VCC-20 Series



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

Little **GIANT**.

• Check valve — Acetal

Wastewater • Water Systems • HVAC • Industrial • Engineered Products

Engineering Data





Specifications

Item	Model	Discharge						P	erformance	(GPH@Hea	d)	Sh	utoff	Cord	Weight
No.	No.	Size	HP	Volts	Hertz	Amps	Watts	1'	5'	10'	20'	Ft	PSI	Length (ft)	(lbs)
554200		3/8" OD Barbed	1/30	115	60	1.5	93	80	70	45	0	20	8.6	6	5.40
554210	VCC-200L3	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.

Replacem	ent 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 Flow - Liters/Hour 7.5 Head - Meters 2.5 230 v Head - Feet Flow - Gallons/Hour



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	A P P L I C A T I O N Max. Pressure	D A T A Fuel
VB-310	60-01	4-3/4"	4"	3-7/8"	3/4"	14	60 psi	Dry Fuel Gas

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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														
Pressu	re Drop														
PSI	IWC	8" iwc Inlet	14" iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet						
.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						

					V	ert	ica	al \	/al	ves	5				
				NP	т	ç	Sizes	Avai	lable		Flan	hon			Ambient Temperature
	3/4"	1"	11/4"	11/2"	2"	21/2"	3"	4"	2"	21/2"	3"	geu 4"	6"	8"	UL -40° to 150° F
Maximum Pressures 7 noi															-10° to 150°F
of	v	v	v												Fluid
Available 60 psi Sizes		\checkmark	\checkmark	\checkmark	\checkmark	√	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	√	√	Natural gas LP gas

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	A P P L I C A T I O N Max. Pressure	D A T A 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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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														
Pressu	re Drop														
PSI	IWC	8" iwc Inlet	14" iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet						
.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						

					V	ert	ica	al \	Val	ves	5				
				NP	т	ç	Sizes	Avai	lable		Flan	han			Ambient Temperature
	3/4"	1"	11/4"	11/2"	2"	2 1/2"	3"	4"	2"	21/2"	3"	4"	6"	8"	UL -40° to 150° F
Maximum Pressures 7 ps															-10º to 150ºF
of / ps															Fluid
Available 60 ps Sizes	i ✓	√	\checkmark	\checkmark	\checkmark		~	√	\checkmark		\checkmark	√	 ✓ 	√	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	A P P L I C A T I O N Max. Pressure	D A T A 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 Me	CAPACIT erit Rating: For determini	TY TABL Cv 64 (Equing approximate	E IWC/PS uivalent Lei values at selecte	SIG - Cap ngth of Pipe d natural gas pre	acity S.C e is 4 Feet)	C.F.H.	
Pressu	re Drop								
PSI	IWC	8" iwc Inlet	14" iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet
.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

						V	ert	ica	al \	/al	ves	5				
					NP	т	ę	Sizes	Avai	lable		Flan	aed			Ambient Temperature
		3/4"	1"	11/4"	11/2"	2"	21/2"	3"	4"	2"	21/2"	3"	4"	6"	8"	UL -40° to 150° F
	Maximum Pressures															-10° to 150°F
	of	V V	v	v	*											Fluid
0	Available 60 ps Sizes	i 🗸	√	✓	 ✓ 	\checkmark	 ✓ 	\checkmark	~	\checkmark	 ✓ 	\checkmark	✓	√	\checkmark	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	A P P L I C A T I O N Max. Pressure	D A T A 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														
Pressu	re Drop														
PSI	IWC	8" iwc Inlet	14" iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet						
.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														
				NP	т	ç	Sizes	Avail	able		Flan	aed			Ambient Temperature
	3/4"	1"	1 1/4"	1 1/2"	2"	21/2"	3"	4"	2"	2 1/2"	3"	4"	6"	8"	UL -40° to 150° F
Maximum Pressures 7 psi		~													-10° to 150°F
of		•			,		/								Fluid
Available 60 psi Sizes	~	✓	√	✓	✓	✓	✓	✓	~	√	✓	✓	√	√	Natural gas LP gas

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	A P P L I C A T I O N Max. Pressure	D A T A 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														
Pressu	re Drop														
PSI	IWC	8" iwc Inlet	14" iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet						
.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	Avai	lable						Ambient
		NPT Flanged							Temperature						
	3/4"	1"	1 1/4"	11/2"	2"	2 1/2	3"	4"	2"	2 1/2"	3"	4"	6"	8"	UL -40° to 150° F
Maximum Prossuros															-10° to 150°F
of	v	V	v	v											Fluid
Available 60 psi Sizes	 ✓ 	\checkmark	√	 ✓ 	\checkmark	 ✓ 	\checkmark	~	✓	\checkmark	\checkmark	~	✓	√	Natural gas LP gas

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	A P P L I C A T I O N Max. Pressure	D A T A 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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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														
Pressu	re Drop				_	_									
PSI	IWC	8" iwc Inlet	14" iwc Inlet	3 psi Inlet	5 psi Inlet	7 psi Inlet	10 psi Inlet	20 psi Inlet	60 psi Inlet						
.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															
				NP	т	ę	Sizes	Avail	lable		Flan	ged			Ambient Temperature
	3/4"	1"	11/4"	11/2"	2"	2 1/2"	3"	4"	2"	21/2"	3"	4"	6"	8"	UL -40° to 150° F
Maximum Prossures 7		/													-10° to 150°F
of		v	V	v											Fluid
Available 60 psi Sizes	\checkmark	\checkmark	√	√	\checkmark	\checkmark	✓	\checkmark	~	\checkmark	\checkmark		√	√	Natural gas LP gas

IN-G-REG-1301-0914-02-A*

Model 143-80 Service Regulator

Installation and Maintenance Instructions



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 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.

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.
- 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.
- If needed, adjust outlet pressure (set point) by removing cap

 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.



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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IN-G-REG-1301-0914-02-A*

Model 143-80 Service Regulator

Installation and Maintenance Instructions



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 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.

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.
- 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.
- If needed, adjust outlet pressure (set point) by removing cap

 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.



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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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 Pressure Loaded Regulator	243-8HP 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 Pres	sure Range	Spring Part		
Spring Color	243-12	243-8	Number		
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 poi*	143-16-021-08		
White †	_	01010 psi	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 -20°F to 150°F.

Buried Service

The Model 243 regulator is not recommended for buried service.



Maximum Inlet Pressure, psig

Desculator Medial and Size	1¼"	*1¼"	1"	*1"	³ /4"	³ /4"	1⁄2"	³ /8"	1⁄4"	.207"
Regulator model and Size	30°	10°	30°	10°	30°	10°	10°	10°	10°	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 $1\frac{1}{2}$ " Model 243-12- 2 with 1" orifice, 30° valve, 15 psig inlet, and 11" w.c. setpoint (green spring) at 2" w.c. droop has a gas capacity of 9800 scfh. Per the table below, this regulator at these conditions will hold outlet pressure at 11" w.c. $\pm \frac{1}{2}$ % (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.	+ 1/2% and -1/2%
7" w.c.	1" w.c.	+ 1/2% and -1/2%
11" w.c.	2" w.c.	+ 1/2% and -1/2%
18" w.c.	3" w.c.	+ 1% and -1%
1psi	0.3 psi	+ 1% and -2%
1psi	0.2 psi	+ 1% and -11/2%
2psi	0.6 psi	+ 1% and -4%
3psi	0.3 psi	+ 1% and -2%
3psi	0.6 psi	+ 1% and -31/2%









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



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.





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.

CAUTION

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 1/2" 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 1/2", 3/4" 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 31/2" w.c. to 35 psig with capacity ranging as high as 75,000 scfh.

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

		Orifice Size and Valve Angle								
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	3⁄4"	³ ⁄4"	1⁄2"	³ /8"	1⁄4"		
		30°	30°	30°	10°	10°	10°	10°		
	1⁄2	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		
Setpoint 6" w.c.	10	13000	15000	12500	9000	5700	3300	1500		
1" w.c. Droop	15	14000	15000	15000	10300	7100	4000	1750		
3½" to 6½" w.c.	25		15000	20000	11500	9500	5300	2400		
143-16-021-03	40			20000	13000	13000	7500	3300		
	60				15000	13000	10000	4500		
	80					13000	12000	5700		
	100					13000	12000	7000		
	125						12000	8000		
	1⁄2	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		
Sotopipt 7" w c	10	12500	14000	12000	8400	5600	3300	1400		
1" w.c. Droop	15	14000	15000	15000	10000	7100	4000	1750		
5" to 8 ¹ / ₂ " w.c.	25		15000	20000	11500	9500	5300	2400		
143-16-021-04	40			20000	13500	12000	7500	3200		
	60				15000	13000	10000	4400		
	80					13000	12000	5600		
	100					13000	12000	7000		
	125						12000	8000		
	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		
Setpoint 11" w.c.	15	14000	14000	15000	10500	7000	4000	1800		
Green Spring	25		15000	20000	12000	9500	5300	2400		
143-16-021-05	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.

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

		Orifice Size and Valve Angle								
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	³ ⁄4"	3/4"	1⁄2"	³ /8"	1⁄4"		
		30°	30°	30°	10°	10°	10°	10°		
	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		
Setpoint 18" w.c. 3" w.c. Droop	15	13500	14500	15000	9500	6500	3900	1700		
Orange Spring	25		16500	20000	11500	9200	5300	2300		
12 10 20 w.c. 143-16-021-06	40			20000	13500	12000	7500	3200		
	60				15000	13000	10000	4400		
	80					14000	12000	5600		
	100					14000	12000	7000		
	125						12000	8000		
	2	6500	5000	4000	4000	2000	1300	500		
	5	8000	7500	6000	6000	4000	2200	1000		
	10	9000	8500	8000	8000	5500	3000	1400		
Setpoint 1 psi	15	12000	11000	10000	10000	7000	4000	1800		
0.31 psi Droop	25		13500	12500	11500	9500	5500	2400		
12" to 28" w.c.	40			14000	13000	11000	7400	3300		
143-16-021-06	60				15000	13500	10000	4500		
	80					15000	13000	6000		
	100					16000	14000	7000		
	125						14000	8500		
	2	3350	3000	2000	1900	1200	1000	500		
	5	6600	5900	4200	3900	2400	1600	1000		
	10	11000	10000	7600	6500	4100	2800	1450		
Setpoint 1 psi	15	13000	12000	9300	8300	5600	3800	1700		
0.2 psi Droop Black Spring	25		15000	16500	11000	8500	5300	2400		
1 to 2 psi	40			20000	14000	12500	7500	3400		
143-10-021-07	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.

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

				Orific	e Size and Valve	Angle		
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	³ ⁄4"	3/4"	1⁄2"	³ /8"	1⁄4"
		30°	30°	30°	10°	10°	10°	10°
	5	8200	7400	5200	4800	2900	1900	900
	10	12500	11300	8700	7800	4800	3000	1400
	15	15500	14500	11500	10000	6500	3800	1700
Setpoint 2 psi 0.6 psi Droop Cadmium Spring 1½ to 3 psi 143-16-021-08	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
	5	3500	3000	2000	1800	1400	1100	750
	10	8000	7000	5500	5000	3000	2000	1100
	15	10500	10000	8000	7000	4000	3000	1600
Setpoint 3 psi	25		11500	9800	9000	5600	4500	2000
Cadmium Spring	40			21500	20000	10500	7500	3500
1½ to 3 psi 143-16-021-08	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.

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

	Inlet Pressure	Orifice Size and Valve Angle						
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	3/4"	1⁄2"	³ /8"	1⁄4"	
		30°	30°	10°	10°	10°	10°	
	1⁄2	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	
Setpoint 6" w.c.	10	8200	7700	6500	5600	3100	1400	
1" w.c. Droop Red Spring	15	9300	9300	7400	6800	3900	1750	
3½" to 6½" w.c.	25		11000	9100	8100	5100	2400	
143-16-021-03	40			10500	9800	7100	3200	
	60			12000	11000	9300	4400	
	80				12000	10500	5600	
	100				12000	11000	7000	
	125					11000	8000	
	1/2	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	
Sotooint 7" w.o.	10	8200	7600	6000	5400	3100	1400	
1" w.c. Droop	15	9300	9100	7000	6600	3900	1750	
5" to 8½" w.c.	25		11000	8400	7800	5100	2400	
143-16-021-04	40			10000	9500	7100	3200	
	60			10500	10500	9300	4400	
	80				11500	10500	5600	
	100				12000	11000	7000	
	125					11000	8000	
	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	
Setpoint 11" w.c.	15	10000	9800	7700	6800	3800	1750	
Green Spring	25		11500	9700	8100	5100	2400	
6" to 14" w.c. 143-16-021-05	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.

11/2" Models 243-12-1 and 243-12-2 in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

	Inlet Pressure	Orifice Size and Valve Angle						
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	3/4"	1⁄2"	3/8"	1⁄4"	
		30°	30°	10°	10°	10°	10°	
	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	
Setpoint 18" w.c.	15	10000	9300	7400	5800	3800	1750	
Orange Spring	25		11500	9100	7800	5100	2400	
143-16-021-06	40			11000	9500	7100	3200	
	60			12500	11000	9300	4400	
	80				12500	10500	5600	
	100				13000	11000	7000	
	125					11000	8000	
	2	6500	5000	4000	2000	1300	500	
	5	8000	7500	6000	4000	2200	1000	
	10	9000	8500	8000	5500	3000	1400	
Setnoint 1 nsi	15	12000	11500	10000	7000	4000	1800	
0.31 psi Droop	25		13500	11500	9500	5500	2400	
12" to 28" w.c.	40			13000	11000	7400	3300	
143-16-021-06	60			15000	13500	10000	4500	
	80				15000	13000	6000	
	100				16000	14000	7000	
	125					14000	8500	
	2	2800	2450	1500	1200	850	500	
	5	5500	5100	3700	2400	1600	950	
	10	8000	7500	5700	4000	2700	1400	
Setpoint 1 psi	15	10000	9100	7100	5300	3700	1750	
0.2 psi Droop Black Spring	25		11000	9300	7300	5100	2400	
1 to 2 psi	40			11000	9300	7100	3200	
143-10-UZ1-U/	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.

11/2" Models 243-12-1 and 243-12-2 in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

		Orifice Size and Valve Angle							
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	³ /4"	1⁄2"	³ /8"	1⁄4"		
		30°	30°	10°	10°	10°	10°		
	5	3500	3000	2000	1400	1100	500		
	10	7000	6000	5000	2500	2000	1000		
	15	9000	8000	7000	3500	2500	1500		
Setpoint 3 psi	25		10000	8000	4800	4500	1900		
Cadmium Spring 1½ to 3 psi 143-16-021-08	40			11500	6500	6000	3500		
	60			14000	8000	7500	4500		
	80				9000	8000	6000		
	100				12000	11000	7000		
	125					12000	8500		
	5	6000	5300	4100	2700	1700	900		
	10	10000	9300	7100	4700	2900	1400		
	15	13000	12000	8800	6200	3800	1700		
Setpoint 2 psi	25		14500	11000	8600	5200	2400		
Cadmium Spring	40			13500	11000	7100	3200		
1½ to 3 psi 143-16-021-08	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.

1¹/₄", 1¹/₂" and 2" Model 243-12-1 with External Control Line in SCFH of Natural Gas

(0.6 Specific Gravity - 14.65 psia - 60°F)

	In lat De	Orifice Size and Valve Angle							
Outlet Pressure and Spring	Inlet Pressure psi	1¼"*	1"	³ ⁄4"	1⁄2"	³ /8"	1⁄4"		
		10°	10°	10°	10°	10°	10°		
	1⁄2	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		
Setpoint 6" w.c.	10	15000	12000	8900	5200	3000	1500		
1" w.c. Droop	15	19000	16000	12000	6700	4000	1750		
3½" to 6½" w.c.	25	22000	20000	16000	9000	5200	2400		
143-16-021-03	40		24000	21000	12000	7500	3200		
	60			27000	15500	10000	4400		
	80				17000	12000	5700		
	100				19000	13500	7000		
	125					15000	8000		
	1⁄2	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		
Cotopiet 7" w o	10	13000	10000	7000	4800	2900	1500		
1" w.c. Droop	15	15000	14000	9400	6400	4000	1750		
5" to 8½" w.c.	25	20000	17000	13500	8500	5200	2400		
143-16-021-04	40		21000	17000	11500	7500	3200		
	60			19000	15000	10000	4400		
	80				17000	12000	5700		
	100				19000	13500	7000		
	125					15000	8000		
	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		
Setpoint 11" w.c.	15	16000	14000	11000	6500	4000	1750		
Green Spring	25	20000	17000	14000	9000	5200	2400		
6" to 14" w.c. 143-16-021-05	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.

1¹/₄", 1¹/₂" 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)

	Inlot Pressure	Orifice Size and Valve Angle							
Outlet Pressure and Spring	Inlet Pressure psi	1¼"*	1"	3/4"	1⁄2"	3/8"	1⁄4"		
		10°	10°	10°	10°	10°	10°		
	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		
Setpoint 18" w.c.	15	14500	11000	8000	5800	3800	1750		
Orange Spring	25	18000	15000	11500	8000	5000	2400		
12 to 28 w.c. 143-16-021-06	40		21000	15000	11000	7000	3200		
	60			20000	15000	9800	4400		
	80				17000	12000	5700		
	100				19000	13500	7000		
	125					15000	8000		
	2	3500	2900	1700	1300	850	500		
	5	7000	5400	4000	2600	1600	950		
	10	10500	8500	5800	4000	2800	1500		
Setpoint 1 psi	15	14500	10500	7600	5400	3800	1750		
0.2 psi Droop	25	18000	14500	10500	7500	5000	2400		
1 to 2 psi	40		20000	15000	10500	7000	3200		
143-16-021-0 <i>1</i>	60			20000	15000	9800	4400		
	80				17000	12000	5700		
	100				19000	13500	7000		
	125					15000	8000		
	5	8600	6800	5300	2700	1900	850		
	10	13000	10500	7500	4500	2900	1400		
	15	17500	13500	10500	6000	3800	1750		
Setpoint 2 psi	25	25000	20000	14000	8500	5000	2400		
Cadmium Spring	40		25000	20000	12000	7000	3200		
143-16-021-08	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 70°F flowing temperature.

