

Model 143-6

Residential Service Regulators



**Model 143-6 Service Regulators
equal outstanding performance,
utility, and dependability with value.**



Best Buy, By Far — The 143-6 Service Regulator

The 143-6 Regulator is designed and built for residential gas service, as well as for commercial and industrial applications; burners, furnaces, ovens, heaters, gas engines, etc. It can also be used for air, LPG, nitrogen, dry CO₂, and other gases.

Simple, rugged construction means dependability. Yet it provides precise pressure control over an amazing range of pres-

sure and load conditions.

It is simple to install and adjust. The two bolt flanged connection makes it easy to install the regulator in the best position, and servicing is easy and convenient.

Common valve body, orifice, and valve system stem allow for easy conversion and limit parts inventory.

Basic Models	Basic 143-6 Models	Description
	143-6-91 143-6-92 143-6-181 143-6-182 143-6-91HP 143-6-92HP 143-6-181HP 143-6-182HP	Standard Regulator with 90° Angle Body Regulator with Internal Relief Valve (IRV) and 90° Angle Body Standard Regulator with Straight Body Regulator with Internal Relief Valve (IRV) and Straight Body Standard High Pressure Regulator with 90° Angle Body High Pressure Regulator with IRV and 90° Angle Body Standard High Pressure Regulator with Straight Body High Pressure Regulator with IRV with Straight Body

Spring Ranges	Outlet Pressure Range	143-6 Regulator	
		Spring Color	Spring Part Number
	3½" w.c. to 6½" w.c. 5" w.c. to 8½" w.c. 6" w.c. to 14" w.c. 12" w.c. to 28" w.c. ½ psig to 2 psig ½ psig to 3 psig 2 psig to 6 psig	Red Blue Green Orange Black/White Cadmium* Black*	143-62-021-15 143-62-021-16 143-62-021-17 143-62-021-18 143-62-021-22 173-62-021-02 139-16-021-01

*For use with high pressure 143-6 models only.

Maximum Inlet Pressures— Standard IRV Models and High-Pressure Models	Regulator Model	Orifice Size						
		5/8"	1/2"	3/8"	5/16"	1/4"	3/16"	1/8"
	143-6 Model	10 psig	20 psig	40 psig	40 psig	60 psig	125 psig	125 psig

Pipe Sizes	Inlet x Outlet NPT	
	3/4" x 3/4"	1" x 1"
	3/4" x 1"	*1" x 1¼"
	*3/4" x 1¼"	*1¼" x 1¼"

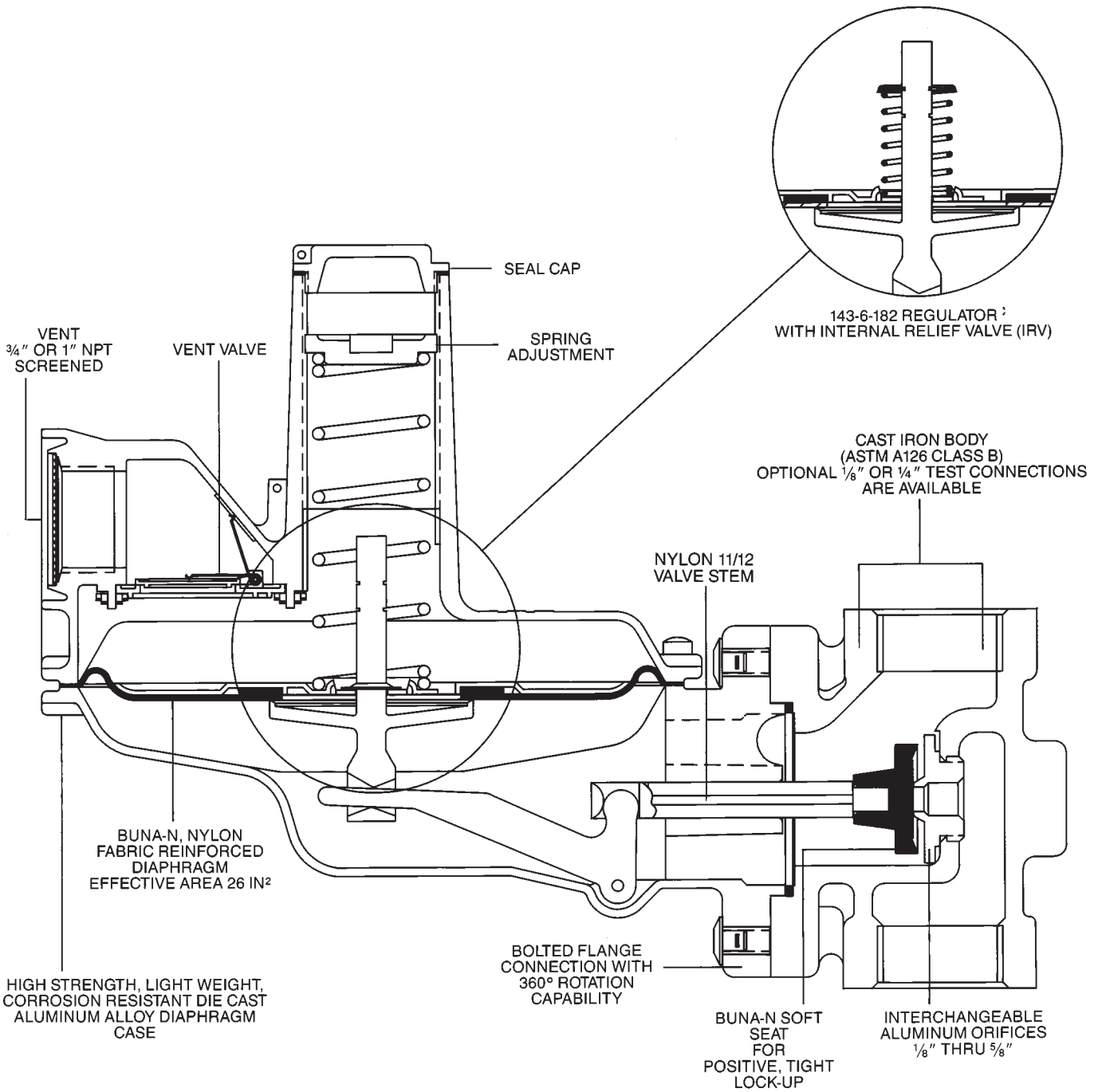
*Not available in 90° Angle Body.

