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Parker-Watts
Pneumatic Division
Richland, Michigan USA
www.parker.com/watts

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PRECISION & ELECTRONIC PROPORTIONAL REGULATORS

	Document Number		Description
☐	2R210	Rev. 2	40mm & 60mm Proportional Regulator, Installation & Service
☐	83-528-000-80	Rev. 4	Dial Regulators, Installation & Service
☐	IS-R216	Rev. 2	R216 Precision Regulator, Installation & Service
☐	IS-2R205	Rev. 2	R210 High Precision Regulator, Installation & Service
☐	IS-2R205	Rev. 2	R220 High Precision Regulator, Installation & Service
☐	IS-2R206	Rev. 2	R230 High Flow Precision Regulator, Installation & Service
☐	Safety Guide	——	PDN Safety Guide

Pneumatic Division
Richland, Michigan 49083
269-629-5000

Installation & Service Instructions
2R210
40mm & 60mm
Proportional Regulator

ISSUED: September, 2008
Supersedes: May, 2005
Doc. # 2R210, EN #080690, Rev 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

Introduction

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

Technical Information

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

Pneumatics

Working Media: Compressed air or inert gasses, filtered to 40µ.

Operating Pressure:

Max. Operating Pressure..... 2 bar unit..... 3 bar (43.5 PSI)
10 bar unit ..... 10.5 bar (152 PSI)

Min. Operating Pressure ..... P2 Pressure + 0.5 bar (7.3 PSI)

Pressure Control Range: Available in two pressure ranges, 0-2 bar (0-29 PSI) or 0-10 bar (0-145 PSI). Pressure range can be changed through the software at all times. (parameter 19)

Temperature Range:.....32°F to 122°F (0°C to 50°C)

Weight: .....10 oz.

Air Consumption: No consumption in stable regulated situation.

Display: The regulator is provided with a digital display, indicating the output pressure, either in PSI or bar. The factory setting is as indicated on the label, can be changed through the software at all times (parameter 14).

Mounting Position: Preferably vertical, with the cable gland on top.

Electronics

Supply Voltage: .....24 VDC +/- 10%

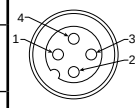
Power Consumption:..... 1.1 W

Current Consumption: ..... Max. 200 mA with no load

Control Signals: The electronic pressure regulator can be externally controlled through an analog control signal of 0-10 V, adjustable to 4-20 mA via parameter 4.

Connections:..... Central M12 connector 4-pole

The electrical connections are as follows:

Pin No.	Function	Description	Color	
1	24 V	Supply	Brown	
2	0 to 10 V or 4 to 20mA	Control Signal Ri = 100k Ω	White	
3	0 V (GND)	Supply	Blue	
4	24 V	Alarm Output Signal	Black	

Dead Band: The dead band is preset at 1.3% F.S.*, adjustable via parameter 13.

Accuracy: .....Linearity: = < 0.3% F.S.*

Proportional Band: The proportional band is preset at 10% F.S.*

Fail-safe Operation: After interrupting the **power supply voltage**, the present output pressure is maintained at approximately the same level. After switching the power supply on again, the pressure can be adjusted immediately by giving a new control signal.

Full Exhaust: Complete exhaust of the regulator is defined as P2 ≤ 1% F.S.*

Degree of Protection: IP65

***** Full Scale

⚠ WARNING

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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.

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Installation

1. Place muffler in Port 3
2. Connect the device to the Air Supply Port 1 and 2.
3. Connect Female M12 Connector on the Male Connector of the device.
4. Apply 24V = (10 second time delay for initialization of unit).
5. Air Supply to Port 1.
6. Give desired Set Point Signal.
7. Secondary Pressure will now be displayed.

How to Change Parameters

Pressing the Accept key for 3 to 6 seconds, will activate parameter change mode. The user can then select the parameters by pressing up or down key (display will show Pxx). When parameter number is correct, pressing accept again will enter parameter number (display will show parameter value).

Pressing the up or down key will change the parameter itself (display will flash indicating parameter editing mode). Pressing the accept key will accept the new parameter value (all digits will flash while being accepted).

After releasing all keys, the next parameter number will be presented on the display (you may step to the next parameter). When no key is pressed, after 3 seconds the display will show the actual output pressure.

Only parameter numbers 0, 4, 9, 14, 18, 19, 20, 12, 13, and 21 are accessible to edit. All other parameters are fixed.

