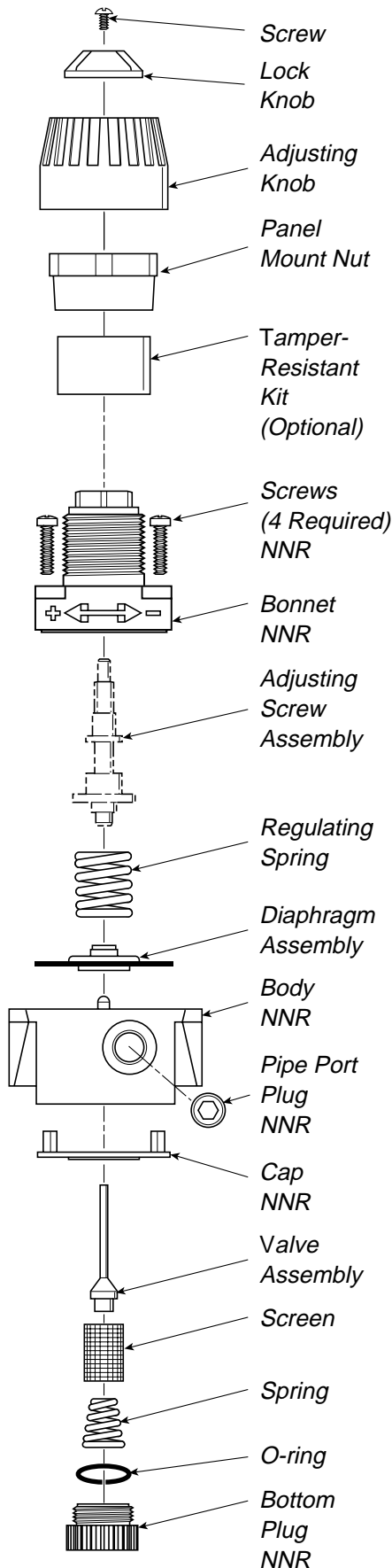
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Maintenance Procedures



NNR = NOT NORMALLY REPLACED

CAUTION:

SHUT OFF AIR SUPPLY and exhaust the primary and secondary pressure before disassembling regulator unit. (Turning the knob counterclockwise reduces regulator's setting, but does not vent downstream pressure on non-relieving regulators.)

1. The regulator can be disassembled for servicing without removal from line.
2. Occasionally remove bottom plug and clean plug, body and valve seat.
3. TO DISASSEMBLE – Shut off air to regulator and vent air lines on both sides of regulator. Turn adjusting knob counterclockwise to relieve compression on spring. Remove the screws, cover and spring. Diaphragm assembly can now be removed. By removing bottom plug and spring the valve stem can be removed from the bottom of the regulator.
4. IF UNIT WILL NOT REGULATE TO DESIRED PRESSURE, OR IF PRESSURE BECOMES EXCESSIVE – Remove bottom plug, spring, and valve assembly. Clean all parts and check valve seat for wear or damage. Replace worn or damaged parts.
5. IF UNIT LEAKS AT RELIEF PORT – Install proper repair kit as listed under Kits and Parts Available.

Kits and Parts Available

Kit No.	Description
PS170	Self-Relieving Repair Kit (Includes self-relieving diaphragm assembly, valve assembly, and o-rings)
Regulating Springs:	
PS177	0-15 PSI
PS171	0-30 PSI
PS172	0-50 PSI
PS175	0-120 PSI

Accessories

Kit No.	Description
PS173B	Wall Mounting Bracket
PS179	Tamper Resistant Kit

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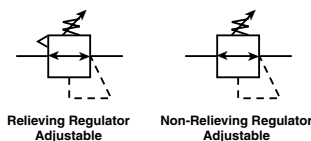
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Operating Pressure:

	kPa	psig	bar
Maximum Inlet Pressure	1720	250	17.2

Ambient Temperature Range: 0°C to 80°C (32°F to 175°F)

Symbols



Installation

1. The regulator should be installed with reasonable accessibility for service whenever possible - repair service kits are available. Keep pipe and tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe - never into the female port. Do not use PTFE tape to

seal pipe joints - pieces have a tendency to break off and lodge inside unit, possibly causing malfunction.

2. Install regulator so that air flow is in the direction of arrow. Installation must be upstream (high pressure) side and as close to the devices it is to service (valve, cylinder, tool, etc.). Mounting may be in any position.
3. Gauge ports are located on both sides of the regulator body for your convenience. It is necessary to install a gauge or pipe plugs into each port during installation.
4. For protection against rust, pipe scale, and other foreign matter, install a filter on the upstream (high pressure) side as close to the regulator as possible.

Operation

1. Before turning on the air supply, turn the adjusting knob (Economy, Precision, Compact, Standard) counterclockwise until compression is released from the control spring. Then turn on air supply and adjust regulator to desired secondary pressure by turning adjusting knob/handle clockwise. This permits pressure to build up slowly, preventing any unexpected operation of the valve, cylinders, tools, etc., attached to the line. Adjustment to desired secondary pressure can be made only with primary pressure applied to the regulator.
2. To decrease regulator pressure setting, always reset from a pressure lower than the final setting desired. For example, lowering the secondary pressure from 550 to 410 kPa (80 to 60 psig) is best accomplished by dropping the secondary pressure to 350 kPa (50 psig), then adjusting upward to 410 kPa (60 psig).

On Economy, Precision, Compact and Standard units, push the adjusting knob down to lock the pressure setting. And on the Hi-Flow unit, tighten the hex nut against the bonnet to lock setting.

Service

⚠ CAUTION:
 SHUT OFF AIR SUPPLY and exhaust the primary and secondary pressure before disassembling regulator unit. (Turning the knob/handle counterclockwise reduces regulator's setting, but does not vent downstream pressure on non-relieving regulators.)

⚠ CAUTION:
 Lubricate parts with a mineral based oil/grease or silicone grease. DO NOT use synthetic oils/greases such as esters.

⚠ WARNING

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This document and other information from The Company, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or systems in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

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A. Use the following procedure to service Economy, Precision, Compact and Standard units, see Figures 1 & 2:

1. Disengage the adjusting knob by pulling upward. Turn adjusting knob counterclockwise until the compression is released from the pressure control spring.
2. Unscrew the threaded collar and remove the bonnet assembly. Next, disassemble, clean, and carefully inspect parts for wear and/or damage. If replacement is necessary, use parts from service kits.
3. Lubricate o-ring and lip seals with grease (supplied with kits).
4. Install diaphragm assembly into bonnet. Then install bonnet assembly to body and tighten threaded collar hand tight plus 1/4 turn.

B. Servicing the Poppet Assembly-

1. Exhaust system air pressure as previously described. Then remove cap by unscrewing it from body. Next, remove poppet assembly, o-ring (Economy, Precision), cap's o-ring and poppet return spring.
2. Next, disassemble, clean, and carefully inspect parts for wear and/or damage. If replacement is necessary, use parts from service kits.
3. Lubricate o-ring (Economy, Precision) and sliding surfaces using grease supplied with service kit.
4. Turn on air supply and adjust to desired secondary pressure as described in the Operation section.

Turn on air pressure and check regulator for leakage. If leakage occurs, **DO NOT OPERATE** — conduct repairs again.

If you have questions concerning how to service this unit, contact your local authorized dealer or your customer service representative.

- Ⓐ Lightly grease with provided lubricant.
- Ⓑ Inspect for nicks, scratches, and surface imperfections.
If present, reduced service life is probable and future replacement should be planned.
- Ⓒ Clean with lint-free cloth.

Service Kits Available

	Economy	Precision	Compact	Standard
Regulator (Standard) Repair Kit (Relieving)	PS908	PS907	PS708	PS808
Regulator (Reverse Flow) Repair Kit (Relieving)	N/A	N/A	PS708R	PS808R
Regulator (Standard) Repair Kit (Non-Relieving)	PS909	N/A	PS709	PS809
Regulator (Reverse Flow) Repair Kit (Non-Relieving)	N/A	N/A	PS709R	PS809R
Seat Insert Repair Kit (Standard)	N/A	N/A	PS713	PS813
Seat Insert Repair Kit (Reverse Flow)	N/A	N/A	PS813	N/A
Bonnet Assembly	PS915	N/A	PS715	PS715
Air Pilot Conversion (Non-Relieving)	PS944	N/A	PS744	PS744
Air Pilot Conversion (Relieving)	PS945	N/A	PS745	PS745
Mounting Bracket Kit	PS963	PS963	PS707	PS807
Relieving Piston Kit	N/A	N/A	N/A	N/A
Non-Relieving Piston Kit	N/A	N/A	N/A	N/A
Body Service Kit (Balanced Poppet)	N/A	N/A	N/A	N/A
Gauges: Low Pressure 0 to 410 kPa (0 to 60 psig)	K4515N14060		K4520N14060	
Standard Pressure 0 to 1100 kPa (0 to 160 psig)	K4515N14160		K4520N14160	
High Pressure 0 to 2070 kPa (0 to 300 psig)	K4515N14300		K4520N14300	

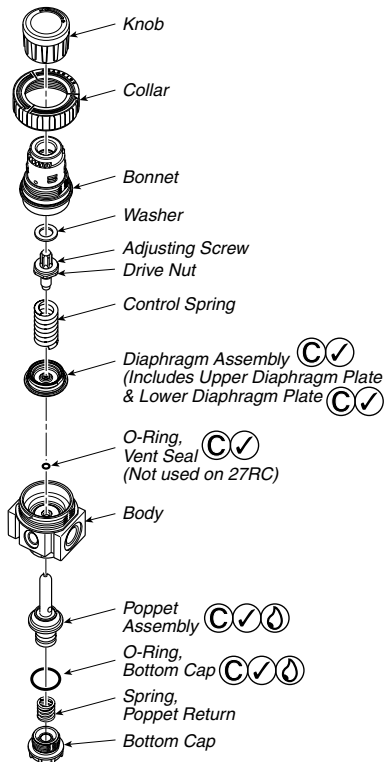


Figure 1: Economy & Precision

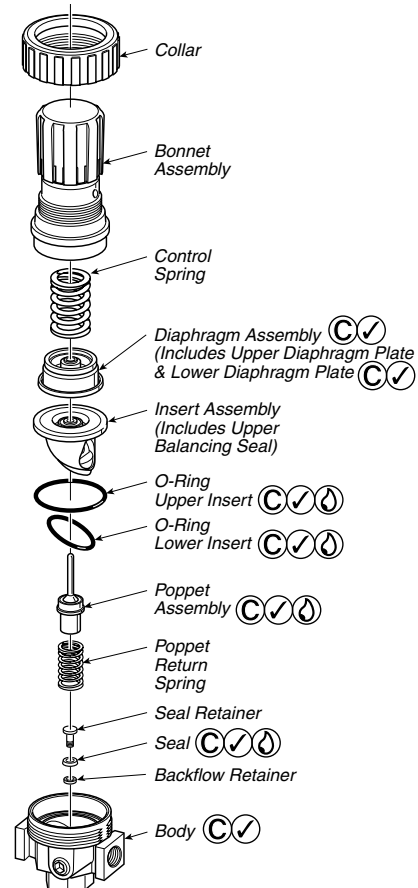


Figure 2: Compact & Standard

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<p>To avoid unpredictable system behavior that can cause personal injury and property damage:</p> <ul style="list-style-type: none"> • Disconnect electrical supply (when necessary) before installation, servicing, or conversion. • Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion. • Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions. • Medium must be moisture-free if ambient temperature is below freezing. • Service according to procedures listed in these instructions. • Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied. • After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use. • Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

⚠ WARNING
<p>Product rupture can cause serious injury. Do not connect regulator to bottled gas. Do not exceed maximum primary pressure rating.</p>

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:	PSIG	bar
PRIMARY – Maximum	150	10.34
SECONDARY – Spring Pressure		
40 PSIG Minimum	2	0.14
Maximum	40	2.76
120 PSIG Minimum	2	0.14
Maximum	120	8.27

Operating Temperature Range:

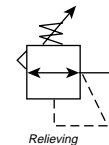
-18°C † to 65°C (0°F to 150°F)

† Temperatures below 0°C (32°F) require moisture free air.