Temperature Limits

The 143-6 Residential Service Regulators can be used for flowing gas temperatures from -20°F to 150°F.

Buried Service

The 143-6 Residential Service Regulator is **not** recommended for buried service.



143-6-181 STANDARD REGULATOR*

*90° Angle Body Configurations Also Available

Low Pressure Cut-Off



This is the low pressure cut-off version of the 143-6 residential service regulator.

It is a safety device which stops the inlet gas supply if the outlet pressure drops below a certain point.

Hazardous conditions sometimes develop as a result of a loss in service pressure. A good example of this would be flame or pilot outage resulting from a line break, an interruption in the gas supply, or an excessive demand. The low pressure "cut-off" acts as a safety device for the gas service.

The cut-off unit consists of an extra valve which seats against the inlet side of the orifice. As the main valve moves away from its seat to increase flow, in response to a decreasing outlet pressure signal, the cut-off valve moves toward its seat. If the main valve movement becomes excessive, the cut-off valve will take over and go closed. At this point the gas supply is shut off and cannot be resumed until the cut-off unit is manually reset.

Basic LPCO Models

143-6-184	Standard Regulator with LPCO
143-6-186	Regulator with IRV & LPCO

Pipe Sizes

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

Basically, "cut-off" is triggered by an excessive drop in outlet pressure. However, the specific outlet pressure at which "cut-off" occurs also depends on the size of the orifice and the inlet pressure.

As mentioned previously, once the cut-off valve closes, it must be manually opened to put the regulator back into operation. It must also be manually opened when put into service initially or when returned to service after being shut down. This is easily done by removing the cover cap and pulling upwards on the diaphragm post extension.

Installation is simple and quick. It is the same as for other standard types of self-contained residential service regulators.

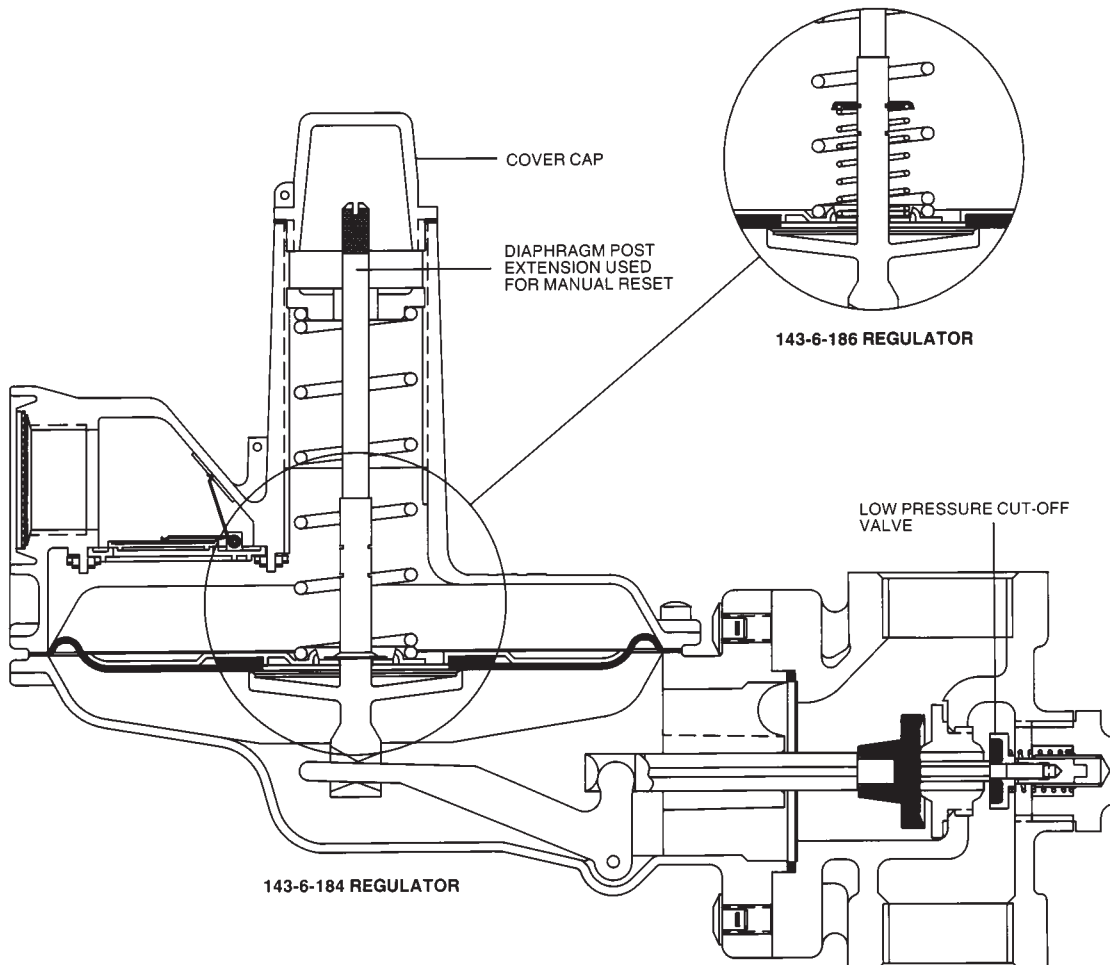
Adjustment for the outlet pressure set point is accomplished by removing the cover cap and screwing the adjustment ferrule down or up to raise or lower pressure.