Manual Mode

When keys DOWN and UP are pressed during startup, (connecting to the 24 V power supply) manual mode is activated. This means that the user is able to in/decrease the output pressure of the regulator, by pressing the UP or DOWN key. During this action the display will blink, indicating that the manual mode is activated.

Back to Factory Setting

After start up. (Power is on)

Parameter 0 = 3

Entering this value in parameter 0 will store the calibrated factory data into the working parameters. (Default calibration data is used)

Parameter Number 0 – Reset Back to Factory Settings

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P00	000. Flashing Decimal	003. Flashing Decimal	003 Flashing	P01
Description	Accesses changeable parameters.	Accesses parameter no. 0.	Displays current parameter value.	Edits parameter. 3 = standard factory settings. If other than 3, use Up or Down Arrow and accept 3	Accepts and saves new parameter setting.	Sequences to next parameter.

Set Control Signal

The unit is factory set for 0-10 V control signal. If 4-20 mA control signal is required, change parameter 4.

Parameter Number 4 – Set Control Signal in Volts or Milliamps

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P04	001. Flashing Decimal	000. Flashing Decimal	000 Flashing	P05
Description	Accesses changeable parameters.	Accesses parameter no. 4.	Displays current parameter value. 1 = V, 0 = mA	Edits parameter.	Accepts and saves new parameter setting.	Sequences to next parameter.

Parameter Number 6 – Set Output Signal

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P06	001. Flashing Decimal	###. Flashing Decimal (Value 0, 1 or 2)	###. Flashing	P07
Description	Accesses changeable parameters.	Accesses parameter no. 6.	Displays current parameter value. 1 = m factory default for P3H with analog options	Edits parameter. 0 = digital (NPN or PNP) 1 = analog 0..10V 2 = analog 4..20 mA	Accepts and saves new parameter setting.	Sequences to next parameter.

Parameter Number 8 – Adjust Span Analog Output Signal

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P08	001. Flashing Decimal (For 2 bar versions value = 92)	###. Flashing Decimal (Value between 0 and 130)	###. Flashing	P09
Description	Accesses changeable parameters.	Accesses parameter no. 8.	Displays current parameter value.	Edits parameter.	Accepts and saves new parameter setting and implements the new analog signal span.	Sequences to next parameter.

Adjust Digital Display

If necessary, adjustments can be made to the digital display when using an external pressure sensor.

Parameter Number 9 – Adjust Digital Display Value (Pressure Calibration)

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P09	###. Flashing Decimal	###. Flashing Decimal	### Flashing	P 10
Description	Accesses changeable parameters.	Accesses parameter no. 9.	Displays current digital display	Use up or down arrows and accept to adjust the display value if using an external pressure sensor.	Accepts and saves new parameter setting.	Sequences to next parameter.

Set Pressure Scale

Units with NPT port threads are supplied with a factory set PSI pressure scale. Use parameter 14 to change scale to bar.

Parameter Number 14 – Set Pressure Scale in PSI or bar

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P 14	001. Flashing Decimal	000. Flashing Decimal	000 Flashing	P 15
Description	Accesses changeable parameters.	Accesses parameter no. 14.	Displays current parameter value. 1 = PSI, 0 = bar	Edits parameter.	Accepts and saves new parameter setting.	Sequences to next parameter.

Preset Minimum Pressure

If there is a need for a pre-set minimum pressure, use parameter 18. (Note: preset pressure is affected by % P19.)

Parameter Number 18 – Set Minimum Preset Pressure

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P 18	000. Flashing Decimal	###. Flashing Decimal (value between 0 and 200)	### Flashing	P 19
Description	Accesses changeable parameters.	Accesses parameter no. 18.	Displays current parameter value. Incremental value is: 2 bar unit: x 2 mbar x % P19 10 bar unit: x 10 mbar x % P19	Edits parameter.	Accepts and saves new parameter setting.	Sequences to next parameter.

Set Pressure Correction

Pressure correction allows the user to set a maximum pressure as a percentage of secondary pressure F.S.

Example: If F.S. is 10 bar, set parameter 19 to 50 for maximum preset pressure of 5 bar.

Pressure correction also affects the minimum preset pressure in parameter 18.

Example: If F.S. is 10 bar and parameter 18 is set to a value of 100 (1 bar), and parameter 19 is set to 50%, then the actual minimum preset pressure seen is 0.5 bar.

