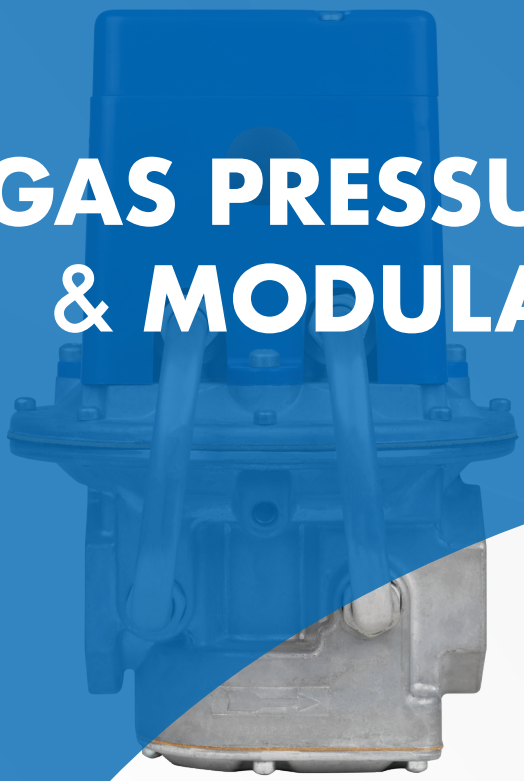
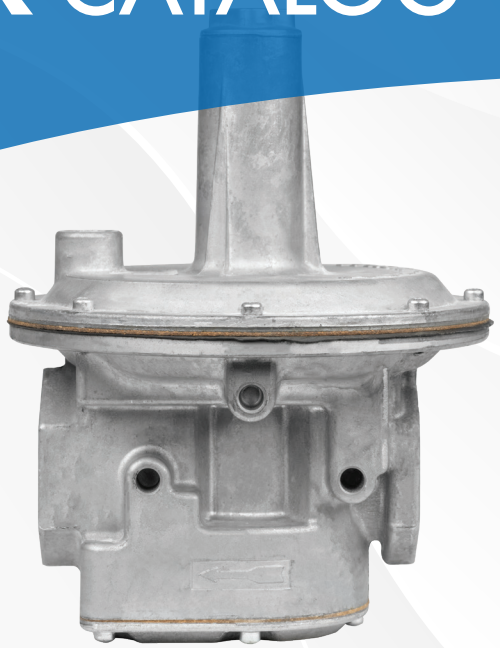
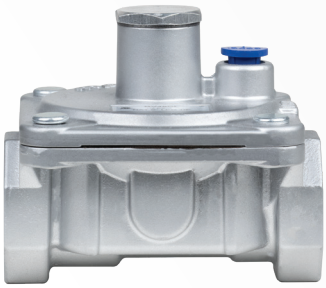
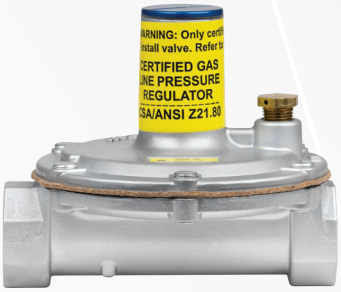
7th Edition

GAS PRESSURE REGULATOR & MODULATOR CATALOG









MAXITROL®

www.maxitrol.com

⚠ WARNING

Service and installation must be performed by a trained/experienced service technician.

All products used with combustible gas **must** be installed and used **strictly** in accordance with the instructions of the Original Equipment Manufacturer (OEM) and with all applicable government codes and regulations, e.g. plumbing, mechanical, and electrical codes and practices. Maxitrol products should be installed and operated in accordance with Maxitrol Safety Warning Instructions.

Maxitrol Company is NOT responsible for any errors or omissions in reliance by anyone of any information set forth in this catalog without additional reference to local requirements and applicable ordinances or codes.

Other worldwide approvals and certifications available upon inquiry.

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210Z SERIES

Zero Governor Design

The 210Z series are adaptable for air-gas mixing applications. Because of the balanced valve construction, Z models offer superior performance at an economical price compared with other types of atmospheric regulators.

Maxitrol's 210Z zero governor model regulators are used for flow control of burners, nozzel mixers, mixing tees and proportional premixers.

210EZ

Specifications

Pipe Sizes.....210Z Models: 1" to 3" threaded connections with NPT or ISO 7-1 threads. 4" 125 lb. flange (210JZ only).

Housing Material.....210DZ, 210EZ, 210GZ, 210JZ: aluminum.

Mounting.....210DZ, 210EZ, 210GZ, 210JZ mount in an upright position only.

NOTE: All Maxitrol gas pressure regulators should be installed and operated in accordance with Maxitrol Safety Warning Instructions (see GPR_MI_EN.ES or GPR_CSA_MI_EN.FR).

Certifications.....210DZ, 210EZ, 210GZ: ANSI Z21.18/CSA 6.3 Gas Appliance Pressure Regulators.

Fuel Gases.....Suitable for natural, manufactured, mixed gases, liquefied petroleum gases, and LP gas-air mixtures.

Rated Inlet Pressure.....CSA Certified: 210DZ, 210EZ, 210GZ: 5 psi (34.5 kPa)
Maxitrol Tested.....210JZ: 5 psi (34.5 kPa)

Emergency Exposure Limits .....210DZ, 210EZ, 210GZ, 210JZ: 25 psi (172 kPa)

Ambient Temperature Ranges.....210DZ, 210EZ, 210GZ, 210JZ: -40 to 200°F (-40 to 93°C)

Sensing Taps..... 210Z has convenient tap locations available for downstream sensing, cross connections, and differential control. Four locations can be tapped and plugged for measuring pressure.

Remote Sensing..... 210DZ, 210EZ, 210GZ models may be ordered with remote sensing. The internal sensing tube is omitted and external sensing taps are provided. Add suffix letter "R" to model number when ordering.