Changes in performance can occur at extreme low flowing temperatures.

11/2" and 2" Model 243-8-1 and 243-8-2 in SCFH of Natural Gas (0.6 Specific Gravity - 14.65 psia - 60°F)

	Inlot Pressure	Orifice Size and Valve Angle						
Outlet Pressure and Spring	Inlet Pressure psi	1"	3/4"	1⁄2"	³ /8"	1⁄4"	0.207"	
		30°	10°	10°	10°	10°	10°	
	1⁄2	1100	900	700	500			
	1	1950	1600	1050	750	350		
	2	3200	2400	1550	1000	550	350	
	5	5200	3900	2700	1900	950	550	
Setpoint 6" w.c.	10	7400	5800	4500	3000	1350	900	
1" w.c. Droop	15	9100	7100	5800	3800	1700	1150	
3½" to 6½" w.c. 143-82-021-00	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	
	1/2	1000	750	650	400			
	1	1600	1150	900	650	300		
	2	2700	1800	1350	950	450	350	
	5	4800	3500	2350	1600	770	500	
Cotopiet 7" w o	10	7000	5400	3900	2500	1250	900	
1" w.c. Droop	15	9100	7000	5000	3500	1700	1150	
5" to 81/2" w.c.	25	12500	8700	6600	5100	2400	1500	
143-82-021-01	40		10500	9000	7100	3200	2100	
	60			11000	9300	4400	2900	
	80			11500	10500	5600	3700	
	100				11000	7000	4500	
	125					8000	5600	
	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	
Setpoint 11" w.c.	15	9000	7400	5500	3600	1700	1100	
Green-Black Spring	25	11000	8800	7500	5100	2400	1500	
6" to 14" w.c. 143-82-021-02	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.

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

	Inlot Dressure	Orifice Size and Valve Angle						
Outlet Pressure and Spring	Inlet Pressure psi	1"	3/4"	1⁄2"	³ /8"	1⁄4"	0.207"	
		30°	10°	10°	10°	10°	10°	
	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	
Setpoint 18" w.c.	15	8800	7100	5000	3400	1700	1050	
Green Spring	25	11500	9100	7100	5100	2400	1500	
12 to 28 w.c. 143-16-021-05	40		11000	9300	7100	3200	2100	
	60			11000	9400	4400	2900	
	80			12000	10500	5600	3700	
	100				11000	7000	4500	
	125					8000	5600	
	2	4000	3500	1800	1200	500		
	5	6000	5000	3500	2200	1000		
	10	7500	7000	5000	3000	1500		
Setnoint 1 nsi	15	9000	8000	6500	4000	1850		
0.31 psi Droop	25	12000	10000	8000	5000	2000		
12" to 28" w.c.	40		12500	9500	7000	3000		
143-16-021-05	60			11500	9500	4500		
	80			12500	11500	6000		
	100				12500	7000		
	125					8000	_	
	2	2100	1650	1200	850	450		
	5	4000	3200	2100	1300	850	550	
	10	6500	5200	3100	2200	1300	800	
Setpoint 1 psi	15	8400	6500	4400	3000	1700	1000	
0.2 psi Droop Orange Spring	25	11000	8600	6500	4400	2400	1500	
1 to 2 psi	40		11000	8600	6700	3200	2100	
143-10-021-00	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.

11/2" Models 243-8-1 and 243-8-2 in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

		Orifice Size and Valve Angle							
Outlet Pressure and Spring	Inlet Pressure	1"	³ /4"	1/2"	³ ⁄8"	1⁄4"	0.207"		
opg		30°	10°	10°	10°	10°	10°		
	5	3000	1800	1200	1100	900			
	10	4000	2500	1800	1500	1000			
	15	5200	4000	2850	2000	1400			
Setpoint 3 psi	25	7000	5200	3600	3100	1800			
Black Spring 2 to 4¼ psi 143-16-021-07	40		9000	5000	4200	2200			
	60			8300	6500	3000			
	80			10000	8500	5000			
	100				9000	6000			
	125					8000			
	5	4400	3400	2400	1600	800			
	10	7100	5900	3600	2400	1300	750		
	15	9600	7500	4800	3400	1700	1000		
Setpoint 3 psi	25	12500	10500	6500	5000	2400	1500		
Black Spring	40		13000	9600	7000	3200	2100		
2 to 4¼ psi 143-16-021-07	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.

Model 243 Capacity Tables 1¹/₄" 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	Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle				
			3/4"	1⁄2"	³ /8"	1⁄4"	0.207"
243-12	243-0		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	1⁄2	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	1⁄2	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 30° and 11/4" x 30° orifice and valve angle are available on the 11/4" 243-12-1 and 243-12-2 models.

NOTE: The performance data is based on normal testing at 70°F flowing temperature.

Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables 1¹/₄" 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	Outlet Pressure and Spring	Inlet Pressure psi	Orifice Size and Valve Angle				
			3⁄4"	1⁄2"	³ ∕8 [™]	1⁄4"	0.207"
243-12	243-8		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 30° and 11/4" x 30° orifice and valve angle are available on the 11/4" 243-12-1 and 243-12-2 models.

NOTE: The performance data is based on normal testing at 70°F flowing temperature.

Changes in performance can occur at extreme low flowing temperatures.
(0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

Outlet Pressure	Outlet Pressure		Orifice Size and Valve Angle						
and Spring 243-12	and Spring	Inlet Pressure psi	³ /4"	1⁄2"	³ ⁄8"	1⁄4"	0.207"		
	243-8		10°	10°	10°	10°	10°		
		5	1200	1000	800	500			
		10	2000	1800	1400	1000			
		15	3300	2800	1800	1400			
Setpoint 3 psi	Setpoint 3 psi	25	4700	3300	2300	1650			
Cadmium Spring	Black Spring	40	6300	4900	2800	2000			
1½ to 3 psi 143-16-021-08	2 to 4¼ psi 143-16-021-07	60		5800	5000	2800			
		80		6500	6400	4600			
		100			6500	4750			
		125				5000			
		5	2200	1950	1650	700			
		10	3600	2300	2150	1300	750		
		15	3800	3400	2350	1700	1000		
Setpoint 3 psi	Setpoint 3 psi	25	5000	3900	3250	2400	1500		
Cadmium Spring	Black Spring	40	6300	4300	3700	3200	2100		
1½ to 3 psi 143-16-021-08	2 to 4 ¼ psi 143-16-021-07	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 30° and 1¼" x 30° orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

		Orifice Size and Valve Angle							
Outlet Pressure and Spring	Inlet Pressure psi	1"	3⁄4"	3/4"	1⁄2"	3/8"	1⁄4"		
		30°	30°	10°	10°	10°	10°		
Setpoint 18" w.c.	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		
Green Spring	25	14500	17500	10000	8200	5600	2400		
12" to 28" W.C. 143-16-021-05	40		20000	12000	11500	7400	3400		
	60				13500	10000	4600		
	80				14000	11000	5600		
	100					12000	7000		
	125					-	8000		
	2	5000	4000	4000	3000	1000	500		
	5	8000	7000	7000	4000	1900	1000		
	10	14000	12800	10000	5500	3000	1500		
Setnoint 1 nsi	15	16500	14000	13900	7750	4500	1800		
0.31 psi Droop	25	17700	16900	15000	9000	5500	2500		
12" to 28" w.c.	40		18000	16500	11500	7400	3200		
143-16-021-05	60				15000	10000	4600		
	80				17000	13800	6100		
	100					14000	7000		
	125					-	9000		
	2	2400	1800	1700	1200	850	450		
	5	4000	3400	3300	2200	1300	900		
	10	7000	6000	5400	3500	2200	1400		
Setpoint 1 psi	15	11000	9000	7000	4600	3100	1700		
0.2 psi Droop	25	14500	15000	10000	7400	4800	2400		
1 to 2 psi	40		17500	12000	10500	7000	3400		
143-10-021-06	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.

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

		Orifice Size and Valve Angle								
Outlet Pressure and Spring	Inlet Pressure psi	1"	³ /4"	³ /4"	1⁄2"	3/8"	1⁄4"			
		30°	30°	10°	10°	10°	10°			
	5	2000	1600	1600	1400	1000	500			
	10	4000	3000	3000	2000	1400	1000			
	15	5800	4200	4000	2600	1800	1500			
Setpoint 3 psi	25	7500	5200	5000	3900	2750	2300			
Black Spring	40		9100	9000	6500	5800	3100			
2 to 4¼ psi 143-16-021-07	60				10000	7500	4600			
	80				14000	10000	6000			
	100					12000	7000			
	125						9000			
	5	4400	3400	3300	2400	1600	800			
	10	7600	6000	5800	3600	2400	1300			
	15	11000	9000	7500	4800	3500	1700			
Setpoint 3 psi	25	15000	15000	10500	8000	5100	2400			
Black Spring	40		17500	13000	11000	7000	3400			
2 to 4¼ psi 143-16-021-07	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.

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

		11/4" Model 243-8HP			11/2" Model 243-8HP				2" Model 243-8HP						
Outlet Pressure	Inlet Pressure	Orifice Size and Valve Angle			Orifice Size and Valve Angle				Orifice Size and Valve Angle						
	psi	³⁄₄" 10°	½" 10°	³⁄ଃ" 10°	¼" 10°	1" 30°	³⁄₄" 10°	½" 10°	³⁄ଃ" 10°	1⁄4" 10°	1" 30°	³ ⁄4" 10°	½" 10°	³∕8" 10°	¼" 10°
	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
Setpoint 5 psi	25	4400	3650	3050	2400	12000	9300	6100	4800	2400	13000	8200	6100	4800	2400
1 psi Droop	40	5800	3800	3200	3200		12000	8500	6100	3200		12000	8700	6100	3400
Spring	60		4400	4100	4400			10000	8700	4400			10000	8700	4600
3 to 6½ psi 143-16-021-08	80		4500	5300	5600			11000	10000	5600			11500	10000	5600
	100			6000	7000				11000	7000			•	11000	7000
	125				8000					8000					8000
	10	2300	2000	1800	1000	2500	2300	2000	1600	1000	2700	2500	2100	1600	1000
Setpoint	15	3000	2800	2200	1400	5000	4000	2500	2200	1500	5900	4300	2800	2400	1500
7 psi	25	5400	4100	3300	2000	8500	6500	4300	3500	2000	8600	6600	4600	3600	2000
1 psi Droop Cadmium-	40	7600	5600	4800	2800		9500	6500	5000	3000		10000	7200	5600	3000
White Springs	60		7500	6200	3800			9000	6500	4000			9700	7000	4500
6 to 10 psi	80		8800	7200	5200			11000	8500	5000			12000	9000	5500
143-16-021-03	100			8600	5800				10500	5500			•	11500	7000
	125				7000					5500					5500
	10	5400	3500	2500	1400	8000	5500	3500	2500	1300	8600	6000	4300	2700	1400
Setnoint	15	7400	5000	3500	1800	10500	8000	5000	3500	1700	12700	8900	5700	3800	1800
7 psi	25	10000	7600	5500	2500	15000	12000	8000	5000	2300	18600	13500	8600	5700	2400
2 psi Droop Cadmium-	40	12500	10000	7500	3500		16000	11500	7500	3300		19000	12500	8000	3500
White Springs	60		12500	9500	4800			15000	9500	4500			17000	10000	4800
6 to 10 psi	80		14000	11500	6100			17500	12500	5500			20000	13500	6200
143-10-021-03	100			13500	7200				15500	7000				16500	7300
	125				8800					7000					8100
	15	2500	2200	1800	1200	3500	3000	2000	1300	1000	3600	3000	2000	1800	1000
Setpoint	25	4800	3500	2800	1900	6500	5000	3500	2500	1900	6800	5700	4000	3000	1900
1 psi Droop	40	7200	5000	4000	2500		8000	5500	4300	2500		8600	5700	4600	2800
Cadmium- White	60		6700	5700	3500		10500	7500	6000	3500			8600	6400	4300
Springs 6 to 10 psi	80		7800	6600	4600			9000	7500	4500			10500	8400	5200
143-16-021-03	100			7800	5400				9500	6000				10700	6500
	125				6500					7000					8000
	15	6000	4000	2800	1700	8500	6500	4000	2500	1500	9000	6600	4800	3000	1500
Setpoint	25	9000	6500	5000	2500	12000	10500	7000	4500	2300	15500	11000	7400	5000	2400
2 psi Droop	40	12000	9000	7000	3500		15000	10000	7500	3000		16500	11000	7700	3200
White	60		12000	9400	4700			14000	10000	4500			15000	10700	4800
Springs 6 to 10 psi	80		13000	11000	6000			17000	12000	5500			18500	13000	6000
143-16-021-03	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.

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.

243 MONITOR SET



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.**

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.

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.



3

CDF1306-065



Model	243-12	243-8	243-8HP
А	14"	103⁄16"	103⁄16"
**B	9¾ "	9¾"	-
B1	-	-	12¾"
С	5¾"	5¾"	5¾"
***C1	7½"	7½"	7½"
C ²	71/8"	71/8"	71/8"
D	21/8"	21/8"	21/8"
Е	10 ¹³ / ₃₂ "	8 ¹⁹ / ₃₂ "	8 ¹⁹ / ₃₂ "
F	61/32"	4 ²⁷ / ₃₂ "	4 ²⁷ / ₃₂ "
G	4 ¹¹ / ₃₂ "	45/32"	45/32"
Shipping Weight*	27 Ibs.	25 Ibs.	29 Ibs.

* Add 9 lbs. for flanges on 2" body

** 10" for 243-12-1 and 243-12-4, which include travel stop *** ANSI flanges

CDF1306-070

C²

Materials of Construction

Body	Cast Iron
Diaphragm Case Die 0	Cast Aluminum Alloy
DiaphragmBuna-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, S	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.	$Q = K\sqrt{P_o}$	$\overline{(P_i - P_o)}$ (for $\frac{P_i}{P_o}$ less than 1.894)
2.	$Q = \frac{KP_i}{2}$	(for $\frac{P_i}{P_0}$ 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)
- Po = absolute outlet pressure (psia)

Orifice size:	.207"	1⁄4"	3⁄8 "	1⁄2"	³ ⁄4"	1"	1¼"
К	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:

CORRECTION FACTOR = $\sqrt{}$

0.60 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 CO₂,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 nlet pressuresto 125 psi Dutlet pressures	
Model 143-80 4", 1", 1¼" pipe sizes nlet pressuresto 125 psi Dutlet pressures	

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.

Vodel 046	
³ / ₄ ", 1" and 1 ¹ / ₄ " pipe sizes	
nlet 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	
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:

BR-G-REG-1306-0313-01-A Model 243 Service Regulators Construction and Design Features

Authorized Distributor:

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IN-G-REG-1301-0914-02-A*

Model 143-80 Service Regulator

Installation and Maintenance Instructions



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 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.

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.
- 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.
- If needed, adjust outlet pressure (set point) by removing cap

 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.



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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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 Pressure Loaded Regulator	243-8HP 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 Pres	sure Range	Spring Part
Spring Color	243-12	243-8	Number
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	Blue 5" to 81⁄2" 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	ange 12" to 28" w.c. 1 to 2 psi		143-16-021-06
Black	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 poi*	143-16-021-08
White †	_	01010 psi	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 -20°F to 150°F.

Buried Service

The Model 243 regulator is not recommended for buried service.



Maximum Inlet Pressure, psig

5	1¼"	*1¼"	1"	*1"	³ /4"	³ /4"	1⁄2"	³ /8"	1⁄4"	.207"
Regulator model and Size	30°	10°	30°	10°	30°	10°	10°	10°	10°	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 $1\frac{1}{2}$ " Model 243-12- 2 with 1" orifice, 30° valve, 15 psig inlet, and 11" w.c. setpoint (green spring) at 2" w.c. droop has a gas capacity of 9800 scfh. Per the table below, this regulator at these conditions will hold outlet pressure at 11" w.c. $\pm \frac{1}{2}$ % (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.	+ 1/2% and -1/2%
7" w.c.	1" w.c.	+ 1/2% and -1/2%
11" w.c.	2" w.c.	+ 1/2% and -1/2%
18" w.c.	3" w.c.	+ 1% and -1%
1psi	0.3 psi	+ 1% and -2%
1psi	0.2 psi	+ 1% and -11/2%
2psi	0.6 psi	+ 1% and -4%
3psi	0.3 psi	+ 1% and -2%
3psi	0.6 psi	+ 1% and -31/2%









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



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.





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.

CAUTION

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 1/2" 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 1/2", 3/4" 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 31/2" w.c. to 35 psig with capacity ranging as high as 75,000 scfh.

