



Regulator Installation and Maintenance Instructions

143-6 Residential Service Regulator

The 143-6 Residential Service Regulator is an excellent general purpose gas pressure regulator. It can be used for natural gas, air, dry CO₂, propane, butane, nitrogen, and other gases.

This residential service regulator can be used for gas service to homes, commercial establishments and small industrial users for pressure control of gas supplied to burners, unit heaters, boilers and other types of equipment.

The Standard 143-6-181 Residential Service Regulator is shown on page 3. This regulator, equipped with a $\frac{3}{4}$ " or 1" vent, is also available with a 90° angle body — the 143-6-91. Both of these regulators can be supplied with internal relief valves — the 143-6-182 or the 143-6-92. Finally, this regulator is available in a low pressure cut-off version — the 143-6-184 — and a low pressure cut-off version with internal relief valve — the 143-6-186.

Maximum Inlet Pressures—Standard IRV Models and High-Pressure Models

Orifice	$\frac{5}{8}$ "	$\frac{1}{2}$ "	$\frac{3}{8}$ "	$\frac{5}{16}$ "	$\frac{1}{4}$ "	$\frac{3}{16}$ "	$\frac{1}{8}$ "
Pressure	10 psig	20 psig	40 psig	40 psig	60 psig	125 psig	125 psig

Maximum Inlet Pressure – Low Pressure Cut-Off Models

ORIFICE	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{7}{16}$ "
Pressure	60 psig	40 psig	25 psig	15 psig

PIPE SIZES (Inlet x Outlet, NPT)

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

Installation and Start-Up

- Remove the shipping plugs from both the regulator inlet and outlet connections.
- Make certain that the inside of the piping and the regulator inlet and outlet connections are clean — they must be free of dirt, pipe dope and other debris.
- Use pipe joint material only on the male threads of the pipe being connected to the regulator. **Do not** use pipe joint material on the female threads of the regulator.
- Install the regulator in the line. Make certain that the gas flow through the regulator is in the direction as indicated by the arrow on the regulator body.

The regulator may be installed in any position: right side up, upside down, vertical piping, diagonal piping, etc. If required, the diaphragm case may be rotated 360° in 90° increments. Simply remove the two body flange bolts, remove the two plastic hole plugs, and rotate the diaphragm case of the regulator. Before reassembling the body flange coupling, make certain that the tetraseal (6) is properly positioned. Reassemble the body flange coupling, insert the body flange bolts and tighten the body flange bolts to hold the diaphragm case in position and reseal the unit. Reinstall the plastic hole plugs in the two unused flange holes. The body flange bolts should be tightened to a torque of 18 ft-lbs.

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 for foreign material from collecting in the vent side of the regulator diaphragm. If required, the upper diaphragm case may be rotated by removing the diaphragm flange screws (13) and rotating the upper diaphragm case to the desired position. Reinstall the diaphragm flange screws and tighten to hold the upper diaphragm case in position, and reseal.

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.

- Turn the gas on very slowly.
- Make certain that there are no leaks and that all connections are tight.
- To adjust the outlet pressure setting (set point), remove the regulator seal cap (1) and seal cap gasket (2) and turn the spring adjustment button (3). To increase the outlet pressure setting (set point), turn the spring adjustment button (3) clockwise. To decrease the outlet pressure setting (set point), turn the spring adjustment button (3) counterclockwise. This adjustment to the outlet pressure setting (set point) can only be made when gas is flowing through the regulator. After completing the outlet pressure setting (set point) adjustment, be sure to reinstall the seal cap gasket (2) and the seal cap (1).

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. Where vent lines are used, it is the user's responsibility to assure that each residential service regulator is individually vented and that common vent lines ARE NOT used.

