RB 4000

Commercial & Industrial Regulator

The RB 4000 pressure regulator is designed for industrial use: gas supply networks, district stations, industries, heating plants and all installations where accurate pressure control, ease of adjustment and fast response are required, such as for burners, industrial ovens, boilers, etc.

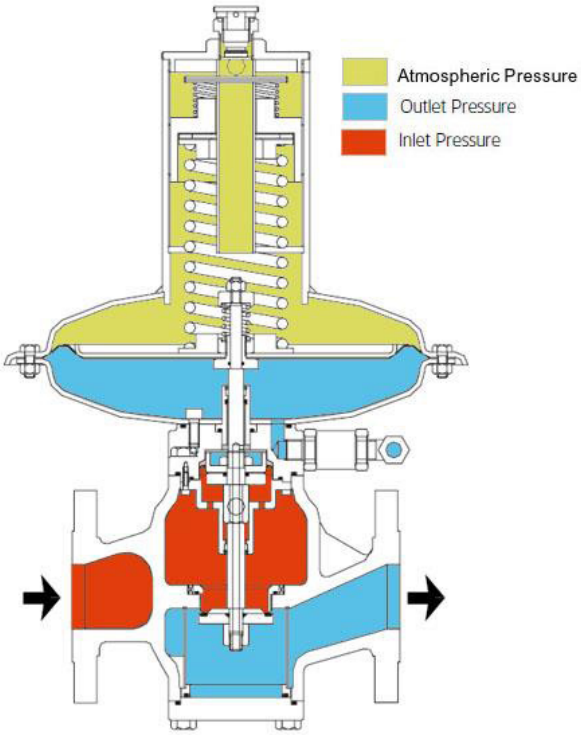
Advantages

- High capacity/ high flow accuracy
- Quick response/fast lockup - excellent for all things with a quicker on/off cycle
- Easy operator/monitor setup
- Horizontally or vertically mounted capability
- Pulse dampener allows lower flow rate
- Easy maintenance
- Rugged construction for durability
- Balanced valve design eliminates inlet pressure effect
- Low noise
- True Bubble Tight Lock-up

Technical Features

Inlet pressure	275 psi
Outlet pressure	30 psi
Accuracy & lock-up pressure	Up to AC5 / up to SG 10
Operating temperature	-4°F to +140°F
Ambient temperature	-22°F to +140°F (body material)
Acceptable gases	Natural gas, town gas, propane, butane, air, nitrogen or any non-corrosive gas
Safety devices	Optional built-in safety shut-off valve Overpressure shut-off (OPSO) and under-pressure shut-off (UPSO)
Options	Built-in silencer Monitor version

Operational Schematic



Materials

Body	Spheroidal graphite cast iron EN-GJS-400-18-LT Steel EN 10213-3 grade G 20 Mn 5
Head	Pressed steel UNI EN 10025
Internal parts	Stainless steel and brass
Seals	Nitrile rubber
Diaphragm	Synthetic rubber with fabric reinforcement

Construction

- Dresser Actaris takes pride in delivering products with the utmost concern for safety, quality, and customer satisfaction.

SHIPPING WEIGHT

1 regulator per box	Box weight: Varies by model

ADDITIONAL SPECIFICATIONS

Available Vent Sizes	1/4″ NPT
Downstream Sensing Line Connection	3/8″ NPT
Maximum Operating Inlet Pressure	275 PSIG (DI body)
Maximum Emergency Outlet Pressure No Damage	90 PSIG
Maximum Emergency Outlet Pressure Gas Containment	105 PSIG
Available Options	Seal wire to indicate unapproved tampering

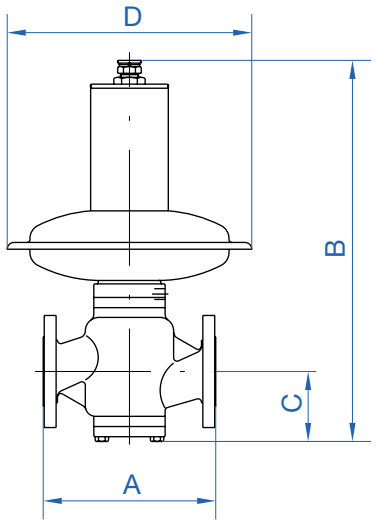
MODEL DESIGNATIONS

4	0	X	X	Valve Body	Options
		1			Low pressure
		2			Medium pressure
		3			High pressure
		4			High pressure
			0		Without shutoff valve
			1		With over pressure shutoff valve**
			2		With over and under pressure shutoff valve**
				2″ Flange	
				3″ Flange	
				4″ Flange	

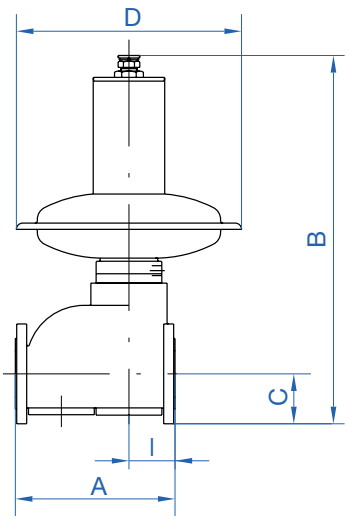
VALVE BODY SIZE (INCHES)

Inlet	Outlet	Flanged	Orifice Diameter	Wide Open Flow Coefficient (K-Factor)
2″	2″	X	2″	1900
3″	3″	X	3″	4000
4″	4″	X	4″	5100

RB4000 DIMENSIONS (INCHES)

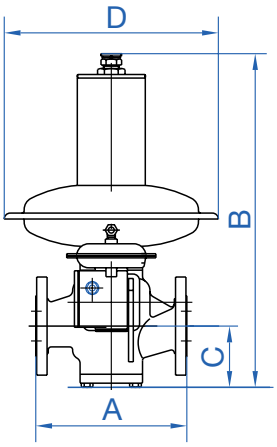


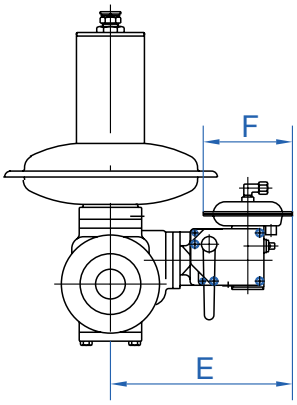
2" & 3"

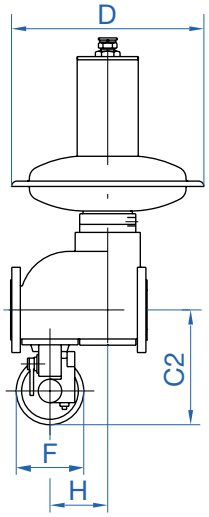


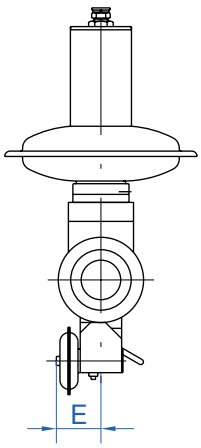
4"

Valve body	ACTUATOR	Model	A	B	C	D	I	Weight
2"	480	4010	10"	22"	4"	19"	-	90.4 lbs
	360 & 360TR	4020/30	10"	21"	4"	14"	-	64 lbs
3"	600	4010	12"	28"	5"	24"	-	154.3 lbs
	480	4020	12"	26"	5"	19"	-	123.5 lbs
	360 & 360TR	4030/40	12"	24.5"	5"	14"	-	108 lbs
4"	600	4010	14"	28.75"	4.25"	24"	4"	209.5 lbs
	480	4020	14"	26.5"	4.25"	19"	4"	178.5 lbs
	360 & 360TR	4030/40	14"	25.5"	4.25"	14"	4"	163 lbs









W/Safety Shut Off Valve

Valve body	ACTUATOR	E	F	H	C2	Additional. Weight
2"	150	12"	6"	-	-	15.5 lbs
	90	11"	3.5"	-	-	
3"	150	14.25"	6"	-	-	20 lbs
	90	13"	3.5"	-	-	
4"	150	5"	6"	6"	11.5"	22 lbs
	90	5"	3.5"	6"	11.5"	

CORRECTION FACTORS FOR NON-NATURAL GAS APPLICATIONS

The RB4000 may be used to control gases other than natural gas. To determine the capacity for gases other than natural gas, multiply the values within the capacity tables by a correction factor. The table below lists the correction factors for some of the more common gases:

Gas Type	Specific Gravity	Correction Factor (CF)
Air	1.00	0.77
Butane	2.01	0.55
Carbon Dioxide (Dry)	1.52	0.63
Carbon Monoxide (Dry)	0.97	0.79
Natural Gas	0.60	1.00
Nitrogen	0.97	0.79
Propane	1.53	0.63
Propane-Air-Mix	1.20	0.71

To calculate the correction factor for gases not listed in the table above, use the gases' specific gravity and insert it in the formula listed below:

Correction Factor (CF) = $\sqrt{\frac{SG_1}{SG_2}}$

Where:

SG_1 = Specific gravity of the gas in which the capacity is published.

