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# Model 122 Industrial Combustion Regulators

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**invensys**  
Metering Systems

# Model 122 Industrial Combustion Regulators

For an unbeatable combination of capacity, performance and economy, install the Invensys Metering Systems Model 122...the latest in industrial-combustion type gas pressure regulators.

Streamline body passages provide **large capacity**.

Carefully engineered internal sensing produces **accurate pressure control** without an external control line. And, just in case a particular application necessitates one, a handy tap on the 122 makes connection into an external control line a

simple matter.

Diaphragm cases are high strength, corrosion resistant die-cast aluminum alloy. This makes a better looking regulator at a better price. In addition, on 1" through 2 1/2" sizes a large area double acting damper in the vent assures **fast speed of response** while maintaining stability...just the thing for those troublesome "snap-acting" loads.

Soft seats plus a precision machined "knife-edge" orifice provide **positive tight shutoff**. And the orifice is removable.

## Maximum inlet pressure is 15 psig.

Outlet pressure is easily adjusted throughout a range of inches w.c. to 2 psig. And the **springs are color coded** for easy identification.

## Outlet Pressure Ranges and Springs - Standard Regulator

SIZE	OUTLET PRESSURE RANGE	SPRING COLOR	SPRING PART NUMBER	NOMINAL DIAPHRAGM SIZE
3/4" Model 122-6	1 1/2" to 3 1/2" w.c.	cadmium	120-08-021-12	6"
	1 1/2" to 12" w.c.	green blue	143-62-021-17 (main spring) 143-08-021-01 (counter spring)	
	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. 1/2 psi to 2 psi	red blue green orange black-white	143-62-021-15 143-62-021-16 143-62-021-17 143-62-021-18 143-62-021-22	
1" and 1 1/4" Model 122-8	1 1/2" to 3 1/2" w.c.	blue-black black	143-82-021-01 (main spring) 143-41-021-00 (counter spring)	8"
	1 1/2" to 12" w.c.	green-black black	143-82-021-02 (main spring) 143-41-021-00 (counter spring)	
	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	red-black blue-black green-black green orange	143-82-021-00 143-82-021-01 143-82-021-02 143-16-021-05 143-16-021-06	
1 1/2", 2" and 2 1/2" Model 122-12	1 1/2" to 3 1/2" w.c.	red red-black	143-16-021-03 (main spring) 121-10-021-50 (counter spring)	12"
	1 1/2" to 12" w.c.	maroon red-black	121-42-021-00 (main spring) 121-10-021-50 (counter spring)	
	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 1/2 psi to 2 psi	red blue green orange 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	

