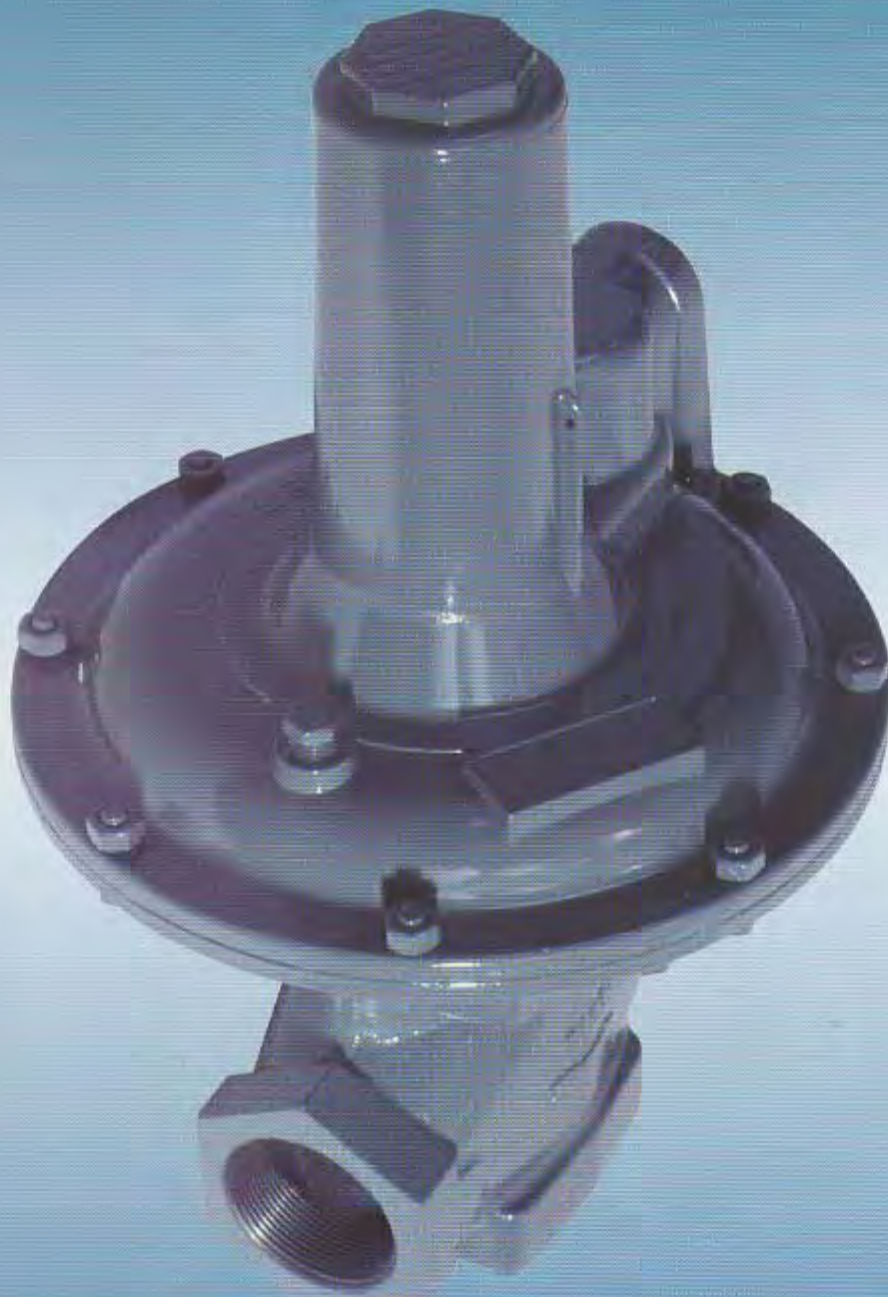

Model 121 Regulators



 **SENSUS**
METERING SYSTEMS

Model 121 Regulators

For Commercial, Industrial Combustion and Distribution Applications

The Model 121—A new dimension in spring regulator capability and you can't beat a spring regulator for **dependability, simplicity or economy.**

New technology plus modern design provides greater capacity, higher inlet pressure, more accurate performance and faster response, with resulting economy . . . in most cases a smaller regulator will do the job.

Use the 121 for commercial and industrial applications: burners, boilers, furnaces, air heaters, kilns, gas engines. Its fast response will help.

Use it also as a large capacity supply regulator on commercial or industrial service lines, or as a small district regu-

lator. It's excellent for primary control or monitoring . . . use it for either or both.

The 121 is actually a whole new family of regulators—standard regulator, zero governor or atmospheric regulator, differential regulator, back pressure regulator, or relief valve, vacuum regulator and vacuum breaker.

Compatible with natural gas, propane, LPG, air, nitrogen, etc. Special materials available for certain corrosive gases. For installation, servicing and parts, see Bulletin RM 132B.

And, for a complete 121 regulator, ready to go to work for you—contact your Sensus Representative or Authorized Industrial Distributor.