Low-Fire By-Pass.....With the main valve closed, an adjustable by-pass provides a minimum firing rate. Add suffix "L" (left side) , "R" (right side), or "B" (both sides) when ordering.

Model Designations .....(F) Factory-set; fixed non-adjustable regulator. Welch plug replaces seal cap.
(M) B.S.P. - PL parallel thread - conforms to ISO 7-1, where pressure tight joints are made on the threads.

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Capacities and Pressure Drop

Capacities expressed in CFH (m^3/h) @ 0.64 sp gr gas

Model	Pipe Size	Pressure Drop - inches w.c. (kPa) unless noted										
		0.1 (0.025)	**0.3 (0.075)**	**0.5 (0.125)**	**1.0 (0.25)**	**3.0 (0.75)**	**5.0 (1.25)**	**7.0 (1.74)**	**0.5 psi (3.45)**	**0.75 psi (5.17)**	**1 psi (6.89)**	**1.5 psi (10.34)**
210DZ	1″ x 1″	--	--	--	900 (25.2)	1600 (44.8)	2000 (56.0)	2400 (67.2)	3300 (92.4)	4100 (115)	4750 (133)	5800 (162)
	1 1/4″ x 1 1/4″	--	--	--	1100 (30.8)	1900 (53.2)	2500 (70.0)	2900 (81.2)	4100 (115)	5000 (140)	5850 (164)	7150 (200)
	1 1/2″ x 1 1/2″	--	--	--	1200 (33.6)	2100 (58.8)	2700 (75.6)	3200 (89.6)	4500 (126)	5500 (154)	6350 (176)	7750 (217)
210EZ	1 1/2″ x 1 1/2″	--	1050 (29.4)	1350 (37.8)	1915 (53.6)	3315 (92.8)	4280 (120)	5065 (142)	7125 (199)	8725 (244)	10075 (282)	12340 (345)
	2″ x 2″	--	1210 (33.9)	1560 (43.7)	2210 (61.9)	3825 (107)	4940 (139)	5845 (164)	8225 (230)	10070 (282)	11630 (326)	14245 (399)
210GZ	2 1/2″ x 2 1/2″	1410 (39.5)	2450 (68.6)	3160 (88.5)	4470 (125)	7740 (217)	9995 (280)	11825 (331)	16635 (466)	20370 (570)	23525 (659)	28810 (807)
	3″ x 3″	1555 (43.5)	2695 (75.5)	3475 (97.3)	4920 (138)	8520 (239)	11000 (308)	13020 (365)	18310 (513)	22425 (628)	25890 (725)	31710 (888)
210JZ	4″ x 4″	2700 (75.6)	4700 (132)	6000 (168)	8600 (241)	15000 (420)	19000 (532)	23000 (644)	32000 (896)	40000 (1120)	45500 (1274)	55700 (1560)

NOTE: CSA maximum capacities vary with spring range and pipe size. Please contact Maxitrol directly for CSA maximums. See pages 72-73 for Regulator Sizing Requirements and Examples.

Model	Pressure Drop - inches w.c. (kPa) unless noted
	By-Pass (L Suffix Only)
210DZ	10 - 90 (0.28 - 2.5)
210EZ	10 - 90 (0.28 - 2.5)

By-pass flow maximum calculated at a pressure drop. (Delta P) = 3.5″ w.c.

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210Z SERIES
Zero Governor Design

Spring Selection: inches w.c (kPa)

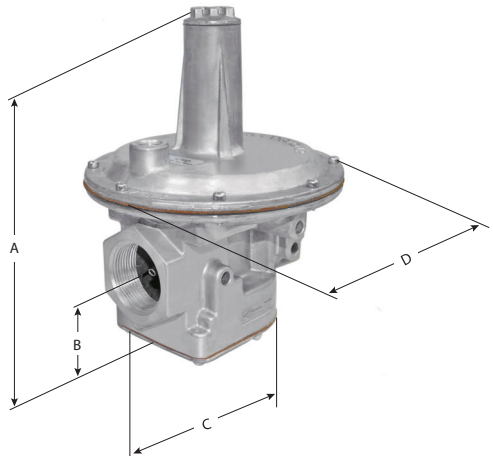
Model	Outlet Pressure Range
210DZ	-1.0 to 1.5 (-0.25 to 0.37)
210EZ	-1.0 to 1.5 (-0.25 to 0.37)
210GZ	-1.0 to 1.5 (-0.25 to 0.37)
210JZ	-1.0 to 1.5 (-0.25 to 0.37)

NOTE: See pages 70-71 for complete Spring Selection Chart.

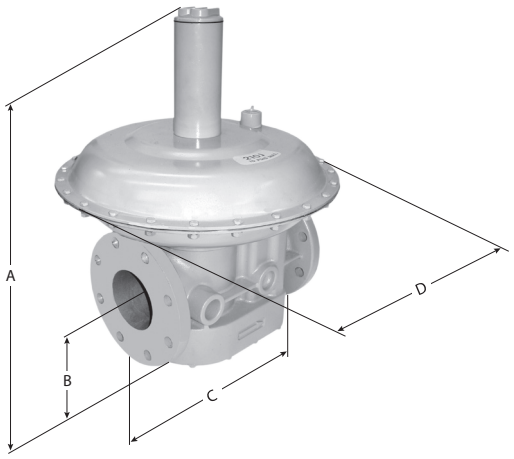
Dimensions

Model	Pipe Size	Vent Connection	Swing Radius	Dimensions			
				A	B	C	D
210DZ	1″, 1 1/4″, 1 1/2″	3/8″ NPT	5.4″ (138 mm)	9″ (229 mm)	2.4″ (60 mm)	6″ (152 mm)	7″ (178 mm)
210EZ	1 1/2″, 2″	1/2″ NPT	8.3″ (211 mm)	11.3″ (286 mm)	2.9″ (75 mm)	8″ (203 mm)	9.1″ (232 mm)
210GZ	2 1/2″, 3″	3/4″ NPT	11.9″ (302 mm)	16.5″ (419 mm)	4.6″ (116 mm)	11.8″ (300 mm)	13.5″ (343 mm)
210JZ	4″	3/4″ NPT	18.4″ (467 mm)	24.3″ (616 mm)	5.4″ (138 mm)	13.8″ (349 mm)	18″ (457 mm)

NOTE: Dimensions are maximums and to be used only as an aid in designing clearance for the valve. Actual production dimensions may vary somewhat from those shown.