SG_2 = Specific gravity of the gas to be controlled.

Wide Open Flow Calculations

For wide-open orifice flow calculations use the following equations:

For $\frac{P_1}{P_2} < 1.89$ use: $Q = K\sqrt{P_2(P_1 - P_2)}$ For $\frac{P_1}{P_2} > 1.89$ use: $Q = \frac{KP_1}{2}$

Where:

P_1 = Absolute Inlet Pressure (PSIA)

P_2 = Absolute Outlet Pressure (PSIA)

Q = Flow Rate (SCFH)

K = Orifice Coefficient (SCFH/PSI)

SPRING COLOR OUTLET PRESSURE RANGES:

Spring characteristics:
D: wire diameter De: external diameter
Di: internal diameter Lo: height Lt: no. of spires

2″

Spring Code	Spring Characteristic				Color	Spring Range		
	D (in)	Di (in)	Lo (in)	Lt		4010/11/12 (Ø 480)	4020/21/22 (Ø 360)	4030/31/32 (Ø 360/TR)
20568085	0.16	2.48	12.6	15	Orange/Sliver	0.1 – 0.2 psi (2.8-5.5″ WC)	•	•
20568086	0.16	2.48	12.6	10.5	Brown/Silver	0.2 – 0.3 psi (5.5-8.3″ WC)	•	•
20568087	0.2	2.48	12.6	16.5	Dark Green/Silver	0.3 – 0.4 psi (8.3-11.1″ WC)	•	•
20568088	0.2	2.48	12.6	13	Light Green/Silver	0.4 – 0,5 psi (11.1-13.8″ WC)	•	•
20568089	0.2	2.48	12.6	9.25	Light Blue/Silver	0.5 – 0.7 psi (13.8-19.4″ WC)	0.99 – 1.55 psi (27.4-42.9″ WC)	•
20568081	0.26	2.48	10.63	9.75	Purple/Silver	0.7 – 1.2 psi (19.4-33.2″WC)	1.60 – 2.61 psi	•
20568082	0.33	2.48	10.63	15	Yellow	1.2 – 1.9 psi	2.61 – 4.06 psi	•
20568083	0.33	2.48	10.63	11.5	Blue/Silver	1.6 – 2.0 psi	4.06 – 5.37 psi	•
20568183	0.35	2.48	10.24	11.5	Blue	1.7 – 3.5 psi	3.92 – 6.53 psi	•
20568283	0.35	2.48	9.57	10.8	Blue	•	4.35 – 7.25 psi	•
20568282	0.39	2.48	9.57	11	Silver	•	6.96 – 9.57 psi	10.15 – 14.79 psi
20568281	0.43	2.48	9.57	11	Purple	•	9.43 – 11.89 psi	14.36 – 17.40 psi
20568286	0.45	2.48	9.57	10.8	Yellow/Silver	•	11.60 – 14.50 psi	17.11 – 22.48 psi
20568284	0.47	2.48	9.57	10	Red/Silver	•	14.36 – 18.85 psi	21.76 – 29.01 psi

3″ & 4″

Spring Code	Spring Characteristic				Color	Spring Range			
	D (in)	Di (in)	Lo (in)	Lt		4010/11/12 (Ø 600)	4020/21/22 (Ø 480)	4030/31/32 (Ø 360)	4040/41/42 (Ø360TR)
20569590	0.24	3.15	13.78	12.5	Orange	0.2 – 0.4 psi (5.5-11.1″ WC)	•	•	•
20569591	0.24	3.15	13.78	10	Brown	0.3 – 0.4 psi (8.3-11.1″ WC)	•	•	•
20569592	0.26	3.15	13.78	10	Dark Green	0.4 – 0.5 psi (11.1-13.8″WC)	•	•	•
20569593	0.28	3.15	13.78	9.5	Light Green	0.6 – 0.8 psi(16.6-22.1″WC)	•	•	•
20569594	0.31	3.15	13.78	11.5	Black	0.6 – 1.0 psi (16.6-27.7″ WC)	•	•	•
20569690	0.35	3.15	12.6	10.5	Red	0.8 – 1.4 psi(22.1-38.8″ WC)	•	•	•
20569691	0.37	3.15	12.6	10	light Blue	1.0 – 1.7 psi	•	•	•
20569585	0.43	3.15	12.6	10.5	White	1.4 – 2.5 psi	•	•	•
20569586	0.51	3.15	12.6	12.5	Pink	2.2 – 2.9 psi	•	•	•
20568082	0.33	2.48	10.63	15	Yellow	•	1.19 – 1.89 psi	•	•
20568083	0.33	2.48	10.63	11.5	Blue/Silver	•	1.60 – 2.03 psi	•	•
20568183	0.35	2.48	10.24	11.5	Blue	•	1.74 – 3.48 psi	•	•
20568283	0.35	2.48	9.57	10.8	Blue	•	•	4.35 – 7.25 psi	•
20568182	0.39	2.48	10.24	11.5	Silver	•	2.61 – 4.21 psi	•	•
20568282	0.39	2.48	9.57	11	Silver	•	•	6.96 – 9.57 psi	10.15 – 14.79 psi
20568181	0.43	2.48	10.24	11.5	Purple	•	3.48 – 5.37 psi	•	•
20568281	0.43	2.48	9.57	11	Purple	•	•	9.43 – 11.89 psi	14.36 – 17.40 psi
20568186	0.45	2.48	10.24	11.5	Yellow/Silver	•	4.35 – 6.82 psi	•	•
20568286	0.45	2.48	9.57	10.8	Yellow/Silver	•	•	11.60 – 14.50 psi	17.11 – 22.48 psi
20568184	0.47	2.48	10.24	10.5	Red/Silver	•	5.51 – 7.25 psi	•	•
20568284	0.47	2.48	9.57	10	Red/Silver	•	•	14.36 – 18.75 psi	21.76 – 29.01 psi

Overpressure Shut-off Valve Spring Ranges:

Spring Code	Spring Characteristic				Color	Spring Range			
	D (in)	De (in)	Lo (in)	Lt		8611/12 (Ø 150)	8621/22 (Ø 150/TR)	8631/ 8632 (Ø 90)	8641/ 8642 (Ø 90/TR)
20565233	0.09	1.38	2.36	7	Yellow	0.4 – 0.9 psi (11.1-24.9″ WC)	•	•	•
20565234	0.10	1.38	2.36	7	Red	0.7 – 1.5 psi (19.4-41.5″ WC)	•	•	•
20565330	0.11	1.38	2.36	7	White	1.2 – 2.0 psi	•	•	•
20565331	0.12	1.38	2.36	7	Blue	1.5 – 3.5 psi	•	8.70 – 13.05 psi	•
20565332	0.14	1.38	2.36	7	Orange	2.8 – 5.1 psi	7.98 – 13.05 psi	13.05 – 20.32 psi	•
20565333	0.16	1.38	2.36	7	Brown	5.1 – 10.2 psi	13.05 – 24.66 psi	20.31 – 34.81 psi	33.36 – 59.47 psi
20565334	0.17	1.38	2.36	7	Green	6 .5 – 11.6 psi	21.76 – 29.01 psi	29.01 – 44.96 psi	44.96 – 72.52 psi
20565430	0.18	1.38	2.36	7	Black	8.7 – 14.5 psi	24.66 – 33.36 psi	36.25 – 56.56 psi	55.11 – 87.02 psi
20565431	0.20	1.38	2.36	7	Grey	13.8 – 18.9 psi	2.30 – 3.00 psi	56.56 – 66.72 psi	82.67 – 108.78 psi
20565432	0.22	1.38	2.36	7	Yellow	•	•	66.72 – 91.37 psi	108.78 – 145..04 psi
20565134	0.24	1.38	2.36	7	Red	•	•	6.30 – 10.80 psi	145.04 – 217.56 psi

PART SCHEMATIC

Key:

No.	Description
1	Spring chamber cover
2	Calibration spring
3	Diaphragm nut
4	Diaphragm chamber bottom case
5	Balancing diaphragm
6	Stem
7	Valve orifice
8	Inlet chamber
9	Valve seat
10	Valve plug
11	Outlet chamber
12	Balancing tube
13	Control line intake
14	Regulation control chamber
15	Diaphragm
16	Spring housing cover
17	Spring adjustment lock nut
18	Vent plug
19	Shutoff valve diaphragm chamber
20	Diaphragm assembly
21	Over pressure adjustment spring
22	Under pressure adjustment spring
23	Shutoff valve outlet chamber
24	Control levers
25	Shutoff valve plug
26	By-pass
27	Reset lever
28	Shutoff valve spring
29	Shutoff valve seat

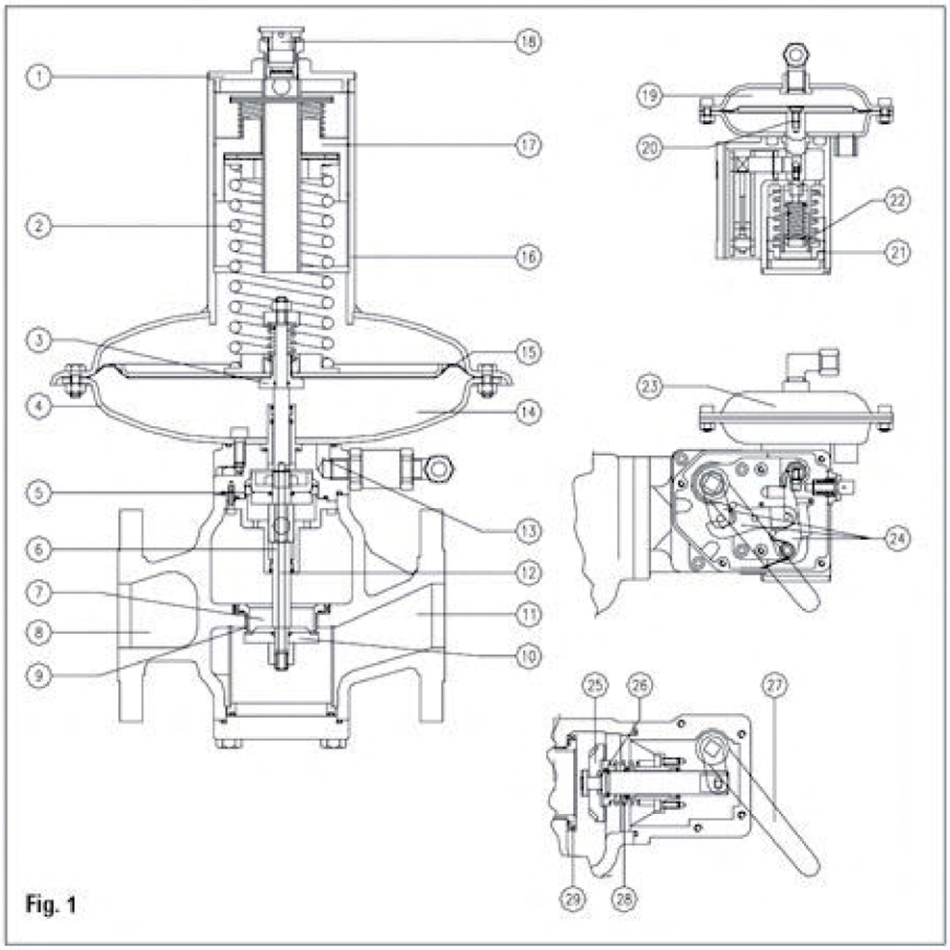


Fig. 1

RB4010 CAPACITY TABLE 2" VALVE BODY (Ø 480 Actuator-19" Head)

Typical Capacity Info.

Manufacturer	Roots
Type and model	RB4010

Capacities in 1,000 SCFH of 0.6 S.G. gas; base conditions of 14.7 PSIA and 60° F.

Inlet Pressure (PSIG)	Outlet Pressure Setting					
	7" w.c	14" w.c	1 PSIG		2 PSIG	
	1" w.c. droop	2" w.c. droop	1% Abs droop	2% Abs droop	1% Abs droop	2% Abs droop
1	14.2	13.5				
2	18.0	17.5	16.0	17.0		
3	23.5	25.0	22.5	25.7	10.3	17.8
5	38.0	34.3	32.5	38.3	16.3	28.6
8	43.9	38.9	33.5	43.9	22.7	39.9
10	47.9	55.8	56.3	64.3	26.2	47.5
15	57.4	75.6	56.1	64.1	32.6	57.5
20	67.0	94.8	65.5	74.8	40.7	67.0
30	86.2	96.2	84.4	96.4	45.5	79.0
40	105.4	99.6	103.3	118.0	52.8	98.2
50	124.6	117.9	122.2	139.6	58.5	120.6
60	143.8	136.1	141.0	161.1	77.3	139.3
70	162.9	154.3	159.9	182.7	87.7	158.0
80	182.1	172.5	178.8	204.2	98.1	176.7
90	201.3	190.7	197.7	225.8	108.5	195.4

RB4010 CAPACITY TABLE 2" VALVE BODY CONTINUED

Inlet Pressure (PSIG)	Outlet Pressure Setting					
	7" w.c	14" w.c	1 PSIG		2 PSIG	
	1" w.c. droop	2" w.c. droop	1% Abs droop	2% Abs droop	1% Abs droop	2% Abs droop
100	220.5	208.9	216.6	247.4	118.9	214.2
120	261.2	245.4	254.3	290.5	139.7	251.6
150	316.4	566.4	311.0	355.2	170.8	307.8
175	364.3	652.4	358.2	409.2	196.8	354.6
200	412.3	738.4	405.4	463.1	222.8	401.4
225	460.2	824.4	452.6	517.0	248.8	448.1

Lock-up Pressure	1" w.c.	1.5" w.c.	0.1 PSIG	0.2 PSIG

Notes:

*Individual regulator performance may vary from data shown.

**Multiply capacity data by 0.7 if you are using shutoff valve versions.

RB4020 CAPACITY TABLE 2" VALVE BODY (Ø 380 Actuator-14" Head)

Typical Capacity Info.

Manufacturer	Roots
Type and model	RB4020

Capacities in 1,000 SCFH of 0.6 S.G. gas; base conditions of 14.7 PSIA and 60° F.

Inlet Pressure (PSIG)	Outlet Pressure Setting							
	1 PSIG	2 PSIG		5 PSIG		10 PSIG		
	1% abs droop	1% abs droop	2% abs droop	1% Abs droop	2% Abs droop	1% Abs droop	10% GA droop	20% GA droop
1								
2	15.2							
3	19.7	10.3	17.8					
5	27.2	16.3	28.6					
8	34.8	22.7	39.9	16.0	23.6			
10	38.2	26.2	47.5	20.8	28.9			
15	46.2	32.6	57.5	30.8	46.4	17.8	34.8	50.8
20	52.4	40.7	67.0	36.6	49.4	24.9	47.6	69.1
30	68.1	45.5	79.0	43.5	62.8	35.9	68.0	98.2
40	87.2	52.8	98.2	53.8	76.4	44.4	85.2	121.0
50	100.3	58.5	120.6	63.6	90.4	50.0	92.6	133.3
60	115.9	77.3	139.3	70.5	97.4	65.4	117.3	166.6
70	131.5	87.7	158.0	83.4	118.5	65.5	121.3	174.6
80	147.1	98.1	176.7	93.3	132.5	73.2	135.7	195.3
90	162.6	108.5	195.4	94.4	134.0	89.9	157.6	225.3
100	178.2	118.9	214.2	113.0	160.6	88.8	164.4	236.7
120	211.4	141.0	251.6	121.0	188.7	105.4	193.2	278.1
150	256.1	170.8	307.8	126.8	191.0	131.4	213.0	315.3
175	295.1	196.8	354.6	139.6	203.0	146.9	232.3	349.9
200	334.0	222.8	401.4	211.9	301.0	166.3	308.2	443.6
225	372.9	248.8	448.1	236.6	336.1	185.7	344.1	495.3

Lock-up Pressure (PSIG)	0.2	0.3	0.3	0.5

Notes:

*Individual regulator performance may vary from data shown.

**Multiply capacity data by 0.7 if you are using shutoff valve versions. Inlet pressure is too low to deliver set point.

RB4030 CAPACITY TABLE 2"VALVE BODY (Ø 380 Actuator-14" Head)

Typical Capacity Info.