## Temperature Limits

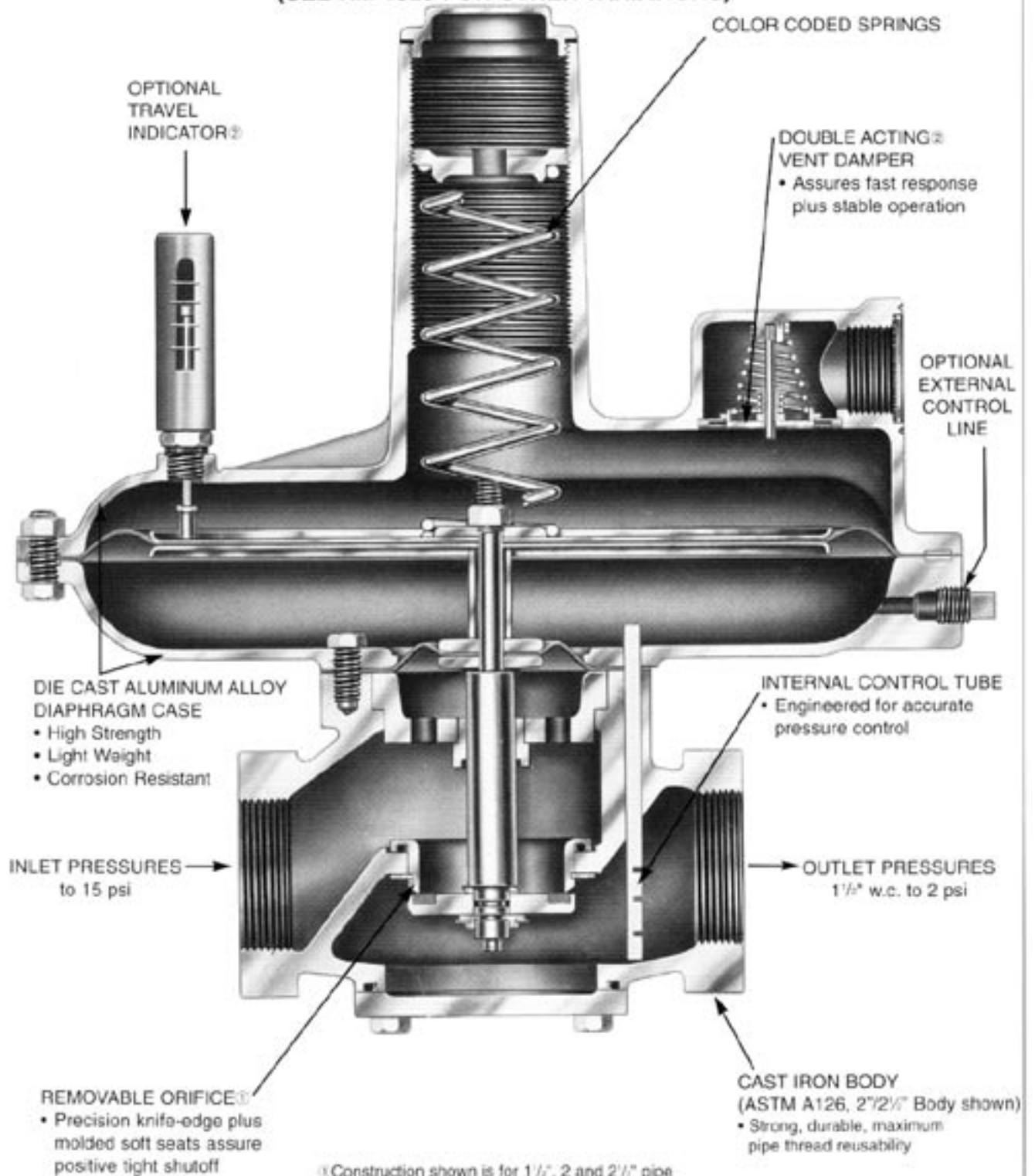
Model 122 regulators can be used for temperatures from -20°F to +150°F.

## Buried Service

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

**Periodic Inspection:** Regulators are pressure control devices with numerous moving parts subject to wear that is dependent upon particular operating conditions. To assure continuous satisfactory operation, a periodic inspection schedule must be adhered to with the frequency of inspection determined by the severity of service and applicable laws and regulations. **See bulletin RM-1329 for complete field service instructions and warranty obligation.**