Parameter Number 19 – Set Maximum Preset Pressure

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P 19	100. Flashing Decimal	###. Flashing Decimal (value between 0 and 100)	### Flashing	P20
Description	Accesses changeable parameters.	Accesses parameter no. 19.	Displays current parameter value. Incremental value is: % of F.S.	Edits parameter.	Accepts and saves new parameter setting.	Sequences to next parameter.

Behavior Control

The regulation speed of the pressure regulator can be modified by means of one parameter. (P 20)

The value in this parameter has a range from 0-5. A higher value indicates slower regulation speed, but will be more stable.

Parameter Number 20 – Set Behavior Control

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	P20	003.	###. Flashing Decimal	###. Flashing Decimal (value between 0 and 5)	P21 Flashing	
Description	Accesses changeable parameters.	Accesses parameter no. 20.	Displays current parameter value.	Edits parameter 0 = custom set* 1 = fastest (narrow proportional band) 2 = fast, 3 = normal, 4 = slow, 5 = slowest (proportional band is broad)	Accepts and saves new parameter setting.	Sequences to next parameter.

* When the value 0 is entered, you are able to create your own custom settings true parameters 12, 13 and 21.

Fine Settings

Set Proportional Band

Proportional band is used for setting the reaction sensitivity of the regulator. The displayed value is X 10 mbar and has a range between 50 (0.5 bar) and 250 (2.5 bar).

Parameter Number 12 – Set Proportional Band (P20 Must be Set to 0)

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P12	100. Flashing Decimal	###. Flashing Decimal (value between 50 and 250)	### Flashing	P13
Description	Accesses changeable parameters.	Accesses parameter no. 12.	Displays current parameter value. Incremental value is: x 10 mbar	Edits parameter.	Accepts and saves new parameter setting.	Sequences to next parameter.

Set Deadband

Deadband is the minimum limit of accuracy at which the regulator is set for normal operation. The displayed value is X 10 mbar and has a range between 4 (40 mbar) and 40 (400 mbar).

Parameter Number 13 – Set Deadband (P20 Must be Set to 0)

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P 13	0 15.	### . Flashing Decimal (value between 4 and 40)	### Flashing	P 14
Description	Accesses changeable parameters.	Accesses parameter no. 13.	Displays current parameter value. Incremental value is x 10 mbar	Edits parameter.	Accepts and saves new parameter setting.	Sequences to next parameter.

Proportional Effect

Sets the speed at which the regulator adjusts either filling or exhausting. The displayed value has a range between 5 (fastest regulation) and 100 (slowest regulation).

Parameter Number 21 – Set Proportional Effect (P20 Must be Set to 0)

Step	1	2	3	4	5	
Press	acc 3-6 seconds	▼ or ▲	acc	▼ or ▲	acc	
Until Display Reads	Pxx	P21	0 10.	### . Flashing Decimal (value between 5 and 100)	### Flashing	P22
Description	Accesses changeable parameters.	Accesses parameter no. 21.	Displays current parameter value.	Edits parameter. 5 = fastest regulation 100 = slowest regulation.	Accepts and saves new parameter setting.	Sequences to next parameter.

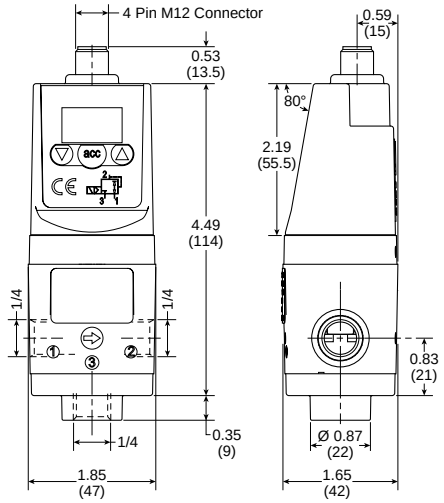
Parameter Number 39 – Displays Current Software Version

Step	1	2	3	
Press	acc 3-6 seconds	▼ or ▲	acc	
Until Display Reads	Pxx	P39	### Flashing Decimal	
Description	Accesses changeable parameters.	Accesses parameter no. 39.	Displays current parameter value. XXX = current software version	

