

P1098 Pressure Reducing Regulator

The BelGAS P1098 pressure regulator is an accurate and economical pressure control device for large volume gas use in pressures from inches of water column up to 75 PSIG output pressure. The P1098 incorporates a two-path pilot system and a large area actuator diaphragm allowing for fast and accurate response to changing flow conditions. The pilot acts as an amplifier to the main regulator valve for precision control. Bubble tight shutoff is also achieved with a sharp-edged orifice and soft seat material.

Applications

- City/District gate operation
- Commercial Buildings
- Boilers, Furnaces, Ovens
- Plant Air Systems

Features

- Multiple Pilot Choices (Low to Extra High Pressure)
- Up to 250 PSI Main Valve Inlet
- Loading Pressure Bleeds Downstream (No Atmospheric Relief)

Operations

- Pilot operated providing quick response and high accuracy requires less droop than a direct operated regulator to obtain the same pressure difference.
- Pilots assemblies can be exchanged in the field from high to low pressure.
- Seat design is an elastomer seat disk against a sharp edge orifice.
- Inlet pressures provide the pilot which in turn controls the actuator operating on a pressure differential.



Materials of Construction

Main Regulators	
Body	WCB Steel
Bonnet	Steel
Actuator Casing	Steel
Main Spring	Steel
Diaphragm	Nitrile
Trim	316 Stainless
Pilots	
Body	Aluminum / Iron
Spring Case	Aluminum / Iron
Diaphragms	Nitrile
Orifices	Stainless
Springs	Steel
Tubing & Fittings	316 Stainless

Specifications

Pilot Version	Max Inlet	Outlet Pressure Range
PL81	250 PSIG	3 PSIG up to 100 PSIG
PL84	150 PSIG	4" WC up to 20 PSIG
Temperature Ratings		
Nitrile	-20 to 180°F	-29 to 82°C
Weight Approximate		
2" NPT	100 lbs.	45.4 kg
2" Flange	110 lbs.	50.0 kg
3" Flange	125 lbs.	56.7 kg
4" Flange	175 lbs.	79.4 kg

P1098 Part Matrix

P1098										
	↑↑	↑	↑	↑	↑		↑	↑	↑	Port Size
16										2"
32										4"
										Connections
	O									2" NPT (only for 2" body)
	A									150 RF (Steel)
	B									300 RF (Steel)
										Actuator
		4								40 Actuator (Max Outlet 75 PSIG)
										Spring: Maximum Differential Pressure
			2							20 PSI Spring
			6							60 PSI Spring
			1							125 PSI Spring
			4							400 PSI Spring
										Elastomers
				0						Nitrile
										Pilot Model & Outlet Range
					0					No Pilot Installed
										PL81
					A					3-35 PSI
					B					35-100 PSI
										PL84
					C					4" - 14" WC
					D					14" WC - 2 PSI
					E					2-20 PSI
										Cage Type
						1				CF8M Linear Cage (2" Only at this time)
						3				CF8M Noise Reduction Cage (4" Only at this time)
										Travel Indicator
							1			No Travel Indicator, SS Fitting
							2			Steel Travel Indicator Fittings
							3			Stainless Steel Travel Indicator Fittings
										Body Material
							1			Steel

P1098 Flow Coefficients

LINEAR CAGE								
Body Size	1:1 Line to Body				2:1 Line to Body			
	Cg		Cv		Cg		Cv	
	Regulating	Wide-Open	Regulating	Wide-Open	Regulating	Wide-Open	Regulating	Wide-Open
2"	2280	2400	64	67	2050	2160	60	63
3"	4630	4880	132	132	4410	4650	128	135

NOISE REDUCTION								
Body Size	1:1 Line to Body				2:1 Line to Body			
	Cg		Cv		Cg		Cv	
	Regulating	Wide-Open	Regulating	Wide-Open	Regulating	Wide-Open	Regulating	Wide-Open
4"	6280	6610	180	190	6020	6340	171	180