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

		Orifice Size and Valve Angle								
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	3⁄4"	³ ⁄4"	1⁄2"	³ /8"	1⁄4"		
Spring		30°	30°	30°	10°	10°	10°	10°		
Setpoint 6" w.c.	1⁄2	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		
1" w.c. Droop	15	14000	15000	15000	10300	7100	4000	1750		
3½" to 6½" w.c.	25		15000	20000	11500	9500	5300	2400		
143-16-021-03	40			20000	13000	13000	7500	3300		
	60				15000	13000	10000	4500		
	80					13000	12000	5700		
	100					13000	12000	7000		
	125						12000	8000		
	1⁄2	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		
Sotopipt 7" w c	10	12500	14000	12000	8400	5600	3300	1400		
1" w.c. Droop	15	14000	15000	15000	10000	7100	4000	1750		
5" to 81/2" w.c.	25		15000	20000	11500	9500	5300	2400		
143-16-021-04	40			20000	13500	12000	7500	3200		
	60				15000	13000	10000	4400		
	80					13000	12000	5600		
	100					13000	12000	7000		
	125						12000	8000		
	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		
Setpoint 11" w.c.	15	14000	14000	15000	10500	7000	4000	1800		
Green Spring	25		15000	20000	12000	9500	5300	2400		
143-16-021-05	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.

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

		Orifice Size and Valve Angle							
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	³ ⁄4"	3/4"	1⁄2"	³ /8"	1⁄4"	
		30°	30°	30°	10°	10°	10°	10°	
	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	
Setpoint 18" w.c. 3" w.c. Droop	15	13500	14500	15000	9500	6500	3900	1700	
Orange Spring	25		16500	20000	11500	9200	5300	2300	
143-16-021-06	40			20000	13500	12000	7500	3200	
	60				15000	13000	10000	4400	
	80					14000	12000	5600	
	100					14000	12000	7000	
	125						12000	8000	
	2	6500	5000	4000	4000	2000	1300	500	
	5	8000	7500	6000	6000	4000	2200	1000	
	10	9000	8500	8000	8000	5500	3000	1400	
Setpoint 1 psi	15	12000	11000	10000	10000	7000	4000	1800	
0.31 psi Droop	25		13500	12500	11500	9500	5500	2400	
12" to 28" w.c.	40			14000	13000	11000	7400	3300	
143-16-021-06	60				15000	13500	10000	4500	
	80					15000	13000	6000	
	100					16000	14000	7000	
	125						14000	8500	
	2	3350	3000	2000	1900	1200	1000	500	
	5	6600	5900	4200	3900	2400	1600	1000	
	10	11000	10000	7600	6500	4100	2800	1450	
Setpoint 1 psi	15	13000	12000	9300	8300	5600	3800	1700	
0.2 psi Droop Black Spring	25		15000	16500	11000	8500	5300	2400	
1 to 2 psi	40			20000	14000	12500	7500	3400	
143-10-021-07	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.

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

		Orifice Size and Valve Angle								
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	³ ⁄4"	3/4"	1⁄2"	³ /8"	1⁄4"		
		30°	30°	30°	10°	10°	10°	10°		
	5	8200	7400	5200	4800	2900	1900	900		
	10	12500	11300	8700	7800	4800	3000	1400		
	15	15500	14500	11500	10000	6500	3800	1700		
Setpoint 2 psi	25		18000	16500	13500	9000	5300	2400		
0.6 psi Droop Cadmium Spring 1½ to 3 psi 143-16-021-08	40			20000	16500	12500	7600	3400		
	60				16500	15500	10000	4600		
	80					16000	12000	5600		
	100					16000	12000	7000		
	125						12000	8000		
	5	3500	3000	2000	1800	1400	1100	750		
	10	8000	7000	5500	5000	3000	2000	1100		
	15	10500	10000	8000	7000	4000	3000	1600		
Setpoint 3 psi	25		11500	9800	9000	5600	4500	2000		
Cadmium Spring	40			21500	20000	10500	7500	3500		
1½ to 3 psi 143-16-021-08	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.

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

		Orifice Size and Valve Angle								
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	3/4"	1⁄2"	³ /8"	1⁄4"			
		30°	30°	10°	10°	10°	10°			
	1⁄2	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			
Setpoint 6" w.c.	10	8200	7700	6500	5600	3100	1400			
1" w.c. Droop Red Spring	15	9300	9300	7400	6800	3900	1750			
3½" to 6½" w.c.	25		11000	9100	8100	5100	2400			
143-16-021-03	40			10500	9800	7100	3200			
	60			12000	11000	9300	4400			
	80				12000	10500	5600			
	100				12000	11000	7000			
	125					11000	8000			
	1/2	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			
Sotooint 7" w.o.	10	8200	7600	6000	5400	3100	1400			
1" w.c. Droop	15	9300	9100	7000	6600	3900	1750			
5" to 8½" w.c.	25		11000	8400	7800	5100	2400			
143-16-021-04	40			10000	9500	7100	3200			
	60			10500	10500	9300	4400			
	80				11500	10500	5600			
	100				12000	11000	7000			
	125					11000	8000			
	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			
Setpoint 11" w.c.	15	10000	9800	7700	6800	3800	1750			
Green Spring	25		11500	9700	8100	5100	2400			
6" to 14" w.c. 143-16-021-05	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.

11/2" Models 243-12-1 and 243-12-2 in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

		Orifice Size and Valve Angle							
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	3/4"	1⁄2"	3/8"	1⁄4"		
Spring		30°	30°	10°	10°	10°	10°		
	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		
Setpoint 18" w.c.	15	10000	9300	7400	5800	3800	1750		
Orange Spring	25		11500	9100	7800	5100	2400		
143-16-021-06	40			11000	9500	7100	3200		
	60			12500	11000	9300	4400		
	80				12500	10500	5600		
	100				13000	11000	7000		
	125					11000	8000		
	2	6500	5000	4000	2000	1300	500		
	5	8000	7500	6000	4000	2200	1000		
	10	9000	8500	8000	5500	3000	1400		
Setnoint 1 nsi	15	12000	11500	10000	7000	4000	1800		
0.31 psi Droop	25		13500	11500	9500	5500	2400		
12" to 28" w.c.	40			13000	11000	7400	3300		
143-16-021-06	60			15000	13500	10000	4500		
	80				15000	13000	6000		
	100				16000	14000	7000		
	125					14000	8500		
	2	2800	2450	1500	1200	850	500		
	5	5500	5100	3700	2400	1600	950		
	10	8000	7500	5700	4000	2700	1400		
Setpoint 1 psi	15	10000	9100	7100	5300	3700	1750		
0.2 psi Droop Black Spring	25		11000	9300	7300	5100	2400		
1 to 2 psi	40			11000	9300	7100	3200		
143-10-UZ1-U/	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.

11/2" 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 1/¼" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 10 30° 30° 30° 10° 1 5 3500 3000 2000 10° 1 10 10° 10° 1 10 10° 11 10° 10° 11 10° 100 2000 11 10° 10° 11 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 11° 10° 10° 10° 10° 10° 11° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10°	Orifice Size and Valve Angle						
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1%" 1" ¾" ½" ¾" 30° 30° 10° 10° 10° 10° 3500 3000 2000 1400 1100 7000 6000 5000 2500 2000 9000 8000 7000 3500 2500 9000 8000 7000 3500 2500 10000 8000 4800 4500 11500 6500 6000 5000 14000 8000 7500 9000 9000 3000 7100 1000 12000 1000 1000 1000 6000 5300 4100 2700 1700 10000 9300 7100 4700 2900 13000 12000 8800 6200 3800 14500 11000 8600 5200 14500 11000 13500 10000 15000 13500 12000 16000 1	1⁄4"			
		30°	30°	10°	10°	10°	10°
	5	3500	3000	2000	1400	1100	500
Outlet Pressure and Spring Inlet Pressure psi 1%" 1" %" 30° 30° 10° 30° 30° 10° 5 3500 3000 2000 5000 5000 10 7000 6000 5000 5000 5000 15 9000 8000 7000 6000 5000 0.35 psi Droop 25 10000 8000 7000 Cadmium Spring 40 11500 14000 800 1½ to 3 psi 60 14000 800 7100 125 5 6000 5300 4100 7100 125 13000 12000 8800 7100	5000	2500	2000	1000			
	15	9000	1" ¾"<	1500			
Setpoint 3 psi	25		10000	8000	4800	Angle ½" ¾" ¼" 10° 10° 10° 1400 1100 500 2500 2000 1000 3500 2500 1500 4800 4500 1900 6500 6000 3500 8000 7500 4500 9000 8000 6000 12000 11000 7000 12000 12000 8500 2700 1700 900 4700 2900 1400 6200 3800 1700 8600 5200 2400 11000 7100 3200 13500 10000 4600 15000 12000 5600 16000 12000 8000	1900
Cadmium Spring	40			11500	6500		
1½ to 3 psi 143-16-021-08	60			14000	2 3000 7500 4500 9000 8000 6000 11000 7000		
	80 9000 8000 100 12000 11000	6000					
	100				12000	11000	7000
	125			1" ¾" ¾" 30° 10° 10° 10° 3000 2000 1400 1100 3000 5000 2500 2000 3000 5000 2500 2000 3000 7000 3500 2500 0000 8000 4800 4500 0000 8000 6500 6000 11500 6500 6000 1000 14000 8000 7500 9000 8000 300 7100 12000 1000 12000 300 7100 4700 2900 2000 8800 6200 3800 4500 11000 8600 5200 13500 10000 1000 4500 11000 13500 10000 12000 12000 12000	8500		
	5	ure 1¼" 1" 30° 30° 3500 3000 7000 6000 9000 8000 10000 10000 10000 10000 13000 12000 14500	4100	2700	1700	900	
	10	10000	9300	7100	4700	Ngie %4" %4" ½" ¾4" ¼4" 10° 10° 10° 400 1100 500 5500 2000 1000 5500 2500 1500 800 4500 1900 5500 6000 3500 000 7500 4500 000 8000 6000 2000 11000 7000 12000 8500 1400 7700 2900 1400 2000 3800 2200 1000 7100 3200 3500 10000 4600 5000 12000 5600 5000 12000 5600 5000 12000 8000	1400
	15	13000	12000	8800	6200		1700
Setpoint 2 psi	25		14500	11000	8600	5200	2400
Cadmium Spring	40			13500	11000	7100	3200
1½ to 3 psi 143-16-021-08	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.

1¹/₄", 1¹/₂" and 2" Model 243-12-1 with External Control Line in SCFH of Natural Gas

(0.6 Specific Gravity - 14.65 psia - 60°F)

	Intel Presume psi 1/4" 1" 54" 54" 10° 10° 10° 10° 10° 10° 12 2200 1900 1600 800 500 1 3600 3200 2300 1300 800 2 5600 4700 3500 2000 1400 5 10600 8200 5700 3500 2200 10 15000 12000 8900 5200 3000 15 19000 16000 12000 6700 4000 25 22000 20000 16000 9000 5200 40 24000 21000 1700 1200 1000 100 1500 1000 13500 1000 13500 125 2000 1700 1500 700 450 1 3100 2600 2000 1100 750 1 3100 2600 3000 1700						
Outlet Pressure and Spring	Inlet Pressure psi	1¼"*	1"	³ ⁄4"	1⁄2"	³ /8"	1⁄4"
		10°	10°	10°	10°	10°	10°
	1⁄2	2200	1900	1600	800	500	
Outet Pressure and Spring Intel Pressure psi 1/1/1*** 1** 1*** 1** 10* 10* 10* 10* 10* 10* 10* 12 2200 1900 1600 800 2000 500 2000 1300 2 5600 4700 3500 2000 5500 5000 500 5000 500 1000 1000 1000 1000 1000 1000 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100	1300	850	400				
	2	Intel Pressure psi 1%** 1%* %* </td <td>600</td>	600				
	5		1000				
Setpoint 6" w.c.	10	15000	1" 3/4" 3	1500			
1" w.c. Droop	15	19000	16000	12000	6700	4000	1750
3½" to 6½" w.c.	25	22000	20000	16000	9000	5200	2400
143-16-021-03	40		24000	21000	12000	7500	3200
	60			27000	15500	10000	4400
	80				17000	12000	5700
	143-16-021-03 40 24000 21000 12000 7500 60 27000 15500 10000 80 17000 12000 100 19000 13500 125 15000 15000 1/2 2000 1700 1500 1 3100 2600 2000 1100 750 2 5000 3800 3000 1700 1200 5 7800 6500 5000 3100 2000 10 13000 10000 7000 4800 2900 10 13000 10000 7000 4800 2900 10 13000 10000 7000 4800 2900 11 w.c. Droop Blue Spring 25 2000 17000 13500 8500 5200	13500	7000				
	125			A A A A 10° 10° 10° 10° 1600 800 500 2300 1300 850 400 3500 2000 1400 600 5700 3500 2200 1000 8900 5200 3000 1500 12000 6700 4000 1750 16000 9000 5200 2400 21000 12000 7500 3200 27000 15500 10000 4400 17000 12000 5700 3200 1500 700 450 1000 1000 1500 700 450 1000 1000 1500 700 450 1000 1000 1500 700 4800 2900 1500 9400 6400 4000 1750 3200 13500 8500 5200 2400 17000 1500	8000		
	1⁄2	2000	1700	1500	700	450	
	1	3100	2600	2000	1100	750	400
Head Spring 33%** 0.65** w.c. 143-16-021-03 25 22000 20000 16000 9000 52 40 24000 21000 12000 75 60 27000 15500 100 80 17000 122 100 19000 133 125 150 100 125 150 100 12 2000 1700 1500 700 443 1 3100 2600 2000 1100 75 2 5000 3800 3000 1700 12 5 7800 6500 5000 3100 20 10 13000 10000 700 480 29 15 15000 14000 9400 6400 40 25 20000 17000 13500 52 40 21000 17000 1500 100 80 1 17000 122 100 100 <td>1200</td> <td>600</td>	1200	600					
	3100	2000	1000				
	10	13000	10000	7000	4800	2900	1500
1" w.c. Droop	1 3100 2600 2000 1100 2 5000 3800 3000 1700 5 7800 6500 5000 3100 10 13000 10000 7000 4800 .c. Droop 15 15000 14000 9400 6400 8½" w.c. 25 20000 17000 13500 8500 16-021-04 40 21000 17000 11500	4000	1750				
5" to 8½" w.c.	25	20000	17000	13500	8500	5200	2400
143-16-021-04	40		21000	17000	11500	7500	3200
	60			19000	15000	10000	4400
	80	5000 3800 3000 1700 1200 7800 6500 5000 3100 2000 13000 10000 7000 4800 2900 15000 14000 9400 6400 4000 20000 17000 13500 8500 5200 20000 17000 17000 11500 7500 19000 15000 10000 10000 12000 19000 13500 13500 13500 13500	5700				
	Setpoint 7" w.c. 10 10 1" w.c. Droop 15 1 Blue Spring 25 2 5" to 8½" w.c. 25 2 143-16-021-04 40 60 80 100 100				19000	13500	7000
	125				1600 800 500 2300 1300 850 400 3500 2000 1400 600 5700 3500 2200 1000 8900 5200 3000 1500 12000 6700 4000 1750 16000 9000 5200 2400 21000 12000 7500 3200 21000 15500 10000 4400 21000 15500 10000 5700 21000 1500 13500 7000 1500 700 450 200 1500 700 450 400 3000 1700 1200 600 5000 3100 2000 1000 7000 4800 2900 1500 9400 6400 4000 1750 13500 8500 5200 2400 17000 1500 1000 4400 17000 1500 300 500 19000 1500 1000 400 19000 1500 1000 350 19000 1000 100 350 19000 1300 550	8000	
	1	3200	2500	15000 800 15000 700 450 400 2000 1100 750 400 3000 1700 1200 600 5000 3100 2000 100 7000 4800 2900 150 9400 6400 4000 175 13500 8500 5200 240 17000 11500 7500 320 19000 15000 10000 4400 19000 15000 10000 4400 19000 15000 10000 4400 19000 15000 10000 4400 19000 15000 10000 4400 19000 15000 10000 5000 19000 15000 13500 700 19000 1100 700 3500 19000 1300 5500 3200 1000 19000 1300 5500 3000 1000 </td <td>350</td>	350		
	2	5200	4200	3200	1800	1300	550
	5	8500	7200	5200	3200	2000	1000
	10	13500	11000	8000	5000	3000	1500
Setpoint 11" w.c.	15	16000	14000	11000	6500	4000	1750
Green Spring	25	20000	17000	900 1600 800 500 2200 2300 1300 850 400 700 3500 2000 1400 600 2200 5700 3500 2200 1000 2000 8900 5200 3000 1500 6000 12000 6700 4000 1750 0000 16000 9000 5200 2400 4000 21000 12000 7500 3200 4000 21000 15500 10000 4400 17000 13500 700 450 700 700 1500 700 450 700 6600 2000 1100 750 400 6800 3000 1700 1200 600 1500 5000 3100 2000 1500 1000 13500 5200 2400 1500 1000 1700 1500 1000 4400	2400		
6" to 14" w.c. 143-16-021-05	40		2.00 2.00 1.00 850 400 4700 3500 2000 1400 600 8200 5700 3500 2200 1000 12000 8900 5200 3000 1500 16000 12000 6700 4000 1750 20000 16000 9000 5200 2400 24000 21000 12000 7500 3200 24000 21000 12000 7500 3200 24000 27000 15500 10000 4400 1700 1500 700 450 700 1700 1500 700 450 700 1700 1500 3000 1700 1200 600 6500 5000 3100 2000 1000 1500 14000 9400 6400 4000 1750 3200 14000 1900 1500 10000 4400 3500 7000	3200			
	80 17000 12000 100 19000 13500 125 15000 1 3100 2600 2000 1100 750 2 5000 3800 3000 1700 1200 5 7800 6500 5000 3100 2000 10 13000 10000 7000 4800 2900 10 13000 10000 7000 4800 2900 "w.c. 15 15000 14000 9400 6400 4000 "w.c. 15 15000 17000 13500 8500 5200 21.04 40 21000 17000 11500 7500 60 19000 15000 10000 13500 13500 10 3200 2500 1900 1100 700 22 5200 4200 3200 1800 1300 10 13500 14000 1100 650	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.