Manufacturer	Roots
Type and model	RB4030

Capacities in 1,000 SCFH of 0.6 S.G. gas; base conditions of 14.7 PSIA and 60° F.

Inlet Pressure (PSIG)	Outlet Pressure Setting							
	10 PSIG		15 PSIG		20 PSIG		30 PSIG	
	10% GA droop	20% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop
15	29.0	49.5						
20	36.0	70.0	34.9	57.8				
30	59.2	89.0	58.9	88.2	49.8	87.5		
40	70.6	115.5	73.0	114.0	69.6	120.0	49.3	85.5
50	78.0	123.3	77.0	121.6	84.7	136.8	59.8	110.8
60	90.4	144.2	89.4	141.2	98.3	158.8	69.4	128.6
70	102.9	162.9	97.3	146.2	115.9	181.7	80.4	151.1
80	113.1	180.2	114.2	180.3	125.5	202.8	88.6	164.2
90	121.6	199.3	126.6	199.9	139.1	224.8	98.2	182.0
100	133.2	214.5	138.0	221.6	163.2	250.2	107.9	199.8
120	159.5	250.1	160.4	255.3	186.7	292.8	127.1	235.5
150	184.4	303.0	189.1	314.0	223.2	352.0	155.9	302.9
175	214.1	357.1	231.9	366.1	254.8	411.8	180.0	333.4
200	260.3	419.9	262.9	415.0	288.8	466.8	204.0	378.0
225	291.0	469.4	293.8	463.9	322.8	521.7	228.0	422.5

Lock-up Pressure (PSIG)	0.5	0.8	0.9	1.3

Notes:

*Individual regulator performance may vary from data shown.

**Multiply capacity data by 0.7 if you are using shutoff valve versions. Inlet pressure is too low to deliver set point.

RB4010 CAPACITY TABLE 3"VALVE BODY (Ø 600 Actuator-24" Head)

Typical Capacity Info.

Manufacturer	Roots
Type and model	RB4010

Capacities in 1,000 SCFH of 0.6 S.G. gas; base conditions of 14.7 PSIA and 60° F.

Inlet Pressure (PSIG)	Outlet Pressure Setting					
	7" w.c	14" w.c	1 PSIG		2 PSIG	
	1" w.c. droop	2" w.c. droop	1% Abs droop	2% Abs droop	1% Abs droop	2% Abs droop
1	14.2					
2	22.9	28.2	17.6	22.9		
3	33.5	42.4	31.7	38.8	21.2	30.0
5	42.4	53.0	42.4	49.4	31.7	42.4
8	53.0	70.6	56.5	70.6	45.9	63.6
10	63.6	84.7	70.6	84.7	56.5	77.7
15	70.6	98.9	84.7	105.9	70.6	98.9
20	84.7	120.1	98.9	127.1	84.7	120.1
30	105.9	148.3	127.1	162.4	113.0	155.4
40	127.1	176.6	162.4	211.9	148.3	194.2
50	141.2	194.2	176.6	229.5	162.4	211.9
60	155.4	211.9	194.2	279.6	176.6	229.5
70	169.5	229.5	211.9	285.4	208.6	252.1
80	176.6	235.6	229.5	298.9	228.2	269.3
90	211.9	242.9	239.0	310.2	237.8	283.2

RB4010 CAPACITY TABLE 3" VALVE BODY CONTINUED (Ø 600 Actuator-24" Head)

Inlet Pressure (PSIG)	Outlet Pressure Setting					
	7" w.c	14" w.c	1 PSIG		2 PSIG	
	1" w.c. droop	2" w.c. droop	1% Abs droop	2% Abs droop	1% Abs droop	2% Abs droop
100	220.0	247.1	245.6	325.4	238.6	309.4
120	229.5	253.4	253.5	346.9	250.1	330.5
150	245.7	265.8	268.9	365.2	259.3	355.6
175	260.8	280.4	284.0	378.5	268.8	374.7
200	288.7	298.3	322.3	400.3	285.9	398.5
225	301.0	310.6	350.7	425.6	302.3	411.3

Lock-up Pressure	1" w.c.	1.5" w.c.	0.1 PSIG	0.2 PSIG

Notes:

*Individual regulator performance may vary from data shown.

**Multiply capacity data by 0.7 if you are using shutoff valve versions. Inlet pressure is too low to deliver set point.

RB4020 CAPACITY TABLE 3" VALVE BODY (Ø 480 Actuator-19" Head)

Typical Capacity Info.

Manufacturer	Roots
Type and model	RB4020

Capacities in 1,000 SCFH of 0.6 S.G. gas; base conditions of 14.7 PSIA and 60° F.

Inlet Pressure (PSIG)	Outlet Pressure Setting					
	2 PSIG		3 PSIG		5 PSIG	
	1% absolute droop	2% absolute droop	1% absolute droop	2% absolute droop	1% absolute droop	2% absolute droop
3	44.3	50.6				
5	64.0	75.4	32.1	46.2		
8	66.0	86.5	44.7	64.4	31.5	46.5
10	110.9	126.7	51.6	74.3	41.0	56.9
15	110.5	126.2	64.2	92.5	60.6	91.3
20	129.1	147.4	80.2	115.5	72.1	97.3
30	166.3	189.9	89.6	129.1	85.7	123.7
40	203.4	232.4	104.0	149.8	105.9	150.5
50	240.6	274.9	115.2	166.0	125.4	178.1
60	277.8	317.4	152.3	219.3	138.9	191.9
70	315.0	359.9	172.8	248.8	164.3	233.5
80	352.2	402.4	193.2	278.3	183.8	261.1
90	389.4	444.9	213.7	307.8	186.0	264.0
100	426.6	487.4	234.2	337.2	222.7	316.4
120	501.0	572.4	275.1	396.2	238.4	371.8
150	612.6	699.8	336.5	484.6	249.8	376.3
175	705.6	806.1	387.7	558.3	275.0	399.9
200	798.5	912.3	438.9	632.0	417.4	539.0
225	891.5	1018.5	490.1	705.7	466.0	662.2

Lock up Pressure (PSIG)	0.1	0.2	0.35

Notes:

*Individual regulator performance may vary from data shown.

**Multiply capacity data by 0.7 if you are using shutoff valve versions. Inlet pressure is too low to deliver set point.

RB4030 CAPACITY TABLE 3" VALVE BODY (Ø 360 Actuator-14" Head)

Typical Capacity Info.

Manufacturer	Roots
Type and model	RB4030

Capacities in 1,000 SCFH of 0.6 S.G. gas; base conditions of 14.7 PSIA and 60° F.

Inlet Pressure (PSIG)	Outlet Pressure Setting			
	10 PSIG		15 PSIG	
	10%-ga droop	20%-ga droop	10%-ga droop	20%-ga droop
15	57.1	97.5		
20	70.9	137.9	68.8	113.9
30	116.6	175.3	116.0	173.8
40	139.1	227.5	143.8	224.6
50	153.7	242.9	151.8	239.6
60	178.1	284.1	176.2	278.2
70	202.7	320.9	191.7	288.0
80	222.8	355.0	225.0	355.2
90	239.6	392.6	249.4	393.7
100	262.4	422.6	271.9	436.6
120	314.2	492.7	316.0	502.9
150	363.3	596.9	372.5	618.6
175	421.8	703.5	456.8	721.2
200	512.8	827.2	517.8	817.5
225	573.3	924.7	578.8	913.9

Lock up Pressure (PSIG)	0.5	0.8

*Individual regulator performance may vary from data shown.

**Multiply capacity data by 0.7 if you are using shutoff valve versions. Inlet pressure is too low to deliver 2" w.c.

RB4040 CAPACITY TABLE 3" VALVE BODY (Ø 360TR Actuator-14" Head)

Typical Capacity Info.

Manufacturer	Roots
Type and model	RB4040

Capacities in 1,000 SCFH of 0.6 S.G. gas; base conditions of 14.7 PSIA and 60° F.

