HVAC

VCC-20 Series

C US

Applications

- Designed for automatic collection and removal of condensate from air conditioning, refrigeration and dehumidification equipment when gravity drainage is not possible or practical. Also suitable for high efficiency oil- and gas-fired condensing furnace equipment

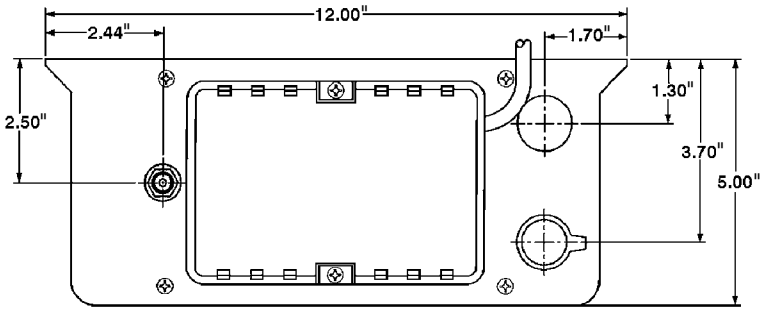
Features

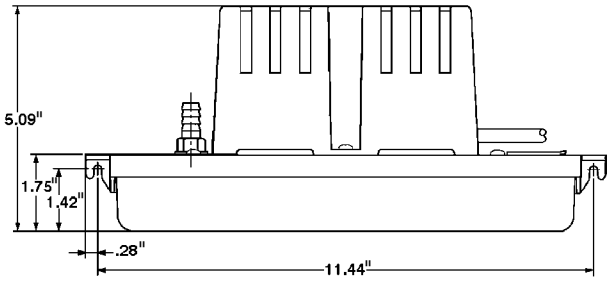
- Low profile for limited spaces
- Vertical centrifugal pump design
- Automatic start, stop and high level water detection (safety overflow switch)
- 3/8" O.D. barbed discharge adapter with built-in check valve (installed on the pump)
- 1/4" O.D. barbed discharge adapter (included in the box)
- Two inlet openings (one 1.0" and one 1-1/8" diameter)
- Safety overflow float activated switch
- Two 5" safety overflow switch lead wires
- Thermally protected, fan cooled motor
- Built-in wall mount tabs
- Intermittent liquid temperature up to 120 °F
- 20' shut-off head
- 6 ft, 3-conductor cable with grounded 3-prong plug (115 V and 230 V models)

Construction

- Motor — 1/30 hp
- Discharge — 3/8" O.D. barbed
- Housing/tank cover — ABS
- Motor Cover — ABS
- Volute — ABS
- Tank — ABS
- Impeller — Glass filled polypropylene
- Check valve — Acetal

Engineering Data





Specifications

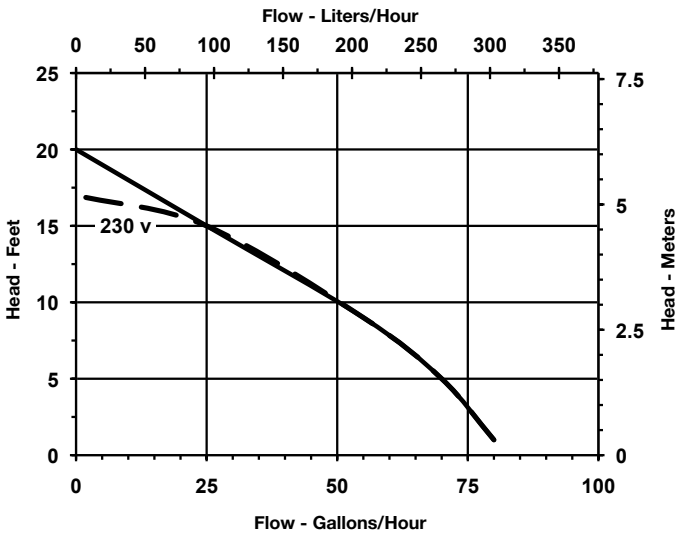
Item No.	Model No.	Discharge Size	HP	Volts	Hertz	Amps	Watts	Performance (GPH@Head)				Shutoff		Cord Length (ft)	Weight (lbs)
								1'	5'	10'	20'	Ft	PSI		
554200	VCC-20ULS	3/8" OD Barbed	1/30	115	60	1.5	93	80	70	45	0	20	8.6	6	5.40
554210		3/8" OD Barbed	1/30	230	50/60	0.6	75	80	70	45	0	17	7.4	6	5.40

NOTE: GPH is through check valve.

Replacement Parts

Item	Part Number
Tank	154004
Impeller	154009
Volute	154015
Cover, motor	154006
Check valve	154715
Switch pump	950337
Seal ring	928006
Safety switch	154714
Float/stem	154017
Adapter, 1/4"	154037

Performance Data

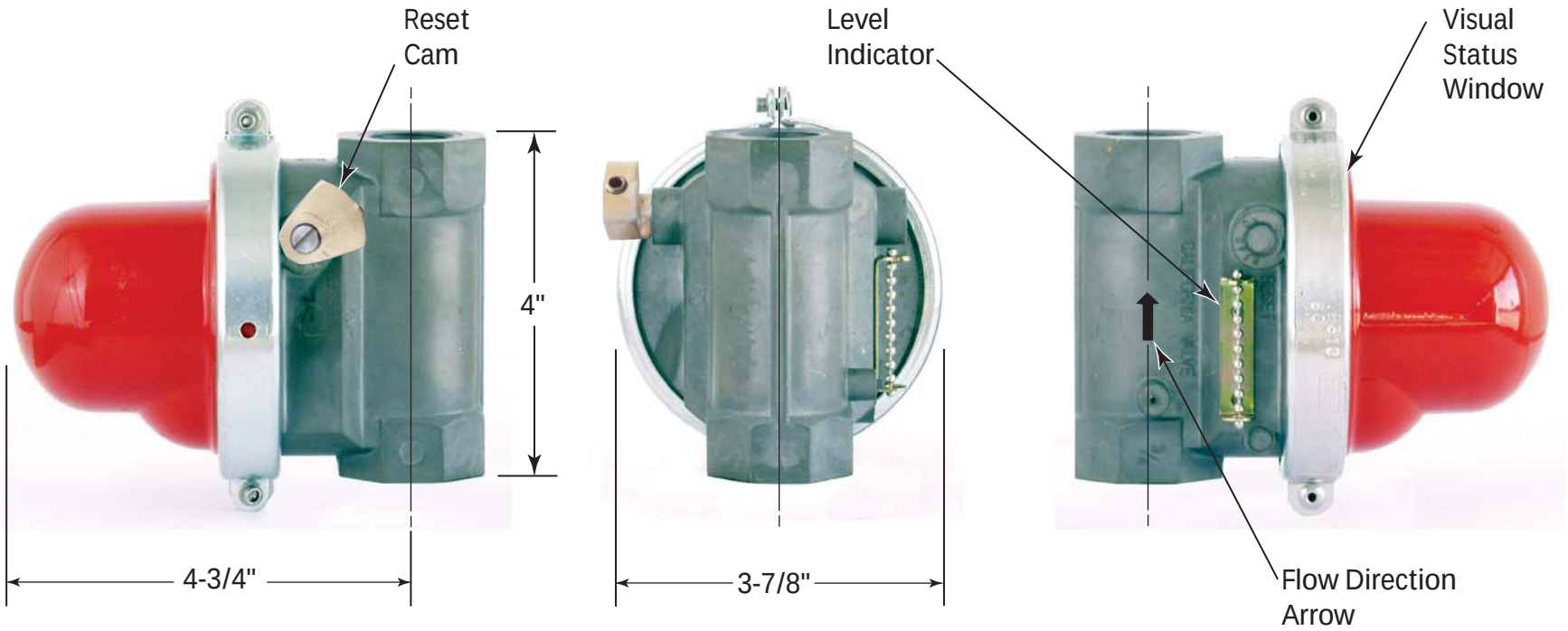


Franklin Electric

P.O. Box 12010
Oklahoma City, OK 73157-2010
Phone: 1.800.701.7894
Fax: 1.800.678.7867
www.LittleGiantPump.com

Specifications: Model VB-310(60) NPT Valve

Vertical - Bottom In Flow



Valve Model#	CA-DSA No.	Length	Height	Width	Nominal Pipe Size	Threads Per Inch	APPLICATION DATA	
							Max. Pressure	Fuel
VB-310	60-01	4-3/4"	4"	3-7/8"	3/4"	14	60 psi	Dry Fuel Gas

California Seismic Valves are UL listed in the USA and Canada, Certified by the California State Architect's Office, Approved by the City of Los Angeles, and are warranted free of manufacturer's defects for 30 years. All valves meet California Standards for Earthquake Actuated Automatic Gas Shut off Systems, Standard No. 12-23-1, ANSI Z21.70, 1981 and ASCE 25-97 Standards.

Pacific Seismic Products

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Fax (661) 942-0999
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www.4GasOff.net

3/4” Model VB-310 California Seismic Valve
Threaded Vertical - Upward Flow

FLOW CAPACITY TABLE IWC/PSIG - Capacity S.C.F.H.
Merit Rating: Cv 21 (Equivalent Length of Pipe is 3 Feet)
For determining approximate values at selected natural gas pressures to

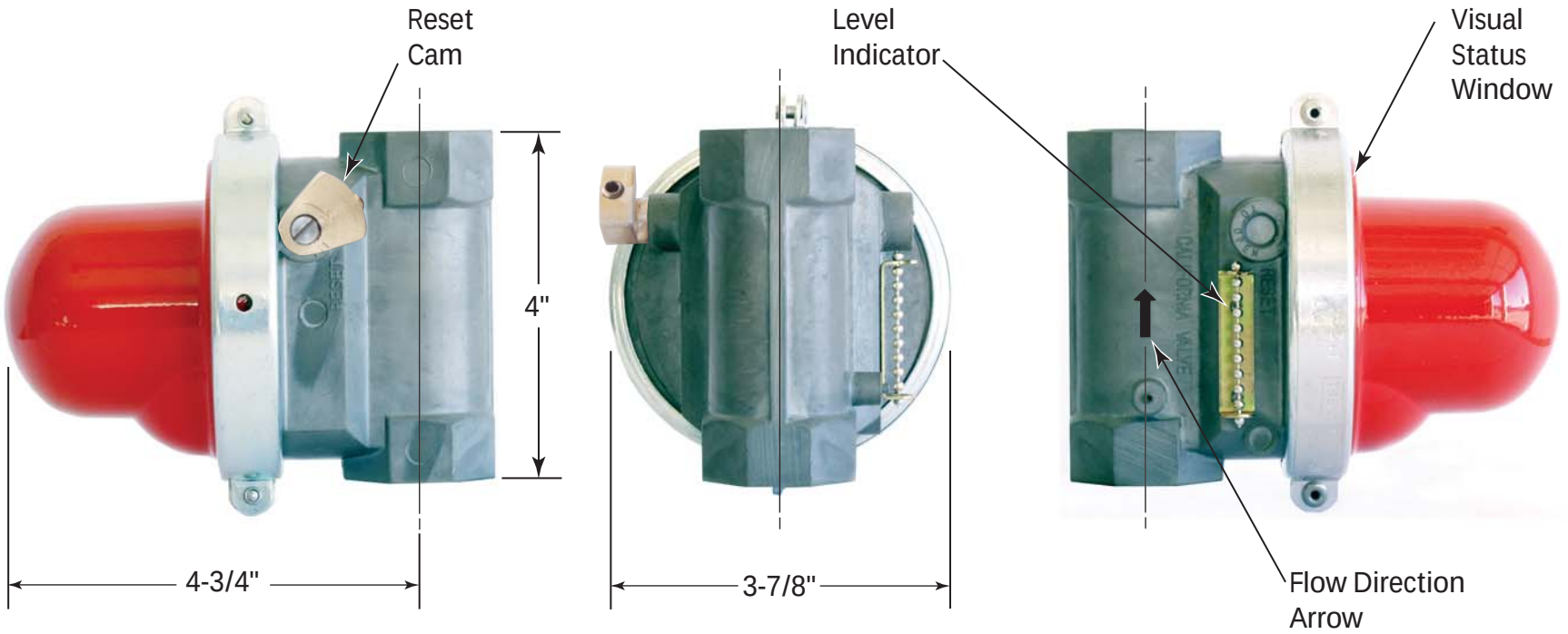
Pressure Drop		8” iwc Inlet	14” iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet
PSI	IWC								
.0036	0.1	362	365	393	415	435	465	551	808
.0072	0.2	512	516	556	587	616	657	779	1,143
.0108	0.3	627	631	681	718	754	804	954	1,399
.0144	0.4	724	729	786	829	871	929	1,101	1,616
.0180	0.5	809	815	879	927	973	1,038	1,231	1,806
.0216	0.6	886	893	963	1,016	1,066	1,137	1,348	1,979
.0252	0.7	957	964	1,040	1,097	1,151	1,229	1,456	2,137
.0288	0.8	1,023	1,031	1,111	1,173	1,231	1,313	1,557	2,285
.0324	0.9	1,085	1,093	1,179	1,244	1,305	1,393	1,651	2,423
.0360	1.0	1,144	1,152	1,242	1,311	1,376	1,468	1,740	2,554
.0720	2.0	1,616	1,627	1,755	1,852	1,944	2,075	2,460	3,612
.1080	3.0	1,976	1,990	2,147	2,286	2,379	2,539	3,011	4,422
.1440	4.0	2,279	2,296	2,477	2,614	2,745	2,930	3,475	5,105
.1800	5.0	2,545	2,564	2,767	2,920	3,066	3,273	3,884	5,706

Vertical Valves

		Sizes Available													Ambient Temperature
		NPT								Flanged					UL -40° to 150° F CA DSA: -10° to 150°F
		3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	2"	2 1/2"	3"	4"	6"	8"	Fluid
Maximum Pressures of Available Sizes	7 psi	✓	✓	✓	✓											Natural gas LP gas
	60 psi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Specifications: Model VB-311(60) NPT Valve

Vertical - Bottom In Flow



Valve Model#	CA-DSA No.	Length	Height	Width	Nominal Pipe Size	Threads Per Inch	APPLICATION DATA	
							Max. Pressure	Fuel
VB-311	60-01	4-3/4"	4"	3-7/8"	1"	11-1/2	60 psi	Dry Fuel Gas

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www.4GasOff.net

1” Model VB-311 California Seismic Valve
Threaded Vertical - Upward Flow

FLOW CAPACITY TABLE IWC/PSIG - Capacity S.C.F.H.
Merit Rating: Cv 41 (Equivalent Length of Pipe is 3 Feet)
For determining approximate values at selected natural gas pressures to 60 PSIG

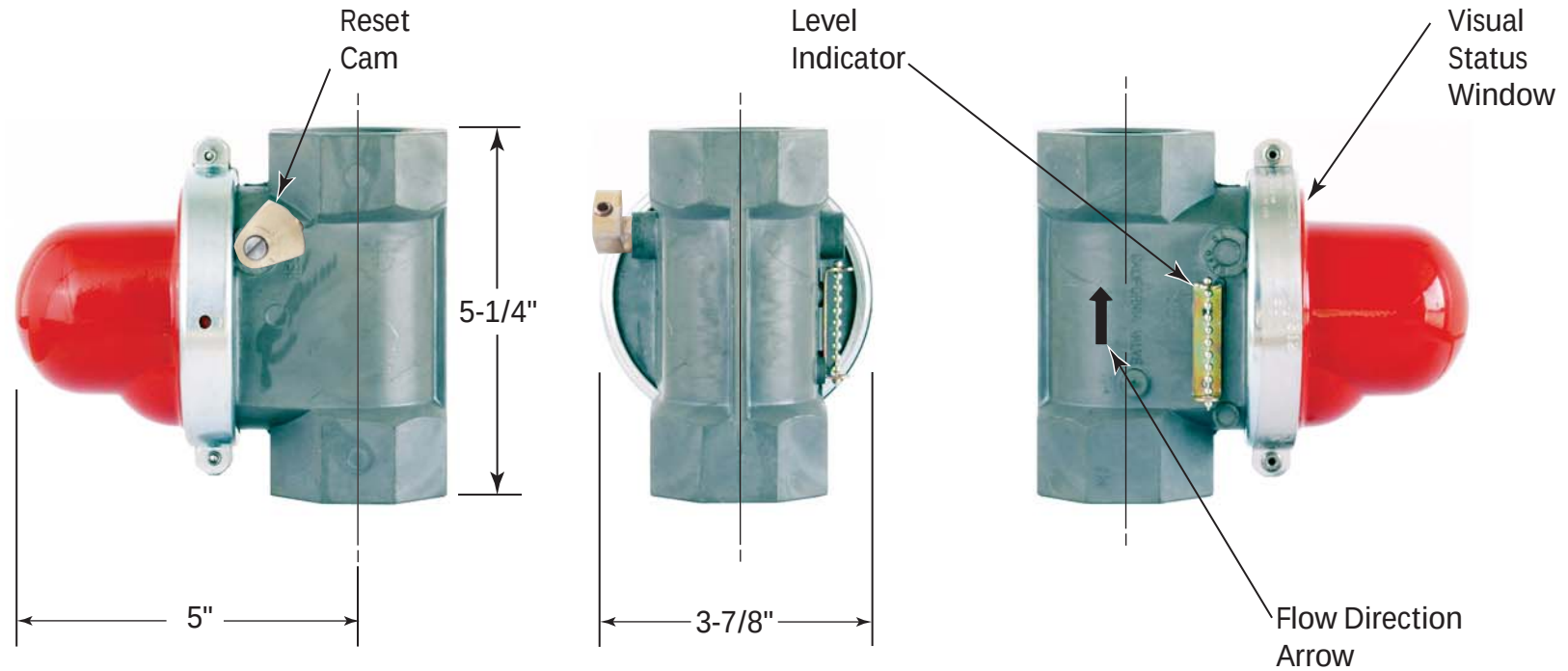
Pressure Drop		8” iwc Inlet	14” iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet
PSI	IWC								
.0036	0.1	707	712	768	810	850	907	1,075	1,577
.0072	0.2	1,000	1,007	1,086	1.145	1,202	1,283	1,520	2,231
.0108	0.3	1,224	1,233	1,329	1,403	1,472	1,571	1,862	2,732
.0144	0.4	1,413	1,423	1,535	1,619	1,700	1,814	2,150	3,155
.0180	0.5	1,580	1,591	1,716	1,810	1,900	2,027	2,403	3,527
.0216	0.6	1,731	1,743	1,880	1,983	2,081	2,221	2,633	3,863
.0252	0.7	1,869	1,882	2,030	2,142	2,248	2,399	2,843	4,173
.0288	0.8	1,998	2,012	2,170	2,289	2,403	2,564	3,040	4,461
.0324	0.9	2,119	2,134	2,301	2,428	2,549	2,719	3,224	4,731
.0360	1.0	2,233	2,249	2,426	2,559	2,686	2,866	3,398	4,987
.0720	2.0	3,154	3,177	3,427	3,616	3,796	4,050	4,803	7,051
.1080	3.0	3,858	3,886	4,193	4,425	4,645	4,957	5,879	8,634
.1440	4.0	4,450	4,482	4,836	5,104	5,359	5,720	6,785	9,967
.1800	5.0	4,969	5,005	5,401	5,702	5,987	6,390	7,582	11,141

Vertical Valves

		Sizes Available													Ambient Temperature
		NPT								Flanged					UL -40° to 150° F CA DSA: -10° to 150°F
		3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	2"	2 1/2"	3"	4"	6"	8"	
Maximum Pressures of Available Sizes	7 psi	✓	✓	✓	✓											Fluid
	60 psi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Natural gas LP gas

Specifications: Model VB-312(60) NPT Valve

Vertical - Bottom In Flow



Valve Model#	CA-DSA No.	Length	Height	Width	Nominal Pipe Size	Threads Per Inch	APPLICATION DATA	
							Max. Pressure	Fuel
VB-312	60-02	5"	5-1/4"	3-7/8"	1-1/4"	11-1/2	60 psi	Dry Fuel Gas

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1-1/4” Model VB-312 California Seismic Valve
Threaded Vertical - Upward Flow

FLOW CAPACITY TABLE IWC/PSIG - Capacity S.C.F.H.
Merit Rating: Cv 64 (Equivalent Length of Pipe is 4 Feet)
For determining approximate values at selected natural gas pressures to

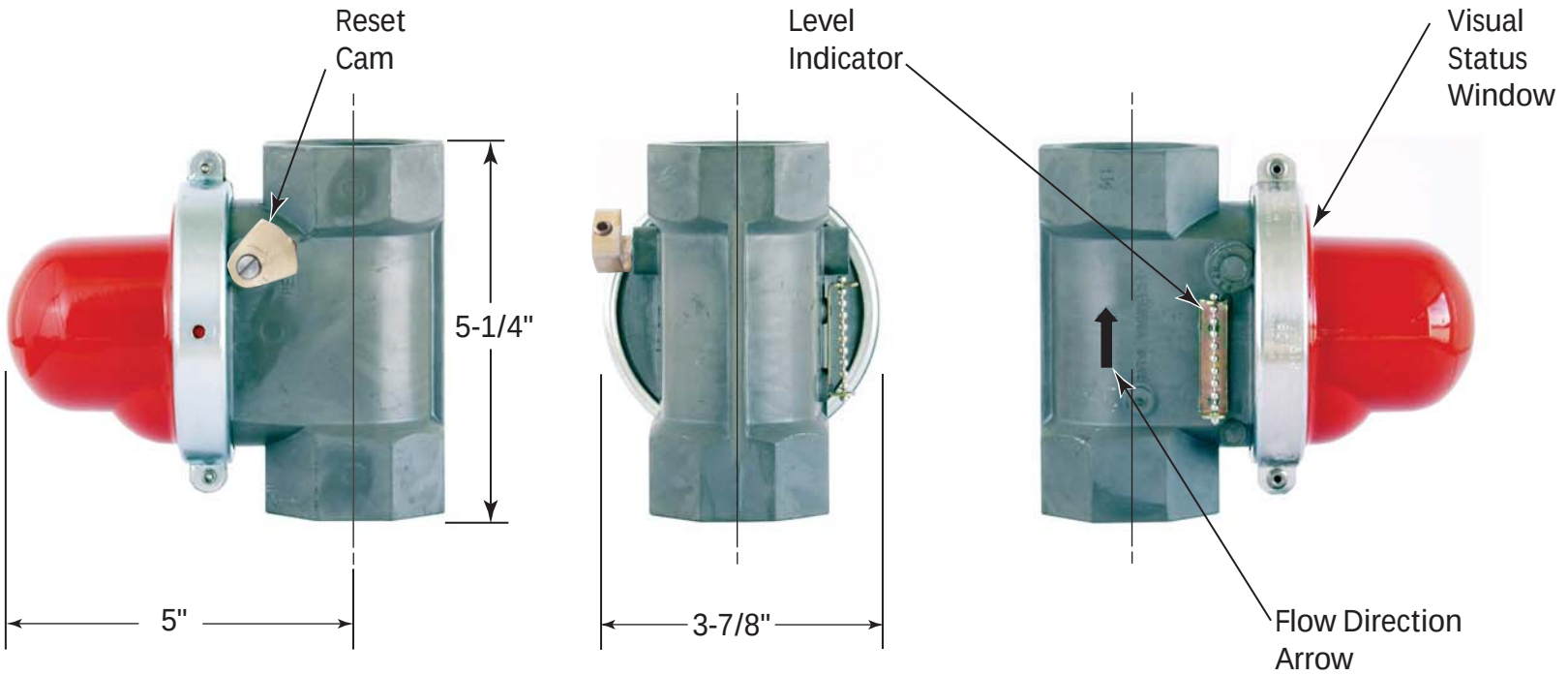
Pressure Drop		8” iwc Inlet	14” iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet
PSI	IWC								
.0036	0.1	1,103	1,111	1,198	1,264	1,327	1,416	1,678	2,462
.0072	0.2	1,560	1,571	1,695	1,788	1,876	2,002	2,373	3,482
.0108	0.3	1,911	1,924	2,075	2,189	2,298	2,452	2,906	4,265
.0144	0.4	2,187	2,204	2,396	2,528	2,653	2,831	3,356	4,924
.0180	0.5	2,466	2,484	2,679	2,826	2,966	3,165	3,752	5,505
.0216	0.6	2,701	2,721	2,934	3,096	3,249	3,467	4,109	6,031
.0252	0.7	2,917	2,938	3,169	3,343	3,509	3,744	4,439	6,514
.0288	0.8	3,118	3,141	3,387	3,574	3,751	4,002	4,745	6,963
.0324	0.9	3,307	3,331	3,592	3,790	3,978	4,245	5,032	7,386
.0360	1.0	3,486	3,511	3,786	3,995	4,193	4,474	5,304	7,785
.0720	2.0	4,924	4,959	5,349	5,644	5,925	6,323	7,497	11,007
.1080	3.0	6,023	6,066	6,544	6,907	7,251	7,738	9,178	13,477
.1440	4.0	6,946	6,996	7,549	7,968	8,365	8,929	10,592	15,558
.1800	5.0	7,757	7,813	8,432	8,900	9,345	9,975	11,836	17,391

Vertical Valves

		Sizes Available													Ambient Temperature
		NPT								Flanged					UL -40° to 150° F CA DSA: -10° to 150°F
		3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	2"	2 1/2"	3"	4"	6"	8"	
Maximum Pressures of Available Sizes	7 psi	✓	✓	✓	✓											Fluid
	60 psi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Natural gas LP gas

Specifications: Model VB-313(60) NPT Valve

Vertical - Bottom In Flow



Valve Model#	CA-DSA No.	Length	Height	Width	Nominal Pipe Size	Threads Per Inch	APPLICATION DATA	
							Max. Pressure	Fuel
VB-313	60-02	5"	5-1/4"	3-7/8"	1-1/2"	11-1/2	60 psi	Dry Fuel Gas

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1-1/2” Model VB-313 California Seismic Valve
Threaded Vertical - Upward Flow

FLOW CAPACITY TABLE IWC/PSIG - Capacity S.C.F.H.
Merit Rating: Cv 101 (Equivalent Length of Pipe is 5 Feet)
For determining approximate values at selected natural gas pressures to 60 PSIG

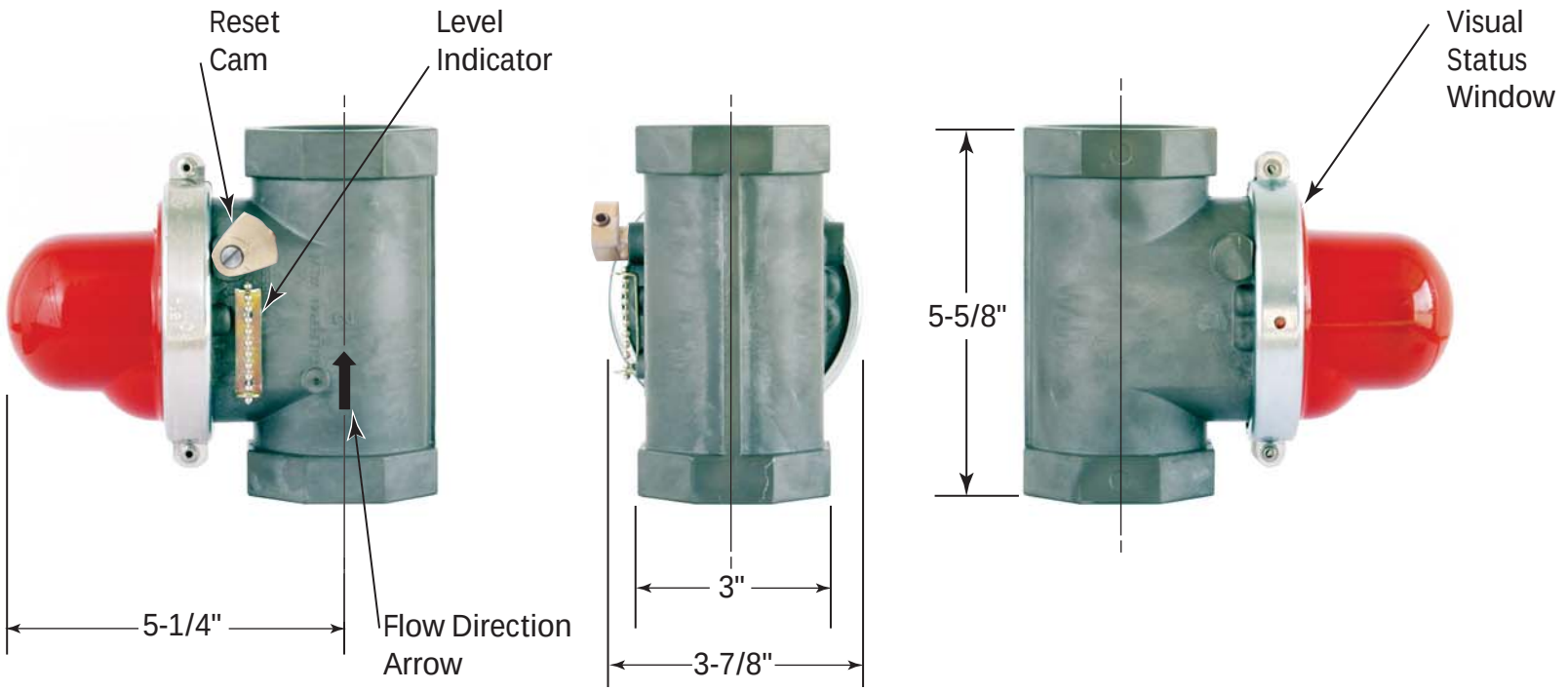
Pressure Drop		8” iwc Inlet	14” iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet
PSI	IWC								
.0036	0.1	1,741	1,754	1,891	1,995	2,094	2,234	2,648	3,886
.0072	0.2	2,462	2,480	2,674	2,821	2,961	3,159	3,745	5,495
.0108	0.3	3,015	3,037	3,275	3,455	3,627	3,869	4,586	6,730
.0144	0.4	3,454	3,478	3,781	3,989	4,187	4,468	5,296	7,771
.0180	0.5	3,892	3,920	4,227	4,460	4,681	4,994	5,921	8,688
.0216	0.6	4,263	4,293	4,630	4,885	5,127	5,471	6,485	9,517
.0252	0.7	4,604	4,637	5,001	5,276	5,538	5,909	7,005	10,280
.0288	0.8	4,921	4,956	5,345	5,640	5,920	6,316	7,488	10,989
.0324	0.9	5,219	5,256	5,669	5,981	6,278	6,699	7,942	11,655
.0360	1.0	5,501	5,540	5,975	6,304	6,617	7,061	8,371	12,285
.0720	2.0	7,770	7,826	8,441	8,908	9,350	9,978	11,832	17,370
.1080	3.0	9,505	9,573	10,328	10,899	11,442	12,212	14,483	21,269
.1440	4.0	10,962	11,041	11,914	12,574	13,201	14,090	16,715	24,553
.1800	5.0	12,241	12,330	13,306	14,045	14,747	15,742	18,679	27,445