Outlet Pressure Ranges and Springs

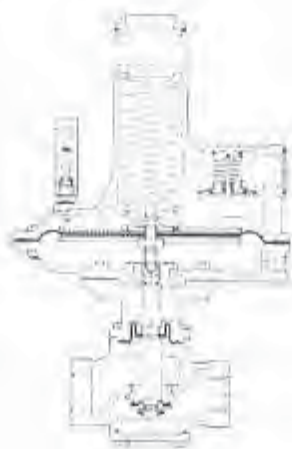
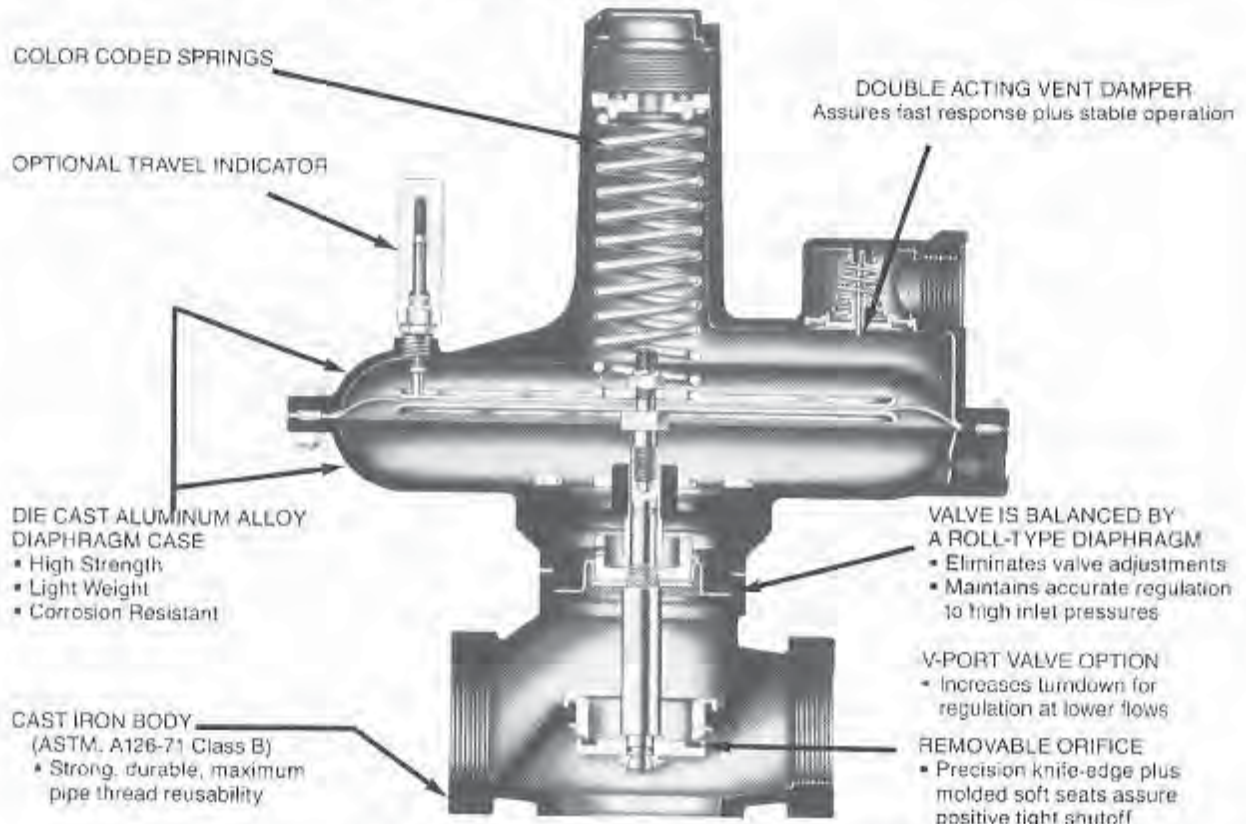
SIZE	OUTLET PRESSURE RANGE	SPRING COLOR	SPRING PART NUMBER	MAXIMUM INLET PRESSURE	NOMINAL DIAPHRAGM SIZE
3/4", 1" and 1 1/2" ** Model 121-B	1 1/2" to 3 1/2" w.c.	blue-black black-red	143-82-021-01 (main spring) 121-10-021-50 (counterspring)	60 psi	8"
	1 1/2" to 12" w.c.	green-black black-red	143-82-021-02 (main spring) 121-10-021-50 (counterspring)		
3/4", 1" and 1 1/2" *** Model 121-8HP	3 1/2" to 6 1/2" w.c. 5" to 8 1/2" w.c. 8" to 14" w.c. 12" to 28" w.c. 1 psi to 2 psi 2 psi to 4 1/4 psi	red-black blue-black green-black green (2" O.D.) orange (2" O.D.) black	143-82-021-00 143-82-021-01 143-82-021-02 143-16-021-05 143-16-021-06 143-16-021-07	60 psi	8"
	3 psi to 6 1/2 psi 6 psi to 10 psi	cadmium * cadmium * white	143-16-021-08 143-16-021-08 (outer) 143-16-021-13 (inner)		
1 1/2", 2" and 2 1/2" Model 121-12	1 1/2" to 3 1/2" w.c.	red —	143-16-021-03 (main spring) 120-10-021-10 (counterspring)	60 psi	12"
	1 1/2" to 12" w.c.	maroon —	121-42-021-00 (main spring) 120-10-021-10 (counterspring)		
1 1/2", 2" and 2 1/2" Model 121-8	3 1/2" to 6 1/2" w.c. 5" to 8 1/2" w.c. 6" to 14" w.c. 12" to 28" w.c. 1 psi to 2 psi 1 1/2 psi to 3 psi	red (2" O.D.) blue (2" O.D.) green (2" O.D.) orange (2" O.D.) black cadmium	143-16-021-03 143-16-021-04 143-16-021-05 143-16-021-06 143-16-021-07 143-16-021-08	60 psi	8"
	1 psi to 2 psi 2 psi to 4 1/4 psi	orange (2" O.D.) black	143-16-021-06 143-16-021-07		
1 1/2", 2" and 2 1/2" Model 121-8HP	3 psi to 6 1/2 psi 6 psi to 10 psi	cadmium * cadmium * white	143-16-021-08 143-16-021-08 (outer) 143-16-021-13 (inner)	60 psi	8"
	3 1/2" to 6 1/2" w.c. 5" to 8 1/2" w.c. 6" to 14" w.c. 14" to 28" w.c. 1/2 psi to 1 1/4 psi	red (3" O.D.) blue (3" O.D.) green (3" O.D.) orange (3" O.D.) yellow	121-62-021-50 121-62-021-51 121-62-021-52 121-62-021-53 121-62-021-56		
3" and 4" Model 121-16	1 psi to 2 psi 1 1/2 psi to 3 psi	black cadmium	143-16-021-07 143-16-021-08	40 and 15†	12"

* Require High Pressure Spring Adjustment

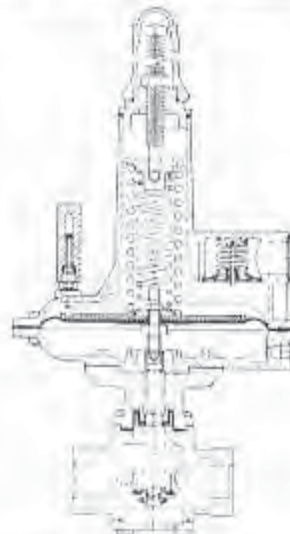
† 3" 121 is 40 psi, 4" 121 is 15 psi

** 3/4 x 3/4 not available

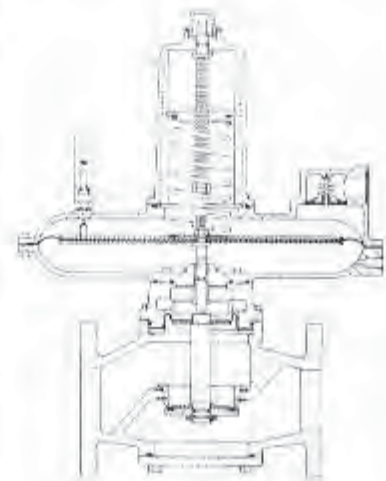
1½", 2" and 2½" MODEL 121-12 REGULATOR



¾" and 1¼" MODEL 121-9



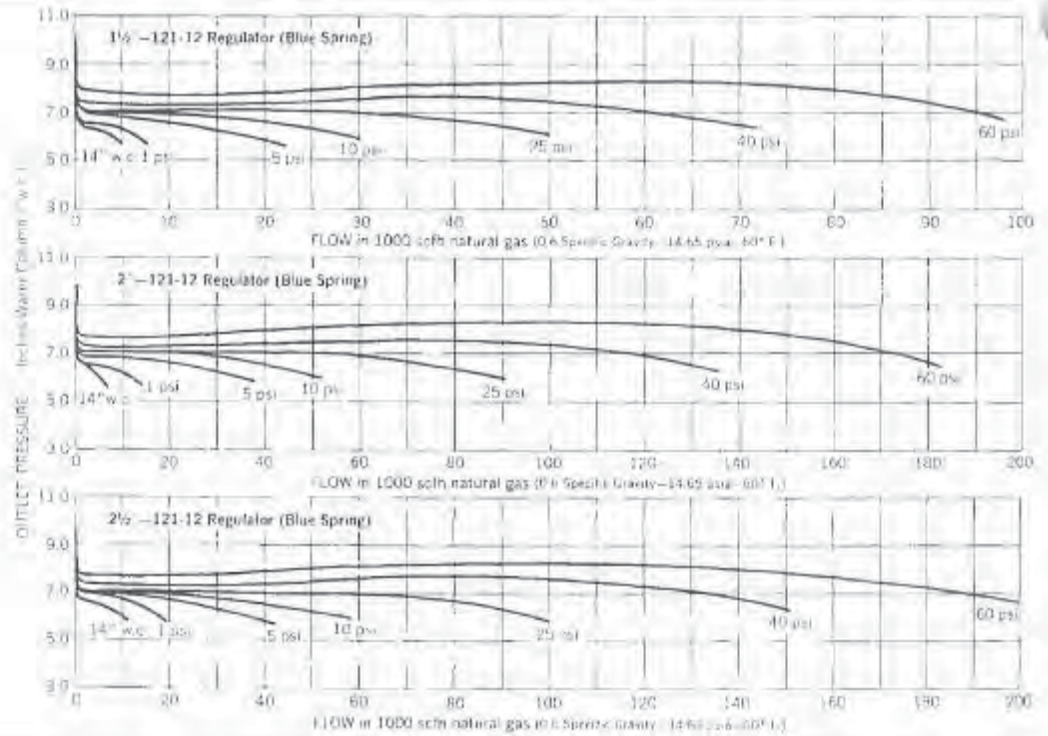
HIGH PRESSURE SPRING ADJUSTMENT FOR 3 PSI TO 10 PSI OUTLET PRESSURE MODEL 121-8HP