Maximum Inlet Pressure – Low Pressure Cut-Off

ORIFICE SIZE	$\frac{1}{4}''$	$\frac{5}{16}''$	$\frac{3}{8}''$	$\frac{7}{16}''$
Maximum Inlet Pressure	60 psig	40 psig	25 psig	15 psig

Spring Ranges – Low Pressure Cut-Off Models

Outlet Pressure Ranges	Spring Color
4 $\frac{1}{2}''$ to 7 $\frac{1}{2}''$ w.c.	Red
6 $\frac{1}{2}''$ x 9 $\frac{1}{2}''$ w.c.	Blue
7 $\frac{1}{2}''$ x 15" w.c.	Green



Capacity Tables



Models 143-6-91, -92, -181, -182, -91HP, -92HP, -181HP, and -182HP CAPACITY* In SCFH natural gas (0.6 specific gravity — 14.65 psia — 60°F.)

Pipe Size (Inches)	Inlet Pressure (psig)	ORIFICE SIZE (Inches)						
		1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"
3/4" x 3/4"	1/2	—	—	—	—	340	450	510
	1	—	—	—	480	500	510	530
	2	—	—	530	560	570	580	600
	3	—	420	600	620	630	650	670
	5	250	560	700	720	730	770	790
	7 1/2	310	700	840	860	880	900	900
	10	370	830	950	970	1000	1020	1020
	20	530	1200	1220	1240	1250	1270	—
	40	860	1570	1330	1340	1450	—	—
	60	1200	1660	1520	—	—	—	—
	80	1500	1710	—	—	—	—	—
	125	1800	1900	—	—	—	—	—
3/4" x 1" 1" x 1"	1/2	—	—	—	—	350	460	520
	1	—	—	—	480	550	600	650
	2	—	—	530	700	840	880	780
	3	—	420	650	870	1000	920	810
	5	250	560	890	1120	1160	950	970
	7 1/2	310	700	1140	1340	1270	1140	1060
	10	370	840	1360	1500	1330	1200	1180
	20	530	1230	2000	1600	1480	1400	—
	40	860	1700	2000	1640	1900	—	—
	60	1200	1900	2000	—	—	—	—
	80	1540	2000	—	—	—	—	—
	125	2100	2100	—	—	—	—	—
3/4" x 1 1/4" 1" x 1 1/4" 1 1/4" x 1 1/4"	1/2	—	—	—	—	350	460	520
	1	—	—	—	480	550	680	760
	2	—	—	530	700	840	1020	1030
	3	—	420	650	870	1030	1200	1050
	5	250	560	890	1180	1350	1490	1050
	7 1/2	310	700	1140	1500	1610	1560	1060
	10	370	840	1360	1700	1710	1800	1180
	20	530	1230	1600	1800	1900	1900	—
	40	860	1800	2200	1900	2000	—	—
	60	1200	2100	2400	—	—	—	—
	80	1550	2200	—	—	—	—	—
	125	2250	2400	—	—	—	—	—

*Capacities are based on the following maximum variations in outlet pressure:
 RED and BLUE SPRINGS:.....1" w.c. droop
 GREEN SPRING:.....2" w.c. droop
 ORANGE SPRING:.....3" w.c. droop
 BLACK/WHITE and CADIUM SPRINGS:.....1/4 psig droop
 BLACK SPRING:.....10% droop
 Capacities for 1/2, 1, and 2 psig Pressures apply only to RED and BLUE Springs. Note carefully these capacities do not apply to the green, orange, and black springs.
 NOTE: Last figure in each column is the maximum capacity or each orifice at recommended inlet pressure within the optimum performance range.

Models 143-6-184 and 186 — Low Pressure Cut-Off CAPACITY* In SCFH natural gas (0.6 specific gravity — 14.65 psia — 60°F.)