1¹/₄", 1¹/₂" 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)

				Orifice Size ar	d Valve Angle		
Outlet Pressure and Spring	Inlet Pressure psi	1¼"*	1"	3/4"	1⁄2"	3/8"	1⁄4"
		10°	10°	10°	10°	Angle ½" ¾" ¼" 10° 10° 10° 900 600 300 1500 1000 500 2700 1600 950 4200 2800 1500 5800 3800 1750 3000 5000 2400 1000 7000 3200 5000 9800 4400 7000 12000 5700 9000 13500 7000 1300 850 500 2600 1600 950 4000 2800 1500 2600 1600 950 4000 2800 1500 5000 9800 4400 7500 5000 2400 5000 7000 3200 5000 9800 4400 7000 12000 5700 9000 13500 7000 2000 1900 850 4500 2900 1400 5000	
	1	2400	2000	1200	900	600	300
	Pressure of psile Intel Pressure of 114" 1" 3" 3" 3" 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 2 4200 3200 2000 1500 1000 1000 5 6500 5500 4100 2700 1600 5 6500 11000 8000 6800 3800 5 18000 15000 11500 8000 5000 7000 21000 15000 11000 9800 12000 100 1200 15000 11000 13500 12000 13500 125 120 1000 6500 5800 400 2600 1600 126 120 1600 1600 7600 5400 3800 125 1600	1000	500				
		950					
	10	Image: Section of the state and vertices Section of the state and vertices 1%** 1%** 3/** 3/** 1/** 10* 10* 10* 10* 10* 10* 10* 2400 2000 1200 900 6600 300 4200 3200 2000 1500 1000 500 6500 5500 4100 2700 1600 950 11000 8000 6200 4200 2800 1500 14500 11000 8000 5800 3800 1750 18000 15000 11500 8000 5000 2400 21000 15000 11000 7000 3200 10000 15000 15000 13500 7000 3500 2900 1700 1300 850 500 10500 8500 5800 4000 2600 1500 10500 16500 7600 5400 3800 1750	1500				
Setpoint 18" w.c.	15		3800	1750			
Orange Spring	25	18000	15000	11500	8000	5000	2400
12 to 28 w.c. 143-16-021-06	40		21000	15000	11000	7000	3200
	60			20000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
	2	3500	2900	1700	1300	850	500
Setpoint 1 psi 0.2 psi Droop Black Spring	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
1 to 2 psi	40		20000	15000	10500	7000	3200
143-16-021-0 <i>1</i>	60			20000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
	5	8600	6800	5300	2700	1900	850
	10	13000	10500	7500	4500	2900	1400
	15	17500	13500	10500	6000	3800	1750
Setpoint 2 psi	25	25000	20000	14000	8500	5000	2400
Cadmium Spring	40		25000	20000	12000	7000	3200
143-16-021-08	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 70°F flowing temperature.

Changes in performance can occur at extreme low flowing temperatures.

11/2" and 2" Model 243-8-1 and 243-8-2 in SCFH of Natural Gas (0.6 Specific Gravity - 14.65 psia - 60°F)

	And pail Here pail Here 30° Office Size and Valve Argie 1° %° %° %° %° 30° 10° 10° 10° 10° 30° 10° 10° 10° 10° 1 1950 1600 1050 750 350 2 3200 2400 1550 1000 550 5 5200 3900 2700 1800 350 10 7400 5800 4500 3000 1350 115 9100 7100 5800 2000 7100 3200 400 1050 9200 7100 3200 4400 500 500 4200 100 1000 750 650 400 500 300 450 100 1000 750 650 400 500 300 150 300 150 300 150 300 150 300 160 100																																																																																																																																												
Outlet Pressure and Spring		1"	3/4"	1⁄2"	³ /8"	1⁄4"	0.207"																																																																																																																																						
		30°	10°	10°	10°	¼" 0.2 10° 1 350 3 550 3 950 5 1350 9 1700 11 2400 15 3200 21 4400 25 5600 37 7000 45 8000 56 3200 21 4400 25 300 31 7700 45 8000 56 3200 21 4400 25 3200 21 4400 25 3200 21 4400 25 3200 21 4400 25 3300 31 1300 9 1300 9 1700 11 2400 15 3200 21 3200 21 3200 2	10°																																																																																																																																						
	1⁄2	1100	900	700	500																																																																																																																																								
Outlet Pressure and Spring Intel Pressure psi 1" %" %" %" 30° 10° 10° 10° 10° 10° 10° 12 1100 900 700 500 10° 10° 10° 2 3200 2400 1550 1000 5 500 9100 700 500 10 7400 5800 4500 9000 7100 5800 3800 11 15 9100 7100 5800 3800 1000 100 100 1000	750	350																																																																																																																																											
	550	350																																																																																																																																											
	Pressure Spring Intel Pressure psi 1* 5e* 6e* 5e* 5e* 12 1100 900 700 500 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 100 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 55 5200 3900 2700 1900 950 155 9100 7100 5800 3800 170 500 240 440 10500 9200 7100 320 440 60 11000 9300 440 60 11000 100	950	550																																																																																																																																										
Setpoint 6" w.c.	10	1* ½* ½* ¾* ¾* ¾* 30° 10° 10° 10° 10° 10° 1100 900 700 500 10° 1950 1600 10550 750 350 3200 2400 1550 1000 550 5200 3900 2700 1900 950 7400 5800 4500 3000 1350 9100 7100 5800 3800 1700 12500 8700 7200 5100 2400 10500 9200 7100 3200 1000 750 650 400 1000 1000 750 650 400 300 2500 1250 1000 750 650 400 300 250 1250 2700 1800 1350 950 450 1250 1250 9100 7000 5600 5100 2400	900																																																																																																																																										
1" w.c. Droop	15	9100	7100	パ" パ" 0.207" 10° 10° 10° 10° 700 500 550 350 1050 750 350 550 1550 1000 550 350 2700 1900 950 550 4500 3000 1350 900 5800 3800 1700 1150 7200 5100 2400 1500 9200 7100 3200 2100 11000 9300 4400 2900 1150 10500 5600 3700 11000 7000 4500 350 1150 10500 5600 3700 1350 950 450 350 1350 950 450 350 1350 950 1250 900 5000 3500 1700 1150 6600 5100 2400 1500 9000 7100	1150																																																																																																																																								
3½" to 6½" w.c.	25	12500	8700	7200	5100	2400	1500																																																																																																																																						
143-82-021-00	40		10500	9200	7100	3200	2100																																																																																																																																						
	60			11000	9300	4400	2900																																																																																																																																						
	80		10500 9200 7100 3200 2100 11000 9300 4400 2900 11500 10500 5600 3700 11000 7000 4500 8000 5600 1000 750 650 400 5600 5600 1000 750 650 400 5600 5600 1000 750 650 400 5600 5600 1000 750 650 400 5600 5600 5600 1000 750 650 400 5600 5600 5600 5600 1000 750 650 400 500 500 500 500 2700 1800 1350 950 450 3500 500 700 500 7000 5400 3900 2500 1250 900 500	3700																																																																																																																																									
	60 11000 9300 4400 80 11500 10500 5600 100 11000 7000 1000 7000 125 8000 100 100 7000 125 8000 1150 900 650 300 12 1000 750 650 400 10 1 1600 1150 900 650 300 2 2700 1800 1350 950 450 5 4800 3500 2350 1600 770 10 7000 5400 3900 2500 1250 15 9100 7000 5000 3500 1700	7000	4500																																																																																																																																										
	125			x² x² x² x² x² 0.207 10° 10° 10° 10° 10° 10° 700 500 350 350 350 1550 1000 550 350 2700 1900 950 550 4500 3000 1350 900 5800 3800 1700 1150 7200 5100 2400 1500 9200 7100 3200 2100 11000 9300 4400 2900 1150 10500 5600 3700 11000 9300 4500 350 1350 950 450 350 2350 1600 770 500 3900 2500 1250 900 5000 3500 1700 1500 6600 5100 2400 1500 1000 9300 4400 2900 11000	5600																																																																																																																																								
	1/2	1000	750	650	400																																																																																																																																								
	1	1600	1150	900	650	300																																																																																																																																							
Setpoint 6" w.c. 10 7400 1" w.c. Droop 15 9100 Red-Black Spring 25 12500 3½" to 6½" w.c. 40 60 40 60 60 100 100 100 125 100 100 102 1000 100 125 12500 143-82-021-01 Setpoint 7" w.c. 1 1600 1 1600 2 Setpoint 7" w.c. 15 9100 Setpoint 7" w.c. 15 9100 10 7000 15 11 1600 25 12500 143-82-021-01 40 60 80 100 10 125 12500 100 125 1250 125 1 1650 2 2700 5 100 100 125 100 125 1650 <tr td=""> 2 2700 <td>2</td><td>2700</td><td>1800</td><td>1350</td><td>950</td><td>450</td><td>350</td></tr> <tr><td>3500</td><td>2350</td><td>1600</td><td>770</td><td>500</td></tr> <tr><td>10</td><td>7000</td><td>5400</td><td>3900</td><td>2500</td><td>1250</td><td>900</td></tr> <tr><td>1" w.c. Droop</td><td>1 1600 1150 900 650 3 2 2700 1800 1350 950 4 5 4800 3500 2350 1600 7 10 7000 5400 3900 2500 1 spring w.c. 15 9100 7000 5000 3500 1 40 10500 9000 7100 3</td><td>1700</td><td>1150</td></tr> <tr><td>5" to 81/2" w.c.</td><td>25</td><td>12500</td><td>8700</td><td>650 400 900 650 300 1350 950 450 350 2350 1600 770 500 3900 2500 1250 900 5000 3500 1700 1150 6600 5100 2400 1500 9000 7100 3200 2100 11000 9300 4400 2900</td><td>1500</td></tr> <tr><td>143-82-021-01</td><td>40</td><td></td><td>10500</td><td>9000</td><td>7100</td><td>3200</td><td>2100</td></tr> <tr><td></td><td>60</td><td></td><td></td><td>11500 10500 5600 3700 11000 7000 4500 1100 7000 5600 750 650 400 1150 900 650 300 1800 1350 950 450 350 3500 2350 1600 770 500 5400 3900 2500 1250 900 7000 5000 3500 1700 1150 8700 6600 5100 2400 1500 10500 9000 7100 3200 2100 10500 9300 4400 2900 11500 10500 5600 3700 11500 10500 5600 3700 11500 10500 5600 3700 1150 1000 650 300 5600 1150 1000 650 300 5600 1150 1000 650 300 5600</td><td>2900</td></tr> <tr><td></td><td>80</td><td></td><td>2700 1800 1350 950 450 35 4800 3500 2350 1600 770 50 7000 5400 3900 2500 1250 90 9100 7000 5000 3500 1700 11 12500 8700 6600 5100 2400 15 10500 9000 7100 3200 21 11000 9300 4400 29 11500 10500 5600 37 11000 7000 4400 29</td><td>3700</td></tr> <tr><td></td><td>Serpoint / w.c. 15 9100 7000 5000 3500 7 1" w.c. Droop 15 9100 7000 5000 3500 7 Blue-Black Spring 25 12500 8700 6600 5100 2 143-82-021-01 40 10500 9000 7100 3 60 110500 9000 11000 9300 4 100 11000 11000 11000 3</td><td>7000</td><td>4500</td></tr> <tr><td></td><td>125</td><td></td><td></td><td></td><td>10005503501900950550300013509003800700115051002400150071003200210093004400290010500560037001100070045006503005600950450350160077050025001250900350017001150510024001500710032002100930044002900105005600370011000700450065030010010500560037001100070045006503005600110004503501100045035011000450350110004503501100045035011000100100100045025001000240015001000240015001000240015001000240015001050056003700105005600370010500560037001050056003700105005600370010500560037001050056003700105005600370010500560037</td></tr> <tr><td></td><td>1</td><td>1650</td><td>1150</td><td>1000</td><td>650</td><td>300</td><td></td></tr> <tr><td></td><td>2</td><td>2700</td><td>2000</td><td>1400</td><td>1000</td><td>450</td><td>350</td></tr> <tr><td>Setpoint 7" w.c. 1" w.c. Droop Blue-Black Spring 5" to 8½" w.c. 143-82-021-01</td><td>5</td><td>4800</td><td>3800</td><td>2600</td><td>1750</td><td>900</td><td>600</td></tr> <tr><td></td><td>10</td><td>7000</td><td>5400</td><td>4200</td><td>2800</td><td>1300</td><td>900</td></tr> <tr><td>Setpoint 11" w.c.</td><td>15</td><td>9000</td><td>7400</td><td>5500</td><td>3600</td><td>1700</td><td>1100</td></tr> <tr><td>Green-Black Spring</td><td>2 3200 2400 1550 1000 550 5 5200 3900 2700 1900 950 10 7400 5800 4500 3000 1350 15 9100 7100 5800 3800 1700 25 12500 8700 7200 6100 2400 40 10500 9200 7100 3200 60 11000 9300 4400 10500 5600 100 1000 11000 7000 5600 400 125 2700 1800 1350 950 450 2 2700 1800 1350 950 450 5 4800 3500 2350 1600 770 10 7000 5400 3900 2500 1250 15 9100 7000 5000 3000 1400 100 7000 5000 1100 7000 500<</td><td>1500</td></tr> <tr><td>6" to 14" w.c. 143-82-021-02</td><td>40</td><td></td><td>11000</td><td>9600</td><td>7100</td><td>3200</td><td>2100</td></tr> <tr><td></td><td>60</td><td></td><td></td><td>11000</td><td>9300</td><td>4400</td><td>2900</td></tr> <tr><td></td><td>80</td><td></td><td></td><td>11500</td><td>10500</td><td>5600</td><td>3700</td></tr> <tr><td></td><td>100</td><td></td><td></td><td></td><td>11000</td><td>7000</td><td>4500</td></tr> <tr><td></td><td>125</td><td></td><td></td><td></td><td></td><td>8000</td><td>5600</td></tr>	2	2700	1800	1350	950	450	350	3500	2350	1600	770	500	10	7000	5400	3900	2500	1250	900	1" w.c. Droop	1 1600 1150 900 650 3 2 2700 1800 1350 950 4 5 4800 3500 2350 1600 7 10 7000 5400 3900 2500 1 spring w.c. 15 9100 7000 5000 3500 1 40 10500 9000 7100 3	1700	1150	5" to 81/2" w.c.	25	12500	8700	650 400 900 650 300 1350 950 450 350 2350 1600 770 500 3900 2500 1250 900 5000 3500 1700 1150 6600 5100 2400 1500 9000 7100 3200 2100 11000 9300 4400 2900	1500	143-82-021-01	40		10500	9000	7100	3200	2100		60			11500 10500 5600 3700 11000 7000 4500 1100 7000 5600 750 650 400 1150 900 650 300 1800 1350 950 450 350 3500 2350 1600 770 500 5400 3900 2500 1250 900 7000 5000 3500 1700 1150 8700 6600 5100 2400 1500 10500 9000 7100 3200 2100 10500 9300 4400 2900 11500 10500 5600 3700 11500 10500 5600 3700 11500 10500 5600 3700 1150 1000 650 300 5600 1150 1000 650 300 5600 1150 1000 650 300 5600	2900		80		2700 1800 1350 950 450 35 4800 3500 2350 1600 770 50 7000 5400 3900 2500 1250 90 9100 7000 5000 3500 1700 11 12500 8700 6600 5100 2400 15 10500 9000 7100 3200 21 11000 9300 4400 29 11500 10500 5600 37 11000 7000 4400 29	3700		Serpoint / w.c. 15 9100 7000 5000 3500 7 1" w.c. Droop 15 9100 7000 5000 3500 7 Blue-Black Spring 25 12500 8700 6600 5100 2 143-82-021-01 40 10500 9000 7100 3 60 110500 9000 11000 9300 4 100 11000 11000 11000 3	7000	4500		125				10005503501900950550300013509003800700115051002400150071003200210093004400290010500560037001100070045006503005600950450350160077050025001250900350017001150510024001500710032002100930044002900105005600370011000700450065030010010500560037001100070045006503005600110004503501100045035011000450350110004503501100045035011000100100100045025001000240015001000240015001000240015001000240015001050056003700105005600370010500560037001050056003700105005600370010500560037001050056003700105005600370010500560037		1	1650	1150	1000	650	300			2	2700	2000	1400	1000	450	350	Setpoint 7" w.c. 1" w.c. Droop Blue-Black Spring 5" to 8½" w.c. 143-82-021-01	5	4800	3800	2600	1750	900	600		10	7000	5400	4200	2800	1300	900	Setpoint 11" w.c.	15	9000	7400	5500	3600	1700	1100	Green-Black Spring	2 3200 2400 1550 1000 550 5 5200 3900 2700 1900 950 10 7400 5800 4500 3000 1350 15 9100 7100 5800 3800 1700 25 12500 8700 7200 6100 2400 40 10500 9200 7100 3200 60 11000 9300 4400 10500 5600 100 1000 11000 7000 5600 400 125 2700 1800 1350 950 450 2 2700 1800 1350 950 450 5 4800 3500 2350 1600 770 10 7000 5400 3900 2500 1250 15 9100 7000 5000 3000 1400 100 7000 5000 1100 7000 500<	1500	6" to 14" w.c. 143-82-021-02	40		11000	9600	7100	3200	2100		60			11000	9300	4400	2900		80			11500	10500	5600	3700		100				11000	7000	4500		125					8000	5600
	2	2700	1800	1350	950	450	350																																																																																																																																						
	3500	2350	1600	770	500																																																																																																																																								
10	7000	5400	3900	2500	1250	900																																																																																																																																							
1" w.c. Droop	1 1600 1150 900 650 3 2 2700 1800 1350 950 4 5 4800 3500 2350 1600 7 10 7000 5400 3900 2500 1 spring w.c. 15 9100 7000 5000 3500 1 40 10500 9000 7100 3	1700	1150																																																																																																																																										
5" to 81/2" w.c.	25	12500	8700	650 400 900 650 300 1350 950 450 350 2350 1600 770 500 3900 2500 1250 900 5000 3500 1700 1150 6600 5100 2400 1500 9000 7100 3200 2100 11000 9300 4400 2900	1500																																																																																																																																								
143-82-021-01	40		10500	9000	7100	3200	2100																																																																																																																																						
	60			11500 10500 5600 3700 11000 7000 4500 1100 7000 5600 750 650 400 1150 900 650 300 1800 1350 950 450 350 3500 2350 1600 770 500 5400 3900 2500 1250 900 7000 5000 3500 1700 1150 8700 6600 5100 2400 1500 10500 9000 7100 3200 2100 10500 9300 4400 2900 11500 10500 5600 3700 11500 10500 5600 3700 11500 10500 5600 3700 1150 1000 650 300 5600 1150 1000 650 300 5600 1150 1000 650 300 5600	2900																																																																																																																																								
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	Serpoint / w.c. 15 9100 7000 5000 3500 7 1" w.c. Droop 15 9100 7000 5000 3500 7 Blue-Black Spring 25 12500 8700 6600 5100 2 143-82-021-01 40 10500 9000 7100 3 60 110500 9000 11000 9300 4 100 11000 11000 11000 3	7000	4500																																																																																																																																										
	125				10005503501900950550300013509003800700115051002400150071003200210093004400290010500560037001100070045006503005600950450350160077050025001250900350017001150510024001500710032002100930044002900105005600370011000700450065030010010500560037001100070045006503005600110004503501100045035011000450350110004503501100045035011000100100100045025001000240015001000240015001000240015001000240015001050056003700105005600370010500560037001050056003700105005600370010500560037001050056003700105005600370010500560037																																																																																																																																								
	1	1650	1150	1000	650	300																																																																																																																																							
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Setpoint 7" w.c. 1" w.c. Droop Blue-Black Spring 5" to 8½" w.c. 143-82-021-01	5	4800	3800	2600	1750	900	600																																																																																																																																						
	10	7000	5400	4200	2800	1300	900																																																																																																																																						
Setpoint 11" w.c.	15	9000	7400	5500	3600	1700	1100																																																																																																																																						
Green-Black Spring	2 3200 2400 1550 1000 550 5 5200 3900 2700 1900 950 10 7400 5800 4500 3000 1350 15 9100 7100 5800 3800 1700 25 12500 8700 7200 6100 2400 40 10500 9200 7100 3200 60 11000 9300 4400 10500 5600 100 1000 11000 7000 5600 400 125 2700 1800 1350 950 450 2 2700 1800 1350 950 450 5 4800 3500 2350 1600 770 10 7000 5400 3900 2500 1250 15 9100 7000 5000 3000 1400 100 7000 5000 1100 7000 500<	1500																																																																																																																																											
6" to 14" w.c. 143-82-021-02	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.

