
Model 243 Service Regulators

R-1306
Rev. 10



**SENSUS**

243 Service Regulators

These large capacity service regulators are designed and built for commercial, industrial and gas distribution work. They are right at home in such places as factories and foundries, district regulator stations, commercial laundries and laundromats, motels-hotels and apartments, bakeries, restaurants, schools, churches and hospitals.

The versatile 243 is used for all kinds of gas fueled equipment . . .boilers, burners, furnaces, ovens, heaters, kilns, engines, air conditioners, etc.

Remarkable field versatility results from the union connection between the fully interchangeable bodies and diaphragm-case

assemblies. They are easy to install, adjust, inspect and service in all kinds of piping arrangements.

While used primarily for natural gas services, Model 243 regulators perform equally well on LPG vapor, air, dry CO₂, nitrogen and other inert gas applications. Contact your representative for special construction which may be available for certain corrosive gases.

Basic Models	243-12 Model Numbers	Variation	243-8 Model Numbers
	243-12-1 243-12-2 243-12-4 243-12-6	Standard Regulator Regulator with Internal Relief Valve (IRV) Regulator with Low Pressure Cut-Off (LPCO) Regulator with both IRV and LPCO High Pressure Regulator Pressure Loaded Regulator	

For additional information on IRV refer to page 5. For LPCO refer to page 6
*The term standard refers to non-IRV configurations.

Outlet Pressure Ranges and Springs	Spring Color	Outlet Pressure Range		Spring Part Number
		243-12	243-8	
	Red-Black	---	3½" to 6½" w.c.	143-82-021-00
	Blue-Black	---	5" to 8½" w.c.	143-82-021-01
	Green-Black	---	6" to 14" w.c.	143-16-021-02
	Red	3½" to 6½" w.c.	---	143-16-021-03
	Blue	5" to 8½" w.c.	---	143-16-021-04
	Green	6" to 14" w.c.	12" to 28" w.c.	143-16-021-05
	Orange-Black	10" to 18" w.c.	---	143-16-021-11
	Orange	12" to 28" w.c.	1 to 2 psi	143-16-021-06
	Black	1 to 2 psi	2 to 4½ psi	143-16-021-07
	Cadmium	1½ to 3 psi	3 to 5 psi♦	143-16-021-08
	Cadmium	1½ to 3 psi	3 to 6½ psi*	143-16-021-08
	Cadmium	---	6 to 10 psi*	143-16-021-08
	White †	---		143-16-021-13

†White is nested inside Cadmium

*Model 243-8HP only

♦Model 243-8-2 (IRV) only.

Pipe Sizes

Model	Pipe Size
243-12-1 and 243-12-2	1¼", ½" and 2"
243-8-1 and 243-8-2	1¼", 1½" and 2"
243-8HP	1¼", 1½" and 2"

Temperature Limits

The Model 243 Regulator may be used for flowing gas temperatures from -20°F to 150°F.

Buried Service

The Model 243 Regulator is not recommended for buried service.

Maximum Inlet Pressure, psig

Regulator Model and Size										
	1½"	*1¼"	1"	*1"	¾"	¾"	½"	¾"	¼"	.207"
	30°	10°	30°	10°	30°	10°	10°	10°	10°	10°
1½", 243-12	15	25	25	40	-	60	100	125	125	-
1½", 243-12	15	25	25	40	-	60	100	125	125	-
2", 243-12	15	25	25	40	40	60	100	125	125	-
1½", 243-8	-	-	-	-	-	40	80	100	125	125
1½", 243-8	-	-	25	-	-	40	80	100	125	125
2", 243-8	-	-	25	-	40	40	80	100	125	-
1½", 243-8HP	-	-	-	-	-	40	80	100	125	-
1½", 243-8HP	-	-	25	-	-	40	80	100	125	-
2", 243-8HP	-	-	25	-	-	40	80	100	125	-

*External Control Regulator Only

Fixed Factor billing

Regulator accuracy is essential to measurement accuracy, and because the 243 is so precise, it is ideal for Pressure-Factor Measurement, Pressure Compensated Metering, Fixed Factor Billing, etc.

The table below gives the pressure accuracies obtainable with 243-12 and 243-8 regulators at the capacities in the tables on pages 8 to 19.