210DZ, 210EZ, 210GZ



210JZ

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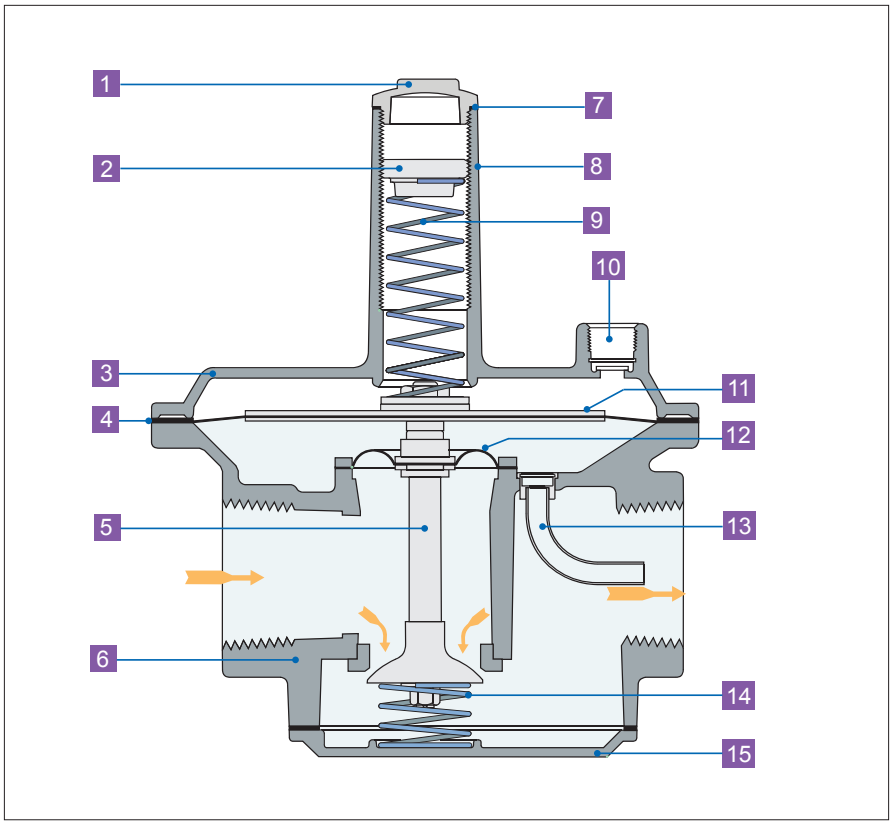
Zero Governor Design

210DZ, 210EZ, 210GZ, 210JZ



1	Welch Plug or Seal Cap
2	Adjusting Screw
3	Top Housing
4	Regulating Diaphragm
5	Stem & Valve
6	Bottom Housing
7	Seal Cap Gasket
8	Stack
9	Spring
10	Vent Connection
11	Diaphragm Plates
12	Balancing Diaphragm
13	Sensing Tube
14	Counter Spring
15	Bottom Plate

NOTE: Diagrams are graphical representations only and may differ from actual product.

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SPRING SELECTION CHART

Model	Part Number	Color Code	Outlet Pressure (In. w.c.)	Approx Inner Diameter	Approx Length
Adjustable Models:					
RV12L	R1210T-13 R1210T-35* R1210T-48 R1210T-610 R1210T-812	Brown Plated Orange Red Blue	1.0 to 3.5 2.8 to 5.2 4.0 to 8.0 6.0 to 10 8.0 to 12	3/8″	9/16″ 3/4″ 3/4″ 7/8″ 1″
RV20L	R2010T-13 R2010T-35* R2010T-48 R2010T-610 R2010T-812 R2010T-912	Brown Plated Orange Red Blue Plated	1.0 to 3.5 2.8 to 5.2 4.0 to 8.0 6.0 to 10 8.0 to 12 9.0 to 12	7/16″	13/16″ 1 1/16″ 15/16″ 1″ 1 1/8″ 1 9/16″
RV47AD RV47AL	R4710-4 R4710-5 R4710-6 R4710-10	Black Green Red Blue	3.8 to 4.3 4.7 to 5.3 5.6 to 6.4 9.7 to 11.3	9/16″	1 3/4″ 1 13/16″ 1 13/16″ 1 11/16″
CV47 RV47D RV47L	R4710-13 R4710-35* R4710-48 R4710-412 R4710-610 R4710-812	Brown Plated Orange Violet Red Blue	1.0 to 3.5 2.8 to 5.2 4.0 to 8.0 4.0 to 12 6.0 to 10 8.0 to 12	9/16″	7/8″ 1 1/4″ 1 5/16″ 1 1/16″ 1 7/16″ 1 1/2″
CV48 RV48	R4810-13 R4810-36* R4810-48 R4810-512 R4810-610	Brown Plated Orange Blue Red	1.0 to 3.5 3.0 to 6.0 4.0 to 8.0 5.0 to 12 6.0 to 10	9/16″	15/16″ 1 3/16″ 1 1/8″ 1 3/16″ 1 1/2″
CV48T RV48T	R4810T-36* R4810T-48 R4810T-512 R4810T-610	S Steel Orange Blue Red	3.0 to 6.0 4.0 to 8.0 5.0 to 12 6.0 to 10	9/16″	1 3/16″ 1 1/8″ 1 3/16″ 1 1/2″
R400 R400S	R400B10-13 R400B10-25 R400B10-36* R400B10-38 R400B10-412 R400B10-512 R400B10-1022	Brown Plated Plated Pink Violet Blue Red	1.0 to 3.5 2.0 to 5.0 3.0 to 6.0 3.0 to 8.0 4.0 to 12 5.0 to 12 10 to 22	3/8″	1 1/4″ 1 9/16″ 2″ 1 9/16″ 1 1/2″ 1 7/8″ 1 3/4″
RV52 R500 R500S	R5210-13 R5210-25 R5210-36* R5210-38 R5210-48 R5210-412 R5210-512	Brown Plated Plated Pink Orange Violet Blue	1.0 to 3.5 2.0 to 5.0 3.0 to 6.0 3.0 to 8.0 4.0 to 8.0 4.0 to 12 5.0 to 12	9/16″	2″ 2 9/16″ 2 7/8″ 2 9/16″ 3 1/8″ 2 1/2″ 2 15/16″
R500 R500S	R5210-1022	Red	10 to 22	9/16″	2 13/16″
RV53 R600 R600S	R5310-13 R5310-25 R5310-36* R5310-38 R5310-48 R5310-412 R5310-512	Brown Plated Plated Pink Orange Violet Blue	1.0 to 3.5 2.0 to 5.0 3.0 to 6.0 3.0 to 8.0 4.0 to 8.0 4.0 to 12 5.0 to 12	5/8″	2 5/8″ 2 15/16″ 3 3/8″ 3 1/16″ 3 5/8″ 3 1/6″ 3 7/16″