- The vent connection is an escape path for flammable gas and it must be located and/or piped so that potential discharge occurs in a safe area away from buildings, open flames, collection areas, arcing devices, etc. Regulators that are installed indoors or in a non-vented area must be vented to the outside. Simply run vent piping from the regulator vent connection to a non-hazardous location on the outside, away from **any potential** sources of ignition. The vent piping must be connection size or larger and piped to a safe area. The vent discharge must be protected against the potentials outlined in #4, #8, and #9. For regulators equipped with internal relief valves (IRV), (models 143-6-92, 143-6-182 and 143-6-186, 143-6-92HP, 143-6-182HP) vent piping must be vent connection size or larger. This will assure that the vent piping will be large enough to be able to vent all of the internal relief valve discharge to atmosphere without excessive back pressure that would result in excessive pressure in the regulator. The outlet of the vent piping must allow for the free and unobstructed passage of air and gas and must be protected against the potentials listed in #4, #8 and #9.



- 9 For outdoor installations, it is recommended that the regulator be installed so that the regulator vent faces downward to avoid the potential for water or other foreign matter entering the regulator and interfering with the proper operation of the regulator.

CAUTION

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.

Servicing

- 1 For access to the valve pad (7) and orifice (12), remove the body flange bolts and the diaphragm assembly from the regulator body.
- 2 To remove the valve stem from the regulator, simply pull. The orifice (12) can be removed by unscrewing it from the body using a 1" hex socket wrench — "thin-wall" type.
- 3 To replace the regulator diaphragm, remove the seal cap (1), remove the spring adjustment button (3), remove the regulator spring (9), remove the diaphragm flange screws (13) and disassemble the diaphragm assembly. Upon reassembly, make certain that all of the parts are reassembled into the correct order and that all screws and joints are tightened evenly and firmly.
- 4 Before reassembling the body flange coupling, make certain that the tetraseal (6) is properly positioned. Make certain that the body flange bolts are tightened to hold the regulator diaphragm case in position and create a seal. The body flange bolts should be tightened to 18 ft-lbs.
- 5 Upon completing the regulator reassembly, make certain that the regulator is free of leaks.

Over Pressurization Protection

Protection must be provided for the downstream piping system and the regulator's low pressure chambers to assure against the potential over-pressurization due to a regulator malfunction or a failure of the regulator to lock-up. The allowable over-pressurization is the lowest of the maximum pressures permitted by federal codes, state codes, Equimeter Bulletin RDS-1498, or other applicable standards. The method of providing over-pressure protection could be a relief valve, a monitor regulator, a shut-off device or any similar device.

Temperature Limits

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

Buried Service

The 143-6 Residential Service Regulators **are not** recommended for buried service.

CONDENSED PARTS LISTS

- Models:** 143-6-91 143-6-181
 143-6-91HP 143-6-181HP
 143-6-92 143-6-182
 143-6-92HP 143-6-182HP