Inlet Pressure (PSIG)	Outlet Pressure Setting							
	10 PSIG		15 PSIG		20 PSIG		30 PSIG	
	10% GA droop	20% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop
15	52.0	88.7						
20	67.4	131.0	63.3	104.8				
30	106.1	159.6	109.1	163.3	98.1	172.4		
40	132.1	216.2	132.3	206.6	137.1	236.4	97.1	168.4
50	139.8	221.0	142.7	225.3	166.8	269.5	117.8	218.3
60	169.2	269.9	162.1	255.9	193.6	312.9	136.7	253.3
70	184.5	292.0	180.2	270.7	228.3	357.9	158.4	297.7
80	211.7	337.2	207.0	326.8	247.2	399.5	174.6	323.5
90	218.0	357.3	234.4	370.1	274.0	442.9	193.5	358.6
100	249.3	401.4	250.1	401.6	321.5	492.9	212.5	393.7
120	285.9	448.4	297.0	472.8	367.8	576.8	250.3	463.9

RB4040 CAPACITY TABLE 3" VALVE BODY CONTINUED

Inlet Pressure (PSIG)	Outlet Pressure Setting							
	10 PSIG		15 PSIG		20 PSIG		30 PSIG	
	10% GA droop	20% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop
150	345.1	567.1	342.7	569.1	439.7	693.4	307.2	596.7
175	383.8	640.2	429.4	677.9	501.9	811.2	354.5	656.9
200	487.2	785.8	476.4	752.1	569.0	919.5	401.8	744.6
225	521.7	841.4	544.1	859.0	636.0	1027.8	449.2	832.3

Lock-up Pressure (PSIG)	0.6	1.0	1.1	1.5

Notes:

*Individual regulator performance may vary from data shown.

**Multiply capacity data by 0.7 if you are using shutoff valve versions. Inlet pressure is too low to deliver set point.

RB4020 CAPACITY TABLE 4" VALVE BODY (Ø 480 Actuator-19" Head)

Typical Capacity Info.

Manufacturer	Roots
Type and model	RB4020

Capacities in 1,000 SCFH of 0.6 S.G. gas; base conditions of 14.7 PSIA and 60° F.

Inlet Pressure (PSIG)	Outlet Pressure Setting							
	1 PSIG		3 PSIG		5 PSIG		10 PSIG	
	1% ABS droop	2% ABS droop	1% ABS droop	2% ABS droop	1% ABS droop	2% ABS droop	1% ABS droop	2% ABS droop
3	24.7	35.3	16.9	24.7				
5	42.4	63.6	35.3	56.5	24.7	38.8		
8	49.4	77.7	42.4	70.6	35.3	53.0	19.0	28.0
10	60.0	91.8	56.5	84.7	53.0	77.7	42.4	63.6
15	84.7	134.2	77.7	127.1	77.7	127.1	70.6	113.0
20	91.8	148.3	84.7	141.2	84.7	134.2	84.7	134.2
30	120.1	176.6	113.0	176.6	120.1	176.6	113.0	176.6
40	141.2	211.9	134.2	194.2	141.2	211.9	141.2	211.9
50	176.6	264.8	169.5	247.2	176.6	264.8	176.6	264.8
60	194.2	282.5	176.6	282.5	194.2	282.5	194.2	300.1
70	229.5	317.8	211.9	317.8	229.5	335.4	229.5	353.1
80	247.2	353.1	225.9	324.8	264.8	388.4	264.8	388.4
90	264.8	360.0	247.0	331.9	268.3	395.4	264.8	399.0
100	282.5	370.7	264.8	335.4	300.1	402.5	296.6	406.0
120	317.8	388.4	300.0	346.0	335.4	406.0	331.9	409.5
150	335.4	423.7	317.7	353.1	388.4	409.5	423.7	413.0
175	353.1	494.4	346.0	356.6	391.9	413.0	441.3	416.6
200	356.6	564.9	353.1	360.0	395.4	416.6	448.4	420.0
225	360.0	600.0	354.8	367.2	399.0	420.0	423.7	430.7

Lock-up Pressure (PSIG)	0.6	1.0	1.1	1.5

Notes:

*Individual regulator performance may vary from data shown.

**Multiply capacity data by 0.7 if you are using shutoff valve versions. Inlet pressure is too low to deliver set point.

RB4030 CAPACITY TABLE 4" VALVE BODY (Ø 360 Actuator-14" Head)

Typical Capacity Info.

Manufacturer	Roots
Type and model	RB4030

Capacities in 1,000 SCFH of 0.6 S.G. gas; base conditions of 14.7 PSIA and 60° F.

Inlet Pressure (PSIG)	Outlet Pressure Setting							
	5 PSIG		10 PSIG		15 PSIG		30 PSIG	
	10% GA droop	15% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop
8	30.1	42.4						
10	42.4	60.0						
15	70.6	98.9	49.4	70.6				
20	91.8	134.2	77.7	120.1	67.1	98.9		
30	127.1	176.6	120.1	176.6	105.9	162.4		
40	176.6	247.2	162.4	247.2	162.4	247.2	141.2	194.2
50	194.2	282.5	176.6	282.5	176.6	282.5	169.5	247.2
60	211.9	317.8	211.9	300.1	211.9	317.8	194.2	300.1
70	264.8	353.1	247.2	353.1	264.8	353.1	247.2	353.1
80	300.1	388.4	300.1	423.7	300.1	423.7	300.1	423.7
90	335.4	423.7	317.8	459.0	335.4	459.0	353.1	494.3
100	353.1	425.0	353.1	462.8	353.1	494.3	388.4	565.0
120	388.4	435.5	388.4	473.0	423.7	503.4	423.7	600.3
150	423.7	439.3	423.7	482.1	459.0	511.1	459.0	615.5
175	430.0	445.3	459.0	497.0	494.3	515.6	529.7	625.9
200	435.6	452.8	475.3	503.5	510.0	525.3	565.0	637.8
225	441.4	465.0	486.2	515.3	525.4	532.5	600.3	684.0

Lock-up Pressure (PSIG)	0.6	1.0	1.1	1.5

Notes:

*Individual regulator performance may vary from data shown.

**Multiply capacity data by 0.7 if you are using shutoff valve versions. Inlet pressure is too low to deliver set point.

RB4040 CAPACITY TABLE 4" VALVE BODY (Ø 360TR Actuator-14" Head)

Typical Capacity Info.

Manufacturer	Roots
Type and model	RB4040

Capacities in 1,000 SCFH of 0.6 S.G. gas; base conditions of 14.7 PSIA and 60° F.

Inlet Pressure (PSIG)	Outlet Pressure Setting							
	10 PSIG		15 PSIG		20 PSIG		30 PSIG	
	10% GA droop	15% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop
15	52.0	88.7						
20	67.4	131.0	63.3	104.8				
30	106.1	159.6	109.1	163.3	98.1	172.4		
40	132.1	216.2	132.3	206.6	137.1	236.4	97.1	168.4
50	139.8	221.0	142.7	225.3	166.8	269.5	117.8	218.3
60	169.2	269.9	162.1	255.9	193.6	312.9	136.7	253.3
70	184.5	292.0	180.2	270.7	228.3	357.9	158.4	297.7
80	211.7	337.2	207.0	326.8	247.2	399.5	174.6	323.5
90	218.0	357.3	234.4	370.1	274.0	442.9	193.5	358.6
100	249.3	401.4	250.1	401.6	321.5	492.9	212.5	393.7
120	285.9	448.4	297.0	472.8	367.8	576.8	250.3	463.9