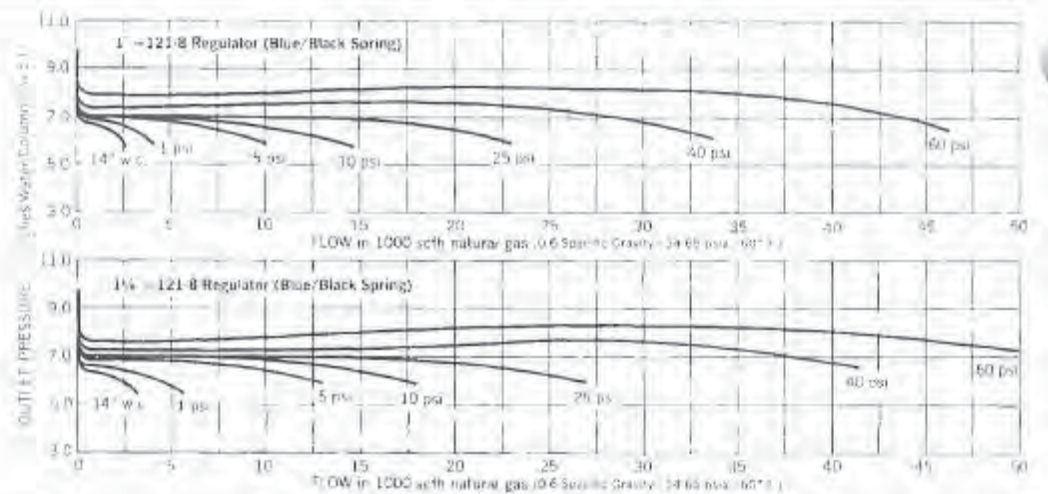
3" AND 4" MODEL 121-16

Typical Performance Curves

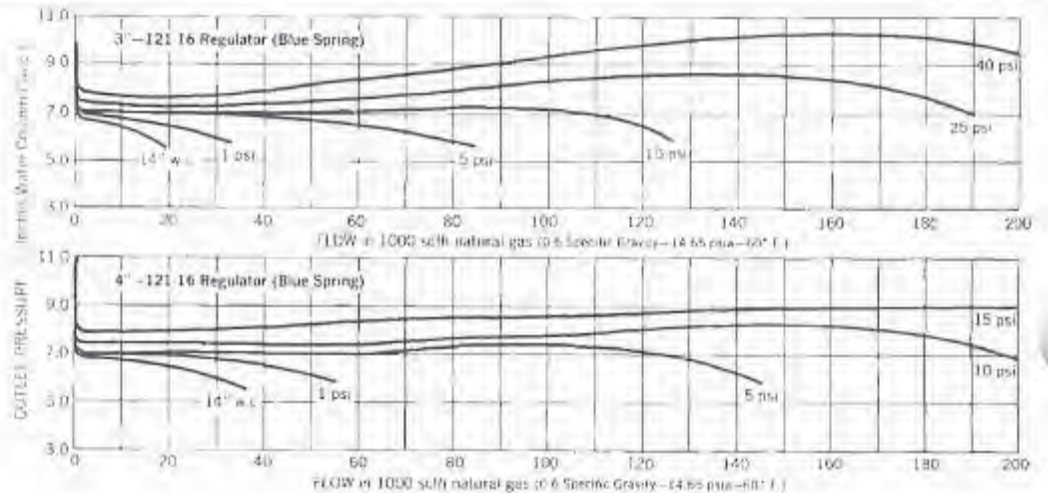
Model 121-12



Model 121-8



Model 121-16



Model 121 Capacity Tables



1 1/2" - 2" - 2 1/2" — Model 121-12 Capacity in scfh of natural gas

(0.6 Specific Gravity — 14.65 psia — 60°F)

An outstanding feature of the 121 is large capacity. It has so much that at higher inlet pressures it is necessary to increase the size of the outlet piping.

This pipe size increase is indicated by the asterisks in the capacity tables below and on pages 5, 6, 7 and 8. The following note explains how to read this data from the tables:

NOTE: Each capacity figure immediately above the heavy horizontal lines is a maximum capacity for the outlet pipe size

shown. Increasing the inlet pressure will not increase the capacity without also increasing the outlet pipe size as indicated.

For example: a 1 1/2" Model 121-12 at 5" w.c. set-point has the following maximum capacities:

1. With 1 1/2" size outlet piping 14,600 SCFH at 3 psi to 60 psi inlet pressure.
2. With 2" size outlet piping 37,000 SCFH at 15 psi to 60 psi inlet pressure.
3. With 3" size outlet piping 95,000 SCFH at 60 psi inlet pressure.

The designated increase in outlet pipe size must be made immediately downstream of the regulator outlet.

This NOTE applies to the asterisks in all capacity tables, pages 5, 6, 7 and 8.

PIPE SIZE	INLET PRESSURE	OUTLET PRESSURE							REGULATOR SIZE & MODEL	
		SET POINT 5" w.c.	SET POINT 7" w.c.	SET POINT 11" w.c.	SET POINT 18" w.c.	SET POINT 28" w.c.	SET POINT 2 psi	SET POINT 3 psi		
		RED SPRING 1" w.c. DROOP	BLUE SPRING 1" w.c. DROOP	GREEN SPRING 2" w.c. DROOP	ORANGE SPRING 2" w.c. DROOP	ORANGE SPRING 3" w.c. DROOP	BLACK SPRING 1/2" psi DROOP	CADMIUM 1/2" psi DROOP		
1 1/2"	8" w.c.	4000	3000	—	—	—	—	—	1 1/2" MODEL 121-12	
	14" w.c.	4900	4500	3700	—	—	—	—		
	1 psi	7400	7000	6500	6000	—	—	—		
	2 psi	11500	11000	10300	9500	10000	—	—		
	3 psi	14800	14500	13750	12500	13000	10000	—		
2"	5 psi	19500	19400	18500	17300	18000	16400	14000		
	10 psi	30000	30000	28000	27000	27500	25100	25500		
	15 psi	37000	37000	36200	35000	35700	34000	31500		
3"	25 psi	50000	50000	49000	47400	48000	46000	45500		
	40 psi	58000	68000	67100	66000	66600	64200	63500		
	50 psi	80000	80000	79000	77700	78000	74900	76000		
3"	60 psi	95000	95000	93500	90000	92000	87000	86500		
	8" w.c.	5000	4000	—	—	—	—	—		2" MODEL 121-12
	14" w.c.	8900	8000	6500	—	—	—	—		
1 psi	13000	12500	12000	11000	—	—	—			
2 psi	20500	20000	19400	17500	18000	—	—			
3 psi	26300	26000	25000	23400	23800	19000	—			
5 psi	35000	35000	34500	33500	34000	30000	27500			
3"	10 psi	52000	52000	51000	49600	50000	49000	46500		
	15 psi	68000	68000	67500	65500	66000	64700	61500		
	25 psi	90000	90000	89000	88000	88500	84500	87000		
4"	40 psi	125000	125000	124000	120000	121500	118000	116500		
	50 psi	150000	150000	148000	145000	146500	143900	139500		
	60 psi	175000	175000	174000	171200	172000	170000	165500		
2 1/2"	8" w.c.	5500	4500	—	—	—	—	—	2 1/2" MODEL 121-12	
	14" w.c.	9700	9000	7300	—	—	—	—		
	1 psi	14400	14000	13000	12000	—	—	—		
	2 psi	22200	22000	21000	19100	20000	—	—		
	3 psi	29100	29000	27900	26000	27100	21500	—		
5 psi	39500	39500	38700	37000	37800	33500	27500			
3"	10 psi	58000	58000	57000	54800	55500	53000	52000		
	15 psi	75500	75500	74000	71900	72300	70100	66500		
	25 psi	100000	100000	99000	97100	98000	94000	94000		
4"	40 psi	140000	140000	138000	133500	135000	130000	129500		
	50 psi	166000	166000	164000	156000	158000	155000	153500		
	60 psi	195000	195000	193000	189700	191000	188000	179000		

*See NOTE in upper part of page 5.