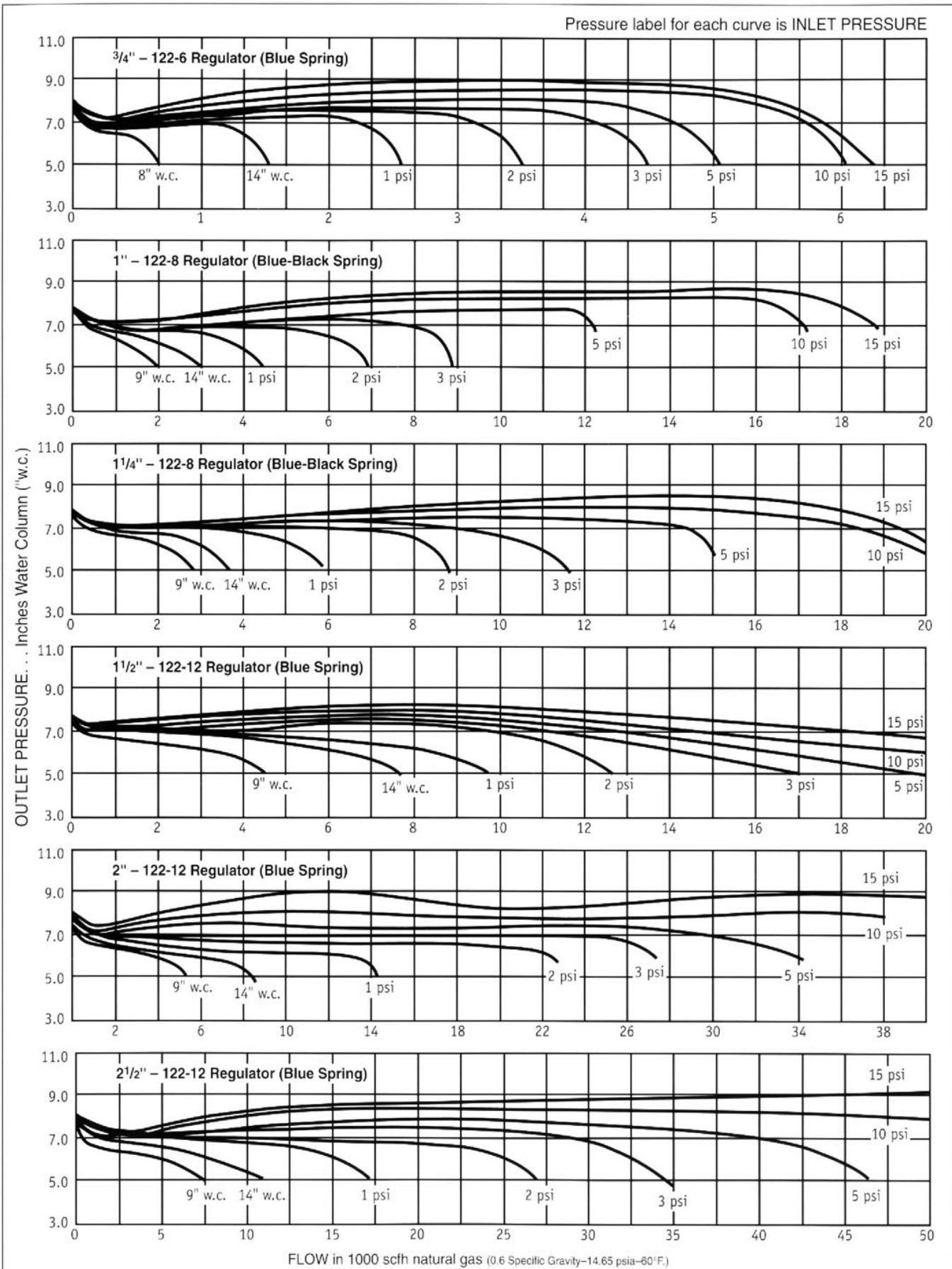
## 122-12 STANDARD REGULATOR WITH INTERNAL CONTROL (SEE RM-1329 FOR OTHER VARIATIONS)



<sup>Ⓢ</sup> Construction shown is for 1 1/2", 2 and 2 1/2" pipe sizes. Orifice in 1/2", 1" and 1 1/2" pipe sizes is screwed-in.

<sup>Ⓢ</sup> Applies to 1", 1 1/2", 1 3/4", 2" and 2 1/2" pipe sizes.