The 243 will hold outlet pressure within the indicated percentage limits from set flow (250 scfh) to the flows given in the capacity tables. Percentages are all based on absolute pressure using 14.4 psia as atmospheric.

As an example, referring to page 10, a 1½" Model 243-12 with 1" orifice, 30° valve, 15 psig inlet and 11" w.c. setpoint (green spring) at 2" w.c. droop has a gas capacity of 9800 scfh. Per the below table, this regulator at these conditions will hold outlet pressure at 11" w.c. ± ½% (2" w.c.) from 250 to 9800 scfh (based on absolute pressure).

For higher outlet pressures, greater capacities, increased accuracies, and excessive inlet pressure variations, use the 243-RPC pilot operated regulator (see page 7).

Set Point	Droop	Accuracy
6" w.c.	1" w.c.	+ ½% and -½%
7" w.c.	1" w.c.	+ ½% and -½%
11" w.c.	2" w.c.	+ ½% and -½%
18" w.c.	3" w.c.	+ 1% and -1%
1psi	0.3 psi	+ 1% and -2%
1psi	0.2 psi	+ 1% and -1½%
2psi	0.6 psi	+ 1% and -4%
3psi	0.3 psi	+ 1% and -2%
3psi	0.6 psi	+ 1% and -3½%

Model 243 Capacity Tables

2" Models 243-12-1 and 243-12-2 in SCFH of Natural Gas (0.6 Specific Gravity - 14.65 psia - 60°F)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle						
		1¼"	1"	¾"	¾"	½"	¾"	¼"
		30°	30°	30°	10°	10°	10°	10°
Set Point 6" w.c. 1" w.c. Droop Red Spring 3½" to 6½" w.c. 143-16-021-03	½	2400	2200	1500	1250	800	500	
	1	4000	3600	2700	2100	1300	850	400
	2	6400	6000	4500	3800	2200	1400	600
	5	11000	11000	8200	6500	3800	2300	1000
	10	13000	15000	12500	9000	5700	3300	1500
	15	14000	15000	15000	10300	7100	4000	1750
	25		15000	20000	11500	9500	5300	2400
	40			20000	13000	13000	7500	3300
	60				15000	13000	10000	4500
	80					13000	12000	5700
	100					13000	12000	7000
	125						12000	8000
Set Point 7" w.c. 1" w.c. Droop Blue Spring 5" to 8½" w.c. 143-16-021-04	½	2000	1800	1400	1100	700	500	
	1	3400	3000	2200	2000	1200	750	400
	2	6000	5600	4000	3200	2000	1250	600
	5	11000	11000	8000	6000	3700	2100	1000
	10	12500	14000	12000	8400	5600	3300	1400
	15	14000	15000	15000	10000	7100	4000	1750
	25		15000	20000	11500	9500	5300	2400
	40			20000	13500	12000	7500	3200
	60				15000	13000	10000	4400
	80					13000	12000	5600
	100					13000	12000	7000
	125						12000	8000
Set Point 11" w.c. 2" w.c. Droop Green Spring 6" to 14" w.c. 143-16-021-05	1	3400	3000	2100	1950	1150	750	400
	2	5600	4700	3700	3400	2000	1200	600
	5	10500	9000	7800	6900	3500	2100	1000
	10	13000	13000	12000	9200	5500	3200	1600
	15	14000	14000	15000	10500	7000	4000	1800
	25		15000	20000	12000	9500	5300	2400
	40			20000	14500	12500	7500	3200
	60				15500	13000	10000	4400
	80					14000	12000	5600
	100					14000	12000	7000
	125						12000	8000

Last capacity figure in each group indicates maximum allowable inlet pressure (except for emergency conditions). Heavy stepped line indicates the recommended maximum capacity and inlet pressure for each orifice for operation within the optimum performance range.