Note: The above performance data is based on normal testing at 70°F flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Capacity Tables

1½" - 2" - 2½" — Model 121-8 and 121-8HP Capacity in scfh of natural gas

(0.6 Specific Gravity — 14.65 psia — 60°F)

REGULATOR SIZE & MODEL	OUTLET PRESSURE		PIPE SIZE	INLET PRESSURE	OUTLET PRESSURE		REGULATOR SIZE & MODEL
	SET POINT 3 psi	SET POINT 2 psi			SET POINT 5 psi	SET POINT 10 psi	
	BLACK SPRING ½ psi DROOP	ORANGE SPRING ¼ psi DROOP			CADMIUM SPRING ½ PSI DROOP	CADMIUM & WHITE SPRING 1 psi DROOP	
1½" MODEL 121-8	—	8500	1½"	3 psi	—	—	1½" MODEL 121-8HP†
	11000	13000		5 psi	—	—	
	20000	21000		10 psi	16500	—	
	26000	27000		15 psi	24500	22000	
	35100	36000		25 psi	33000	30000	
	47000	50000		40 psi	44500	42700	
	63500	66000	2"	50 psi	62000	60500	
	70000	71500		60 psi	68000	66500	
2" MODEL 121-8	—	15000	2"	3 psi	—	—	2" MODEL 121-8HP†
	20000	24000		5 psi	—	—	
	37000	39000		10 psi	30000	—	
	48000	50000		15 psi	45000	40000	
	64000	65000		25 psi	60000	55000	
	85000	90000		40 psi	80000	76000	
	116000	120000	3"	50 psi	114000	110000	
	127000	130000		60 psi	123000	121000	
2½" MODEL 121-8	—	16700	2½"	3 psi	—	—	2½" MODEL 121-HP†
	22000	26700		5 psi	—	—	
	41000	43500		10 psi	33500	—	
	53500	55000		15 psi	50000	44500	
	71000	72000		25 psi	66500	61000	
	94500	100000		40 psi	89000	85000	
	129000	133000	3"	50 psi	127000	122000	
	140000	144000		60 psi	135000	130000	

* See NOTE in upper part of page 5.

† These 121-8 Regulators use the High Pressure Spring Adjustment.

Note: The above performance data is based on normal testing at 70°F flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Capacity Tables



3/4" - 1" - 1 1/4" — Model 121-8 and 121-8HP Capacity in scfh of natural gas

(0.6 Specific Gravity — 14.65 psia — 60°F)

PIPE SIZE	INLET PRESSURE	OUTLET PRESSURE							REGULATOR SIZE & MODEL	
		SET POINT 5" w.c.	SET POINT 7" w.c.	SET POINT 11" w.c.	SET POINT 18" w.c.	SET POINT 28" w.c.	SET POINT 2 psi	SET POINT 3 psi		
		RED/BLACK SPRING 1" w.c. DROOP	BLUE/BLACK SPRING 1" w.c. DROOP	GREEN/BLACK SPRING 2" w.c. DROOP	GREEN SPRING 2" w.c. DROOP	GREEN SPRING 3" w.c. DROOP	ORANGE SPRING 1/4 psi DROOP	BLACK SPRING 1/4 psi DROOP		
1"	8" w.c.	1500	1000	—	—	—	—	—	3/4" x 1" 1" x 1" MODEL 121-8	
	14" w.c.	2500	2300	2000	—	—	—	—		
	1 psi	4200	4000	3600	2500	—	—	—		
	2 psi	6100	6000	5500	5000	5200	—	—		
	3 psi	7700	7500	7400	7200	7300	6000	—		
2"	5 psi	11200	10000	9900	9700	9800	9000	7500		
	10 psi	14500	14000	13700	13000	13500	12200	11500		
	15 psi	17300	17000	16500	15800	16000	15000	14300		
	25 psi	23200	23000	22700	22000	22500	21400	20000		
	40 psi	32000	32000	31200	30000	31000	30100	29500		
3"	50 psi	38000	38000	37700	37000	38000	35500	34500		
	60 psi	44000	44000	43300	42500	43000	42000	40000		
1 1/4"	8" w.c.	2000	1500	—	—	—	—	—		3/4" x 1 1/4" 1" x 1 1/4" 1 1/4" x 1 1/4" MODEL 121-8
	14" w.c.	3500	3000	2200	—	—	—	—		
	1 psi	5500	5000	4500	4000	—	—	—		
	2 psi	7800	7500	7000	6000	6200	—	—		
	3 psi	9700	9500	9000	8000	8400	7200	—		
2"	5 psi	12700	12500	11200	10400	10800	9700	8300		
	10 psi	18000	17850	17000	16000	16300	15400	15000		
	15 psi	22500	22000	21700	20500	21000	18900	18000		
3"	25 psi	27100	27000	26200	25400	25900	24900	24000		
	40 psi	41000	41000	40000	39000	39600	38400	38000		
	50 psi	48000	48000	45000	43600	44000	42000	40800		
3"	60 psi	56000	56000	55000	53000	53800	52100	51600		

REGULATOR SIZE & MODEL	OUTLET PRESSURE		PIPE SIZE	INLET PRESSURE	PIPE SIZE	OUTLET PRESSURE		REGULATOR SIZE & MODEL
	SET POINT 10 psi	SET POINT 5 psi				SET POINT 5 psi	SET POINT 10 psi	
	CADMIUM & WHITE SPRING 1 psi DROOP	CADMIUM SPRING 1/2 psi DROOP				CADMIUM SPRING 1/2 PSI DROOP	CADMIUM & WHITE SPRING 1 psi DROOP	
3/4" x 1" 1" x 1" MODEL 121-8HP†	—	11000	1"	10 psi	1 1/4"	14200	—	3/4" x 1 1/4" 1" x 1 1/4" 1 1/4" x 1 1/4" MODEL 121-8HP†
	10000	14000		15 psi		17300	14000	
	17000	19200		25 psi		23100	20000	
	24000	28000		40 psi		37200	34000	
	30000	34000		50 psi		39800	37000	
	35000	38500	2"	60 psi	50000	45000		

* See NOTE in upper part of page 5

† These 121-8 Regulators use the High Pressure Spring Adjustment.

Note: The above performance data is based on normal testing at 70°F flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Capacity Tables

3" - 4" — Model 121-16 and 121-12

Capacity in scfh of natural gas

(0.6 Specific Gravity — 14.65 psia — 60°F)

PIPE SIZE	INLET PRESSURE	OUTLET PRESSURE					REGULATOR SIZE & MODEL	
		SET POINT 5" w.c.	SET POINT 7" w.c.	SET POINT 11" w.c.	SET POINT 18" w.c.	SET POINT 28" w.c.		
		RED SPRING 1" w.c. DROOP	BLUE SPRING 1" w.c. DROOP	GREEN SPRING 2" w.c. DROOP	ORANGE SPRING 2" w.c. DROOP	ORANGE SPRING 3" w.c. DROOP		
3"	8" w.c.	10000	9700	—	—	—	3" MODEL 121-16	
	14" w.c.	19500	19000	18000	—	—		
	1 psi	31000	30800	29000	27000	—		
	2 psi	47000	46000	46000	34000	35000		
	3 psi	60000	59000	58000	53000	55000		
	5 psi	80000	80000	78000	74000	75000		
4"	10 psi	125000	125000	120000	120000	125000		
	15 psi	145000	145000	145000	138500	140000		
6"	25 psi	190000	190000	190000	185000	190000		
	40 psi	260000	260000	260000	260000	260000		
4"	8" w.c.	18000	17200	—	—	—		4" MODEL 121-16
	14" w.c.	34500	34000	29000	—	—		
	1 psi	56400	56000	49000	47200	—		
	2 psi	90000	85000	80000	68000	70000		
	3 psi	110000	110000	105000	99000	100000		
	5 psi	145000	145000	140000	131000	135000		
6"	10 psi	202000	202000	200000	191000	200000		
	15 psi	252000	252000	245000	240000	250000		

* See NOTE in upper part of page 5

REGULATOR SIZE & MODEL	OUTLET PRESSURE			INLET PRESSURE	OUTLET PRESSURE			REGULATOR SIZE & MODEL
	SET POINT 3 psi	SET POINT 2 psi	SET POINT 1 psi		SET POINT 1 psi	SET POINT 2 psi	SET POINT 3 psi	
	CADMIUM SPRING 1/2 psi DROOP	BLACK SPRING 1/2 psi DROOP	BLACK SPRING 1/4 psi DROOP		BLACK SPRING 1/4 psi DROOP	BLACK SPRING 1/2 psi DROOP	CADMIUM SPRING 1/2 psi DROOP	
3" MODEL 121-12	—	—	35000	2 psi	60000	—	—	4" MODEL 121-12
	—	40000	53000	3 psi	90000	70000	—	
	55000	65000	74000	5 psi	120000	110000	80000	
	90000	100000	110000	10 psi	190000	175000	140000	
	125000	135000	139000	15 psi	240000	225000	200000	
	175000	183000	185000	25 psi	—	—	—	
	200000	200000	100000†	40 psi	—	—	—	

† 100,000 is the capacity at a boost of 3" w.c. instead of the 5" w.c. droop indicated.