ILL. NO.	DESCRIPTION	PART NUMBER
1	Cover Cap	143-08-005-02
	Cover Cap, Aluminum*	138-02-005-01
2	Seal Cap Gasket	120-08-066-00
3	Adjustment Spring Button, Plastic	143-08-009-00
	Adjustment Spring Button, Brass*	143-62-009-02
4	Vent Valve Assembly	143-62-313-00
5	Pushnut	903979
6	Tetraseal (TS33-133)	902497
7	Valve Pad, Buna-N	143-60-011-00
8	Valve Stem	143-60-016-00
9	Spring (See Spring Table)	
10	Diaphragm Assembly, Std.	143-60-550-01
	Diaphragm Assembly, Std. Low-Temp.	143-60-550-05
	Diaphragm Assembly, High Pressure	143-62-550-12
10a	Diaphragm, High Pressure*, Std.	143-62-150-05
10b	Diaphragm, Pan, High Pressure*, Std.	173-62-017-01
10c	Seal Washer, High Pressure*, Std.	143-62-352-00
11	Diaphragm Assembly, I.R.V. w/7" Relief	143-60-550-00
	Diaphragm Assembly, I.R.V. w/9" Relief	143-60-550-06
	Diaphragm Assembly, I.R.V. w/13" Relief	143-60-550-10
	Diaphragm Assembly, I.R.V. High Pressure	143-62-550-14
	Diaphragm Assembly, I.R.V. Low-Temp. w/7" Relief	143-60-550-08
	Diaphragm Assembly, I.R.V. Low-Temp. w/9" Relief	143-60-550-09
12	Orifice, 1/8" Aluminum	143-62-023-37
	Orifice, 3/16" Aluminum	143-62-023-40
	Orifice, 1/4" Aluminum	143-62-023-42
	Orifice, 5/16" Aluminum	143-62-023-43
	Orifice, 3/8" Aluminum	143-62-023-44
	Orifice, 1/2" Aluminum	143-62-023-45
	Orifice, 5/8" Aluminum	143-62-023-46
	Orifice, 1/8" Brass	143-62-023-00
	Orifice, 3/16" Brass	143-62-023-01
	Orifice, 1/4" Brass	143-62-023-02
	Orifice, 5/16" Brass	143-62-023-03
	Orifice, 3/8" Brass	143-62-023-61
	Orifice, 1/2" Brass	143-62-023-62
	Orifice, 5/8" Brass	143-62-023-63
13	Flange Screw, 10-24 x 3/4" Lg. Hex Head	951038
14	Screw-Lower Case to Body Connection (Not Shown) 5/16"-18 x 1" Lg. Hex Head	990012
15	Body, Angle 3/4" x 3/4"	143-60-001-80
	Body, Angle 3/4" x 1"	143-60-001-81
	Body, Angle 1" x 1"	143-60-001-82
	Body, 3/4" x 3/4"	143-60-001-40
	Body, 3/4" x 1"	143-60-001-41
	Body, 1" x 1"	143-60-001-42
	Body, 3/4" x 1 1/4"	143-60-001-00
	Body, 1" x 1 1/4"	143-60-001-02
	Body, 1 1/4" x 1 1/4"	143-60-001-01
16	Lower Case Assembly, Std.	143-60-502-00
	Lower Case Assembly, I.R.V.	143-60-502-02
17	Cover Assembly, Std. 3/4"	143-80-503-03
	Cover Assembly, Std. 1"	143-80-503-04
	Cover Assembly, I.R.V. 3/4"	143-80-503-01
	Cover Assembly, I.R.V. 1"	143-80-503-02
18	Hole Plug	143-60-050-00

*High Pressure

CONDENSED PARTS LISTS

Models: 143-6-184 & 186
Low Pressure Cut-Off

ILL. NO.	DESCRIPTION	PART NUMBER
1	Seal Cap, Aluminum	138-02-005-01
2	Seal Cap Gasket	120-08-066-00
3	Adjustment Spring Button, Plastic	143-08-009-01
	Adjustment Spring Button, Brass	143-62-009-02
4	Vent Valve Assembly	143-62-313-00
5	Pushnut	903979
6	Tetraseal (TS33-133)	902497
7	Valve Pad, Buna-N	143-60-011-00
8	Valve Stem	143-60-016-00
9	Spring (See Spring Table)	
10	Diaphragm Assembly, Std. L.P.C.O.	143-60-550-02
11	Cut-Off Valve Assembly	143-62-516-00
12	Cut-Off Valve Spring	143-62-021-23
13	Orifice, 1/4" Aluminum	143-62-023-49
	Orifice, 5/16" Aluminum	143-62-023-51
	Orifice, 3/8" Aluminum	143-62-023-52
	Orifice, 7/16" Aluminum	143-62-023-53
	Orifice, 1/4" Brass	143-62-023-14
	Orifice, 5/16" Brass	143-62-023-11
	Orifice, 3/8" Brass	143-62-023-12
	Orifice, 7/16" Brass	143-62-023-13
14	Diaphragm Assembly: I.R.V. L.P.C.O. w/7" Relief	143-60-550-03
	I.R.V. L.P.C.O. w/9" Relief	143-60-550-07
15	Flange Screw - 10-24" x 3/4" Lg. Hex Head	951038
16	Screw - Lower Case to Body Connection (Not Shown) 5/16"-18 x 1" Lg. Hex Head	990012
17	Body, 3/4" x 3/4", straight	143-60-001-54
	Body, 3/4" x 1", straight	143-60-001-56
	Body, 1" x 1", straight	143-60-001-55
	Body, 3/4" x 1 1/4", straight	143-60-001-08
	Body, 1" x 1 1/4", straight	143-60-001-09
	Body, 1 1/4" x 1 1/4", straight	143-60-001-07
18	Lower Case Assembly, Std.	143-60-502-00
	Lower Case Assembly, I.R.V.	143-60-502-02
19	Cover Assembly, Std. 3/4"	143-80-503-03
	Cover Assembly, Std. 1"	143-80-503-04
	Cover Assembly, I.R.V. 3/4"	143-80-503-01
	Cover Assembly, I.R.V. 1"	143-80-503-02
20	Hole Plug	143-60-050-00

