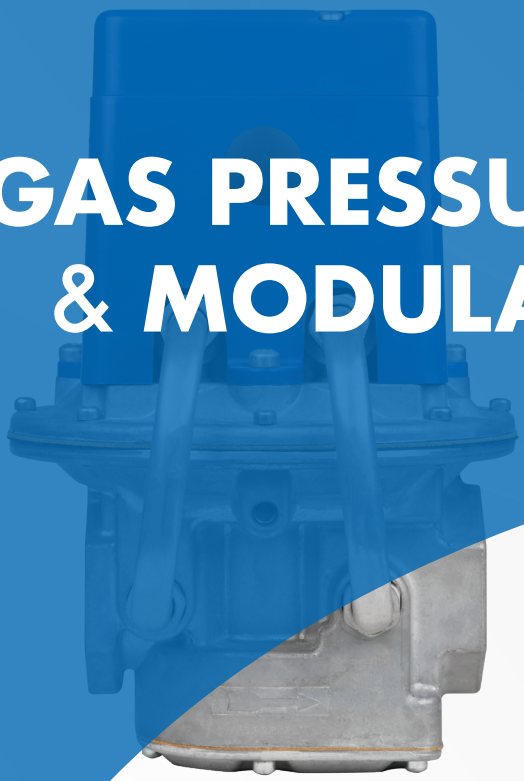
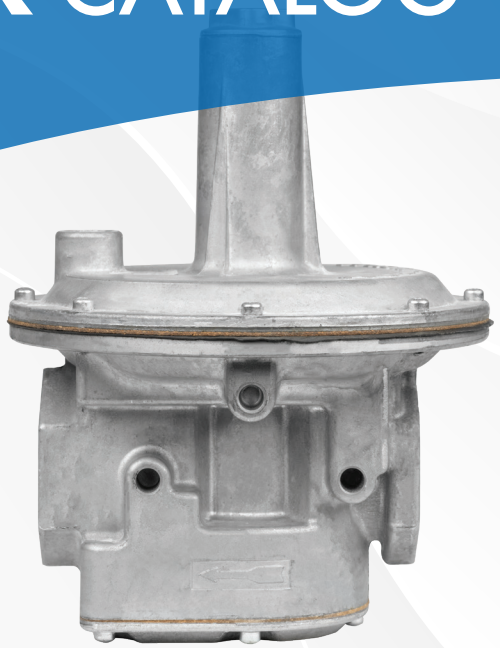
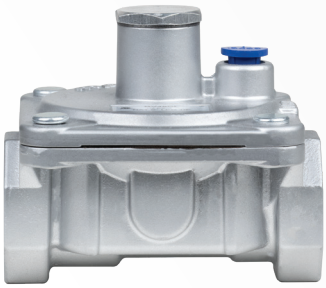
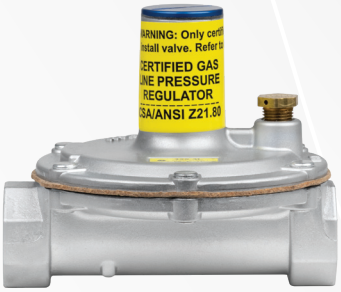
7th Edition

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.

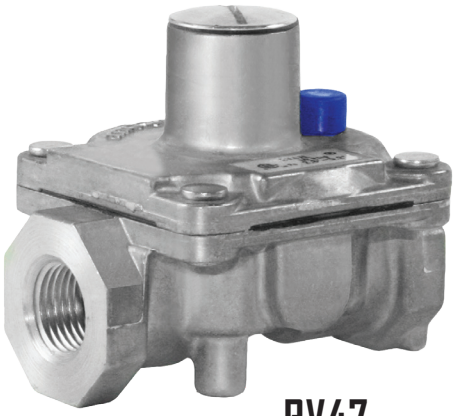
Maxitrol Company is NOT responsible for any errors or omissions in reliance by anyone of any information set forth in this catalog without additional reference to local requirements and applicable ordinances or codes.