Note: The above performance data is based on normal testing at 70°F flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Maximum Emergency Pressures

The maximum pressure the regulator inlet may be subjected to under abnormal conditions without causing damage to the regulator is:

$\frac{1}{2}$ " through 2 $\frac{1}{2}$ " Pipe Sizes	70 psi
3" Pipe Size	50 psi
4" Pipe Size	25 psi
The maximum pressure the regulator outlet may be subjected to without causing damage to the internal parts of the regulator is:	
121-8	set-point + 5 psi
121-8HP	set-point + 10 psi
121-12	set-point + 5 psi
121-16	set-point + 2 psi

Set-point is defined as the outlet pressure a regulator is adjusted to deliver.

If any of the above pressure limits are exceeded, the regulator must be taken out of service and inspected. Damaged or otherwise unsatisfactory parts must be repaired or replaced.

The maximum pressure that can be safely contained by the diaphragm case is:

121-8	25 psi
121-8HP	25 psi
121-12	20 psi
121-16	10 psi

Safely contained means no leakage as well as no bursting. Before using any of the above data, make sure this entire section is clearly understood.

Overpressurization Protection

Protect the downstream piping system and the regulator's low pressure chambers against overpressurization due to the possible regulator malfunction or failure to achieve complete

lockup. The allowable outlet pressure is the lowest of the maximum pressures permitted by federal codes, state codes, Sensus bulletin RDS-1498, or other applicable standards.

The method of protection can be a relief valve, monitor regulator, shutoff device, or similar mechanism.

Full Open Capacity

Capacity of the Model 121 in the full open position can be calculated using the following formulas and K factors:

$$1. Q = K \sqrt{P_o (P_i - P_o)} \quad \text{..... (for } P_i/P_o \text{ less than 1.894)}$$

$$2. Q = \frac{K P_i}{2} \quad \text{..... (for } P_i/P_o \text{ greater than 1.894)}$$

Q = full open capacity of the regulator in SCFH of 0.6 specific gravity natural gas.

P_i = absolute inlet pressure (psia)

P_o = absolute outlet pressure (psia)

1" Pipe Size (outlet), K = 1400

1 $\frac{1}{2}$ " Pipe Size (outlet), K = 1750

1 $\frac{1}{2}$ " Pipe Size	K = 2750	3" Pipe Size	K = 11000
2" Pipe Size	K = 4750	4" Pipe Size	K = 18000
2 $\frac{1}{2}$ " Pipe Size	K = 5250		

Remember, at the above full open capacities the drop is significantly greater than specified in the capacity tables on pages 5, 6, 7 and 8.

When checking 121 regulator capacity for use in providing adequate relief valve capacity, use the above calculated full open capacity. Do not use 121 capacity values from the tables on pages 5, 6, 7 and 8.

Pipe Sizes

SCREWED NPT

$\frac{1}{2}$ " x 1"

1" x 1 $\frac{1}{2}$ "

1 $\frac{1}{2}$ " x 2"

3" x 3"

$\frac{3}{4}$ " x 1 $\frac{1}{4}$ "

1 $\frac{1}{4}$ " x 1 $\frac{3}{4}$ "

2" x 2"

1" x 1"

1 $\frac{1}{2}$ " x 1 $\frac{1}{2}$ "

2 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ "

FLANGED

ANSI 125 lb. FF.

2" x 2"

4" x 4"

3" x 3"

Other Gases

Model 121 Regulators are most widely used on natural gas. However, they perform equally well on LP gas, nitrogen, dry CO₂, and air.

For other gas capacities, multiply the table values on pages 5, 6, 7 & 8 by the applicable correction factors:

OTHER GASES	CORRECTION FACTOR
Air (Specific Gravity 1.0)	0.77
Propane (Specific Gravity 1.52)	0.63
1350 BTU Propane-Air Mix (1.20)	0.71
Nitrogen (Specific Gravity 0.97)	0.79
Dry Carbon Dioxide (Specific Gravity 1.52)	0.63
For other noncorrosive gases: CORRECTION FACTOR =	$\sqrt{\frac{0.6}{\text{Specific Gravity of the Gas}}}$

For use with gases not listed above, please contact your Sensus representative or Industrial Distributor for recommendations.

Caution: Turn gas on slowly. If an outlet stop valve is used, it should be opened first. Do not overload the diaphragm with a sudden surge of inlet pressure. Monitor the outlet pressure during start-up to prevent an outlet pressure overload. **Refer to RM-1328 for more detailed start-up procedures.**

Materials of Construction

Body and Adapter	Cast Iron	Orifice (1/2" thru 4" Model 121)	Cast Iron
Diaphragm Gase (8" and 12" Diaphragm).....	Die Cast Aluminum Alloy	Retaining Ring (1/2" thru 4" Model 121)	Plated Steel
Diaphragm Case (16" Diaphragm)	Permanent Mold Aluminum Alloy	Valve.....	Plated Steel with Molded Buna-N Soft Seat
Main and Seal Diaphragms	Buna-N on Nylon	Wave Holder	Stainless Steel
Piston for Seal Diaphragm (1/2" thru 2 1/2" Model 121).....	Powdered Iron-Zinc Plated	Retaining Ring and Wave Washer	Stainless Steel
Piston for Seal Diaphragm (3" and 4" Model 121).....	Aluminum Alloy	O-Rings and Tetraseals.....	Buna-N
Stem, Stud, Pans and Plates for 8", 12" and 16" Diaphragms.....	Stainless Steel	Adjustment Spring Ferrule	Zinc Die Casting
Stem Bushing.....	Stainless Steel	Bottom Spring Button	Powdered Iron-Plated
Orifice (1/2" thru 1 1/2" Model 121).....	Brass	Adjustment Screw (16" Diaphragm) and H.P. Adjustment Screw	Plated Steel
		Adjustment Ferrule (16" Diaphragm) and H.P. Adjustment Spring Ferrule	Cast Iron
		Seal Cap (8" and 12" Diaphragm)	Zinc Die Casting
		Seal Cap (16" Diaphragm).....	Die Cast Aluminum Alloy

Body Taps

Inlet and outlet taps are available on either side of the body. Tap size is 1/4" NPT. Refer to "dimensions" on page 14. Desired taps must be specified when ordering.

Metrication

Use the following for metric conversions:

std. metres ³ /hr. x 35.31 = std. ft. ³ /hr. (SCFH)
std. ft. ³ /hr. (SCFH) x 0.0283 = std. metres ³ /hr.
kilograms/centimeter ³ (kg/cm ³) x 14.22 = psig
psig x 0.0703 = kilograms/centimeter ³ (kg/cm ³)
kilopascals (kPa) x 0.145 = psig
psi x 6.90 = kilopascals (kPa)
bars x 14.50 = psig
psig x .069 = bars
millimeters water (mm H ₂ O) x .0394 = in. w.c.
in. w.c. x 25.4 = millimeters water (mm H ₂ O)
millimeters mercury (mm Hg) x 0.535 = in. w.c.
in. w.c. x 1.868 = millimeters mercury (mm Hg)

How to Order

- Specify:
1. Model Number.
 2. Pipe size . . . (on 2" and 3" specify whether screwed or flanged).
 3. Inlet Pressure.
 4. Outlet Pressure.
 5. Capacity required . . . SCFH.
 6. Kind of gas . . . (natural gas, propane, air, etc.)