Vertical Valves

		Sizes Available													Ambient Temperature
		NPT								Flanged					UL -40° to 150° F CA DSA: -10° to 150°F
		3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	2"	2 1/2"	3"	4"	6"	8"	Fluid
Maximum Pressures of Available Sizes	7 psi	✓	✓	✓	✓											Natural gas LP gas
	60 psi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Specifications: Model VB-314(60) NPT Valve

Vertical - Bottom In Flow



Valve Model#	CA-DSA No.	Length	Height	Octogon	Nominal Pipe Size	Threads Per Inch	APPLICATION DATA	
							Max. Pressure	Fuel
VB-314	60-02	5-1/4"	5-5/8"	3"	2"	11-1/2	60 psi	Dry Fuel Gas

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2” Model VB-314 California Seismic Valve
Threaded Vertical - Upward Flow

FLOW CAPACITY TABLE IWC/PSIG - Capacity S.C.F.H.
Merit Rating: Cv 164 (Equivalent Length of Pipe is 5 Feet)
For determining approximate values at selected natural gas pressures to 60 PSIG

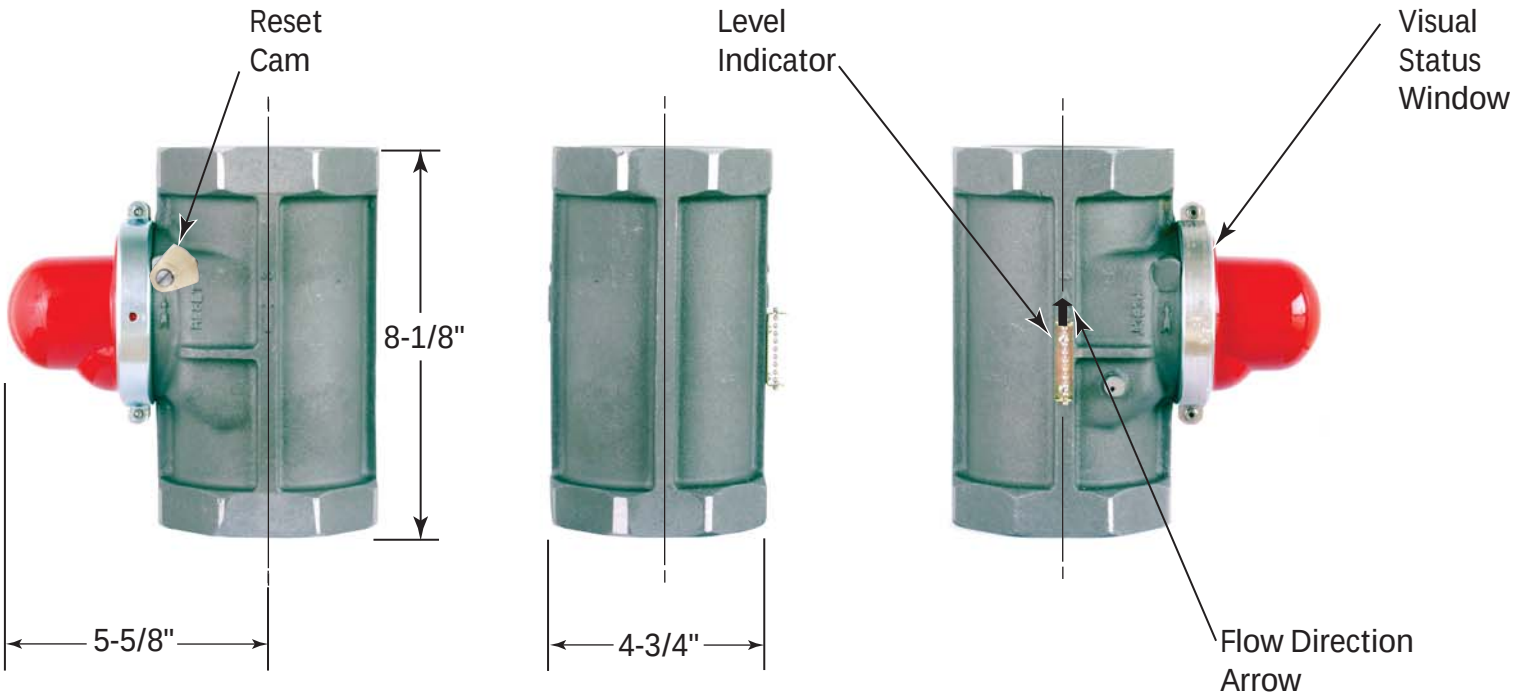
Pressure Drop		8” iwc Inlet	14” iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet
PSI	IWC								
.0036	0.1	2,828	2,848	3,071	3,240	3,400	3,628	4,300	6,310
.0072	0.2	3,998	4,027	4,342	4,581	4,808	5,130	6,081	8,923
.0108	0.3	4,896	4,931	5,318	5,610	5,889	6,283	7,447	10,928
.0144	0.4	5,653	5,693	6,140	6,478	6,799	7,254	8,599	12,619
.0180	0.5	6,320	6,365	6,864	7,242	7,601	8,110	9,614	14,108
.0216	0.6	6,922	6,971	7,518	7,932	8,326	8,883	10,531	15,454
.0252	0.7	7,476	7,529	8,120	8,567	8,992	9,594	11,374	16,692
.0288	0.8	7,991	8,048	8,680	9,158	9,612	10,256	12,158	17,844
.0324	0.9	8,475	8,535	9,205	9,712	10,194	10,877	12,895	18,925
.0360	1.0	8,932	8,996	9,702	10,237	10,745	11,465	13,592	19,949
.0720	2.0	12,617	12,707	13,707	14,464	15,183	16,202	19,212	28,205
.1080	3.0	15,434	15,545	16,770	17,698	18,580	19,829	23,518	34,536
.1440	4.0	17,800	17,928	19,345	20,417	21,436	22,879	27,142	39,869
.1800	5.0	19,877	20,020	21,606	22,806	23,946	25,561	30,330	44,564

Vertical Valves

		Sizes Available													Ambient Temperature
		NPT								Flanged					UL -40° to 150° F CA DSA: -10° to 150°F
		3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	2"	2 1/2"	3"	4"	6"	8"	Fluid
Maximum Pressures of Available Sizes	7 psi	✓	✓	✓	✓											Natural gas LP gas
	60 psi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Specifications: Model VB-315(60) NPT Valve

Vertical - Bottom In Flow



Valve Model#	CA-DSA No.	Length	Height	Octogon	Nominal Pipe Size	Threads Per Inch	APPLICATION DATA	
							Max. Pressure	Fuel
VB-315	60-02	5-5/8"	8-1/8"	4-3/4"	3"	8	60 psi	Dry Fuel Gas

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www.4GasOff.net

3” Model VB-315 California Seismic Valve
Threaded Vertical - Upward Flow

FLOW CAPACITY TABLE IWC/PSIG - Capacity S.C.F.H.
Merit Rating: Cv 336 (Equivalent Length of Pipe is 10 Feet)
For determining approximate values at selected natural gas pressures to 60 PSIG

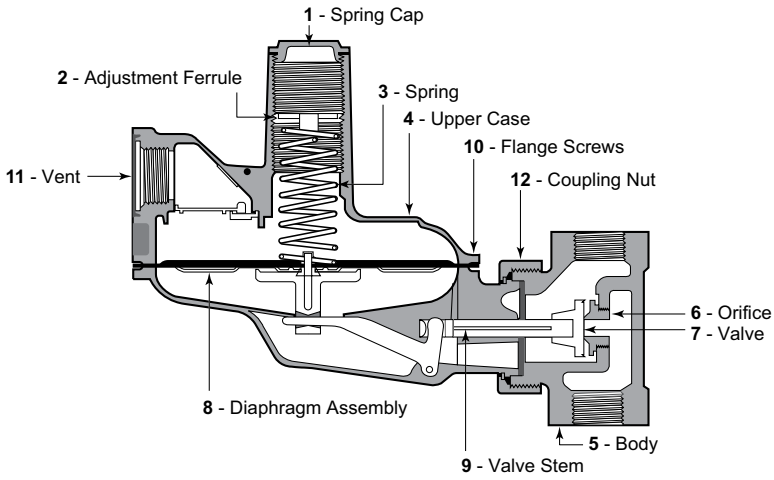
Pressure Drop		8” iwc Inlet	14” iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet
PSI	IWC								
.0036	0.1	5,793	5,834	6,292	6,638	6,967	7,433	8,810	12,927
.0072	0.2	8,192	8,250	8,897	9,386	9,851	10,511	12,459	18,281
.0108	0.3	10,032	10,103	10,895	11,495	12,064	12,872	15,258	22,390
.0144	0.4	11,582	11,665	12,579	13,272	13,930	14,862	17,618	25,853
.0180	0.5	12,948	13,040	14,063	14,837	15,573	16,615	19,696	28,903
.0216	0.6	14,182	14,283	15,403	16,251	17,057	18,200	21,575	31,661
.0252	0.7	15,316	15,426	16,636	17,552	18,423	19,657	23,302	34,197
.0288	0.8	16,372	16,489	17,783	18,762	19,693	21,012	24,910	36,558
.0324	0.9	17,363	17,487	18,859	19,898	20,886	22,285	26,419	38,774
.0360	1.0	18,300	18,431	19,877	20,973	22,014	23,489	27,847	40,871
.0720	2.0	25,849	26,034	28,082	29,633	31,106	33,194	39,361	57,786
.1080	3.0	31,620	31,847	34,359	36,259	38,066	40,625	48,183	70,756
.1440	4.0	36,468	36,731	39,633	41,830	43,918	46,875	55,607	81,682
.1800	5.0	40,724	41,017	44,266	46,725	49,060	52,369	62,139	91,301

Vertical Valves

		Sizes Available													Ambient Temperature
		NPT								Flanged					UL -40° to 150° F CA DSA: -10° to 150°F
		3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	2"	2 1/2"	3"	4"	6"	8"	
Maximum Pressures of Available Sizes	7 psi	✓	✓	✓	✓											Fluid
	60 psi	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Natural gas LP gas

Model 143-80 Service Regulator

Installation and Maintenance Instructions



The Model 143-80 is a general purpose pressure regulator used for natural gas, air, dry CO_2, propane, butane, nitrogen, and other gases. It can be used for gas services to homes, commercial establishments and small industries as well as burners, unit heaters, boilers, and other equipment. Model 143-80-1 is a standard regulator, Model 143-80-2 includes an internal relief valve, and Model 143-80-6 offers low pressure cut-off.

Warning

Only qualified personnel should install or service a regulator. Regulators should be installed, operated, and maintained in accordance with applicable codes and regulations, and Sensus instructions.

If the regulator vents fluid or a leak develops in the system, it indicates that service is required. Failure to take the regulator out of service immediately may create a hazardous condition. Personal injury, equipment damage, or leakage due to escaping fluid or bursting of pressure-containing parts may result if this regulator is over pressured or is installed where service conditions could exceed published specification limits, or where conditions exceed any ratings of the adjacent piping or piping connections.

To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices (as required by the appropriate code, regulation, or standard) to prevent service conditions from exceeding limits.

Additionally, physical damage to the regulator could result in personal injury and property damage due to escaping fluid. To avoid such injury and damage, install the regulator in a safe location.

Installation and Start-Up

1. Remove the shipping plugs from both the regulator inlet and outlet connections.
2. Make certain that the inside of the piping and the regulator inlet and outlet connections are free of dirt, pipe dope and other debris.
3. 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.
4. Install the regulator in the piping. Make certain that the gas flow through the regulator is in the direction as indicated by the arrow on the regulator body.

The regulators 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 any angle increment. To rotate the 143-80 diaphragm case, loosen the coupling nut **(12)** and reposition the diaphragm case to the desired position. Retighten the coupling nut to 35-50 ft-lbs. (**12)** to reseal the regulator. Ensure proper seal and verify no leaks by using a soap and water solution or other utility-approved method.

The diaphragm case vent **(11)** should be positioned to minimize the chances of moisture collecting on the vent side of the diaphragm.

The diaphragm case vent must be positioned to protect against flooding, rain, 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 (**4)** may be rotated by removing the upper-to-lower case flange screws (**10)** and rotating the upper diaphragm case to the desired position. Reinstall the diaphragm flange screws and tighten to hold the diaphragm case in position, ensuring proper seal and no leaks.

Caution

Do not overload the diaphragm with a sudden surge of inlet pressure. Turn the gas on very slowly. If an outlet stop is used, it should be opened first. Monitor the outlet pressure during start-up to prevent an outlet pressure overload.

5. Turn the gas on very slowly.
6. If installing model 143-80-6 Low Pressure Cutoff (LPCO), remove cap **(1)** and pull up pin located inside spring housing to deactivate LPCO device and initiate flow through the regulator.
7. Make certain that all connections are tight. Ensure proper seal and verify no leaks by using a soap and water solution or other utility-approved method.
8. If needed, adjust outlet pressure (set point) by removing cap **(1)** and turning adjustment spring button **(2)**. Turn clockwise to increase and counter-clockwise to decrease outlet pressure. Only adjust when gas is flowing through regulator. Be sure to reinstall cap.

Model 143-80 Service Regulator

Installation and Maintenance Instructions

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

9. The vent connection is an escape path for the regulated gas. Depending upon the type of gas, it could be flammable as with natural gas and propane. Therefore, the vent connection needs to 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. Run vent piping from the regulator vent connection to a non-hazardous location on the outside away from any potential sources of ignition. For regulators equipped with internal relief valves (IRV), The vent piping must be vent connection size or larger and its length be as short and direct as possible to a safe area. This is to assure the venting of the internal relief valve discharge to the atmosphere without excessive pressure increase in the regulator and downstream piping.

   The outlet of the vent piping must allow for free and unobstructed passage of air and gas and must be protected against the potentials listed in instructions #4, #8 and #9.

10. For outdoor installations, it is recommended that the regulator be installed so that the regulator vent faces downward to avoid the potential for water and 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 independent upon particular operating conditions. To assure continuous satisfactory operation, a periodic inspection schedule must be adhered with the frequency of inspection determined by the severity of service and applicable laws and regulations.

Servicing

1. To access valve **(7)**, orifice **(6)**, or diaphragm assembly **(8)**, first remove spring compression by unscrewing the spring cap **(1)** and spring adjustment ferrule **(2)**. Remove spring **(3)** from regulator.
2. For access to the valve **(7)** and orifice **(6)**, completely loosen the coupling nut **(12)** and remove diaphragm case assembly from body **(5)**.
3. To replace valve pad **(7)**, simply pull off of valve stem **(9)** and replace with new pad.
4. To replace orifice **(6)**, unscrew from body using a 1" hex socket wrench "thin-wall" type. Apply sealant on threads of orifice when installing replacement orifice. The replacement orifice must be installed at 50-60 ft-lbs. of torque.
5. To replace diaphragm assembly, remove flange screws **(10)** and disassemble diaphragm assembly. Make certain all parts are reassembled in their correct order and all threads and joints are tightened evenly and firmly.
6. Before reassembling body to diaphragm case, make certain that the O-ring is in position. Ensure proper seal and verify no leaks by using a soap and water solution or other utility-approved method.

Over Pressurization Protection

Protection must be provided for the downstream piping system and the regulator's low pressure chambers to assure against the potential for 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, or other applicable standards. The methods of providing overpressure protection could be a relief valve, a monitor regulator, a shut-off valve or similar device.

Buried Service

The Model 143-80 regulator is not recommended for buried service.

Temperature Limits

The Model 143-80 regulator can be used for the flowing temperature of -20°F to 150°F (-28.9°C to 65.5°C).

Maximum Emergency Pressures

The maximum pressure to which the regulator inlet may be subjected under abnormal conditions, without causing damage to the regulator, is the stated Maximum Inlet Pressure + 50 psi.

The maximum pressure to which the regulators case may be subjected under abnormal conditions without causing damage to the internal parts is: Set point plus 3 psi. 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 diaphragm case is 10 psi (safely contained means no leakage as well as no bursting.)

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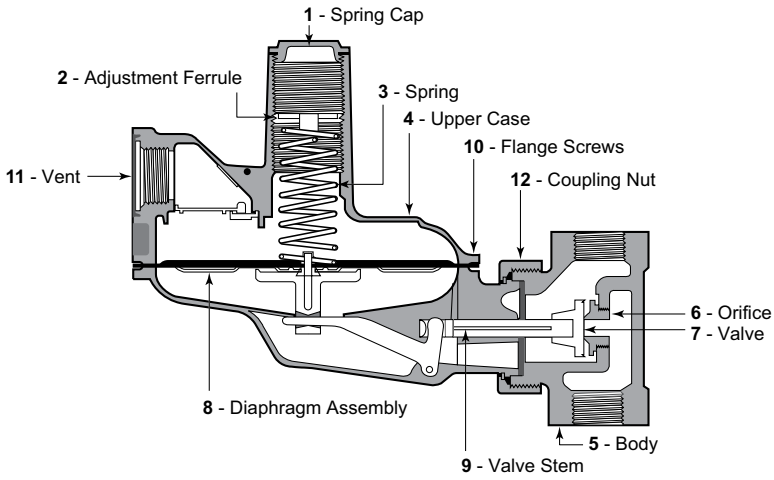
Model 143-80 Service Regulator

Installation and Maintenance Instructions



The Model 143-80 is a general purpose pressure regulator used for natural gas, air, dry CO_2, propane, butane, nitrogen, and other gases. It can be used for gas services to homes, commercial establishments and small industries as well as burners, unit heaters, boilers, and other equipment. Model 143-80-1 is a standard regulator, Model 143-80-2 includes an internal relief valve, and Model 143-80-6 offers low pressure cut-off.

Warning

Only qualified personnel should install or service a regulator. Regulators should be installed, operated, and maintained in accordance with applicable codes and regulations, and Sensus instructions.

If the regulator vents fluid or a leak develops in the system, it indicates that service is required. Failure to take the regulator out of service immediately may create a hazardous condition. Personal injury, equipment damage, or leakage due to escaping fluid or bursting of pressure-containing parts may result if this regulator is over pressured or is installed where service conditions could exceed published specification limits, or where conditions exceed any ratings of the adjacent piping or piping connections.

To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices (as required by the appropriate code, regulation, or standard) to prevent service conditions from exceeding limits.

Additionally, physical damage to the regulator could result in personal injury and property damage due to escaping fluid. To avoid such injury and damage, install the regulator in a safe location.

Installation and Start-Up

1. Remove the shipping plugs from both the regulator inlet and outlet connections.
2. Make certain that the inside of the piping and the regulator inlet and outlet connections are free of dirt, pipe dope and other debris.
3. 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.
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The regulators 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 any angle increment. To rotate the 143-80 diaphragm case, loosen the coupling nut **(12)** and reposition the diaphragm case to the desired position. Retighten the coupling nut to 35-50 ft-lbs. (**12)** to reseal the regulator. Ensure proper seal and verify no leaks by using a soap and water solution or other utility-approved method.

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Caution

Do not overload the diaphragm with a sudden surge of inlet pressure. Turn the gas on very slowly. If an outlet stop is used, it should be opened first. Monitor the outlet pressure during start-up to prevent an outlet pressure overload.

5. Turn the gas on very slowly.
6. If installing model 143-80-6 Low Pressure Cutoff (LPCO), remove cap **(1)** and pull up pin located inside spring housing to deactivate LPCO device and initiate flow through the regulator.
7. Make certain that all connections are tight. Ensure proper seal and verify no leaks by using a soap and water solution or other utility-approved method.
8. If needed, adjust outlet pressure (set point) by removing cap **(1)** and turning adjustment spring button **(2)**. Turn clockwise to increase and counter-clockwise to decrease outlet pressure. Only adjust when gas is flowing through regulator. Be sure to reinstall cap.

Model 143-80 Service Regulator

Installation and Maintenance Instructions

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

9. The vent connection is an escape path for the regulated gas. Depending upon the type of gas, it could be flammable as with natural gas and propane. Therefore, the vent connection needs to 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. Run vent piping from the regulator vent connection to a non-hazardous location on the outside away from any potential sources of ignition. For regulators equipped with internal relief valves (IRV), The vent piping must be vent connection size or larger and its length be as short and direct as possible to a safe area. This is to assure the venting of the internal relief valve discharge to the atmosphere without excessive pressure increase in the regulator and downstream piping.

   The outlet of the vent piping must allow for free and unobstructed passage of air and gas and must be protected against the potentials listed in instructions #4, #8 and #9.

10. For outdoor installations, it is recommended that the regulator be installed so that the regulator vent faces downward to avoid the potential for water and 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 independent upon particular operating conditions. To assure continuous satisfactory operation, a periodic inspection schedule must be adhered with the frequency of inspection determined by the severity of service and applicable laws and regulations.

Servicing

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Over Pressurization Protection

Protection must be provided for the downstream piping system and the regulator's low pressure chambers to assure against the potential for 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, or other applicable standards. The methods of providing overpressure protection could be a relief valve, a monitor regulator, a shut-off valve or similar device.

Buried Service

The Model 143-80 regulator is not recommended for buried service.

Temperature Limits

The Model 143-80 regulator can be used for the flowing temperature of -20°F to 150°F (-28.9°C to 65.5°C).

Maximum Emergency Pressures

The maximum pressure to which the regulator inlet may be subjected under abnormal conditions, without causing damage to the regulator, is the stated Maximum Inlet Pressure + 50 psi.

The maximum pressure to which the regulators case may be subjected under abnormal conditions without causing damage to the internal parts is: Set point plus 3 psi. 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 diaphragm case is 10 psi (safely contained means no leakage as well as no bursting.)

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Model 243 Service Regulators

Construction and Design Features

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 such as 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 CO_2, 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	Standard* Regulator	243-8-1
243-12-2	Regulator with Internal Relief Valve (IRV)	243-8-2
243-12-4	Regulator with Low Pressure Cut-Off (LPCO)	243-8-4
243-12-6	Regulator with both IRV and LPCO	243-8-6
	High Pressure Regulator	243-8HP
	Pressure Loaded Regulator	243-8PL

For additional information on IRV refer to page 4. For LPCO refer to page 5.
*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.	143-82-021-02
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 4¼ 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", 1½" 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 -20ºF to 150ºF.

Buried Service

The Model 243 regulator is **not** recommended for buried service.

Maximum Inlet Pressure, psig

Regulator Model and Size	1¼" 30°	*1¼" 10°	1" 30°	*1" 10°	¾" 30°	¾" 10°	½" 10°	⅜" 10°	¼" 10°	.207" 10°
1¼", 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	-
1¼", 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	-
1¼", 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. 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 6 to 22.

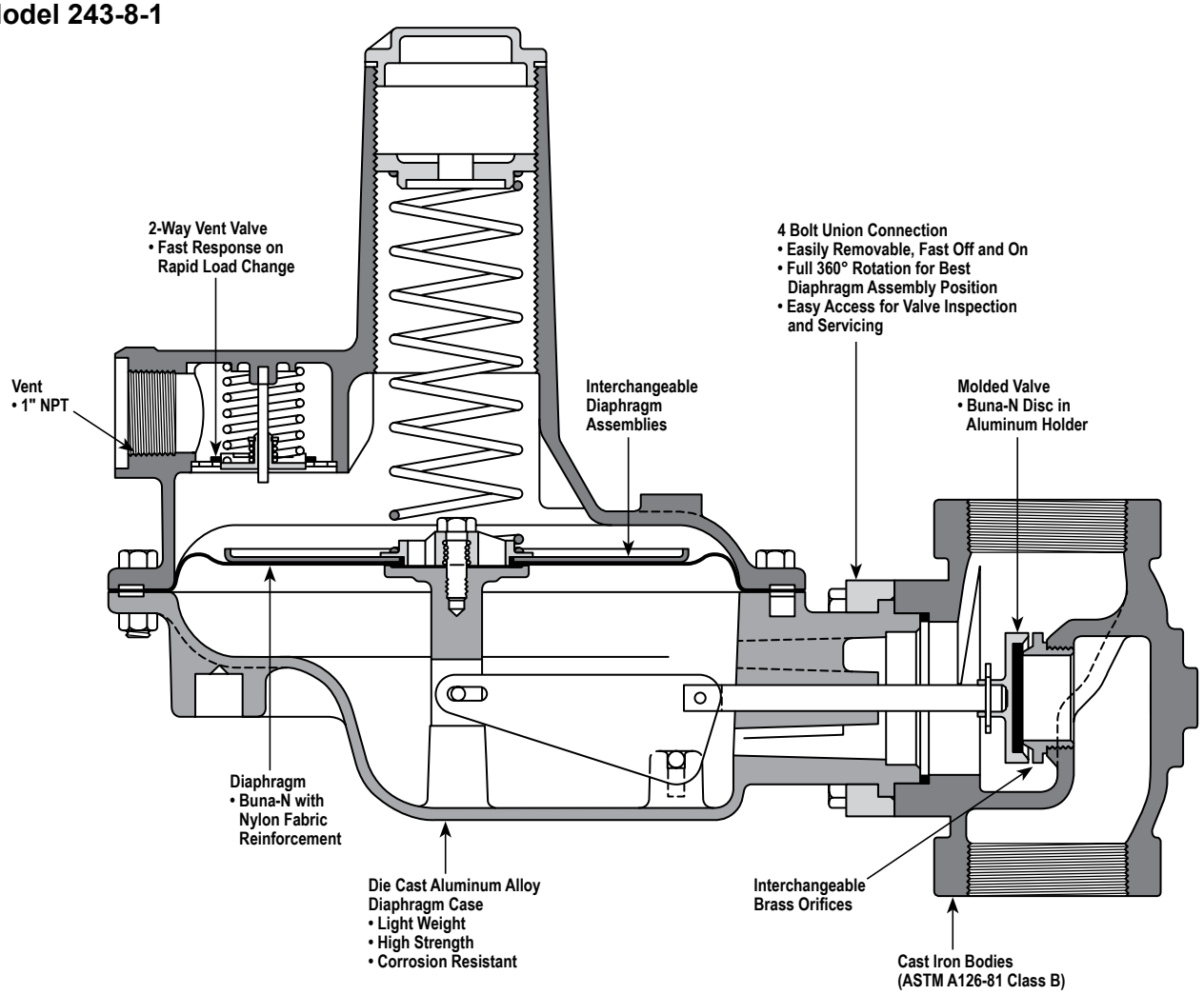
The 243 will hold outlet pressure within the indicated percentage limits from set flow (250 scfh) to the flows given in the capacity tables. Percentages are all based on absolute pressure using 14.4 psia as atmospheric.