Other worldwide approvals and certifications available upon inquiry.

RV SERIES

Rubber Seat Poppet Design

The compact RV poppet regulators are designed primarily for main burner and pilot load applications. Typical applications include residential and commercial cooking appliances, barbecues, hearth products, and pilot lines. Maxitrol rubber seat poppet models offer the ultimate in design features and performance capabilities to meet your specific appliance or utility requirements.



RV47

Specifications

Pipe Sizes ..... 1/8" thru 3/4" threaded connections with NPT or ISO 7-1 threads.
(Other connections available, please consult Maxitrol Company.)

Housing Material ..... RV12, RV20, RV47, RV48, CV47, CV48: aluminum.

Mounting ..... All models, with the exception of "D" suffix models, are suitable for multi-positional mounting. Other than upright position will result in a slight difference in outlet pressure. "D" suffix models are to be mounted upright only. For the RV48, if a vLimiter® or vProtector® is installed, mount in an upright horizontal position only. The vLimiter® 12A06 is multi-positional.

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 ..... RV Series: ANSI Z21.18/CSA 6.3 Gas Appliance Pressure Regulators.
CV47 and CV48 Series: ANSI Z21.78/CSA 6.20 Combination Gas Controls for Gas Appliances.

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

Fuel Gases (CV47 Series) ..... Suitable for natural or liquefied petroleum gases.

Rated Inlet Pressure ..... 1/2 psi (3.4 kPa)

Emergency Exposure Limits ..... 2.5 psi (17.2 kPa)

Ambient Temperature Ranges ... RV20, RV47, RV48, CV47, CV48: 0° to 225°F (-18° to 107°C)
RV12: -40 to 225°F (-40 to 107°C)
RV12T: -40 to 275°F (-40 to 135°C)
RV20T: -40 to 300°F (-40 to 148°C)
RV48T: 0 to 275°F (-18 to 135°C)
RV47T2, RV48T2: -40 to 225°F (-40 to 107°C)

Minimum Regulation ..... Suitable for pilot flow applications. Ⓟ (Circle P) (0.15 CFH NG), ▽P (Delta P) (0.50 CFH NG), None (1.5 CFH NG), N Models (3 CFH NG).

Model Designations

Models having a suffix letter or a combination of suffix letters listed below indicates the design modifications described.

A .....Limited spring adjustment (RV47A & CV47A*, short stack**).

C .....Convertible regulators***; preset to deliver outlet pressures for either natural or LP gases. (RV20, RV47, RV48, CV47, CV48)

D.....Integral ball check limiting device; permits higher maximum individual load (RV47). (see Capacities and Pressure Drop, page 6)

E.....Excessive pressure rated.

F.....Factory-set; fixed/non-adjustable regulator.

I .....Left side integral manual valve; outlet faces main inlet (CV47).

L.....Integral vent limiting orifice as the breather hole - with dust cap.

M .....B.S.P. - PL parallel thread - conforms to ISO 7-1, where pressure tight joints are made on the threads.

N.....Internal by-pass orifice to prevent lockup. Main burner only (RV20, RV47, RV48, CV47).

R .....Right side+ integral manual valve; outlet faces main outlet (CV47).

SR.....Side outlet pressure plugged tap; right side+ 1/8" NPT (RV20, RV47, RV48, CV47).

S.....Side outlet pressure plugged tap; left side+ 1/8" NPT (RV20, RV47, RV48, CV47R).

T.....Higher ambient temperature range.

T2.....Lower minimum ambient temperature (RV47, RV48).

V .....Threaded vent connector, 5/16-24 for 1/8" tubing connection (RV20) - with dust cap.

* CV47 and CV48 are best described as an RV47 and RV48 with an extra regulated outlet. This outlet contains an integral manual valve located on the valve body's side.

** Short stack models have an adjustment range of less than 2" w.c. (0.5 kPa); these models are advantageous where installation must be made in a limited space.