* Standard Spring

Model #	Part Number	Color Code	Outlet Pressure (In. w.c.)	Approx Inner Diameter	Approx Length
Adjustable Models:					
R600 R600S	R5310-1022 R5310-1530	Red Yellow	10 to 22 15 to 30	5/8″	3 1/4″ 3 1/2″
RV61 R700	R6110-13 R6110-25 R6110-36* R6110-38 R6110-48 R6110-512 R6110-1022	Brown Plated Plated Pink Orange Blue Red	1.0 to 3.5 2.0 to 5.0 3.0 to 6.0 3.0 to 8.0 4.0 to 8.0 5.0 to 12 10 to 22	3/4″	2 5/8″ 3 1/4″ 3 1/2″ 3 1/8″ 3 9/16″ 3 9/16″ 3 1/2″
RV81 210D	R8110-13 R8110-25 R8110-36* R8110-38 R8110-48 R8110-412 R8110-512 R8110-515 R8110-1022	Brown Plated Plated Pink Orange Violet Blue Green Red	1.0 to 3.5 2.0 to 5.0 3.0 to 6.0 3.0 to 8.0 4.0 to 8.0 4.0 to 12 5.0 to 12 5.0 to 15 10 to 22	7/8″	3 1/8″ 3 13/16″ 4 5/16″ 3 7/8″ 4 1/2″ 3 3/4″ 4 1/16″ 3 3/4″ 4 5/16″
210D	R8110-1530 R8110-2042	Yellow Black	15 to 30 20 to 42	7/8″	4 1/2″ 4 5/16″
RV91 210E	R9110-13 R9110-25 R9110-36* R9110-38 R9110-48 R9110-412 R9110-512 R9110-515 R9110-1022	Brown Plated Plated Pink Orange Violet Blue Green Red	1.0 to 3.5 2.0 to 5.0 3.0 to 6.0 3.0 to 8.0 4.0 to 8.0 4.0 to 12 5.0 to 12 5.0 to 15 10 to 22	1 1/8″	4″ 4 15/16″ 5 3/4″ 5 1/16″ 5 15/16″ 5 1/16″ 5 1/2″ 5 1/8″ 5 5/8″
210E	R9110-1530 R9110-2042	Yellow Black	15 to 30 20 to 42	1 7/8″	5 7/8″ 5 3/4″
RV111 210G	R11110-13 R11110-25 R11110-36* R11110-38 R11110-48 R11110-412 R11110-512 R11110-515 R11110-1022	Brown Plated Plated Pink Orange Violet Blue Green Red	1.0 to 3.5 2.0 to 5.0 3.0 to 6.0 3.0 to 8.0 4.0 to 8.0 4.0 to 12 5.0 to 12 5.0 to 15 10 to 22	1 1/2″	6 1/8″ 7 1/6″ 8 5/16″ 7 3/8″ 8 3/8″ 7 3/8″ 8 1/8″ 7 1/16″ 8 1/8″
210G	R11110-1530 R11110-2042	Yellow Black	15 to 30 20 to 42	1 1/2″	8 7/16″ 8 1/4″
210J	R210J10-25 R210J10-36* R210J10-38 R210J10-412 R210J10-512 R210J10-1022 R210J10-1530 R210J10-2042	Plated Plated Pink Violet Blue Red Yellow Black	2.0 to 5.0 3.0 to 6.0 3.0 to 8.0 4.0 to 12 5.0 to 12 10 to 22 15 to 30 20 to 42	2 1/8″	9 1/6″ 11 3/4″ 10 1/8″ 9 7/8″ 11 5/8″ 11 1/2″ 11 11/16″ 11 1/4″
220D, E,G,& J	R325C10-1022 R325C10-1530	Tagged Tagged	1 psi-3 psi 2 psi-5 psi	5/8″	2 1/8″ 2 5/16″