As an example, referring to page 9, a 1½" Model 243-12- 2 with 1" orifice, 30º 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 table below, 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 5).

Setpoint	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 243-8-1

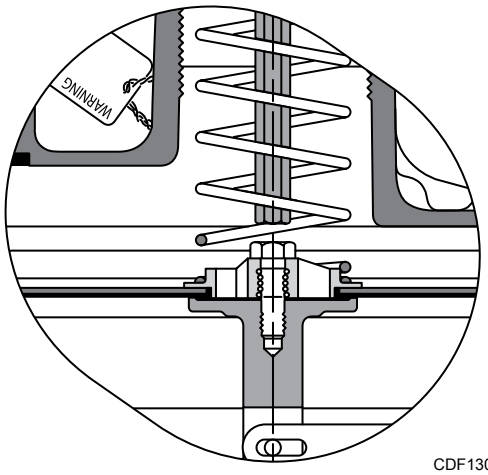


CDF1306-005

Pipe Sizes
2", 1½", 1¼" NPT Screwed*
2" Flanged ANSI 125

*Can also be furnished with British Standard Threads (BST)

Model 243-12-1 Travel Stop



CDF1306-010

A travel stop is located in the 243-12-1 and the 243-12-4 to provide overpressurization protection.

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-1306 for more detailed start-up procedures.

Operation of the Internal Relief Valve

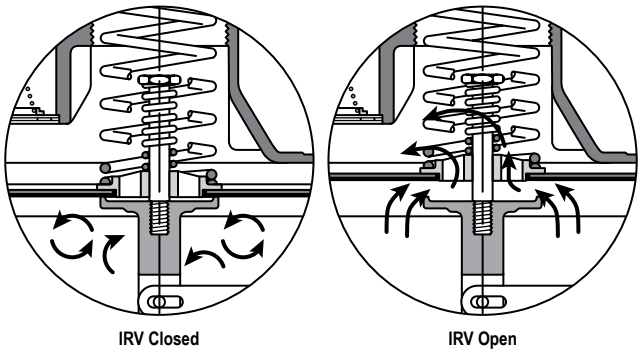
The internal relief valve (IRV) is optional (refer to Basic Models Table, page 1).

The IRV is built into the center of the diaphragm assembly as shown in the illustration and works in essentially the same way as standard relief valves.

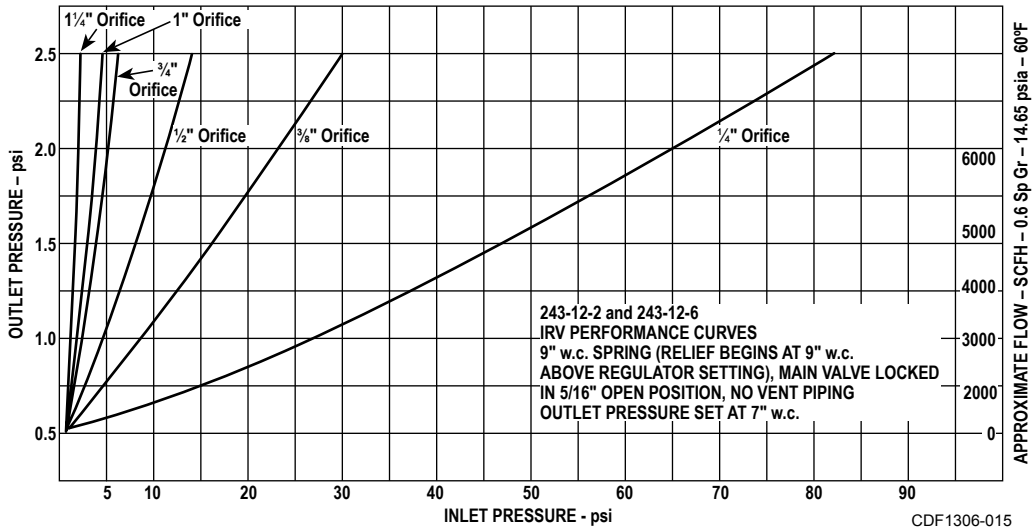
It opens when outlet pressure exceeds the setpoint by approximately 9" w.c. thereby allowing excess gas to escape through the vent to atmosphere. An optional spring is available on the 243-8-2 for relieving at approximately 20" w.c. above setpoint. A cross-section of a complete 243 with IRV is shown on page 5.

Performance is given on the curves below. The IRV will prevent the outlet pressure from exceeding the value shown by the curves upon regulator failure at the conditions specified.

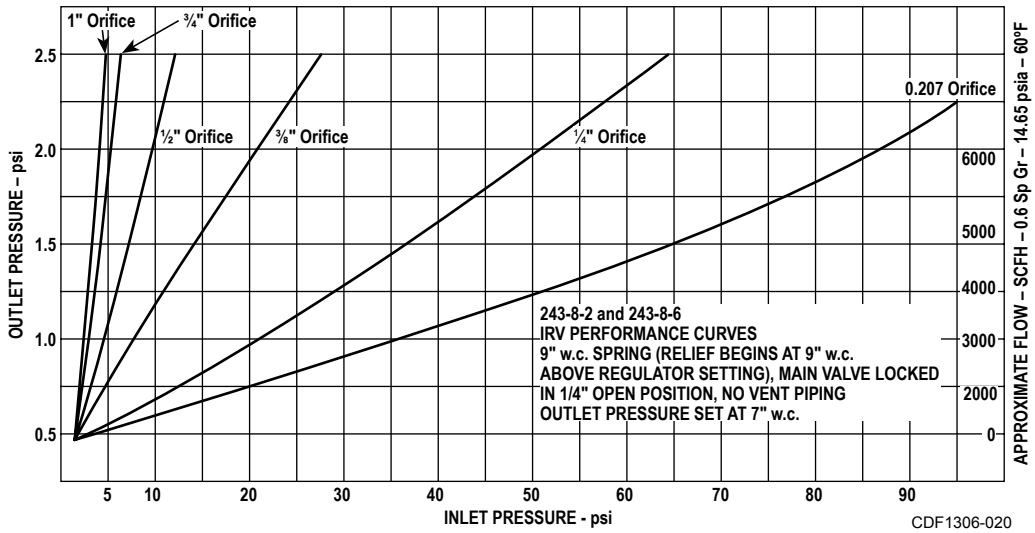
The IRV is a proven design of quality construction. Within its capacity limits it adds a measure of safety protection to the outstanding and dependable performance of the 243.



CDF1306-025



CDF1306-015



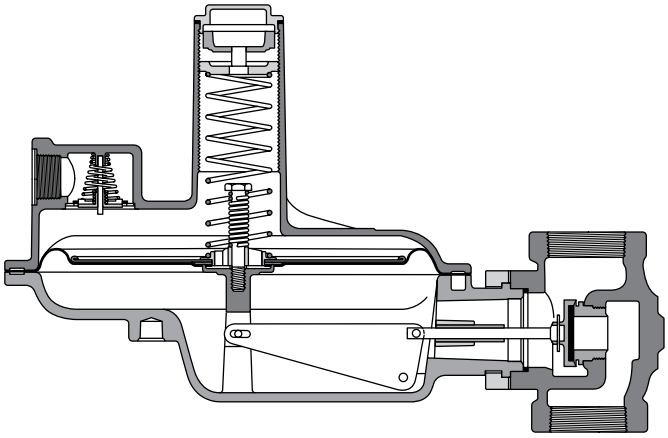
CDF1306-020

CAUTION

Note that an IRV, like any other relief valve, must be sized carefully. If the curves indicate that outlet pressure can exceed the maximum safe limit it is essential to provide an additional relief valve carefully sized to handle the difference.

243 Variations

Internal Relief Valve



CDF1306-030

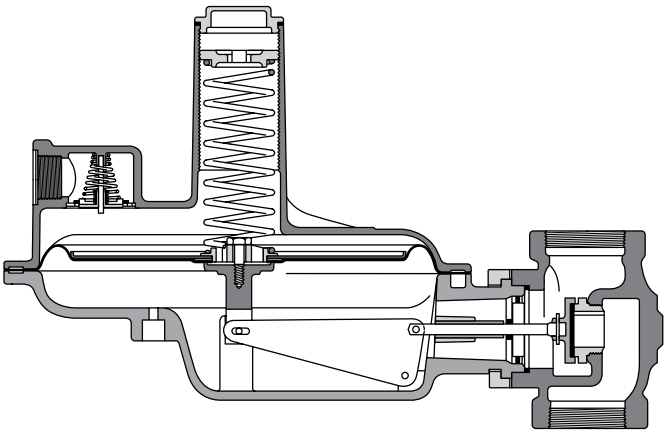
The 243 is available with an internal relief valve (IRV), which is a built-in safety device for providing a limited level of overpressurization protection.

Like any relief valve, an IRV must be carefully sized.

A more complete description plus performance data is given on page 4. For Basic Models, refer to the table on page 1.

Internal relief valves are not available in the high pressure Model 243-8HP.

Monitoring and External Control Line



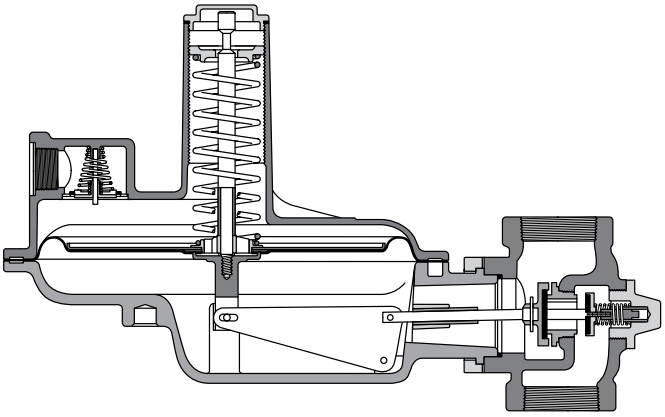
CDF1306-045

This 243 is used for the first regulator (upstream regulator) in a monitor set or for other applications requiring an external downstream control line.

A throat block with an o-ring stem seal isolates the lower diaphragm chamber which has a ½" FNPT connection for the external control line.

Use of this regulator for monitoring is shown on page 23. Capacities with the external control line are provided on pages 13 and 14.

Low Pressure Cut-Off



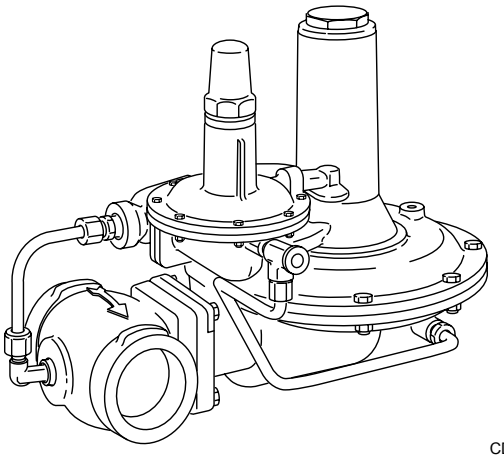
CDF1306-035

The low pressure cut-off (LPCO) is used for automatic gas shutoff when inlet pressure is too low for the required gas flow. Once closed, it must be manually reopened and reset.

Basic Models are given in the table at the bottom on page 1. Note: There is an LPCO version that also includes the internal relief valve.

Outlet pressures range from 4" w.c. to 30" w.c. and available orifices are ½", ¾" and 1".

Pilot Operated Regulator



CDF1306-050

The 243-RPC is a genuine pilot operated regulator.

Like its bigger brothers, it not only provides remarkably precise pressure regulation but it maintains that high level of accuracy even for wide variations in inlet pressure.

The 243-RPC can be used for any outlet pressure from 3½" w.c. to 35 psig with capacity ranging as high as 75,000 scfh.

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"	⅜"	¼"
		30°	30°	30°	10°	10°	10°	10°
Setpoint 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
Setpoint 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
Setpoint 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

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

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) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle						
		1¼"	1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	30°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	1	2500	2000	1400	1200	950	650	
	2	4200	3400	2700	2400	1500	1000	500
	5	8000	7100	5600	4700	2800	1800	950
	10	12000	12000	10500	7500	4800	2900	1400
	15	13500	14500	15000	9500	6500	3900	1700
	25		16500	20000	11500	9200	5300	2300
	40			20000	13500	12000	7500	3200
	60				15000	13000	10000	4400
	80					14000	12000	5600
	100					14000	12000	7000
	125						12000	8000
Setpoint 1 psi 0.31 psi Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	2	6500	5000	4000	4000	2000	1300	500
	5	8000	7500	6000	6000	4000	2200	1000
	10	9000	8500	8000	8000	5500	3000	1400
	15	12000	11000	10000	10000	7000	4000	1800
	25		13500	12500	11500	9500	5500	2400
	40			14000	13000	11000	7400	3300
	60				15000	13500	10000	4500
	80					15000	13000	6000
	100					16000	14000	7000
	125						14000	8500
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	2	3350	3000	2000	1900	1200	1000	500
	5	6600	5900	4200	3900	2400	1600	1000
	10	11000	10000	7600	6500	4100	2800	1450
	15	13000	12000	9300	8300	5600	3800	1700
	25		15000	16500	11000	8500	5300	2400
	40			20000	14000	12500	7500	3400
	60				15500	13000	10000	4400
	80					14000	12000	5600
	100					14000	12000	7000
	125						12000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature.
Changes in performance can occur at extreme low flowing temperatures.

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) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle						
		1¼"	1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	30°	10°	10°	10°	10°
Setpoint 2 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	8200	7400	5200	4800	2900	1900	900
	10	12500	11300	8700	7800	4800	3000	1400
	15	15500	14500	11500	10000	6500	3800	1700
	25		18000	16500	13500	9000	5300	2400
	40			20000	16500	12500	7600	3400
	60				16500	15500	10000	4600
	80					16000	12000	5600
	100					16000	12000	7000
	125						12000	8000
Setpoint 3 psi 0.35 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	3500	3000	2000	1800	1400	1100	750
	10	8000	7000	5500	5000	3000	2000	1100
	15	10500	10000	8000	7000	4000	3000	1600
	25		11500	9800	9000	5600	4500	2000
	40			21500	20000	10500	7500	3500
	60				21000	14500	10500	4500
	80					18000	13500	6000
	100					20500	16400	7500
	125						19000	9000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1½" 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"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red Spring 3½" to 6½" w.c. **143-16-021-03**	½	2000	1600	1300	700	500	
	1	2800	2500	2100	1200	800	400
	2	4000	3500	3200	2100	1300	600
	5	6100	5600	4800	3700	2200	1000
	10	8200	7700	6500	5600	3100	1400
	15	9300	9300	7400	6800	3900	1750
	25		11000	9100	8100	5100	2400
	40			10500	9800	7100	3200
	60			12000	11000	9300	4400
	80				12000	10500	5600
	100				12000	11000	7000
	125					11000	8000
Setpoint 7" w.c. 1" w.c. Droop Blue Spring 5" to 8½" w.c. **143-16-021-04**	½	1800	1550	1100	600	500	
	1	2600	2300	1850	1100	750	400
	2	3800	3300	2600	1900	1250	600
	5	5700	5100	4200	3300	2100	1000
	10	8200	7600	6000	5400	3100	1400
	15	9300	9100	7000	6600	3900	1750
	25		11000	8400	7800	5100	2400
	40			10000	9500	7100	3200
	60			10500	10500	9300	4400
	80				11500	10500	5600
	100				12000	11000	7000
	125					11000	8000
Setpoint 11" w.c. 2" w.c. Droop Green Spring 6" to 14" w.c. **143-16-021-05**	1	2700	2300	1900	1100	750	400
	2	4000	3500	2700	1900	1200	600
	5	6000	5600	4500	3500	2100	1000
	10	8800	8200	6500	5500	2900	1400
	15	10000	9800	7700	6800	3800	1750
	25		11500	9700	8100	5100	2400
	40			11500	9700	7100	3200
	60			12500	11500	9300	4400
	80				12000	10500	5600
	100				12500	11000	7000
	125					11000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

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

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1¼"	1"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	1	1800	1300	1100	800	500	
	2	3000	2800	2200	1500	1000	500
	5	5600	5200	4200	2600	1800	950
	10	8600	7700	6000	4300	2900	1400
	15	10000	9300	7400	5800	3800	1750
	25		11500	9100	7800	5100	2400
	40			11000	9500	7100	3200
	60			12500	11000	9300	4400
	80				12500	10500	5600
	100				13000	11000	7000
	125					11000	8000
Setpoint 1 psi 0.31 psi Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	2	6500	5000	4000	2000	1300	500
	5	8000	7500	6000	4000	2200	1000
	10	9000	8500	8000	5500	3000	1400
	15	12000	11500	10000	7000	4000	1800
	25		13500	11500	9500	5500	2400
	40			13000	11000	7400	3300
	60			15000	13500	10000	4500
	80				15000	13000	6000
	100				16000	14000	7000
	125					14000	8500
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	2	2800	2450	1500	1200	850	500
	5	5500	5100	3700	2400	1600	950
	10	8000	7500	5700	4000	2700	1400
	15	10000	9100	7100	5300	3700	1750
	25		11000	9300	7300	5100	2400
	40			11000	9300	7100	3200
	60			12500	11000	9300	4600
	80				12500	10500	5600
	100				13000	11000	7000
	125					11000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

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

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1¼"	1"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	3500	3000	2000	1400	1100	500
	10	7000	6000	5000	2500	2000	1000
	15	9000	8000	7000	3500	2500	1500
	25		10000	8000	4800	4500	1900
	40			11500	6500	6000	3500
	60			14000	8000	7500	4500
	80				9000	8000	6000
	100				12000	11000	7000
	125					12000	8500
Setpoint 2 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	6000	5300	4100	2700	1700	900
	10	10000	9300	7100	4700	2900	1400
	15	13000	12000	8800	6200	3800	1700
	25		14500	11000	8600	5200	2400
	40			13500	11000	7100	3200
	60			15000	13500	10000	4600
	80				15000	12000	5600
	100				16000	12000	7000
	125					12000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1¼", 1½" and 2" Model 243-12-1 with External Control Line 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"	½"	⅜"	¼"
		10°	10°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red Spring 3½" to 6½" w.c. **143-16-021-03**	½	2200	1900	1600	800	500	
	1	3600	3200	2300	1300	850	400
	2	5600	4700	3500	2000	1400	600
	5	10500	8200	5700	3500	2200	1000
	10	15000	12000	8900	5200	3000	1500
	15	19000	16000	12000	6700	4000	1750
	25	22000	20000	16000	9000	5200	2400
	40		24000	21000	12000	7500	3200
	60			27000	15500	10000	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 7" w.c. 1" w.c. Droop Blue Spring 5" to 8½" w.c. **143-16-021-04**	½	2000	1700	1500	700	450	
	1	3100	2600	2000	1100	750	400
	2	5000	3800	3000	1700	1200	600
	5	7800	6500	5000	3100	2000	1000
	10	13000	10000	7000	4800	2900	1500
	15	15000	14000	9400	6400	4000	1750
	25	20000	17000	13500	8500	5200	2400
	40		21000	17000	11500	7500	3200
	60			19000	15000	10000	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 11" w.c. 2" w.c. Droop Green Spring 6" to 14" w.c. **143-16-021-05**	1	3200	2500	1900	1100	700	350
	2	5200	4200	3200	1800	1300	550
	5	8500	7200	5200	3200	2000	1000
	10	13500	11000	8000	5000	3000	1500
	15	16000	14000	11000	6500	4000	1750
	25	20000	17000	14000	9000	5200	2400
	40		24000	21000	12000	7000	3200
	60			25000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000

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

* 2" Body Only.

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

Model 243 Capacity Tables

1¼", 1½" and 2" Model 243-12-1 with External Control Line in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1¼"*	1"	¾"	½"	⅜"	¼"
		10°	10°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	1	2400	2000	1200	900	600	300
	2	4200	3200	2000	1500	1000	500
	5	6500	5500	4100	2700	1600	950
	10	11000	8000	6200	4200	2800	1500
	15	14500	11000	8000	5800	3800	1750
	25	18000	15000	11500	8000	5000	2400
	40		21000	15000	11000	7000	3200
	60			20000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	2	3500	2900	1700	1300	850	500
	5	7000	5400	4000	2600	1600	950
	10	10500	8500	5800	4000	2800	1500
	15	14500	10500	7600	5400	3800	1750
	25	18000	14500	10500	7500	5000	2400
	40		20000	15000	10500	7000	3200
	60			20000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 2 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	8600	6800	5300	2700	1900	850
	10	13000	10500	7500	4500	2900	1400
	15	17500	13500	10500	6000	3800	1750
	25	25000	20000	14000	8500	5000	2400
	40		25000	20000	12000	7000	3200
	60			25000	15000	10000	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000

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

* 2" Body Only.

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

Model 243 Capacity Tables

1½" and 2" Model 243-8-1 and 243-8-2 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					
		1"	¾"	½"	⅜"	¼"	0.207"
		30°	10°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red-Black Spring 3½" to 6½" w.c. **143-82-021-00**	½	1100	900	700	500		
	1	1950	1600	1050	750	350	
	2	3200	2400	1550	1000	550	350
	5	5200	3900	2700	1900	950	550
	10	7400	5800	4500	3000	1350	900
	15	9100	7100	5800	3800	1700	1150
	25	12500	8700	7200	5100	2400	1500
	40		10500	9200	7100	3200	2100
	60			11000	9300	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600
Setpoint 7" w.c. 1" w.c. Droop Blue-Black Spring 5" to 8½" w.c. **143-82-021-01**	½	1000	750	650	400		
	1	1600	1150	900	650	300	
	2	2700	1800	1350	950	450	350
	5	4800	3500	2350	1600	770	500
	10	7000	5400	3900	2500	1250	900
	15	9100	7000	5000	3500	1700	1150
	25	12500	8700	6600	5100	2400	1500
	40		10500	9000	7100	3200	2100
	60			11000	9300	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600
Setpoint 11" w.c. 2" w.c. Droop Green-Black Spring 6" to 14" w.c. **143-82-021-02**	1	1650	1150	1000	650	300	
	2	2700	2000	1400	1000	450	350
	5	4800	3800	2600	1750	900	600
	10	7000	5400	4200	2800	1300	900
	15	9000	7400	5500	3600	1700	1100
	25	11000	8800	7500	5100	2400	1500
	40		11000	9600	7100	3200	2100
	60			11000	9300	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1½" Models 243-8-1 and 243-8-2 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					
		1"	¾"	½"	⅜"	¼"	0.207"
		30°	10°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Green Spring 12" to 28" w.c. **143-16-021-05**	1	1500	1100	800	550		
	2	2100	1700	1300	900	450	350
	5	4500	3400	2000	1350	850	600
	10	6600	5700	3500	2400	1300	850
	15	8800	7100	5000	3400	1700	1050
	25	11500	9100	7100	5100	2400	1500
	40		11000	9300	7100	3200	2100
	60			11000	9400	4400	2900
	80			12000	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600
Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c. **143-16-021-05**	2	4000	3500	1800	1200	500	
	5	6000	5000	3500	2200	1000	
	10	7500	7000	5000	3000	1500	
	15	9000	8000	6500	4000	1850	
	25	12000	10000	8000	5000	2000	
	40		12500	9500	7000	3000	
	60			11500	9500	4500	
	80			12500	11500	6000	
	100				12500	7000	
	125					8000	
Setpoint 1 psi 0.2 psi Droop Orange Spring 1 to 2 psi **143-16-021-06**	2	2100	1650	1200	850	450	
	5	4000	3200	2100	1300	850	550
	10	6500	5200	3100	2200	1300	800
	15	8400	6500	4400	3000	1700	1000
	25	11000	8600	6500	4400	2400	1500
	40		11000	8600	6700	3200	2100
	60			10500	9000	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1½" Models 243-8-1 and 243-8-2 in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1"	¾"	½"	⅜"	¼"	0.207"
		30°	10°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	3000	1800	1200	1100	900	
	10	4000	2500	1800	1500	1000	
	15	5200	4000	2850	2000	1400	
	25	7000	5200	3600	3100	1800	
	40		9000	5000	4200	2200	
	60			8300	6500	3000	
	80			10000	8500	5000	
	100				9000	6000	
	125					8000	
Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	4400	3400	2400	1600	800	
	10	7100	5900	3600	2400	1300	750
	15	9600	7500	4800	3400	1700	1000
	25	12500	10500	6500	5000	2400	1500
	40		13000	9600	7000	3200	2100
	60			12500	9300	4400	2900
	80			13500	11000	5600	3700
	100				12000	7000	4500
	125					8000	5600

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1¼" Models 243-8-1, 243-8-2, 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 243-12	Outlet Pressure and Spring 243-8	Inlet Pressure psi	Orifice Size and Valve Angle				
			¾"	½"	⅜"	¼"	0.207"
			10°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red Spring 3½" to 6" w.c. **143-16-021-03**	Setpoint 6" w.c. 1" w.c. Droop Red-Black Spring 3½" to 6½" w.c. **143-82-021-00**	½	900	700	500		
		1	1600	1050	750	350	
		2	2250	1500	1000	550	350
		5	2500	2200	1900	950	550
		10	3100	2900	2650	1350	900
		15	3550	3600	2700	1700	1050
		25	4200	3800	3300	2400	1500
		40	4200	4100	3800	3200	2100
		60		4800	4400	4400	2900
		80		5600	5600	5600	3700
		100			6000	6000	4500
		125				6000	5600
Setpoint 7" w.c. 1" w.c. Droop Blue Spring 5" to 8½" w.c. **143-16-021-04**	Setpoint 7" w.c. 1" w.c. Droop Blue-Black Spring 5" to 8½" w.c. **143-82-021-01**	½	750	650	400		
		1	1150	900	650	300	
		2	1700	1300	950	450	350
		5	2300	1900	1600	770	500
		10	2900	2600	2200	1250	900
		15	3500	3100	2500	1700	1050
		25	4200	3600	3300	2400	1500
		40	4800	4000	3800	3200	2100
		60		4600	4400	4400	2900
		80		5600	5600	5600	3700
		100			6000	6000	4500
		125				6000	5600
Setpoint 11" w.c. 2" w.c. Droop Green Spring 6" to 14" w.c. **143-16-021-05**	Setpoint 11" w.c. 2" w.c. Droop Green-Black Spring 6" to 14" w.c. **143-82-021-02**	1	1150	1000	650	300	
		2	1850	1350	1000	450	350
		5	2500	2200	1750	800	550
		10	2900	2700	2450	1300	900
		15	3700	3950	2600	1700	1100
		25	4250	4000	3300	2400	1500
		40	5300	4200	3800	3200	2100
		60		4850	4400	4400	2900
		80		5850	5600	5600	3700
		100			6000	7000	4500
		125				8000	5600

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

NOTE: 1" x 30º and 1¼" x 30º orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

Model 243 Capacity Tables

1¼" Models 243-8-1, 243-8-2, 243-12-1 and 243-12-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring 243-12	Outlet Pressure and Spring 243-8	Inlet Pressure psi	Orifice Size and Valve Angle				
			¾"	½"	⅜"	¼"	0.207"
			10°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	Setpoint 18" w.c. 3" w.c. Droop Green Spring 12" to 28" w.c. **143-16-021-05**	1	1100	800	500		
		2	1900	1250	900	450	350
		5	2250	1700	1350	750	550
		10	2950	2250	2100	1300	850
		15	3450	3600	2450	1700	1050
		25	4400	3750	3300	2400	1500
		40	5300	4100	3800	3200	2100
		60		4800	4400	4400	2900
		80		4850	5600	5600	3700
		100			6000	7000	4500
		125				8000	5600
Setpoint 1 psi 0.31 psi Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c. **143-16-021-05**	2	3000	1800	1200	500	
		5	4000	3000	2000	1000	
		10	5000	4000	3000	1500	
		15	6000	5100	3900	1900	
		25	7500	6400	4500	2200	
		40	8000	7400	6100	2600	
		60		8000	7350	4000	
		80		8500	8000	5100	
		100			8500	6500	
		125				7000	
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	Setpoint 1 psi 0.2 psi Droop Orange Spring 1 to 2 psi **143-16-021-06**	2	1850	1150	850	450	
		5	2100	1700	1350	750	500
		10	2700	2000	1950	1300	800
		15	3150	3100	2050	1700	1000
		25	4150	3250	2850	2400	1500
		40	5300	3800	3600	3200	2100
		60		4600	4250	4400	2900
		80		4650	5600	5600	3700
		100			6000	7000	4500
		125				8000	5600