*** Convertible regulators are designed to deliver either of two fixed outlet pressures for natural or LP gases.
RV20C: NAT GAS: 4.0" w.c. (1.0 kPa); LP: 10" w.c. (2.5 kPa)
RV47C, RV48C, CV47C, CV48C: NAT GAS: 4.0", 5.0" or 6.0" w.c. (1.0, 1.3, or 1.5 kPa); LP: 10" or 11" w.c. (2.5 or 2.8 kPa) for residential ranges. Other settings may be available as standards allow.

\+ Left and right is determined when viewing regulator from outlet side with stack up.

NOTE: For the RV48 and RV20V vent accessory options, see page 76.

RV SERIES
Rubber Seat Poppet Design

Capacities and Pressure Drop

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

Model	Pipe Size	Pressure Drop @ 0.3″ w.c. or (0.07 kPa)	Range of Regulation		Individual Load	
			Main Burner	Main Burner & Pilot	Fixed Orifice	Ball Check Device
RV12	1/8″ x 1/8″*	14,800 (0.42)	30,000 (0.85)	25,000 (0.71)	20,000 (0.56)	---
	3/16″ x 3/16″Loxit	8,800 (0.25)		15,000 (0.43)		
RV20	1/4″ x 1/4″ 3/8″ x 3/8″*	30,000 (0.85)	65,000 (1.84)	50,000 (1.4)	30,000 (0.85)	---
RV20C	1/4″ x 1/4″ 3/8″ x 3/8″	30,000 (0.85)	75,000 (2.11)	50,000 (1.4)	15,000 (0.42)	---
CV47 RV47	3/8″x 3/8″	55,000 (1.5)	125,000 (3.5)	90,000 (2.5)	40,000 (1.1)	125,000 (3.5)
	1/2″ x 1/2″*	60,000 (1.7)				
CV47A or C RV47A or C	3/8″ x 3/8″	55,000 (1.5)	125,000 (3.5)	125,000 (3.5)	40,000 (1.1)	125,000 (3.5)
	1/2″ x 1/2″	60,000 (1.7)				
CV48 RV48	1/2″ x 1/2″	130,000 (3.7)	230,000 (6.5)	230,000 (6.5)	40,000 (1.1)	160,000 (4.5)
	3/4″ x 3/4″	150,000 (4.2)	250,000 (7.1)	250,000 (7.1)		
CV48C RV48C	1/2″ x 1/2″	130,000 (3.7)	400,000 (11.3)	275,000 (7.8) Nat 275,000 (3.1) LP	40,000 (1.1)	160,000 (4.5)
	3/4″ x 3/4″	150,000 (4.2)				

*Also available as Loxit connection.

NOTE: CSA maximum capacities vary with spring range and pipe size. Please contact Maxitrol directly for CSA maximums. Minimum main burner regulation capacity for all models (except “N”) is 150 Btu/hr (0.0042 m^3/h). See pages 72-73 for Regulator Sizing Requirements and Examples.

Spring Selection Chart: inches w.c. (kPa)

Model	Available Springs										
RV12	1.0 to 3.5* (0.37 to 0.75) Brown	2.8 to 5.2 (0.69 to 1.3) Plated	---	4 to 8 (1 to 2) Orange	---	---	---	---	6 to 10 (1.5 to 2.5) Red	8 to 12 (2 to 3) Blue	---
RV20	1 to 3.5* (0.25 to 0.9) Brown	2.8 to 5.2 (0.69 to 1.3) Plated	---	4 to 8 (1 to 2) Orange	---	---	---	---	6 to 10 (1.5 to 2.5) Red	8 to 12 (2 to 3) Blue	9 to 12** (2.25 to 3) Plated
CV47 RV47	1 to 3.5* (0.25 to 0.9) Brown	2.8 to 5.2 (0.69 to 1.3) Plated	3.8 to 4.3 (0.95 to 1.08) Black	4 to 8 (1 to 2) Orange	4 to 12* (1 to 3) Violet	4.7 to 5.3 (1.18 to 1.33) Green	---	5.6 to 6.4 (1.4 to 1.6) Red	6 to 10 (1.5 to 2.5) Red	8 to 12 (2 to 3) Blue	9.7 to 11.3 (2.42 to 2.83) Plated
CV48 RV48	1 to 3.5* (0.25 to 0.9) Brown	3.0 to 6.0 (0.75 to 1.5) Plated	---	4 to 8 (1 to 2) Orange	---	---	5 to 12 (1.25 to 3) Blue	---	6 to 10 (1.5 to 2.5) Red	---	---