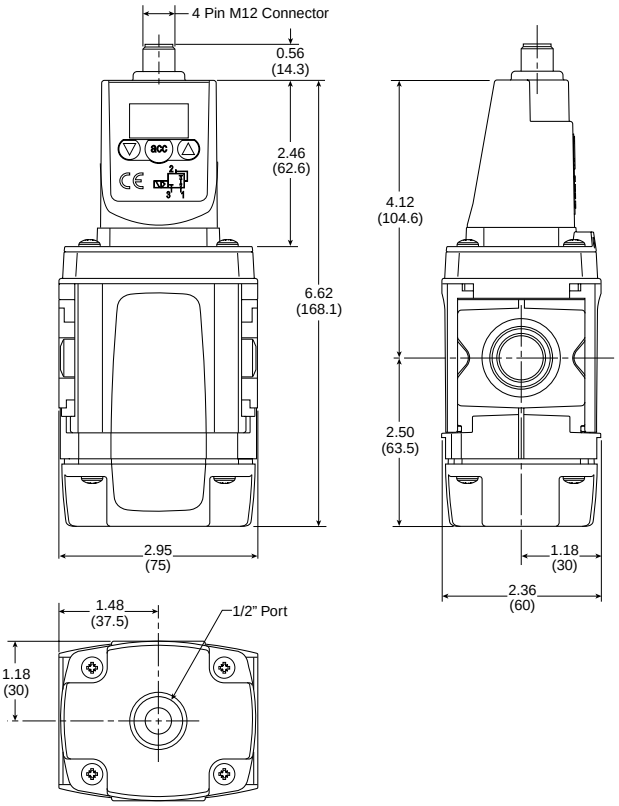
Problem	Possible Reason	Solution
Display will not light up	No 24 volts power supply	Check if the wiring is connected according to the schematic wiring diagram
Unit will not, or not correctly respond to given setpoint	Wrong current applied (I.e. Volt instead of mA or mA instead of Volt	Change setpoint current or re configure the setpoint current through the software by changing parameter 4
		Check wiring if the setpoint signal lead is connected to the right pin within the male M12 connector (should be pin 2)
	Setpoint signal is not stable enough	Stabilize setpoint signal input
Display shows NoP.	Unit detects that required output pressure is higher than the supplied pressure	Adjust the inlet pressure to a higher value, preferably 0,5 bar higher than requested output pressure
		Give lower setpoint value which corresponds to a output pressure lower than the inlet pressure
	No inlet pressure at all	Connect port 1 to the supply pressure
Unit behavior is not considered normal	Faulty settings made in the parameters	Reset the unit to factory settings by using the green key function under parameter 0
Desired pressure can not be reached	Setpoint value to low	Increase setpoint value
	Pre-set pressure limit has been changed to a lower max. outlet pressure	Change max. outlet pressure back to required pressure by changing parameter 19
	Supply pressure is to low	Increase supply pressure
Secondary side stays pressurized	Setpoint value is higher than 0,1 Volt	Lower your setpoint value, preferably to 0 Volts
	Pre-set pressure has been enabled to a certain pressure	Reset parameter 18 to 0
Display shows unrealistic value	Display maybe configured in the wrong value (bar instead of psi)	Check through parameter 14, if the display value is set on either psi or bar, if necessary change it to the required setting
Unit response time too slow or too quick	Volume behind the unit is either too big or too small	Adjust the regulating speed of the unit through parameter 20
Unit gives too much overshoot	Relation between volume and response me is out of balance	Adjust response time to a higher value through parameter 20, to achieve more accurate behavior
Unit is adjusting/regulating constantly	Air leakage in the system behind the unit	Resolve leakage
	Constant changing volume behind the unit	Unit needs to regulate to keep required pressure at the same level
		Try to minimize the volume changes
	“Deadband “area is set too small	Enlarge deadband setting through parameter 13 in the software (parameter 20 has to be set to 0 before changing parameter 13)
Can not enter software through touchpad	Unit is currently working/processing	Make sure that the unit is in steady state while activating the software
	Activating time is too short	Hold the accept button for at least 3 seconds
Display indicates ‘OL’	Wiring not according to diagram (24 volt connected on the setpoint connection pin)	Rewire so that on the setpoint connection pin will be either 0-10v or 4-20mA
	Wrong setpoint value given in relation to programmed setpoint value acceptance	Change over setpoint value to either V or mA or Reprogram the unit to the correct setpoint value via parameter 4
Any other problem	Please consult factory	