Pipe Size (inches)	Inlet Pressure (psig)	OUTLET PRESSURES Red Spring* 4 1/2" to 7 1/2" w.c. Blue Spring* 6 1/2" to 9 1/2" w.c.				OUTLET PRESSURES Green Spring* 7 1/2" to 15" w.c.			
		Orifice Size (inches)				Orifice Size (inches)			
		7/16"	3/8"	5/16"	1/4"	7/16"	3/8"	5/16"	1/4"
3/4" x 3/4"	1/2	240	180	90	—	140	120	90	—
	1	400	300	200	100	250	200	160	90
	2	580	420	300	140	370	320	240	140
	5	800	750	500	230	580	530	460	220
	10	1050	990	740	380	780	720	700	370
	15	1140	1050	950	460	920	850	800	480
	25	—	1100	1100	640	—	900	1000	660
	40	—	—	1300	870	—	—	1300	910
60	—	—	—	1160	—	—	—	1160	
3/4" x 1" 1" x 1"	1/2	270	210	90	—	160	120	90	—
	1	430	310	210	100	260	230	160	90
	2	650	420	399	140	410	350	270	140
	5	1100	750	510	230	800	730	470	220
	10	1300	1120	760	380	1220	1090	740	370
	15	1300	1300	960	460	1300	1300	930	480
	25	—	1300	1300	640	—	1300	1160	660
	40	—	—	1300	870	—	—	1300	910
60	—	—	—	1160	—	—	—	1160	
1 1/4" x 1 1/4"	1/2	270	210	90	—	160	120	90	—
	1	430	310	210	100	260	230	160	90
	2	650	420	300	140	430	350	270	140
	5	1100	750	510	230	870	730	470	220
	10	1300	1120	760	380	1300	1090	740	370
	15	1300	1300	960	460	1300	1300	930	480
	25	—	1300	1300	640	—	1300	1160	660
	40	—	—	1300	870	—	—	1300	910
60	—	—	—	1160	—	—	—	1160	

NOTE: Last figure in each column is the maximum capacity for each orifice at recommended inlet pressure within the optimum performance range. *RED Spring is Part No. 143-62-021-15 BLUE Spring is Part No. 143-62-021-16 GREEN Spring is Part No. 143-62-021-17

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.

The **Internal Relief Valve** begins to open when outlet pressure exceeds regulator set-point by approximately 7" w.c. (standard) or 9" w.c. (optional) for 143-6 models. At lower pressures, it is closed.

Internal Relief Valves, like all relief valves, must be carefully checked for adequate capacity. IRV's only have full capacity relief capability when the inlet pressure to the regulator is low enough and the regulator orifice is small enough. If either one, or both, are too large, the IRV will not have full capacity relief capability and will not be able to prevent the outlet pressure from exceeding the maximum allowable limit.

The curves below are for checking this condition. They are based on the regulator blocked open to simulate a failure in

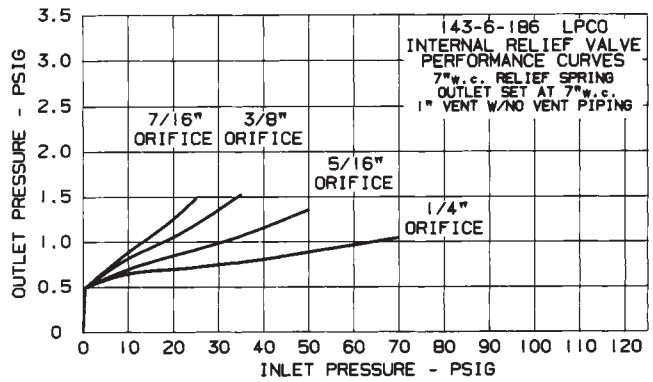
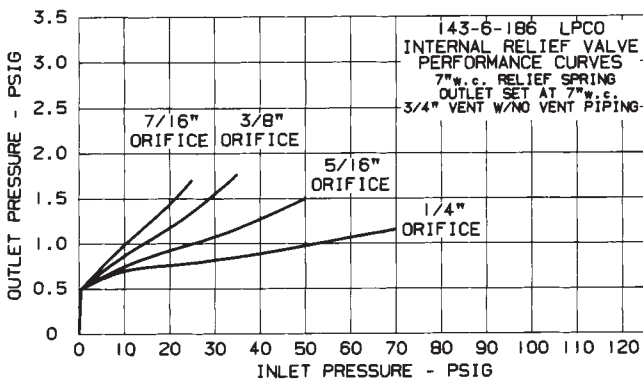
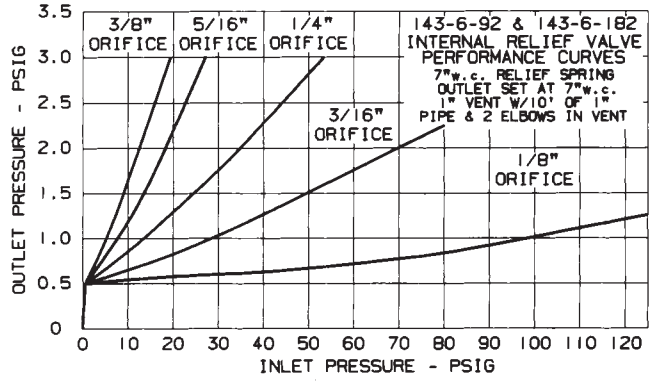
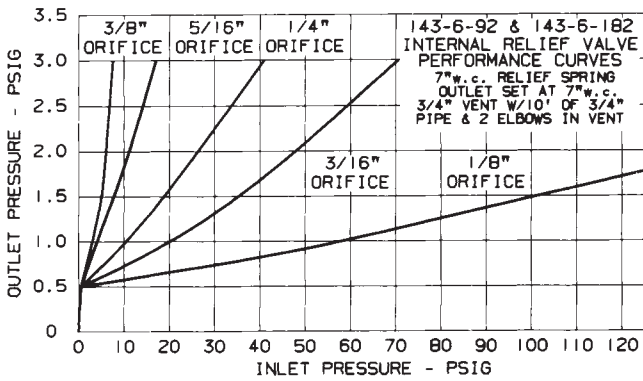
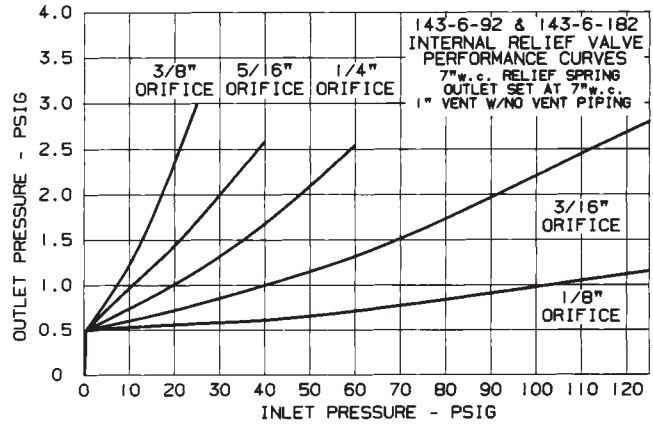
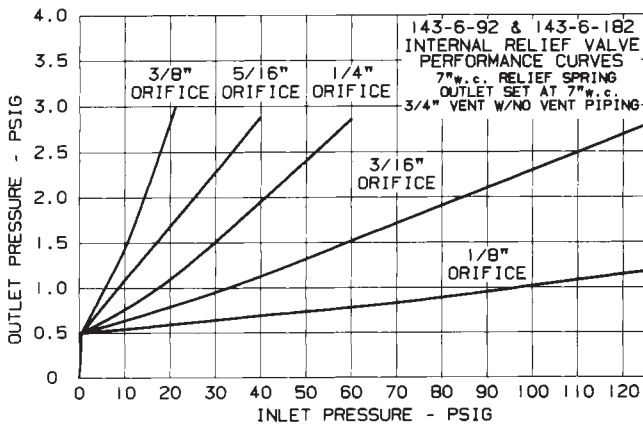
which the valve goes wide open.