RB4040 CAPACITY TABLE 4" VALVE BODY CONTINUED

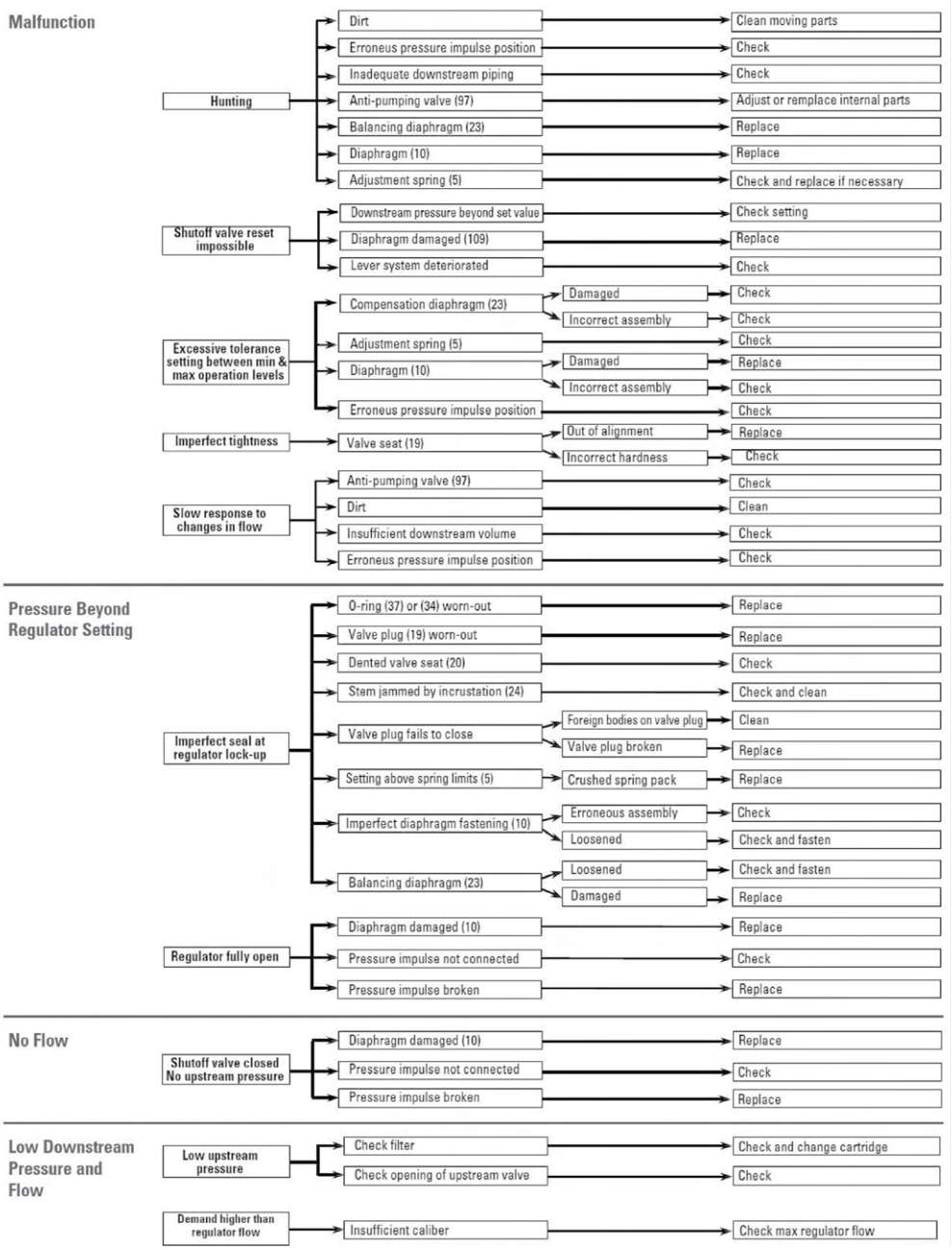
Inlet Pressure (PSIG)	Outlet Pressure Setting							
	10 PSIG		15 PSIG		20 PSIG		30 PSIG	
	10% GA droop	15% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop	10% GA droop	20% GA droop
150	345.1	567.1	342.7	569.1	439.7	693.4	307.2	596.7
175	383.8	640.2	429.4	677.9	501.9	811.2	354.5	656.9
200	487.2	785.8	476.4	752.1	569.0	919.5	401.8	744.6
225	521.7	841.4	544.1	859.0	636.0	1027.8	449.2	832.3

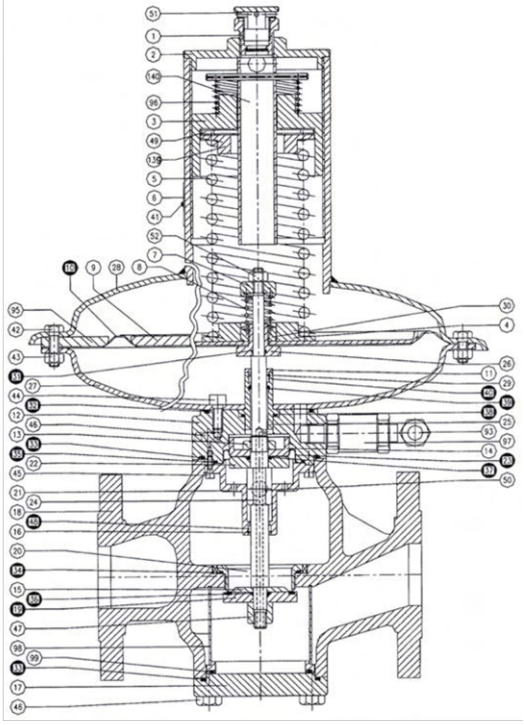
Lock-up Pressure (PSIG)	0.6	1.0	1.1	1.5

Notes:

*Individual regulator performance may vary from data shown.

**Multiply capacity data by 0.7 if you are using shutoff valve versions. Inlet pressure is too low to deliver set point.





Spare Parts Kit RB4000	
Part Number	**Description**
39926101	Spare parts kit RB 4010 2" Body
39926201	Spare parts kit RB 4020 2" Body
39926301	Spare parts kit RB 4030 2" Body
39927200	Spare parts kit RB 4020 3" Body
39927300	Spare parts kit RB 4030 3" Body
39927400	Spare parts kit RB 4040 3" Body
39927120	Spare parts kit list RB 4011-4012 3" Body
39927310	Spare parts kit list RB 4031-4032 3" Body
39927410	Spare parts kit list RB 4041-4042 3" Body

Spare Parts Kit RB 4010 2" Body			
Item Number	**Part Number**	**Quantity**	**Description**
10	20550290	1	Diaphragm RB 4010 2" body rev.0
19	20600260	1	Valve plug SHA 55 RB 4010 2" body rev.C
23	20556290	1	Balancing diaphragm RB 4000 2" body II series rev.0
31	45000108	1	O-ring or 108
32	45004312	1	O-ring or 4312
33	45004325	2	O-ring or 4325
34	45003231	1	O-ring or 3231
35	45003262	1	O-ring or 3262
36	45000112	1	O-ring or 112

Spare Parts Kit RB 4010 2" Body			
Item Number	**Part Number**	**Quantity**	**Description**
37	45003056	1	O-ring or 3056
38	45003087	1	O-ring or 3087
39	20030715	1	O-ring 12 SHA 65 St.3007 rev.A
40	20080170	1	Nylon bushing D.12 rev. 0
48	20080270	1	Nylon bushing D.14 rev.0

Spare Parts Kit RB 4020 2” Body			
Item Number	**Part Number**	**Quantity**	**Description**
10	20552390	1	Diaphragm RB 4020 2" body rev. 0
19	20604260	1	Valve plug SHA 75 RB 4020 2" body rev. C
23	20556290	1	Balancing diaphragm RB 4000 2" body II series rev. 0
31	45000108	1	O-ring or 108
32	45004312	1	O-ring or 4312
33	45004325	2	O-ring or 4325
34	45003231	1	O-ring or 3231
35	45003262	1	O-ring or 3262
36	45000112	1	O-ring or 112
37	45003056	1	O-ring or 3056
38	45003087	1	O-ring or 3087
39	20030715	1	O-ring 12 SHA 65 ST.3007 rev. A
40	20080170	1	Nylon bushing D.12 rev. 0
48	20080270	1	Nylon bushing D.14 Rev.0
Spare Parts Kit RB 4030 2” Body			
Item Number	**Part Number**	**Quantity**	**Description**
10	20552390	1	Diaphragm RB 4020 2" body rev.0
19	20604260	1	Valve Plug SHA 75 RB 4020 2" body rev. C
23	20556290	1	Balancing diaphragm RB 4000 2" body II series rev. 0
31	45000108	1	O-ring or 108
32	45004312	1	O-ring or 4312
33	45004325	2	O-ring or 4325
34	45003231	1	O-ring or 3231
35	45003262	1	O-ring or 3262
36	45000112	1	O-ring or 112
37	45003056	1	O-ring or 3056
38	45003087	1	O-ring or 3087
39	20030715	1	O-ring 12 SHA 65 ST.3007 rev. A
40	20080170	1	Nylon bushing D.12 rev. 0
48	20080270	1	Nylon bushing D.14 rev. 0
Spare Parts Kit RB 4020 3” Body			
Item Number	**Part Number**	**Quantity**	**Description**
10	20552190	1	Diaphragm RB 4020 3" body rev. 0
19	20601100	1	Valve plug SHA75 RB 4020 3" body rev. 0
23	20555390	1	Balancing diaphragm RB 4000 3" body rev. 0
31	45000108	1	O-ring or 108
32	45004450	1	O-ring or 4450
33	45004475	2	O-ring or 4475
34	45004362	1	O-ring or 4362
35	45004387	1	O-ring or 4387
36	45000115	1	O-ring or 115
Spare Parts Kit RB 4010 2” Body			
Item Number	**Part Number**	**Quantity**	**Description**
37	45000121	1	O-ring or 121
38	45000132	1	O-ring or 132
39	20030815	1	O-ring 14 SHA 65 ST.3008 rev. A
40	20080270	1	Nylon bushing D.14 rev. 0
48	20080370	1	Nylon bushing D.18 rev. 0