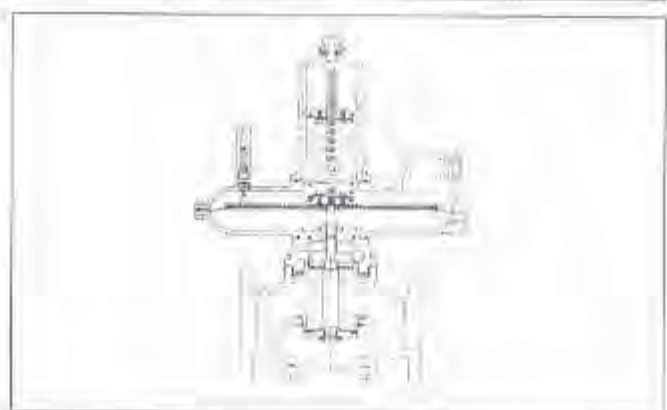
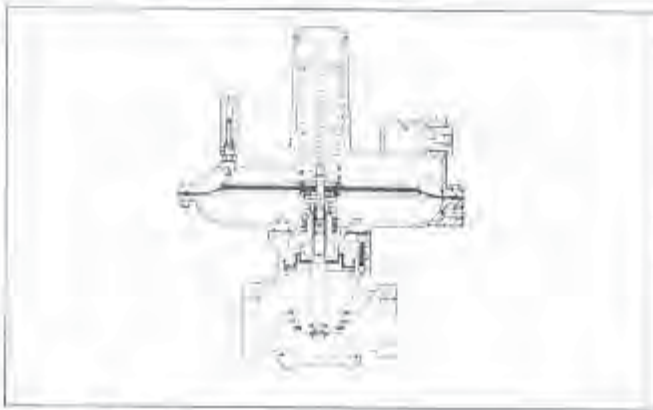
Buried Service

These regulators are designed for above ground or vault installations and are not recommended for direct earth burial.

Temperature Limits

Model 121 regulators can be used for temperatures from -20°F to +150°F.

Caution: It is the user's responsibility to assure that all regulator vents and/or vent lines exhaust to a non-hazardous location away from any potential sources of ignition. **Refer to Sensus Bulletin RM-1328 for more detailed information.**



Zero Governor

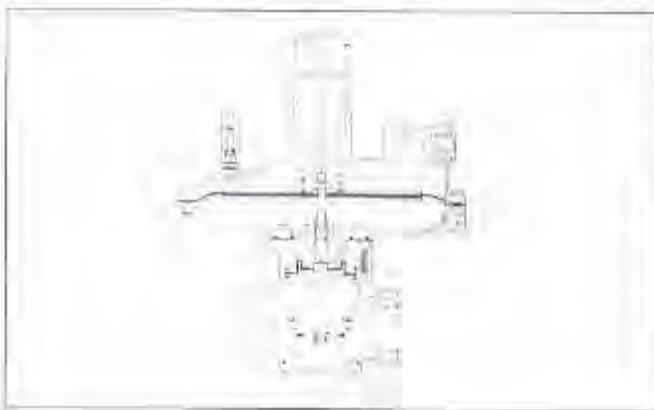
Zero Governors are also called **Atmospheric Regulators**. They are used for outlet pressures close to atmospheric, from slightly above this to slightly below. Inlet pressures are the same as on standard 121 regulators (see page 9)

All of the pipe sizes listed on page 9 are available; 1/2" through

4". Note from the illustrations that the 3" and 4" sizes use a reversed main spring design while the remaining sizes, 2 1/2" and smaller, use a counterspring along with the standard main spring. With the exception of certain parts required for the foregoing, everything else is the same as on standard 121 regulators.

Pressures and Springs

SIZE	OUTLET PRESSURE RANGE	SPRINGS
1/2", 1" and 1 1/2" 121-8	1 1/2" w.c. vacuum (- 1 1/2" w.c.) to + 1 1/2" w.c.	Main Spring (red-black)143-82-021-00 Counterspring (red-black)121-10-021-50
1 1/2", 2" and 2 1/2" 121-12	1" w.c. vacuum (- 1" w.c.) to + 1 1/2" w.c.	Main Spring (red-black)143-82-021-00 Counterspring120-10-021-10
3" and 4" 121-16	1 1/2" w.c. vacuum (- 1 1/2" w.c.) to + 1 1/2" w.c.	Main Spring only121-62-021-54



Differential Regulators

Differential regulators are usually used to maintain a constant difference between gas pressure and air or combustion chamber pressure in certain types of premix and nozzle mix burners. This is done by adding a second control line which applies the air or combustion chamber pressure to the top of the diaphragm.

Differential regulators can also be used to maintain a constant pressure drop across an orifice.

On the 121-8 and 121-12, both control lines are 1/2" NPT. On the 121-16 both are 1/2" NPT.

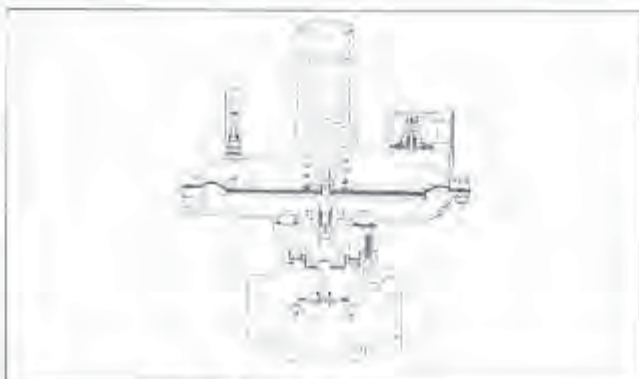
All of the pipe sizes listed on page 3 are available; 1/2" through 4". Parts are interchangeable with standard 121 regulators.

For differentials lower than 3 1/2" w.c., please contact your Sensus Representative.

SIZE	DIFFERENTIAL PRESSURE RANGE	SPRING COLOR	SPRING PART NUMBER	MAXIMUM BODY PRESSURE	MAXIMUM DIAPHRAGM PRESSURE DIFFERENTIAL	MAXIMUM DIAPHRAGM CASE PRESSURE
1/2" and 1 1/2" 121-8**	3 1/2" to 6 1/2" w.c. 5" to 8 1/2" w.c. 8" to 14" w.c. 12" to 28" w.c. 1 psi to 2 psi	red-black blue-black green-black green orange (2" O.D.)	143-82-021-00 143-82-021-01 143-82-021-02 143-16-021-05 143-16-021-06	60 psi	2 psi	35 psi
1 1/2", 2" and 2 1/2" 121-12	8 1/2" to 6 1/2" w.c. 5" to 8 1/2" w.c. 8" to 14" w.c. 12" to 28" w.c.	red (2" O.D.) blue (2" O.D.) green (2" O.D.) orange (2" O.D.)	143-16-021-03 143-16-021-04 143-16-021-05 143-16-021-06	60 psi	2 psi	20 psi
3" and 4" 121-16	3 1/2" to 6 1/2" w.c. 5" to 8 1/2" w.c. 8" to 14" w.c. 12" to 28" w.c.	red (3" O.D.) blue (3" O.D.) green (3" O.D.) orange (3" O.D.)	121-62-021-50 121-62-021-51 121-62-021-52 121-62-021-53	40 and 15*	1 psi	10 psi

* 3" 121-16 is 40 psi and 4" 121-16 is 15 psi ** 1/2" x 1/2" not available

Variations



Back Pressure Regulator

Back Pressure Regulators are also used as Relief Valves. When so used, the 121 is a throttling or modulating type of relief valve, not a "pop" type. During an emergency it only relieves excess pressure. In addition, it closes tight when the emergency ends.

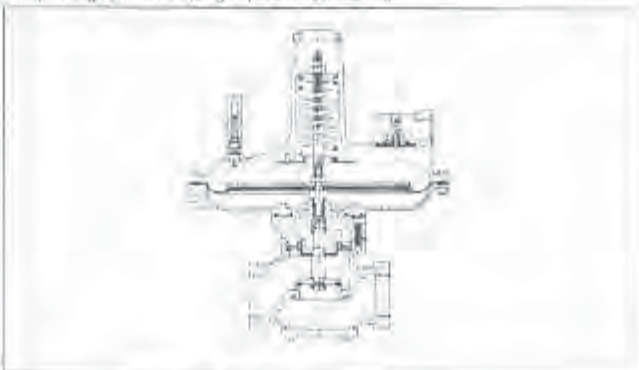
Back Pressure Regulators maintain constant upstream pressure by allowing excess gas to exit to a lower pressure downstream.

All of the pipe sizes listed on page 9 are available: 1/4" through 4". Note on the cutaway drawing that the valve opens upwards (in standard 121 regulators it opens downwards). With the exception of certain stem and orifice parts in the valve assembly, everything else is interchangeable with standard 121 regulators.