Find the maximum inlet pressure on the horizontal scale. Trace it vertically upwards to the curve for the size orifice used. Trace that point horizontally leftward to the vertical scale and read the outlet pressure. If it is below the maximum allowable outlet pressure for the application, the IRV has full capacity relief capability for a wide open regulator failure.

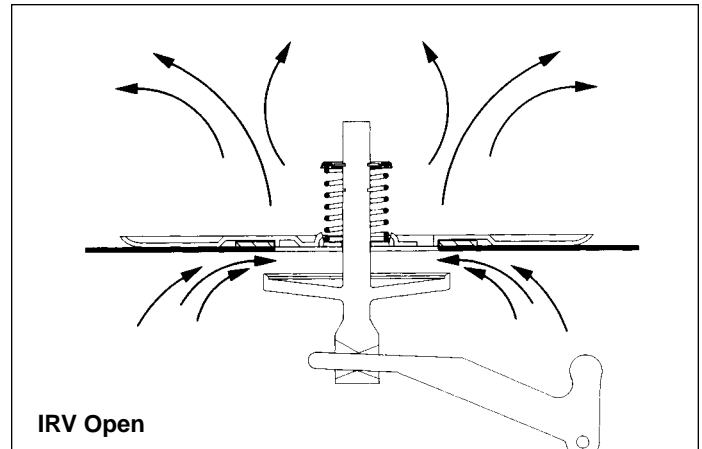
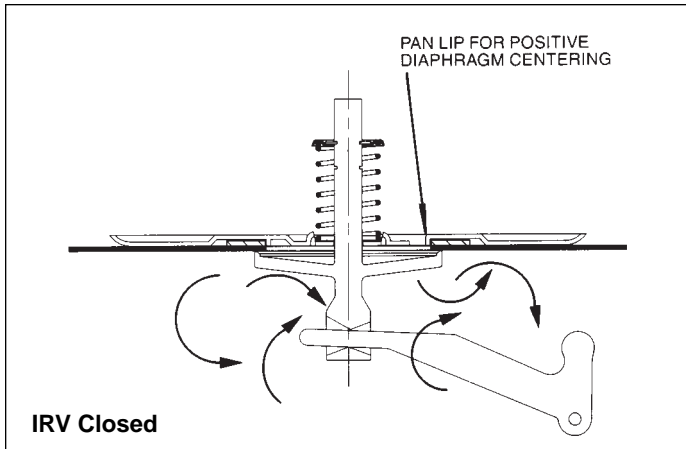
Note that some curves are based on no vent piping and others on 10 ft. of vent piping plus two elbows. If additional vent piping is used it must be carefully sized to avoid restricting the capacity of the IRV.

For conditions other than those covered by the curves contact your Equimeter representative.