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SPRING SELECTION CHART

Model	Part Number	Min / Max	Color Code	Outlet Pressure (In. w.c.)	Approx Inner Diameter	Approx Length
Adjustable Models:						
SR400	SR400B10H	Max	S Steel	3.0 to 5.0	5/16″	1 5/16″
	MR410B10L	Min	Plated	0.3 to 1.2		7/8″
	SR400B10H-1	Max	White	2.5 to 3.5		1″
	MR410B10L	Min	Plated	0.3 to 1.2		7/8″
	SR400B10H	Max	S Steel	4.0 to 6.0		1 5/16″
	MR410B10L-1	Min	Blue	1.0 to 2.8	1 1/16″	1 1/16″
	SR400B10H-1	Max	White	3.0 to 5.0		1″
	MR410B10L-1	Min	Blue	1.0 to 2.8		1 1/16″
	SR400B10L-4	Min	Black	2.5 to 4.0		1 3/16″
SR400-2**	MR410B102-2	Max	Blue	7.5 to 12.0	5/16″	1 1/2″
SR500	SR500B10H	Max	S Steel	3.0 to 5.0	7/16″	1 9/16″
	MR510B10L	Min	Plated	0.3 to 1.2		1 1/16″
	SR500B10H-1	Max	White	1.5 to 3.5		1 1/16″
	MR510B10L	Min	Plated	0.3 to 1.2		1 1/16″
	SR500B10H	Max	S Steel	3.5 to 6.0	1 5/8″	1 9/16″
	MR510B10L-1	Min	Plated	1.0 to 2.8		1 1/4″
	SR500B10H-1	Max	White	2.0 to 4.5		1 1/16″
	MR510B10L-1	Min	Blue	1.0 to 2.8		1 1/4″
SR500-2**	SR500B10H\L-2*	Max	Black	7.5 to 12.0	7/16″	2 1/4″
SR600	SR600B10H	Max	S Steel	3.0 to 5.0	5/8″	2″
	MR610B10L	Min	Plated	0.3 to 1.2		1 9/16″
	SR600B10H-1	Max	White	2.5 to 4.0		1 1/2″
	MR610B10L	Min	Plated	0.3 to 1.2		1 9/16″
	SR600B10H	Max	S Steel	4.0 to 6.0	2 1/8″	2″
	MR610B10L-1	Min	Plated	1.0 to 2.8		1 13/16″
	SR600B10H-1	Max	White	3.0 to 5.5		1 1/2″
	MR610B10L-1	Min	Blue	1.0 to 2.8		1 13/16″

Model #	Part Number	Color Code	Outlet Pressure (In. w.c.)	Approx Inner Diameter	Approx Length
Adjustable Models:					
325-3	R325C10-26	Plated	2.0 to 6.0	5/8″	1 3/4″
	R325C10-59	Plated	5.0 to 9.0 #		2 5/16″
	R325C10-412*	Violet	4.0 to 12		1 3/4″
	R325C10-711	White	7.0 to 11		2 5/8″
	R325C10-1022	Red	10 to 22		2 1/8″
	R325C10-1530	Yellow	15 to 30		2 5/16″
	R325C10-P12	Tagged	1 psi-2 psi		2 5/16″
325-5	R325E10-26A	Plated	2.0 to 6.0	3/4″	2 7/8″
	R325E10-59A	Plated	5.0 to 9.0 #		4 3/16″
	R325E10-412A*	Violet	4.0 to 12		3 1/8″
	R325E10-711A	White	7.0 to 11		4″
	R325E10-1022A	Red	10 to 22		3 9/16″
	R325E10-1530A	Yellow	15 to 30		3 5/8″
	R325E10-P12A	Tagged	1 psi-2 psi		3 3/4″
325-7A	R8110-25	Plated	2.0 to 5.0	7/8″	3 13/16″
	R8110-412*	Violet	4.0 to 12		3 3/4″
	R8110-1022	Red	10 to 22		4 5/16″
	R8110-1530	Yellow	15 to 30		4 1/2″
	R8110-2042	Black	20 to 42		4 5/16″
	R325G10-711	White	7.0 to 11		4 5/8″
325-9	R9110-25	Plated	2.0 to 5.0	1 1/8″	4 15/16″
	R9110-412*	Violet	4.0 to 12		5 1/16″
	R9110-1022	Red	10 to 22		5 5/8″
	R9110-1530	Yellow	15 to 30		5 7/8″
	R9110-2042	Black	20 to 42		5 3/4″
	R325J10-711	White	7.0 to 11		6 1/2″
325-11	R11110-25	Plated	2.0 to 5.0	1 1/2″	7 1/16″
	R11110-412*	Violet	4.0 to 12		7 3/8″
	R11110-1022	Red	10 to 22		8 1/8″
	R11110-1530	Yellow	15 to 30		8 7/16″
	R11110-2042	Black	20 to 42		8 1/4″
	R325K10-711	White	7.0 to 11		8 1/2″

Model #	Part Number	How Used	Color Code	Approx Inner Diameter	Approx Length
Zero Governor Models:					
R400Z	R400B10-13	Regulate	Brown	3/8″	1 1/4″
	R400B10Z	Counter	Plated	1/2″	3/4″
R500Z	R5210-13	Regulate	Brown	9/16″	2″
	R500B10Z	Counter	Plated	7/16″	
R600Z	R5310-13	Regulate	Brown	5/8″	2 5/8″
	R600B10Z	Counter	Plated		
R700Z	R6110-25	Regulate	Plated	3/4″	3 1/4″
	R700B10Z	Counter	Plated	7/8″	3 1/2″
210DZ	R8110-13	Regulate	Brown	7/8″	3 1/8″
	R210D10Z	Counter	Plated	1″	3 3/8″
210EZ	R9110-13	Regulate	Brown	1 1/8″	4″
	R210E10Z	Counter	Plated	1 7/16″	4 3/4″
210GZ	R11110-13	Regulate	Brown	1 1/2″	6 1/8″
	R210G10Z	Counter	Plated	2 1/16″	6 3/4″
210JZ	R210J10-25	Regulate	Plated	2 1/8″	9 1/16″
	R210J10Z	Counter	Plated	2 7/8″	9 1/4″

* Standard Spring
**L.P. - May be used with any minimum spring.
- or 6.0 to 10.0 for 5 psi

NOTE: Spring free length is given as an aid for the purpose of identification only. Variations of ± 1/2″, although unlikely, can occur. This variation will not affect the spring range.