P1098 Pressure Reducing Regulator Rebuild Kits

	Kit Includes	Part Number
2" Complete Repair Kit, Nitrile	Fitting O-Ring, Travel Indicator O-Ring, Main Valve Gasket, Main Valve Piston Ring, Main Valve Port Seal, Main Valve Plug Seal, Indicator Stem O-Ring, Upper Seal, Cage O-ring, Backup Ring (2), E-Ring, Actuator Diaphragm, Actuator Bearing (2), Actuator Wiper, Bonnet O-Ring, Stem O-Rings (2)	971-109-500
4" Complete Repair Kit, Nitrile	Fitting O-Ring, Travel Indicator O-Ring, Main Valve Gasket, Main Valve Piston Ring, Main Valve Port Seal, Main Valve Plug Seal, Indicator Stem O-Ring, Upper Seal, Cage O-ring, Backup Ring (2), E-Ring, Actuator Diaphragm, Actuator Bearing (2), Actuator Wiper, Bonnet O-Ring, Stem O-Rings (2)	971-109-501
#40 Actuator Repair Kit, Nitrile	Actuator Diaphragm, Actuator Bearing (2), Actuator Wiper, Bonnet O-Ring, Stem O-Rings (2)	971-109-8AR
2" Body Flange Repair Kit, Nitrile	Fitting O-Ring, Travel Indicator O-Ring, Main Valve Gasket, Main Valve Piston Ring, Main Valve Port Seal, Main Valve Plug Seal, Indicator Stem O-Ring, Upper Seal, Cage O-ring, Backup Ring (2), E-Ring	971-109-8N2
4" Body Flange Repair Kit, Nitrile	Fitting O-Ring, Travel Indicator O-Ring, Main Valve Gasket, Main Valve Piston Ring, Main Valve Port Seal, Main Valve Plug Seal, Indicator Stem O-Ring, Upper Seal, Cage O-ring, Backup Ring (2), E-Ring	971-109-8N4

P1098 Proportional Band with Size 40 Actuator

Body Size	Pilot	Pilot Control Spring		40 Actuator					
				20 / 60 PSIG Main Spring		125 PSIG Main Spring		400 PSIG Main Spring	
		PSIG / In. WC	BAR / mBAR	PSIG	mBAR	PSIG	mBAR	PSIG	mBAR
2"	PL81	3 - 20	0.21 - 1.4	0.2	14	0.3	21	0.5	34
		5 - 35	0.35 - 2.4	0.3	21	0.5	34	1	69
		35 - 100	2.4 - 6.9	0.5	34	1	69	1.4	97
	PL84	14" - 2	35 mBar - 0.1	0.05	3	0.15	10	0.3	21
		2 - 10	0.14 - 0.69	0.1	7	0.3	21	0.6	41
3"	PL81	3 - 20	0.21 - 1.4	0.3	21	0.4	28	0.6	41
		5 - 35	0.35 - 2.4	0.4	28	0.6	41	1.2	83
		35 - 100	2.4 - 6.9	0.9	62	1.2	83	1.5	103
	PL84	14" - 2	35 mBar - 0.1	0.1	7	0.2	14	0.4	28
		2 - 10	0.14 - 0.69	0.2	14	0.4	28	0.8	55
4"	PL81	3 - 20	0.21 - 1.4	0.4	28	0.5	34	0.8	55
		5 - 35	0.35 - 2.4	0.7	48	0.8	55	1.4	97
		35 - 100	2.4 - 6.9	1.2	83	2	138	3	207
	PL84	14" - 2	35 mBar - 0.1	0.15	10	0.3	21	0.6	41
		2 - 10	0.14 - 0.69	0.3	21	0.6	41	1.2	83

P1098 Max and Min Differential Pressures

Body Size	Main Spring Range	Max Differential or Max Body Pressure ¹		Min. Differential	
				40 Actuator	
		PSIG	BAR	PSIG	BAR
2"	20 PSI	20	1.4	2	0.14
	60 PSI	60	4.1	3	0.21
	125 PSI	125	8.6	5	0.34
	400 PSI	400 ¹	27.6 ¹	10	0.69
3"	20 PSI	20	1.4	2.5	0.17
	60 PSI	60	4.1	4	0.28
	125 PSI	125	8.6	6	0.41
	400 PSI	400 ¹	27.6 ¹	11	0.76
4"	20 PSI	20	1.4	3.5	0.25
	60 PSI	60	4.1	5	0.34
	125 PSI	125	8.6	8	0.55
	400 PSI	400 ¹	27.6 ¹	13	0.9