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

				Orifice Size ar	nd Valve Angle		
Outlet Pressure and Spring	Inlet Pressure psi	1"	3/4"	1⁄2"	³ /8"	1⁄4"	0.207"
		30°	10°	10°	¾" ¾" 0.207" 10° 10° 10° 550 10° 900 450 350 900 450 350 1350 850 600 2400 1300 850 3400 1700 1050 5100 2400 1500 7100 3200 2100 9400 4400 2900 10500 5600 3700 10500 5600 3700 1000 7000 4500 1000 500 200 1200 500 200 3000 1500 200 4000 1850 200 10500 6000 200 11500 6000 200 11500 6000 200 11500 6000 200 12500 7000 300 1300 850 550 2200 1300<	10°	
	1	1500	1100	800	550		
Outlet Pressure and Spring Intel Pressure psi 1 10°	2	2100	1700	1300	900	450	350
	850	600					
	inter Pressure ing inter Pressure pel inter Net 30° int ^o <th< td=""><td>850</td></th<>	850					
Setpoint 18" w.c.		1700	1050				
Green Spring	25	11500	9100	7100	5100	2400	1500
12 to 28 w.c. 143-16-021-05	40		11000	9300	7100	3200	2100
	60			11000	9400	4400	2900
	80			12000	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600
	2	4000	3500	1800 1200		500	
Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c.	5	6000	5000	3500	2200	1000	
	10	7500	7000	5000	3000	1500	
	15	9000	8000	6500	4000	1850	
	25	12000	10000	8000	5000	2000	
12" to 28" w.c.	40		12500	9500	7000	3000	
143-16-021-05	60			11500	9500	4500	
	125 2 4000 5 6000 10 7500 15 9000 0.31 psi Droop Green Spring 12" to 28" w.c. 25 12000 40 40 40 143-16-021-05 60 80 100 125 1200 22 2100 2100		12500	11500	6000		
	100				12500	7000	
	125	10 10 10 10 1500 1100 800 550 2100 1700 1300 900 4500 3400 2000 1350 6600 5700 3500 2400 8800 7100 5000 3400 11500 9100 7100 5100 11000 9300 7100 1000 11000 9300 7100 1000 11000 9300 7100 1000 1000 1000 9300 7100 1000 1000 3500 2200 7500 7000 5000 3000 9000 8000 6500 4000 12000 10000 8000 5000 12000 1000 8000 5000 12500 1500 12500 1500 12500 12500 1300 6500 4000 3200 2100 1300	8000	_			
	2	2100	1650	1200	850	450	
	5	4000	3200	2100	1300	850	550
	10	6500	5200	3100	2200	1300	800
Setpoint 1 psi	15	8400	6500	4400	3000	1700	1000
0.2 psi Droop Orange Spring	25	11000	8600	6500	4400	2400	1500
1 to 2 psi	40		11000	8600	6700	3200	2100
143-10-021-00	60			10500	9000	4400	2900
	80	1 1500 1100 800 550 2 2100 1700 1300 900 450 3 5 4500 3400 2000 1350 850 6 10 6600 5700 3500 2400 1300 8 15 8800 7100 5000 3400 1700 11 26 11500 9100 7100 5100 2400 12 40 11000 9300 7100 3200 2 60 1 11000 9300 7100 3200 2 60 1 11000 9300 7100 3200 2 800 1 1000 9400 4400 22 800 500 12000 10500 5600 33 100 7500 5000 3500 2200 1000 4400 15 9000 8000 6500 4000 1850 450 15 9000 8000 500 7000 3000	3700				
	100				11000	7000	4500
	1 1500 2 2100 5 4500 10 6600 15 8800 en Spring 25 11500 100 600 100 123" w.c. 40 60 80 100 125 1100 7500 15 15 9000 10 15 9000 10 15 9000 10 15 9000 10 15 9000 10 16-021-05 60 10 16-021-05 60 10 125 12000 12 16-021-05 60 10 125 100 125 100 125 100 15 8400 10 16-021-05 60 10 15 8400 10 16-021-05 60 10 16-021-05 60 10				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.

11/2" 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 Prespin 5 5 10 15 5 10 15 25 0.35 psi Droop 40 2 to 4¼ psi 60 143-16-021-07 60 100 100 125 5 0.6 psi Droop 10 Black Spring 40 100 125 5 100 125 5 100 125 5 10 101 15 2 to 4¼ psi 25 0.6 psi Droop 25 143-16-021-07 60 143-16-021-07 60		Orifice Size and Valve Angle									
Outlet Pressure and Spring	Inlet Pressure	1"	³ /4"	1/2"	³ ⁄8"	%/// 1/4" 10° 10° 1100 900 1500 1000 2000 1400 3100 1800 4200 2200 6500 3000 8500 5000 9000 6000 2400 1300 3400 1700 5000 2400 9300 4400 11000 5600 12000 7000	0.207"				
opg		30°	10°	10°	10°	10°	10°				
	5	Orifice Size and Valve Angle 1" $3/4$ " $1/4$ " $3/4$ " 30° 10° 10° 10° 3000 1800 1200 1100 4000 2500 1800 1500 5200 4000 2850 2000 5200 4000 2850 2000 7000 5200 3600 3100 9000 5000 4200 8300 6500 10000 8500 9000 9000 9000 4400 3400 2400 1600 7100 5900 3600 2400 9600 7500 4800 3400 12500 10500 6500 5000 12500 13000 9600 7000 13500 11000 12000 12000	900								
Outlet Pressure and Spring Inlet Pressure psi 1" 30° 30° 30° 30° 5 3000 10 4000 15 5200 Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi 25 7000 40 25 7000 143-16-021-07 60 400 100 125 1250 Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi 10 7100 15 9600 15 10 7100 15 9600 Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi 25 12500 0 143-16-021-07 60 100 100 100 143-16-021-07 60 100 100 100 100 125	2500	1800	1500	1000							
	15	5200	4000	½" ¾" ¼" 0.207" 10° 10° 10° 10° 10° 0 1200 1100 900 1000 1000 0 1800 1500 10							
Setpoint 3 psi	25	7000	5200	3600	¾" ¼" 0.207" 10° 10° 10° 1100 900 10° 1500 1000 2000 2000 1400 200 3100 1800 200 4200 2200 200 6500 3000 200 8500 5000 9000 6000 8000 200 1600 800 200 3400 1700 1000 5000 2400 1500 3000 4400 2900 11000 5600 3700 12000 7000 4500						
Black Spring	40		9000	5000	4200	2200					
2 to 4 ¼ psi 143-16-021-07	60			8300	6500	3000					
	80			8300 6500 3000 10000 8500 5000 9000 6000 8000							
80 100 125		9000	6000								
	125			½" ¾" ¼" 0.207" 10° 10° 10° 10° 10° 1200 1100 900 10° 10° 1800 1500 1000 900 10° 2850 2000 1400 200 200 3600 3100 1800 200 200 5000 4200 2200 200 200 8300 6500 3000 200 200 10000 8500 5000 200 200 2400 1600 800 750 3600 750 4800 3400 1700 1000 6500 2100 6500 5000 2400 1500 900 2100 9600 7000 3200 2100 1000 1000 12500 9300 4400 2900 3700 3700 13500 11000 5600 3700 4500 8000 56							
	Inlet Pressure psi 1" 30° 30° 5 3000 10 4000 15 5200 25 7000 40 - 60 - 80 - 100 7000 125 - 5 4400 100 7100 125 12500 40 - 60 - 10 7100 15 9600 25 12500 40 - 60 - 80 - 100 - 100 - 100 - 100 - 100 - 100 - 125 -	3400	2400	1600	800						
	10	7100	5900	3600	½" ¾" ¾" 10° 10° 10° 1200 1100 900 1800 1500 1000 2850 2000 1400 3600 3100 1800 5000 4200 2200 8300 6500 3000 10000 8500 5000 9000 6000 800 2400 1600 800 3600 2400 1300 4800 3400 1700 6500 5000 2400 12500 9300 4400 13500 11000 5600 12000 7000 8000	750					
	15	9600	7500	4800	3400	Argie ¼" 0.207" 0° 10° 10° 00 900 10° 00 900 10° 00 1000 100° 00 1000 100° 100 1400 10° 100 1800 200 200 2200 200 200 200 200 200 5000 3000 300 6000 300 400 1300 750 400 1700 1000 000 2400 1500 300 4400 2900 000 5600 3700 000 7000 4500	1000				
Setpoint 3 psi	25	12500	10500	6500	5000	2400	1500				
Black Spring	40		13000	9600	7000	3200	2100				
2 to 4¼ psi 143-16-021-07	60			12500	9300	4400	2900				
	80			13500	11000	5600	3700				
	100				12000	7000	4500				
	Spring psi					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.

(0.6 Specific Gravity - 14.65 psia - 60°F)

Outlet Pressure	Outlet Pressure			Orific	Orifice Size and Valve Angle ½" ¾" ½ 10° 10° 1 700 500 3 1050 750 3 1500 1000 5 2200 1900 9 2900 2650 13 3600 2700 17 3800 3300 24 4100 3800 32 4800 4400 44 5600 5600 560 650 400 44 1300 950 44 1900 1600 7 2600 2200 12 3100 2500 12 3600 3300 24 4000 3800 32 4600 4400 44 5600 5600 56 1000 650 3 1350 1000 4 2200 1750 8 3	Angle	
and Spring	and Spring	Inlet Pressure psi	3/4"	1⁄2"	³ /8"	%" ¼" 10° 10° 500 350 750 350 1000 550 1900 950 2650 1350 2700 1700 3300 2400 3800 3200 4400 4400 5600 5600 6000 6000 6000 6000 6000 300 950 450 1600 770 2200 1250 3300 2400 3300 2400 3300 2400 3300 2400 3300 2400 3800 3200 4400 450 1000 450 1000 450 1750 800 2450 1300 2450 1300 2450 1300 2450 1300 2450 1300<	0.207"
243-12	243-0		10°	10°	10°	10°	10°
		1⁄2	900	700	500		
		Sure g Intel Pressure psi N." N." N." N." 10° 10° 10° 10° 10° 10° 12 900 700 500 1 1 1600 1050 750 350 2 2250 1500 1000 550 5 2500 2200 1900 950 10 3100 2900 2650 1350 15 3550 3600 2700 1700 160 4200 3800 3300 2400 40 4200 4100 3800 3200 60 4800 4400 4400 4400 80 5600 5600 5600 5600 100 200 2660 4200 1600 770 11 1150 900 650 3000 250 1700 10 2900 2600 3300 2400 3600 3300	350				
		2	2250	½ ¼ ¾ ¼ ¼ ½ 10 100 100 100 100 100 100 1000	350		
		5	2500	2200	½" ¾" ¼" 0.207" 10° 10° 10° 10° 10° 500 10° 10° 1050 750 350 350 1250 1000 550 350 2200 1900 950 550 2900 2650 1350 900 3600 2700 1700 1050 3800 3300 2400 1500 4100 3800 3200 2100 4800 4400 4400 2900 5600 5600 5600 3700 650 400 4500 5600 900 650 300 350 1300 950 450 350 1900 1600 770 500 2600 2200 1250 900 3100 2500 1700 1050 3600 3300 2400 350 4600 <td< td=""><td>550</td></td<>	550	
Setpoint 6" w.c.	Setpoint 6" w.c.	10	3100	2900		900	
1" w.c. Droop Red Spring	1" w.c. Droop Red-Black Spring	15	3550	3600	2700	¼"0.207"10°10°10°10°350350550350950550135090013509001700105024001500320021006000350060005600300350770500125090012509001250900125090012509001250900125090012509001001050300210056003700440029005600350300550130090010010024001500300210030055030021003002100300210030021003002100300210030021003003700300370030037003003700300370030037003003700300370030037003003700300370030037003003700300370030037003003700300370030037003003700 <td>1050</td>	1050
3½" to 6" w.c.	3½" to 6½" w.c.	25	4200	3800	3300	2400	1500
143-10-021-03	143-02-021-00	40	4200	4100	3800	3200	2100
		60		4800	4400	4400	2900
		80		5600	5600	5600	3700
		100			6000	6000	4500
		125				6000	5600
		1⁄2	750	650	400		
		1	1150	900	650	300	
		2	1700	1300	950	450	350
		5	2300	1900	1600	770	500
Setpoint 7" w.c.	Setpoint 7" w.c.	10	2900	2600	2200	1250	900
1" w.c. Droop	1" w.c. Droop	15	3500	3100	2500	10° 10° 0 350 0 550 350 0 550 350 0 950 550 0 1350 900 0 1350 900 0 1700 1050 0 2400 1500 0 3200 2100 0 3200 2100 0 5600 3700 0 6000 5600 0 300	1050
5" to 8½" w.c.	5" to 8½" w.c.	25	4200	3600	3300	2400	1500
143-16-021-04	143-82-021-01	40	4800	4000	3800	3200	2100
		60		4600	4400	4400	2900
		80		5600	5600	5600	3700
		100			6000	10° 10° 350 350 550 350 950 550 1350 900 1350 900 1350 900 2400 1500 2400 2900 3200 2100 4400 2900 5600 3700 6000 4500 6000 5600 300 350 770 500 1250 900 1250 900 1250 900 1050 2400 1500 3700 4400 2900 5600 3700 4400 2900 5600 3700 4400 2900 5600 3700 1000 550 300 550 1300 900 1700 1100 2400 1500 3200 2100	
		125				6000	5600
		1	1150	1000	650	300	
		2	1850	1350	1000	450	350
		5	2500	2200	1750	800	550
		10	2900	2700	2450	1300	900
Setpoint 11" w.c.	Setpoint 11" w.c.	15	3700	3950	2600	1700	1100
Green Spring	Green-Black Spring	25	4250	4000	3300	2400	1500
143-16-021-05	143-82-021-02	40	5300	4200	3800	3200	2100
		60		4850	4400	Valve Angle V/" 0.207 10° 10° 10° 0 350 350 0 550 350 0 550 350 0 550 350 0 950 550 0 1700 1050 0 2400 1500 0 2400 1500 0 2400 2900 0 300 200 0 5600 3700 0 300 5600 0 450 350 0 770 500 0 450 350 0 770 500 0 300 200 0 450 350 0 2400 1500 0 300 200 0 450 350 0 4400 2900 0 300 500	2900
		80		700 500 1050 750 350 1500 1000 550 33 2200 1900 950 53 2900 2650 1350 99 3600 2700 1700 100 3800 3300 2400 15 4100 3800 3200 21 4800 4400 4400 29 5600 5600 5600 37 6000 6000 45 6000 45 6000 650 300 33 90 56 650 400 400 400 45 33 1300 950 450 33 330 2400 33 1300 950 450 33 340 3200 21 4600 2200 1250 99 3100 250 1700 10 3600 3300 2400 3800 3200 21 4600 4400 4400 39 34 <td< td=""><td>3700</td></td<>	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 30° and 11/4" x 30° orifice and valve angle are available on the 11/4" 243-12-1 and 243-12-2 models.