Installation:

1. Regulator should be installed with reasonable accessibility for service whenever possible — repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe — never into the female port. Do not use PTFE tape to seal pipe joints — pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.
2. Install regulator so that air flows from "IN" to "OUT" as marked on the regulator. Installation must be upstream from devices it is to service (lubricator, valve, cylinder or tool), and mounted closely to these devices. Mounting may be in any position.
3. Gauge ports are located on both sides of the regulator body for your convenience. It is necessary to install a gauge or pipe plug into each port during installation.
4. Remove plastic plug from vent hole in bonnet.
5. For protection against rust, pipe scale and other foreign matter, install a filter on the upstream (high pressure) side as closely to the regulator as possible.

ANSI Symbols



Service Kits / Accessories:

Service Kits 2-40 PSIG 2-120 PSIG 2-120 PSIG High Relieving	RKR210A* RKR210C* RKR220C*
Mounting Brackets Pipe Mounting Right Angle Mounting	SA200YW57 446-707-045

* Parts in Kit

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Operation

1. Before turning on the air supply, turn the adjusting knob counterclockwise until compression is released from the control spring. Then turn on air supply and adjust regulator to desired secondary pressure by turning adjusting knob clockwise. This permits pressure to build up slowly, preventing any unexpected operation of the valve, cylinders, tools, etc., attached to the line. Adjustment to desired secondary pressure can be made only with primary pressure applied to the regulator.
2. To decrease regulator pressure setting, always reset from a pressure lower than the final setting desired. For example, lowering the secondary pressure from 5.5 to 4.1 bar (80 to 60 PSIG) is best accomplished by dropping the secondary pressure to 3.5 kPa (50 PSIG), then adjusting upward to 4.1 bar (60 PSIG).

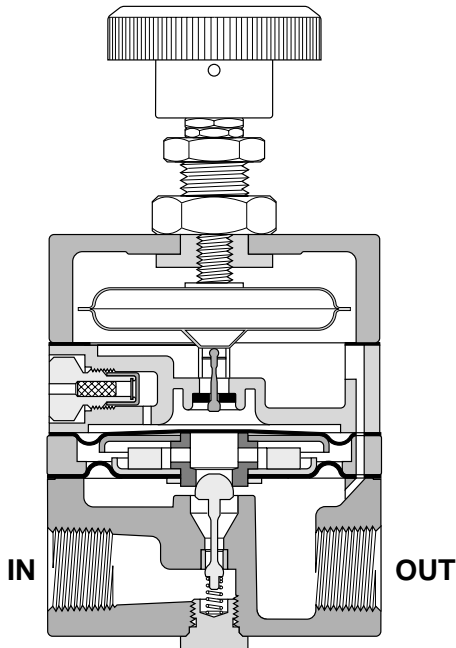


Figure 1

CAUTION

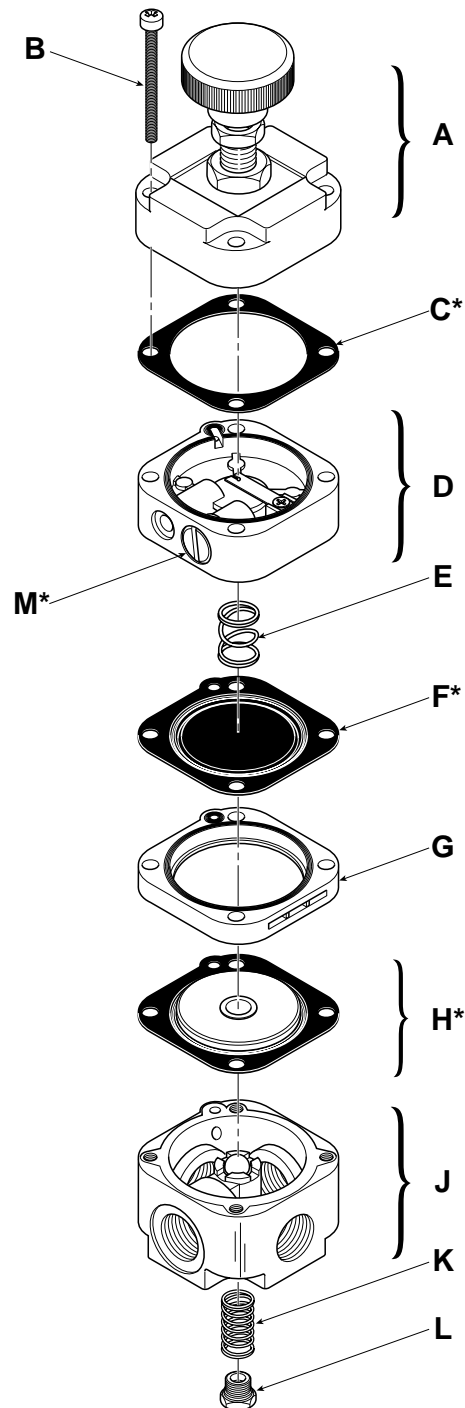
REGULATOR PRESSURE ADJUSTMENT - The working range of the knob adjustment is designed to permit outlet pressures within their full range. Pressure adjustment beyond this range is also possible because the knob is not a limiting device. This is a common characteristic of most industrial regulators, and limiting devices may be obtained only by special design.

Service: (Always vent all air pressure before servicing)

1. Turn the control knob (A) fully counterclockwise. Remove upstream air supply.
2. Remove four screws (B) holding the bonnet (A) in place. Remove bonnet assembly, gasket (C), balance control assembly (D), spring (E), protector diaphragm (F), diaphragm housing (G), and control diaphragm (H). Discard gasket (C), protector diaphragm (F), and control diaphragm (H).
3. Remove bleed screw (M) and discard.
4. Remove spring retainer (L) and spring (K).
5. Clean all retained parts with mild soap and water.
6. Install spring (K) and spring retainer (L) into body making sure that the spring is installed correctly, see Fig. 1. Tighten spring retainer 2.6 to 3.1 Nm (23 to 27 in-lbs).

7. Place the new control diaphragm (H) onto the body (K). Put diaphragm housing (G) on next followed by the new protector diaphragm (F) and spring (E). Put balance control assembly (D) on next then the new gasket (C) followed by bonnet assembly (A) and reassemble the four screws (B). Tighten screws 3.2 to 3.6 Nm (28 to 32 in-lbs) in progressive steps using a crisscross pattern.
8. Install new bleed screw (M). Tighten screw 1.5 to 1.9 Nm (13 to 17 in-lbs) in progressive steps using a crisscross pattern.
9. Admit inlet pressure and turn the adjusting knob (A) to obtain the desired pressure.

NOTE: A slight flow of air through the bonnet vent hole is necessary for proper operation of the regulator.



* Parts in Service Kit

Figure 2

⚠ WARNING

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

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

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety

⚠ CAUTION

EXCEPT as otherwise specified by the manufacturer, this product is specifically designed for compressed air service only, and use with any other fluid (liquid or gas) is a misapplication. For example, use with or injection of certain hazardous liquid or gases in the system (such as alcohol or liquid petroleum gas) could be harmful to the unit or result in a combustible condition or hazardous external leakage. Manufacturer's warranties are void in the event of misapplication, and manufacturer assumes no responsibility for any resulting loss.

The relief flow capacity of relieving type regulators is limited. Under some operating conditions, the secondary (outlet) pressure could increase above the initial setting. If overpressure conditions could cause malfunctions or failure of downstream equipment, additional external pressure relief devices of suitable capacity must be installed.

Before using with fluids other than air, or for nonindustrial applications, or for life support systems, consult manufacturer for written approval.

Introduction

Follow these instructions when installing, operating, or servicing this product.

General Information

The 302 Series 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.

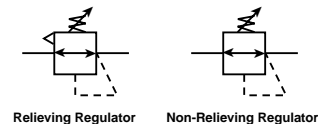
Specifications

- 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**..... 1/4" (.63 cm) Water Column
- Ambient Temperature**-40°F to +200°F, (-40°C to 93.3°C)
- ATEX 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**..... Nitrile on Dacron
- Trim**..... Brass

Symbol



Installation

Clean all pipe lines to remove dirt and scale before installation. Apply a minimum amount of pipe compound to the male threads of the fitting only. Do not use PTFE tape to seal the threads. Start with the third thread back and work away from the end of the fitting to avoid the possibility of contaminating the regulator. Install the regulator in the airline. The inlet and outlet connections are labeled on the underside of the regulator with the arrows pointing in the direction of the flow. Tighten connections securely. Avoid undersized fittings that will limit the flow through the regulator and cause a pressure drop downstream. For more information, see Figure 1 and Figure 2.

NOTE: Oil free air must be applied to the regulator. Use a filter to remove dirt and entrained liquid in the airline ahead of the regulator. If an airline lubricator is used, it MUST be located downstream of the regulator, to avoid interference with regulator performance.

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Operation

1. Before turning on the air supply, turn the adjusting knob counterclockwise until compression is released from the control spring. Then turn on air supply and adjust regulator to desired secondary pressure by turning adjusting knob clockwise. This permits pressure to build up slowly, preventing any unexpected operation of the valve, cylinders, tools, etc., attached to the line. Adjustment to desired secondary pressure can be made only with primary pressure applied to the regulator.
2. To decrease regulator pressure setting, always reset from a pressure lower than the final setting desired. For example, lowering the secondary pressure from 80 to 60 PSIG (550 to 410 kPa) is best accomplished by dropping the secondary pressure to 50 PSIG (350 kPa), then adjusting upward to 60 PSIG (410 kPa). Tighten the lock knob against the bonnet to lock the pressure setting.

Service

1. Turn the control knob (1) fully counterclockwise. Remove upstream air supply. Remove downstream air also for non-relieving type regulators.
2. Remove two # 10-32 screws (19) on the bottom of the regulator body (13) releasing the retaining plate (17) and cap (18). Pull out the inner valve assembly (16) and screen (15). Discard inner valve assembly and screen.
3. Remove four screws (5) holding the bonnet (6) in place. Remove bonnet, spring seat (7), spring (8) and diaphragm assembly (9). Discard diaphragm assembly.
4. Remove the four screws (10) holding the seal plate and jet tube assembly (11) and carefully lift out the assembly taking precautions not to bend the jet tube. Remove the cork seal plate gasket (12) and discard.
5. Tap the seat ring (14) out of the bottom side of the regulator body (13) using a wooden dowel. Discard seat ring.
6. Clean all retained parts with mild soap and water.
7. Insert the new seat ring (13) into the body making sure the brass side enters first. Press into place being careful not to damage the rubber seat. Note: a small amount of silicone grease applied to the outside of the seat ring is advised for easy assembly.
8. Assemble the new cork gasket (12) and jet tube assembly (11), making sure the jet tube is positioned into the outlet port of the regulator. Insert and tighten the four retaining screws (10).
9. Insert the new inner valve assembly (16) making sure the screen (15) is centrally located in the groove on the top side of the valve body. Replace the retaining plate (17) and cap (18), and securely tighten using the two #10-32 screws (19).
10. Place the new diaphragm assembly (9) over the valve stem and pilot bushing. Align the screw holes in the diaphragm with those in the regulator body (16). Place the main spring (8) and spring seat (7) into position on top of the diaphragm assembly.
11. Place the bonnet (6) into position over the spring seat (7) and reassemble the four screws (5). Tighten screws in progressive steps using a crisscross pattern.
12. Admit inlet pressure and turn the adjusting knob to obtain the desired pressure.