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

NOTE: 1" x 30º and 1¼" x 30º orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

Model 243 Capacity Tables

1¼" Models 243-8-1, 243-8-2, 243-12-1 and 243-12-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring 243-12	Outlet Pressure and Spring 243-8	Inlet Pressure psi	Orifice Size and Valve Angle				
			¾"	½"	⅜"	¼"	0.207"
			10°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	1200	1000	800	500	
		10	2000	1800	1400	1000	
		15	3300	2800	1800	1400	
		25	4700	3300	2300	1650	
		40	6300	4900	2800	2000	
		60		5800	5000	2800	
		80		6500	6400	4600	
		100			6500	4750	
		125				5000	
Setpoint 3 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	2200	1950	1650	700	
		10	3600	2300	2150	1300	750
		15	3800	3400	2350	1700	1000
		25	5000	3900	3250	2400	1500
		40	6300	4300	3700	3200	2100
		60		5500	4400	4400	2900
		80		5500	5850	5600	3700
		100			6550	7000	4500
		125				8000	5600

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

NOTE: 1" x 30º and 1¼" x 30º orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

Model 243 Capacity Tables

2" Models 243-8-1 and 243-8-2 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					
		1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Green Spring 12" to 28" w.c. **143-16-021-05**	1	1500	1200	1100	800	600	
	2	2400	1800	1700	1250	950	500
	5	5500	3700	3500	2300	1400	900
	10	9400	8400	6000	3700	2400	1400
	15	12000	12000	8100	5600	3800	1700
	25	14500	17500	10000	8200	5600	2400
	40		20000	12000	11500	7400	3400
	60				13500	10000	4600
	80				14000	11000	5600
	100					12000	7000
	125						8000
Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c. **143-16-021-05**	2	5000	4000	4000	3000	1000	500
	5	8000	7000	7000	4000	1900	1000
	10	14000	12800	10000	5500	3000	1500
	15	16500	14000	13900	7750	4500	1800
	25	17700	16900	15000	9000	5500	2500
	40		18000	16500	11500	7400	3200
	60				15000	10000	4600
	80				17000	13800	6100
	100					14000	7000
	125						9000
Setpoint 1 psi 0.2 psi Droop Orange Spring 1 to 2 psi **143-16-021-06**	2	2400	1800	1700	1200	850	450
	5	4000	3400	3300	2200	1300	900
	10	7000	6000	5400	3500	2200	1400
	15	11000	9000	7000	4600	3100	1700
	25	14500	15000	10000	7400	4800	2400
	40		17500	12000	10500	7000	3400
	60				12500	9500	4600
	80				13500	10500	5600
	100					11000	7000
	125						8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

2" Models 243-8-1 and 243-8-2 in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	2000	1600	1600	1400	1000	500
	10	4000	3000	3000	2000	1400	1000
	15	5800	4200	4000	2600	1800	1500
	25	7500	5200	5000	3900	2750	2300
	40		9100	9000	6500	5800	3100
	60				10000	7500	4600
	80				14000	10000	6000
	100					12000	7000
	125						9000
Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	4400	3400	3300	2400	1600	800
	10	7600	6000	5800	3600	2400	1300
	15	11000	9000	7500	4800	3500	1700
	25	15000	15000	10500	8000	5100	2400
	40		17500	13000	11000	7000	3400
	60				14000	9600	4600
	80				15000	11000	5600
	100					12000	7000
	125						8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

Model 243-8HP in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F)

Outlet Pressure	Inlet Pressure psi	1¼" Model 243-8HP				1½" Model 243-8HP					2" Model 243-8HP				
		Orifice Size and Valve Angle				Orifice Size and Valve Angle					Orifice Size and Valve Angle				
		¾" 10°	½" 10°	⅜" 10°	¼" 10°	1" 30°	¾" 10°	½" 10°	⅜" 10°	¼" 10°	1" 30°	¾" 10°	½" 10°	⅜" 10°	¼" 10°
Setpoint 5 psi 1 psi Droop Cadmium Spring 3 to 6½ psi **143-16-021-08**	10	3300	2050	2000	1300	6000	5500	3200	2300	1300	6000	5500	3200	2400	1300
	15	3400	3100	2200	1700	8600	6500	4400	3200	1700	8600	6000	4400	3200	1700
	25	4400	3650	3050	2400	12000	9300	6100	4800	2400	13000	8200	6100	4800	2400
	40	5800	3800	3200	3200		12000	8500	6100	3200		12000	8700	6100	3400
	60		4400	4100	4400			10000	8700	4400			10000	8700	4600
	80		4500	5300	5600			11000	10000	5600			11500	10000	5600
	100			6000	7000				11000	7000				11000	7000
	125				8000					8000					8000
Setpoint 7 psi 1 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	10	2300	2000	1800	1000	2500	2300	2000	1600	1000	2700	2500	2100	1600	1000
	15	3000	2800	2200	1400	5000	4000	2500	2200	1500	5900	4300	2800	2400	1500
	25	5400	4100	3300	2000	8500	6500	4300	3500	2000	8600	6600	4600	3600	2000
	40	7600	5600	4800	2800		9500	6500	5000	3000		10000	7200	5600	3000
	60		7500	6200	3800			9000	6500	4000			9700	7000	4500
	80		8800	7200	5200			11000	8500	5000			12000	9000	5500
	100			8600	5800				10500	5500				11500	7000
	125				7000					5500					5500
Setpoint 7 psi 2 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	10	5400	3500	2500	1400	8000	5500	3500	2500	1300	8600	6000	4300	2700	1400
	15	7400	5000	3500	1800	10500	8000	5000	3500	1700	12700	8900	5700	3800	1800
	25	10000	7600	5500	2500	15000	12000	8000	5000	2300	18600	13500	8600	5700	2400
	40	12500	10000	7500	3500		16000	11500	7500	3300		19000	12500	8000	3500
	60		12500	9500	4800			15000	9500	4500			17000	10000	4800
	80		14000	11500	6100			17500	12500	5500			20000	13500	6200
	100			13500	7200				15500	7000				16500	7300
	125				8800					7000					8100
Setpoint 10 psi 1 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	15	2500	2200	1800	1200	3500	3000	2000	1300	1000	3600	3000	2000	1800	1000
	25	4800	3500	2800	1900	6500	5000	3500	2500	1900	6800	5700	4000	3000	1900
	40	7200	5000	4000	2500		8000	5500	4300	2500		8600	5700	4600	2800
	60		6700	5700	3500		10500	7500	6000	3500			8600	6400	4300
	80		7800	6600	4600			9000	7500	4500			10500	8400	5200
	100			7800	5400				9500	6000				10700	6500
	125				6500					7000					8000
Setpoint 10 psi 2 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	15	6000	4000	2800	1700	8500	6500	4000	2500	1500	9000	6600	4800	3000	1500
	25	9000	6500	5000	2500	12000	10500	7000	4500	2300	15500	11000	7400	5000	2400
	40	12000	9000	7000	3500		15000	10000	7500	3000		16500	11000	7700	3200
	60		12000	9400	4700			14000	10000	4500			15000	10700	4800
	80		13000	11000	6000			17000	12000	5500			18500	13000	6000
	100			13000	7000				15000	7000				16000	7300
	125				8800					9000					9000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature.
Changes in performance can occur at extreme low flowing temperatures.

Maximum Emergency Pressures

NOTE: The use of an internal or external relief valve is recommended for installations subjected to no flow for extended periods of time, such as pilotless ignition systems. A travel stop stem is located in the 243-12-1 and 243-12-4 to provide over-pressurization protection to internal components during overpressurization.

The maximum pressure the regulator inlet may be subjected to under abnormal conditions without causing damage to the regulator is the maximum allowable inlet pressure (from the capacity tables, pages 6 through 22) plus 50 psi.

The maximum pressure the diaphragm may be subjected to without causing damage to the internal parts of the regulator is:

243-12-1 ..... Setpoint + 3 psi
243-12-2, 243-8-1 and 243-8-2 ..... Setpoint + 5 psi
243-8HP ..... Setpoint + 5 psi

Setpoint is defined as the outlet pressure that a regulator is adjusted to deliver.

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

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

243-12-1 and 243-12-2 ..... 15 psi
243-8-1 and 243-8-2 ..... 15 psi
243-8HP ..... 25 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 positive lockup. The allowable outlet pressure is the lowest of the maximum pressures permitted by federal codes, state codes, Bulletin RDS-1498 or other applicable standards. The method of protection can be a relief valve, monitor regulator, shut-off device or similar mechanism.

Monitoring

A monitor set consists of two regulators in series as shown in the figure. The monitor is the standby. It takes control if a failure in the operating regulator causes outlet pressure to exceed normal.

Either regulator may be used as the monitor. In both cases, the upstream regulator must have a blocked throat and external control line as shown for the 243 on page 5. Also, the control line for the upstream regulator connects into the outlet piping all the way downstream, which means downstream of the downstream regulator.

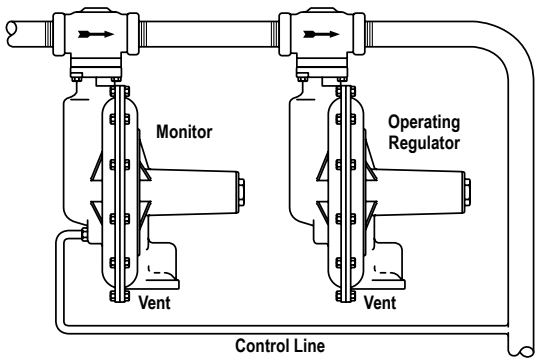
The illustration shows a typical 243 monitor set. While the downstream regulator is shown as operating and the upstream regulator is shown as the monitor, the two can be reversed. There are reasons for doing it either way depending on the user's practice. Stop and bypass valves (which are not shown) likewise would depend on the user's preference and practice.

Either way, the operating regulator is adjusted for the normal outlet pressure. The monitor is adjusted somewhat higher so it is normally full open. If a failure in the operating regulator causes excessive increase in outlet pressure, the monitor will go into operation to hold outlet pressure at its setpoint.

Monitoring is an effective and dependable method of providing overpressure protection. A significant advantage is that it provides the protection without wasting gas to atmosphere. Refer to Bulletin RDS-1306-2 (package monitor sets 243-DOT) for more information.

When a 243 is used to monitor another 243 with an identical orifice size, the total maximum capacity through both can be figured at 70% of the rated capacity for one regulator. This applies with the monitor located upstream or downstream.

243 MONITOR SET



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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-1306 field service instructions.**

Mounting Positions

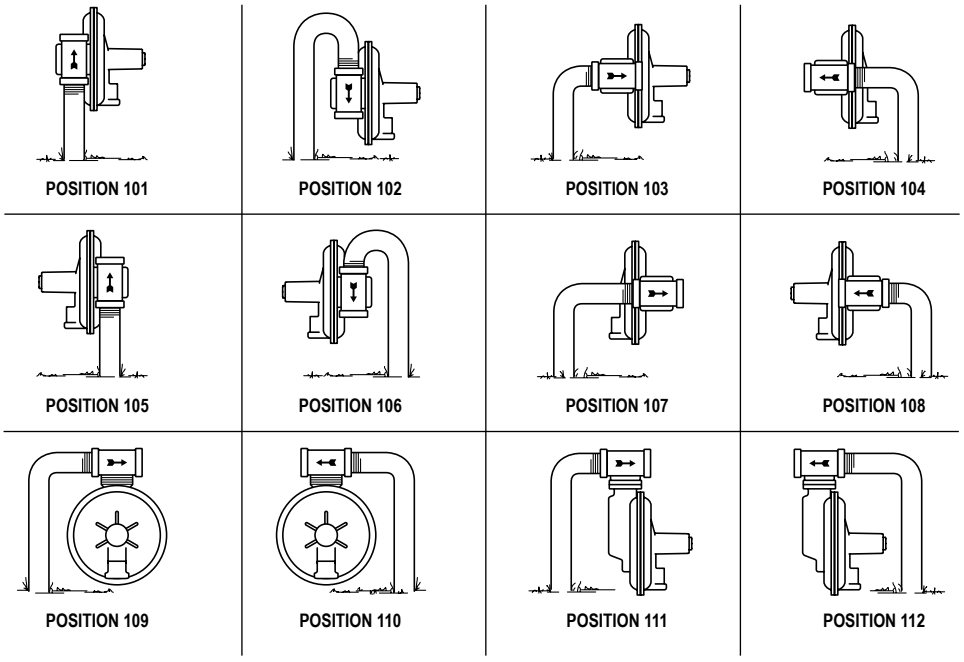
The 243 Service Regulator can be provided in any of the positions shown. Specify by position number when ordering.

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.

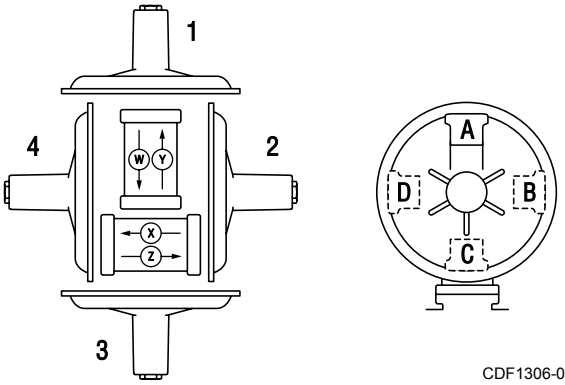
CAUTION

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.



CDF1306-060

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.



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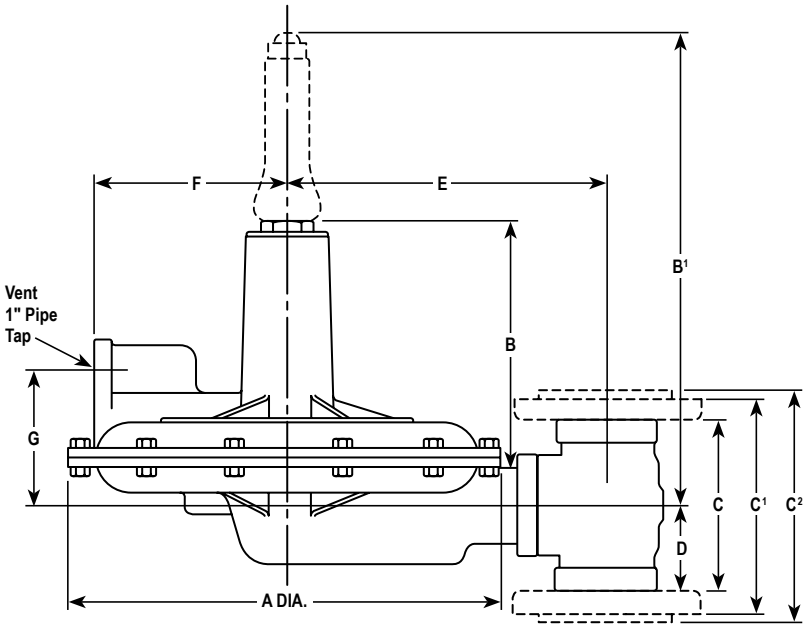
Dimensions



CDF1306-070

Model	243-12	243-8	243-8HP
A	14"	10 3/16"	10 3/16"
**B	9 3/4"	9 3/4"	-
B¹	-	-	12 3/4"
C	5 3/4"	5 3/4"	5 3/4"
***C¹	7 1/2"	7 1/2"	7 1/2"
C²	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

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. $Q = K\sqrt{P_o(P_i - P_o)}$ ..... (for $\frac{P_i}{P_o}$ less than 1.894)

2. $Q = \frac{KP_i}{2}$ ..... (for $\frac{P_i}{P_o}$ greater than 1.894)

Q = maximum capacity of the regulator (in SCGH of 0.6 specific gravity natural gas).
K = the **"K" factor**, the regulator constant (see below)
P_i = **absolute** inlet pressure (psia)
P_o = **absolute** outlet pressure (psia)

Orifice size:	.207"	¼"	⅜"	½"	¾"	1"	1¼"
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 6 through 22.

Other Gases

243 regulators are mainly used on natural gas. However, they perform equally as well on LP gas, nitrogen, dry CO_2, air and others. For capacities, multiply the table values on pages 6 thru 22 by 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 Mix (Specific Gravity 1.20)	0.71
Nitrogen (Specific Gravity 0.97)	0.79
Dry Carbon Dioxide (Specific Gravity 1.52)	0.63

For other non-corrosive gases use the following formula:

$$\text{CORRECTION FACTOR} = \sqrt{\frac{0.60}{\text{Specific gravity of the gas}}}$$

While used primarily on natural gas services, Model 243 regulators perform equally as well on LPG vapor, air, CO_2, nitrogen and other inert gas applications. Please contact your Sensus representative for special construction which may be available for certain corrosive gases.

How to Order

Specify:

1. Pipe size and model number (page 1)
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

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 CO_2,etc. For additional information on a particular model, please request the indicated bulletin from the local Sensus sales office, or visit our website at www.sensus.com

Multi-Purpose Service Regulators

Model 043-C
½", ¾", 1", 1¼" pipe sizes
Inlet pressures ..... to 125 psi
Outlet pressures ..... 5" w.c. to 5 psi
Capacity to 3500 SCFH
Available with 90° angle or straight-through body.
Standard with internal relief valve.

Model 143-80
¾", 1", 1¼" pipe sizes
Inlet pressures ..... to 125 psi
Outlet pressures ..... 3½" w.c. to 6 psi
Capacity to 2000 SCFH
Optional internal relief valve and low pressure cut-off.

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
¾", 1" and 1¼" pipe sizes
Inlet pressures ..... to 1000 psi
Outlet pressures ..... 3 to 200 psi
Capacity to 40,000 SCFH
Optional monitor and internal relief valve.

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.

Model 243-RPC
1¼", 1½" and 2" pipe sizes
Inlet pressures ..... to 150 psi
Outlet pressures ..... 3½" w.c. to 35 psi
Capacity to 76,000 SCFH

Sensus also produces industrial and combustion regulators; high pressure, high capacity regulators, and safety relief valves. Detailed information is available on request.

Notes:

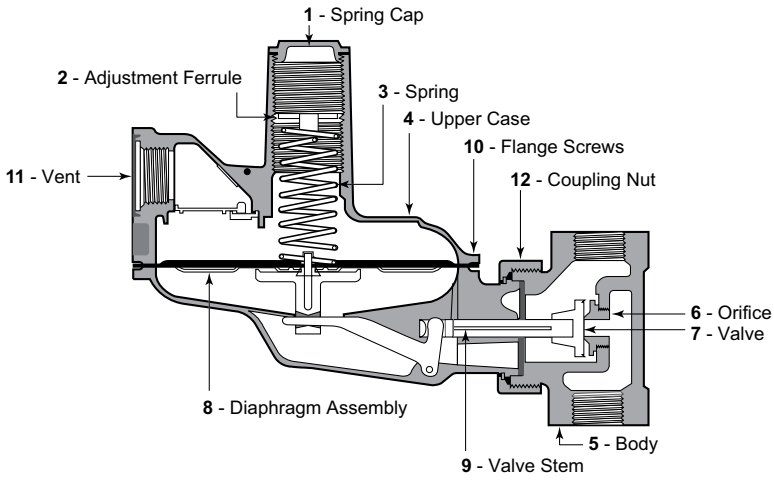
Notes:

Authorized Distributor:

805 Liberty Boulevard
DuBois, PA 15801
1-800-375-8875

Model 143-80 Service Regulator

Installation and Maintenance Instructions



The Model 143-80 is a general purpose pressure regulator used for natural gas, air, dry CO_2, propane, butane, nitrogen, and other gases. It can be used for gas services to homes, commercial establishments and small industries as well as burners, unit heaters, boilers, and other equipment. Model 143-80-1 is a standard regulator, Model 143-80-2 includes an internal relief valve, and Model 143-80-6 offers low pressure cut-off.

Warning

Only qualified personnel should install or service a regulator. Regulators should be installed, operated, and maintained in accordance with applicable codes and regulations, and Sensus instructions.

If the regulator vents fluid or a leak develops in the system, it indicates that service is required. Failure to take the regulator out of service immediately may create a hazardous condition. Personal injury, equipment damage, or leakage due to escaping fluid or bursting of pressure-containing parts may result if this regulator is over pressured or is installed where service conditions could exceed published specification limits, or where conditions exceed any ratings of the adjacent piping or piping connections.

To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices (as required by the appropriate code, regulation, or standard) to prevent service conditions from exceeding limits.

Additionally, physical damage to the regulator could result in personal injury and property damage due to escaping fluid. To avoid such injury and damage, install the regulator in a safe location.

Installation and Start-Up

1. Remove the shipping plugs from both the regulator inlet and outlet connections.
2. Make certain that the inside of the piping and the regulator inlet and outlet connections are free of dirt, pipe dope and other debris.
3. 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.
4. Install the regulator in the piping. Make certain that the gas flow through the regulator is in the direction as indicated by the arrow on the regulator body.

The regulators 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 any angle increment. To rotate the 143-80 diaphragm case, loosen the coupling nut **(12)** and reposition the diaphragm case to the desired position. Retighten the coupling nut to 35-50 ft-lbs. (**12)** to reseal the regulator. Ensure proper seal and verify no leaks by using a soap and water solution or other utility-approved method.

The diaphragm case vent **(11)** should be positioned to minimize the chances of moisture collecting on the vent side of the diaphragm.

The diaphragm case vent must be positioned to protect against flooding, rain, 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 (**4)** may be rotated by removing the upper-to-lower case flange screws (**10)** and rotating the upper diaphragm case to the desired position. Reinstall the diaphragm flange screws and tighten to hold the diaphragm case in position, ensuring proper seal and no leaks.

Caution

Do not overload the diaphragm with a sudden surge of inlet pressure. Turn the gas on very slowly. If an outlet stop is used, it should be opened first. Monitor the outlet pressure during start-up to prevent an outlet pressure overload.

5. Turn the gas on very slowly.
6. If installing model 143-80-6 Low Pressure Cutoff (LPCO), remove cap **(1)** and pull up pin located inside spring housing to deactivate LPCO device and initiate flow through the regulator.
7. Make certain that all connections are tight. Ensure proper seal and verify no leaks by using a soap and water solution or other utility-approved method.
8. If needed, adjust outlet pressure (set point) by removing cap **(1)** and turning adjustment spring button **(2)**. Turn clockwise to increase and counter-clockwise to decrease outlet pressure. Only adjust when gas is flowing through regulator. Be sure to reinstall cap.

Model 143-80 Service Regulator

Installation and Maintenance Instructions

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

9. The vent connection is an escape path for the regulated gas. Depending upon the type of gas, it could be flammable as with natural gas and propane. Therefore, the vent connection needs to 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. Run vent piping from the regulator vent connection to a non-hazardous location on the outside away from any potential sources of ignition. For regulators equipped with internal relief valves (IRV), The vent piping must be vent connection size or larger and its length be as short and direct as possible to a safe area. This is to assure the venting of the internal relief valve discharge to the atmosphere without excessive pressure increase in the regulator and downstream piping.

   The outlet of the vent piping must allow for free and unobstructed passage of air and gas and must be protected against the potentials listed in instructions #4, #8 and #9.

10. For outdoor installations, it is recommended that the regulator be installed so that the regulator vent faces downward to avoid the potential for water and 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 independent upon particular operating conditions. To assure continuous satisfactory operation, a periodic inspection schedule must be adhered with the frequency of inspection determined by the severity of service and applicable laws and regulations.

Servicing

1. To access valve **(7)**, orifice **(6)**, or diaphragm assembly **(8)**, first remove spring compression by unscrewing the spring cap **(1)** and spring adjustment ferrule **(2)**. Remove spring **(3)** from regulator.
2. For access to the valve **(7)** and orifice **(6)**, completely loosen the coupling nut **(12)** and remove diaphragm case assembly from body **(5)**.
3. To replace valve pad **(7)**, simply pull off of valve stem **(9)** and replace with new pad.
4. To replace orifice **(6)**, unscrew from body using a 1" hex socket wrench "thin-wall" type. Apply sealant on threads of orifice when installing replacement orifice. The replacement orifice must be installed at 50-60 ft-lbs. of torque.
5. To replace diaphragm assembly, remove flange screws **(10)** and disassemble diaphragm assembly. Make certain all parts are reassembled in their correct order and all threads and joints are tightened evenly and firmly.
6. Before reassembling body to diaphragm case, make certain that the O-ring is in position. Ensure proper seal and verify no leaks by using a soap and water solution or other utility-approved method.

Over Pressurization Protection

Protection must be provided for the downstream piping system and the regulator's low pressure chambers to assure against the potential for 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, or other applicable standards. The methods of providing overpressure protection could be a relief valve, a monitor regulator, a shut-off valve or similar device.

Buried Service

The Model 143-80 regulator is not recommended for buried service.

Temperature Limits

The Model 143-80 regulator can be used for the flowing temperature of -20°F to 150°F (-28.9°C to 65.5°C).

Maximum Emergency Pressures

The maximum pressure to which the regulator inlet may be subjected under abnormal conditions, without causing damage to the regulator, is the stated Maximum Inlet Pressure + 50 psi.

The maximum pressure to which the regulators case may be subjected under abnormal conditions without causing damage to the internal parts is: Set point plus 3 psi. 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 diaphragm case is 10 psi (safely contained means no leakage as well as no bursting.)

805 Liberty Boulevard
DuBois, PA 15801
1-800-375-8875

For more information, visit us at sensus.com/gas

SENSUS

Model 243 Service Regulators

Construction and Design Features

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 such as 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 CO_2, 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	Standard* Regulator	243-8-1
243-12-2	Regulator with Internal Relief Valve (IRV)	243-8-2
243-12-4	Regulator with Low Pressure Cut-Off (LPCO)	243-8-4
243-12-6	Regulator with both IRV and LPCO	243-8-6
	High Pressure Regulator	243-8HP
	Pressure Loaded Regulator	243-8PL

For additional information on IRV refer to page 4. For LPCO refer to page 5.
*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.	143-82-021-02
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 4¼ 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", 1½" 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 -20ºF to 150ºF.

Buried Service

The Model 243 regulator is **not** recommended for buried service.

Maximum Inlet Pressure, psig

Regulator Model and Size	1¼" 30°	*1¼" 10°	1" 30°	*1" 10°	¾" 30°	¾" 10°	½" 10°	⅜" 10°	¼" 10°	.207" 10°
1¼", 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	-
1¼", 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	-
1¼", 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. 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 6 to 22.

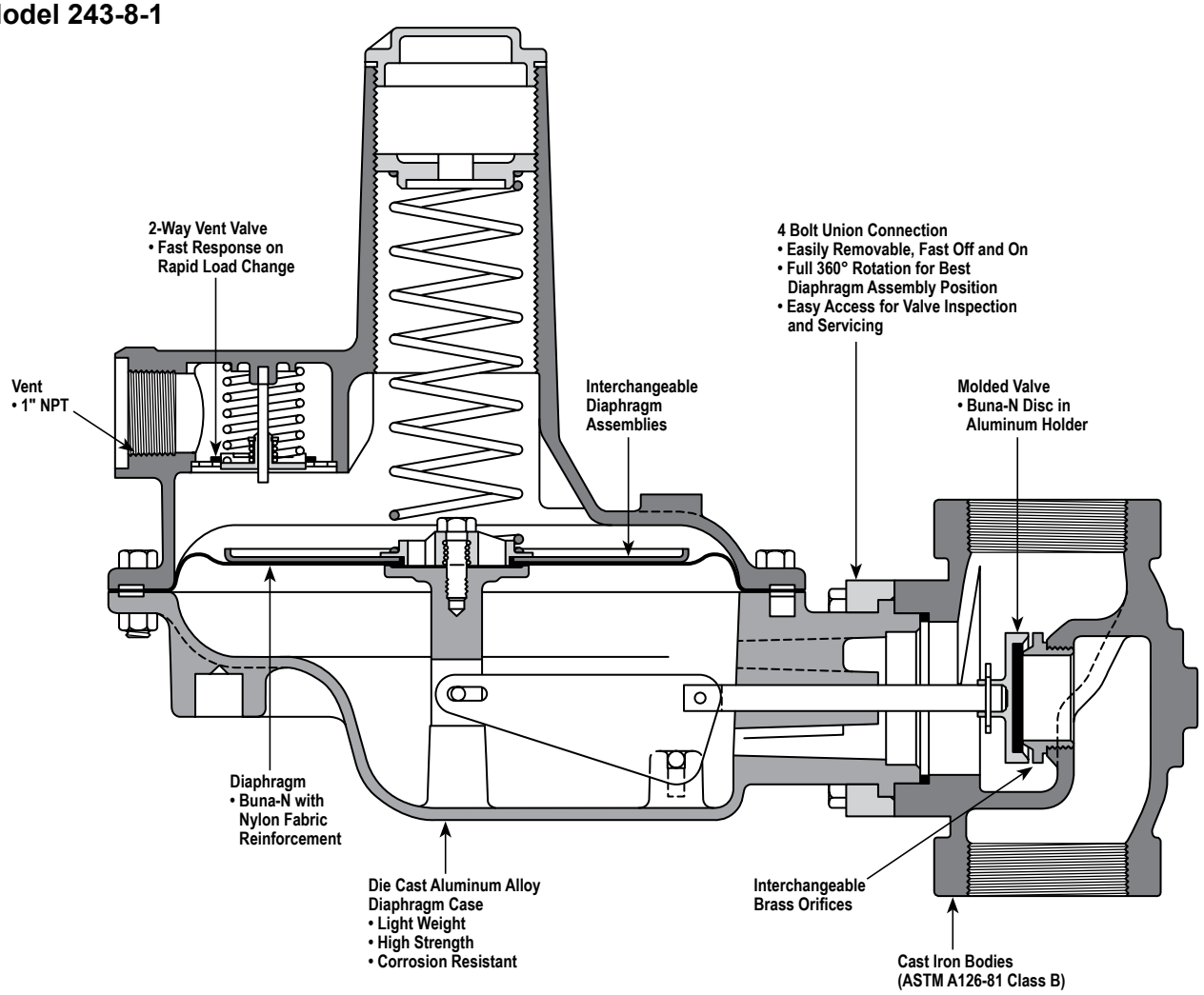
The 243 will hold outlet pressure within the indicated percentage limits from set flow (250 scfh) to the flows given in the capacity tables. Percentages are all based on absolute pressure using 14.4 psia as atmospheric.