Dimensions

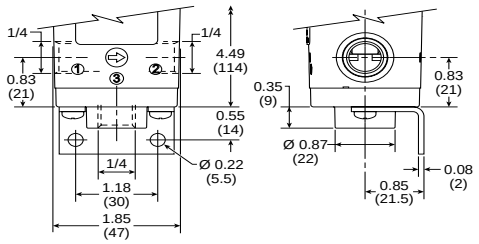
40mm Bottom Exhaust Version



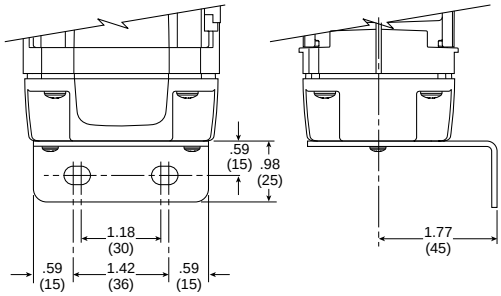
60mm Bottom Exhaust Version



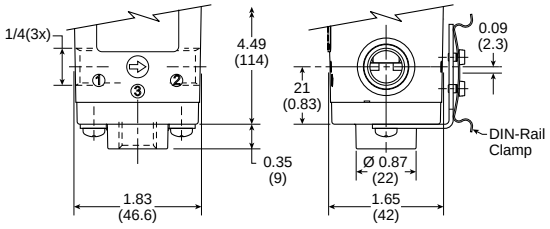
Foot Bracket



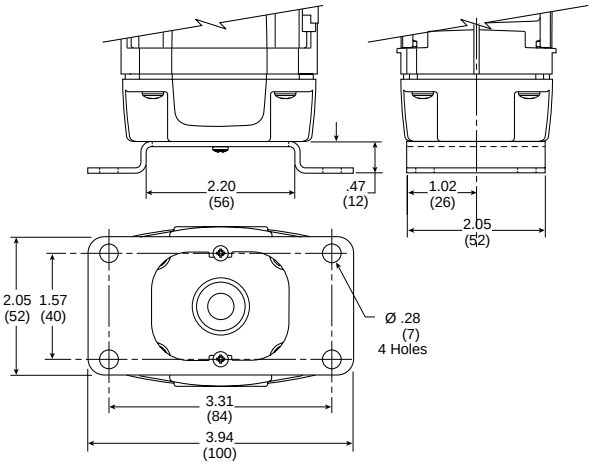
L Bracket



DIN Rail Bracket



Foot Bracket



Dimensions are in mm (Inches)

Dimensions are in mm (Inches)

Installation & Service Instructions
83-528-000-80
Dial Regulators
ISSUED: May, 2012
Supersedes: March, 2011

Doc.# 83-528-000-80, EN# 120233, Rev. 4

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- **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.

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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.

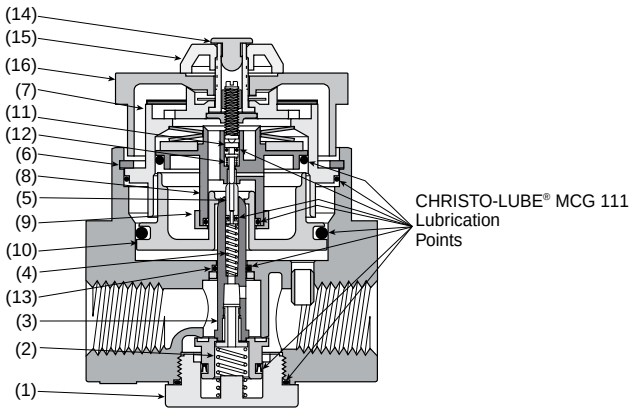


Figure A

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).

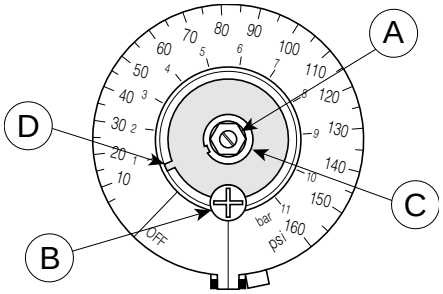
C. **REMOVE** lock button (Figure A, Item 14) from unit.

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.

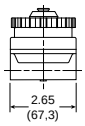
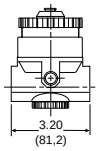
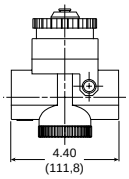
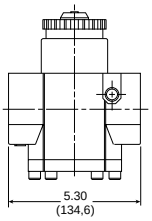
F. **TO CHECK CALIBRATION ADJUSTMENT:** when dial and gauge are reading the same (100 psig ± 2 psig; 7 bar ± 0,14 bar), turn adjusting knob to 20 psi (1,4 bar). Unit is calibrated when gauge reads 20 psig ± 5 psig (1,4 bar ± 0,34). (The ± 2 psig and ± 5 psig are accepted tolerances of the most commonly 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.