NOTE: A slight flow of air through the bonnet vent hole is necessary for proper operation of the regulator

302 Series Kits and Accessories

Service Kits

0 to 2 PSIG, Nitrile, Relieving.....	PS16116-1
0 to 2 PSIG & 0 to 10 PSIG, Nitrile, Nonrelieving.....	PS16116-2
0 to 2 PSIG, Fluorocarbon, Relieving.....	PS16116-9
0 to 2 PSIG & 0 to 10 PSIG, Fluorocarbon, Nonrelieving..	PS16116-10
0 to 10, 1/2 to 30, 1 to 60, & 2 to 100 PSIG, Relieving.....	PS16116-13
1/2 to 30, 1 to 60, & 2 to 100 PSIG, Nonrelieving	PS16116-14
1/2 to 30, 1 to 60, & 2 to 100 PSIG, Fluorocarbon, Relieving.....	PS16116-21
1/2 to 30, 1 to 60, & 2 to 100 PSIG, Fluorocarbon, Nonrelieving	PS16116-22

Tamper Resistant Kit..... PS12163

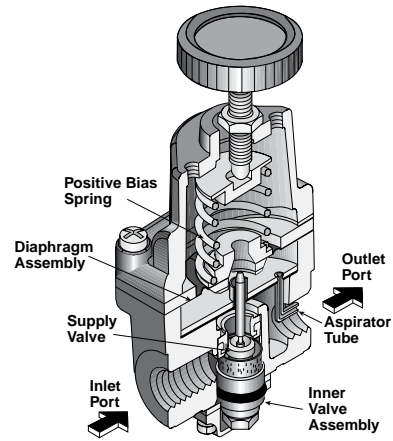


Figure 1

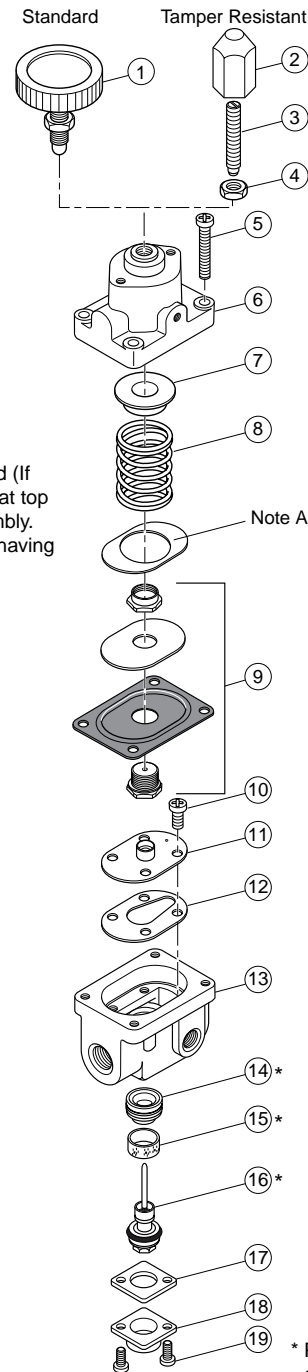


Figure 2

Note A:
Gasket to be applied (If Required) to piston at top of diaphragm assembly. Use only with units having old style bonnets.

* Part number depends on options and pressure range

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- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
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The relief flow capacity of relieving type regulators is limited. Under some operating conditions, the secondary (outlet) pressure could increase above the initial setting. If overpressure conditions could cause malfunctions or failure of downstream equipment, additional external pressure relief devices of suitable capacity must be installed.

Before using with fluids other than air, or for nonindustrial applications, or for life support systems, consult manufacturer for written approval.

Introduction

Follow these instructions when installing, operating, or servicing this product.

General Information

The 102 Series 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.

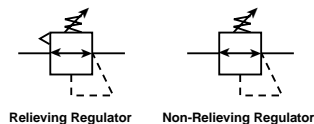
Specifications

- 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 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 0.1 PSIG, (.007 bar), (.7 kPa) for 100 PSIG, (7.0 bar), (700 kPa) change in Supply Pressure
- Sensitivity** less than 1/8" (.32 cm) Water Column
- Ambient Temperature** -40°F to +200°F, (-40°C to 93.3°C)
- ATEX 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

Symbol



Installation

Clean all pipe lines to remove dirt and scale before installation. Apply a minimum amount of pipe compound to the male threads of the fitting only. Do not use PTFE tape to seal the threads. Start with the third thread back and work away from the end of the fitting to avoid the possibility of contaminating the regulator. Install the regulator in the airline. The inlet and outlet connections are labeled on the underside of the regulator with the arrows pointing in the direction of the flow. Tighten connections securely. Avoid undersized fittings that will limit the flow through the regulator and cause a pressure drop downstream. For more information, see Figure 1 and Figure 2.

NOTE: Oil free air must be applied to the regulator. Use a filter to remove dirt and entrained liquid in the airline ahead of the regulator. If an airline lubricator is used, it **MUST** be located downstream of the regulator, to avoid interference with regulator performance.

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2. To decrease regulator pressure setting, always reset from a pressure lower than the final setting desired. For example, lowering the secondary pressure from 80 to 60 PSIG (550 to 410 kPa) is best accomplished by dropping the secondary pressure to 50 PSIG (350 kPa), then adjusting upward to 60 PSIG (410 kPa). Tighten the lock nut against the bonnet to lock the pressure setting.

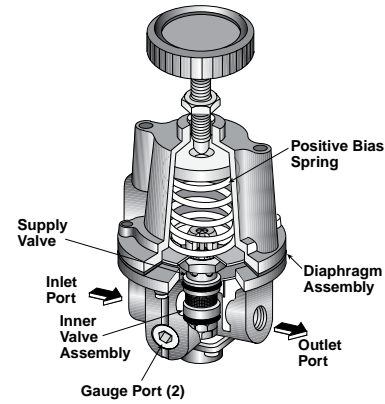


Figure 1

Service (Figure 2)

1. Turn the control knob (1) fully counterclockwise. Remove upstream air supply. Remove downstream air also for non-relieving type regulators.
2. Remove two # 10-32 screws (20) on the bottom of the regulator body (14) releasing the retaining plate (18) and cap (19). Pull out the inner valve assembly (17) and screen (16). Discard inner valve assembly and screen.
3. Remove six screws (5) holding the bonnet (6) in place. Remove bonnet, spring cap (7), spring (8) and diaphragm assembly (10). Discard diaphragm assembly.
4. Remove the four screws (7) holding the seal plate and jet tube assembly (8) and carefully lift out the assembly taking precautions not to bend the jet tube. Remove the cork seal plate gasket (9) and discard.
5. Tap the seat ring (15) out of the bottom side of the regulator body (14) using a wooden dowel. Discard seat ring.
6. Clean all retained parts with mild soap and water.
7. Insert the new seat ring (15) into the body making sure the brass side enters first. Press into place being careful not to damage the rubber seat. Note: a small amount of silicone grease applied to the outside of the seat ring is advised for easy assembly.
8. Assemble the new seal plate gasket (13) and seal plate (12), making sure the jet tube is positioned into the outlet port of the regulator. Insert and tighten the four retaining screws (11).
9. Insert the new inner valve assembly (17) making sure the screen (16) is centrally located in the groove on the top side of the valve body. Replace the retaining plate (18) and cap (19), and securely tighten using the two #10-32 screws (20).
10. Place the new diaphragm assembly (10) over the valve stem and pilot bushing. Align the screw holes in the diaphragm with those in the regulator body (14). Place the main spring (8) and spring seat (7) into position on top of the diaphragm assembly.
11. Place the bonnet (6) into position over the spring seat (7) and reassemble the six screws (5). Tighten screws in progressive steps using a crisscross pattern.
12. Admit inlet pressure and turn the adjusting knob to obtain the desired pressure.

NOTE: Keep the vent hole in the Bonnet clear for proper regulator operation. Lubricate the adjusting screw with Molycote "G".

Operating Principles

The 102 Series regulator uses 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.

102 Series Kits & Accessories

Mounting Bracket Kit –

Zinc Plated Steel	PS09921
Stainless Steel.....	PS14523

Service Kits

0 to 200 PSIG, Relieving	PS12125-1
0 to 200 PSIG, Nonrelieving	PS12125-4
0 to 200 PSIG Fluorocarbon, Relieving	PS12495-1
0 to 200 PSIG Fluorocarbon, Non-Relieving	PS12495-2
300 to 400 PSIG, Relieving	PS12126-1
300 to 400 PSIG, Non-Relieving	PS12126-4
300 to 400 PSIG, Fluorocarbon, Relieving	PS18017-1
300 to 400 PSIG, Fluorocarbon, Non-Relieving	PS18017-2

Tamper Resistant Kit.....PS12165

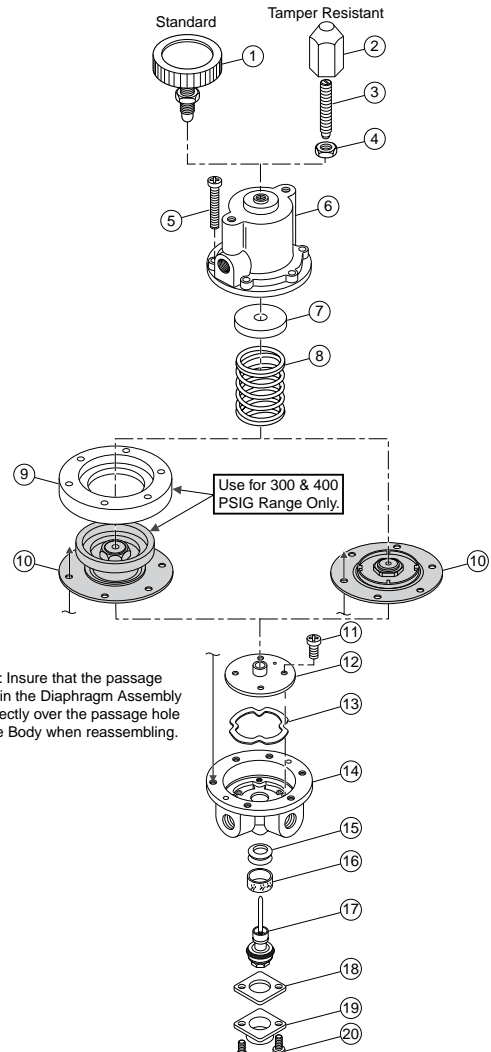


Figure 2

⚠ WARNING

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

⚠ WARNING

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

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety

⚠ CAUTION

EXCEPT as otherwise specified by the manufacturer, this product is specifically designed for compressed air service only, and use with any other fluid (liquid or gas) is a misapplication. For example, use with or injection of certain hazardous liquid or gases in the system (such as alcohol or liquid petroleum gas) could be harmful to the unit or result in a combustible condition or hazardous external leakage. Manufacturer's warranties are void in the event of misapplication, and manufacturer assumes no responsibility for any resulting loss.

The relief flow capacity of relieving type regulators is limited. Under some operating conditions, the secondary (outlet) pressure could increase above the initial setting. If overpressure conditions could cause malfunctions or failure of downstream equipment, additional external pressure relief devices of suitable capacity must be installed.

Before using with fluids other than air, or for nonindustrial applications, or for life support systems, consult manufacturer for written approval.

Introduction

Follow these instructions when installing, operating, or servicing this product.

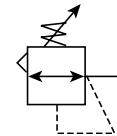
General Information

The Model 171 Series is a high accuracy vacuum regulator that provides uniform vacuum regulation independent of vacuum supply changes and flow demand.

Specifications

- Vacuum Supply (Max)** 760 torr (29.92 Hg) (Full Vacuum)
- Flow Capacity**3 SCFM @ 650 torr Supply, 250 torr setpoint
- Sensitivity**..... 1/8" W.C.
- Ambient Temperature Limits** -40F to +200°F, (-40°C to +93.2°C)
- Vacuum Supply Effect**..... Less than 1 torr for 100 torr change in vacuum supply
- Materials of Construction –**
- Body & Housing**.....Aluminum
- Elastomers** Nitrile
- Trim** Brass, Zinc Plated Steel

Symbol



Installation

Clean all pipe lines to remove dirt and scale before installation. Apply a minimum amount of pipe compound to the male threads of the fitting only. Start with the third thread back and work away from the end of the fitting to avoid the possibility of contaminating the regulator. Install the regulator in the airline. The inlet and outlet connections are labeled on the underside of the regulator with the arrows pointing in the direction of the flow. Tighten connections securely. Avoid undersized fittings that will limit the flow through the regulator and cause a pressure drop downstream. For more information, see Figure 1.

NOTE: Oil free air must be applied to the regulator. Use a filter to remove dirt and entrained liquid in the airline ahead of the regulator. If an airline lubricator is used, it **MUST** be located downstream of the regulator, to avoid interference with regulator performance.

⚠ WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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Operation

1. Before turning on the air supply, turn the adjusting knob counterclockwise until compression is released from the control spring. Then turn on air supply and adjust regulator to desired secondary pressure by turning adjusting knob clockwise. This permits pressure to build up slowly, preventing any unexpected operation of the valve, cylinders, tools, etc., attached to the line. Adjustment to desired secondary pressure can be made only with primary pressure applied to the regulator.
2. To decrease regulator pressure setting, always reset from a pressure lower than the final setting desired. For example, lowering the secondary pressure from 550 to 410 kPa (80 to 60 PSIG) is best accomplished by dropping the secondary pressure to 350 kPa (50 PSIG), then adjusting upward to 410 kPa (60 PSIG).
Tighten the lock knob against the bonnet to lock the pressure setting.