NOTE: The performance data is based on normal testing at 70°F flowing temperature.

Changes in performance can occur at extreme low flowing temperatures.

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

Outlet Pressure	Outlet Pressure			Orific	e Size and Valve	Angle	
and Spring	and Spring	Inlet Pressure psi	3⁄4"	1⁄2"	3/8 ''	1⁄4"	0.207"
243-12	243-8		10°	10°	10°	10°	10°
		1	1100	800	500		
Setpoint 18" w.c. 3" w.c. Droop 3" w.c. Droop 5 2250 10 2950 10 2950 12" to 28" w.c. 15 3450 3450 12" to 28" w.c. 143-16-021-05 4400 5300 60 100 25 4400 5300 60	1250	900	450	350			
		Multi Pressure and Spring 243-8 Inlet Pressure psi N." N." N." N." N." 0.207 10° <td>550</td>	550				
		10	2950	½" ¾" ¾" ½" 0.207" 10° 10° 10° 10° 10° 800 500 350 350 1250 900 450 350 1700 1350 750 550 2250 2100 1300 850 3600 2450 1700 1050 3750 3300 2400 1500 4100 3800 3200 2100 4800 4400 4400 2900 4850 5600 5600 3700 4850 5600 5600 3700 4850 5600 5600 3700 400 3000 1000 1000 3000 2000 1000 1000 4000 3000 1500 100 4000 3000 5100 200 6400 4500 2200 100 8500 6500 500 500			
Setpoint 18" w.c.	Setpoint 18" w.c.	15	3450	3600	%" ¼" 0.207" 10° 10° 10° 500 350 900 450 350 1350 750 550 2100 1300 850 2450 1700 1050 3300 2400 1500 3800 3200 2100 4400 4400 2900 5600 5600 3700 6000 7000 4500 2000 1000 5600 1200 500 5600 3000 1500 500 3000 1500 500 3000 1500 500 3000 5100 500 4500 2200 500 8500 6500 500 8500 6500 500 1350 750 500 1350 750 500 1950 1300 800 2050 1700		
Orange Spring	Green Spring	25	4400	3750	3300	2400	1500
12" to 28" w.c. 143-16-021-06	12" to 28" w.c. 143-16-021-05	40	5300	4100	3800	3200	2100
		60		4800	4400	4400	2900
		80		4850	5600	5600	3700
		100			6000	7000	4500
		125				8000	5600
		2	3000	1800	1200	500	
		5	4000	3000	2000	1000	
		10	5000	4000	3000	1500	
Setpoint 1 psi	Setnoint 1 nsi	15	6000	5100	3900	1900	
0.31 psi Droop	0.31 psi Droop	25	7500	6400	4500	2200	
12" to 28" w.c.	12" to 28" w.c.	40	4850 5600 5600 6000 7000 8000 8000 3000 1800 1200 500 4000 3000 2000 1000 5000 4000 3000 1500 6000 5100 3900 1900 7500 6400 4500 2200 8000 7400 6100 2600 8000 7350 4000 8500 8000 5100 8500 6500 7000	2600			
143-16-021-06	143-16-021-05	60		8000	7350	4000	
		80		8500	8000	5100	
		100	111 1100 <th1< td=""><td></td></th1<>				
		125				7000	
		2	1850	1150	850	450	
		5	2100	1700	1350	750	500
		10	2700	2000	1950	1300	800
Setpoint 1 psi	Setpoint 1 psi	15	3150	3100	2050	1700	1000
0.2 psi Droop	0.2 psi Droop	25	4150	3250	2850	2400	1500
1 to 2 psi	1 to 2 psi	40	5300	3800	3600	3200	2100
14 <i>3</i> -16-021-0 <i>1</i>	143-10-021-06	60		4600	4250	4400	2900
		80		½" ¾" ¾" ¾" 0.207 10° 10° 10° 10° 10° 10° 800 500 550 350 1250 900 450 350 1250 900 450 350 550 2250 2100 1300 850 3600 2450 1700 1050 3750 3300 2400 1500 4100 3800 3200 2100 4800 4400 2900 4800 4400 4400 2900 3700 4500 4850 5600 5600 3700 8000 5600 3000 2000 1000 4500 200 3000 5600 1800 1200 500 3000 1500 300 5600 300 5600 5600 300 5600 300 5600 300 5600 5600 300 5600 300 5600 300 5600 5600	3700		
		100	A A A A A A 10° 10° 10° 10° 10° 10° 1 1100 800 500 1 2 1900 1250 900 450 5 2250 1700 1350 750 10 2950 2250 2100 1300 15 3450 3600 2450 1700 25 4400 3750 3300 2400 40 5300 4100 3800 3200 60 4800 4400 4400 800 4850 5600 5600 00 6000 7000 25 8000 2 3000 1800 1200 500 5 4000 3000 2000 1000 15 6000 5100 3900 1900 25 7500 6400 4500 200 600 74	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 30° and 11/4" x 30° orifice and valve angle are available on the 11/4" 243-12-1 and 243-12-2 models.

NOTE: The performance data is based on normal testing at 70°F flowing temperature.

Changes in performance can occur at extreme low flowing temperatures.

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

Outlet Pressure	Outlet Pressure			Orific	e Size and Valve	Angle	
and Spring	and Spring	Inlet Pressure psi	³ /4"	1⁄2"	³ ⁄8"	Number of the second	0.207"
243-12	243-8		10°	10°	10°	10°	10°
		5	1200	1000	800	500	
Setpoint 3 psi 0.35 psi Droop Cadmium Spring 1½ to 3 psi 143-16-021-08		10	2000	1800	1400	1000	
		Pressure Spring 243-8 Inlet Pressure psi χ'' χ''' χ''' χ''' χ''' χ''' χ'''' $\chi''''''''''''''''''''''''''''''''''''$					
Setpoint 3 psi	Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 41⁄c psi	25	Orifice Size and Valve Angle ½" ½" ½" ½" 0.207" 10° 10° 10° 10° 10° 10° 1200 1000 800 500				
Cadmium Spring		40	6300	10° 10° 10° 10° 10° 200 1000 800 500 200 1800 1400 1000 300 2800 1800 1400 700 3300 2300 1650 300 4900 2800 2000 5800 5000 2800 2000 6500 6400 4600 4600 6500 6400 4750 5000 200 1950 1650 700 200 1950 1650 700 200 3400 2350 1700 1000 300 3400 3250 2400 1500 300 4300 3700 3200 2100			
1½ to 3 psi 143-16-021-08	2 to 4¼ psi 143-16-021-07	60					
		80					
		100	80 6500 6400 4600 100 6500 4750 125 5000				
		125				5000	
		5	2200	1950	1650	700	
	3 Black Spring 2 to 4¼ psi 143-16-021-07 Setpoint 3 psi 0.6 psi Droop Black Spring	10	3600	2300	2150	1300	750
		15	3800	3400	10° 10° 10° 10° 1000 800 500 10° 1800 1400 1000 2800 1400 2800 1800 1400 1000 2800 2800 3300 2300 1650 4900 2800 2000 2800 2000 5800 5600 2800 2000 2800 2000 2800 2000 2800 2000 2800 2000 2800 2000 2000 2800 2000 2800 2000 2800 2000 2800 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2000 2300 2150 1300 750 3400 2350 2100 1500 4300 3700 3200 2100 2500 5500 3700 4500 3700 4500 5600 3700 4500 8000 5600 3600 5600 3700 <		
Setpoint 3 psi	Setpoint 3 psi	25	5000	3900	3250	2400	1500
Cadmium Spring	Black Spring	40	6300	4300	3700	3200	2100
1½ to 3 psi 143-16-021-08	2 to 4 ¼ psi 143-16-021-07	60		5500	4400	4400	2900
		80		5500	5850	5600	3700
		100			6550	7000	4500
		psi 10° 5 1200 10 2000 11 2000 15 3300 25 4700 40 6300 60 80 1000 125 25 2200 10 3600 15 3800 25 5000 40 6300 60 6300 10 3600 15 3800 25 5000 40 6300 60 80 100 125 100 125			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 30° and 1¼" x 30° orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

				Orifice Size ar	d Valve Angle		
Outlet Pressure and Spring	Inlet Pressure psi	1"	3⁄4"	3/4"	1⁄2"	3/8"	1⁄4"
		30°	30°	10°	10°	%" ¼" 10° 10° 600 500 950 500 1400 900 2400 1400 3800 1700 5600 2400 7400 3400 10000 4600 11000 5600 12000 7000 1000 500 1000 500 1000 500 1000 500 1000 1000 3000 1500 1000 2500 1000 3200 1000 4600 1000 900 1000 4600 13800 6100 13800 6100 1300 900 2200 1400 3100 1700 4800 2400 7000 3400 9500 4600 10500 5600 10500	10°
	1	1500	1200	1100	800	600	
Outlet Pressure and Spring Intel Pressure pil 1 100 100 100 100 1 1500 1200 1100 800 600 2 2400 1800 1700 1250 950 5 5500 3700 3600 2300 1400 10 9400 8400 6000 3700 2400 5 5500 12000 1100 800 6600 3800 12 025 14500 17500 10000 8200 1600 10000 134-16-021-05 660 2000 12000 11500 7400 1000 100 125 14500 12000 11500 10000 10000 100 <t< td=""><td>1700</td><td>1250</td><td>950</td><td>500</td></t<>	1700	1250	950	500			
	1400	900					
	Image region 1° $\frac{1}{2}$	1400					
Setpoint 18" w.c.	15	12000	12000	¾" ¾" ¾" ¾" 30° 10° 10° 10° 10° 1200 1100 800 600 1800 1700 1250 950 500 3700 3500 2300 1400 900 8400 6000 3700 2400 1400 12000 8100 5600 3800 1700 17500 10000 8200 5600 2400 20000 12000 11500 7400 3400 20000 12000 11500 7400 3600 10000 8200 5600 2400 3600 1000 10000 11000 5600 3600 3600 1000 1000 4000 1000 5600 3000 1000 12800 10000 5500 3000 1500 3000 1500 14000 13900 7750 4500 1800 6100 14	1700		
Green Spring	25	14500	17500	10000	8200	5600	2400
12" to 28" W.C. 143-16-021-05	40		20000	12000	11500	7400	3400
	60				13500	10000	4600
	80				14000	11000	5600
	1 1500 1200 2 2400 1800 5 5500 3700 10 9400 8400 3" w.c. Droop Green Spring 12" to 28" w.c. 15 12000 12000 143-16-021-05 40 20000 20000 60			12000	7000		
	125			Orifice Size and Valve Angle 3/4" 1/4" 3/4" 10° 10° 10° 0 1100 800 600 0 1700 1250 950 0 3500 2300 1400 0 6000 3700 2400 0 6000 3700 2400 00 6000 3700 2400 00 6000 3700 2400 00 8100 5600 3800 00 10000 8200 5600 100 12000 11500 7400 11000 12000 11000 12000 100 12000 10000 10000 100 7000 4000 1900 100 13900 7750 4500 100 16500 11500 7400 100 1700 13800 14000 100 1700 13800 200	-	8000	
	2	5000	4000	4000	3000	1000	500
2 5000 4000 4000 3000 1000 5 8000 7000 7000 4000 1900 10 14000 12800 10000 5500 3000 Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c. 15 16500 14000 13900 7750 4500 12" to 28" w.c. 40 18000 16500 11500 7400	5	8000	7000	7000	4000	1900	1000
	3000	1500					
	15	16500	14000	13900	7750	4500	1800
0.31 psi Droop	toto toto toto toto toto toto toto 5 8000 7000 7000 4000 1900 10 14000 12800 10000 5500 3000 11 psi Droop 25 17700 16900 15000 9000 5500 11 psi Droop 25 17700 16900 15000 9000 5500 11 psi Droop 25 17700 16900 15000 9000 5500 11 psi Droop 40 18000 16500 11500 7400	5500	2500				
12" to 28" w.c.	40		18000	8100 5600 3800 1700 10000 8200 5600 2400 12000 11500 7400 3400 12000 11500 7400 3400 13500 10000 4600 14000 11000 5600 14000 11000 5600 12000 7000 8000 4000 3000 1000 500 7000 4000 1900 1000 10000 5500 3000 1500 10000 5500 2500 3200 13900 7750 4500 1800 15000 9000 5500 2500 16500 11500 7400 3200 16500 15000 10000 4600 17000 13800 6100 17000 1200 850 450 3300 2200 1300 900 5400 3500 2200 1400	3200		
143-16-021-05	60				15000	10000	4600
	80				17000	13800	6100
	10 Setpoint 1 psi .31 psi Droop 3reen Spring 2" to 28" w.c. 43-16-021-05 60 80 100 125					14000	7000
	125				10° 10° 10° 800 600 500 1250 950 500 2300 1400 900 3700 2400 1400 5600 3800 1700 8200 5600 2400 11500 7400 3400 13500 10000 4600 14000 11000 5600 14000 1000 500 3000 1000 500 4000 1900 1000 5500 3000 1500 7750 4500 1800 9000 5500 2500 11500 7400 3200 15000 10000 4600 10000 4600 100 15000 10000 4600 1000 2200 1300 900 2200 1300 900 3500 2400 3500 2200 1400 100 10		
	2	2400	1800	1700	1200	850	450
	5	4000	3400	3300	2200	1300	900
	10	7000	6000	5400	3500	2200	1400
Setpoint 1 psi	15	11000	9000	7000	4600	3100	1700
0.2 psi Droop	25	14500	15000	10000	7400	4800	2400
1 to 2 psi	40		17500	12000	10500	7000	3400
143-10-021-06	60				12500	9500	4600
	80		1800 1700 1250 950 500 3700 3500 2300 1400 900 8400 6000 3700 2400 1400 12000 8100 5600 3800 1700 17500 10000 8200 5600 2400 20000 12000 11500 7400 3400 20000 12000 11500 7400 3400 14000 10000 5600 2400 14000 1000 5600 3400 14000 1000 5600 3600 7000 7000 4000 1000 500 12800 10000 5500 3000 1500 14000 13900 7750 4500 1800 16900 1500 9000 5500 2500 18000 16500 11500 7400 3200 18000 1600 1600 1600 1600 1800 <td>5600</td>	5600			
	100					11000	7000
	tipoint 18" w.c. 2 2400 1800 5 5500 3700 10 9400 8400 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 1000 11 11 11 11 11 11 11 125 11 11 13 15 16500 14000 120 125 11 11000 125 125 125 125 100 1000 1200 1200 101 7000 6000 125 102 10 1000 1000 102				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" 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 Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi 143-16-021-07		Orifice Size and Valve Angle									
Outlet Pressure and Spring	Inlet Pressure psi	1"	3/4" 3/4" <th< th=""><th>3/8"</th><th>1⁄4"</th></th<>	3/8"	1⁄4"						
		30°	30°	10°	10°	10°	10°				
Outlet Pressure and Spring Inlet Pressure psi 1" ¼" 30°	5	2000	1600	1600	1400	1000	500				
	3000	3000	3000 2000		1000						
	15	5800	1" ¾"<								
Setpoint 3 psi	25	7500	5200	5000	½" ¾" ¼" 10° 10° 10° 10° 1400 1000 500 2000 1400 1000 2600 1800 1500 3900 2750 2300 6500 5800 3100 10000 7500 4600 14000 10000 6000 14000 10000 6000 14000 10000 6000 14000 10000 6000 14000 10000 6000 14000 1600 800 3600 2400 1300 4800 3500 1700 8000 5100 2400 11000 7000 3400 14000 9600 4600 15000 11000 5600 12000 7000 8000						
Black Spring	40		9100	9000	6500	5800	3100				
2 to 4¼ psi 143-16-021-07	60				10000	7500	4600				
80 14000 1000 100 1200 125	10000	6000									
	100					12000	7000				
	125		1" ¾"<		9000						
	5	4400	3400	3300	2400	1600	800				
	10	7600	6000	5800	¾" ¾"<	1300					
	15	11000	9000	7500	4800	½" ¾" ¼" 10° 10° 10° 1400 1000 500 2000 1400 1000 2600 1800 1500 3900 2750 2300 6500 5800 3100 10000 7500 4600 14000 10000 6000 14000 10000 6000 14000 10000 6000 14000 1600 800 3600 2400 1300 4800 3500 1700 8000 5100 2400 14000 9600 4600 14000 9600 4600 14000 9600 4600 15000 11000 5600 15000 1000 5600 12000 7000 8000					
Setpoint 3 psi	25	15000	15000	10500	8000	5100	2400				
Black Spring	40		17500	13000	11000	7000	3400				
2 to 4¼ psi 143-16-021-07	60				14000	9600	4600				
	80				15000	11000	5600				
8.6 psi Dioop Black Spring 2 to 4¼ psi 143-16-021-07	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.