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 .

Nominal Body Size	Kits	Part Number
	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
	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
	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
	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
	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
Richland, Michigan 49083
269-629-5000

Installation & Service Instructions
IS-R216

R216 Precision Regulators

ISSUED: January, 2007
Supersedes: December, 2006

Doc. #ISR216, EN #070030, Rev. 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

Introduction

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

Application Limits

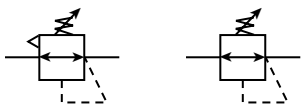
These products are intended for use in general purpose compressed media systems only.

Operating Pressure:

	kPa	PSIG	bar
Maximum Inlet Pressure	2068	300	21.0

Ambient Temperature Range: 40°F to 125°F (4°C to 52°C)

Symbols



Relieving Regulator Adjustable **Non-Relieving Regulator Adjustable**

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 media flow is in the direction labeled on the bottom of the regulator ("IN", OUT") . 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 media source turn the T-handle counterclockwise until compression is released from the Control Spring. Then turn on media source and adjust regulator to desired secondary pressure by turning T-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 40 to 20 PSIG (276 to 138 kPa) is best accomplished by dropping the secondary pressure to 10 PSIG (69 kPa), then adjusting upward to 20 PSIG (138 kPa). Tighten the Locking Nut on the T-handle to lock the pressure setting.

Reduced Pressure Spring Ranges

"E": 0 to 8 PSIG (0 to .55 bar)
"F": 5 to 20 PSIG (.03 to 1.4 bar)
"H": 0 to 50 PSIG (0 to 3.4 bar)

Service

⚠ **Caution: Disconnect or shut off air supply and exhaust the primary and secondary pressures before servicing unit. Turning the T-handle counterclockwise does not vent downstream pressure on non-relieving regulators. Downstream pressure must be vented before servicing regulator.**

⚠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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⚠ **Caution: Grease packets are supplied with kits for lubrication of seals. Use only mineral based grease or oils. Do not use synthetic oils such as esters. Do not use silicones.**

Note: After servicing unit, turn on air supply and adjust regulator to the desired downstream pressure. Check unit for leaks. If leakage occurs, do not operate - conduct repairs and retest.

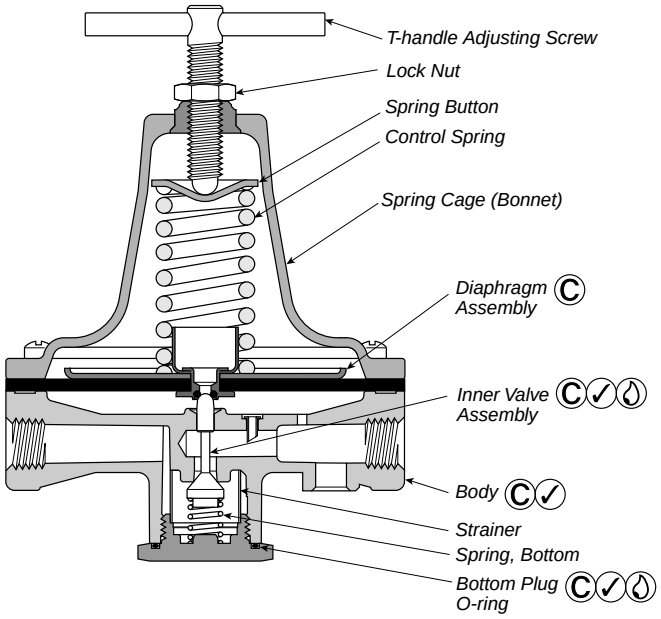
A. Servicing the Bonnet and Diaphragm Assembly

1. Turn the T-handle counterclockwise until the compression is released from the Pressure Control Spring.
2. Remove Bonnet Mounting Screws, Bonnet Assembly, Pressure Control Spring and Spring Button. Remove Diaphragm Assembly. Next, disassemble, clean, and carefully inspect parts for wear and / or damage. Wipe parts, clean with soapy water or denatured alcohol. If using compressed air to blow dry, be sure to wear appropriate eye protection. If replacement is necessary, use parts from service kits.
3. Install Diaphragm Assembly, Pressure Control Spring, Spring Button as shown below. Then, install Bonnet Assembly to Body with Mounting Screws and tighten in an alternating or star pattern to the following torque specifications: 2.3 to 4.5 Nm (20 to 40 in. lb.)