Maintenance Procedures

1. Before assembly, shut off the valve that is supplying air to the regulator. This is to prevent air from escaping. It is not necessary to remove the regulator from the airline.
2. Remove the two Screws from the bottom of the unit.
3. Pull out the Inner Valve Assembly. Wash the Seat on the Inner Valve Assembly carefully.
4. Wipe off any particles that may be attached to rubber Seat Ring in Body.
5. Replace the assembly carefully.
6. Keep the vent hole in the Bonnet clear for proper regulator operation. Lubricate the adjusting screw with Molycote®G.

NOTE: Avoid such solvents as acetone, carbon tetrachloride and trichorethylene.

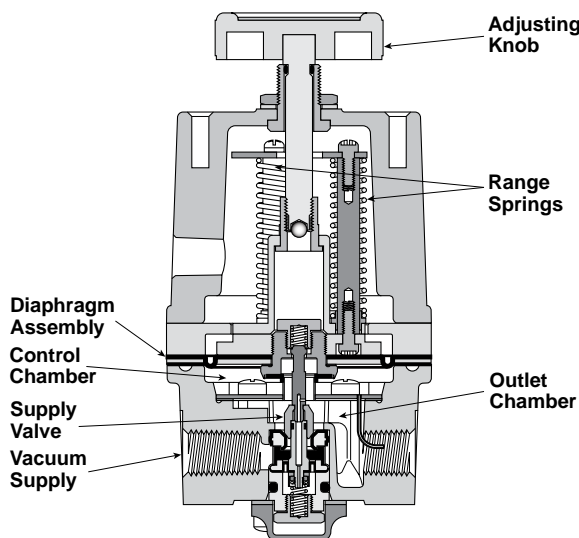


Figure 1

171 Series Kits and Accessories

Service Kits

(Includes Diaphragm Assy, Valve Assy, Seat Assy & Gasket) –

0-5" Hg, Nitrile, Nonrelieving	PS20966-1
0-5" Hg, Fluorocarbon, Nonrelieving	PS20966-2
0-5" Hg, Nitrile, Relieving.....	PS20966-3
0-5" Hg, Fluorocarbon, Relieving.....	PS20966-4
0-15" Hg, Nitrile, Nonrelieving	PS20966-5
0-15" Hg, Fluorocarbon, Nonrelieving	PS20966-6
0-15" Hg, Nitrile, Relieving.....	PS20966-7
0-15" Hg, Fluorocarbon, Relieving.....	PS20966-8
0-30" Hg, Nitrile, Nonrelieving	PS20966-9
0-30" Hg, Fluorocarbon, Nonrelieving	PS20966-10
0-30" Hg, Nitrile, Relieving.....	PS20966-11
0-30" Hg, Fluorocarbon, Relieving.....	PS20966-12

Wall Mounting Bracket.....PS09921

Tamperproof Resistant Kit..... PS20967-1

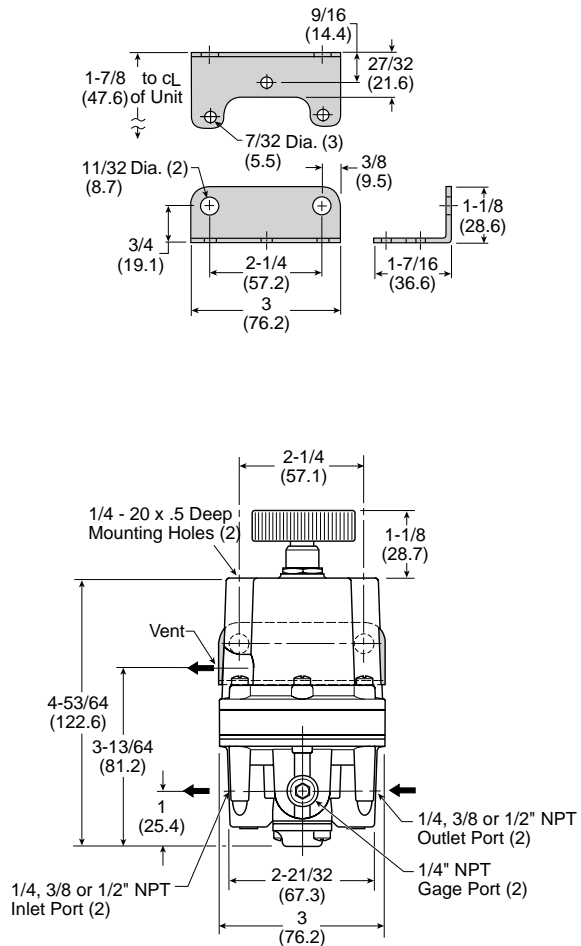


Figure 2

 **WARNING**

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

 **WARNING**

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

Safety Guide

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 **CAUTION**

EXCEPT as otherwise specified by the manufacturer, this product is specifically designed for compressed air service only, and use with any other fluid (liquid or gas) is a misapplication. For example, use with or injection of certain hazardous liquid or gases in the system (such as alcohol or liquid petroleum gas) could be harmful to the unit or result in a combustible condition or hazardous external leakage. Manufacturer's warranties are void in the event of misapplication, and manufacturer assumes no responsibility for any resulting loss.

The relief flow capacity of relieving type regulators is limited. Under some operating conditions, the secondary (outlet) pressure could increase above the initial setting. If overpressure conditions could cause malfunctions or failure of downstream equipment, additional external pressure relief devices of suitable capacity must be installed.

Before using with fluids other than air, or for nonindustrial applications, or for life support systems, consult manufacturer for written approval.

Introduction

Follow these instructions when installing, operating, or servicing this product.

General Information

The 208 Series can be mounted in any position without affecting its operation. It can be mounted to a flat surface using Mounting

Bracket PS09921 For more information, see mounting bracket dimensions.

Clean all pipelines to remove dirt and scale before installation.

Apply a minimum amount of pipe compound to the male threads of the fitting only. Do Not use PTFE tape as a sealant. Start with the third thread back and work away from the end of the fitting to avoid the possibility of contaminating the booster. Install the booster in the air line.

The inlet and outlet ports are labeled on the underside of the booster with the arrows pointing in the direction of the flow. Tighten connections securely. Avoid undersized fittings that will limit the flow through the booster and cause a pressure drop down stream. For more information, see Figure 1.

Note: Oil free air must be applied to the booster. Use a filter to remove dirt and entrained liquid in the air line ahead of the booster. If an air line lubricator is used, it **MUST** be located downstream of the booster, to avoid interference with booster performance.

Operation

The 208 Series reproduces a pneumatic signal in a 1:1 ratio or in multiplying or dividing ratios. ($P_o = P_s \times R$); where P_o is output pressure, P_s is signal pressure, R is ratio.

Maintenance

To clean the 208 Series, use the following procedure:

1. Before disassembly, shut off the valve that is supplying air to the booster. This is to prevent air from escaping. It is not necessary to remove the booster from the air line.
2. Remove the two Screws from the bottom of the unit.
3. Remove the Inner Valve Assembly. Wash the Seat on the Inner Valve Assembly carefully.
4. Wipe off any particles that may be attached to rubber Seat Assembly.
5. Replace the assembly carefully. For more information, see Figure 1.

 **WARNING**

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Note: Avoid such solvents as acetone, carbon tetrachloride and trichlorethylene. If the standard maintenance procedure does not correct the trouble, install service kit.

Operating Principles

The 208 Series 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. See Figure 1.

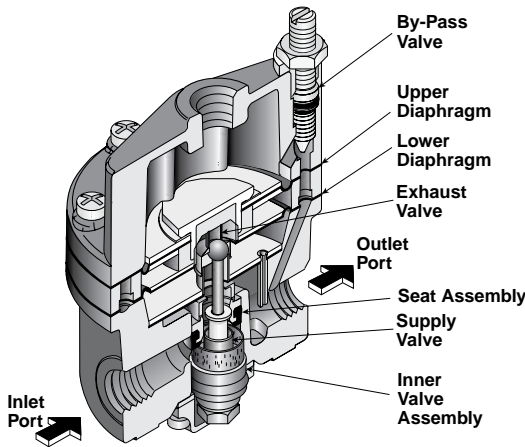


Figure 1.

Materials of Construction

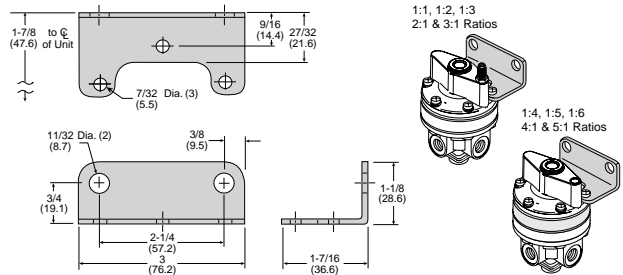
- Body and Housing Aluminum
- Diaphragm Nitrile on Dacron Fabric
- Trim Zinc Plated Steel, Brass

208 Series Kits and Accessories

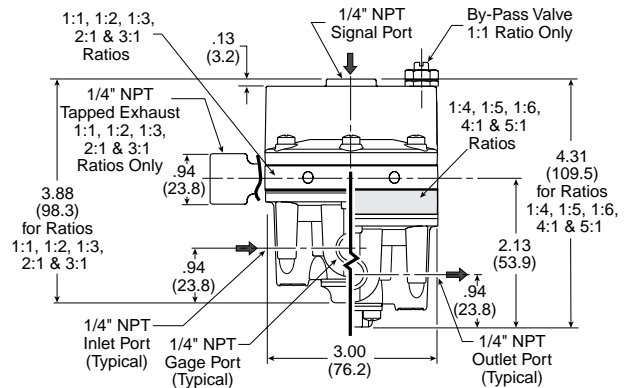
Service Kits

- 1:1 Ratio PS19513-11
- 1:1 Ratio w/ By-Pass Valve PS19513-11I
- 1:1 Ratio, Non-Relieving PS19513-11N
- 1:2 Ratio PS19513-12
- 1:2 Ratio, Non-Relieving PS19513-12N
- 1:3 Ratio PS19513-13
- 1:3 Ratio, Non-Relieving PS19513-13N
- 2:1 Ratio PS19513-21
- 2:1 Ratio, Non-Relieving PS19513-21N
- 3:1 Ratio PS19513-31
- 3:1 Ratio, Non-Relieving PS19513-31N
- 4:1 Ratio PS19513-41
- 1:4 Ratio PS19513-14
- 1:5 Ratio PS19513-15
- 1:6 Ratio PS19513-16
- 5:1 Ratio PS19513-51
- 1:1 Ratio, Fluorocarbon PS19513-11J
- 1:1 Ratio, Fluorocarbon, Non-Relieving PS19513-11JN
- 1:2 Ratio, Fluorocarbon PS19513-12J
- 2:1 Ratio, Fluorocarbon PS19513-21J

Mounting Bracket PS09921



Dimensions



Functional Specifications

Ratio	Signal:Output										
	1:1	1:2	1:3	1:4	1:5	1:6	2:1	3:1	4:1	5:1	
Maximum Output Pressure	PSIG (bar)	150 (10.0)	150 (10.0)	150 (10.0)	150 (10.0)	150 (10.0)	150 (10.0)	75 (5.0)	50 (3.5)	37.5 (2.6)	30 (2.0)
Maximum Supply Pressure	PSIG (bar)	250 (17.0)	250 (17.0)	250 (17.0)	250 (17.0)	250 (17.0)	250 (17.0)	250 (17.0)	250 (17.0)	250 (17.0)	250 (17.0)
Flow Capacity SCFM, (m ³ /HR)		45 (76.5)	45 (76.5)	45 (76.5)	45 (76.5)	45 (76.5)	45 (76.5)	45 (76.5)	45 (76.5)	45 (76.5)	45 (76.5)
Exhaust Capacity SCFM, (m ³ /HR)		11 (18.7)	11 (18.7)	11 (18.7)	7.5 (12.8)	7.5 (12.8)	7.5 (12.8)	11 (18.7)	11 (18.7)	7.5 (12.8)	7.5 (12.8)
100 PSIG, (7.0 bar) Supply, 20 PSIG, (1.5 bar) Output.											
Downstream Pressure 5 PSIG, (.35 bar) Above Output Pressure Set Point of 20 PSIG, (1.5 bar).											