Pressures and Springs

SIZE	RELIEF OR BACK PRESSURE RANGE	SPRING COLOR	PART NUMBER	MAX. DIAPHRAGM CASE PRESSURE
1/4" thru 2 1/2" 121-8	3" to 5 1/2" w.c. 5" to 7 1/2" w.c. 6" to 13" w.c. 10" to 15" w.c. 12" to 25" w.c. 18" w.c. to 2 psi 1 psi to 4 psi	red-black blue-black green-black blue (2" O.D.) green (2" O.D.) orange (2" O.D.) black	143-82-021-00 143-82-021-01 143-82-021-02 143-16-021-04 143-16-021-05 143-16-021-06 143-16-021-07	10 psi
3/4" thru 3 1/2" 121-8	3 psi to 6 psi 5 psi to 10 psi	cadmium* [cadmium (outer)* white (inner)]	143-16-021-08 143-16-021-08 143-16-021-13	20 psi
1 1/2", 2" and 2 1/2" 121-12	3" to 5 1/2" w.c. 5" to 7" w.c. 6" to 12" w.c. 12" to 25" w.c.	red (2" O.D.) blue (2" O.D.) green (2" O.D.) orange (2" O.D.)	143-16-021-03 143-16-021-04 143-16-021-05 143-16-021-06	10 psi
1 1/2" thru 4" 121-12	20" w.c. to 1 1/2" psi 1 1/2" to 2 1/2" psi	black cadmium	143-16-021-07 143-16-021-08	
3" and 4" 121-16	3" to 4 1/2" w.c. 3" to 6" w.c. 5" to 11" w.c. 10" to 24" w.c. 14" w.c. to 1 1/2" psi	red (3" O.D.) blue (3" O.D.) green (3" O.D.) orange (3" O.D.) yellow	121-62-021-50 121-62-021-51 121-62-021-52 121-62-021-53 121-62-021-56	5 psi

*Requires High Pressure Spring Adjustment (121-9HP).



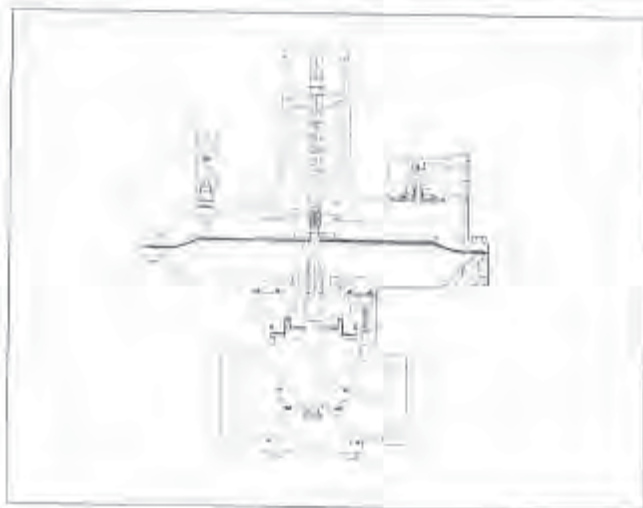
Vacuum Regulator

Vacuum Regulators are used to maintain a certain negative pressure (vacuum) in enclosed spaces such as tanks, vessels, chambers, piping systems, etc. In general, these are piped to the regulator inlet and control line connections and the regulator outlet piped to the inlet of a vacuum pump or other vacuum source.

Available pipe sizes are 1/4" thru 2 1/2", as listed on page 9. Note on the cutaway drawing that the spring assembly is arranged for an upward force on the valve. Also, the valve itself is normally open and moves downward to close rather than upward as in the standard 121. With the exception of certain parts involved in the foregoing, everything else is interchangeable with standard 121 regulators.

Vacuums and Springs

SIZE	VACUUM RANGE "w.c. vacuum (-"w.c.)	SPRING COLOR	SPRING PART NUMBER
1/4", 1" and 1 1/2" 121-8	3" to 6 1/2" 5" to 8 1/2" 8" to 14" 12" to 20" 18" to 30"	red-black blue-black green-black blue green	143-82-021-00 143-82-021-01 143-82-021-02 143-16-021-04 143-16-021-05
1 1/2", 2" and 2 1/2" 121-12	3 1/2" to 6 1/2" 5" to 8 1/2" 6" to 14"	red blue green	143-16-021-03 143-16-021-04 143-16-021-05



Vacuum Breaker

Vacuum Breakers are vacuum limiting devices. In their general function, they can be compared to relief valves or back pressure regulators.

The breaker outlet and control line are piped to the vacuum. The breaker inlet connects to a lesser vacuum, to atmosphere, or to a positive pressure. The maximums for the positive pressure are 60 psi for 1/2" through 2 1/2" sizes, 40 psi for 3", and 15 psi for 4".

The vacuum breaker is normally closed and excess vacuum creates a valve opening movement which increases flow from the inlet and thereby relieves or "breaks" the excess.

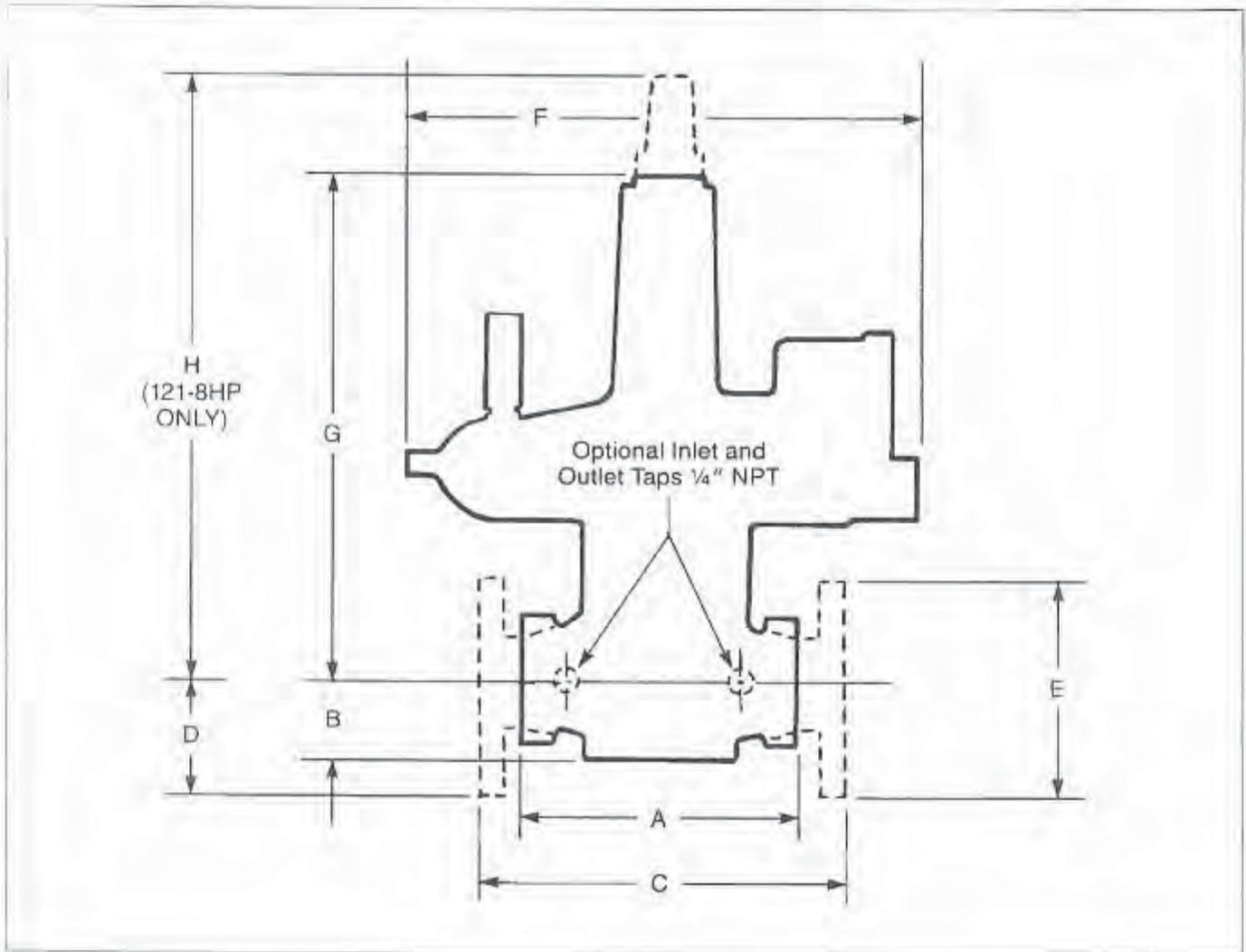
All of the pipe sizes listed on page 9 are available 1/2" through 4". Note on the cutaway drawing that the main spring is reversed to provide the upward closing force on the valve. Except for certain parts used in the spring assembly, everything else is interchangeable with standard 121 regulators.