*Uncertified Spring

**Certified at inlet pressure of 2 psi

Model	Available Springs					
RV20CL	4 / 10 (1 / 2.5)	---	---	---	---	---
CV47CL*** RV47CL***	4 / 10 (1 / 2.5)	4 / 11 (1 / 2.75)	5 / 10 (1.25 / 2.5)	5 / 11 (1.25 / 2.75)	6 / 10 (1.5 / 2.5)	6 / 11 (1.5 / 2.75)
CV48C RV48C(L)***	4 / 10 (1 / 2.5)	4 / 11 (1 / 2.75)	5 / 10 (1.25 / 2.5)	5 / 11 (1.25 / 2.75)	6 / 10 (1.5 / 2.5)	6 / 11 (1.5 / 2.75)

***Listed spring ranges are for residential ranges. Other settings may be available as standards allow.

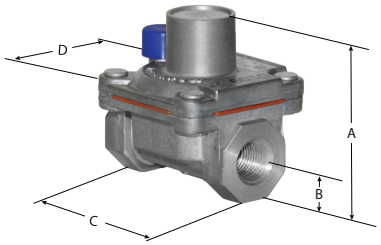
NOTE: See pages 70-71 for complete Spring Selection Chart.

RV SERIES
Rubber Seat Poppet Design

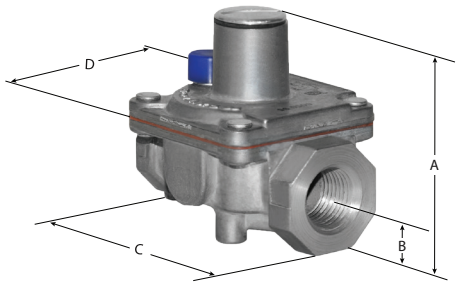
Dimensions

Model	Pipe Size	Vent	Swing Radius	Dimensions			
				A	B	C	D
RV12	1/8″ 3/16″Loxit	Integral Vent Limiting Orifice “L”	1.4″ (35 mm)	1.7″ (43 mm)	0.4″ (10 mm)	1.7″ (43 mm)	1.4″ (35 mm)
RV20	1/4″, 3/8″	Integral Vent Limiting Orifice “L” or 5/16-24 “V”	1.6″ (41 mm)	2.1″ (54 mm)	0.5″ (13 mm)	2.4″ (61 mm)	1.8″ (45 mm)
CV47 RV47	3/8″, 1/2″	Integral Vent Limiting Orifice “D” or “L” suffix	1.9″ (48 mm)	2.5″ (64 mm)	0.6″ (16 mm)	2.9″ (75 mm)	2.3″ (57 mm)
CV47A RV47A			1.6″ (41 mm)	2.3″ (57 mm)			
CV48 RV48	1/2″, 3/4″	Integral “L” or 1/8″ NPT, 12A04 or 12A06 vent limiting device	2″ (51 mm)	2.8″ (70 mm)	0.8″ (19 mm)	3.4″ (86 mm)	3″ (76 mm)

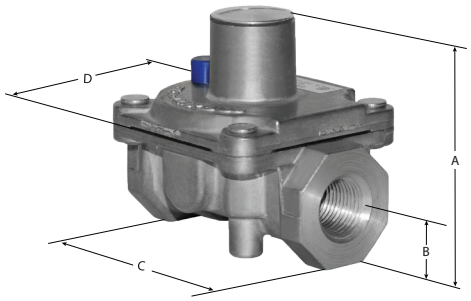
NOTE: Dimensions are maximums and to be used only as an aid in designing clearance for the valve. Actual production dimensions may vary somewhat from those shown.