Performance Specifications

Sensitivity (Water Column)	1/4" (.64 cm)	1/2" (1.27 cm)	3/4" (1.9 cm)	1" (2.54 cm)	1-1/4" (3.18 cm)	1-1/2" (3.8 cm)	1/2" (1.27 cm)	1/2" (1.27 cm)	3/4" (1.9 cm)	3/4" (1.9 cm)	
Ratio Accuracy	1.0	1.0	1.0	2.0	2.0	2.0	—	—	—	—	
% of 100 PSIG, (7.0 bar) Output Span											
% of Output Span with (7.0 bar) Input Span	—	—	—	—	—	—	2.0	2.0	2.0	2.0	
Supply Pressure Effect for change of 100 PSIG, (7.0 bar).	PSIG (bar)	0.10 (.007)	0.20 (.014)	0.30 (.021)	0.40 (.028)	0.50 (.034)	0.60 (.041)	0.10 (.007)	0.10 (.007)	0.10 (.007)	
Ambient Temperature	°F (°C)	-40° to 200° (-40° to 93.3°)									
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.									

 **WARNING**

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
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 **WARNING**

Product rupture can cause serious injury.
Do not connect regulator to bottled gas.
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Before using with fluids other than air, or for nonindustrial applications, or for life support systems, consult manufacturer for written approval.

Introduction

Follow these instructions when installing, operating, or servicing this product.

General Information

The 45 Series can be mounted in any position without affecting its operation.

Clean all pipelines to remove dirt and scale before installation.

Apply a minimum amount of pipe compound to the male threads of the fitting only. Do Not use PTFE tape as a sealant. Start with the third thread back and work away from the end of the fitting to avoid the possibility of contaminating the booster. Install the booster in the air line.

The inlet and outlet ports are labeled "IN" and "OUT". Tighten connections securely. Avoid undersized fittings that will limit the flow through the booster. For more information, see Figure 1.

Note: Oil free air must be applied to the booster. Use a filter to remove dirt and entrained liquid in the air line ahead of the booster. If an air line lubricator is used, it **MUST** be located downstream of the booster, to avoid interference with booster performance.

Operation

The 45 Series reproduces a pneumatic signal in a 1:1 ratio or in multiplying or dividing ratios. ($P_o = P_s \times R$); where P_o is output pressure, P_s is signal pressure, R is ratio.

Maintenance

To clean the 45 Series, use the following procedure:

1. Before disassembly, shut off the valve that is supplying air to the booster. This is to prevent air from escaping. It is not necessary to remove the booster from the air line.
 2. Remove the four Screws and four Washers from the bottom of the unit.
 3. Remove the Inner Valve Assembly. Wash the Seat on the Inner Valve Assembly carefully.
- Note:** Avoid such solvents as acetone, carbon tetrachloride and trichlorethylene. If the standard maintenance procedure does not correct the trouble, install service kit.
5. Replace the assembly carefully. Ensure that the Vent in the exterior part of the Inner Valve Assembly and the Exhaust Vents in the Spacer Ring are clear. For more information, see Figure 1.

 **WARNING**

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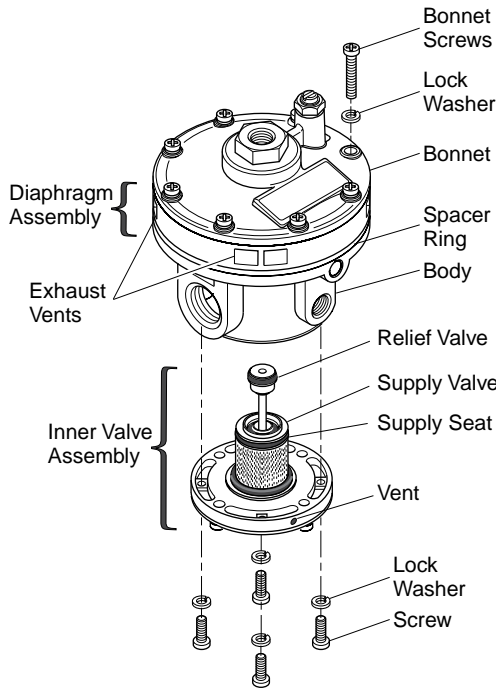


Figure 1.

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. For more information, see Figure 2.

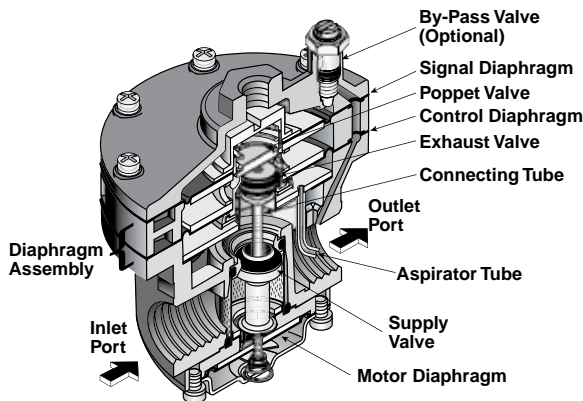


Figure 2.

Functional Specifications

Ratio		Signal:Output				
		1:1	1:2	1:3	2:1	3:1
Maximum Output Pressure	PSIG (bar)	150 (10.0)	150 (10.0)	150 (10.0)	75 (5.0)	50 (3.5)
	PSIG (bar)	250 (17.0)	250 (17.0)	250 (17.0)	250 (17.0)	250 (17.0)
Flow Capacity SCFM, (m ³ /HR) 100 PSIG, (7.0 bar) Supply, 20 PSIG, (1.5 bar) Output.		150 (255)	150 (255)	150 (255)	150 (255)	150 (255)
Exhaust Capacity SCFM, (m ³ /HR) Downstream Pressure 5 PSIG, (.35 bar) Above Output Pressure Set Point of 20 PSIG, (1.5 bar).		40 (65.2)	40 (65.2)	40 (65.2)	40 (65.2)	40 (65.2)

Performance Specifications

Sensitivity (Water Column)	in. (cm)	1" (2.54)	2" (5.08)	3" (7.62)	2" (5.08)	2" (5.08)
Ratio Accuracy		3.0	3.0	3.0	—	—
% of 100 PSIG (7.0 bar) Output Span		—	—	—	3.0	3.0
% of Output Span with 100 PSIG (7.0 bar) Input Span		0.10 (.007)	0.20 (.014)	0.30 (.021)	0.10 (.007)	0.10 (.007)
Supply Pressure Effect for change of 100 PSIG, (7.0 bar).		-40° to 200° (-40° to 93.3°)				
Ambient Temperature		Acceptable for use in Zones 1 and 2 for gas atmosphere; Groups IIA and IIB and Zones 21 and 22 for dust atmospheres.				
Hazardous Locations						

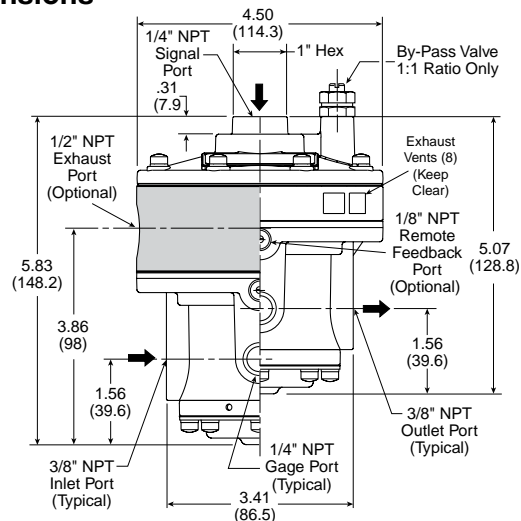
Materials of Construction

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

45 Series Kits and Accessories

- Service Kits**
- 1:1 Ratio PS19549-1
 - 1:1 Ratio w/ Tapped Exhaust PS19549-1E
 - 1:1 Ratio Fluorocarbon Service Kit..... PS19549-1J
 - 3:1 Ratio Service Kit..... PS19549-5
 - 1:3 Ratio PS19549-3
 - 2:1 Ratio PS19549-4
 - 2:1 Ratio w/ Tapped Exhaust PS19549-4E
 - 1:2 Ratio PS19549-2
 - 1:1 w/ Tapped Exhaust, I Option..... PS19549-20E

Dimensions



⚠ WARNING

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

⚠ WARNING

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

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety

⚠ CAUTION

EXCEPT as otherwise specified by the manufacturer, this product is specifically designed for compressed air service only, and use with any other fluid (liquid or gas) is a misapplication. For example, use with or injection of certain hazardous liquid or gases in the system (such as alcohol or liquid petroleum gas) could be harmful to the unit or result in a combustible condition or hazardous external leakage. Manufacturer's warranties are void in the event of misapplication, and manufacturer assumes no responsibility for any resulting loss.

The relief flow capacity of relieving type regulators is limited. Under some operating conditions, the secondary (outlet) pressure could increase above the initial setting. If overpressure conditions could cause malfunctions or failure of downstream equipment, additional external pressure relief devices of suitable capacity must be installed.

Before using with fluids other than air, or for nonindustrial applications, or for life support systems, consult manufacturer for written approval.

Introduction

Follow these instructions when installing, operating, or servicing this product.

General Information

The 102BP Series 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.

Specifications

Set Point Range	System Pressure (Maximum)
2-200 PSIG (0.15-14 bar) (15-1400 kPa)	300 PSIG (21.0 bar) (2100 kPa)
300-400 PSIG (21-28 bar) (2100-2800 kPa)	500 PSIG (35.0 bar) (3500 kPa)

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 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 0.1 PSIG, (.007 bar), (.7 kPa) for 100 PSIG, (7.0 bar), (700 kPa) change in Supply Pressure

Sensitivity..... less than 1/8" (.32 cm) Water Column

Ambient Temperature -40°F to +200°F, (-40°C to 93.3°C)

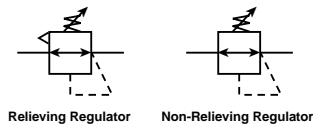
ATEX Hazardous Locations –

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

Symbol



Installation

Clean all pipe lines to remove dirt and scale before installation. Apply a minimum amount of pipe compound to the male threads of the fitting only. Do not use PTFE tape to seal the threads. Start with the third thread back and work away from the end of the fitting to avoid the possibility of contaminating the regulator. Install the regulator in the airline. The inlet and outlet connections are labeled on the underside of the regulator with the arrows pointing in the direction of the flow. Tighten connections

⚠ WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or systems in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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102BP Series Standard Precision Regulator

2R410

securely. Avoid undersized fittings that will limit the flow through the regulator and cause a pressure drop downstream. For more information, see Figure 1 and Figure 2.

NOTE: Oil free air must be applied to the regulator. Use a filter to remove dirt and entrained liquid in the airline ahead of the regulator. If an airline lubricator is used, it **MUST** be located downstream of the regulator, to avoid interference with regulator performance.

Operation

1. Before turning on the air supply, turn the adjusting knob counterclockwise until compression is released from the control spring. Then turn on air supply and adjust regulator to desired secondary pressure by turning adjusting knob clockwise. This permits pressure to build up slowly, preventing any unexpected operation of the valve, cylinders, tools, etc., attached to the line. Adjustment to desired secondary pressure can be made only with primary pressure applied to the regulator.
2. To decrease regulator pressure setting, always reset from a pressure lower than the final setting desired. For example, lowering the secondary pressure from 80 to 60 PSIG (550 to 410 kPa) is best accomplished by dropping the secondary pressure to 50 PSIG (350 kPa), then adjusting upward to 60 PSIG (410 kPa). Tighten the lock nut against the bonnet to lock the pressure setting.