As an example, referring to page 9, a 1½" Model 243-12- 2 with 1" orifice, 30º 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 table below, 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 5).

Setpoint	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 243-8-1

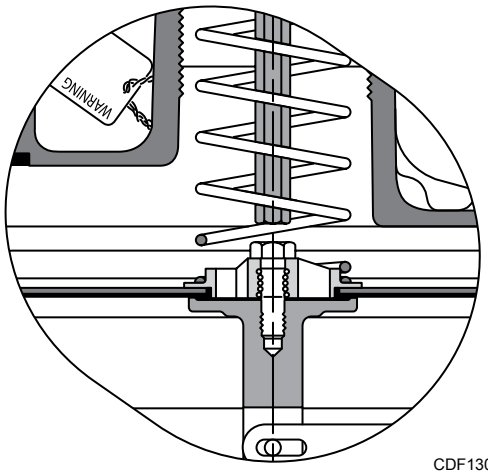


CDF1306-005

Pipe Sizes
2", 1½", 1¼" NPT Screwed*
2" Flanged ANSI 125

*Can also be furnished with British Standard Threads (BST)

Model 243-12-1 Travel Stop



CDF1306-010

A travel stop is located in the 243-12-1 and the 243-12-4 to provide overpressurization protection.

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-1306 for more detailed start-up procedures.

Operation of the Internal Relief Valve

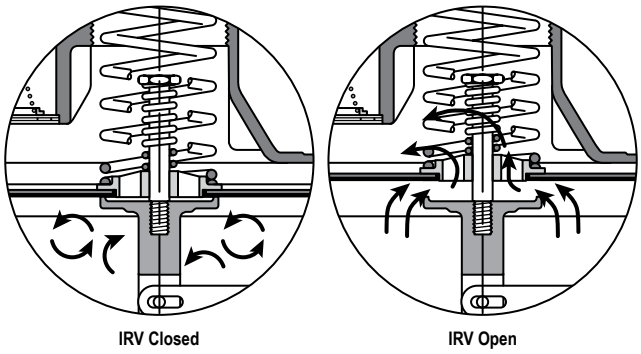
The internal relief valve (IRV) is optional (refer to Basic Models Table, page 1).

The IRV is built into the center of the diaphragm assembly as shown in the illustration and works in essentially the same way as standard relief valves.

It opens when outlet pressure exceeds the setpoint by approximately 9" w.c. thereby allowing excess gas to escape through the vent to atmosphere. An optional spring is available on the 243-8-2 for relieving at approximately 20" w.c. above setpoint. A cross-section of a complete 243 with IRV is shown on page 5.

Performance is given on the curves below. The IRV will prevent the outlet pressure from exceeding the value shown by the curves upon regulator failure at the conditions specified.

The IRV is a proven design of quality construction. Within its capacity limits it adds a measure of safety protection to the outstanding and dependable performance of the 243.



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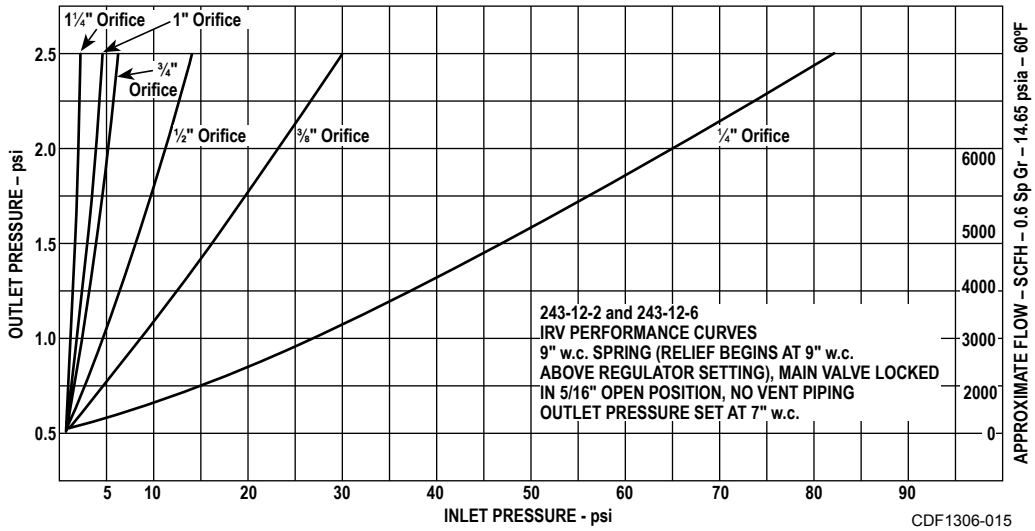

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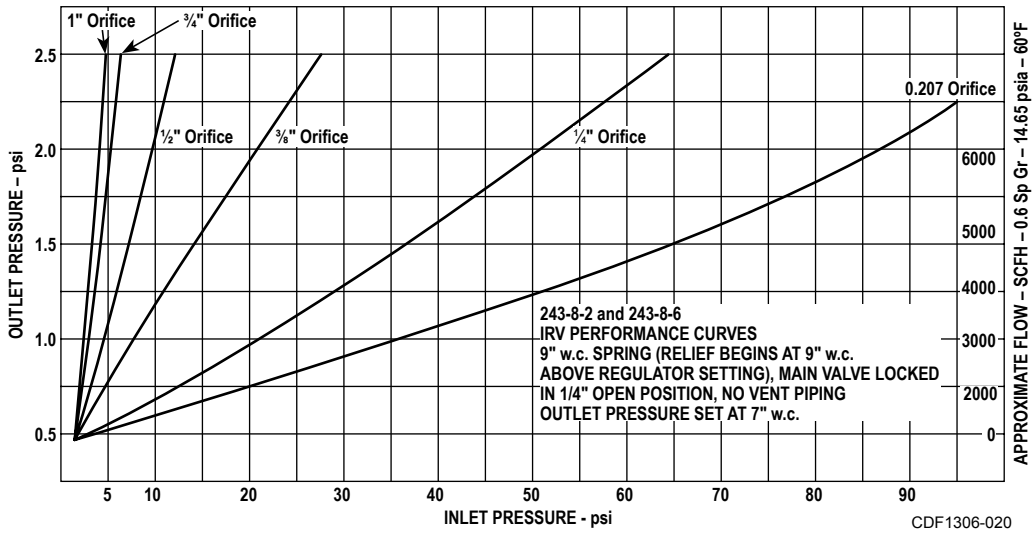


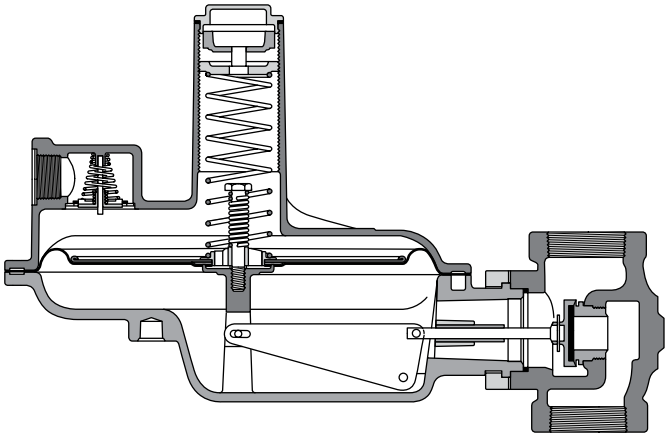
CDF1306-020

CAUTION

Note that an IRV, like any other relief valve, must be sized carefully. If the curves indicate that outlet pressure can exceed the maximum safe limit it is essential to provide an additional relief valve carefully sized to handle the difference.

243 Variations

Internal Relief Valve



CDF1306-030

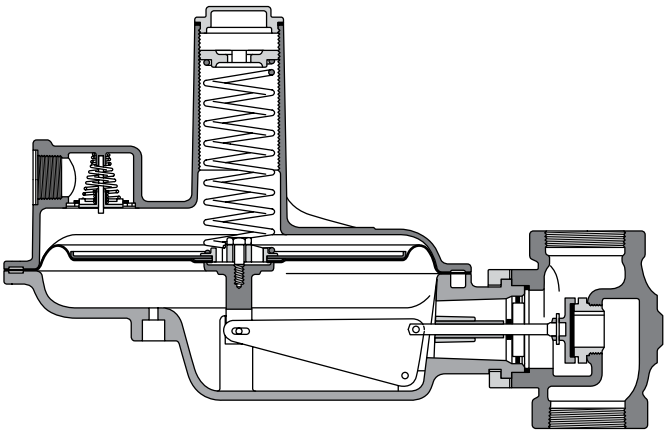
The 243 is available with an internal relief valve (IRV), which is a built-in safety device for providing a limited level of overpressurization protection.

Like any relief valve, an IRV must be carefully sized.

A more complete description plus performance data is given on page 4. For Basic Models, refer to the table on page 1.

Internal relief valves are not available in the high pressure Model 243-8HP.

Monitoring and External Control Line



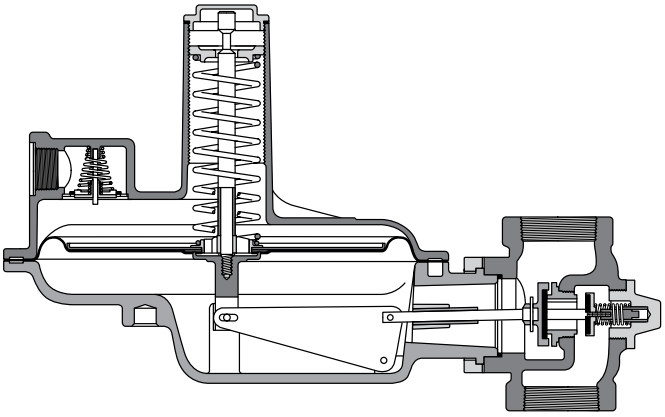
CDF1306-045

This 243 is used for the first regulator (upstream regulator) in a monitor set or for other applications requiring an external downstream control line.

A throat block with an o-ring stem seal isolates the lower diaphragm chamber which has a ½" FNPT connection for the external control line.

Use of this regulator for monitoring is shown on page 23. Capacities with the external control line are provided on pages 13 and 14.

Low Pressure Cut-Off



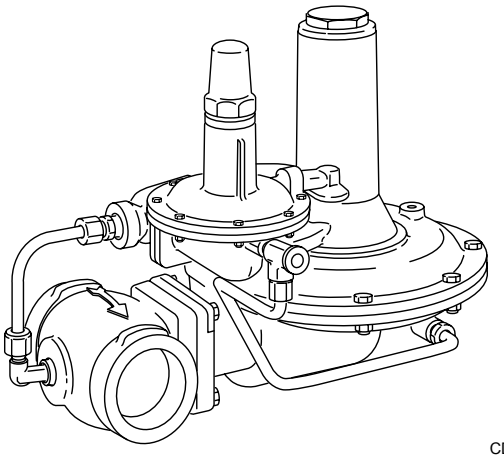
CDF1306-035

The low pressure cut-off (LPCO) is used for automatic gas shutoff when inlet pressure is too low for the required gas flow. Once closed, it must be manually reopened and reset.

Basic Models are given in the table at the bottom on page 1. Note: There is an LPCO version that also includes the internal relief valve.

Outlet pressures range from 4" w.c. to 30" w.c. and available orifices are ½", ¾" and 1".

Pilot Operated Regulator



CDF1306-050

The 243-RPC is a genuine pilot operated regulator.

Like its bigger brothers, it not only provides remarkably precise pressure regulation but it maintains that high level of accuracy even for wide variations in inlet pressure.

The 243-RPC can be used for any outlet pressure from 3½" w.c. to 35 psig with capacity ranging as high as 75,000 scfh.

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"	⅜"	¼"
		30°	30°	30°	10°	10°	10°	10°
Setpoint 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
Setpoint 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
Setpoint 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

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

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) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle						
		1¼"	1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	30°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	1	2500	2000	1400	1200	950	650	
	2	4200	3400	2700	2400	1500	1000	500
	5	8000	7100	5600	4700	2800	1800	950
	10	12000	12000	10500	7500	4800	2900	1400
	15	13500	14500	15000	9500	6500	3900	1700
	25		16500	20000	11500	9200	5300	2300
	40			20000	13500	12000	7500	3200
	60				15000	13000	10000	4400
	80					14000	12000	5600
	100					14000	12000	7000
	125						12000	8000
Setpoint 1 psi 0.31 psi Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	2	6500	5000	4000	4000	2000	1300	500
	5	8000	7500	6000	6000	4000	2200	1000
	10	9000	8500	8000	8000	5500	3000	1400
	15	12000	11000	10000	10000	7000	4000	1800
	25		13500	12500	11500	9500	5500	2400
	40			14000	13000	11000	7400	3300
	60				15000	13500	10000	4500
	80					15000	13000	6000
	100					16000	14000	7000
	125						14000	8500
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	2	3350	3000	2000	1900	1200	1000	500
	5	6600	5900	4200	3900	2400	1600	1000
	10	11000	10000	7600	6500	4100	2800	1450
	15	13000	12000	9300	8300	5600	3800	1700
	25		15000	16500	11000	8500	5300	2400
	40			20000	14000	12500	7500	3400
	60				15500	13000	10000	4400
	80					14000	12000	5600
	100					14000	12000	7000
	125						12000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature.
Changes in performance can occur at extreme low flowing temperatures.

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) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle						
		1¼"	1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	30°	10°	10°	10°	10°
Setpoint 2 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	8200	7400	5200	4800	2900	1900	900
	10	12500	11300	8700	7800	4800	3000	1400
	15	15500	14500	11500	10000	6500	3800	1700
	25		18000	16500	13500	9000	5300	2400
	40			20000	16500	12500	7600	3400
	60				16500	15500	10000	4600
	80					16000	12000	5600
	100					16000	12000	7000
	125						12000	8000
Setpoint 3 psi 0.35 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	3500	3000	2000	1800	1400	1100	750
	10	8000	7000	5500	5000	3000	2000	1100
	15	10500	10000	8000	7000	4000	3000	1600
	25		11500	9800	9000	5600	4500	2000
	40			21500	20000	10500	7500	3500
	60				21000	14500	10500	4500
	80					18000	13500	6000
	100					20500	16400	7500
	125						19000	9000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1½" 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"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red Spring 3½" to 6½" w.c. **143-16-021-03**	½	2000	1600	1300	700	500	
	1	2800	2500	2100	1200	800	400
	2	4000	3500	3200	2100	1300	600
	5	6100	5600	4800	3700	2200	1000
	10	8200	7700	6500	5600	3100	1400
	15	9300	9300	7400	6800	3900	1750
	25		11000	9100	8100	5100	2400
	40			10500	9800	7100	3200
	60			12000	11000	9300	4400
	80				12000	10500	5600
	100				12000	11000	7000
	125					11000	8000
Setpoint 7" w.c. 1" w.c. Droop Blue Spring 5" to 8½" w.c. **143-16-021-04**	½	1800	1550	1100	600	500	
	1	2600	2300	1850	1100	750	400
	2	3800	3300	2600	1900	1250	600
	5	5700	5100	4200	3300	2100	1000
	10	8200	7600	6000	5400	3100	1400
	15	9300	9100	7000	6600	3900	1750
	25		11000	8400	7800	5100	2400
	40			10000	9500	7100	3200
	60			10500	10500	9300	4400
	80				11500	10500	5600
	100				12000	11000	7000
	125					11000	8000
Setpoint 11" w.c. 2" w.c. Droop Green Spring 6" to 14" w.c. **143-16-021-05**	1	2700	2300	1900	1100	750	400
	2	4000	3500	2700	1900	1200	600
	5	6000	5600	4500	3500	2100	1000
	10	8800	8200	6500	5500	2900	1400
	15	10000	9800	7700	6800	3800	1750
	25		11500	9700	8100	5100	2400
	40			11500	9700	7100	3200
	60			12500	11500	9300	4400
	80				12000	10500	5600
	100				12500	11000	7000
	125					11000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

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

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1¼"	1"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	1	1800	1300	1100	800	500	
	2	3000	2800	2200	1500	1000	500
	5	5600	5200	4200	2600	1800	950
	10	8600	7700	6000	4300	2900	1400
	15	10000	9300	7400	5800	3800	1750
	25		11500	9100	7800	5100	2400
	40			11000	9500	7100	3200
	60			12500	11000	9300	4400
	80				12500	10500	5600
	100				13000	11000	7000
	125					11000	8000
Setpoint 1 psi 0.31 psi Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	2	6500	5000	4000	2000	1300	500
	5	8000	7500	6000	4000	2200	1000
	10	9000	8500	8000	5500	3000	1400
	15	12000	11500	10000	7000	4000	1800
	25		13500	11500	9500	5500	2400
	40			13000	11000	7400	3300
	60			15000	13500	10000	4500
	80				15000	13000	6000
	100				16000	14000	7000
	125					14000	8500
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	2	2800	2450	1500	1200	850	500
	5	5500	5100	3700	2400	1600	950
	10	8000	7500	5700	4000	2700	1400
	15	10000	9100	7100	5300	3700	1750
	25		11000	9300	7300	5100	2400
	40			11000	9300	7100	3200
	60			12500	11000	9300	4600
	80				12500	10500	5600
	100				13000	11000	7000
	125					11000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

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

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1¼"	1"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	3500	3000	2000	1400	1100	500
	10	7000	6000	5000	2500	2000	1000
	15	9000	8000	7000	3500	2500	1500
	25		10000	8000	4800	4500	1900
	40			11500	6500	6000	3500
	60			14000	8000	7500	4500
	80				9000	8000	6000
	100				12000	11000	7000
	125					12000	8500
Setpoint 2 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	6000	5300	4100	2700	1700	900
	10	10000	9300	7100	4700	2900	1400
	15	13000	12000	8800	6200	3800	1700
	25		14500	11000	8600	5200	2400
	40			13500	11000	7100	3200
	60			15000	13500	10000	4600
	80				15000	12000	5600
	100				16000	12000	7000
	125					12000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1¼", 1½" and 2" Model 243-12-1 with External Control Line 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"	½"	⅜"	¼"
		10°	10°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red Spring 3½" to 6½" w.c. **143-16-021-03**	½	2200	1900	1600	800	500	
	1	3600	3200	2300	1300	850	400
	2	5600	4700	3500	2000	1400	600
	5	10500	8200	5700	3500	2200	1000
	10	15000	12000	8900	5200	3000	1500
	15	19000	16000	12000	6700	4000	1750
	25	22000	20000	16000	9000	5200	2400
	40		24000	21000	12000	7500	3200
	60			27000	15500	10000	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 7" w.c. 1" w.c. Droop Blue Spring 5" to 8½" w.c. **143-16-021-04**	½	2000	1700	1500	700	450	
	1	3100	2600	2000	1100	750	400
	2	5000	3800	3000	1700	1200	600
	5	7800	6500	5000	3100	2000	1000
	10	13000	10000	7000	4800	2900	1500
	15	15000	14000	9400	6400	4000	1750
	25	20000	17000	13500	8500	5200	2400
	40		21000	17000	11500	7500	3200
	60			19000	15000	10000	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 11" w.c. 2" w.c. Droop Green Spring 6" to 14" w.c. **143-16-021-05**	1	3200	2500	1900	1100	700	350
	2	5200	4200	3200	1800	1300	550
	5	8500	7200	5200	3200	2000	1000
	10	13500	11000	8000	5000	3000	1500
	15	16000	14000	11000	6500	4000	1750
	25	20000	17000	14000	9000	5200	2400
	40		24000	21000	12000	7000	3200
	60			25000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000

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

* 2" Body Only.

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

Model 243 Capacity Tables

1¼", 1½" and 2" Model 243-12-1 with External Control Line in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1¼"*	1"	¾"	½"	⅜"	¼"
		10°	10°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	1	2400	2000	1200	900	600	300
	2	4200	3200	2000	1500	1000	500
	5	6500	5500	4100	2700	1600	950
	10	11000	8000	6200	4200	2800	1500
	15	14500	11000	8000	5800	3800	1750
	25	18000	15000	11500	8000	5000	2400
	40		21000	15000	11000	7000	3200
	60			20000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	2	3500	2900	1700	1300	850	500
	5	7000	5400	4000	2600	1600	950
	10	10500	8500	5800	4000	2800	1500
	15	14500	10500	7600	5400	3800	1750
	25	18000	14500	10500	7500	5000	2400
	40		20000	15000	10500	7000	3200
	60			20000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 2 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	8600	6800	5300	2700	1900	850
	10	13000	10500	7500	4500	2900	1400
	15	17500	13500	10500	6000	3800	1750
	25	25000	20000	14000	8500	5000	2400
	40		25000	20000	12000	7000	3200
	60			25000	15000	10000	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000

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

* 2" Body Only.

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

Model 243 Capacity Tables

1½" and 2" Model 243-8-1 and 243-8-2 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					
		1"	¾"	½"	⅜"	¼"	0.207"
		30°	10°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red-Black Spring 3½" to 6½" w.c. **143-82-021-00**	½	1100	900	700	500		
	1	1950	1600	1050	750	350	
	2	3200	2400	1550	1000	550	350
	5	5200	3900	2700	1900	950	550
	10	7400	5800	4500	3000	1350	900
	15	9100	7100	5800	3800	1700	1150
	25	12500	8700	7200	5100	2400	1500
	40		10500	9200	7100	3200	2100
	60			11000	9300	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600
Setpoint 7" w.c. 1" w.c. Droop Blue-Black Spring 5" to 8½" w.c. **143-82-021-01**	½	1000	750	650	400		
	1	1600	1150	900	650	300	
	2	2700	1800	1350	950	450	350
	5	4800	3500	2350	1600	770	500
	10	7000	5400	3900	2500	1250	900
	15	9100	7000	5000	3500	1700	1150
	25	12500	8700	6600	5100	2400	1500
	40		10500	9000	7100	3200	2100
	60			11000	9300	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600
Setpoint 11" w.c. 2" w.c. Droop Green-Black Spring 6" to 14" w.c. **143-82-021-02**	1	1650	1150	1000	650	300	
	2	2700	2000	1400	1000	450	350
	5	4800	3800	2600	1750	900	600
	10	7000	5400	4200	2800	1300	900
	15	9000	7400	5500	3600	1700	1100
	25	11000	8800	7500	5100	2400	1500
	40		11000	9600	7100	3200	2100
	60			11000	9300	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1½" Models 243-8-1 and 243-8-2 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					
		1"	¾"	½"	⅜"	¼"	0.207"
		30°	10°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Green Spring 12" to 28" w.c. **143-16-021-05**	1	1500	1100	800	550		
	2	2100	1700	1300	900	450	350
	5	4500	3400	2000	1350	850	600
	10	6600	5700	3500	2400	1300	850
	15	8800	7100	5000	3400	1700	1050
	25	11500	9100	7100	5100	2400	1500
	40		11000	9300	7100	3200	2100
	60			11000	9400	4400	2900
	80			12000	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600
Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c. **143-16-021-05**	2	4000	3500	1800	1200	500	
	5	6000	5000	3500	2200	1000	
	10	7500	7000	5000	3000	1500	
	15	9000	8000	6500	4000	1850	
	25	12000	10000	8000	5000	2000	
	40		12500	9500	7000	3000	
	60			11500	9500	4500	
	80			12500	11500	6000	
	100				12500	7000	
	125					8000	
Setpoint 1 psi 0.2 psi Droop Orange Spring 1 to 2 psi **143-16-021-06**	2	2100	1650	1200	850	450	
	5	4000	3200	2100	1300	850	550
	10	6500	5200	3100	2200	1300	800
	15	8400	6500	4400	3000	1700	1000
	25	11000	8600	6500	4400	2400	1500
	40		11000	8600	6700	3200	2100
	60			10500	9000	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1½" Models 243-8-1 and 243-8-2 in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1"	¾"	½"	⅜"	¼"	0.207"
		30°	10°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	3000	1800	1200	1100	900	
	10	4000	2500	1800	1500	1000	
	15	5200	4000	2850	2000	1400	
	25	7000	5200	3600	3100	1800	
	40		9000	5000	4200	2200	
	60			8300	6500	3000	
	80			10000	8500	5000	
	100				9000	6000	
	125					8000	
Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	4400	3400	2400	1600	800	
	10	7100	5900	3600	2400	1300	750
	15	9600	7500	4800	3400	1700	1000
	25	12500	10500	6500	5000	2400	1500
	40		13000	9600	7000	3200	2100
	60			12500	9300	4400	2900
	80			13500	11000	5600	3700
	100				12000	7000	4500
	125					8000	5600

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1¼" Models 243-8-1, 243-8-2, 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 243-12	Outlet Pressure and Spring 243-8	Inlet Pressure psi	Orifice Size and Valve Angle				
			¾"	½"	⅜"	¼"	0.207"
			10°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red Spring 3½" to 6" w.c. **143-16-021-03**	Setpoint 6" w.c. 1" w.c. Droop Red-Black Spring 3½" to 6½" w.c. **143-82-021-00**	½	900	700	500		
		1	1600	1050	750	350	
		2	2250	1500	1000	550	350
		5	2500	2200	1900	950	550
		10	3100	2900	2650	1350	900
		15	3550	3600	2700	1700	1050
		25	4200	3800	3300	2400	1500
		40	4200	4100	3800	3200	2100
		60		4800	4400	4400	2900
		80		5600	5600	5600	3700
		100			6000	6000	4500
		125				6000	5600
Setpoint 7" w.c. 1" w.c. Droop Blue Spring 5" to 8½" w.c. **143-16-021-04**	Setpoint 7" w.c. 1" w.c. Droop Blue-Black Spring 5" to 8½" w.c. **143-82-021-01**	½	750	650	400		
		1	1150	900	650	300	
		2	1700	1300	950	450	350
		5	2300	1900	1600	770	500
		10	2900	2600	2200	1250	900
		15	3500	3100	2500	1700	1050
		25	4200	3600	3300	2400	1500
		40	4800	4000	3800	3200	2100
		60		4600	4400	4400	2900
		80		5600	5600	5600	3700
		100			6000	6000	4500
		125				6000	5600
Setpoint 11" w.c. 2" w.c. Droop Green Spring 6" to 14" w.c. **143-16-021-05**	Setpoint 11" w.c. 2" w.c. Droop Green-Black Spring 6" to 14" w.c. **143-82-021-02**	1	1150	1000	650	300	
		2	1850	1350	1000	450	350
		5	2500	2200	1750	800	550
		10	2900	2700	2450	1300	900
		15	3700	3950	2600	1700	1100
		25	4250	4000	3300	2400	1500
		40	5300	4200	3800	3200	2100
		60		4850	4400	4400	2900
		80		5850	5600	5600	3700
		100			6000	7000	4500
		125				8000	5600

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

NOTE: 1" x 30º and 1¼" x 30º orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