P1098 Flow Capacities with Line Size Equals Main Valve Body

Inlet Pressure		Outlet Setting		Standard Travel and Standard Linear Cage, Thousands of SCFH Nat. Gas					
				2" Main Body		3" Main Body		4" Main Body	
PSIG	BAR	WC or PSIG / Bar		SCFH	Nm³/h	SCFH	Nm³/h	SCFH	Nm³/h
3	0.2	7"	17mBar	32	0.9	66	1.8	101	2.7
		7"	17 mBar	42	1.1	87	2.3	135	3.6
5	0.35	1	0.1	39	1.0	82	2.2	126	3.4
		2	0.1	35	0.9	73	2.0	112	3.0
		7"	17 mBar	63	1.7	129	3.5	201	5.4
10	0.7	3	0.2	56	1.5	116	3.1	180	4.8
		5	0.3	49	1.3	102	2.7	158	4.2
		7	0.5	40	1.1	82	2.2	127	3.4
		1	0.1	79	2.1	163	4.4	254	6.8
15	1	4	0.3	74	2.0	153	4.1	237	6.4
		8	0.5	63	1.7	130	3.5	201	5.4
		12	0.8	44	1.2	91	2.4	140	3.8
		1	0.1	102	2.7	207	5.6	328	8.8
20	1.4	10	0.7	79	2.1	164	4.4	254	6.8
		15	1.0	60	1.6	125	3.4	192	5.2
		17	2.0	48	1.3	99	2.7	153	4.1
		4	0.2	131	3.5	267	7.2	422	11.3
30	2.1	15	1.0	108	2.9	223	6.0	345	9.3
		20	1.4	93	2.5	192	5.2	297	8.0
		25	1.7	69	1.6	144	3.9	221	5.9
		9	0.5	161	4.3	327	8.8	517	13.9
40	2.8	20	1.4	136	3.6	280	7.5	434	11.6
		30	2.1	105	2.8	217	5.8	335	9.0
		35	2.4	77	2.1	161	4.3	247	6.6
		13	0.8	190	5.1	386	10.3	611	16.4
50	3.4	20	1.4	172	4.6	354	9.5	551	14.8
		30	2.1	152	4.1	313	8.4	485	13.0
		40	2.8	115	3.1	240	6.4	369	9.9
		45	3.1	85	2.3	176	4.7	270	7.5
		24	1.6	264	7.1	536	14.4	847	22.7
75	5.2	50	3.4	203	5.4	419	11.2	648	17.4
		60	4.1	166	4.5	343	9.2	529	14.2
		70	4.8	101	2.7	209	5.6	322	8.6
		35	2.4	337	9.0	685	18.4	1083	29.0
100	7	60	4.1	280	7.5	578	15.5	896	24.0
		75	5.2	236	6.3	489	13.1	754	20.2
		46	3.2	411	11.0	834	22.4	1319	35.3
125	8.6	75	5.2	344	9.2	710	19.0	1101	29.5
		57	3.9	484	13.0	984	26.4	1555	41.7
150	10	75	5.2	436	11.7	897	24.0	1396	37.4
		68	4.7	558	15.0	1133	30.4	1791	48.0
175	12	75	5.2	631	16.9	1282	34.4	2027	54.3
200	14	75	5.2	779	20.9	1581	42.4	2500	67.0
250	17.2	75	5.2						