# Typical Performance Curves



# Model 122 Capacity Tables



## Capacity in scfh of natural gas (0.6 Specific Gravity-14.65 psia-60°F)

INLET PRESSURE	OUTLET PRESSURE						Regulator Size and 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	
	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/WHITE SPRING 1/4" psi DROOP	
8" w.c.	950	600	-	-	-	-	3/4" Model 122-6
14" w.c.	1550	1450	1250	-	-	-	
1 psi	2600	2500	1250	1550	-	-	
2 psi	3550	3400	3300	2500	2800	-	
3 psi	4500	4350	3700	3050	3200	2500	
5 psi	4950	4950	5200	4850	4950	4650	
10 psi	5600	5900	6200	5900	6000	5600	
15 psi	5600	5900	6800	7150	7150	6800	
INLET PRESSURE	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	Regulator Size and Model
	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	
	8" w.c.	1550	1000	-	-	-	
14" w.c.	2500	2300	2000	-	-	-	
1 psi	4200	4000	3600	2500	-	-	
2 psi	5700	5500	5300	4000	4500	-	
3 psi	7300	7000	6000	4900	5200	4000	
5 psi	8000	8000	8400	7800	8000	7500	
10 psi	9000	9500	10000	9500	9700	9000	
15 psi	9000	9500	11000	11500	11500	11000	
8" w.c.	2000	1500	-	-	-	-	1 1/4" Model 122-8
14" w.c.	3500	3000	2200	-	-	-	
1 psi	5000	4800	4000	3600	-	-	
2 psi	7300	7000	6400	5700	6000	-	
3 psi	9000	8700	8000	6900	7200	6300	
5 psi	10000	9800	9500	8800	9100	8100	
10 psi	15000	15700	15200	14500	14900	13800	
15 psi	15000	15700	15800	15000	15000	14000	
INLET PRESSURE	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	Regulator Size and Model
	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 1/4" psi DROOP	
	8" w.c.	4000	3000	-	-	-	
14" w.c.	4900	4500	3700	-	-	-	
1 psi	6600	6500	6000	5750	-	-	
2 psi	10500	10000	9800	9000	9500	-	
3 psi	12000	12000	11100	10000	10500	8900	
5 psi	14500	14500	13900	12000	12700	10000	
10 psi	16000	16000	15000	13500	14000	12700	
15 psi	18000	18000	19000	19000	20000	18000	
8" w.c.	5000	4000	-	-	-	-	2" Model 122-12
14" w.c.	8800	8000	6600	-	-	-	
1 psi	12200	12000	11500	10700	-	-	
2 psi	18200	18000	17300	16500	16900	-	
3 psi	25000	25000	24000	22300	23000	18000	
5 psi	32000	32000	30000	28100	29000	27400	
10 psi	38000	38000	35000	32200	33000	30000	
15 psi	38000	38000	40000	39000	40000	36000	
8" w.c.	5500	4500	-	-	-	-	2 1/2" Model 122-12
14" w.c.	9600	9000	7300	-	-	-	
1 psi	13600	13400	12100	11300	-	-	
2 psi	20700	20000	19200	18200	18800	-	
3 psi	27000	27000	26500	24900	25400	20000	
5 psi	35000	35000	32000	30200	31000	29000	
10 psi	42000	42000	39000	36000	37000	33000	
15 psi	48000	48000	48000	42000	45000	39900	

**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.

# General Information

## Maximum Emergency Pressures

The maximum inlet pressure a Model 122 regulator may be subjected to under abnormal conditions without causing internal damage is 20 psi.

The maximum pressure the diaphragm may be subjected to under abnormal conditions without causing internal damage is set-point plus 2 psi. Set-point is defined as the outlet pressure a regulator is adjusted to deliver.

If either of the above

limits is exceeded the regulator must be taken out of service and inspected. Damaged or otherwise unsatisfactory parts must be repaired or replaced before returning the regulator to service.