Spare Parts Kit RB 4030 3” Body			
Item Number	**Part Number**	**Quantity**	**Description**
10	20552190	1	Diaphragm RB 4020 2" body rev. 0
19	20601100	1	Valve plug SHA75 RB 4020 3" body rev. 0
23	20555390	1	Balancing diaphragm RB 4000 3" body rev. 0
31	45000108	1	O-ring or 108
32	45004450	1	O-ring or 4450
33	45004475	2	O-ring or 4475
34	45004362	1	O-ring or 4362
35	45004387	1	O-ring or 4387
36	45000115	1	O-ring or 115
37	45000121	1	O-ring or 121
38	45000132	1	O-ring or 132
39	20030815	1	O-ring 14 SHA 65 ST.3008 rev. A
40	20080270	1	Nylon bushing D.14 rev. 0
48	20080370	1	Nylon bushing D.18 rev. 0
Spare Parts Kit RB 4040 3” Body			
Item Number	**Part Number**	**Quantity**	**Description**
10	20552390	1	Diaphragm RB 4020 2" body rev. 0
19	20604260	1	Valve plug SHA 75 RB 4020 2" body rev. C
23	20556290	1	Balancing diaphragm RB 4000 2" body II series rev. 0
31	45000108	1	O-ring or 108
32	45004312	1	O-ring or 4312
33	45004325	2	O-ring or 4325
34	45003231	1	O-ring or 3231
35	45003262	1	O-ring or 3262
36	45000112	1	O-ring or 112
37	45003056	1	O-ring or 3056
38	45003087	1	O-ring or 3087
39	20030715	1	O-ring 12 SHA 65 ST.3007 rev. A
40	20080170	1	Nylon bushing D.12 rev. 0
48	20080270	1	Nylon bushing D.14 rev. 0
Spare Parts Kit RB 4011-4012 3” Body			
Item Number	**Part Number**	**Quantity**	**Description**
10	20555290	1	Diaphragm RB 4010 3" body rev. A
19	20600100	1	Valve plug SHA 55 RB 4010 3" body rev.0
23	20555390	1	Balancing diaphragm RB 4000 3" body rev. 0
31	45000115	2	O-ring or 115
32	45004450	1	O-ring or 4450
33	45004475	2	O-ring or 4475
34	45004362	2	O-ring or 4362
35	45004387	1	O-ring or 4387
37	45000121	1	O-ring or 121
38	45000132	1	O-ring or 132
Spare Parts Kit RB 4011-4012 3” Body			
Item Number	**Part Number**	**Quantity**	**Description**
39	20030815	1	O-ring 14 SHA 65 ST.3008 rev. A
40	20080270	1	Nylon bushing D.14 rev. 0
48	20080370	3	Nylon bushing D.18 rev. 0
54	20500270	1	Cap gasket for VDB 8600 rev. 0
56	48000804	1	Elastic Pin 3x20 UNI 6873
57	20600200	1	Valve Plug RB 4011 3" Body Rev. B
60	45000128	2	O-ring or 128
65	45003037	2	O-ring or 3037
109	20558290	1	Diaphragm VDB 8600 L.P. rev. 0
117	45004437	1	O-ring or 4437

Spare Parts Kit RB 4031-4032 3” Body			
Item Number	**Part Number**	**Quantity**	**Description**
10	20552390	1	Diaphragm RB 4020 2" body rev. 0
19	20601100	1	Valve plug ShA75 RB 4020 3" body rev. 0
23	20555390	1	Balancing diaphragm RB 4000 3" body rev.0
31	45000108	1	O-ring or 108
32	45004450	1	O-ring or 4450
33	45004475	2	O-ring or 4475
34	45004362	2	O-ring or 4362
35	45004387	1	O-ring or 4387
36	45000115	1	O-ring or 115
37	45000121	1	O-ring or 121
38	45000132	1	O-ring or 132
39	20030815	1	O-ring 14 SHA 65 ST.3008 rev. A
40	20080270	1	Nylon bushing D.14 rev. 0
48	20080370	1	Nylon bushing D.18 Rev. 0
67	20551690	1	Shut-off valve diaphragm RB 4021 rev.0
72	20600200	1	Valve plug RB 4011 3" body rev. B
75	45000112	1	O-ring or 112
76	45003237	1	O-ring or 3237
77	45003087	1	O-ring or 3087
78	20030415	1	O-ring 10 SHA 65 ST.3001 rev. B
85	48000804	1	Elastic pin 3x20 UNI 6873
86	45004437	1	O-ring or 4437

Spare Parts Kit RB 4041-4042 3” Body			
Item Number	**Part Number**	**Quantity**	**Description**
10	20552990	1	Diaphragm RB 4030 rev. 0
19	20601100	1	Valve plug SHA75 RB 4020 3" body rev. 0
23	20555390	1	Balancing diaphragm RB 4000 3" body rev. 0
31	45000108	1	O-ring or 108
32	45004450	1	O-ring or 4450
33	45004475	2	O-ring or 4475
34	45004362	1	O-ring or 4362
35	45004387	1	O-ring or 4387
36	45000115	1	O-ring or 115
37	45000121	1	O-ring or 121

Spare Parts Kit RB 4041-4042 3” Body			
Item Number	**Part Number**	**Quantity**	**Description**
39	20030815	1	O-ring 14 SHA 65 St.3008 rev. A
40	20080270	1	Nylon bushing D.14 rev. 0
48	20080370	1	Nylon bushing D.18 rev. 0
67	20555090	1	Shut-off valve diaphragm RB 4031 Rev. 0
72	20600200	1	Valve plug RB 4011 3" body rev. B
75	45000112	1	O-ring or 112
76	45003237	1	O-ring or 3237
77	45003087	1	O-ring or 3087
78	20030415	1	O-ring 10 SHA 65 ST.3001 rev. B
85	48000804	1	Elastic Pin 3 x 20 UNI 6873
86	45004437	1	O-ring or 4437

Item Number	Part Number	Spring Color
5	20568085	Orange/silver
5	20568086	Brown/silver
5	20568087	Dark green/silver
5	20568088	Light green/silver
5	20568089	Light blue/silver
5	20568090	Black/silver
5	20568081	Purple/silver
5	20568082	Yellow
5	20568083	Blue/silver
5	20568183	Blue
5	20568182	Silver
5	20568181	Purple
5	20568186	Yellow/silver
5	20568184	Red/silver
5	20568185	White/silver
5	20569590	Orange
5	20569591	Brown
5	20569592	Dark green
5	20569593	Light green
5	20569594	Black
5	20569690	Red
5	20569691	Light blue
5	20569585	White
5	20569586	Pink

Special Tools	
Part Number	**Description**
39926000	"Orifice wrench 2"" valve body"
39927000	"Orifice wrench 3"" valve body"
799056	"Spring adjustment wrench"

VENT LINES FOR REGULATORS

When constructing vent lines to be attached to regulators installed indoors, follow a few basic rules:

A. Never use pipe sizes smaller than the vent size; smaller pipe sizes restrict the gas flow. If a long gas run must be used, Roots advises increasing the pipe one nominal size every ten feet to keep the flow restriction as low as possible
B. Keep the vent line length as short as possible to minimize the restriction and reduce the vent's tendency to cause regulator pulsation.
C. Support the vent pipe to eliminate strain on the regulator diaphragm case.
D. Always point outdoor vent pipes in the downward position to reduce the possibility of rain, snow, sleet, and other moisture entering the pipe. Install a bug screen in the end of the pipe.
E. Do not locate the vent line terminus near windows, fans, or other ventilation equipment. See the installation instructions furnished with the regulator.
F. Adhere to all applicable codes and regulations.
G. If your vent pipe causes regulator pulsation, consult your sales representative or manufacturer
H. Roots strongly recommends running a separate vent line for each regulator. Headers with various installed devices can cause regulator malfunction.

Caution Ensure the end of the vent line is away from ANY potential ignition sources. It is the installer's responsibility to ensure the vent line is exhausting to a safe environment.