P1098 Flow Capacities with Line Size Equals Main Valve Body

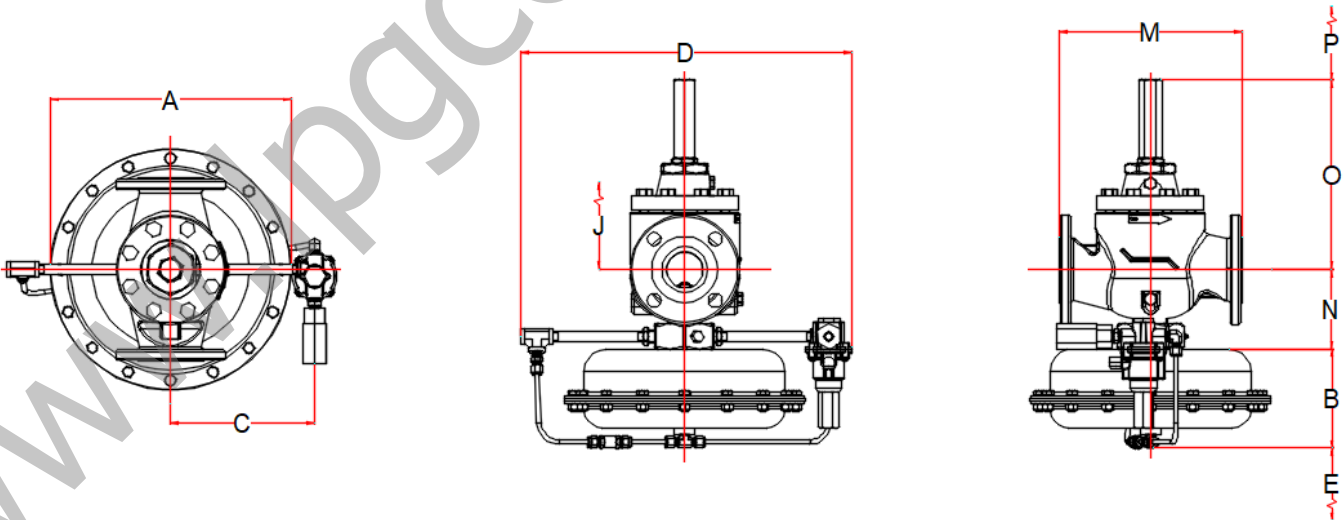
Inlet Pressure		Outlet Setting		Standard Travel and Standard Linear Cage, Gallons Per Minute Water					
				2" Main Body		3" Main Body		4" Main Body	
PSIG	BAR	WC or PSIG / Bar		GPM	L/min	GPM	L/min	GPM	L/min
3	0.2	0.25	0.02	105	397	219	829	335	1268
5	0.35	0.25	0.02	138	522	288	1090	440	1665
		1	0.1	127	481	264	999	404	1529
		2	0.1	110	416	229	867	350	1325
10	0.7	0.25	0.02	198	749	412	1559	631	2388
		3	0.2	167	632	349	1321	534	2021
		5	0.3	142	537	295	1117	452	1711
		7	0.5	110	416	229	867	350	1325
15	1	1	0.1	237	897	494	1870	756	2861
		4	0.3	210	795	438	1658	670	2536
		8	0.5	167	632	349	1321	534	2021
		12	0.8	110	416	229	867	350	1325
20	1.4	1	0.1	276	1045	575	2176	880	3331
		10	0.7	200	757	417	1578	639	2419
		15	1.0	142	537	295	1117	452	1711
		17	2.0	110	416	229	867	350	1325
30	2.1	4	0.2	323	1223	673	2547	1030	3899
		15	1.0	245	927	511	1934	782	2960
		20	1.4	200	757	417	1578	639	2419
		25	1.7	142	537	295	1117	452	1711
40	2.8	9	0.5	352	1332	735	2782	1125	4258
		20	1.4	283	1071	590	2233	903	3418
		30	2.1	200	757	417	1578	639	2419
		35	2.4	142	537	295	1117	452	1711
50	3.4	13	0.8	385	1457	803	3039	1229	4652
		20	1.4	347	1313	723	2737	1106	4186
		30	2.1	283	1071	590	2233	903	3418
		40	2.8	200	757	417	1578	639	2419
		45	3.1	142	537	295	1117	452	1711
75	5.2	24	1.6	452	1711	943	3569	1443	5462
		50	3.4	317	1200	660	2498	1010	3823
		60	4.1	245	927	511	1934	782	2960
		70	4.8	142	537	295	1117	452	1711
100	7	35	2.4	510	1930	1064	4027	1629	6166
		60	4.1	400	1514	835	3160	1278	4837
		75	5.2	317	1200	660	2498	1010	3823
125	8.6	46	3.2	563	2131	1173	4440	1795	6794
		75	5.2	448	1696	933	3531	1428	5405
150	10	57	3.9	610	2309	1273	4818	1948	7373
		75	5.2	548	2074	1143	4326	1749	6620
175	12	68	4.7	655	2479	1365	5167	2090	7911
200	14	75	5.2	708	2680	1476	5587	2258	8547
250	17.2	75	5.2	837	3168	1746	6609	2672	10114

P1098 Dimensions

Actuator					
Actuator	A	B	C	D	E
				w/ Pilot Vent	Actuator Rem.
	In / mm	In / mm	In / mm	In / mm	In / mm
40	13.2 / 333	5.8 / 146	8.0 / 200	18.2 / 462	4.0 / 100