Model 243 Capacity Tables

1¼" Models 243-8-1, 243-8-2, 243-12-1 and 243-12-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring 243-12	Outlet Pressure and Spring 243-8	Inlet Pressure psi	Orifice Size and Valve Angle				
			¾"	½"	⅜"	¼"	0.207"
			10°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	Setpoint 18" w.c. 3" w.c. Droop Green Spring 12" to 28" w.c. **143-16-021-05**	1	1100	800	500		
		2	1900	1250	900	450	350
		5	2250	1700	1350	750	550
		10	2950	2250	2100	1300	850
		15	3450	3600	2450	1700	1050
		25	4400	3750	3300	2400	1500
		40	5300	4100	3800	3200	2100
		60		4800	4400	4400	2900
		80		4850	5600	5600	3700
		100			6000	7000	4500
		125				8000	5600
Setpoint 1 psi 0.31 psi Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c. **143-16-021-05**	2	3000	1800	1200	500	
		5	4000	3000	2000	1000	
		10	5000	4000	3000	1500	
		15	6000	5100	3900	1900	
		25	7500	6400	4500	2200	
		40	8000	7400	6100	2600	
		60		8000	7350	4000	
		80		8500	8000	5100	
		100			8500	6500	
		125				7000	
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	Setpoint 1 psi 0.2 psi Droop Orange Spring 1 to 2 psi **143-16-021-06**	2	1850	1150	850	450	
		5	2100	1700	1350	750	500
		10	2700	2000	1950	1300	800
		15	3150	3100	2050	1700	1000
		25	4150	3250	2850	2400	1500
		40	5300	3800	3600	3200	2100
		60		4600	4250	4400	2900
		80		4650	5600	5600	3700
		100			6000	7000	4500
		125				8000	5600

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

NOTE: 1" x 30º and 1¼" x 30º orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

Model 243 Capacity Tables

1¼" Models 243-8-1, 243-8-2, 243-12-1 and 243-12-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring 243-12	Outlet Pressure and Spring 243-8	Inlet Pressure psi	Orifice Size and Valve Angle				
			¾"	½"	⅜"	¼"	0.207"
			10°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	1200	1000	800	500	
		10	2000	1800	1400	1000	
		15	3300	2800	1800	1400	
		25	4700	3300	2300	1650	
		40	6300	4900	2800	2000	
		60		5800	5000	2800	
		80		6500	6400	4600	
		100			6500	4750	
		125				5000	
Setpoint 3 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	2200	1950	1650	700	
		10	3600	2300	2150	1300	750
		15	3800	3400	2350	1700	1000
		25	5000	3900	3250	2400	1500
		40	6300	4300	3700	3200	2100
		60		5500	4400	4400	2900
		80		5500	5850	5600	3700
		100			6550	7000	4500
		125				8000	5600

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

NOTE: 1" x 30º and 1¼" x 30º orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

Model 243 Capacity Tables

2" Models 243-8-1 and 243-8-2 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					
		1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Green Spring 12" to 28" w.c. **143-16-021-05**	1	1500	1200	1100	800	600	
	2	2400	1800	1700	1250	950	500
	5	5500	3700	3500	2300	1400	900
	10	9400	8400	6000	3700	2400	1400
	15	12000	12000	8100	5600	3800	1700
	25	14500	17500	10000	8200	5600	2400
	40		20000	12000	11500	7400	3400
	60				13500	10000	4600
	80				14000	11000	5600
	100					12000	7000
	125						8000
Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c. **143-16-021-05**	2	5000	4000	4000	3000	1000	500
	5	8000	7000	7000	4000	1900	1000
	10	14000	12800	10000	5500	3000	1500
	15	16500	14000	13900	7750	4500	1800
	25	17700	16900	15000	9000	5500	2500
	40		18000	16500	11500	7400	3200
	60				15000	10000	4600
	80				17000	13800	6100
	100					14000	7000
	125						9000
Setpoint 1 psi 0.2 psi Droop Orange Spring 1 to 2 psi **143-16-021-06**	2	2400	1800	1700	1200	850	450
	5	4000	3400	3300	2200	1300	900
	10	7000	6000	5400	3500	2200	1400
	15	11000	9000	7000	4600	3100	1700
	25	14500	15000	10000	7400	4800	2400
	40		17500	12000	10500	7000	3400
	60				12500	9500	4600
	80				13500	10500	5600
	100					11000	7000
	125						8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

2" Models 243-8-1 and 243-8-2 in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	2000	1600	1600	1400	1000	500
	10	4000	3000	3000	2000	1400	1000
	15	5800	4200	4000	2600	1800	1500
	25	7500	5200	5000	3900	2750	2300
	40		9100	9000	6500	5800	3100
	60				10000	7500	4600
	80				14000	10000	6000
	100					12000	7000
	125						9000
Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	4400	3400	3300	2400	1600	800
	10	7600	6000	5800	3600	2400	1300
	15	11000	9000	7500	4800	3500	1700
	25	15000	15000	10500	8000	5100	2400
	40		17500	13000	11000	7000	3400
	60				14000	9600	4600
	80				15000	11000	5600
	100					12000	7000
	125						8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

Model 243-8HP in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F)

Outlet Pressure	Inlet Pressure psi	1¼" Model 243-8HP				1½" Model 243-8HP					2" Model 243-8HP				
		Orifice Size and Valve Angle				Orifice Size and Valve Angle					Orifice Size and Valve Angle				
		¾" 10°	½" 10°	⅜" 10°	¼" 10°	1" 30°	¾" 10°	½" 10°	⅜" 10°	¼" 10°	1" 30°	¾" 10°	½" 10°	⅜" 10°	¼" 10°
Setpoint 5 psi 1 psi Droop Cadmium Spring 3 to 6½ psi **143-16-021-08**	10	3300	2050	2000	1300	6000	5500	3200	2300	1300	6000	5500	3200	2400	1300
	15	3400	3100	2200	1700	8600	6500	4400	3200	1700	8600	6000	4400	3200	1700
	25	4400	3650	3050	2400	12000	9300	6100	4800	2400	13000	8200	6100	4800	2400
	40	5800	3800	3200	3200		12000	8500	6100	3200		12000	8700	6100	3400
	60		4400	4100	4400			10000	8700	4400			10000	8700	4600
	80		4500	5300	5600			11000	10000	5600			11500	10000	5600
	100			6000	7000				11000	7000				11000	7000
	125				8000					8000					8000
Setpoint 7 psi 1 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	10	2300	2000	1800	1000	2500	2300	2000	1600	1000	2700	2500	2100	1600	1000
	15	3000	2800	2200	1400	5000	4000	2500	2200	1500	5900	4300	2800	2400	1500
	25	5400	4100	3300	2000	8500	6500	4300	3500	2000	8600	6600	4600	3600	2000
	40	7600	5600	4800	2800		9500	6500	5000	3000		10000	7200	5600	3000
	60		7500	6200	3800			9000	6500	4000			9700	7000	4500
	80		8800	7200	5200			11000	8500	5000			12000	9000	5500
	100			8600	5800				10500	5500				11500	7000
	125				7000					5500					5500
Setpoint 7 psi 2 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	10	5400	3500	2500	1400	8000	5500	3500	2500	1300	8600	6000	4300	2700	1400
	15	7400	5000	3500	1800	10500	8000	5000	3500	1700	12700	8900	5700	3800	1800
	25	10000	7600	5500	2500	15000	12000	8000	5000	2300	18600	13500	8600	5700	2400
	40	12500	10000	7500	3500		16000	11500	7500	3300		19000	12500	8000	3500
	60		12500	9500	4800			15000	9500	4500			17000	10000	4800
	80		14000	11500	6100			17500	12500	5500			20000	13500	6200
	100			13500	7200				15500	7000				16500	7300
	125				8800					7000					8100
Setpoint 10 psi 1 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	15	2500	2200	1800	1200	3500	3000	2000	1300	1000	3600	3000	2000	1800	1000
	25	4800	3500	2800	1900	6500	5000	3500	2500	1900	6800	5700	4000	3000	1900
	40	7200	5000	4000	2500		8000	5500	4300	2500		8600	5700	4600	2800
	60		6700	5700	3500		10500	7500	6000	3500			8600	6400	4300
	80		7800	6600	4600			9000	7500	4500			10500	8400	5200
	100			7800	5400				9500	6000				10700	6500
	125				6500					7000					8000
Setpoint 10 psi 2 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	15	6000	4000	2800	1700	8500	6500	4000	2500	1500	9000	6600	4800	3000	1500
	25	9000	6500	5000	2500	12000	10500	7000	4500	2300	15500	11000	7400	5000	2400
	40	12000	9000	7000	3500		15000	10000	7500	3000		16500	11000	7700	3200
	60		12000	9400	4700			14000	10000	4500			15000	10700	4800
	80		13000	11000	6000			17000	12000	5500			18500	13000	6000
	100			13000	7000				15000	7000				16000	7300
	125				8800					9000					9000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature.
Changes in performance can occur at extreme low flowing temperatures.

Maximum Emergency Pressures

NOTE: The use of an internal or external relief valve is recommended for installations subjected to no flow for extended periods of time, such as pilotless ignition systems. A travel stop stem is located in the 243-12-1 and 243-12-4 to provide over-pressurization protection to internal components during overpressurization.

The maximum pressure the regulator inlet may be subjected to under abnormal conditions without causing damage to the regulator is the maximum allowable inlet pressure (from the capacity tables, pages 6 through 22) plus 50 psi.

The maximum pressure the diaphragm may be subjected to without causing damage to the internal parts of the regulator is:

243-12-1 ..... Setpoint + 3 psi
243-12-2, 243-8-1 and 243-8-2 ..... Setpoint + 5 psi
243-8HP ..... Setpoint + 5 psi

Setpoint is defined as the outlet pressure that a regulator is adjusted to deliver.

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

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

243-12-1 and 243-12-2 ..... 15 psi
243-8-1 and 243-8-2 ..... 15 psi
243-8HP ..... 25 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 positive lockup. The allowable outlet pressure is the lowest of the maximum pressures permitted by federal codes, state codes, Bulletin RDS-1498 or other applicable standards. The method of protection can be a relief valve, monitor regulator, shut-off device or similar mechanism.

Monitoring

A monitor set consists of two regulators in series as shown in the figure. The monitor is the standby. It takes control if a failure in the operating regulator causes outlet pressure to exceed normal.

Either regulator may be used as the monitor. In both cases, the upstream regulator must have a blocked throat and external control line as shown for the 243 on page 5. Also, the control line for the upstream regulator connects into the outlet piping all the way downstream, which means downstream of the downstream regulator.

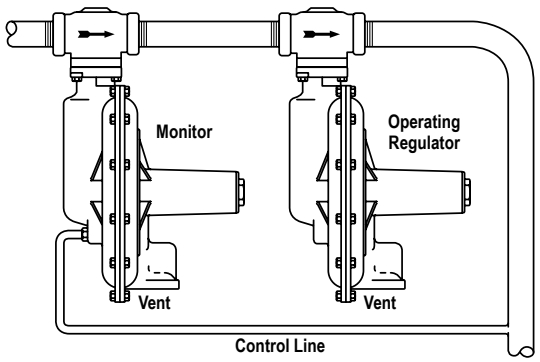
The illustration shows a typical 243 monitor set. While the downstream regulator is shown as operating and the upstream regulator is shown as the monitor, the two can be reversed. There are reasons for doing it either way depending on the user's practice. Stop and bypass valves (which are not shown) likewise would depend on the user's preference and practice.

Either way, the operating regulator is adjusted for the normal outlet pressure. The monitor is adjusted somewhat higher so it is normally full open. If a failure in the operating regulator causes excessive increase in outlet pressure, the monitor will go into operation to hold outlet pressure at its setpoint.

Monitoring is an effective and dependable method of providing overpressure protection. A significant advantage is that it provides the protection without wasting gas to atmosphere. Refer to Bulletin RDS-1306-2 (package monitor sets 243-DOT) for more information.

When a 243 is used to monitor another 243 with an identical orifice size, the total maximum capacity through both can be figured at 70% of the rated capacity for one regulator. This applies with the monitor located upstream or downstream.

243 MONITOR SET



CDF1306-055

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-1306 field service instructions.**

Mounting Positions

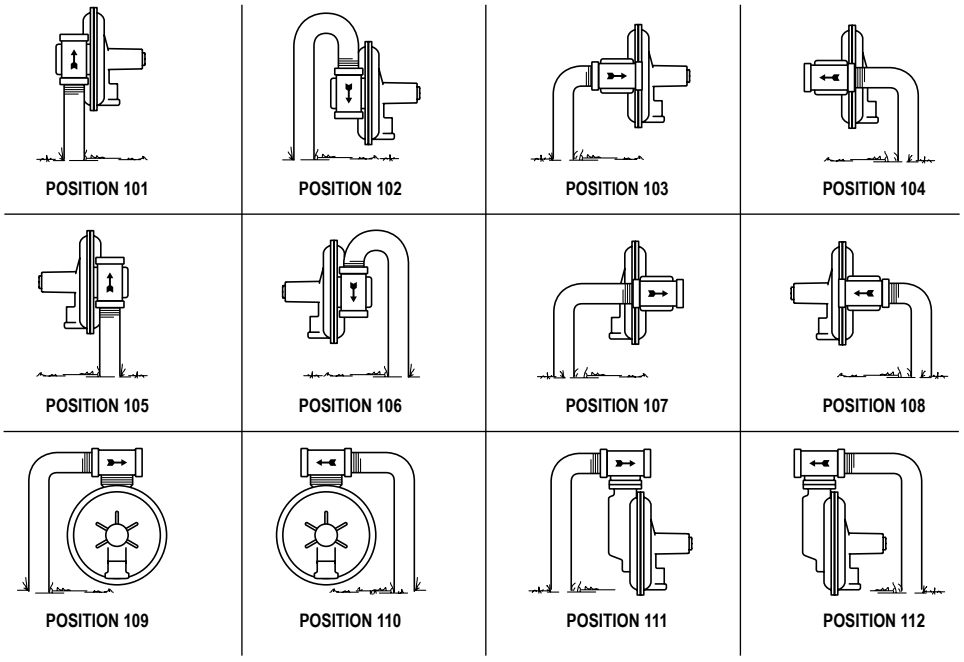
The 243 Service Regulator can be provided in any of the positions shown. Specify by position number when ordering.

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.

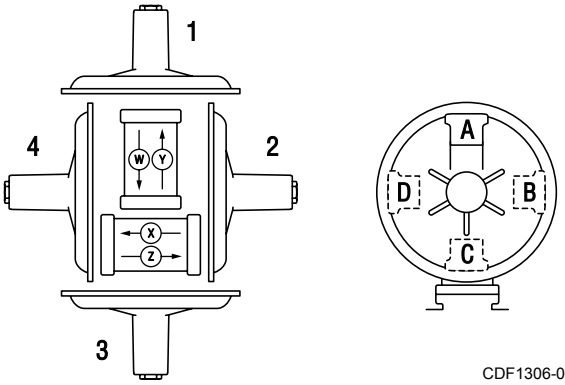
CAUTION

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.



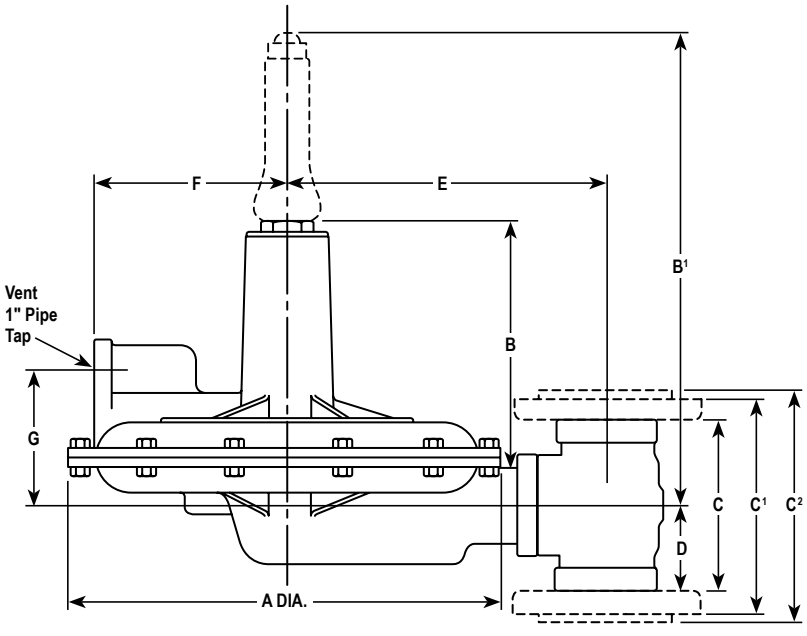
CDF1306-060

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.



CDF1306-065

Dimensions



CDF1306-070

Model	243-12	243-8	243-8HP
A	14"	10 3/16"	10 3/16"
**B	9 3/4"	9 3/4"	-
B¹	-	-	12 3/4"
C	5 3/4"	5 3/4"	5 3/4"
***C¹	7 1/2"	7 1/2"	7 1/2"
C²	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

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. $Q = K\sqrt{P_o(P_i - P_o)}$ ..... (for $\frac{P_i}{P_o}$ less than 1.894)

2. $Q = \frac{KP_i}{2}$ ..... (for $\frac{P_i}{P_o}$ greater than 1.894)

Q = maximum capacity of the regulator (in SCGH of 0.6 specific gravity natural gas).
K = the **"K" factor**, the regulator constant (see below)
P_i = **absolute** inlet pressure (psia)
P_o = **absolute** outlet pressure (psia)

Orifice size:	.207"	¼"	⅜"	½"	¾"	1"	1¼"
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 6 through 22.

Other Gases

243 regulators are mainly used on natural gas. However, they perform equally as well on LP gas, nitrogen, dry CO_2, air and others. For capacities, multiply the table values on pages 6 thru 22 by 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 Mix (Specific Gravity 1.20)	0.71
Nitrogen (Specific Gravity 0.97)	0.79
Dry Carbon Dioxide (Specific Gravity 1.52)	0.63

For other non-corrosive gases use the following formula:

$$\text{CORRECTION FACTOR} = \sqrt{\frac{0.60}{\text{Specific gravity of the gas}}}$$

While used primarily on natural gas services, Model 243 regulators perform equally as well on LPG vapor, air, CO_2, nitrogen and other inert gas applications. Please contact your Sensus representative for special construction which may be available for certain corrosive gases.

How to Order

Specify:

1. Pipe size and model number (page 1)
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

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 CO_2,etc. For additional information on a particular model, please request the indicated bulletin from the local Sensus sales office, or visit our website at www.sensus.com

Multi-Purpose Service Regulators

Model 043-C
½", ¾", 1", 1¼" pipe sizes
Inlet pressures ..... to 125 psi
Outlet pressures ..... 5" w.c. to 5 psi
Capacity to 3500 SCFH
Available with 90° angle or straight-through body.
Standard with internal relief valve.

Model 143-80
¾", 1", 1¼" pipe sizes
Inlet pressures ..... to 125 psi
Outlet pressures ..... 3½" w.c. to 6 psi
Capacity to 2000 SCFH
Optional internal relief valve and low pressure cut-off.

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
¾", 1" and 1¼" pipe sizes
Inlet pressures ..... to 1000 psi
Outlet pressures ..... 3 to 200 psi
Capacity to 40,000 SCFH
Optional monitor and internal relief valve.

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.

Model 243-RPC
1¼", 1½" and 2" pipe sizes
Inlet pressures ..... to 150 psi
Outlet pressures ..... 3½" w.c. to 35 psi
Capacity to 76,000 SCFH

Sensus also produces industrial and combustion regulators; high pressure, high capacity regulators, and safety relief valves. Detailed information is available on request.

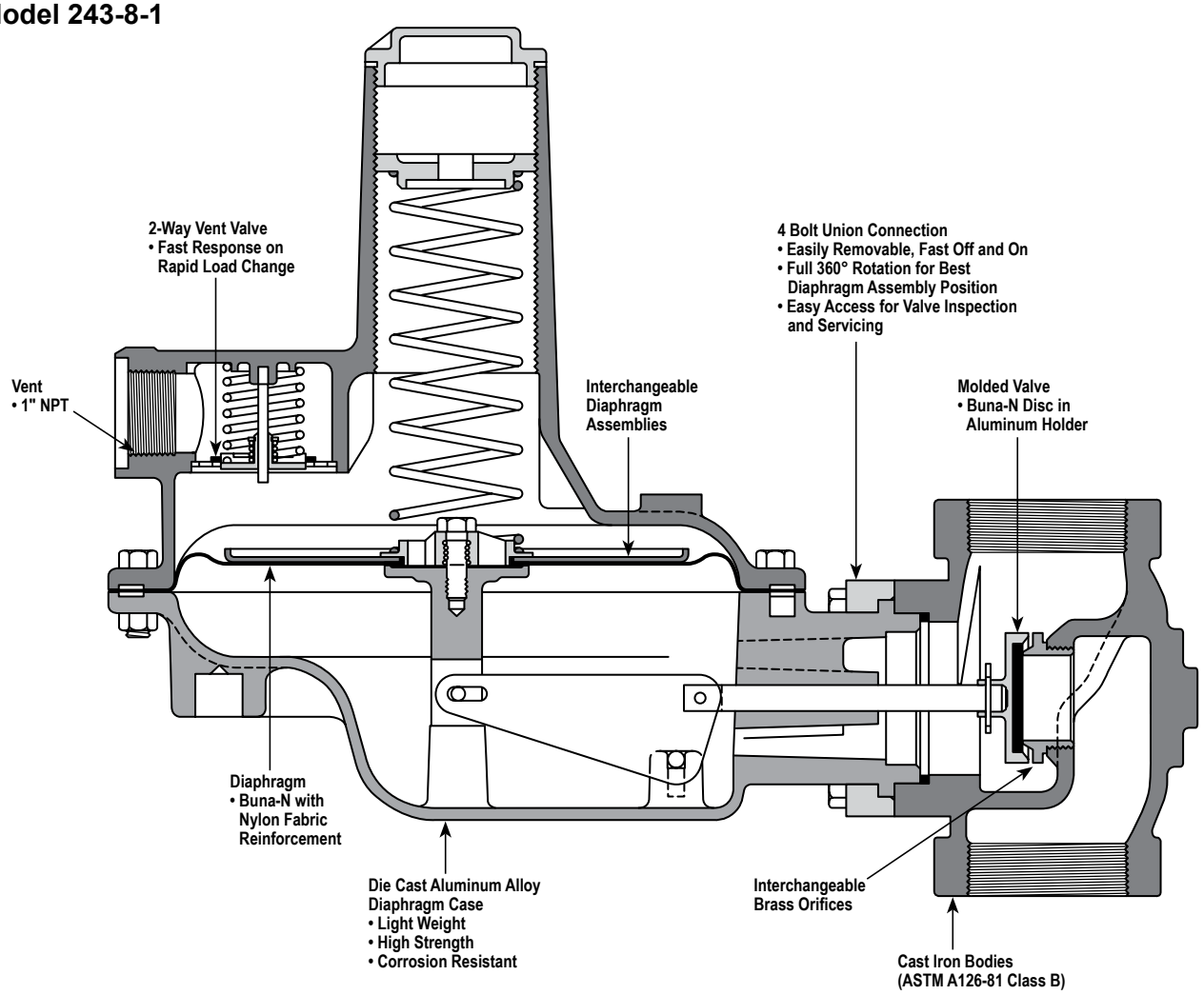
Notes:

Notes:

Authorized Distributor:

805 Liberty Boulevard
DuBois, PA 15801
1-800-375-8875

Model 243-8-1

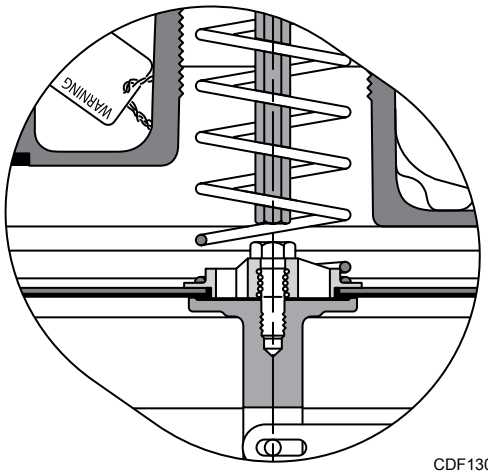


CDF1306-005

Pipe Sizes
2", 1½", 1¼" NPT Screwed*
2" Flanged ANSI 125

*Can also be furnished with British Standard Threads (BST)

Model 243-12-1 Travel Stop



CDF1306-010

A travel stop is located in the 243-12-1 and the 243-12-4 to provide overpressurization protection.

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-1306 for more detailed start-up procedures.

Operation of the Internal Relief Valve

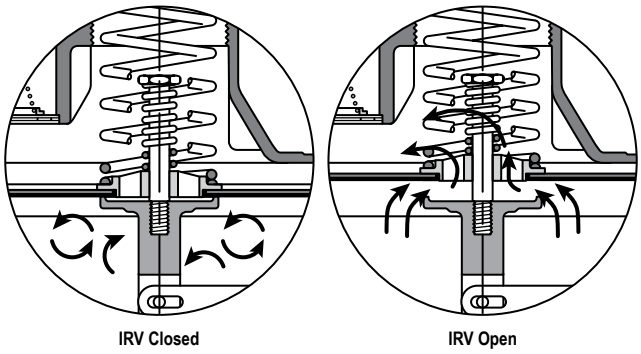
The internal relief valve (IRV) is optional (refer to Basic Models Table, page 1).

The IRV is built into the center of the diaphragm assembly as shown in the illustration and works in essentially the same way as standard relief valves.

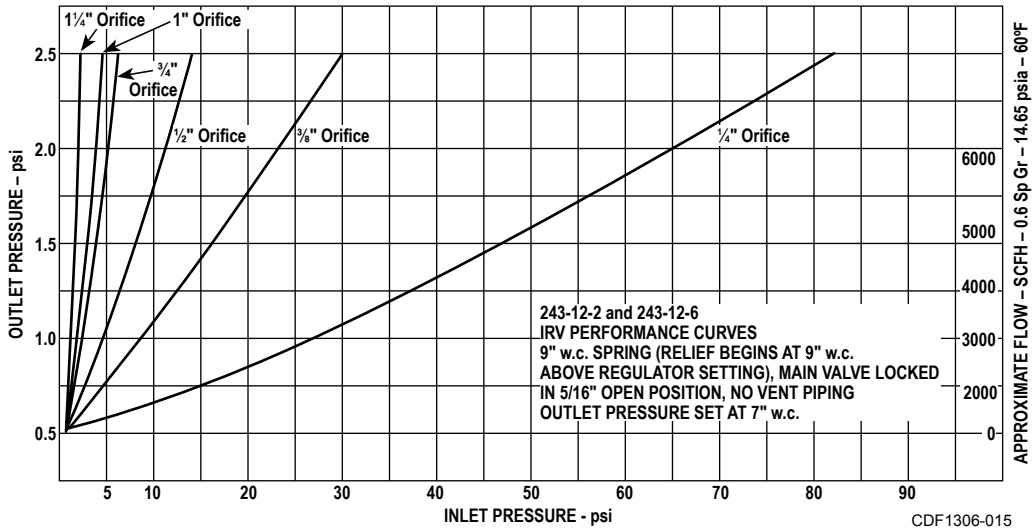
It opens when outlet pressure exceeds the setpoint by approximately 9" w.c. thereby allowing excess gas to escape through the vent to atmosphere. An optional spring is available on the 243-8-2 for relieving at approximately 20" w.c. above setpoint. A cross-section of a complete 243 with IRV is shown on page 5.

Performance is given on the curves below. The IRV will prevent the outlet pressure from exceeding the value shown by the curves upon regulator failure at the conditions specified.

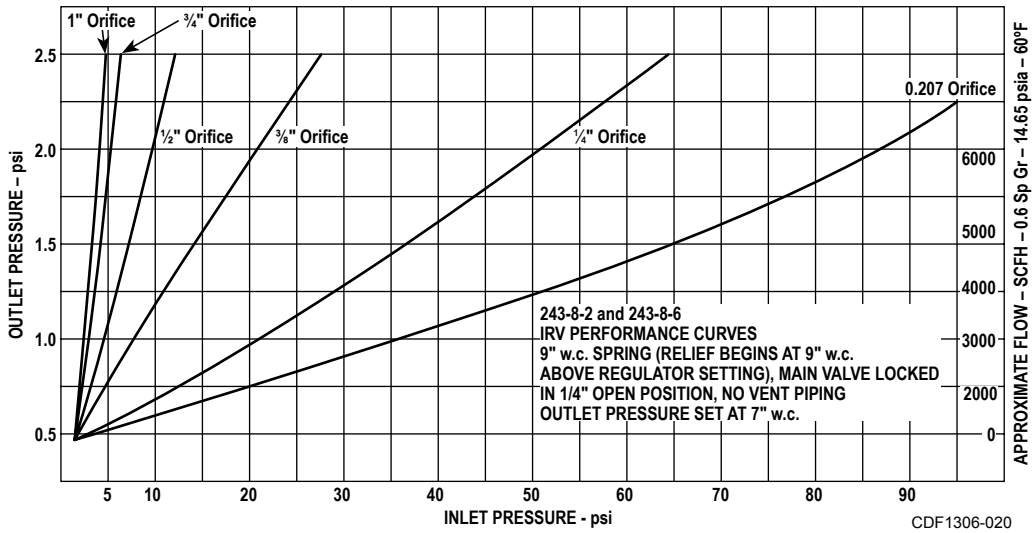
The IRV is a proven design of quality construction. Within its capacity limits it adds a measure of safety protection to the outstanding and dependable performance of the 243.