INSTALLATION

- Warning Roots does not endorse or warrant the completeness or accuracy of any third party regulator installation procedures or practices, unless otherwise provided in writing by Roots. Follow your company's standard operating procedures regarding the use of personal protection equipment (PPE). Adhere to guidelines issued by your company in addition to those given in this document when installing regulators. Remove all shipping plugs from the inlet, outlet, and vent of any ROOTS Regulator before installation.
- Keep the piping interior (inner diameter), ROOTS Regulator inlet, and regulator outlet free of dirt, chemical sealant (pipe dope), Teflon tape, or other debris. Materials in piping or ROOTS Regulator inlet or outlet creating a loss of pressure control.
- Gas must flow through the ROOTS Regulator valve body in the same direction as the arrow on the regulator body. Gas flowing in the wrong direction may cause an over-pressure condition and damage the Root Regulator.
- Apply a gas resistant pipe joint sealant on the male (exterior) pipe threads. Do not use any type of Teflon tape on ROOTS Regulator installations. Do not apply pipe joint sealant on the female (interior) pipe threads of the ROOTS Regulator as joint materials could lodge in the regulator creating a loss of pressure control.
- During product installation, do not clamp the valve body in a vice, this may lead to permanent damage rendering a ROOTS Regulator that is not fit for service. During product installation, use of excessive force and unsafe practices can lead to permanent damage rendering a ROOTS Regulator that is not fit for service. It is recommended to not exceed 3 full turns past hand tight into the ROOTS Regulator valve body per SAE standard AS71051. Do not use oversized pipe wrenches and/or "Cheater" bars during the installation of ROOTS Regulators which can damage valve body from an over torque situation.
- RB series regulators are high flow valves and the downstream piping should be designed to carry the load. This will often result in much larger diameter pipe after the regulator. The transition to the larger diameter pipe should be made as soon as possible after the outlet. The sensing lines should always be terminated in this larger diameter pipe at least 4 Pipe diameters downstream or preferably 8-10 Pipe diameters downstream in straight pipe with minimal turbulence. The velocity in the pipe at the outlet should not exceed 380 ft/second.

Key:

No.	Description
1	Upstream valve
2	Differential pressure gauge
3	Strainer/Filter
4	Upstream pressure gauge
5	Regulator/Monitor
6	Shutoff valve
7	Pressure gauge
8	Monitor Regulator
9	Shutoff valve impulse
10	Regulator impulse
11	Monitor regulator impulse
12	Downstream pressure gauge
13	Discharge vent pipe
14	Downstream valve
15	Upstream isolating connection
16	Discharge vent pipe
17	Regulator vent
18	Meter
19	Peak shaving valve
20	Downstream electrical insulating connection

Fig. 1

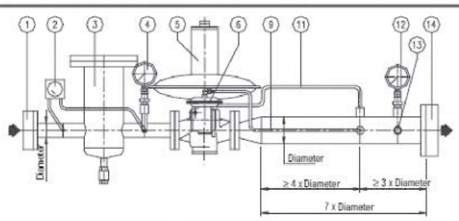


Fig. 2

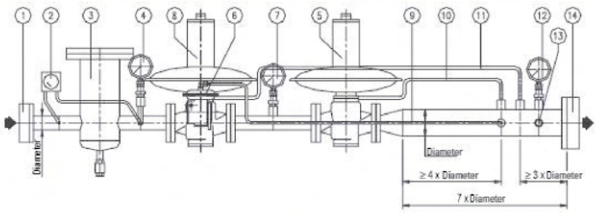


Fig. 3

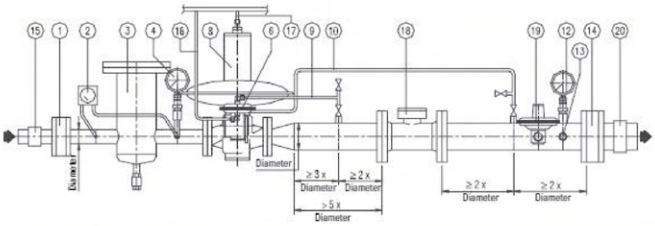
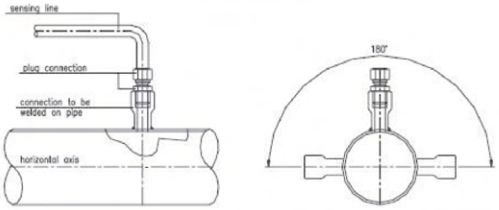


Fig. 4



START-UP PROCEDURE

After the pressure regulator has been installed, verify that:
• The upstream and downstream on/off valves and the discharge vent pipe are all closed
• The pressure of the inlet gas is not higher than the established design value.

After these checks are completed, proceed as follows :
• Partially open the upstream on/off valve slowly, just enough to verify that a very small amount of gas passes.
• Reset the shutoff valve whenever it was set for minimum pressure intervention; it will be closed in the absence of pressure (see Shutoff Device Reset).
• Verify that the pressure rises slowly on the upstream and downstream pressure gauges. The downstream pressure must stabilize around the pre-set set value or a value slightly higher. If the pressure continues to rise, interrupt the starting procedure by closing the upstream on/off valve and consult the trouble-shooting diagram to identify the cause of the malfunction.
• After the upstream pressure value stabilizes, open the upstream on/off valve completely.
• Slowly open the downstream on/off valve until the piping is completely filled.
• At this point, the pressure regulator is operative. You must use the same procedure when installing monitor-equipped pressure regulators connected on line with the active pressure regulator (see Figure 2).

Note The pressure gauge installed in the section between the two regulators must indicate the same pressure value as the upstream gauge.

After verification, proceed as follows:
• To increase the value of the set pressure, rotate the spring adjustment ferrule (lock) nut clockwise using the adjustment wrench until the desired value is reached (monitor the reading on the gauge downstream).
• To decrease the value of the set pressure, proceed as above, rotating the spring adjustment ferrule counter-clockwise.

Pressure regulator should always be set under flowing conditions. Flow should be obtained by running a downstream appliance or using a controlled bleed.

Shutoff Device Setting

Important If you are Changing the shutoff valve setting, the diaphragm chamber must always be under pressure (see the Principal of Operation schematic).

Begin by reviewing the installed spring specifications to verify the spring is capable of the desired setting value. After verification, check the setting of the shutoff unit.

• To reach the maximum downstream pressure, close the ON/OFF valve downstream (see Figure 1) and slowly increase the pressure downstream until the you reach the desired maximum intervention pressure.
• To correct the maximum intervention value, rotate the overpressure adjustment spring nut (see the Principal of Operation Schematic) clockwise to increase the set pressure and counter-clockwise to decrease the value.
• To reach the minimum downstream pressure, close the upstream

Shutoff Device Reset

(Fig.1, 2 & 3)

Important Identify the cause of the device shutoff prior to resetting the shutoff.

To restore normal operating conditions, perform the following operations:
• Close the ON/OFF valve downstream
• Open the valve for the upstream and downstream pressure gauges
• Downstream pressure = 0 (discharge any residual pressure by opening the discharge vent pipe).
• Relief valve and discharge valve closed

Check the unit's valve seat seal by opening the discharge valve (test the unit using the bubble system).
• Slowly rotate the reset lever (see the Principal of Operation schematic) clockwise until the internal bypass is opened. Slowly rotating the reset lever permits the outlet chamber, the downstream piping, and the shutoff valve diaphragm chamber to fill. Verify the outlet chamber, the downstream piping, and the shutoff valve filled on the gauge positioned downstream.
• After the pressure on the gauge stabilizes, continue using the reset lever until it can be connected to the control levers. At this point, the reset lever will remain stable in its open position.

After these operations are completed, the shutoff valve is ready for service and the downstream valve can be slowly reopened.

When you are restoring normal operating conditions, the shutoff valve must always be reset whenever the valve is equipped with the minimum

Pressure Regulator Setting

(See the Principle of Operation Schematic)

The pressure regulator is typically shipped set to the specifications indicated in the order. If you must modify the set pressure, the new setting value must be within the installed spring's setting range.

Begin by reviewing the installed spring specifications to verify the spring is ON/OFF valve (see Figure 1), and slowly discharge the downstream pressure until the desired minimum intervention pressure is reached.

• To correct the minimum downstream pressure, rotate the under pressure adjustment spring nut (see the Principle of Operation Schematic) clockwise to increase the setting value, and counter-clockwise to decrease the value.

SAFETY WARNING

This product, as of the date of manufacture, is designed and tested to conform to all governmental and industry safety standards as they may apply to the manufacturer. The purchaser/user of this product must comply with all fire control, building codes, and other safety regulations governing the application, installation, operation, and general use of this regulator to avoid leaking gas hazards resulting from improper installation, startup or use of this product.

Roots strongly recommends installation by a qualified professional and periodic inspection of pressure regulators (inspections may be required by local applicable codes or regulations).

Inspections should include checking for gas quality, cycle numbers, external environmental changes, and operating conditions that impact wear on the regulator's moving parts. To ensure safe and efficient operation of this product, replace worn or damaged parts found during inspection.

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