Main Regulator							
Body Size	M			N	O	P	J
	2" NPT	150 RF	300 RF			Cap Removal	Trim Removal
	In / mm	In / mm	In / mm	In / mm	In / mm	In / mm	In / mm
2"	11.25 / 286	10.0 / 254	10.5 / 267	4.55 / 116	10.40 / 264	4.5 / 114	15 / 381
3"	N/A	11.75 / 298	12.5 / 317	5.60 / 142	11.60 / 295	4.5 / 114	17 / 432
4"	N/A	13.9 / 353	14.5 / 368	6.55 / 167	12.70 / 322	4.5 / 114	19 / 483

Figure 1

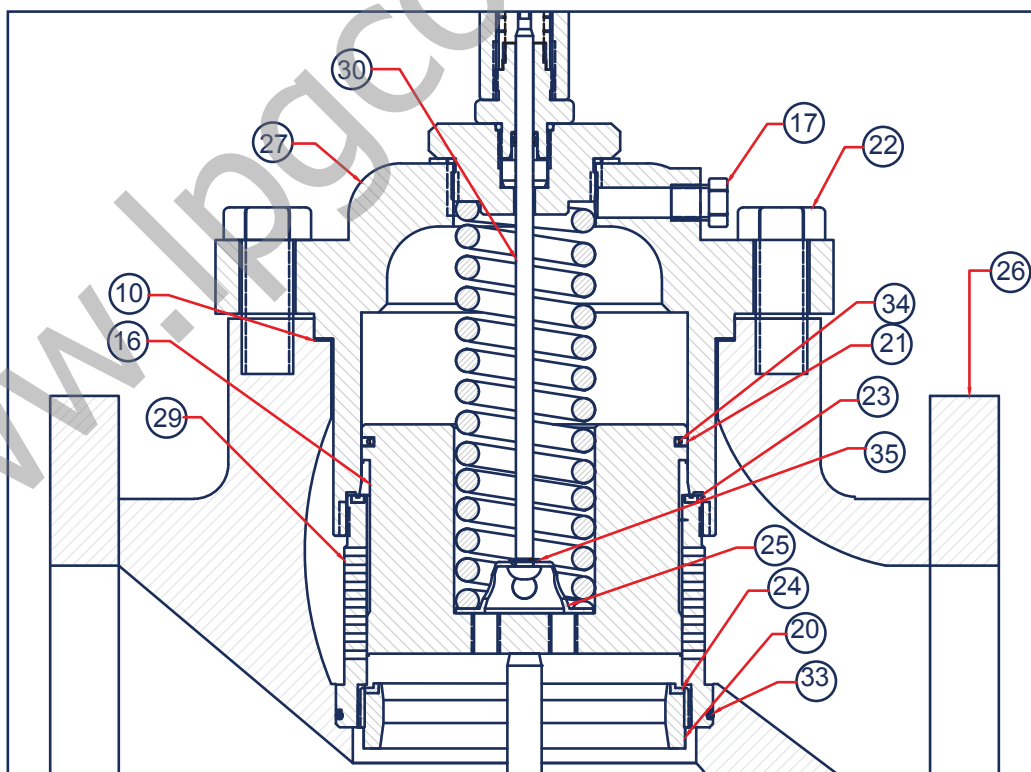


P1098 Main Regulator Parts

Item			Qty.	Part Number
10	Valve Gasket	2"	1	624-136-001
		3"		624-136-002
		4"		624-136-000
16	Main Valve Plug	2"	1	639-177-001
		3"		639-177-002
		4"		639-177-000
17	Main Pipe Plug		2	639-178-000
20	Main Seat Ring	2"	1	644-072-001
		3"		644-072-002
		4"		644-072-000
21	Main Piston Ring	2"	1	644-073-001
		3"		644-073-002
		4"		644-073-000
22	Flange Hex Screws	2"	8	648-626-001
		3"		648-626-002
		4"		648-626-000
23	Main Valve Port Seal	2"	1	649-399-001
		3"		649-399-002
		4"		649-399-000
24	Main Valve Plug Seal	2"	1	649-401-001
		3"		649-401-002
		4"		649-401-000
25	Main Spring Seat		1	650-229-000