CDF1306-025



CDF1306-015



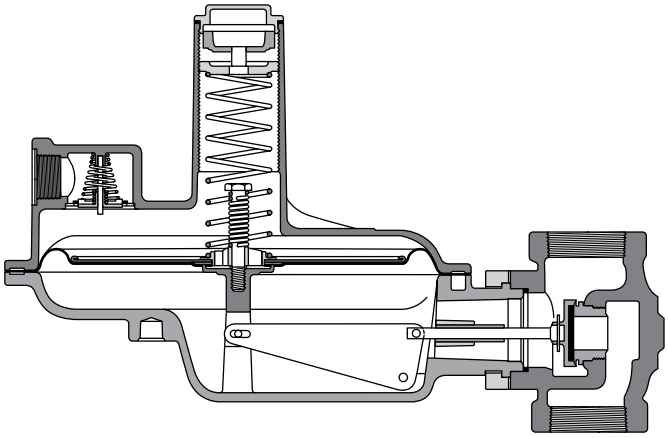
CDF1306-020

CAUTION

Note that an IRV, like any other relief valve, must be sized carefully. If the curves indicate that outlet pressure can exceed the maximum safe limit it is essential to provide an additional relief valve carefully sized to handle the difference.

243 Variations

Internal Relief Valve



CDF1306-030

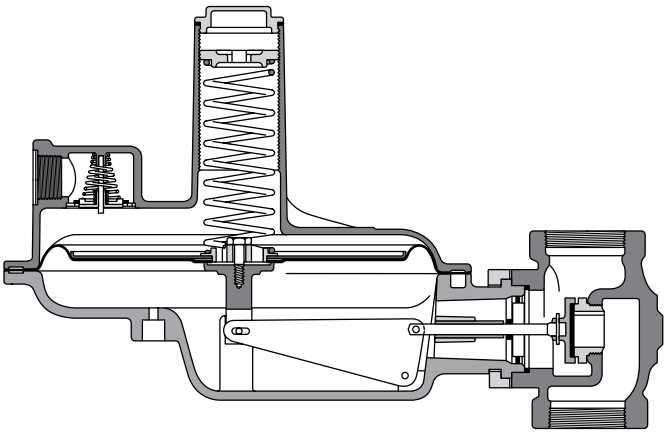
The 243 is available with an internal relief valve (IRV), which is a built-in safety device for providing a limited level of overpressurization protection.

Like any relief valve, an IRV must be carefully sized.

A more complete description plus performance data is given on page 4. For Basic Models, refer to the table on page 1.

Internal relief valves are not available in the high pressure Model 243-8HP.

Monitoring and External Control Line



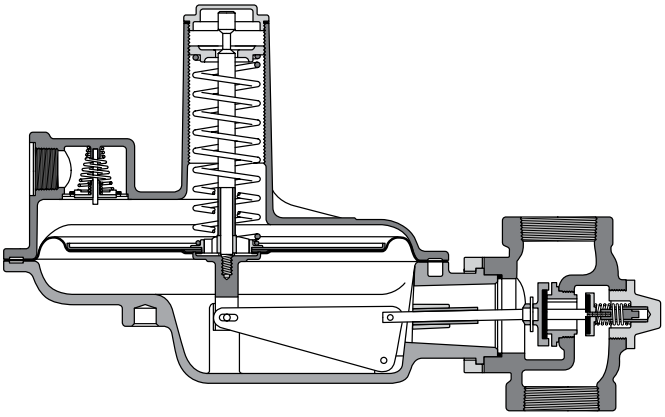
CDF1306-045

This 243 is used for the first regulator (upstream regulator) in a monitor set or for other applications requiring an external downstream control line.

A throat block with an o-ring stem seal isolates the lower diaphragm chamber which has a ½" FNPT connection for the external control line.

Use of this regulator for monitoring is shown on page 23. Capacities with the external control line are provided on pages 13 and 14.

Low Pressure Cut-Off



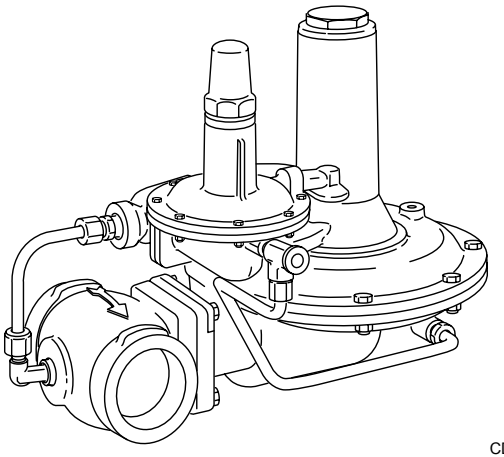
CDF1306-035

The low pressure cut-off (LPCO) is used for automatic gas shutoff when inlet pressure is too low for the required gas flow. Once closed, it must be manually reopened and reset.

Basic Models are given in the table at the bottom on page 1. Note: There is an LPCO version that also includes the internal relief valve.

Outlet pressures range from 4" w.c. to 30" w.c. and available orifices are ½", ¾" and 1".

Pilot Operated Regulator



CDF1306-050

The 243-RPC is a genuine pilot operated regulator.

Like its bigger brothers, it not only provides remarkably precise pressure regulation but it maintains that high level of accuracy even for wide variations in inlet pressure.

The 243-RPC can be used for any outlet pressure from 3½" w.c. to 35 psig with capacity ranging as high as 75,000 scfh.

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"	⅜"	¼"
		30°	30°	30°	10°	10°	10°	10°
Setpoint 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
Setpoint 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
Setpoint 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

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

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) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle						
		1¼"	1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	30°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	1	2500	2000	1400	1200	950	650	
	2	4200	3400	2700	2400	1500	1000	500
	5	8000	7100	5600	4700	2800	1800	950
	10	12000	12000	10500	7500	4800	2900	1400
	15	13500	14500	15000	9500	6500	3900	1700
	25		16500	20000	11500	9200	5300	2300
	40			20000	13500	12000	7500	3200
	60				15000	13000	10000	4400
	80					14000	12000	5600
	100					14000	12000	7000
	125						12000	8000
Setpoint 1 psi 0.31 psi Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	2	6500	5000	4000	4000	2000	1300	500
	5	8000	7500	6000	6000	4000	2200	1000
	10	9000	8500	8000	8000	5500	3000	1400
	15	12000	11000	10000	10000	7000	4000	1800
	25		13500	12500	11500	9500	5500	2400
	40			14000	13000	11000	7400	3300
	60				15000	13500	10000	4500
	80					15000	13000	6000
	100					16000	14000	7000
	125						14000	8500
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	2	3350	3000	2000	1900	1200	1000	500
	5	6600	5900	4200	3900	2400	1600	1000
	10	11000	10000	7600	6500	4100	2800	1450
	15	13000	12000	9300	8300	5600	3800	1700
	25		15000	16500	11000	8500	5300	2400
	40			20000	14000	12500	7500	3400
	60				15500	13000	10000	4400
	80					14000	12000	5600
	100					14000	12000	7000
	125						12000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature.
Changes in performance can occur at extreme low flowing temperatures.

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) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle						
		1¼"	1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	30°	10°	10°	10°	10°
Setpoint 2 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	8200	7400	5200	4800	2900	1900	900
	10	12500	11300	8700	7800	4800	3000	1400
	15	15500	14500	11500	10000	6500	3800	1700
	25		18000	16500	13500	9000	5300	2400
	40			20000	16500	12500	7600	3400
	60				16500	15500	10000	4600
	80					16000	12000	5600
	100					16000	12000	7000
	125						12000	8000
Setpoint 3 psi 0.35 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	3500	3000	2000	1800	1400	1100	750
	10	8000	7000	5500	5000	3000	2000	1100
	15	10500	10000	8000	7000	4000	3000	1600
	25		11500	9800	9000	5600	4500	2000
	40			21500	20000	10500	7500	3500
	60				21000	14500	10500	4500
	80					18000	13500	6000
	100					20500	16400	7500
	125						19000	9000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1½" 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"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red Spring 3½" to 6½" w.c. **143-16-021-03**	½	2000	1600	1300	700	500	
	1	2800	2500	2100	1200	800	400
	2	4000	3500	3200	2100	1300	600
	5	6100	5600	4800	3700	2200	1000
	10	8200	7700	6500	5600	3100	1400
	15	9300	9300	7400	6800	3900	1750
	25		11000	9100	8100	5100	2400
	40			10500	9800	7100	3200
	60			12000	11000	9300	4400
	80				12000	10500	5600
	100				12000	11000	7000
	125					11000	8000
Setpoint 7" w.c. 1" w.c. Droop Blue Spring 5" to 8½" w.c. **143-16-021-04**	½	1800	1550	1100	600	500	
	1	2600	2300	1850	1100	750	400
	2	3800	3300	2600	1900	1250	600
	5	5700	5100	4200	3300	2100	1000
	10	8200	7600	6000	5400	3100	1400
	15	9300	9100	7000	6600	3900	1750
	25		11000	8400	7800	5100	2400
	40			10000	9500	7100	3200
	60			10500	10500	9300	4400
	80				11500	10500	5600
	100				12000	11000	7000
	125					11000	8000
Setpoint 11" w.c. 2" w.c. Droop Green Spring 6" to 14" w.c. **143-16-021-05**	1	2700	2300	1900	1100	750	400
	2	4000	3500	2700	1900	1200	600
	5	6000	5600	4500	3500	2100	1000
	10	8800	8200	6500	5500	2900	1400
	15	10000	9800	7700	6800	3800	1750
	25		11500	9700	8100	5100	2400
	40			11500	9700	7100	3200
	60			12500	11500	9300	4400
	80				12000	10500	5600
	100				12500	11000	7000
	125					11000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

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

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1¼"	1"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	1	1800	1300	1100	800	500	
	2	3000	2800	2200	1500	1000	500
	5	5600	5200	4200	2600	1800	950
	10	8600	7700	6000	4300	2900	1400
	15	10000	9300	7400	5800	3800	1750
	25		11500	9100	7800	5100	2400
	40			11000	9500	7100	3200
	60			12500	11000	9300	4400
	80				12500	10500	5600
	100				13000	11000	7000
	125					11000	8000
Setpoint 1 psi 0.31 psi Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	2	6500	5000	4000	2000	1300	500
	5	8000	7500	6000	4000	2200	1000
	10	9000	8500	8000	5500	3000	1400
	15	12000	11500	10000	7000	4000	1800
	25		13500	11500	9500	5500	2400
	40			13000	11000	7400	3300
	60			15000	13500	10000	4500
	80				15000	13000	6000
	100				16000	14000	7000
	125					14000	8500
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	2	2800	2450	1500	1200	850	500
	5	5500	5100	3700	2400	1600	950
	10	8000	7500	5700	4000	2700	1400
	15	10000	9100	7100	5300	3700	1750
	25		11000	9300	7300	5100	2400
	40			11000	9300	7100	3200
	60			12500	11000	9300	4600
	80				12500	10500	5600
	100				13000	11000	7000
	125					11000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

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

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1¼"	1"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	3500	3000	2000	1400	1100	500
	10	7000	6000	5000	2500	2000	1000
	15	9000	8000	7000	3500	2500	1500
	25		10000	8000	4800	4500	1900
	40			11500	6500	6000	3500
	60			14000	8000	7500	4500
	80				9000	8000	6000
	100				12000	11000	7000
	125					12000	8500
Setpoint 2 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	6000	5300	4100	2700	1700	900
	10	10000	9300	7100	4700	2900	1400
	15	13000	12000	8800	6200	3800	1700
	25		14500	11000	8600	5200	2400
	40			13500	11000	7100	3200
	60			15000	13500	10000	4600
	80				15000	12000	5600
	100				16000	12000	7000
	125					12000	8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1¼", 1½" and 2" Model 243-12-1 with External Control Line 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"	½"	⅜"	¼"
		10°	10°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red Spring 3½" to 6½" w.c. **143-16-021-03**	½	2200	1900	1600	800	500	
	1	3600	3200	2300	1300	850	400
	2	5600	4700	3500	2000	1400	600
	5	10500	8200	5700	3500	2200	1000
	10	15000	12000	8900	5200	3000	1500
	15	19000	16000	12000	6700	4000	1750
	25	22000	20000	16000	9000	5200	2400
	40		24000	21000	12000	7500	3200
	60			27000	15500	10000	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 7" w.c. 1" w.c. Droop Blue Spring 5" to 8½" w.c. **143-16-021-04**	½	2000	1700	1500	700	450	
	1	3100	2600	2000	1100	750	400
	2	5000	3800	3000	1700	1200	600
	5	7800	6500	5000	3100	2000	1000
	10	13000	10000	7000	4800	2900	1500
	15	15000	14000	9400	6400	4000	1750
	25	20000	17000	13500	8500	5200	2400
	40		21000	17000	11500	7500	3200
	60			19000	15000	10000	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 11" w.c. 2" w.c. Droop Green Spring 6" to 14" w.c. **143-16-021-05**	1	3200	2500	1900	1100	700	350
	2	5200	4200	3200	1800	1300	550
	5	8500	7200	5200	3200	2000	1000
	10	13500	11000	8000	5000	3000	1500
	15	16000	14000	11000	6500	4000	1750
	25	20000	17000	14000	9000	5200	2400
	40		24000	21000	12000	7000	3200
	60			25000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000

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

* 2" Body Only.

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

Model 243 Capacity Tables

1¼", 1½" and 2" Model 243-12-1 with External Control Line in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1¼"*	1"	¾"	½"	⅜"	¼"
		10°	10°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	1	2400	2000	1200	900	600	300
	2	4200	3200	2000	1500	1000	500
	5	6500	5500	4100	2700	1600	950
	10	11000	8000	6200	4200	2800	1500
	15	14500	11000	8000	5800	3800	1750
	25	18000	15000	11500	8000	5000	2400
	40		21000	15000	11000	7000	3200
	60			20000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	2	3500	2900	1700	1300	850	500
	5	7000	5400	4000	2600	1600	950
	10	10500	8500	5800	4000	2800	1500
	15	14500	10500	7600	5400	3800	1750
	25	18000	14500	10500	7500	5000	2400
	40		20000	15000	10500	7000	3200
	60			20000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
Setpoint 2 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	5	8600	6800	5300	2700	1900	850
	10	13000	10500	7500	4500	2900	1400
	15	17500	13500	10500	6000	3800	1750
	25	25000	20000	14000	8500	5000	2400
	40		25000	20000	12000	7000	3200
	60			25000	15000	10000	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000

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

* 2" Body Only.

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

Model 243 Capacity Tables

1½" and 2" Model 243-8-1 and 243-8-2 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					
		1"	¾"	½"	⅜"	¼"	0.207"
		30°	10°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red-Black Spring 3½" to 6½" w.c. **143-82-021-00**	½	1100	900	700	500		
	1	1950	1600	1050	750	350	
	2	3200	2400	1550	1000	550	350
	5	5200	3900	2700	1900	950	550
	10	7400	5800	4500	3000	1350	900
	15	9100	7100	5800	3800	1700	1150
	25	12500	8700	7200	5100	2400	1500
	40		10500	9200	7100	3200	2100
	60			11000	9300	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600
Setpoint 7" w.c. 1" w.c. Droop Blue-Black Spring 5" to 8½" w.c. **143-82-021-01**	½	1000	750	650	400		
	1	1600	1150	900	650	300	
	2	2700	1800	1350	950	450	350
	5	4800	3500	2350	1600	770	500
	10	7000	5400	3900	2500	1250	900
	15	9100	7000	5000	3500	1700	1150
	25	12500	8700	6600	5100	2400	1500
	40		10500	9000	7100	3200	2100
	60			11000	9300	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600
Setpoint 11" w.c. 2" w.c. Droop Green-Black Spring 6" to 14" w.c. **143-82-021-02**	1	1650	1150	1000	650	300	
	2	2700	2000	1400	1000	450	350
	5	4800	3800	2600	1750	900	600
	10	7000	5400	4200	2800	1300	900
	15	9000	7400	5500	3600	1700	1100
	25	11000	8800	7500	5100	2400	1500
	40		11000	9600	7100	3200	2100
	60			11000	9300	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1½" Models 243-8-1 and 243-8-2 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					
		1"	¾"	½"	⅜"	¼"	0.207"
		30°	10°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Green Spring 12" to 28" w.c. **143-16-021-05**	1	1500	1100	800	550		
	2	2100	1700	1300	900	450	350
	5	4500	3400	2000	1350	850	600
	10	6600	5700	3500	2400	1300	850
	15	8800	7100	5000	3400	1700	1050
	25	11500	9100	7100	5100	2400	1500
	40		11000	9300	7100	3200	2100
	60			11000	9400	4400	2900
	80			12000	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600
Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c. **143-16-021-05**	2	4000	3500	1800	1200	500	
	5	6000	5000	3500	2200	1000	
	10	7500	7000	5000	3000	1500	
	15	9000	8000	6500	4000	1850	
	25	12000	10000	8000	5000	2000	
	40		12500	9500	7000	3000	
	60			11500	9500	4500	
	80			12500	11500	6000	
	100				12500	7000	
	125					8000	
Setpoint 1 psi 0.2 psi Droop Orange Spring 1 to 2 psi **143-16-021-06**	2	2100	1650	1200	850	450	
	5	4000	3200	2100	1300	850	550
	10	6500	5200	3100	2200	1300	800
	15	8400	6500	4400	3000	1700	1000
	25	11000	8600	6500	4400	2400	1500
	40		11000	8600	6700	3200	2100
	60			10500	9000	4400	2900
	80			11500	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1½" Models 243-8-1 and 243-8-2 in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1"	¾"	½"	⅜"	¼"	0.207"
		30°	10°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	3000	1800	1200	1100	900	
	10	4000	2500	1800	1500	1000	
	15	5200	4000	2850	2000	1400	
	25	7000	5200	3600	3100	1800	
	40		9000	5000	4200	2200	
	60			8300	6500	3000	
	80			10000	8500	5000	
	100				9000	6000	
	125					8000	
Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	4400	3400	2400	1600	800	
	10	7100	5900	3600	2400	1300	750
	15	9600	7500	4800	3400	1700	1000
	25	12500	10500	6500	5000	2400	1500
	40		13000	9600	7000	3200	2100
	60			12500	9300	4400	2900
	80			13500	11000	5600	3700
	100				12000	7000	4500
	125					8000	5600

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

1¼" Models 243-8-1, 243-8-2, 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 243-12	Outlet Pressure and Spring 243-8	Inlet Pressure psi	Orifice Size and Valve Angle				
			¾"	½"	⅜"	¼"	0.207"
			10°	10°	10°	10°	10°
Setpoint 6" w.c. 1" w.c. Droop Red Spring 3½" to 6" w.c. **143-16-021-03**	Setpoint 6" w.c. 1" w.c. Droop Red-Black Spring 3½" to 6½" w.c. **143-82-021-00**	½	900	700	500		
		1	1600	1050	750	350	
		2	2250	1500	1000	550	350
		5	2500	2200	1900	950	550
		10	3100	2900	2650	1350	900
		15	3550	3600	2700	1700	1050
		25	4200	3800	3300	2400	1500
		40	4200	4100	3800	3200	2100
		60		4800	4400	4400	2900
		80		5600	5600	5600	3700
		100			6000	6000	4500
		125				6000	5600
Setpoint 7" w.c. 1" w.c. Droop Blue Spring 5" to 8½" w.c. **143-16-021-04**	Setpoint 7" w.c. 1" w.c. Droop Blue-Black Spring 5" to 8½" w.c. **143-82-021-01**	½	750	650	400		
		1	1150	900	650	300	
		2	1700	1300	950	450	350
		5	2300	1900	1600	770	500
		10	2900	2600	2200	1250	900
		15	3500	3100	2500	1700	1050
		25	4200	3600	3300	2400	1500
		40	4800	4000	3800	3200	2100
		60		4600	4400	4400	2900
		80		5600	5600	5600	3700
		100			6000	6000	4500
		125				6000	5600
Setpoint 11" w.c. 2" w.c. Droop Green Spring 6" to 14" w.c. **143-16-021-05**	Setpoint 11" w.c. 2" w.c. Droop Green-Black Spring 6" to 14" w.c. **143-82-021-02**	1	1150	1000	650	300	
		2	1850	1350	1000	450	350
		5	2500	2200	1750	800	550
		10	2900	2700	2450	1300	900
		15	3700	3950	2600	1700	1100
		25	4250	4000	3300	2400	1500
		40	5300	4200	3800	3200	2100
		60		4850	4400	4400	2900
		80		5850	5600	5600	3700
		100			6000	7000	4500
		125				8000	5600

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

NOTE: 1" x 30º and 1¼" x 30º orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

Model 243 Capacity Tables

1¼" Models 243-8-1, 243-8-2, 243-12-1 and 243-12-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring 243-12	Outlet Pressure and Spring 243-8	Inlet Pressure psi	Orifice Size and Valve Angle				
			¾"	½"	⅜"	¼"	0.207"
			10°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	Setpoint 18" w.c. 3" w.c. Droop Green Spring 12" to 28" w.c. **143-16-021-05**	1	1100	800	500		
		2	1900	1250	900	450	350
		5	2250	1700	1350	750	550
		10	2950	2250	2100	1300	850
		15	3450	3600	2450	1700	1050
		25	4400	3750	3300	2400	1500
		40	5300	4100	3800	3200	2100
		60		4800	4400	4400	2900
		80		4850	5600	5600	3700
		100			6000	7000	4500
		125				8000	5600
Setpoint 1 psi 0.31 psi Droop Orange Spring 12" to 28" w.c. **143-16-021-06**	Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c. **143-16-021-05**	2	3000	1800	1200	500	
		5	4000	3000	2000	1000	
		10	5000	4000	3000	1500	
		15	6000	5100	3900	1900	
		25	7500	6400	4500	2200	
		40	8000	7400	6100	2600	
		60		8000	7350	4000	
		80		8500	8000	5100	
		100			8500	6500	
		125				7000	
Setpoint 1 psi 0.2 psi Droop Black Spring 1 to 2 psi **143-16-021-07**	Setpoint 1 psi 0.2 psi Droop Orange Spring 1 to 2 psi **143-16-021-06**	2	1850	1150	850	450	
		5	2100	1700	1350	750	500
		10	2700	2000	1950	1300	800
		15	3150	3100	2050	1700	1000
		25	4150	3250	2850	2400	1500
		40	5300	3800	3600	3200	2100
		60		4600	4250	4400	2900
		80		4650	5600	5600	3700
		100			6000	7000	4500
		125				8000	5600

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

NOTE: 1" x 30º and 1¼" x 30º orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

Model 243 Capacity Tables

1¼" Models 243-8-1, 243-8-2, 243-12-1 and 243-12-2 in SCFH of Natural Gas

(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring 243-12	Outlet Pressure and Spring 243-8	Inlet Pressure psi	Orifice Size and Valve Angle				
			¾"	½"	⅜"	¼"	0.207"
			10°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	1200	1000	800	500	
		10	2000	1800	1400	1000	
		15	3300	2800	1800	1400	
		25	4700	3300	2300	1650	
		40	6300	4900	2800	2000	
		60		5800	5000	2800	
		80		6500	6400	4600	
		100			6500	4750	
		125				5000	
Setpoint 3 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi **143-16-021-08**	Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	2200	1950	1650	700	
		10	3600	2300	2150	1300	750
		15	3800	3400	2350	1700	1000
		25	5000	3900	3250	2400	1500
		40	6300	4300	3700	3200	2100
		60		5500	4400	4400	2900
		80		5500	5850	5600	3700
		100			6550	7000	4500
		125				8000	5600

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

NOTE: 1" x 30º and 1¼" x 30º orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

Model 243 Capacity Tables

2" Models 243-8-1 and 243-8-2 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					
		1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 18" w.c. 3" w.c. Droop Green Spring 12" to 28" w.c. **143-16-021-05**	1	1500	1200	1100	800	600	
	2	2400	1800	1700	1250	950	500
	5	5500	3700	3500	2300	1400	900
	10	9400	8400	6000	3700	2400	1400
	15	12000	12000	8100	5600	3800	1700
	25	14500	17500	10000	8200	5600	2400
	40		20000	12000	11500	7400	3400
	60				13500	10000	4600
	80				14000	11000	5600
	100					12000	7000
	125						8000
Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c. **143-16-021-05**	2	5000	4000	4000	3000	1000	500
	5	8000	7000	7000	4000	1900	1000
	10	14000	12800	10000	5500	3000	1500
	15	16500	14000	13900	7750	4500	1800
	25	17700	16900	15000	9000	5500	2500
	40		18000	16500	11500	7400	3200
	60				15000	10000	4600
	80				17000	13800	6100
	100					14000	7000
	125						9000
Setpoint 1 psi 0.2 psi Droop Orange Spring 1 to 2 psi **143-16-021-06**	2	2400	1800	1700	1200	850	450
	5	4000	3400	3300	2200	1300	900
	10	7000	6000	5400	3500	2200	1400
	15	11000	9000	7000	4600	3100	1700
	25	14500	15000	10000	7400	4800	2400
	40		17500	12000	10500	7000	3400
	60				12500	9500	4600
	80				13500	10500	5600
	100					11000	7000
	125						8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

2" Models 243-8-1 and 243-8-2 in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle					
		1"	¾"	¾"	½"	⅜"	¼"
		30°	30°	10°	10°	10°	10°
Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	2000	1600	1600	1400	1000	500
	10	4000	3000	3000	2000	1400	1000
	15	5800	4200	4000	2600	1800	1500
	25	7500	5200	5000	3900	2750	2300
	40		9100	9000	6500	5800	3100
	60				10000	7500	4600
	80				14000	10000	6000
	100					12000	7000
	125						9000
Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi **143-16-021-07**	5	4400	3400	3300	2400	1600	800
	10	7600	6000	5800	3600	2400	1300
	15	11000	9000	7500	4800	3500	1700
	25	15000	15000	10500	8000	5100	2400
	40		17500	13000	11000	7000	3400
	60				14000	9600	4600
	80				15000	11000	5600
	100					12000	7000
	125						8000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature. Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables

Model 243-8HP in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F)

Outlet Pressure	Inlet Pressure psi	1¼" Model 243-8HP				1½" Model 243-8HP					2" Model 243-8HP				
		Orifice Size and Valve Angle				Orifice Size and Valve Angle					Orifice Size and Valve Angle				
		¾" 10°	½" 10°	⅜" 10°	¼" 10°	1" 30°	¾" 10°	½" 10°	⅜" 10°	¼" 10°	1" 30°	¾" 10°	½" 10°	⅜" 10°	¼" 10°
Setpoint 5 psi 1 psi Droop Cadmium Spring 3 to 6½ psi **143-16-021-08**	10	3300	2050	2000	1300	6000	5500	3200	2300	1300	6000	5500	3200	2400	1300
	15	3400	3100	2200	1700	8600	6500	4400	3200	1700	8600	6000	4400	3200	1700
	25	4400	3650	3050	2400	12000	9300	6100	4800	2400	13000	8200	6100	4800	2400
	40	5800	3800	3200	3200		12000	8500	6100	3200		12000	8700	6100	3400
	60		4400	4100	4400			10000	8700	4400			10000	8700	4600
	80		4500	5300	5600			11000	10000	5600			11500	10000	5600
	100			6000	7000				11000	7000				11000	7000
	125				8000					8000					8000
Setpoint 7 psi 1 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	10	2300	2000	1800	1000	2500	2300	2000	1600	1000	2700	2500	2100	1600	1000
	15	3000	2800	2200	1400	5000	4000	2500	2200	1500	5900	4300	2800	2400	1500
	25	5400	4100	3300	2000	8500	6500	4300	3500	2000	8600	6600	4600	3600	2000
	40	7600	5600	4800	2800		9500	6500	5000	3000		10000	7200	5600	3000
	60		7500	6200	3800			9000	6500	4000			9700	7000	4500
	80		8800	7200	5200			11000	8500	5000			12000	9000	5500
	100			8600	5800				10500	5500				11500	7000
	125				7000					5500					5500
Setpoint 7 psi 2 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	10	5400	3500	2500	1400	8000	5500	3500	2500	1300	8600	6000	4300	2700	1400
	15	7400	5000	3500	1800	10500	8000	5000	3500	1700	12700	8900	5700	3800	1800
	25	10000	7600	5500	2500	15000	12000	8000	5000	2300	18600	13500	8600	5700	2400
	40	12500	10000	7500	3500		16000	11500	7500	3300		19000	12500	8000	3500
	60		12500	9500	4800			15000	9500	4500			17000	10000	4800
	80		14000	11500	6100			17500	12500	5500			20000	13500	6200
	100			13500	7200				15500	7000				16500	7300
	125				8800					7000					8100
Setpoint 10 psi 1 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	15	2500	2200	1800	1200	3500	3000	2000	1300	1000	3600	3000	2000	1800	1000
	25	4800	3500	2800	1900	6500	5000	3500	2500	1900	6800	5700	4000	3000	1900
	40	7200	5000	4000	2500		8000	5500	4300	2500		8600	5700	4600	2800
	60		6700	5700	3500		10500	7500	6000	3500			8600	6400	4300
	80		7800	6600	4600			9000	7500	4500			10500	8400	5200
	100			7800	5400				9500	6000				10700	6500
	125				6500					7000					8000
Setpoint 10 psi 2 psi Droop Cadmium-White Springs 6 to 10 psi **143-16-021-03**	15	6000	4000	2800	1700	8500	6500	4000	2500	1500	9000	6600	4800	3000	1500
	25	9000	6500	5000	2500	12000	10500	7000	4500	2300	15500	11000	7400	5000	2400
	40	12000	9000	7000	3500		15000	10000	7500	3000		16500	11000	7700	3200
	60		12000	9400	4700			14000	10000	4500			15000	10700	4800
	80		13000	11000	6000			17000	12000	5500			18500	13000	6000
	100			13000	7000				15000	7000				16000	7300
	125				8800					9000					9000

The last capacity figure in each group indicates the maximum allowable inlet pressure (except for emergency conditions). The 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 70ºF flowing temperature.
Changes in performance can occur at extreme low flowing temperatures.