Vacuums and Springs

SIZE	VACUUM RANGE "w.c. vacuum (-"w.c.)	SPRING COLOR	SPRING PART NUMBER
1/2", 1" and 1 1/2" 121-8	3" to 6 1/2"	red-black	143-82-021-00
	5" to 8 1/2"	blue-black	143-82-021-01
	8" to 14"	green-black	143-82-021-02
	12" to 20"	blue (2" O.D.)	143-16-021-04
	18" to 30"	green (2" O.D.)	143-16-021-05
	30" to 56"	orange (2" O.D.)	143-16-021-06
1 1/2", 2" and 2 1/2" 121-12	3" to 6 1/2"	red (2" O.D.)	143-16-021-03
	5" to 8 1/2"	blue (2" O.D.)	143-16-021-04
	8" to 14"	green (2" O.D.)	143-16-021-05
	12" to 28"	orange (2" O.D.)	143-16-021-06
	28" to 56"	black	143-16-021-07
3" and 4" 121-16	3" to 5 1/2"	red (3" O.D.)	121-62-021-50
	4" to 7 1/2"	blue (3" O.D.)	121-62-021-51
	7" to 14"	green (3" O.D.)	121-62-021-52
3" and 4" 121-12	12" to 28"	orange (2" O.D.)	143-16-021-06
	28" to 56"	black	143-16-021-07

Periodic Inspection: Regulators are pressure control devices with numerous moving parts subject to wear that is dependent upon particular operation conditions. To assure continuous satisfactory operation, a periodic inspection schedule must be adhered to with the frequency of inspections, determined by the severity of service and applicable laws and regulations. **See Bulletin RM-1328 for field service instructions and warranty obligation.**

Dimensions



PIPE SIZE	MODEL NUMBER	SCREWED NPT		FLANGED ANSI 125 LB. FF			F (dia.)	G	HIGH PRESSURE SPRING ADJUSTMENT	
		A	B	C	D	E			H	
3/4"-1"-1 1/4"	121-B & -8HP	5 3/4	1 7/8	—	—	—	10 3/16	13 3/16	19 1/8	
1 1/2"	121-B & -8HP	7 1/2	2 3/8	—	—	—	10 3/16	13 1/16	19 1/4	
1 1/2"	121-12	7 1/2	2 3/8	—	—	—	14	14 1/8	—	
2"	121-B & -8HP	7 1/2	2 3/8	10	3	6	10 3/16	13 1/16	19 1/4	
2"	121-12	7 1/2	2 3/8	10	3	6	14	14 1/8	—	
2 1/2"	121-B & -8HP	8 1/4	2 3/8	—	—	—	10 3/16	13 1/16	19 1/4	
2 1/2"	121-12	8 1/4	2 3/8	—	—	—	14	14 1/8	—	
3"	121-12	11 3/4	3 3/16	11 3/4	3 3/4	7 1/2	14	15 1/2	—	
3"	121-16	11 3/4	3 3/16	11 3/4	3 3/4	7 1/2	18	19	—	
4"	121-12	—	—	13 3/8	4 1/2	9	14	16 1/2	—	
4"	121-16	—	—	13 3/8	4 1/2	9	18	20	—	

Dimensions are in inches.

Other Sensus Gas Pressure Regulators



Sensus produces a broad product line of Gas Pressure Regulators which are widely used throughout the natural gas industry. These regulators are also suitable for non-corrosive industrial gas applications such as propane, butane, air,

nitrogen, dry CO₂, etc. For additional detailed information on a particular model, please request the indicated bulletin from the local Sensus sales office.

Service Regulators

Model 143-80

Bulletin: R-1301

3/4", 1", 1 1/2" pipe size

Inlet pressuresto 125 psi

Outlet pressures3 1/2" w.c. to 6 psi

Capacity to 2000 CFH

Available with straight-through body.

Also available: internal relief valve and low pressure cut-off.

Models 243-8, 243-12, 243-8HP

Bulletin: R-1306

1 1/4", 1 1/2" and 2" pipe size

Inlet pressuresto 125 psi

Outlet pressures3 1/2" w.c. to 10 psi

Capacity to 25,000 CFH

Also available: internal relief valve, low pressure cut-off, and external control line.

Industrial Field Regulators

For intermediate to high pressure applications. Ideal on pipeline taps servicing plants and buildings. Appropriate for double stage reduction ahead of service regulators and for high pressure burners and compressed air systems.

Model 046

Bulletin: R-1312

3/4", 1" and 1 1/2" pipe size

Inlet pressuresto 1000 psi

Outlet pressures3 to 200 psi

Capacity to 40,000 SCFH

Monitor and pressure loaded version, and internal relief valve also available.

Model 141A

Bulletin: R-1311

2" pipe size

Inlet pressuresto 1500 psi

Outlet pressures5 to 400 psi

Capacity to 55,000 SCFH

Pilot Loaded Regulators

For intermediate and high-pressure applications requiring precise pressure reduction with minimal droop. Ideal for standard and high capacity flows on burners, driers, dehydrators and compressor line. Appropriate for fixed factor billing.

Model 243-RPC

Bulletin: R-1343

1 1/4", 1 1/2" and 2" pipe size

Inlet pressuresto 150 psi

Outlet pressures3 1/2" w.c. to 35 psi

Capacity to 76,000 SCFH

Model 1100

Bulletin: R-1341

Pipe size: 2"

(screwed or flanged)

Inlet pressuresto 400 psi

Outlet pressures3" w.c. to 100 psi

Capacity to 414,000 SCFH

Model 1200

Bulletin: R-1342

Pipe size: 2" (flanged)

Inlet pressuresto 1200 psi

Outlet pressures20 to 600 psi

Capacity to 789,000 SCFH

Sensus also produces Industrial and Combustion Regulators; High Pressure, High Capacity Regulators; and Safety Relief Valves. Detailed information available on request.

Sensus Metering Systems
805 Liberty Boulevard, DuBois, PA 15801
(814) 371-8000
FAX (814) 375-8460

Representatives in all principal cities.
Distributors throughout the world.



Sensus Metering Systems
805 Liberty Boulevard
DuBois, PA 15801

Authorized Distributor:

LIMITED WARRANTY Seller warrants the Goods to be free from defects in materials manufactured by Seller and in Seller's workmanship for a period of **one (1) year** after tender of delivery (the "Warranty Period"). **THIS LIMITED WARRANTY (a) IS IN LIEU OF, AND SELLER DISCLAIMS AND EXCLUDES, ALL OTHER WARRANTIES, STATUTORY, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR OF CONFORMITY TO MODELS OR SAMPLES; (b) does not apply to any Goods which have been (i) repaired, altered or improperly installed; (ii) subjected to improper use or storage; (iii) used or incorporated with other materials or equipment, after Buyer or Buyer's using the Goods has, or reasonably should have, knowledge of any defect or nonconformance of the Goods; or (iv) manufactured, fabricated or assembled by anyone other than Seller; (c) shall not be effective unless Buyer notifies Seller in writing of any purported defect or nonconformance within [thirty (30) days] after Buyer discovers or should have reasonably discovered such purported defect or nonconformance; and (d) shall only extend to Buyer and not to any subsequent buyers or users of the Goods. Buyer shall provide Seller access to the Goods as to which Buyer claims a purported defect or nonconformance; upon request by Seller, Buyer shall, at its (his) risk and expense, promptly return the Goods in question to Seller's Plant.**