Model 143-6 IRV Performance Curves 143-6-92 and 182 Versions



Operation of the Internal Relief Valve



Maximum Emergency Pressures

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

Basic 143-6 Models

143-6-91	143-6-91HP	} Maximum Inlet Pressure +50 psig
143-6-92	143-6-92HP	
143-6-181	143-6-181HP	
143-6-182	143-6-182HP	

Low Pressure Cut-Off Models

143-6-184	} Maximum Inlet Pressure +10 psig
143-6-186	

The maximum outlet pressure to which the 143-6 regulator's diaphragm case can be subjected under abnormal conditions without causing damage to the regulator internals is set-point +3 psig. If the outlet pressure exceeds this pressure, the regulator must be removed from service and carefully inspected. Damaged or otherwise unsatisfactory parts must be replaced before returning the regulator to service.

The maximum outlet pressure that can be safely contained in the 143-6 regulator's diaphragm case is 10 psig. Safely contained means "no leakage and no bursting."

The preceding pressure ratings apply to all of the models listed in the table on page 2.

Overpressurization Protection

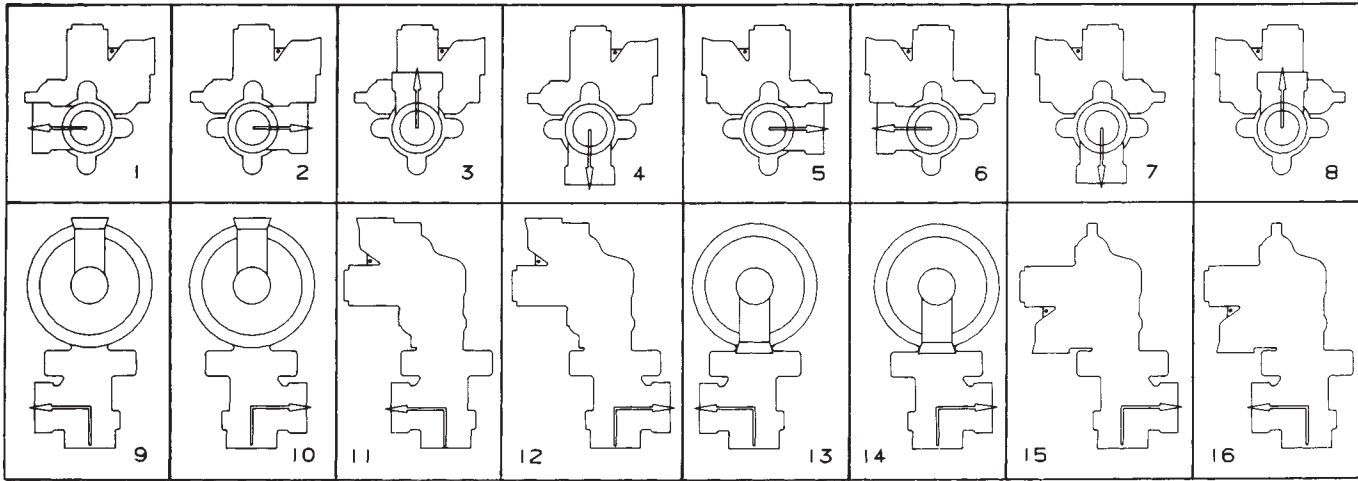
Protect the downstream piping system and the regulator's low pressure chambers against overpressurization due to the possible regulator malfunction or failure to achieve complete lock-up. The allowable outlet pressure is the lowest of the maximum

pressures permitted by federal codes, state codes, Equimeter Bulletin RDS-1498, or other applicable standards. The method of protection can be a relief valve, monitor regulator, shut off device, or similar mechanism.