Spring Ranges

OUTLET PRESSURE RANGE	143-6 REGULATOR	
	SPRING COLOR	SPRING PART NUMBER
3 1/2" w.c. to 6 1/2" w.c.	Red	143-62-021-15
5" w.c. to 8 1/2" w.c.	Blue	143-62-021-16
6" w.c. to 14" w.c.	Green	143-62-021-17
12" w.c. to 28" w.c.	Orange	143-62-021-18
1/2 psig to 2 psig	Black / White	143-62-021-22
1/2 psig to 3 psig	Cadmium*	173-62-021-02
2 psig to 6 psig	Black*	139-16-021-01

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

Spring Ranges - Low Pressure Cut-Off

OUTLET PRESSURE RANGE	SPRING COLOR	SPRING PART NUMBER
4 1/2" w.c. to 7 1/2" w.c.	Red	143-62-021-15
6 1/2" w.c. to 9 1/2" w.c.	Blue	143-62-021-16
7 1/2" w.c. to 15" w.c.	Green	143-62-021-17

Regulator General Assembly Descriptions

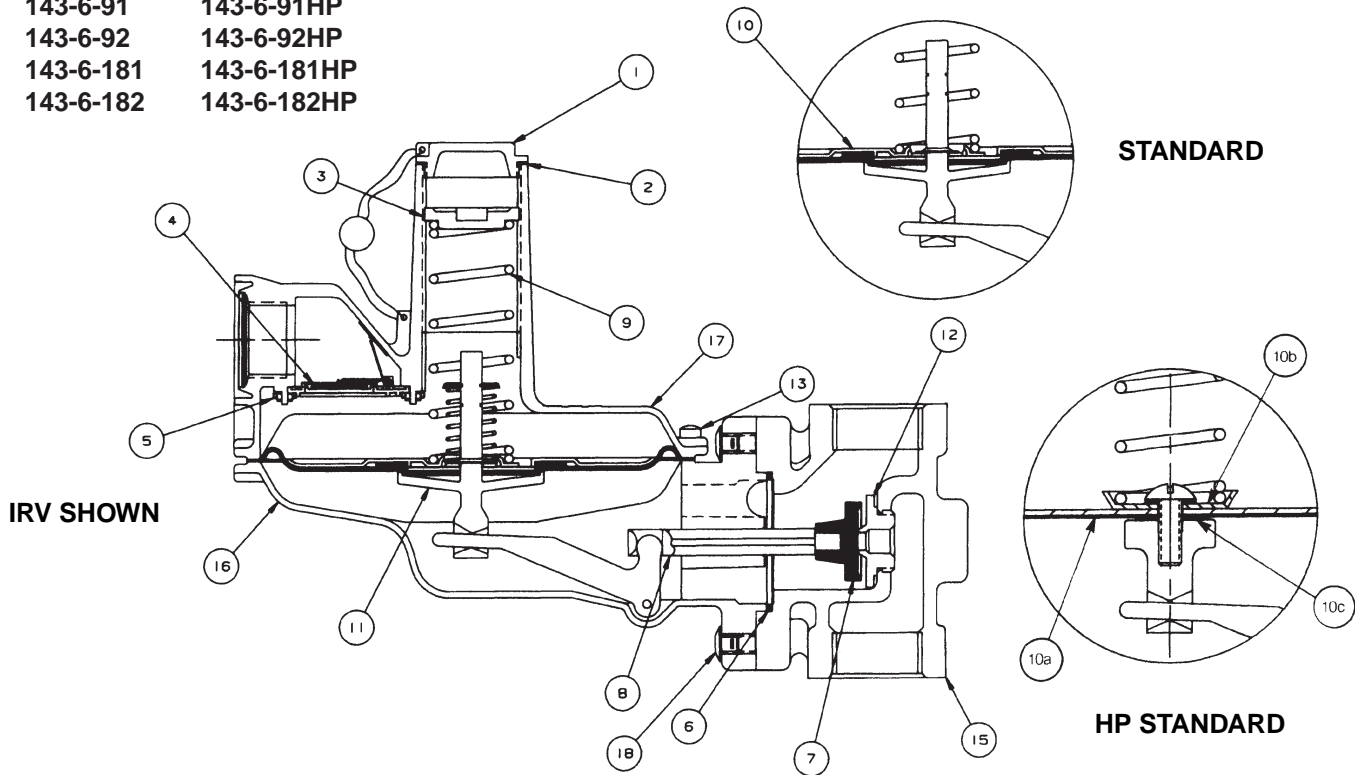
Basic 143-6 Models	Description
143-6-91	Standard Regulator with 90° Angle Body
143-6-92	Regulator with Internal Relief Valve (IRV) and 90° Angle Body
143-6-181	Standard Regulator with Straight Body
143-6-182	Regulator with Internal Relief Valve (IRV) and Straight Body
143-6-91HP	Standard High Pressure Regulator with 90° Angle Body
143-6-92HP	High Pressure Regulator with IRV and 90° Angle Body
143-6-181HP	Standard High Pressure Regulator with Straight Body
143-6-182HP	High Pressure Regulator with IRV and Straight Body
143-6-184	Regulator with Low Pressure Cut-Off (LPCO) — Straight Body
143-6-186	Regulator with IRV and LPCO — Straight Body