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SIZING A REGULATOR

See **www.maxitrol.com** for our Regulator Sizing Program. Please contact Maxitrol directly for more information on sizing a regulator.

System Requirements

When sizing a regulator the following must be known:

- Gas Type
- Available Inlet Pressure
- Desired Outlet Pressure
- Zero Governor Application (indicated by model number ending in "Z")
- Will the regulator control main burner and pilot load OR main burner only?
- Required minimum and maximum flow rate in cfh or m^3/h or Btu/h
- Pipe Size

In most cases, the manifold pipe size has already been selected on the basis of good engineering practice, and the regulator pipe size should conform to this size.

The capacity of any regulator is not an absolute value but will vary with the application depending on the prevailing differential pressure.

⚠ WARNING

Service and installation must be performed by a trained/experienced service technician.

All products used with combustible gas must be installed and used strictly in accordance with the instructions of the Original Equipment Manufacturer (OEM) and with all applicable government codes and regulations, e.g. plumbing, mechanical, and electrical codes and practices. These instructions do NOT supersede OEM's installation or operating instructions.

All Maxitrol products should be installed and operated in accordance with Maxitrol Safety Warning Instructions.

HOW TO CALCULATE PRESSURE DROP AT VARIOUS FLOW RATES FROM CAPACITY CHART

LP Applications - When using natural gas pressure drop chart to determine LP pressure drop in terms of Btu/h, multiply NAT Btu/h by 1.61; in terms of CFH multiply NAT CFH by 0.645.

Formula: $P2 = P1 \times (Q2/Q1)^2$

P2 = Pressure drop at desired flow rate
P1 = Known pressure drop
Q2 = Desired flow rate
Q1 = Known flow rate

A. Check Capacity Chart, ensuring regulator has ample range of regulation and individual load capacities (for use with pilot) for the application.

B. Know the minimum encountered inlet pressure. MINIMUM INLET PRESSURE MINUS "P2" MUST BE GREATER THAN DESIRED OUTLET PRESSURE. Solve for "P2" using the formula above.
(See examples on page 73.)

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Sizing Examples

RUBBER SEAT POPPETS

For main burner and pilot load applications.

Example: To select an RV type regulator:

- Known: Single 150,000 Btu/h main burner; pipe size 1/2″; inlet pressure 7″ w.c.; outlet pressure 4″ w.c.
- Solution: The RV48 (1/2″) has a maximum capacity of 230,000 Bth/h and a maximum individual load of 160,000 Btu/h. The pressure drop at a flow rate of 150,000 Btu/h is 0.4″ w.c., well below the available differential of 3″ w.c. The RV48 (without "L" fixed orifice) is the correct regulator to use for the application.

STRAIGHT-THRU-FLOW (S-T-F)

For main burner only applications not requiring a lockup type regulator. When sizing the S-T-F series, it is recommended that pressure drop not exceed 1/2 of available differential pressure.

Example: To select an RV type regulator:

- Known: Flow rate 2,000,000 Btu/h; pipe size 1 1/4″; inlet pressure 9″ w.c.; outlet pressure 5″ w.c.
- Solution: The RV81(1 1/4″) has a maximum capacity of 2,500,000 Btu/h. The pressure drop at a flow of 2,000,000 Btu/h is 0.66″ w.c. The RV81 (1 1/4″) is the correct regulator to use with this application. The pressure drop of the RV61 (1 1/4″) at a flow rate of 2,000,000 Btu/h is 2.64″ w.c. This is within the available differential but exceeds the recommended 50% maximum.

LEVER ACTING

For main burner and pilot load application requiring positive dead-end lockup (see Definitions page 63).

Example: To select a 325 series regulator:

- Known: Single 145,000 Btu/h burner; pipe size 1/2″; inlet pressure 2 psi; outlet pressure 7″ w.c.
- Solution: The 325-3's pressure drop at a flow rate of 145,000 Btu/h is 7″ w.c., well below the available differential of 1 3/4 psi. However, the Maximum Individual Load for th 325-3 is only 100,000 Btu/h. The 325-5 (1/2″) is the correct regulator to use with this application.

BALANCED VALVE

For main burner and pilot load application requiring a lockup type regulator or zero governor usage (see Definitions page 63).

Example: To select a 210 or R/RS series regulator:

- Known: Desired flow rate 6,000,000 Btu/h; pipe size 1 1/2″; inlet pressure 1 psi; outlet pressure 9″ w.c.
- Solution: The 210E (1 1/2″) has a maximum capacity of 10,000,000 Btu/h. The 210D (1 1/2″) has a capacity of 6,000,000 Btu/h. Therefore, the 210E (1 1/2″) will give you the desired outlet pressure of 9″ w.c. and is the correct regulator to use for the application.

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ACCESSORIES

Vent Tube Connector

Threaded sleeve - two piece assembly where the nut is tightened inside male connector.

- **11A03:** connects 1/8″ female pipe thread to 1/8″ O.D. tubing.
- **11A04:** connects 1/8″ female pipe thread to 1/4″ O.D. tubing.

Threaded sleeve nut - for RV20V.

- **11A08:** 5/16-24 threaded sleeve nut for 1/8″ O.D. tubing.

Compression fitting - where nut and sleeve are slipped over tubing and tightened into fitting body.