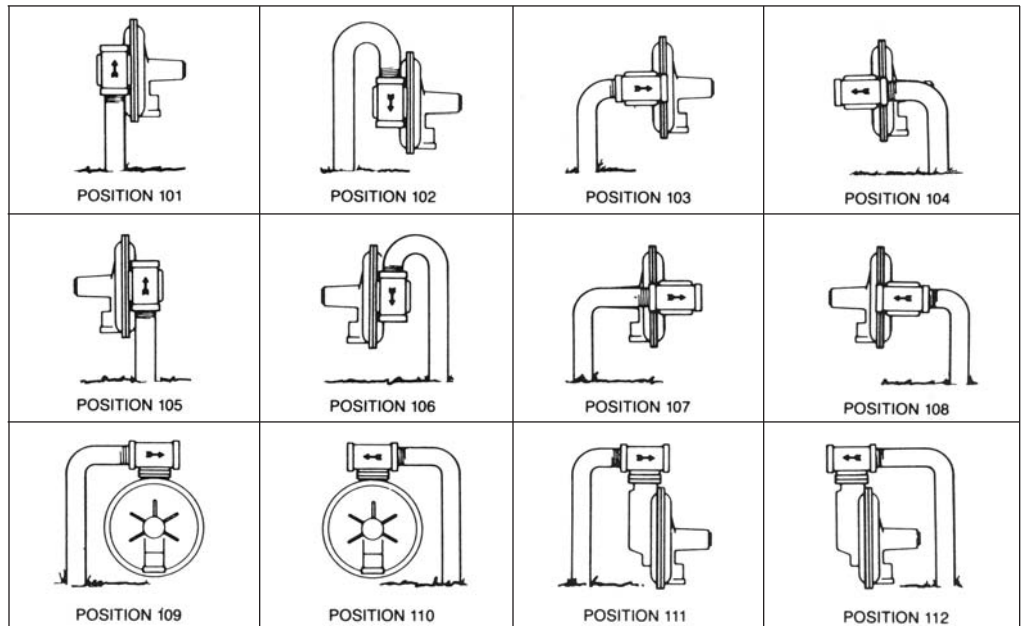
Note: The performance data is based on normal testing at 70°F flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Mounting Positions

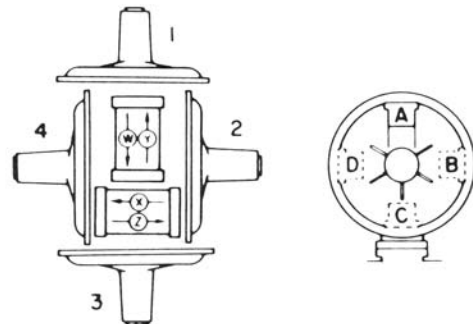
The 243 Service Regulator can be provided in any of the positions shown. Specify by position number when ordering.

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 materials from collecting in the vent side.



NOTE: If desired position is not shown use diagrams at right as guides to specify vent, diaphragm case, and body arrangement. Example: Position 105 would be D-4-Y.