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

a Model 122 regulator is 5 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 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, Invensys Metering Systems RDS-1498, or other applicable

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

## Materials of Construction

Body ..... Cast Iron  
 Diaphragm Case ..... Die Cast Aluminum Alloy  
 Stem Bushing and Plate ..... Plated Steel  
 Main and Seal Diaphragms ..... Buna-N with (Viton Not Available) Nylon Fabric Insert  
 Orifice ..... Cast Iron (1½" and 2½" Model 122)  
 Orifice ..... Brass (¾", 1" and 1¼" Model 122)  
 Valve ..... Plated Steel with Molded Buna-N Soft Seat

Stem ..... Plated Steel  
 Diaphragm Pans, Collars and Washers ..... Plated Steel  
 O-Rings and Tetra Seals ..... Buna-N  
 Adjustment Spring Button ..... Zinc Die Casting (1" and 2½" Model 122)  
 Adjustment Spring Button ..... Thermo-Set-Plastic (¾" Model 122)  
 Seal Cap ..... Zinc Die Casting (1" through 2½") Thermo-Plastic (¾" Model 122)

## Full Open Capacity

Capacity of the Model 122 in the wide-open position can be calculated using the following formula and K factors:

1. Formula... $Q = K \sqrt{P_o (P_i - P_o)}$

Q = Full open capacity in SCFH of 0.6 specific gravity natural gas.

P<sub>i</sub> = **Absolute** inlet pressure (psia).

P<sub>o</sub> = **Absolute** outlet pressure (psia).

2. K Factors =

¾" Model 122-6 ..... K = 1000

1" Model 122-8 ..... K = 1400  
 1¼" Model 122-8 ..... K = 1750  
 1½" Model 122-12 ..... K = 2750  
 2" Model 122-12 ..... K = 4750  
 2½" Model 122-12 ..... K = 5250

Remember, at the above full open capacities the droop is significantly greater than specified in the capacity tables.

When checking 122 regulator capacity to provide adequate relief valve capacity, use the full open capacity - do not use 122 capacity from the tables.

## Other Gases

Standard Model 122 Regulators are most widely used on natural gas. However, they perform equally well on LP gas, nitrogen, dry CO<sub>2</sub> and air.

For capacities, multiply the table values on page 5 by the following correction factors.

OTHER GASES	CORRECTION FACTOR
Air (Specific Gravity 1.0)	0.77
Propane (Specific Gravity 1.53)	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: $\text{CORRECTION FACTOR} = \sqrt{\frac{0.6}{\text{Specific Gravity of the Gas}}}$	

For use with gases not listed above, please contact your Invensys Metering Systems representative or Industrial Distributor for recommendations

**Caution:** It is the user's responsibility to assure that all residential service regulator vents and/or vent lines exhaust to a non-hazardous location away from any **potential sources** of ignition. Refer to **Invensys Metering Systems Bulletin RM-1329 for more detailed information.**

## 122 Variations

The following variations of the Model 122 are also available:

### Atmospheric Regulator / Zero Governor

All pipe sizes,  $\frac{3}{4}$ " through  $2\frac{1}{2}$ ".

Set-point pressures...

$-1\frac{1}{4}$ " w.c. to  $+1\frac{1}{2}$ " w.c. . . . . . ( $\frac{3}{4}$ " Model 122-6).  
 $-1$ " w.c. to  $+1\frac{1}{2}$ " w.c. . . . . . (1" through  $2\frac{1}{2}$ " Model 122).

### Differential Regulator

All pipe sizes,  $\frac{3}{4}$ " through  $2\frac{1}{2}$ ".

Set points to a maximum differential of 1 psi.

### Back Pressure Regulator / Relief Valve

All pipe sizes,  $\frac{3}{4}$ " through  $2\frac{1}{2}$ ".

Set-point pressures...

$1\frac{1}{2}$ " w.c. to 2 psi . . . . . ( $\frac{3}{4}$ " Model 122-6).  
 3" w.c. to 2 psi . . . . . (1" and  $1\frac{1}{4}$ " Model 122-8).  
 3" w.c. to  $1\frac{3}{4}$  psi . . . . . (1" and  $2\frac{1}{2}$ " Model 122-12).

For more complete information refer to RM 1329. For other variations or special applications, please contact your Invensys Metering Systems Representative or Industrial Distributor.