- **11A05-42:** connects 1/4″ female pipe thread to 1/4″ O.D. tubing.
- **11A05-61:** connects 1/8″ female pipe thread to 3/8″ O.D. tubing.
- **11A05-63:** connects 3/8″ female pipe thread to 3/8″ O.D. tubing.
- **11A05-64:** connects 1/2″ female pipe thread to 3/8″ O.D. tubing.

11A03

11A08

11A05

Vent Limiting Device: vLimiter ®

Optional automatic vent limiting device - ball check permits unobstructed inhalation for fast regulator diaphragm response on opening cycle, but limits gas escapement to within ANSI standards should a diaphragm rupture.

NOTE: When using the vent limiting device, regulator must be mounted in an upright horizontal position. A Maxitrol vent limiting device should only be installed in the Maxitrol regulator that it is certified with.

- **12A04**: CSA certified for up to 1/2 psi (14″ w.c.) inlet pressure.
  Use on RV48, RV52, RV53, RV61, R400(S), R500(S), R600(S) regulators.
  Color - brass. 1/8″ NPT.
- **12A09:** CSA certified for 2 psi (LP) and 5 psi (natural) inlet pressure with 325-3 and 325-3L regulators; OPD48, OPD600.
  Color - green. 1/8″ NPT.
- **12A34:** CSA certified for up to 1/2 psi (14″ w.c.) inlet pressure with RV81.
  Color - brass. 3/8″ NPT.
- **12A39:** CSA certified for 2 psi (LP) and 5 psi (natural) inlet pressure with, 325-5 and 325-5L regulators; OPD210D, R700.
  Color - brass. 3/8″ NPT.
- **12A49:** CSA certified for 2 psi (LP) and 5 psi (natural) inlet pressure with 325-7A, 325-7AL, 325-9, and 325-9L regulators; OPD210E.
  Color - brass. 1/2″ NPT.

12A09

12A39

12A49

Satisfies ANSI Standards for both Natural and LP gas.

NOTE: Vent limiters are not recommended for use in models RV91, RV111 and 210 Series.

Vent Limiting Orifice

- **12A06:** Orifice hole is on side of body, under head. Fixed orifice equally limits inhalation and escapement. Use on RV48, RV52, RV53, RV61, R400(S), R500(S), R600(S) regulators.
  Color- brown. 1/8″ NPT.

12A06

Satisfies ANSI Standards for both Natural and LP gas.

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Vent Protector: vProtector®

Designed for outdoor applications. Use on vent opening to protect breather hole from rain, snow, dust, insects and other foreign particles.

NOTE: Vent protector MUST be mounted in an upright position.

- **13A30-50:** for 1/8" NPT vent. For outdoor use in 325-3, 325-3L, 325-3BL, RV48, RV52, RV53, RV61, R500(S)(Z), R600(S)(Z).
- **13A31-50:** for 3/8" NPT vent. For outdoor use in 325-5, 325-5L, R700(Z), RV81, and 210D.
- **13A32-50:** for 1/2" NPT vent. For outdoor use in 325-7A, 325-7AL, 325-9, 325-9L, RV91, 210E.
- **13A33-10:** for 3/4" NPT vent. For outdoor use in 325-11, 210G, RV111.

NOTE: NOT a vent limiting device. Consult Maxitrol regarding other configurations.

13A30-50

13A31-50

13A32-50

13A33-10

Vent Dampener

- **KVOP-3:** Used on 325-5, 325-5L.
- **KVOP-4:** Used on 325-7A, 325-7AL, 325-9L

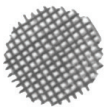
NOTE: Should not be used with vent limiter.

KVOP-3

Vent Screen

Brass, 40 mesh screen flame arrestor for insertion in vent outlet. Prevents ignition of gas-air mixture which might be present in upper diaphragm chamber.

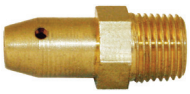
- **13A03-1:** for 1/8" NPT vent.
- **13A03-2:** for 1/4" NPT vent.
- **13A03-3:** for 3/8" NPT vent.
- **13A03-4:** for 1/2" NPT vent.
- **13A03-6:** for 3/4" NPT vent.



13A03

Pressure Tap Connector

- **PF10:** Pressure tap connector can be installed as part of the control. It is a hose fitting incorporating a captured sealing means for testing inlet and outlet pressures. This eliminates the need for a special barb fitting. Optional per work order.



PF10

Dust Cap

Use on vent opening to prevent blockage of breather hole from dust or other foreign particles. Standard on all "L" models with 1/8" threaded vent.

- **13A09:** for 1/8" NPT vent. Press-in plastic cap.

13A09

Tamper Proof Seals

Permanent pressure sensitive backed paper. Attempted removal of these seals will destroy the face stock, leaving adhesive residue on surface beneath. Therefore, tampering can be easily detected. Available for all threaded models. Outlet pressure printed on seal.

- **101310:** for RV12, RV20L, RV47, RV48, RV52, RV53, RV61, R400(S)(Z), RV500(S)(Z), R600(S)(Z), R700(S)(Z), 325-3, and 325-5.
- **101311:** for RV81, RV91, RV111, 210D, 210E, 210G, 325-7A, 325-9, and 325-11.

101310

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CHOOSING A VENT ACCESSORY

NOTE: If vent limiting device is not used, regulator vent must be piped in accordance with government and local codes and regulations.