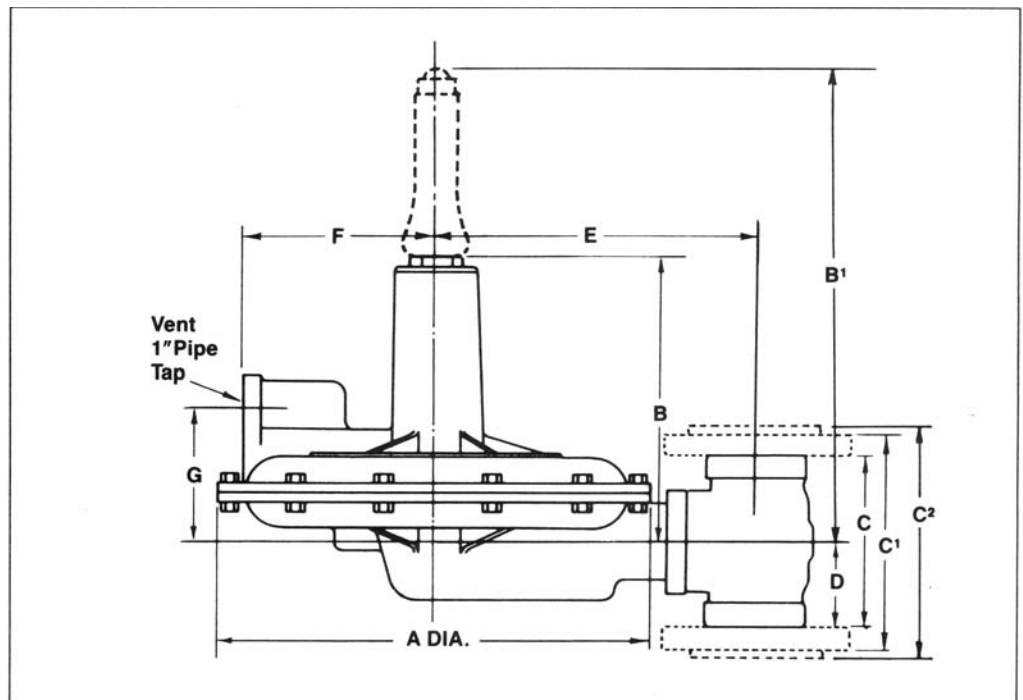


CAUTION: It is the user's responsibility to assure that all service regulator vents and/or vent lines exhaust to a non-hazardous location away from any potential sources of ignition. Refer to Bulletin RM-1306 for more detailed information.

Dimensions

Model	243-12	243-8	243-8HP
A	14"	10 ³ / ₁₆ "	10 ³ / ₁₆ "
**B	9 ³ / ₄ "	9 ³ / ₄ "	-
B ¹	-	-	12 ³ / ₄ "
C	5 ³ / ₄ "	5 ³ / ₄ "	5 ³ / ₄ "
***C ¹	7 ¹ / ₂ "	7 ¹ / ₂ "	7 ¹ / ₂ "
****C ²	7 ⁷ / ₈ "	7 ⁷ / ₈ "	7 ⁷ / ₈ "
D	2 ⁷ / ₈ "	2 ⁷ / ₈ "	2 ⁷ / ₈ "
E	10 ¹³ / ₃₂ "	8 ¹⁹ / ₃₂ "	8 ¹⁹ / ₃₂ "
F	6 ¹ / ₃₂ "	4 ²⁷ / ₃₂ "	4 ²⁷ / ₃₂ "
G	4 ¹¹ / ₃₂ "	4 ⁵ / ₃₂ "	4 ⁵ / ₃₂ "
Shipping* Weight	27 lbs.	25 lbs.	29 lbs.

* Add 9 lbs. for flanges on 2" body
 ** 10" for 243-12-1 and 243-12-4, which include travel stop
 *** ANSI Flanges
 **** ND-10 Flanges



Materials of Construction

Body	Cast Iron
Diaphragm Case	Die Cast Aluminum Alloy
Diaphragm	Buna-N with Nylon Fabric Insert
Diaphragm Pans	Zinc Plated Steel
Diaphragm Coupling	Zinc Die Casting
Orifice	Brass
Valve	Buna-N Soft Seat in Aluminum Holder
Stem	Brass
Lever	Zinc Plated Steel
O-Rings and Tetra Seals	Buna-N
Adjustment Spring Button & Seal Cap, Std.	Zinc Die Casting
Adjustment Screw, 243-8HP	Zinc Plated Steel
Cover, 243-8HP	Cast Iron
Seal Cap, 243-8HP	Cast Iron

Full Open Capacity

Use the following formula for the full open capacity of 243 regulators.

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

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

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)

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

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

Orifice Size-in.	.207"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"
K	90	132	292	520	1100	1800	2480

When sizing relief valves for use with 243 regulators, use *full open capacity*. Do not use capacity from capacity tables pages 8 through 19.

Other Cases

243 Regulators are mainly used on natural gas. However, they perform equally as well on LP gas, nitrogen, dry CO₂, air and others. For capacities, multiply the table values on pages 8 thru 19 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: CORRECTION FACTOR =	$\sqrt{\frac{0.6}{\text{Specific Gravity of the Gas}}}$

While used primarily on natural gas services, Model 243 regulators perform equally as well on LPG vapor, air, CO₂, nitrogen and other inert gas applications. Please contact your Sensus Metering Systems representative for special construction which may be available for certain corrosive gases.

How to Order

Specify:

1. Pipe size and model number (page 2).
2. Screwed or flanged connections
3. Mounting position

4. Orifice size and valve angle.
5. Inlet pressure (also maximum and minimum if available)
6. Outlet pressure setting
7. Capacity required (scfh)

8. Type of gas (natural gas, propane, etc.)
9. Spring part number



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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 anyone 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 own risk and expense, promptly return the Goods in question to Seller's Plant.