26	Body	2" NPT / Steel	1	664-669-002
		2" 150RF / Steel		664-669-000
		2" 300RF / Steel		664-669-001
		3" 150RF / Steel		664-645-001
		3" 300RF / Steel		664-645-002
		4" 150RF / Steel		664-635-000
		4" 300RF / Steel		664-635-001
27	Body Flange	2"	1	664-636-001
		3"		664-636-002
		4"		664-636-000
28	Pipe Adaptor		1	673-037-000
29	Main Valve Cage	2"	1	688-084-001
		3"		688-084-002
		4"		688-084-000
30	Travel Indicator Stem	2"	1	689-048-002
		3"		689-048-003
		4"		689-048-000
33	Case O-Ring	2"	1	649-438-000
		3"		649-400-000
		4"		010-468-000
34	Plus O-Ring	4"	1	649-400-000
		2"	1	649-400-001
35	E-Ring		1	644-049-000

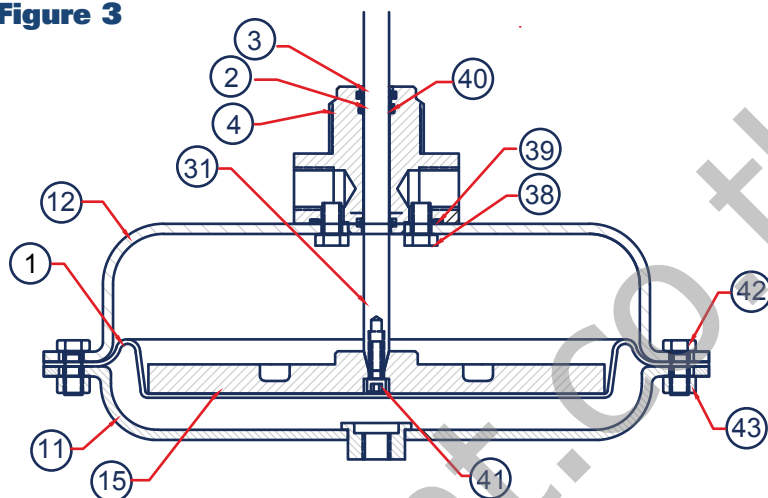
Figure 2



P1098 Actuator Parts

Item		Qty.	Part Number
1	Diaphragm	1	600-492-000
2	Actuator Bearing	2	602-146-000
3	Actuator Wiper	1	602-145-000
4	Actuator Bonnet	1	604-285-000
11	Lower Casing Assembly	1	629-297-000
12	Upper Casing	1	629-298-000
15	Diaphragm Plate	1	638-132-000
	2" SS Actuator Stem		689-049-001
31	3" SS Actuator Stem	1	689-049-004
	4" SS Actuator Stem		689-049-000
38	Bonnet Screw	4	648-000-034
39	Bonnet O-ring	1	649-309-007
40	Stem O-ring	2	649-000-150
41	Diaphragm Plate Screw	1	648-466-004
42	Cap Screw	16	648-467-007
43	Hex Nut	16	634-151-000