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

			1¼" Mode	1 243-8HP			1½"	Model 243	-8HP			2" N	lodel 243-	BHP	
Outlet Pressure	Inlet Pressure	Orifi	ice Size ar	nd Valve A	ngle		Orifice Si	ze and Va	lve Angle			Orifice Si	ze and Val	lve Angle	
	psi	³⁄₄" 10°	½" 10°	³⁄ଃ" 10°	¼" 10°	1" 30°	³⁄₄" 10°	½" 10°	³⁄ଃ" 10°	1⁄4" 10°	1" 30°	³ ⁄4" 10°	½" 10°	³∕8" 10°	¼" 10°
	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
Setpoint 5 psi	25	4400	3650	3050	2400	12000	9300	6100	4800	2400	13000	8200	6100	4800	2400
1 psi Droop	40	5800	3800	3200	3200		12000	8500	6100	3200		12000	8700	6100	3400
Spring	60		4400	4100	4400			10000	8700	4400			10000	8700	4600
3 to 6½ psi 143-16-021-08	80		4500	5300	5600			11000	10000	5600			11500	10000	5600
	100			6000	7000				11000	7000			•	11000	7000
	125				8000					8000					8000
	10	2300	2000	1800	1000	2500	2300	2000	1600	1000	2700	2500	2100	1600	1000
Setpoint	15	3000	2800	2200	1400	5000	4000	2500	2200	1500	5900	4300	2800	2400	1500
7 psi	25	5400	4100	3300	2000	8500	6500	4300	3500	2000	8600	6600	4600	3600	2000
1 psi Droop Cadmium-	40	7600	5600	4800	2800		9500	6500	5000	3000		10000	7200	5600	3000
White Springs	60		7500	6200	3800			9000	6500	4000			9700	7000	4500
6 to 10 psi	80		8800	7200	5200			11000	8500	5000			12000	9000	5500
143-16-021-03	100			8600	5800				10500	5500			•	11500	7000
	125				7000					5500					5500
	10	5400	3500	2500	1400	8000	5500	3500	2500	1300	8600	6000	4300	2700	1400
Setnoint	15	7400	5000	3500	1800	10500	8000	5000	3500	1700	12700	8900	5700	3800	1800
7 psi	25	10000	7600	5500	2500	15000	12000	8000	5000	2300	18600	13500	8600	5700	2400
2 psi Droop Cadmium-	40	12500	10000	7500	3500		16000	11500	7500	3300		19000	12500	8000	3500
White Springs	60		12500	9500	4800			15000	9500	4500			17000	10000	4800
6 to 10 psi	80		14000	11500	6100			17500	12500	5500			20000	13500	6200
143-10-021-03	100			13500	7200				15500	7000				16500	7300
	125				8800					7000					8100
	15	2500	2200	1800	1200	3500	3000	2000	1300	1000	3600	3000	2000	1800	1000
Setpoint	25	4800	3500	2800	1900	6500	5000	3500	2500	1900	6800	5700	4000	3000	1900
1 psi Droop	40	7200	5000	4000	2500		8000	5500	4300	2500		8600	5700	4600	2800
Cadmium- White	60		6700	5700	3500		10500	7500	6000	3500			8600	6400	4300
Springs 6 to 10 psi	80		7800	6600	4600			9000	7500	4500			10500	8400	5200
143-16-021-03	100			7800	5400				9500	6000				10700	6500
	125				6500					7000					8000
	15	6000	4000	2800	1700	8500	6500	4000	2500	1500	9000	6600	4800	3000	1500
Setpoint	25	9000	6500	5000	2500	12000	10500	7000	4500	2300	15500	11000	7400	5000	2400
2 psi Droop	40	12000	9000	7000	3500		15000	10000	7500	3000		16500	11000	7700	3200
White	60		12000	9400	4700			14000	10000	4500			15000	10700	4800
Springs 6 to 10 psi	80		13000	11000	6000			17000	12000	5500			18500	13000	6000
143-16-021-03	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.

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.

243 MONITOR SET



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.**

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.

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.



3

CDF1306-065



Model	243-12	243-8	243-8HP
А	14"	103⁄16"	103⁄16"
**B	9¾ "	9¾"	-
B1	-	-	12¾"
С	5¾"	5¾"	5¾"
***C1	7½"	7½"	7½"
C ²	71/8"	71/8"	71/8"
D	21/8"	21/8"	21/8"
Е	10 ¹³ / ₃₂ "	8 ¹⁹ / ₃₂ "	8 ¹⁹ / ₃₂ "
F	61/32"	4 ²⁷ / ₃₂ "	4 ²⁷ / ₃₂ "
G	4 ¹¹ / ₃₂ "	45/32"	45/32"
Shipping Weight*	27 Ibs.	25 Ibs.	29 Ibs.

* Add 9 lbs. for flanges on 2" body

** 10" for 243-12-1 and 243-12-4, which include travel stop *** ANSI flanges

CDF1306-070

C²
Materials of Construction

Body	Cast Iron
Diaphragm Case Die 0	Cast Aluminum Alloy
DiaphragmBuna-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, S	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.	$Q = K\sqrt{P_o}$	$\overline{(P_i - P_o)}$ (for $\frac{P_i}{P_o}$ less than 1.894)
2.	$Q = \frac{KP_i}{2}$	(for $\frac{P_i}{P_0}$ 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)
- Po = absolute outlet pressure (psia)

Orifice size:	.207"	1⁄4"	3⁄8 "	1⁄2"	³ ⁄4"	1"	1¼"
К	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:

CORRECTION FACTOR = $\sqrt{}$

0.60 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 CO₂,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 nlet pressuresto 125 psi Dutlet pressures	
Model 143-80 4", 1", 1¼" pipe sizes nlet pressuresto 125 psi Dutlet pressures	

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.

Vodel 046	
³ / ₄ ", 1" and 1 ¹ / ₄ " pipe sizes	
nlet 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	
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:

BR-G-REG-1306-0313-01-A Model 243 Service Regulators Construction and Design Features

Authorized Distributor:

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



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.





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.

CAUTION

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 1/2" 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 1/2", 3/4" 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 31/2" w.c. to 35 psig with capacity ranging as high as 75,000 scfh.

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

		Orifice Size and Valve Angle						
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	3⁄4"	³ ⁄4"	1⁄2"	³ /8"	1⁄4"
		30°	30°	30°	10°	10°	10°	10°
	1⁄2	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
Setpoint 6" w.c.	10	13000	15000	12500	9000	5700	3300	1500
1" w.c. Droop	15	14000	15000	15000	10300	7100	4000	1750
3½" to 6½" w.c.	25		15000	20000	11500	9500	5300	2400
143-16-021-03	40			20000	13000	13000	7500	3300
	60				15000	13000	10000	4500
	80					13000	12000	5700
	100					13000	12000	7000
	125						12000	8000
	1⁄2	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
Sotopipt 7" w c	10	12500	14000	12000	8400	5600	3300	1400
1" w.c. Droop	15	14000	15000	15000	10000	7100	4000	1750
5" to 81/2" w.c.	25		15000	20000	11500	9500	5300	2400
143-16-021-04	40			20000	13500	12000	7500	3200
	60				15000	13000	10000	4400
	80					13000	12000	5600
	100					13000	12000	7000
	125						12000	8000
	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
Setpoint 11" w.c.	15	14000	14000	15000	10500	7000	4000	1800
Green Spring	25		15000	20000	12000	9500	5300	2400
143-16-021-05	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.

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

Orifice Size and Value					e Size and Valve	Angle		
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	³ ⁄4"	3/4"	1⁄2"	³ /8"	1⁄4"
		30°	30°	30°	10°	10°	10°	10°
	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
Setpoint 18" w.c. 3" w.c. Droop	15	13500	14500	15000	9500	6500	3900	1700
Orange Spring	25		16500	20000	11500	9200	5300	2300
12 10 20 w.c. 143-16-021-06	40			20000	13500	12000	7500	3200
	60				15000	13000	10000	4400
	80					14000	12000	5600
	100					14000	12000	7000
	125						12000	8000
	2	6500	5000	4000	4000	2000	1300	500
	5	8000	7500	6000	6000	4000	2200	1000
	10	9000	8500	8000	8000	5500	3000	1400
Setpoint 1 psi	15	12000	11000	10000	10000	7000	4000	1800
0.31 psi Droop	25		13500	12500	11500	9500	5500	2400
12" to 28" w.c.	40			14000	13000	11000	7400	3300
143-16-021-06	60				15000	13500	10000	4500
	80					15000	13000	6000
	100					16000	14000	7000
	125						14000	8500
	2	3350	3000	2000	1900	1200	1000	500
	5	6600	5900	4200	3900	2400	1600	1000
	10	11000	10000	7600	6500	4100	2800	1450
Setpoint 1 psi	15	13000	12000	9300	8300	5600	3800	1700
0.2 psi Droop Black Spring	25		15000	16500	11000	8500	5300	2400
1 to 2 psi	40			20000	14000	12500	7500	3400
143-10-021-07	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.

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

		Orifice Size and Valve Angle								
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	³ ⁄4"	3/4"	1⁄2"	³ /8"	1⁄4"		
opinig		30°	30°	30°	10°	10°	10°	10°		
	5	8200	7400	5200	4800	2900	1900	900		
	10	12500	11300	8700	7800	4800	3000	1400		
	15	15500	14500	11500	10000	6500	3800	1700		
Setpoint 2 psi	25		18000	16500	13500	9000	5300	2400		
Cadmium Spring	40			20000	16500	12500	7600	3400		
1½ to 3 psi 143-16-021-08	60				16500	15500	10000	4600		
	80					16000	12000	5600		
	100					16000	12000	7000		
	125						12000	8000		
	5	3500	3000	2000	1800	1400	1100	750		
	10	8000	7000	5500	5000	3000	2000	1100		
	15	10500	10000	8000	7000	4000	3000	1600		
Setpoint 3 psi	25		11500	9800	9000	5600	4500	2000		
Cadmium Spring	40			21500	20000	10500	7500	3500		
1½ to 3 psi 143-16-021-08	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.

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

		Orifice Size and Valve Angle					
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	3/4"	1⁄2"	³ /8"	1⁄4"
		30°	30°	10°	10°	10°	10°
	1⁄2	2000	1600	1300	700	500	
	1	2800	2500	2100	1200	800	400
Setpoint 6" w.c.	2	4000	3500	3200	2100	1300	600
	5	6100	5600	4800	3700	2200	1000
	10	8200	7700	6500	5600	3100	1400
1" w.c. Droop	15	9300	9300	7400	6800	3900	1750
3½" to 6½" w.c.	25		11000	9100	8100	5100	2400
143-16-021-03	40			10500	9800	7100	3200
	60			12000	11000	9300	4400
	80				12000	10500	5600
	100				12000	11000	7000
	125					11000	8000
	1/2	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
Sotooint 7" w.o.	10	8200	7600	6000	5400	3100	1400
1" w.c. Droop	15	9300	9100	7000	6600	3900	1750
5" to 8½" w.c.	25		11000	8400	7800	5100	2400
143-16-021-04	40			10000	9500	7100	3200
	60			10500	10500	9300	4400
	80				11500	10500	5600
	100				12000	11000	7000
	125					11000	8000
	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
Setpoint 11" w.c.	15	10000	9800	7700	6800	3800	1750
Green Spring	25		11500	9700	8100	5100	2400
6" to 14" w.c. 143-16-021-05	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.

11/2" Models 243-12-1 and 243-12-2 in SCFH of Natural Gas (0.6 Specific Gravity – 14.65 psia – 60°F) (Continued)

		Orifice Size and Valve Angle							
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1"	3/4"	1⁄2"	3/8"	1⁄4"		
		30°	30°	10°	10°	10°	10°		
	1	1800	1300	1100	800	500			
	2	3000	2800	2200	1500	1000	500		
Setpoint 18" w.c.	5	5600	5200	4200	2600	1800	950		
	10	8600	7700	6000	4300	2900	1400		
	15	10000	9300	7400	5800	3800	1750		
Orange Spring	25		11500	9100	7800	5100	2400		
143-16-021-06	40			11000	9500	7100	3200		
	60			12500	11000	9300	4400		
	80				12500	10500	5600		
	100				13000	11000	7000		
	125					11000	8000		
	2	6500	5000	4000	2000	1300	500		
	5	8000	7500	6000	4000	2200	1000		
	10	9000	8500	8000	5500	3000	1400		
Setnoint 1 nsi	15	12000	11500	10000	7000	4000	1800		
0.31 psi Droop	25		13500	11500	9500	5500	2400		
12" to 28" w.c.	40			13000	11000	7400	3300		
143-16-021-06	60			15000	13500	10000	4500		
	80				15000	13000	6000		
	100				16000	14000	7000		
	125					14000	8500		
	2	2800	2450	1500	1200	850	500		
	5	5500	5100	3700	2400	1600	950		
	10	8000	7500	5700	4000	2700	1400		
Setpoint 1 psi	15	10000	9100	7100	5300	3700	1750		
0.2 psi Droop Black Spring	25		11000	9300	7300	5100	2400		
1 to 2 psi	40			11000	9300	7100	3200		
143-10-UZ1-U/	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.

11/2" 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 1/¼" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 1" ½" 10 30° 30° 30° 10° 1 5 3500 3000 2000 10° 1 10 10° 10° 1 10 10° 10° 10 100 2000 14 10 10° 11° 10° 10° 11° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 11° 10° 10° 10° 10° 10° 11° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10	Orifice Size and Valve Angle						
Outlet Pressure and Spring	Inlet Pressure psi	1¼"	1%" 1" ¾" ½" ¾" 30° 30° 10° 10° 10° 10° 3500 3000 2000 1400 1100 7000 6000 5000 2500 2000 9000 8000 7000 3500 2500 9000 8000 7000 3500 2500 10000 8000 4800 4500 11500 6500 6000 5000 14000 8000 7500 9000 9000 3000 7100 1000 12000 1000 1000 1000 6000 5300 4100 2700 1700 10000 9300 7100 4700 2900 13000 12000 8800 6200 3800 14500 11000 8600 5200 14500 11000 13500 10000 15000 13500 12000 16000 1	1⁄4"			
		30°	30°	10°	10°	10°	10°
	5	3500	3000	2000	1400	1100	500
Outlet Pressure and Spring Inlet Pressure psi 1%" 1" %" 30° 30° 10° 30° 30° 10° 5 3500 3000 2000 5000 5000 10 7000 6000 5000 5000 5000 15 9000 8000 7000 6000 5000 0.35 psi Droop 25 10000 8000 7000 Cadmium Spring 40 11500 14000 800 1½ to 3 psi 60 14000 800 7100 125 5 6000 5300 4100 7100 125 13000 12000 8800 7100	5000	2500	2000	1000			
	15	9000	1" ¾"<	1500			
Setpoint 3 psi	25		10000	8000	4800	Angle ½" ¾" ¼" 10° 10° 10° 1400 1100 500 2500 2000 1000 3500 2500 1500 4800 4500 1900 6500 6000 3500 8000 7500 4500 9000 8000 6000 12000 11000 7000 12000 12000 8500 2700 1700 900 4700 2900 1400 6200 3800 1700 8600 5200 2400 11000 7100 3200 13500 10000 4600 15000 12000 5600 16000 12000 8000	1900
Cadmium Spring	40			11500	6500		
1½ to 3 psi 143-16-021-08	60			14000	2 3000 7500 4500 9000 8000 6000 11000 7000		
	80 9000 8000 100 12000 11000	6000					
	100				12000	11000	7000
	125			1" ¾" ¾" 30° 10° 10° 10° 3000 2000 1400 1100 3000 5000 2500 2000 3000 5000 2500 2000 3000 7000 3500 2500 0000 8000 4800 4500 0000 8000 6500 6000 11500 6500 6000 1000 14000 8000 7500 9000 8000 300 7100 12000 1000 12000 300 7100 4700 2900 2000 8800 6200 3800 4500 11000 8600 5200 13500 10000 1000 4500 11000 13500 10000 12000 12000 12000	8500		
	5	ure 1¼" 1" 30° 30° 3500 3000 7000 6000 9000 8000 10000 10000 10000 10000 13000 12000 14500	4100	2700	1700	900	
	10	10000	9300	7100	4700	Ngie %4" %4" ½" ¾4" ¼4" 10° 10° 10° 400 1100 500 5500 2000 1000 5500 2500 1500 800 4500 1900 5500 6000 3500 000 7500 4500 000 8000 6000 2000 11000 7000 12000 8500 1400 7700 2900 1400 2000 3800 2200 1000 7100 3200 3500 10000 4600 5000 12000 5600 5000 12000 5600 5000 12000 8000	1400
	15	13000	12000	8800	6200		1700
Setpoint 2 psi	25		14500	11000	8600	5200	2400
Cadmium Spring	40			13500	11000	7100	3200
1½ to 3 psi 143-16-021-08	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.