## Larger Sizes

The 122 is manufactured in  $\frac{3}{4}$ " through  $2\frac{1}{2}$ " pipe sizes only. For larger sizes see the 3" and 4" Model 121...Bulletins R-1328 or RM-1328.

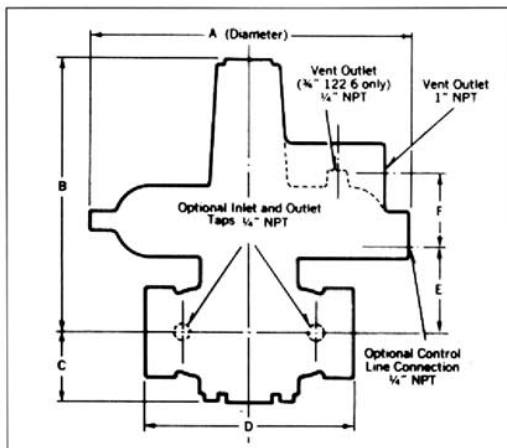
## Metrication

Use the following for metric conversions:

std. metres <sup>3</sup> /hr. x 35.31 = std. ft. <sup>3</sup> /hr. (SCFH) std. ft. <sup>3</sup> /hr. (SCFH) x 0.0283 = std. metres <sup>3</sup> /hr.
kilograms/centimeter <sup>2</sup> (kg/cm <sup>2</sup> ) x 14.22 = psig psig x 0.0703 = kilograms/centimeter <sup>2</sup> (kg/cm <sup>2</sup> )
kilopascals (kPa) x 0.145 = psig psig x 6.90 = kilopascals (kPa)

bars x 14.50 = psig psig x .069 = bars
millimeters water (mm H <sub>2</sub> O) x .0394 = in. w.c. in. w.c. x 25.4 = millimeters water (mm H <sub>2</sub> O)
millimeters mercury (mm Hg) x 0.535 = in. w.c. in. w.c. x 1.868 = millimeters mercury (mm Hg)

## Dimensions

	A	B	C	D	E	F	SHPG. WT.
$\frac{3}{4}$ " NPT	7 $\frac{3}{8}$ "	7 $\frac{7}{8}$ "	1 $\frac{7}{8}$ "	5 $\frac{3}{4}$ "	2 $\frac{5}{8}$ "	—	10 lbs.
1" NPT	10 $\frac{1}{4}$ "	11 $\frac{5}{8}$ "	1 $\frac{7}{8}$ "	5 $\frac{3}{4}$ "	2 $\frac{1}{2}$ "	3 $\frac{7}{16}$ "	15 lbs.
1 $\frac{1}{4}$ " NPT	10 $\frac{1}{4}$ "	11 $\frac{5}{8}$ "	1 $\frac{7}{8}$ "	5 $\frac{3}{4}$ "	2 $\frac{1}{2}$ "	3 $\frac{7}{16}$ "	15 lbs.
1 $\frac{1}{2}$ " NPT	14"	13"	2 $\frac{3}{8}$ "	7 $\frac{1}{2}$ "	3 $\frac{15}{16}$ "	3 $\frac{9}{16}$ "	28 lbs.
2" NPT	14"	13"	2 $\frac{3}{8}$ "	7 $\frac{1}{2}$ "	3 $\frac{15}{16}$ "	3 $\frac{9}{16}$ "	28 lbs.
2 $\frac{1}{2}$ " NPT	14"	13"	2 $\frac{3}{8}$ "	8 $\frac{1}{4}$ "	3 $\frac{15}{16}$ "	3 $\frac{9}{16}$ "	30 lbs.

## How to Order

Specify:

1. Model Number.
2. Pipe size.
3. Inlet Pressure.

4. Outlet Pressure.
5. Capacity required... SCFH.

6. Kind of gas...(natural gas, propane, air, etc.)

**Caution:** Turn gas on very 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.

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Representatives in all principal cities.  
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