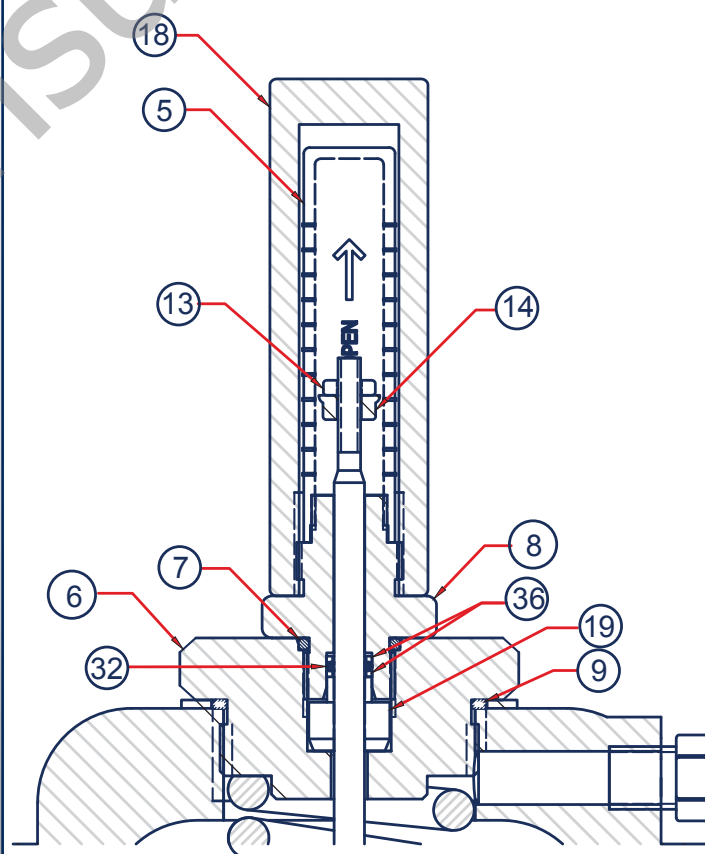
Figure 3



P1098 Travel Indicator Parts

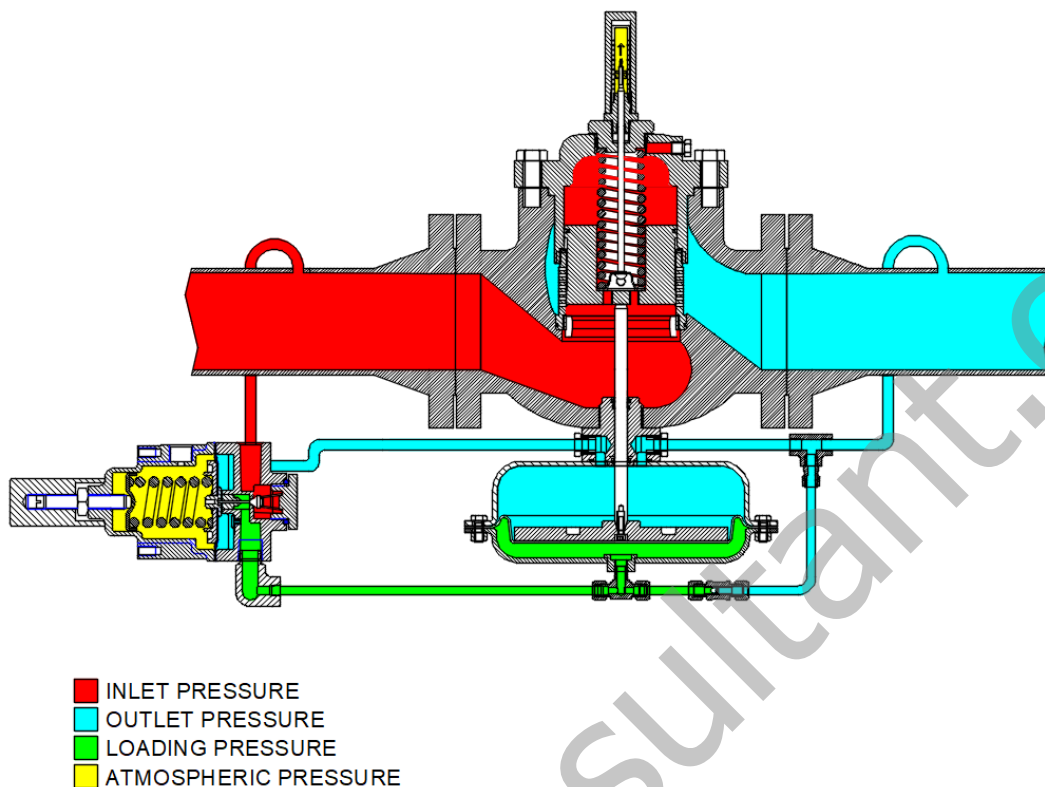
Item		Qty.	Part Number
5	Travel Indicator Scale	1	614-075-000
6	Travel Indicator Fitting (Steel)	1	622-093-000
	Travel Indicator Fitting (SS)	1	622-093-001
7	Fitting O-Ring	1	649-000-170
	Steel Valve Fitting	1	622-094-000
8	SS Valve Fitting	1	622-094-001
9	Travel Indicator O-Ring	1	649-000-249
13	Travel Indicator Hex Nut	1	634-497-000
14	Travel Indicator Flange Nut	1	634-498-000
18	Travel Indicator Protector	1	641-016-000
19	O-ring Retainer	1	643-236-000
32	Stem O-Ring	1	649-000-003
36	Backup Ring	2	644-047-000