Service (Figure 2)

1. Turn the control knob (1) fully counterclockwise. Remove upstream air supply. Remove downstream air also for non-relieving type regulators.
2. Remove two # 10-32 screws (15) on the bottom of the regulator body (10) releasing the retaining cap (13). Pull out the cylinder assembly (16) and screen (12). Discard cylinder assembly and screen.
3. Remove six screws (5) holding the bonnet (2) in place. Remove bonnet, spring seat (3), spring (4) and diaphragm assembly (6). Discard diaphragm assembly.
4. Remove the four screws (9) holding the seal plate and jet tube assembly (7) and carefully lift out the assembly taking precautions not to bend the jet tube. Remove the cork seal plate gasket (17) and discard.
5. Tap the seat ring (11) out of the bottom side of the regulator body (10) using a wooden dowel. Discard seat ring.
6. Clean all retained parts with mild soap and water.
7. Insert the new seat ring (11) into the body making sure the brass side enters first. Press into place being careful not to damage the rubber seat. Note: a small amount of silicone grease applied to the outside of the seat ring is advised for easy assembly.
8. Assemble the new seal plate gasket (8) and seal plate (7), making sure the jet tube is positioned into the outlet port of the regulator. Insert and tighten the four retaining screws (9).
9. Insert the new cylinder assembly (16) making sure the screen (12) is centrally located in the groove on the top side of the valve body. Replace the retaining cap (13), and securely tighten using the two #10-32 screws (15).
10. Place the new diaphragm assembly (6) over the valve stem and pilot bushing. Align the screw holes in the diaphragm with those in the regulator body (10). Place the main spring (4) and spring seat (3) into position on top of the diaphragm assembly.
11. Place the bonnet (2) into position over the spring seat (3) and reassemble the six screws (5). Tighten screws in progressive steps using a crisscross pattern.
12. Admit inlet pressure and turn the adjusting knob to obtain the desired pressure.

NOTE: Keep the vent hole in the Bonnet clear for proper regulator operation. Lubricate the adjusting screw with Molycote "G".

Operating Principles

The 102BP Series regulator uses 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.

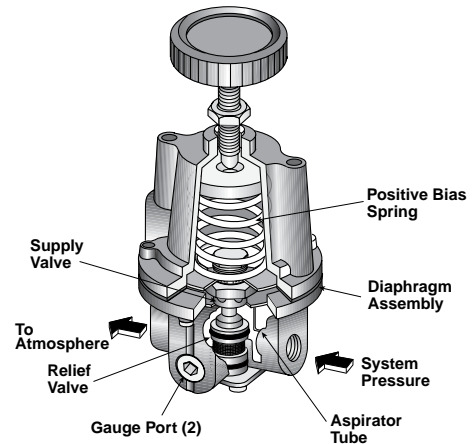


Figure 1

102BP Series Kits & Accessories

Mounting Bracket Kit –

Zinc Plated Steel	PS09921
Stainless Steel	PS14523

Service Kits

0 to 200 PSIG, Standard	PS12127-1
0 to 200 PSIG Fluorocarbon	PS13412-1
300 to 400 PSIG, Standard	PS12127-2
300 to 400 PSIG, Fluorocarbon	PS13412-2

Tamper Resistant Kit

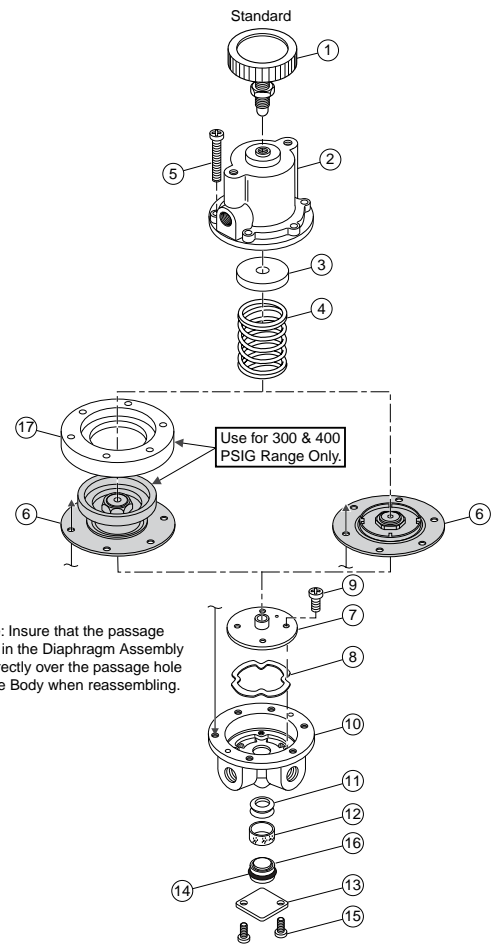


Figure 2

 **WARNING**

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

YOU have selected a quality product, and we appreciate it... To be assured of maximum performance and satisfaction please read these instructions before installing this product.

 **WARNING**

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

Installation Instructions For Dial Regulators

1. **DO NOT** install the unit until you have read this entire product information sheet.
2. **EXCEPT** as otherwise specified by manufacturer, this product is specifically designed for compressed air service, and use with any other fluid (liquid or gas) is a misapplication. For example, use with or injection of certain hazardous liquids or gases in the system (such as alcohol or liquid petroleum gas) could be harmful to unit or result in a combustible condition or hazardous external leakage. Manufacturer's warranties are void in the event of misapplication and manufacturer assumes no responsibility for any resulting loss. Maximum pressure rating is 300 psig (21 bar). Temperature range is 32°F to 150°F (0°C to 65.5°C).
3. **INSTALL** upstream of and as close as possible to where regulated air is needed.
4. **INSTALL** with air flow in direction of arrow on casting.
5. **DO NOT** restrict the air flow with undersize piping or fittings, unless maximum air flow is not needed.
6. **INSTALL** regulator in any rotational position.

7. **GAUGE PORTS** may be used for installing gauge or they may be used as additional regulated air outlet ports. Plug all unused ports.
8. **PANEL MOUNTING** requires a 2-11/16" (69 mm) diameter hole, and 4 7/32" (5.5 mm) screw holes. Unit can be mounted on material up to 1-1/4" (32 mm) thick .
9. **INSTALLATION** of a 5-micron rated filter upstream of regulator is recommended.
10. **TO REGULATE AIR** turn adjustment knob clockwise to raise the regulated air pressure and counterclockwise to lower the regulated air pressure.

Maintenance Instructions For Dial Regulators

1. **BEFORE SERVICING THIS UNIT, READ THIS ENTIRE PRODUCT INFORMATION SHEET AND TURN OFF AIR SUPPLY AND VENT BOTH SIDES OF REGULATOR.**

Lubrication Of Dial Regulators

1. **FOR TROUBLE-FREE OPERATION**, proper lubrication of the Dial regulator is essential.
2. **WHEN ANY** of the following symptoms occur, lubricate regulator with CHRISTO-LUBE® MCG 111. (See note) If CHRISTO-LUBE® MCG 111 is not available, use a heavy grease such as MAGNALUBE®-G, Lubriplate or Molykote®. **NOTE:** Never use oil as a lubricant.
 - A. Excessive relief venting .
 - B. Inability to attain high secondary pressure.
 - C. Erratic secondary pressures.
 - D. Excessive hysteresis (a retardation of desired effect: in this case because of the lack of lubrication).
3. Refer to "Figure A" on page 2 for steps 1 thru 10.
 1. Remove bottom plug (1), main valve spring (2), main valve (3), pilot valve spring (4), and pilot valve (5).
 2. Clean main valve molded rubber seat (Do not lubricate).
 3. Clean and lubricate bottom plug seal, main valve seal and pilot valve seal.

 **WARNING**

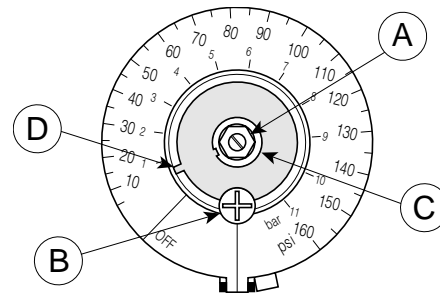
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4. Reassemble unit.
5. If problem is not remedied, lubricate remaining seals. (See steps 6 thru 10)
6. Remove black retaining knob (15), clear plastic knob (16), retaining ring (6), and pull bonnet assembly (7) from unit.
7. Remove upper piston (8), upper piston cup (9), lower piston (10), needle valve (11), and needle valve spring (12).
8. Clean and lightly lubricate inside of body.
9. Clean and lubricate upper piston seal, upper piston cup seal, lower piston seal, needle valve seal and main valve slide seal (13).
10. Reassemble unit. If symptoms still exist, contact manufacturer.



- A Calibration Screw
- B Dial Screw
- C Adjustment Coupling
- D Tip

IMPORTANT NOTE: As with any new product, everyone seems to have an urge to see how it works. All Dial regulators have been factory - calibrated. Any “tinkering” with calibration settings easily can throw the unit out of calibration. For example, removing dial screw “B” and rotating “C” in either direction so that tip “D” passes the dial screw “B” will throw unit out of calibration .

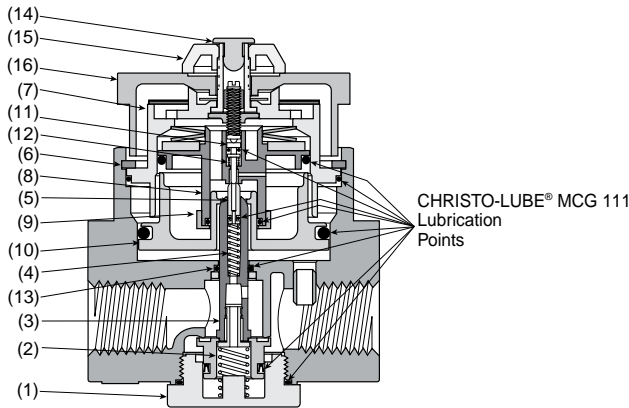


Figure A

Recalibration Of Dial Regulators

1. **DO NOT ATTEMPT TO CALIBRATE UNIT UNTIL ALL EIGHT SEALS HAVE BEEN PROPERLY LUBRICATED.**
2. **TO RECALIBRATE DIAL REGULATOR:**
 - A. **INSTALL** regulator on air line with at least 110 psig (7,5 bar) air pressure at the inlet port .
 - B. **INSTALL** an air pressure gauge to one of the gauge ports. Plug remaining gauge port with plug (supplied).
 - C. **REMOVE** lock button (Figure A, Item 14) from unit.
 - D. **TURN** adjusting knob to 100 psi (7 bar) setting.
 - E. **CHECK** the gauge for 100 psig (7 bar) reading. If gauge reads other than 100 psig (7 bar) adjust screw “A” (Fig. B) with a screw driver while holding adjusting knob on 100 psi (7 bar) setting. If more than one-half turn of screw “A” is required to achieve 100 psig (7 bar), see “G” below.
 - F. **TO CHECK CALIBRATION ADJUSTMENT:** when dial and gauge are reading the same (100 psig ± 2 psig; 7 bar ± 0,14 bar), turn adjusting knob to 20 psi (1,4 bar). Unit is calibrated when gauge reads 20 psig ± 5 psig (1,4 bar ± 0,34). (The ± 2 psig and ± 5 psig are accepted tolerances of the most commonly used gauges.)
 - G. **DO NOT** adjust screw “A” more than one-half turn when calibrating unit. If unit has been properly lubricated and more than one-half turn is required to calibrate it, additional problems with unit are involved and unit should be returned to the vendor.