B. Servicing the Poppet Assembly

1. Exhaust system media pressure as previously described. Then remove Bottom Plug by unscrewing it from Body. Next, remove Bottom Plug, O-ring, Bottom Spring and Inner Valve Assembly.
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 and sliding surfaces using grease supplied with service kit.
4. Install parts as shown.
5. Lubricate Bottom Plug O-ring and install it in o-ring groove on Bottom Plug. Be sure Inner Valve Stem fits into center area of Diaphragm Assembly before installing Bottom Plug. Then screw Bottom Plug into Body until it bottoms out in body. Tighten to 3.5 to 5.1 Nm (35 to 45 in. lb.).
6. Turn on media source and adjust to desired secondary pressure as described in the Operation section. Check regulator for leakage. If leakage occurs, DO NOT OPERATE — conduct repairs again.

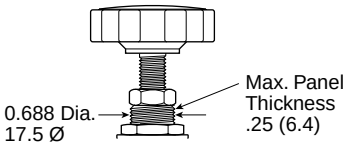
If you have questions concerning how to service this unit, contact your local authorized dealer or your customer service representative.



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.



Panel Mount

Service Kits Available

Description	Kit Number
Panel Mount Conversion Kit	4206
Panel Mount Hardware Only	PK16Y
Regulator Repair Kit (Relieving)	RK216Y
Regulator Repair Kit (Non-Relieving)	RK216KY
T Handle Assembly (Includes Locknut)	TK119A

Accessories

Gauges	0 to 30 PSI (0 to 4 bar)	K4515N18030
	0 to 60 PSI (0 to 4 bar)	K4515N18060

Pneumatic Division
Richland, Michigan 49083
269-629-5000

Installation & Service Instructions: IS-2R205

High Precision Regulators

ISSUED: July, 2004
Supersedes: April, 2004

Doc.# 2R205, ECN# 040593, Rev. 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.

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:

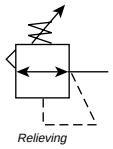
-18°C † to 65°C (0°F to 150°F)

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

* Parts in Kit

⚠ WARNING

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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).