Figure 4

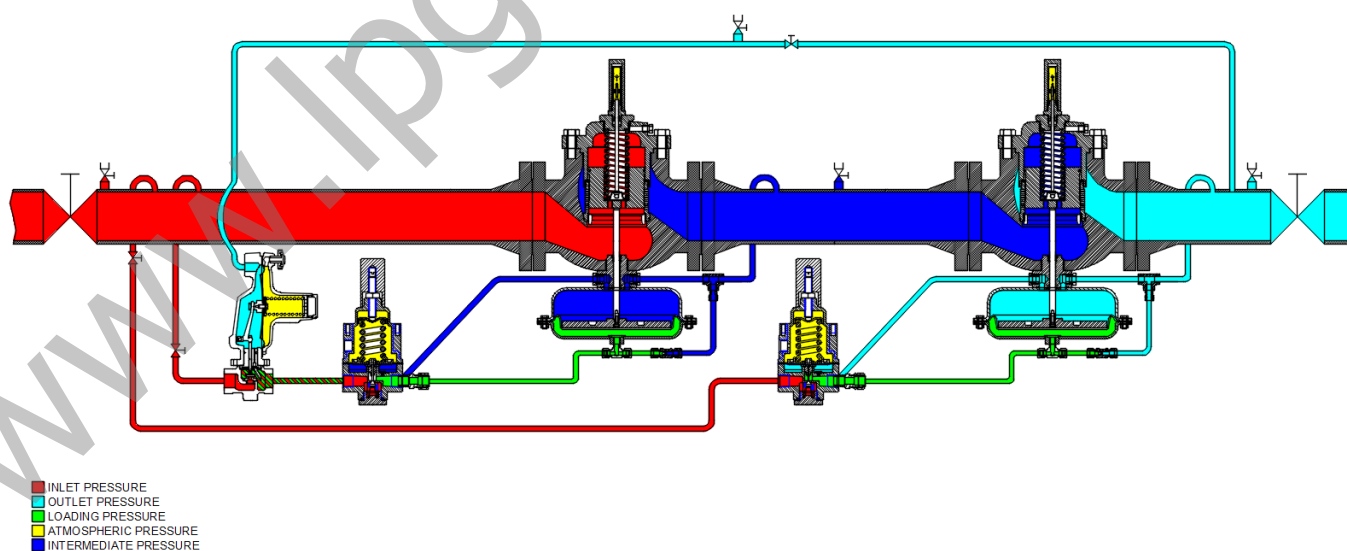


P1098 Pressure Reducing Regulator

BelGAS PL81 Or PL84 pilot



BelGAS P600 and PL81 or PL84 pilots on a working monitor setup



BelGAS

A Division of the Marsh Bellofram Group of Companies

8019 Ohio River Blvd.
Newell, WV 26050
(304) 387-1200 | www.belgas.net



BelGAS Website

With decades of proven market experience, the BelGAS division of Marsh Bellofram is a global leader in the design and manufacturing of high pressure regulators, low pressure regulators, and other flow control products. Scan the QR or visit our website at <https://bit.ly/BelGAS>



BelGAS Regulator Sizing Wizard

Need help finding the right regulator for your application? Check out the BelGAS Regulator Sizing Wizard - an interactive online tool that makes it easier than ever to precisely match a regulator with your specifications. Scan the QR code or visit our website at <https://bit.ly/BelGAS-Wizard>



BelGAS Videos

Interested in learning more about what BelGAS has to offer? Visit our YouTube channel and check out the BelGAS playlist for How-Tos, product overviews, and more! Scan the QR code or watch the videos on our YouTube channel at <https://bit.ly/BelGAS-YouTube-List>



The contents of this publication are presented for informational purposes only. Although we have made reasonable efforts to give information that we believe is up-to-date and accurate, we make no representations or warranties regarding its adequacy, accuracy, completeness, or correctness. We do not warrant or represent that the information is complete in every respect. Our terms and conditions, which are available upon request, govern all sales. We reserve the right to modify or improve the designs and specifications of our products, and the information contained in this document is subject to change without notice.

We reserve the right to modify or improve the designs or specifications of our products and the information contained in this document is subject to change without notice. The user is solely responsible for making the final selection of the product and assuring that all installation, performance, endurance, maintenance, safety, and warning requirements of the product are met. Final product recommendations should be verified by a gas professional.

BelGAS does not assume responsibility for its products' selection, use, or maintenance. Neither BelGAS nor its suppliers shall be liable for any loss or damage to the user or third parties caused by the product, the confidential information of BelGAS, or BelGAS's performance of these terms.