Nominal Body Size	Kits	Part Number
<p>2.65 (67.3)</p>	Adjustment Dial Knob	RRP-16-024-80
	O-ring Repair Kit	GRP-95-260-80
	Piston and Bonnet Repair Kit	RRP-95-765-80
	Spring, Regulation, Belleville Washer 2-40 psig	RRP-95-906-80
	Spring, Regulation, Belleville Washer 3-60 psig	RRP-95-907-80
	Spring, Regulation, Belleville Washer 5-160 psig	RRP-95-905-80
	Tamper Resistant Kit	RRP-95-585-80
	Valve, Pilot with O-ring and Valve Spring	RRP-96-934-80
<p>3.20 (81.2)</p>	Adjustment Dial Knob	RRP-16-024-80
	O-ring Repair Kit	GRP-95-260-80
	Piston bottom and O-Ring Seal	RRP-95-192-80
	Piston and Bonnet Repair Kit	RRP-95-766-80
	Spring, Regulation, Belleville Washer 2-40 psig	RRP-95-906-80
	Spring, Regulation, Belleville Washer 3-60 psig	RRP-95-907-80
	Spring, Regulation, Belleville Washer 5-160 psig	RRP-95-905-80
	Tamper Resistant Kit	RRP-95-585-80
<p>4.40 (111.8)</p>	Valve, Main with U-Cup Seal	RRP-95-151-80
	Valve, Pilot with O-ring and Valve Spring	RRP-96-934-80
	Adjustment Dial Knob	RRP-16-024-80
	O-ring Repair Kit	GRP-95-261-80
	Piston bottom and O-Ring Seal	RRP-95-192-80
	Piston and Bonnet Repair Kit	RRP-95-766-80
	Spring, Regulation, Belleville Washer 2-40 psig	RRP-95-906-80
	Spring, Regulation, Belleville Washer 3-60 psig	RRP-95-907-80
<p>5.30 (134.6)</p>	Spring, Regulation, Belleville Washer 5-160 psig	RRP-95-905-80
	Tamper Resistant Kit	RRP-95-585-80
	Valve, Main with U-Cup Seal	RRP-95-152-80
	Valve, Pilot with O-ring and Valve Spring	RRP-96-935-80
	Adjustment Dial Knob	RRP-16-024-80
	O-ring Repair Kit	GRP-95-262-80
	Piston bottom and O-Ring Seal	RRP-95-192-80
	Piston and Bonnet Repair Kit	RRP-95-766-80
<p>5.30 (134.6)</p>	Spring, Regulation, Belleville Washer 2-40 psig	RRP-95-906-80
	Spring, Regulation, Belleville Washer 3-60 psig	RRP-95-907-80
	Spring, Regulation, Belleville Washer 5-160 psig	RRP-95-905-80
	Spring, Main Valve	RRP-95-024-80
	Tamper Resistant Kit	RRP-95-585-80
	Valve, Main with U-Cup Seal	RRP-95-153-80
	Valve, Pilot with O-ring and Valve Spring	RRP-96-935-80



Pneumatic Division North America
8676 East M-89
Richland, MI 49083

Installation and Service Instructions
35507019
Prep-Air® II Air Line
Precision Regulator
Issued: July, 1998
Supercedes: May, 1996

WARNING

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Disconnect electrical supply before installation, servicing or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed on these instructions.
- Installation, service and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air supplies should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

APPLICATION LIMITS

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:

Primary:	PSIG	BAR	kPa
Maximum	500	34.48	3448

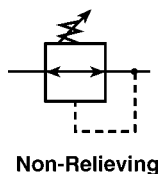
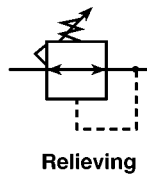
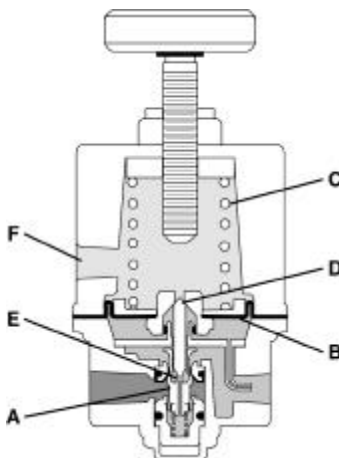
Secondary:

Spring:	Pressure Range:			
	PSIG	BAR	kPa	
30 PSIG	Minimum	0.5	0.03	3.4
	Maximum	30	20.70	207
60 PSIG	Minimum	1	0.07	7
	Maximum	60	4.14	414
150 PSIG	Minimum	2	0.14	14
	Maximum	150	10.34	1034

Operating Temperature Range: -40°F * (-40°C) to 200°F (93°C)

* Temperatures below 32°F (0°C) require moisture free air.

ANSI SYMBOLS



INSTALLATION

1. Regulator should be installed with reasonable accessibility for service whenever possible -- repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe -- never into the female port. Do not use PTFE tape to seal pipe joints -- pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.
2. Install regulator so that air flows from "IN" to "OUT" as marked on the regulator. Installation must be upstream from devices it is to service (lubricator, valve, cylinder or tool), and mounted closely to these devices. Mounting may be in any position.
3. Gauge ports are located on both sides of the regulator body for your convenience. It is necessary to install a gauge or pipe plug into each port during installation.
4. Remove plastic plug from vent hole in bonnet.
5. For protection against rust, pipe scale and other foreign matter, install a filter on the upstream (high pressure) side as closely to the regulator as possible.

OPERATION

With the adjusting knob turned fully counterclockwise (no spring load), and pressure supplied to the regulator inlet port, the valve poppet assembly (A) is closed. Turning the adjusting knob clockwise applies a load to control spring (C). This load causes the diaphragm (B) and the valve poppet assembly (A) to move downward allowing flow across the seat area (E) created between the poppet assembly and the seat. Pressure in the downstream line is sensed below the diaphragm (B) and offsets the load of spring (C). As downstream pressure rises, poppet assembly (A) and the diaphragm (B) move upward until the area (E) is closed and the load of the spring (C) and pressure under the diaphragm (B) are in balance. A reduced outlet pressure has now been obtained, depending on spring load. Creating a demand downstream, such as opening a valve, results in a reduced pressure under the diaphragm (B). The load of control spring (C) now causes the poppet assembly to move downward opening seat area (E) allowing air to flow to meet the downstream demand. The flow of downstream air is metered by the amount of opening (E).

Should downstream pressure exceed the desired regulated pressure, the excess pressure will cause the diaphragm (B) to move upward against control spring (C), open vent hold (D), and vent the excess pressure to atmosphere through the hole in the bonnet (F). (This occurs in the relieving type regulator only.)

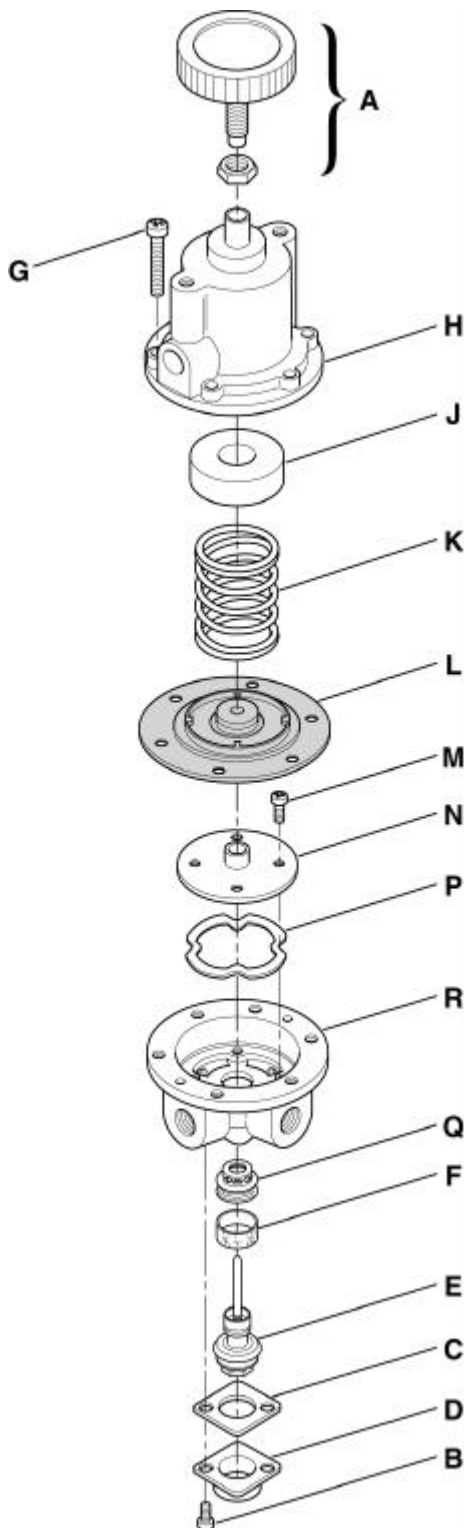
CAUTION

REGULATOR PRESSURE ADJUSTMENT - The working range of the knob adjustment is designed to permit outlet pressures within their full range. Pressure adjustment beyond this range is also possible because the knob is not a limiting device. This is a common characteristic of most industrial regulators, and limiting devices may be obtained only by special design

REGULATOR SPRING CONVERSION

Turn the control knob (A) fully counterclockwise. Remove upstream air supply. Remove downstream air also for non-relieving type regulators.

1. Remove (6) screws (B), bonnet (C) spring (D) and spring seat (E).
2. Place the spring (C) and spring seat (E) into position over the diaphragm assembly.
3. Place the bonnet (C) into position over the spring seat (E) and reassemble the (6) screws (B). Tighten screws to (xx-xx in-lb) in progressive steps using a crisscross pattern.



SERVICE

1. Turn the control knob (A) fully counterclockwise. Remove upstream air supply. Remove downstream air also for non-relieving type regulators.
2. Remove two # 10-32 screws (B) on the bottom of the regulator body (R) releasing the retaining plate (C) and cap (D). Pull out the inner valve assembly (E) and screen (F). Discard inner valve assembly and screen.
3. Remove six screws (G) holding the bonnet (H) in place. Remove bonnet, spring cap (J), spring (K) and diaphragm assembly (L). Discard diaphragm assembly.
4. Remove the four screws (M) holding the seal plate and jet tube assembly (N) and carefully lift out the assembly taking precautions not to bend the jet tube. Remove the cork seal plate gasket (P) and discard.
5. Tap the seat ring (Q) out of the bottom side of the regulator body (R) using a wooden dowel. Discard seat ring.
6. Clean all retained parts with mild soap and water.
7. Insert the new seat ring (Q) into the body making sure the brass side enters first. Press into place being careful not to damage the rubber seat. Note: a small amount of silicone grease applied to the outside of the seat ring is advised for easy assembly.
8. Assemble the new cork gasket (P) and jet tube assembly (N), making sure the jet tube is positioned into the *outlet* port of the regulator. Insert and tighten the four retaining screws (M).
9. Insert the new inner valve assembly (E) making sure the screen (F) is centrally located in the groove on the top side of the valve body. Replace the retaining plate (C) and cap (D), and securely tighten using the two #10-32 screws (B).
10. Place the new diaphragm assembly (L) over the valve stem and pilot bushing. Align the screw holes in the diaphragm with those in the regulator body (R). Place the main spring (K) and spring cap (L) into position on top of the diaphragm assembly.
11. Place the bonnet (H) into position over the spring seat (J) and reassemble the (6) screws (G). Tighten screws in progressive steps using a crisscross pattern.
12. Admit inlet pressure and turn the adjusting knob to obtain the desired pressure.

NOTE: A slight flow of air through the bonnet vent hole is necessary for proper operation of the regulator

Service Kits / Accessories

Relieving Service Kit	03550 8000
Non-Relieving Service Kit	03550 8009
Control Springs (Color)	
0.5-30 PSIG (Red)	03550 7101
1-60 PSIG (Blue)	03550 7116
2-150 PSIG (Green)	03550 7117
Gauges	
0-30 PSIG	03560 0030
0-60 PSIG	03560 0100
0-160 PSIG	03560 0200
Mounting Brackets	
Pipe Mounting	00902 0400
Right Angle Mounting	03550 0400



WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure, and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

EXTRA COPIES OF THESE INSTRUCTIONS ARE AVAILABLE FOR INCLUSION IN EQUIPMENT / MAINTENANCE INSTRUCTION MANUALS THAT UTILIZE THESE PRODUCTS. CONTACT YOUR LOCAL REPRESENTATIVE.

⚠ WARNING

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

⚠ WARNING

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

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:	PSIG	bar
PRIMARY – Maximum	250	17.24
SECONDARY – Spring Pressure		
2 PSIG		
Minimum	0	0
Maximum	2	0.14
30 PSIG		
Minimum	0.5	0.03
Maximum	30	20.70
60 PSIG		
Minimum	1	0.07
Maximum	60	4.14
150 PSIG		
Minimum	2	0.14
Maximum	150	10.34

Operating Temperature Range:

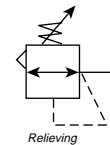
-40°C † to 71°C (-40°F to 160°F)

† Temperatures below 0°C (32°F) require moisture free air.

Installation:

1. Regulator should be installed with reasonable accessibility for service whenever possible — repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe — never into the female port. Do not use PTFE tape to seal pipe joints — pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.
2. Install regulator so that air flows from “IN” to “OUT” as marked on the regulator. Installation must be upstream from devices it is to service (lubricator, valve, cylinder or tool), and mounted closely to these devices. Mounting may be in any position.
3. Gauge ports are located on both sides of the regulator body for your convenience. It is necessary to install a gauge or pipe plug into each port during installation.
4. Remove plastic plug from vent hole in bonnet.
5. For protection against rust, pipe scale and other foreign matter, install a filter on the upstream (high pressure) side as closely to the regulator as possible.

ANSI Symbols



Service Kits / Accessories:

Relieving Service Kit	
0-2 PSIG	RKR230E*
0-30 PSIG	RKR230B*
1-60 PSIG	RKR230C*
2-150 PSIG	RKR230D*
Mounting Brackets	
Pipe Mounting	SA200XW57
Right Angle Mounting	446-707-025

* Parts in Kit.