RV12L, RV20L	Integral vent limiting orifice with dust cap standard.
RV20VL	Integral vent limiting orifice with dust cap standard or use 11A08 threaded sleeve nut and run vent line as per code.
RV47	Must order: "L" suffix - Integral vent limiting orifice, includes dust cap; or "D" suffix - integral ball-check limiting device, includes dust cap.
RV48	1/8" NPT vent tap. Optional 12A04 or 12A06 vent limiter. Optional 13A09 dust cap. Optional 10A16-2 or 10A16-3 plastic thread protector.
RV48L	Integral vent limiting orifice.
RV52, RV53, RV61	1/8" NPT vent tap. Optional 12A04 or 12A06 vent limiter or 13A30 vent protector.
RV81	3/8" NPT vent tap. Optional 12A34 vent limiter or 13A31 vent protector.
RV91 (2 1/2" pipe size)	1/4" NPT vent tap. Optional 13A30 vent protector. *Vent limiter not approved for this model.*
RV91 (2" pipe size)	1/2" NPT vent tap. 2" pipe size. Optional 13A32 vent protector. *Vent limiter not approved for this model.*
RV111	3/4" NPT vent tap. *Vent limiter not approved for these models.* Optional 13A33 vent protector.
210D	3/8" NPT vent tap. Optional 13A31 vent protector. *Vent limiter not approved for this model.*
210E	1/2" NPT vent tap. Optional 13A32 vent protector. *Vent limiter not approved for this model.*
210G, 210J	3/4" NPT vent tap. *Vent limiter not approved for these models.* Optional 13A33 vent protector.
220D, 220E, 220G, 220J	Pilot regulator is equipped with 12A06 vent limiting orifice, separate vent line is not required.
325-3, 325-3L	1/8" NPT vent tap. Optional 12A09 vent limiting device or 13A30 vent protector.
325-5, 325-5L, R700	3/8" NPT vent tap. Optional 12A39 vent limiting device or 13A31 vent protector.
325-7A, 325-7AL	1/2" NPT vent tap. Optional 12A49 vent limiting device or 13A32 vent protector.
325-9, 325-9L	1/2" NPT vent tap. Optional 12A49 vent limiting device or 13A32 vent protector.
325-11, 325-11L	3/4" NPT went tap. *Contact Maxitrol Customer Service for optional vent protector.* Optional 13A33 vent protector.
R400(S), R500(S), R600(S)	1/8' NPT vent tap. Optional 12A04 vent limiting device.
OPD47	Integral vent limiting orifice, includes dust cap.
OPD48, OPD600	1/8" NPT vent tap. Optional 12A09 vent limiting device or 13A30 vent protector.
OPD210D, OPD700	3/8" NPT vent tap. Optional 12A39 vent limiting device or 13A31 vent protector.
OPD210G	3/4" NPT vent tap. *Contact Maxitrol Customer Service for optional vent protector.* Optional 13A33 vent protector.
OPD210E	1/2" NPT vent tap. Optional 12A49 vent limiting device or 13A32 vent protector.

NOTICE

Maxitrol vent limiting devices eliminate the need to run vent piping to the outside. Vent limiting devices are designed for use indoors and in spaces where limiting the amount of gas escapement due to diaphragm failure is critical. **Vent limiting devices should not be used outdoors if they are exposed to the environment.** When installed outdoors, the use of a ceritfied Maxitrol Vent Protector is recommended.

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Dead End Lockup
Pressure will be maintained within ANSI/CSA limits under no flow conditions. The amount of climb above set point is influenced by inlet pressure, flow rate before no flow condition and piping arrangement. Dead end lockup pressure regulators must be properly sized for desired performance.

Differential Pressure
The difference between inlet pressure to the pressure regulator and outlet pressure from the pressure regulator. To obtain differential pressure, subtract the desired outlet pressure from available inlet pressure.

Line Pressure Regulator
A pressure regulator intended for installation in a building gas distribution system between the building service regulator or LP-gas 2 psi service regulator and gas utilization equipment.

Lockup Type
Under no flow conditions, outlet pressure will rise above adjusted pressure but will not rise to line pressure.

Minimum Capacity (Main Burner Only)
Minimum capacity of a pressure regulator designed to control the flow to the main burner only.

Maximum Capacity (Main Burner Only)
Maximum capacity of a pressure regulator at which the pressure regulator will control main burner pressure within acceptable limits.

Maximum Capacity (Main Burner and Pilot)
Maximum capacity of a pressure regulator at which the pressure regulator will control main burner and pilot line pressure within acceptable limits.

Capacity
Total load Btu/h of all appliances combined.

Maximum Individual Load
Largest single appliance or burner served by the pressure regulator.

Maximum Individual Load Capacity
1. The maximum capacity or flow at which a line pressure regulator will control lockup pressure within acceptable limits.
2. The maximum capacity or flow at which a pressure regulator will control pilot line pressure within acceptable limits.

Non-Lockup Type
Under static conditions when no gas is flowing, outlet pressure will rise to line pressure.

Overpressure Protection Device (OPD)
A device which under abnormal conditions will act to reduce, restrict, or shut off the supply of gas flowing into a system to prevent pressure in that system from exceeding 2 psi.

- *Monitoring Regulator:* An overpressure protection device which functions as a second pressure regulator in series with the primary pressure regulator.
- *Overpressure Relief Device:* An overpressure protection device which functions by discharging gas from the downstream system to a safe location.
- *Overpressure Shut-Off Device:* An overpressure protection device which functions by completely shutting off the flow of gas into the downstream system.

Pressure Drop
The natural loss of pressure that occurs in the pressure regulator (or in any valve or pipe) due to friction. This friction impedes fluid motion, without regard to artificial losses deliberately created by diaphragm action. The equivalent flow rate for a loss in given pressure with the pressure regulator valve in a normally wide open position.

Rated Inlet Pressure
The highest inlet pressure for which the control is intended to be used.

Vent Limiter
A means that limits the flow of gas from the atmospheric chamber to the atmosphere in the event of a diaphragm rupture. This may be either a limiting orifice or a ball check vent limiting device.

- Limiting Orifice Type: A vent limiter where the flow through the limiter is the same in both directions

Zero Governors
They require an external impulse signal, such as top loading with pressure or generating vacuum in the downstream piping.

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