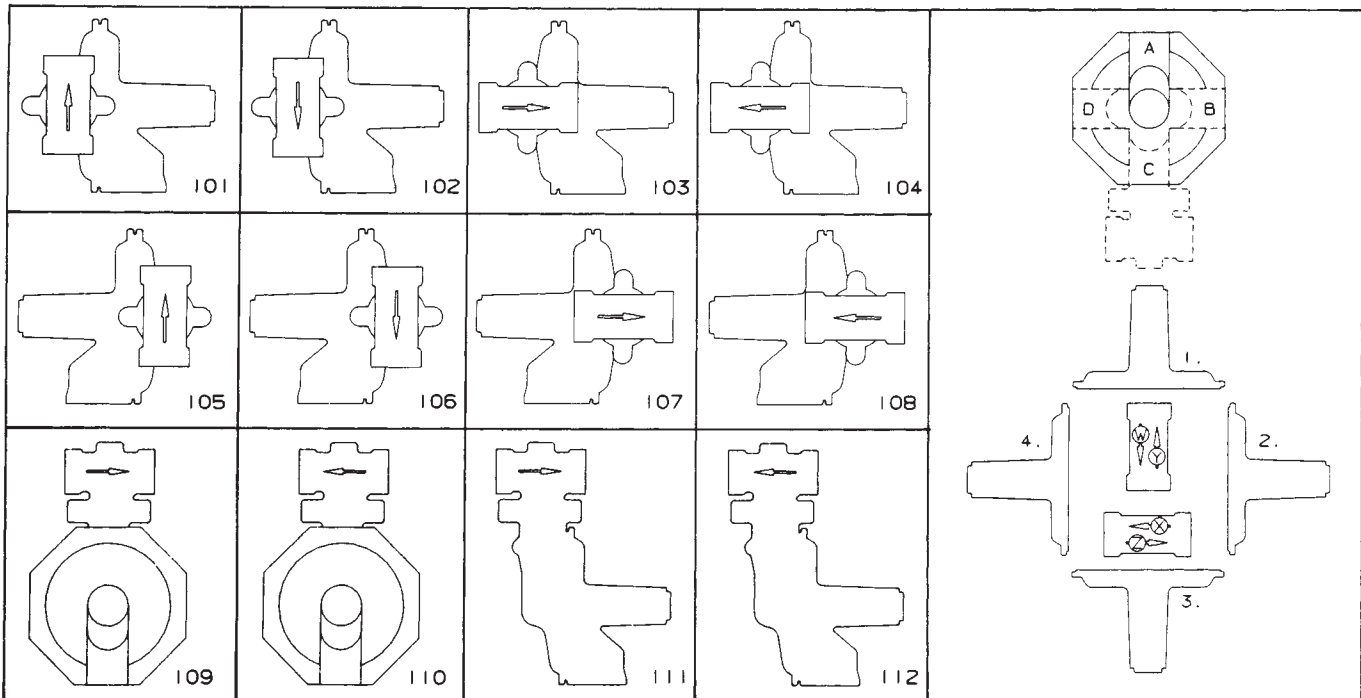
Periodic Inspection: Regulators are pressure control devices with numerous moving parts subject to wear that is dependent upon particular operating conditions. To assure continuous satisfactory operation, a periodic inspection schedule must be adhered to with the frequency of inspection determined by the severity of service and applicable laws and regulations. **See Bulletin RM-1303 for field service instructions.**



Angle Body Configurations



Straight Body Configurations



NOTE: If desired position is not shown, use these diagrams to specify vent, diaphragm case, and body arrangements.

Example: Position 105 would be D-4-Y.

CAUTION

The diaphragm case vent must be positioned to protect against flooding, drain water, ice formation, traffic, tampering, etc. The vent must be protected against nest building, animals, bees, insects, etc. to prevent vent blockage and minimize the chances of foreign material from collecting in the vent side of the regulator diaphragm.

Standard Construction:

The following items will be considered standard construction for the 143-6 regulator (options are available at additional charge):

1. Body—no pressure taps
2. Orifice—aluminum
3. Valve & stem assembly—Nylon 11/12 stem w/Buna-N valve pad
4. Seal wire—none
5. Vent—1" side vent
6. Cover cap—plastic
7. Spring ferrule—plastic
8. External nuts and bolts—plated steel
9. Identification—stamped on diaphragm cover (no badge)
10. Paint—AGA gray
11. Packaging—six per carton
12. Position—105 for straight thru body configuration
13. Position—14 for 90° angle body configuration

Standard Testing:

The following will be considered standard testing for the 143-6 regulator (optional testing at additional charge):

1. Set point adjustment at customer specified:
 - A. Inlet pressure
 - B. Outlet pressure (set point)
 - C. Minimum and maximum rate flow within 50 to 350 SCFH
2. Lock-up test (will not exceed 1.5" w.c. above set point)
3. Leak test
4. Internal relief valve test
 - A. Initial relief at 7" w.c. (standard) or 9" w.c. (optional) ±2" above set point for the 143-6 models
 - B. Reset at 20% below initial relief pressure

Full Open Capacity

Use the following formula for the full open capacity for 143-6 regulators:

$$1. Q = K \sqrt{P_0 (P_1 - P_0)} \dots \dots \dots \text{(for } \frac{P_1}{P_0} \text{ less than 1.894)}$$

$$2. Q = \frac{KP_1}{2} \dots \dots \dots \text{(for } \frac{P_1}{P_0} \text{ greater than 1.894)}$$

Q = maximum capacity of the regulator (in SCFH of 0.6 specific gravity natural gas).

K = the "K" factor, the regulator constant (from the table below).

P₁ = **absolute** inlet pressure (psia).

P₀ = **absolute** outlet pressure (psia).

Orifice	5/8"	1/2"	3/8"	5/16"	1/4"	3/16"	1/8"
K	820	520	292	206	132	74	33

When sizing relief valves for use with 143-6 regulators use **full open capacity** (except for LPCO models).

Other Gases

143-6 regulators are mainly used on natural gas. However, they perform equally well on LP gas, nitrogen, dry CO₂, air and others.