Regulator General Assemblies

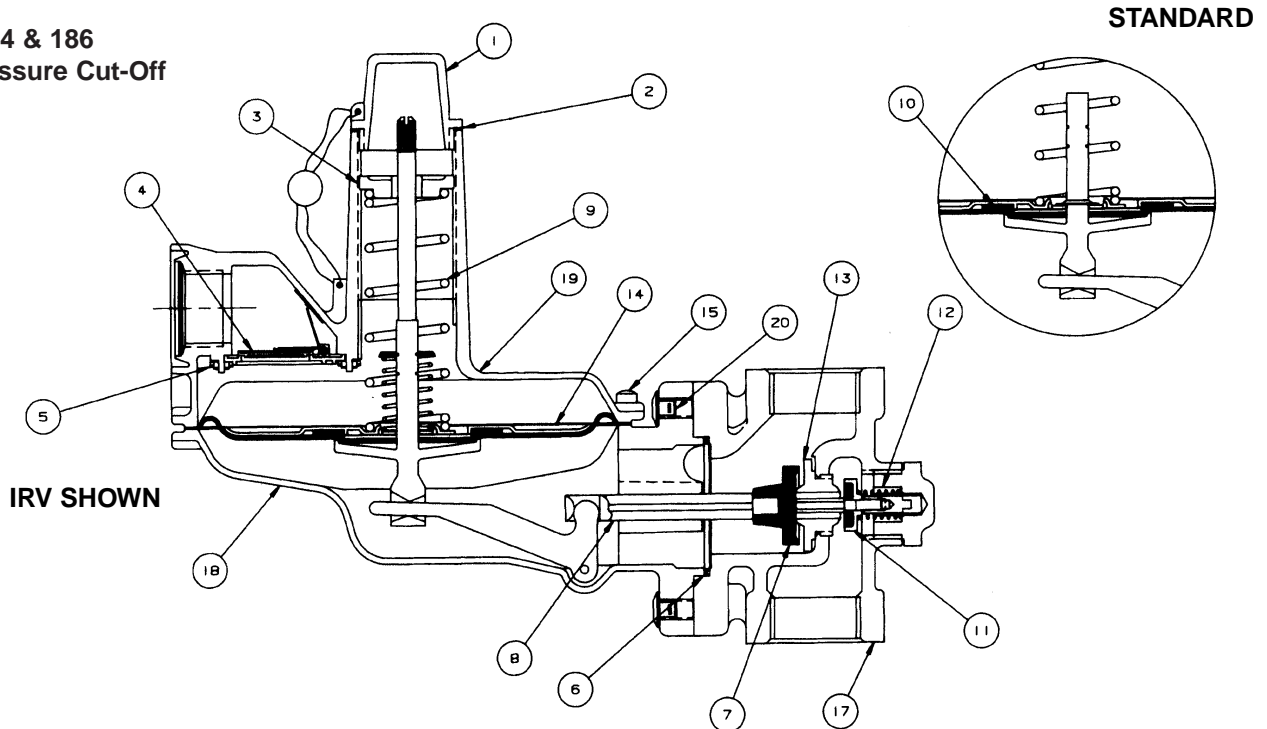
MODELS:

- | | |
|-----------|-------------|
| 143-6-91 | 143-6-91HP |
| 143-6-92 | 143-6-92HP |
| 143-6-181 | 143-6-181HP |
| 143-6-182 | 143-6-182HP |



MODELS:

- 143-6-184 & 186
Low Pressure Cut-Off



Models 143-6-91, -92, -181, -182, -91HP, -92HP, -181HP, and -182HP

CAPACITY* In SCFH natural gas (0.6 specific gravity—14.65 psig—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	BLACK/WHITE and CADMIUM SPRINGS	1/4 psig droop
GREEN SPRING	2" w.c. droop	BLACK SPRING	10% droop
ORANGE SPRING	3" w.c. 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: The last figure in each column is the maximum capacity for each orifice at recommended inlet pressure within the optimum performance range.

Models 143-6-184 & 186 — Low Pressure Cut-Off

CAPACITY* In SCFH natural gas (0.6 specific gravity—14.65 psig—60°F.)

PIPE SIZE (Inches)	INLET PRESSURE (psig)	OUTLET PRESSURES Red Spring* 4½" to 7½" w.c. Blue Spring* 6½" to 9½" w.c.				OUTLET PRESSURES Green Spring* 7½" to 15" w.c.			
		ORIFICE SIZE (inches)				ORIFICE SIZE (inches)			
		¼"	⅝"	7/16"	⅜"	¼"	⅝"	7/16"	⅜"
¾" X ¾"	½		90	240	180		90	140	120
	1	100	200	400	300	90	160	250	200
	2	140	300	580	420	140	240	370	320
	5	230	500	800	750	220	460	580	530
	10	380	740	1050	990	370	700	780	720
	15	460	950	1140	1050	480	800	920	850
	25	640	1100		1100	660	1000		900
	40	870	1300			910	1300		
60	1160				1160				
¾" X 1" 1" X 1"	½		90	270	210		90	160	120
	1	100	210	430	310	90	160	260	230
	2	140	300	650	420	140	270	410	350
	5	230	510	1100	750	220	470	800	730
	10	380	760	1300	1120	370	740	1220	1090
	15	460	960	1300	1300	480	930	1300	1300
	25	640	1300		1300	660	1160		1300
	40	870	1300			910	1300		
60	1160				1160				
¾" X 1¼" 1" X 1¼" 1¼" X 1¼"	½		90	270	210		90	160	120
	1	100	210	430	310	90	160	260	230
	2	140	300	650	420	140	270	430	350
	5	230	510	1100	750	220	470	870	730
	10	380	760	1300	1120	370	740	1300	1090
	15	460	960	1300	1300	480	930	1300	1300
	25	640	1300		1300	660	1160		1300
	40	870	1300			910	1300		
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.