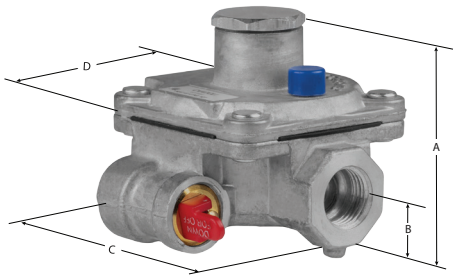
RV12



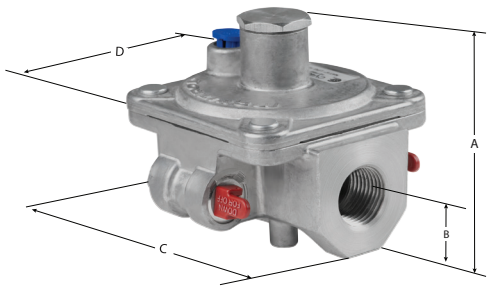
RV20



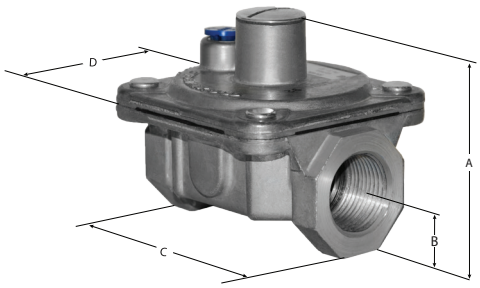
RV47, RV47A



CV47, CV47A

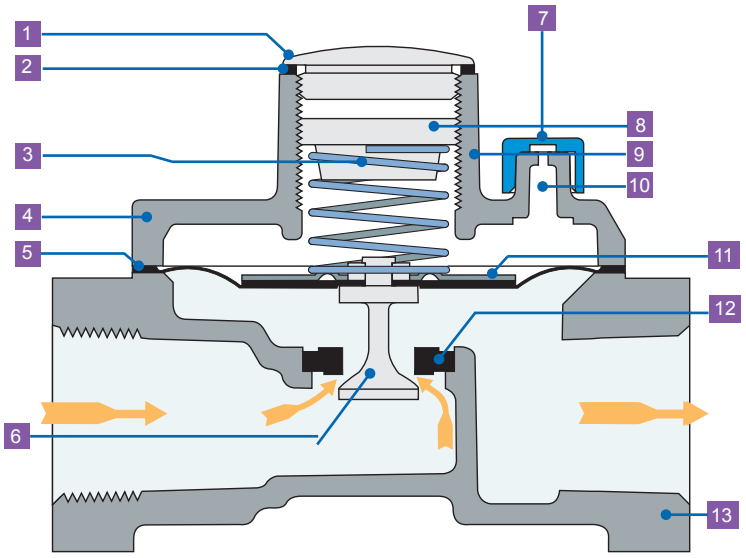


CV48



RV48

Rubber Seat Poppet Design



1	Welch Plug or Seal Cap
2	Seal Cap Gasket
3	Spring
4	Top Housing
5	Diaphragm
6	Stem & Valve
7	Dust Cap
8	Adjusting Screw
9	Stack
10	Vent
11	Diaphragm Plate
12	Rubber Seat
13	Bottom Housing

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

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″

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.

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.)

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.

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.

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

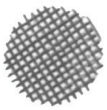
NOTE: Should not be used with vent limiter.

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.

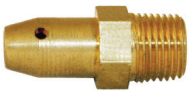
- **13A03-1:** for 1/8" NPT vent.
- **13A03-2:** for 1/4" NPT vent.
- **13A03-3:** for 3/8" NPT vent.
- **13A03-4:** for 1/2" NPT vent.
- **13A03-6:** for 3/4" NPT vent.



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

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.

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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