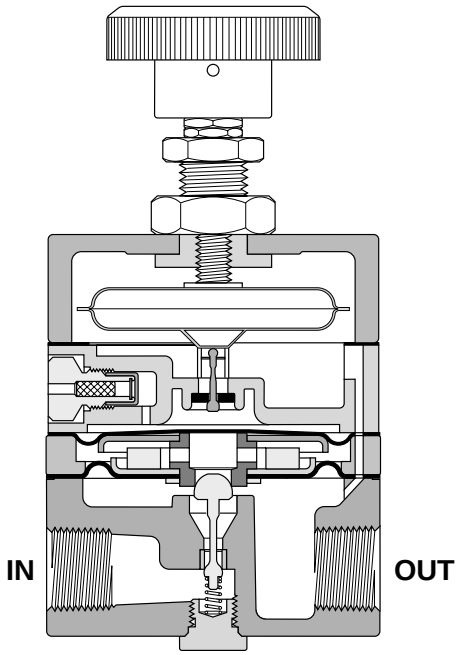


Figure 1

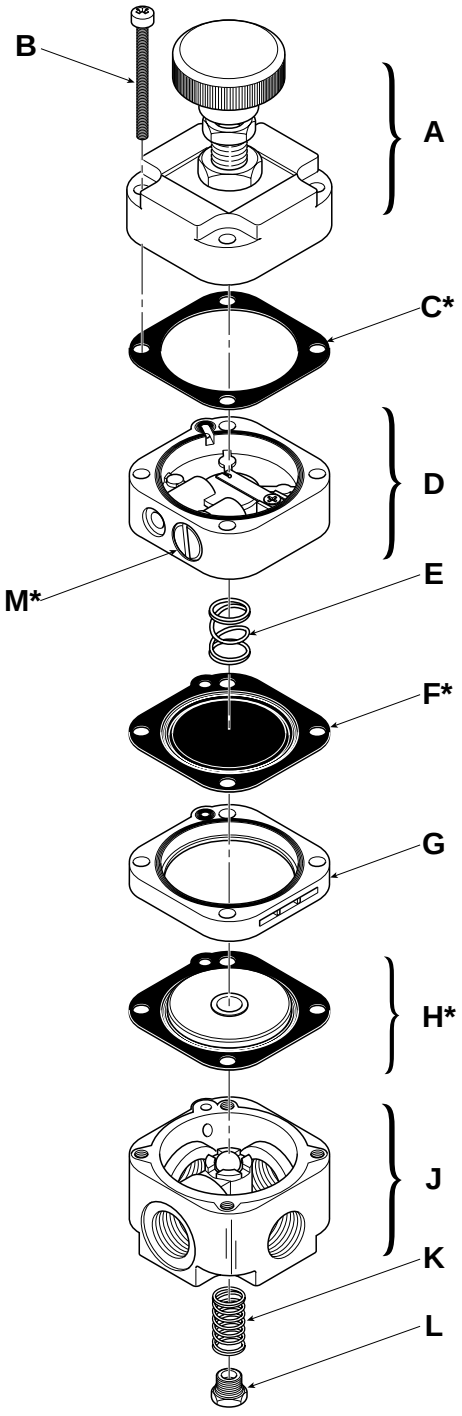
⚠CAUTION

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

Pneumatic Division
Richland, Michigan 49083
269-629-5000

Installation & Service Instructions: IS-2R206

High Flow Precision Regulators

ISSUED: July, 2004
Supersedes: April, 2004

Doc.# 2R206, ECN# 040593, Rev. 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.

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:

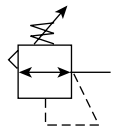
-40°C † to 71°C (-40°F to 160°F)

† 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



Relieving

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).

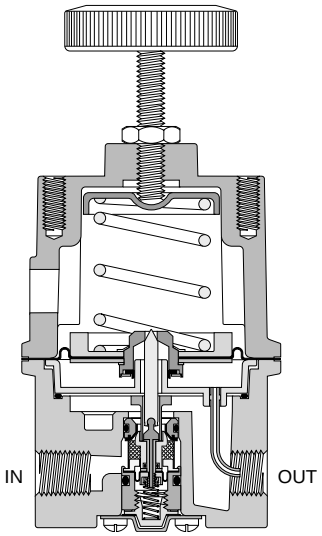


Figure 1

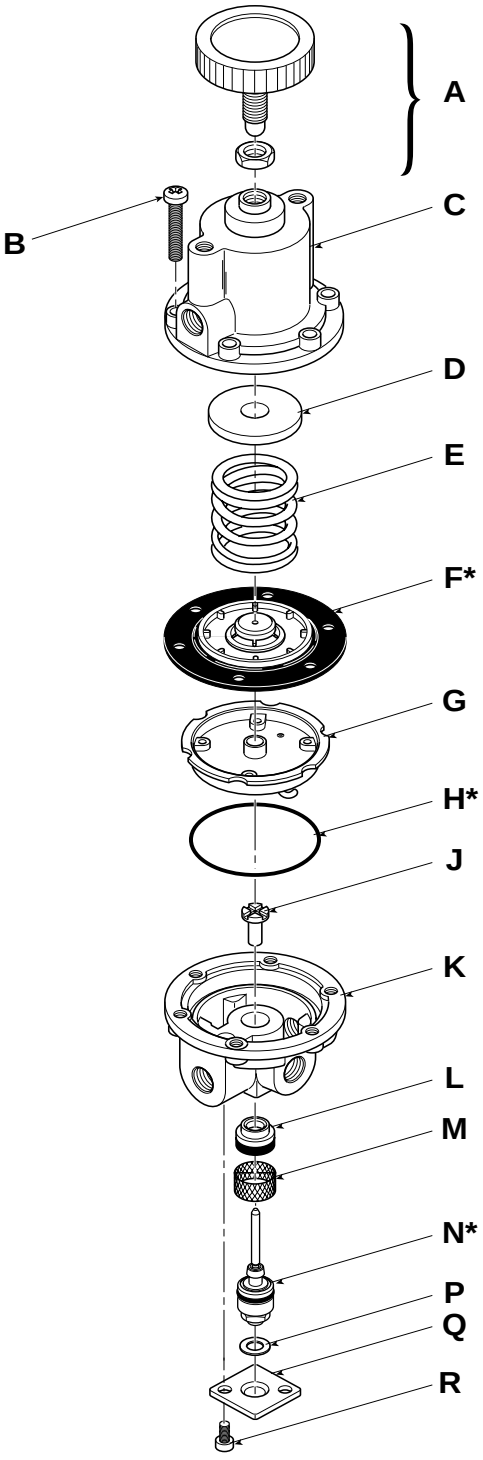
⚠ CAUTION

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 using 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
269-629-5000

PDNSG-1
Pneumatic Division Safety Guide
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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, keytones, 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.

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.