Maximum Emergency Pressure

The maximum emergency pressure that the inlet side of the Residential Service Regulator can be subjected to under abnormal conditions without causing damage to the regulator is:

143-6-91	143-6-91HP	} Maximum inlet pressure plus 50 PSIG
143-6-92	143-6-92HP	
143-6-181	143-6-181HP	
143-6-182	143-6-182HP	
143-6-184	} Maximum inlet pressure plus 10 PSIG	
143-6-186		

The maximum emergency outlet pressure that the 143-6 Residential Service Regulator can be subjected to under abnormal conditions without causing damage to the regulator is the regulator set point +3 PSIG. Should the regulator outlet be subjected to a pressure greater than set point of the regulator +3 PSIG, the regulator must be removed from service and carefully inspected for damage. At that time, any damaged or otherwise unsatisfactory parts must be replaced before returning the regulator to service. The maximum emergency outlet pressure that can safely be contained in the 143-6 Residential Service Regulator diaphragm case is 10 PSIG. Safely contained means "no leaking or bursting."

Other Gases

The 143-6 Residential Service Regulators are mainly used on natural gas services; however, these regulators will perform equally as well on other gases. When using the 143-6 Residential Service Regulators on other gases, the regulator capacities must be adjusted using the following correction factors.

Type of Gas	Correction Factor
Air (specific gravity 1.0)	0.77
Propane (specific gravity 1.53)	0.63
1350 BTU Propane-Air Mixture (specific gravity 1.20)	0.71
Nitrogen (specific gravity 0.97)	0.79
Dry CO ₂ (specific gravity 1.52)	0.63

For other non-corrosive gases use the following formula:

$$\text{Correction Factor} = \sqrt{\frac{0.60}{\text{Specific gravity of the gas}}}$$

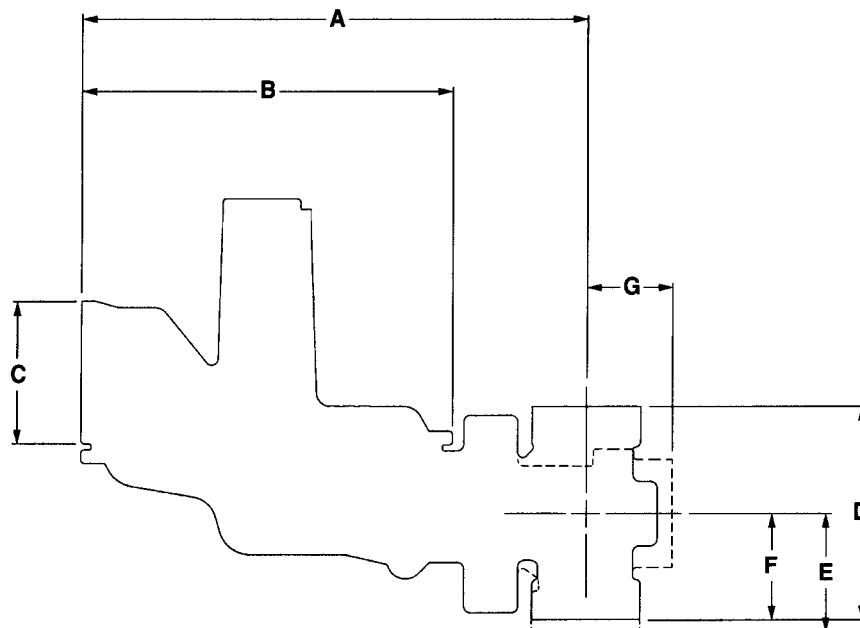
Corrosive Gas Service

The 143-6 Residential Service Regulators can be used on some corrosive gases such as ammonia, sewage gas, sludge gas, manufactured gas, etc.; however, special materials of construction may be required. Please contact your Equimeter representative or authorized distributor for additional information and recommendations.

Metrication Use the following for metric conversions:

std. meters ³ /hr. x 35.31 = std. ft. ³ /hr. (SCFH) std. ft. ³ /hr. (SCFH) x 0.0283 = std. metres ³ /hr.
kilograms/centimeter ² (kg/cm ²) x 14.22 = psig psig x 0.0703 = kilograms/centimeter ² (kg/cm ²)
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 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)



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