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Operation

1. Before turning on the air supply, turn the adjusting knob counterclockwise until compression is released from the control spring. Then turn on air supply and adjust regulator to desired secondary pressure by turning adjusting knob clockwise. This permits pressure to build up slowly, preventing any unexpected operation of the valve, cylinders, tools, etc., attached to the line. Adjustment to desired secondary pressure can be made only with primary pressure applied to the regulator.
2. To decrease regulator pressure setting, always reset from a pressure lower than the final setting desired. For example, lowering the secondary pressure from 5.5 to 4.1 bar (80 to 60 PSIG) is best accomplished by dropping the secondary pressure to 3.5 bar (50 PSIG), then adjusting upward to 4.1 bar (60 PSIG).

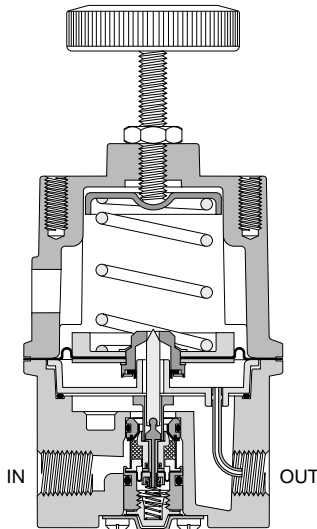


Figure 1

CAUTION

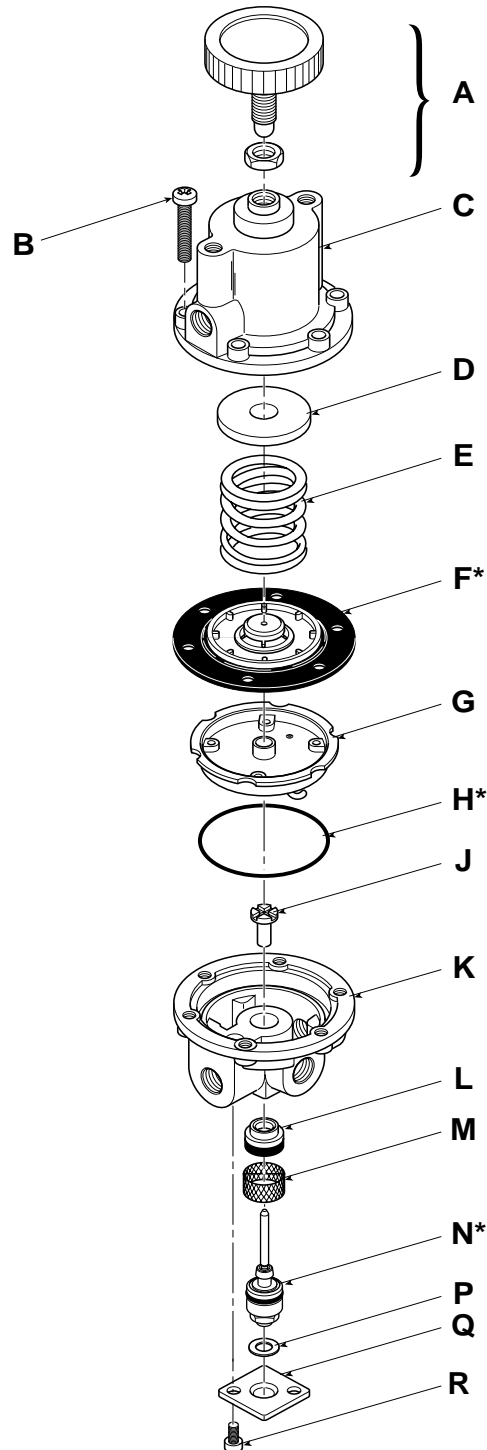
REGULATOR PRESSURE ADJUSTMENT - The working range of the knob adjustment is designed to permit outlet pressures within their full range. Pressure adjustment beyond this range is also possible because the knob is not a limiting device. This is a common characteristic of most industrial regulators, and limiting devices may be obtained only by special design.

Service: (Always vent all air pressure before servicing)

1. Turn the control knob (A) fully counterclockwise. Remove upstream air supply.
2. Remove two # 10-32 screws (R) on the bottom of the regulator body (K) releasing the seal (P) and cap (Q). Pull out the inner valve assembly (N) and screen (M). Discard inner valve assembly and clean screen with mild soap and water.
3. Remove six screws (B) holding the bonnet (C) in place. Remove bonnet, spring cap (D), spring (E) and diaphragm assembly (F). Discard diaphragm assembly.
4. Remove the seal plate and jet tube assembly (G) and carefully lift out the assembly taking precautions not to bend the jet tube. Remove o-ring (H) and inner valve guide (J).
5. Clean all retained parts with mild soap and water.
6. Assemble the o-ring (H) and inner valve guide (J).
7. Place the new diaphragm assembly (F) over the valve stem and pilot bushing. Align the screw holes in the diaphragm with those in the regulator body (K). Place the main spring (E) and spring cap (D) into position on top of the diaphragm assembly.

8. Insert the new inner valve assembly (N) making sure the screen (M) is centrally located in the groove on the top side of the valve body. Replace the seal (P) and cap (Q), and securely tighten the two #10-32 screws (R) torque 3.2 to 3.6 Nm (28 to 32 in-lbs).
9. Place the bonnet (C) into position over the spring cap (D) and reassemble the (6) screws (B). Tighten screws 3.2 to 3.6 Nm (28 to 32 in-lbs) in progressive steps using a crisscross pattern.
10. Admit inlet pressure and turn the adjusting knob (A) to obtain the desired pressure.

NOTE: A slight flow of air through the bonnet vent hole is necessary for proper operation of the regulator.



* Parts in Kit

Figure 2



Pneumatic Division
Richland, Michigan 49083

FRL-APP-01
Precision Regulators
Application Guide

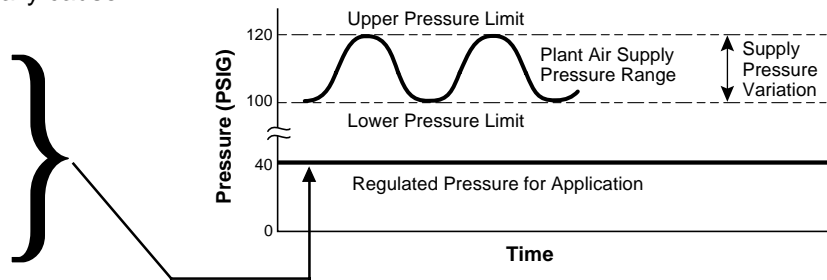
ISSUED: July, 2004
Supersedes: None

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?

Examples→	High Precision Regulators <i>R210, R220, R230</i>	Precision Regulators <i>27R, R216</i>	General Purpose Regulators <i>06R, 07R, R119, R10</i>
Sensitivity: <i>Reduced pressure repeatability/variation under no-flow condition</i>	.005 to .010 PSIG (1/8" to 1/4" of water column)	.5 to 1 PSIG	2 to 4 PSIG
Regulator's ability to control backpressure accurately: <i>*key for cylinder applications</i>	Begins to relieve at .005 to .010 PSIG overpressure	Begins to relieve at .5 to 2 PSIG overpressure	Begins to relieve at 5 to 10 PSIG overpressure
Regulator's ability to maintain set pressure under varying flow, input pressure, temperature conditions:	High	Medium	Standard
Constant Bleed - does the regulator constantly bleed a small volume of air to the atmosphere to maintain stability?	Yes	No	No

Application Chart

Original Equipment Manufacturers (OEMs)

Air Gauging	Manufacturers of Air Gauging Equipment.
Anesthesia Equipment	Manufacturers
Calibration Stands	Similar to Test Stands
Clamping Pressure Control	End Effect Grippers, Roll Loading
Control Panels	Manufacturers and Users
Coordinate Measuring Machines	Manufacturers use in Force Counterbalance Applications in Z-axis
Dispensing Equipment	Adhesive, Paint, or any other form of Liquid or Gas
Food Process Machinery	Manufacturers
Gas Analyzers	Used for Reference and Calibration Air Pressures
Ink or Paint Robotics Spraying Systems	Manufacturers use to Maintain an Even Pressure on System
Leak Testing Equipment	Manufacturers of Equipment that Detects Leaks (i.e., Plastic Bottles)
Medical Equipment	Manufacturers that Utilize for Blood Processing and Sampling as Examples
Oxygen Ventilators	Manufacturers
Pharmaceutical Process Machinery	Pill or Tablet Making Machines
Phone Cable Pressurization Systems	Manufacturers
Polishing Machinery	Used to Maintain Even Pressure on Polishing Head
Semi-conductor Manufacturing Machinery	Manufacturers
Smoke Stack Analyzers	Used for Reference and Calibration Air Pressures
Soil or Environmental Analysis Equipment	Used for Reference and Calibration Air Pressures
Tank Blanketing	Maintain Pressure on Top Level of a Tank or Storage Vessel
Test Equipment	Similar to Test Stands
Test Stands	Manufacturers of Test Stands, Laboratory Test Stands, Engineering Test Stands, Production Test Stands
Tool Balancers	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.
Web Tensioning	Machinery Builders for Printing Presses, Paper Converting, Packaging, Textiles, Plastics. Primarily Unwind Stands and Rewind Stands.

System Integrators

Automation Integrators	Anyone Involved in Designs or Projects that Automate Processes
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Energy Controls Systems

HVAC	Anyone who would be involved in Designs that would include Damper and Louvre Control for HVAC Applications
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End Users

Instrumentation Supervisors	
Instrumentation Technicians	
Project Engineers	
Store Room Supervisors	

MRO

Chemical	
Petrochemical	
Pulp & Paper	
Food & Drug	
Refineries	
Power	
Mining	
Oil & Gas	



Pneumatic Division
Richland, Michigan 49083
269-629-5000

PDNSG-1

Pneumatic Division Safety Guide

ISSUED: August 1, 2006

Supersedes: June 1, 2006

Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

⚠ WARNING:

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

- 1.1. Scope:** This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.
- 1.2. Fail-Safe:** Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.
- 1.3. Relevant International Standards:** For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules Relating to Systems. See www.iso.org for ordering information.
- 1.4. Distribution:** Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.
- 1.5. User Responsibility:** Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:
 - Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
 - Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
 - Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
 - Assuring compliance with all applicable government and industry standards.
- 1.6. Safety Devices:** Safety devices should not be removed, or defeated.
- 1.7. Warning Labels:** Warning labels should not be removed, painted over or otherwise obscured.
- 1.8. Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

- 2.1. Flow Rate:** The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.
- 2.2. Pressure Rating:** Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.
- 2.3. Temperature Rating:** Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.
- 2.4. Environment:** Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.
- 2.5. Lubrication and Compressor Carryover:** Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.
- 2.6. Polycarbonate Bowls and Sight Glasses:** To avoid potential polycarbonate bowl failures:
 - Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
 - Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, ketones, esters or certain alcohols.
 - Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

Pneumatic Division Safety Guide

- 2.7. Chemical Compatibility:** For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5
- 2.8. Product Rupture:** Product rupture can cause death, serious personal injury, and property damage.
- Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
 - Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
 - Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

- 3.1. Component Inspection:** Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.
- 3.2. Installation Instructions:** Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.
- 3.3. Air Supply:** The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- 4.1. Maintenance:** Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.
- 4.2. Installation and Service Instructions:** Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.
- 4.3. Lockout / Tagout Procedures:** Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – (Lockout / Tagout)
- 4.4. Visual Inspection:** Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
 - Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
 - Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
 - Any observed improper system or component function: Immediately shut down the system and correct malfunction.
 - Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.
- Caution: Leak detection solutions should be rinsed off after use.**
- 4.5. Routine Maintenance Issues:**
- Remove excessive dirt, grime and clutter from work areas.
 - Make sure all required guards and shields are in place.
- 4.6. Functional Test:** Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.
- 4.7. Service or Replacement Intervals:** It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
- Previous performance experiences.
 - Government and / or industrial standards.
 - When failures could result in unacceptable down time, equipment damage or personal injury risk.
- 4.8. Servicing or Replacing of any Worn or Damaged Parts:** To avoid unpredictable system behavior that can cause death, personal injury and property damage:
- Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
 - Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
 - Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
 - Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
 - After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
 - Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.
- 4.9. Putting Serviced System Back into Operation:** Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.