Maximum Emergency Pressures

NOTE: The use of an internal or external relief valve is recommended for installations subjected to no flow for extended periods of time, such as pilotless ignition systems. A travel stop stem is located in the 243-12-1 and 243-12-4 to provide over-pressurization protection to internal components during overpressurization.

The maximum pressure the regulator inlet may be subjected to under abnormal conditions without causing damage to the regulator is the maximum allowable inlet pressure (from the capacity tables, pages 6 through 22) plus 50 psi.

The maximum pressure the diaphragm may be subjected to without causing damage to the internal parts of the regulator is:

243-12-1 ..... Setpoint + 3 psi
243-12-2, 243-8-1 and 243-8-2 ..... Setpoint + 5 psi
243-8HP ..... Setpoint + 5 psi

Setpoint is defined as the outlet pressure that a regulator is adjusted to deliver.

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

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

243-12-1 and 243-12-2 ..... 15 psi
243-8-1 and 243-8-2 ..... 15 psi
243-8HP ..... 25 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 positive lockup. The allowable outlet pressure is the lowest of the maximum pressures permitted by federal codes, state codes, Bulletin RDS-1498 or other applicable standards. The method of protection can be a relief valve, monitor regulator, shut-off device or similar mechanism.

Monitoring

A monitor set consists of two regulators in series as shown in the figure. The monitor is the standby. It takes control if a failure in the operating regulator causes outlet pressure to exceed normal.

Either regulator may be used as the monitor. In both cases, the upstream regulator must have a blocked throat and external control line as shown for the 243 on page 5. Also, the control line for the upstream regulator connects into the outlet piping all the way downstream, which means downstream of the downstream regulator.

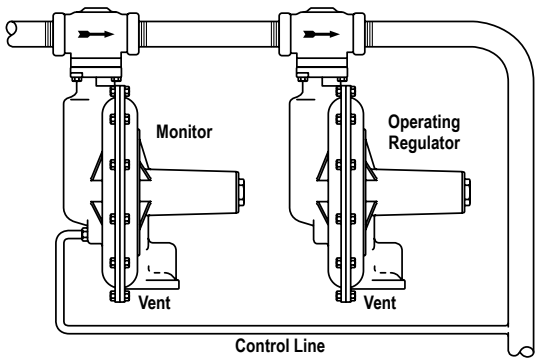
The illustration shows a typical 243 monitor set. While the downstream regulator is shown as operating and the upstream regulator is shown as the monitor, the two can be reversed. There are reasons for doing it either way depending on the user's practice. Stop and bypass valves (which are not shown) likewise would depend on the user's preference and practice.

Either way, the operating regulator is adjusted for the normal outlet pressure. The monitor is adjusted somewhat higher so it is normally full open. If a failure in the operating regulator causes excessive increase in outlet pressure, the monitor will go into operation to hold outlet pressure at its setpoint.

Monitoring is an effective and dependable method of providing overpressure protection. A significant advantage is that it provides the protection without wasting gas to atmosphere. Refer to Bulletin RDS-1306-2 (package monitor sets 243-DOT) for more information.

When a 243 is used to monitor another 243 with an identical orifice size, the total maximum capacity through both can be figured at 70% of the rated capacity for one regulator. This applies with the monitor located upstream or downstream.

243 MONITOR SET



CDF1306-055

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-1306 field service instructions.**

Mounting Positions

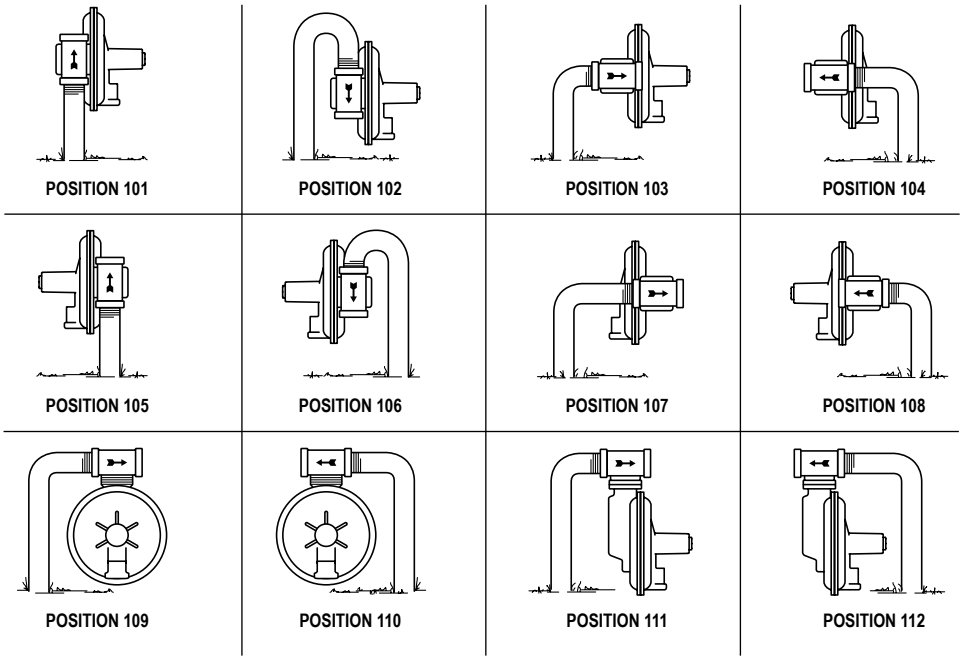
The 243 Service Regulator can be provided in any of the positions shown. Specify by position number when ordering.

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.

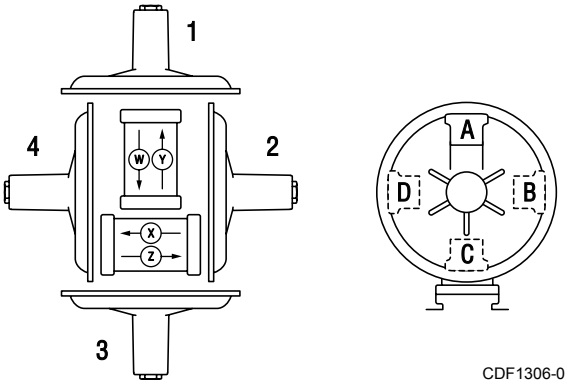
CAUTION

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.



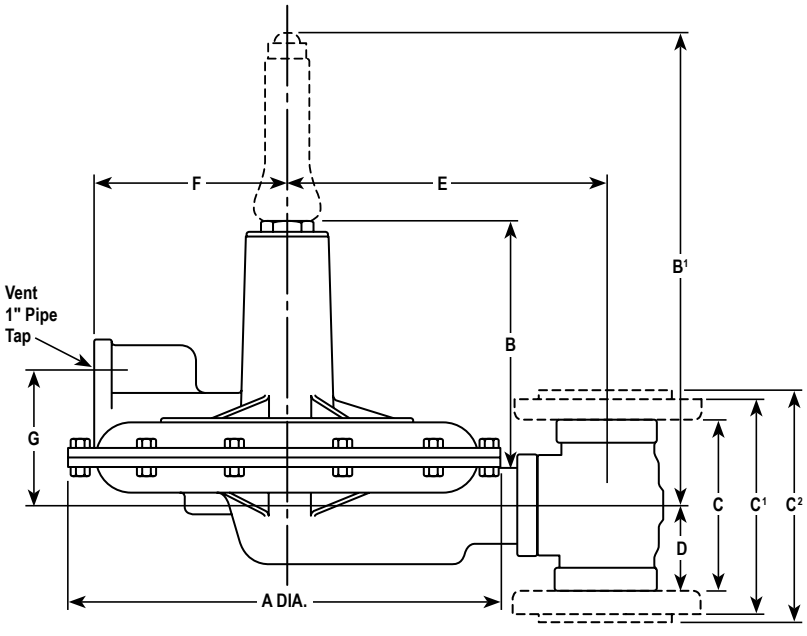
CDF1306-060

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.



CDF1306-065

Dimensions



CDF1306-070

Model	243-12	243-8	243-8HP
A	14"	10 3/16"	10 3/16"
**B	9 3/4"	9 3/4"	-
B¹	-	-	12 3/4"
C	5 3/4"	5 3/4"	5 3/4"
***C¹	7 1/2"	7 1/2"	7 1/2"
C²	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

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. $Q = K\sqrt{P_o(P_i - P_o)}$ ..... (for $\frac{P_i}{P_o}$ less than 1.894)

2. $Q = \frac{KP_i}{2}$ ..... (for $\frac{P_i}{P_o}$ greater than 1.894)

Q = maximum capacity of the regulator (in SCGH of 0.6 specific gravity natural gas).
K = the **"K" factor**, the regulator constant (see below)
P_i = **absolute** inlet pressure (psia)
P_o = **absolute** outlet pressure (psia)

Orifice size:	.207"	¼"	⅜"	½"	¾"	1"	1¼"
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 6 through 22.

Other Gases

243 regulators are mainly used on natural gas. However, they perform equally as well on LP gas, nitrogen, dry CO_2, air and others. For capacities, multiply the table values on pages 6 thru 22 by 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 Mix (Specific Gravity 1.20)	0.71
Nitrogen (Specific Gravity 0.97)	0.79
Dry Carbon Dioxide (Specific Gravity 1.52)	0.63

For other non-corrosive gases use the following formula:

$$\text{CORRECTION FACTOR} = \sqrt{\frac{0.60}{\text{Specific gravity of the gas}}}$$

While used primarily on natural gas services, Model 243 regulators perform equally as well on LPG vapor, air, CO_2, nitrogen and other inert gas applications. Please contact your Sensus representative for special construction which may be available for certain corrosive gases.

How to Order

Specify:

1. Pipe size and model number (page 1)
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

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 CO_2,etc. For additional information on a particular model, please request the indicated bulletin from the local Sensus sales office, or visit our website at www.sensus.com

Multi-Purpose Service Regulators

Model 043-C
½", ¾", 1", 1¼" pipe sizes
Inlet pressures ..... to 125 psi
Outlet pressures ..... 5" w.c. to 5 psi
Capacity to 3500 SCFH
Available with 90° angle or straight-through body.
Standard with internal relief valve.

Model 143-80
¾", 1", 1¼" pipe sizes
Inlet pressures ..... to 125 psi
Outlet pressures ..... 3½" w.c. to 6 psi
Capacity to 2000 SCFH
Optional internal relief valve and low pressure cut-off.

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
¾", 1" and 1¼" pipe sizes
Inlet pressures ..... to 1000 psi
Outlet pressures ..... 3 to 200 psi
Capacity to 40,000 SCFH
Optional monitor and internal relief valve.

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.

Model 243-RPC
1¼", 1½" and 2" pipe sizes
Inlet pressures ..... to 150 psi
Outlet pressures ..... 3½" w.c. to 35 psi
Capacity to 76,000 SCFH

Sensus also produces industrial and combustion regulators; high pressure, high capacity regulators, and safety relief valves. Detailed information is available on request.

Notes:

Notes:

Authorized Distributor:

805 Liberty Boulevard
DuBois, PA 15801
1-800-375-8875

DS-G-REG-1301-0113-03-A*

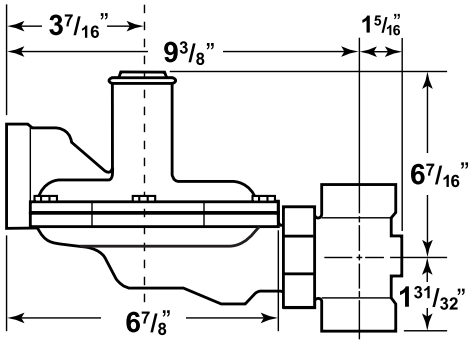
Model 143-80

Domestic Service Regulator (Models 143-80-1, 143-80-2, 143-80-2HP)

Technical Data

Valve Body	Cast Iron - 125 psig working pressure
Spring and Lower Case	Die-Cast Aluminum
Orifice	Aluminum
Fulcrum Pin	Stainless Steel
Valve Seat	One piece molded Buna-N
Valve Stem	Fiberglass reinforced nylon
Throat/Support/Stem	Acetal insert
Diaphragm Plate	Plated Steel
Diaphragm	Nylon fabric-reinforced Buna-N with full 26 in^2 effective area
Vent and Valve	Polyethylene valve and seat, 1” NPT vent
Operating Temperature	-20° to +150° F (-28.9° to +65.5° C)
Corrosion Protection	Cases dip primed chromate conversion coating, enamel topcoat
Internal Relief Valve	Set to relieve at approximately 7-10” w.c. above normal outlet pressure setting

Dimensions



Valve Body Sizes

Straight
3/4” x 3/4”
3/4” x 1”
3/4” x 1-1/4”
1” x 1”
1” x 1-1/4”
1-1/4” x 1-1/4”

Orifice and Maximum Inlet Pressure

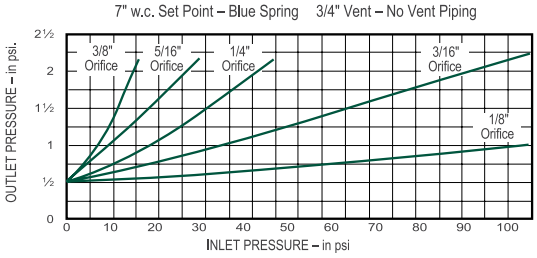
Pressure	Size	Part Number
125 psig	1/8”	143-62-023-37
125 psig	3/16”	143-62-023-40
60 psig	1/4”	143-62-023-42
40 psig	5/16”	143-62-023-43
40 psig	3/8”	143-62-023-44
20 psig	1/2”	143-62-023-45
10 psig	5/8”	143-62-023-46

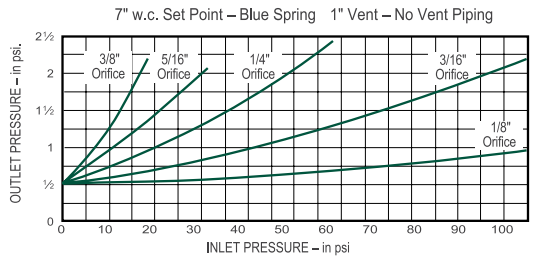
Regulator Spring Chart

Normal Range	Color	Part Number
3.5” - 6.5” w.c.	Red	143-62-021-15
5.0” - 8.5” w.c.	Blue	143-62-021-16
6.0” - 14.0” w.c.	Green	143-62-021-17
12.0” - 28.0” w.c.	Orange	143-62-021-18
0.5 - 2.0 psi	Black/White	143-62-021-22
0.5 - 3.0 psi	Cadmium*	173-62-021-02
2.0 - 6.0 psi	Black*	139-62-021-01

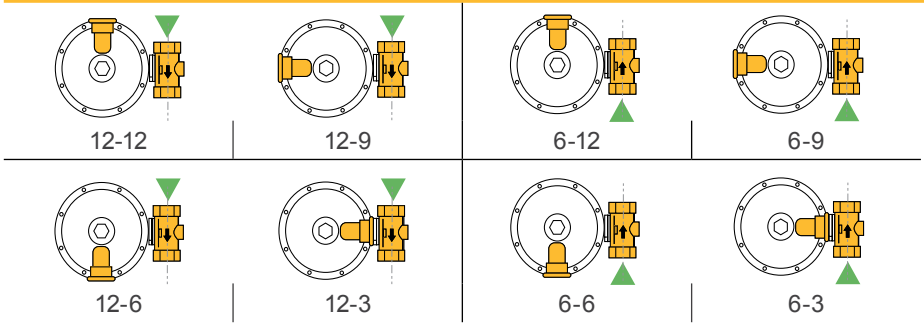
* For high pressure model 143-80-2HP

Relief Valve Performance





Mounting Positions



Note:

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

SENSUS

*This document replaces TD-1301

Model 143-80

Domestic Service Regulator (Models 143-80-1, 143-80-2, 143-80-2HP)

Capacities

SCFH Natural Gas (0.6 specific gravity - 14.65 psia - 60° F)

Pipe Size: 3/4 x 3/4”

Inlet	Orifice						
Psig	**1/8”**	**3/16”**	**1/4”**	**5/16”**	**3/8”**	**1/2”**	**5/8”**
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
7.5	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	-	-	-	-	-

Pipe Size: 3/4” x 1” and 1” x 1”

Inlet	Orifice						
Psig	**1/8”**	**3/16”**	**1/4”**	**5/16”**	**3/8”**	**1/2”**	**5/8”**
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	580	890	1120	1160	950	970
7.5	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	-	-	-	-	-

Pipe Size: 3/4” x 1-1/4”; 1” x 1-1/4”; 1-1/4” x 1-1/4”

Inlet	Orifice						
Psig	**1/8”**	**3/16”**	**1/4”**	**5/16”**	**3/8”**	**1/2”**	**5/8”**
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	580	890	1180	1350	1490	1060
7.5	310	700	1140	1500	1610	1580	1060
10	370	840	1360	1700	1710	1800	1180
20	630	1230	1600	1800	1900	1900	-
40	860	1800	2200	1900	2000	-	-
60	1200	2100	2400	-	-	-	-
80	1550	2200	-	-	-	-	-
125	2250	2400	-	-	-	-	-

NOTES:

Orifice Outlet Pressure variations:

- Red & Blue Springs 1” w.c. droop
- Orange Spring 3” w.c. droop
- Green Spring 2” w.c. droop
- Black Spring 10% droop

*The 1/2, 1, and 2 psig inlet pressures apply only to Red and Blue springs.

Note: Figures highlighted in each column indicate maximum capacity for each orifice at recommended pressure within the optimum performance range.

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

Calculations for Other Gases

Type	Sp. Gravity	Corr. Factor
Air	1.00	0.77
Propane	1.53	0.63
1350 BTU Propane/Air	1.20	0.71
Nitrogen	0.97	0.79
Dry Carbon Dioxide	1.52	0.63

For other non-corrosive gases $\sqrt{\frac{0.60}{\text{Specific Gravity of the Gas}}}$

Full Open Capacity Calculations

Formula 1: For $\frac{P_1}{P_0}$ ***less than*** 1.894)

$$Q = K\sqrt{P_0(P_1-P_0)}$$

Formula 2: For $\frac{P_1}{P_0}$ ***greater than*** 1.894)

$$Q = \frac{KP_1}{2}$$

Where:

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

K = the regulator constant from the table below

5/8”	1/2”	3/8”	5/16”	1/4”	3/16”	1/8”
820	520	292	206	132	74	33

P_1 = absolute inlet pressure (psia)

P_2 = absolute outlet pressure (psia)

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For more information, visit us at sensus.com/gas

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CONDENSATE PUMPS

TATTOO
Condensate Removal System

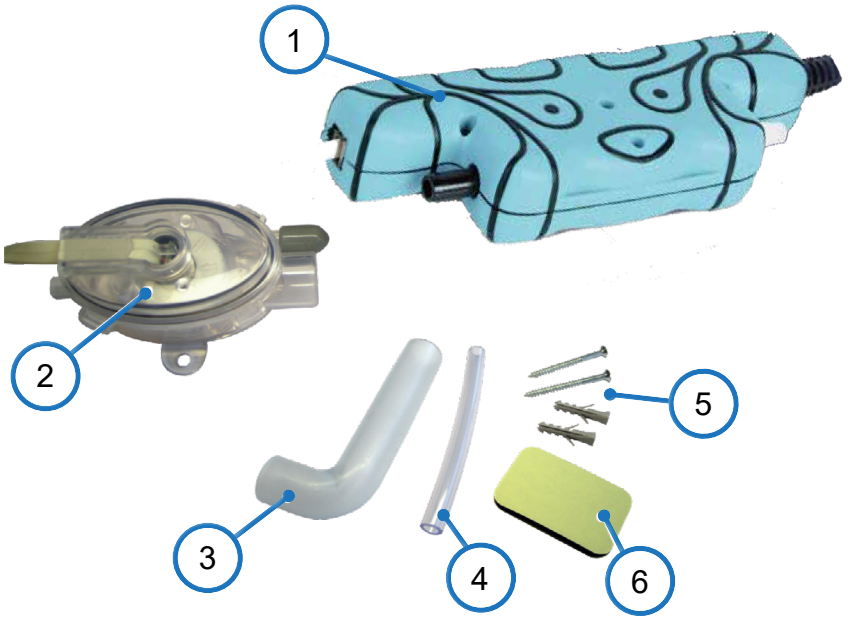
- The TATTOO series is the ***most silent*** condensate removal system on the market today.
- Compact size compared to a tank pump
- Built-in check valve
- Thermal security of 230°F (110°C)
- 5ft communication wire
- ***Normally Open/Normally Closed alarm 100V to 240V/8A***
- Delivered complete with mounting accessories - ***ready to use***

SUITABILITY

- Split, multiplit and VRF/VRV systems
- TATTOO10 is for air-conditioning systems up to 36,000 BTU, 3 tons
- TATTOO16 is for air-conditioning systems up to 54,000 BTU, 5 tons
- High-wall split systems, ducted units, floor standing and chassis units

CONTENTS

1. *TATTOO Pump Body*
2. *Plug & Play Detection Unit; 5' Communication Wire Included*
3. *Connection Elbow*
4. *Ventilation Tube*
5. *Fixing Screws and Anchors*
6. *Double-sided Foam Adhesive*
7. *Mounting bracket for horizontal and vertical application (not shown)*

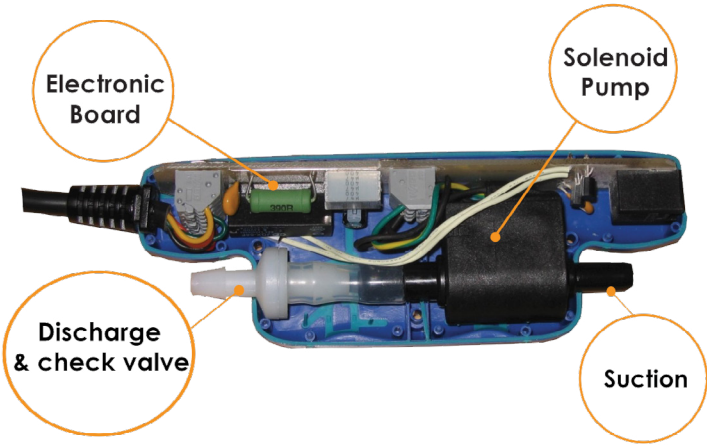


HMAX

CONDENSATE PUMPS

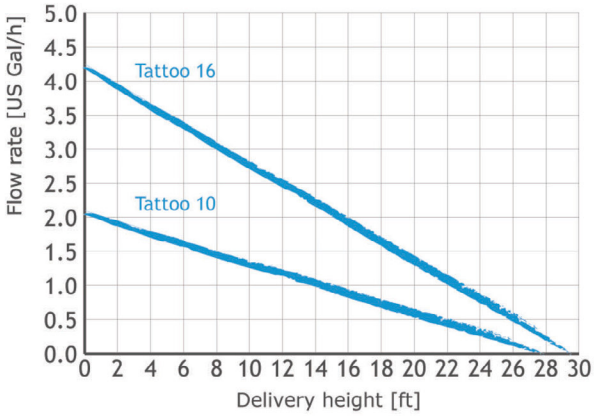
TATTOO
Condensate Removal System

PART NUMBER	TATTOO10	TATTOO16
MAX FLOW RATE	2.1 GAL/HR	4.3 GAL/HR
FLOW RATE AT 3'	1.9 GAL/HR	3.8 GAL/HR
FLOW RATE AT 10'	1.4 GAL/HR	2.8 GAL/HR
MAX DRY SUCTION HEIGHT	3.3'	3.3'
MAX WET SUCTION HEIGHT	6.6'	6.6'
MAX DELIVERY HEIGHT	28'	29.5'
ALARM CONTACT	NO/NC-120V / 8A	NO/NC-120V / 8A
PUMP DIMENSIONS	5.9" X 2.2" X 1.1"	5.9" X 2.2" X 1.1"
SENSOR UNIT DIMENSIONS	3.2" X 1.6" X 1.6"	3.2" X 1.6" X 1.6"
WEIGHT	15.5 OZ	15.5 OZ
POWER SUPPLY	120V OR 230V	120V OR 230V
NOISE LEVEL	<19 DBA	22 DBA

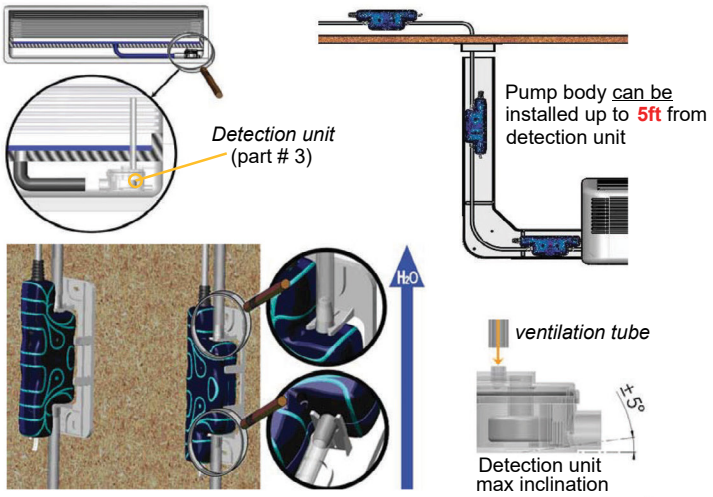


PRODUCT CERTIFICATIONS AVAILABLE UPON REQUEST

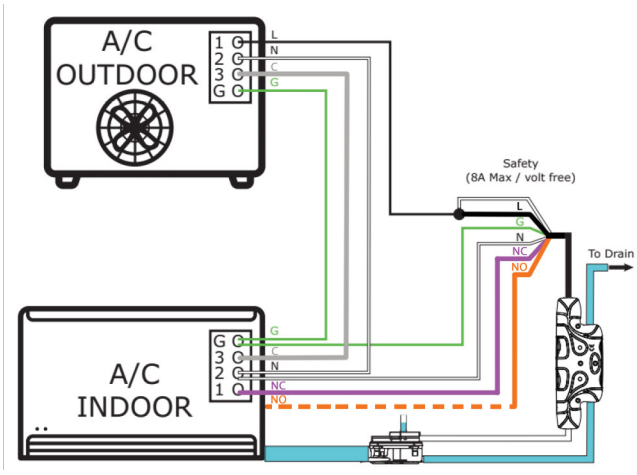
FLOW RATE



INSTALLATION OPTIONS



WIRING - RESIDENTIAL



WIRING - COMMERCIAL