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: CORRECTION FACTOR =	$\sqrt{\frac{0.6}{\text{Specific Gravity of the Gas}}}$

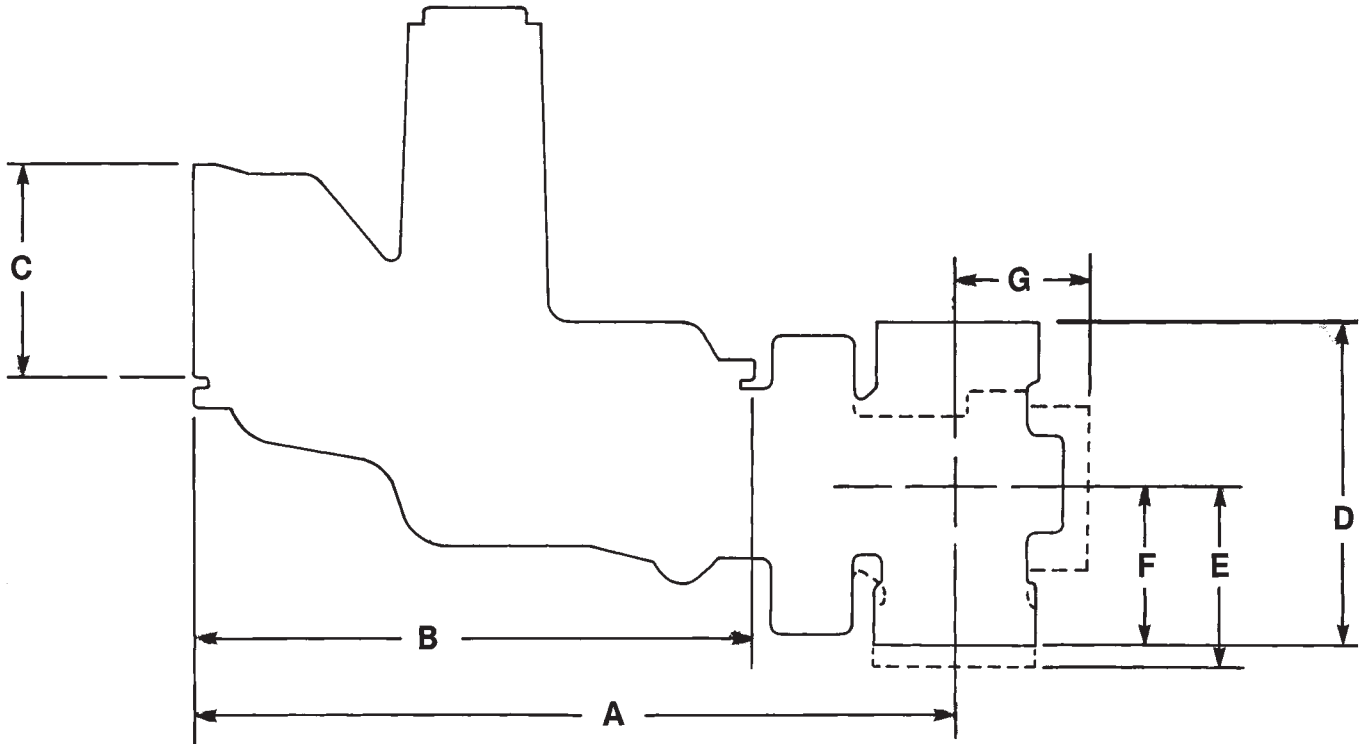
For other gases, such as ammonia, sewage gas, sludge gas, manufactured gas, etc., special materials may be available. Please contact your Equimeter representative or Industrial Distributor for recommendations.

How to Order

Specify:

1. Pipe size and model number
2. Mounting position
3. Orifice Size
4. Inlet pressure (also maximum and minimum if available)
5. Outlet pressure set-point
6. Capacity required (scfh)
7. Type of gas (natural gas, propane, etc.)
8. Spring part number
9. Vent size

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. Common vent lines are not recommended. Refer to Equimeter Bulletin RM-1303 for more detailed information.



Regulator	A	B	C	D	E	F	G
143-6 Models	9 ³ / ₈ "	6 ⁷ / ₈ "	1 ⁷ / ₈ "	3 ¹⁵ / ₁₆ "	2 ³ / ₁₆ "	1 ³¹ / ₃₂ "	1 ⁵ / ₈ "

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-1303 for 143-6 models for more detailed start-up procedures.

Other Equimeter Gas Pressure Regulators



Equimeter 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, nitro-

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

Multi-Purpose Service Regulators

Model 043
Bulletin: R-1300
3/8", 1/2", 3/4", 1" pipe size
Inlet pressuresto 125 psi
Outlet pressures5" w.c. to 2 psi
Capacity to 2000 CFH
Available with 90° body.
Also available with internal relief valve.

Model 143-80
Bulletin: R-1301
3/4", 1", 1 1/4" pipe size
Inlet pressuresto 125 psi
Outlet pressures3 1/2" w.c. to 6 psi
Capacity to 2000 CFH
Available with straight-through or 90° body.
Also available: internal relief valve and low pressure cut-off.

Model 143-6
Bulletin: R-1303
3/4", 1", 1 1/4" pipe size
Inlet pressuresto 125 psi
Outlet pressures3 1/2" w.c. to 6 psi
Capacity to 2000 CFH
Available with 90° angle or straight-through body.
Also available: internal relief valve and low pressure cut-off.

Industrial Service Regulators

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, external control line, back pressure regulator, relief valve, vacuum regulator and vacuum breaker.

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.

046
Bulletin: R-1312
3/4", 1" and 1 1/4" pipe size
Inlet pressuresto 1000 psi
Outlet pressures3 to 200 psi
Capacity to 40,000 SCFH
Also available: internal relief monitor, and pressure loaded.

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 lines. Appropriate for fixed factor billing.

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

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

1200
Bulletin: R-1342
Pipe Size: 2" (flanged)
Inlet pressuresto 1200 psi
Outlet pressures20 to 600 psi
Capacity to 789,000 SCFH

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