1¹/₄", 1¹/₂" and 2" Model 243-12-1 with External Control Line in SCFH of Natural Gas

(0.6 Specific Gravity - 14.65 psia - 60°F)

	Intel Presume psi 1/4" 1" 54" 54" 10° 10° 10° 10° 10° 10° 12 2200 1900 1600 800 500 1 3600 3200 2300 1300 800 2 5600 4700 3500 2000 1400 5 10600 8200 5700 3500 2200 10 15000 12000 8900 5200 3000 15 19000 16000 12000 6700 4000 25 22000 20000 16000 9000 5200 40 24000 21000 1700 1200 1000 100 1500 1000 13500 1000 13500 125 2000 1700 1500 700 450 1 3100 2600 2000 1100 750 1 3100 2600 3000 1700						
Outlet Pressure and Spring	Inlet Pressure psi	1¼"*	1"	³ ⁄4"	1⁄2"	³ /8"	1⁄4"
		10°	10°	10°	10°	10°	10°
	1⁄2	2200	1900	1600	800	500	
Outet Pressure and Spring Intel Pressure psi 1/1/1*** 1** 1*** 1** 10* 10* 10* 10* 10* 10* 10* 12 2200 1900 1600 800 2000 500 2000 1300 2 5600 4700 3500 2000 5500 5000 500 5000 500 1000 1000 1000 1000 1000 1000 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 1000 1000	1300	850	400				
	2	Intel Pressure psi 1%** 1%* %* </td <td>600</td>	600				
	5		1000				
Setpoint 6" w.c.	10	15000	1" 3/4" 3	1500			
1" w.c. Droop	15	19000	16000	12000	6700	4000	1750
3½" to 6½" w.c.	25	22000	20000	16000	9000	5200	2400
143-16-021-03	40		24000	21000	12000	7500	3200
	60			27000	15500	10000	4400
	80				17000	12000	5700
	143-16-021-03 40 24000 21000 12000 7500 60 27000 15500 10000 80 17000 12000 100 19000 13500 125 15000 15000 1/2 2000 1700 1500 1 3100 2600 2000 1100 750 2 5000 3800 3000 1700 1200 5 7800 6500 5000 3100 2000 10 13000 10000 7000 4800 2900 10 13000 10000 7000 4800 2900 10 13000 10000 7000 4800 2900 11 w.c. Droop Blue Spring 25 2000 17000 13500 8500 5200	13500	7000				
	125			A A A A 10° 10° 10° 10° 1600 800 500 2300 1300 850 400 3500 2000 1400 600 5700 3500 2200 1000 8900 5200 3000 1500 12000 6700 4000 1750 16000 9000 5200 2400 21000 12000 7500 3200 27000 15500 10000 4400 17000 12000 5700 3200 1500 700 450 1000 3000 1500 700 450 1000 1000 1500 700 450 1000 1000 1500 700 4800 2900 1500 9400 6400 4000 1750 3200 13500 8500 5200 2400 17000 1500	8000		
	1⁄2	2000	1700	1500	700	450	
	1	3100	2600	2000	1100	750	400
Head Spring 33%** 0.65** w.c. 143-16-021-03 25 22000 20000 16000 9000 52 40 24000 21000 12000 75 60 27000 15500 100 80 17000 122 100 19000 133 125 150 100 125 150 100 12 2000 1700 1500 700 443 1 3100 2600 2000 1100 75 2 5000 3800 3000 1700 12 5 7800 6500 5000 3100 20 10 13000 10000 700 480 29 15 15000 14000 9400 6400 40 25 20000 17000 13500 52 40 21000 17000 1500 100 80 1 17000 122 100 100 <td>1200</td> <td>600</td>	1200	600					
	3100	2000	1000				
	10	13000	10000	7000	4800	2900	1500
1" w.c. Droop	1 3100 2600 2000 1100 2 5000 3800 3000 1700 5 7800 6500 5000 3100 10 13000 10000 7000 4800 .c. Droop 15 15000 14000 9400 6400 8½" w.c. 25 20000 17000 13500 8500 16-021-04 40 21000 17000 11500	4000	1750				
5" to 8½" w.c.	25	20000	17000	13500	8500	5200	2400
143-16-021-04	40		21000	17000	11500	7500	3200
	60			19000	15000	10000	4400
	80	5000 3800 3000 1700 1200 7800 6500 5000 3100 2000 13000 10000 7000 4800 2900 15000 14000 9400 6400 4000 20000 17000 13500 8500 5200 20000 17000 17000 11500 7500 19000 15000 10000 10000 12000 19000 13500 13500 13500 13500	5700				
	Setpoint 7" w.c. 10 10 1" w.c. Droop 15 1 Blue Spring 25 2 5" to 8½" w.c. 25 2 143-16-021-04 40 60 80 100 100				19000	13500	7000
	125				1600 800 500 2300 1300 850 400 3500 2000 1400 600 5700 3500 2200 1000 8900 5200 3000 1500 12000 6700 4000 1750 16000 9000 5200 2400 21000 12000 7500 3200 21000 15500 10000 4400 21000 15500 10000 5700 21000 1500 13500 7000 1500 700 450 200 1500 700 450 400 3000 1700 1200 600 5000 3100 2000 1000 7000 4800 2900 1500 9400 6400 4000 1750 13500 8500 5200 2400 17000 1500 1000 4400 17000 1500 1000 400 19000 1500 1000 350 19000 1000 1000 350 19000 1000 1000 1000 19000 1000 1000 </td <td>8000</td>	8000	
	1	3200	2500	15000 800 15000 700 450 400 2000 1100 750 400 3000 1700 1200 600 5000 3100 2000 100 7000 4800 2900 150 9400 6400 4000 175 13500 8500 5200 240 17000 11500 7500 320 19000 15000 10000 4400 19000 15000 10000 4400 19000 15000 10000 4400 19000 15000 10000 4400 19000 15000 10000 4400 19000 15000 10000 5000 19000 15000 13500 700 19000 1100 700 3500 19000 1300 5500 3200 1000 19000 1300 5500 3000 1000 </td <td>350</td>	350		
	2	5200	4200	3200	1800	1300	550
	5	8500	7200	5200	3200	2000	1000
	10	13500	11000	8000	5000	3000	1500
Setpoint 11" w.c.	15	16000	14000	11000	6500	4000	1750
Green Spring	25	20000	17000	900 1600 800 500 2200 2300 1300 850 400 700 3500 2000 1400 600 2200 5700 3500 2200 1000 2000 8900 5200 3000 1500 6000 12000 6700 4000 1750 0000 16000 9000 5200 2400 4000 21000 12000 7500 3200 4000 21000 15500 10000 4400 17000 13500 700 450 700 700 1500 700 450 700 6600 2000 1100 750 400 6800 3000 1700 1200 600 1500 5000 3100 2000 1500 1000 13500 5200 2400 1500 1000 1700 1500 1000 4400	2400		
6" to 14" w.c. 143-16-021-05	40		2.00 2.00 1.00 850 400 4700 3500 2000 1400 600 8200 5700 3500 2200 1000 12000 8900 5200 3000 1500 16000 12000 6700 4000 1750 20000 16000 9000 5200 2400 24000 21000 12000 7500 3200 24000 21000 12000 7500 3200 24000 27000 15500 10000 4400 1700 1500 700 450 700 1700 1500 700 450 700 1700 1500 3000 1700 1200 600 6500 5000 3100 2000 1000 1500 14000 9400 6400 4000 1750 3200 14000 1900 1500 10000 4400 3500 7000	3200			
	80 17000 12000 100 19000 13500 125 15000 1 3100 2600 2000 1100 750 2 5000 3800 3000 1700 1200 5 7800 6500 5000 3100 2000 10 13000 10000 7000 4800 2900 10 13000 10000 7000 4800 2900 "w.c. 15 15000 14000 9400 6400 4000 "w.c. 15 15000 17000 13500 8500 5200 21.04 40 21000 17000 11500 7500 60 19000 15000 10000 13500 13500 10 3200 2500 1900 1100 700 22 5200 4200 3200 1800 1300 10 13500 14000 1100 650	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.

1¹/₄", 1¹/₂" 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)

				Orifice Size ar	d Valve Angle		
Outlet Pressure and Spring	Inlet Pressure psi	1¼"*	1"	3/4"	1⁄2"	3/8"	1⁄4"
		10°	10°	10°	10°	Angle ½" ¾" ¼" 10° 10° 10° 900 600 300 1500 1000 500 2700 1600 950 4200 2800 1500 5800 3800 1750 3000 5000 2400 1000 7000 3200 5000 9800 4400 7000 12000 5700 9000 13500 7000 1300 850 500 2600 1600 950 4000 2800 1500 2600 1600 950 4000 2800 1500 5000 9800 4400 7500 5000 2400 5000 7000 3200 5000 9800 4400 7000 12000 5700 9000 13500 7000 2000 1900 850 4500 2900 1400 5000	
	1	2400	2000	1200	900	600	300
	Pressure of psile Intel Pressure of 114" 1" 3" 3" 3" 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 2 4200 3200 2000 1500 1000 1000 5 6500 5500 4100 2700 1600 5 6500 11000 8000 6800 3800 5 18000 15000 11500 8000 5000 7000 21000 15000 11000 9800 12000 100 1200 15000 11000 13500 12000 13500 125 120 1000 6500 5800 400 2600 1600 126 120 1600 1600 7600 5400 3800 125 1600	1000	500				
		950					
	10	Image: Section of the state and vertices Section of the state and vertices 1%** 1%** 3/** 3/** 1/** 10* 10* 10* 10* 10* 10* 10* 2400 2000 1200 900 6600 300 4200 3200 2000 1500 1000 500 6500 5500 4100 2700 1600 950 11000 8000 6200 4200 2800 1500 14500 11000 8000 5800 3800 1750 18000 15000 11500 8000 5000 2400 21000 15000 11000 7000 3200 10000 15000 15000 13500 7000 3500 2900 1700 1300 850 500 10500 8500 5800 4000 2600 1500 10500 16500 7600 5400 3800 1750	1500				
Setpoint 18" w.c.	15		3800	1750			
Orange Spring	25	18000	15000	11500	8000	5000	2400
12 to 28 w.c. 143-16-021-06	40		21000	15000	11000	7000	3200
	60			20000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
	2	3500	2900	1700	1300	850	500
Setpoint 1 psi 0.2 psi Droop Black Spring	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
1 to 2 psi	40		20000	15000	10500	7000	3200
143-16-021-0 <i>1</i>	60			20000	15000	9800	4400
	80				17000	12000	5700
	100				19000	13500	7000
	125					15000	8000
	5	8600	6800	5300	2700	1900	850
	10	13000	10500	7500	4500	2900	1400
	15	17500	13500	10500	6000	3800	1750
Setpoint 2 psi	25	25000	20000	14000	8500	5000	2400
Cadmium Spring	40		25000	20000	12000	7000	3200
143-16-021-08	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 70°F flowing temperature.

Changes in performance can occur at extreme low flowing temperatures.

11/2" and 2" Model 243-8-1 and 243-8-2 in SCFH of Natural Gas (0.6 Specific Gravity - 14.65 psia - 60°F)

	And pail Here pail Here 30° Office Size and Valve Argie 1° %° %° %° %° 30° 10° 10° 10° 10° 30° 10° 10° 10° 10° 1 1950 1600 1050 750 350 2 3200 2400 1550 1000 550 5 5200 3900 2700 1800 350 10 7400 5800 4500 3000 1350 115 9100 7100 5800 2000 7100 3200 400 1050 9200 7100 3200 4400 500 500 4200 100 1000 750 650 400 500 300 1500 700 500 300 150 300 150 300 150 300 150 300 150 300 150 300 150 300 150						
Outlet Pressure and Spring		1"	3/4"	1⁄2"	³ /8"	1⁄4"	0.207"
		30°	10°	10°	10°	¼" 0.2 10° 1 350 3 550 3 950 5 1350 9 1700 11 2400 15 3200 21 4400 25 5600 37 7000 45 8000 56 3200 21 4400 25 300 31 7700 45 300 31 770 5 1250 9 1700 11 2400 15 3200 21 4400 25 5600 37 7000 45 3200 21 4400 25 3200 21 3200 31 900 6 13200 31 900 6 3200 21 <th>10°</th>	10°
	1⁄2	1100	900	700	500		
Outlet Pressure and Spring Intel Pressure psi 1" %" %" %" 30° 10° 10° 10° 10° 10° 10° 12 1100 900 700 500 10° 10° 10° 2 3200 2400 1550 1000 5 500 9100 700 500 10 7400 5800 4500 9000 7100 5800 3800 11 15 9100 7100 5800 3800 1000 100 100 1000	750	350					
	550	350					
	Pressure Spring Intel Pressure psi 1* 5e* 6e* 5e* 5e* 12 1100 900 700 500 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 10° 100 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 55 5200 3900 2700 1900 950 155 9100 7100 5800 3800 170 500 240 440 10500 9200 7100 320 440 60 11000 9300 440 60 11000 100	950	550				
Setpoint 6" w.c.	10	1* ½* ½* ¾* ¾* ¾* 30° 10° 10° 10° 10° 10° 1100 900 700 500 10° 1950 1600 10550 750 350 3200 2400 1550 1000 550 5200 3900 2700 1900 950 7400 5800 4500 3000 1350 9100 7100 5800 3800 1700 12500 8700 7200 5100 2400 10500 9200 7100 3200 4400 11000 9300 4400 10500 5600 1000 750 650 400 1000 700 1000 750 650 400 1000 700 2700 1800 1350 950 450 4800 3500 2350 1600 770 7000 5400	900				
1" w.c. Droop	15	9100	7100	パ" パ" 0.207" 10° 10° 10° 10° 700 500 550 350 1050 750 350 550 1550 1000 550 350 2700 1900 950 550 4500 3000 1350 900 5800 3800 1700 1150 7200 5100 2400 1500 9200 7100 3200 2100 11000 9300 4400 2900 1150 10500 5600 3700 11000 7000 4500 350 1150 10500 5600 3700 11500 650 300 350 1350 950 450 350 1350 950 1250 900 5000 3500 1700 1150 6600 5100 2400 1500 9000 7100	1150		
3½" to 6½" w.c.	25	12500	8700	7200	5100	2400	1500
143-82-021-00	40		10500	9200	7100	3200	2100
	60			11000	9300	4400	2900
	80		10500 9200 7100 3200 2100 11000 9300 4400 2900 11500 10500 5600 3700 11000 7000 4500 8000 5600 1000 750 650 400 5600 5600 1000 750 650 400 5600 5600 1000 750 650 400 5600 5600 1000 750 650 400 5600 5600 5600 1000 750 650 400 5600 5600 5600 5600 1000 750 650 400 500 500 500 500 2700 1800 1350 950 450 3500 500 700 500 7000 5400 3900 2500 1250 900 500	3700			
	60 11000 9300 4400 80 11500 10500 5600 100 11000 7000 1000 7000 125 8000 100 100 7000 125 8000 1150 900 650 300 12 1000 750 650 400 10 1 1600 1150 900 650 300 2 2700 1800 1350 950 450 5 4800 3500 2350 1600 770 10 7000 5400 3900 2500 1250 15 9100 7000 5000 3500 1700	7000	4500				
	125			x² x² x² x² x² 0.207 10° 10° 10° 10° 10° 10° 700 500 350 350 350 1550 1000 550 350 2700 1900 950 550 4500 3000 1350 900 5800 3800 1700 1150 7200 5100 2400 1500 9200 7100 3200 2100 11000 9300 4400 2900 1150 10500 5600 3700 11000 9300 4500 350 1350 950 450 350 2350 1600 770 500 3900 2500 1250 900 5000 3500 1700 1500 6600 5100 2400 1500 1000 9300 4400 2900 11000	5600		
	1/2	1000	750	650	400		
	1	1600	1150	900	650	300	
Setpoint 6" w.c. 10 7400 1" w.c. Droop 15 9100 Red-Black Spring 25 12500 3½" to 6½" w.c. 40 60 40 60 60 100 100 100 125 100 100 102 1000 100 125 12500 143-82-021-01 Setpoint 7" w.c. 1 1600 1 1600 2 Setpoint 7" w.c. 15 9100 Setpoint 7" w.c. 15 9100 10 7000 15 11 1600 25 12500 143-82-021-01 40 60 80 100 10 125 12500 100 125 1250 125 1 1650 2 2700 5 100 100 125 100 125 143-80 100 100	2	2700	1800	1350	950	450	350
	3500	2350	1600	770	500		
	10	7000	5400	3900	2500	1250	900
1" w.c. Droop	1 1600 1150 900 650 3 2 2700 1800 1350 950 4 5 4800 3500 2350 1600 7 10 7000 5400 3900 2500 1 spring w.c. 15 9100 7000 5000 3500 1 40 10500 9000 7100 3	1700	1150				
5" to 81/2" w.c.	25	12500	8700	650 400 900 650 300 1350 950 450 350 2350 1600 770 500 3900 2500 1250 900 5000 3500 1700 1150 6600 5100 2400 1500 9000 7100 3200 2100 11000 9300 4400 2900	1500		
143-82-021-01	40		10500	9000	7100	3200	2100
	60			11500 10500 5600 3700 11000 7000 4500 1100 7000 5600 750 650 400 1150 900 650 300 1800 1350 950 450 350 3500 2350 1600 770 500 5400 3900 2500 1250 900 7000 5000 3500 1700 1150 8700 6600 5100 2400 1500 10500 9000 7100 3200 2100 10500 9300 4400 2900 11500 10500 5600 3700 11500 10500 5600 3700 11500 10500 5600 3700 1150 1000 650 300 5600 1150 1000 650 300 5600 1150 1000 650 300 5600	2900		
	80		2700 1800 1350 950 450 35 4800 3500 2350 1600 770 50 7000 5400 3900 2500 1250 90 9100 7000 5000 3500 1700 11 12500 8700 6600 5100 2400 15 10500 9000 7100 3200 21 11000 9300 4400 29 11500 10500 5600 37 11000 7000 4400 29	3700			
	Serpoint / w.c. 15 9100 7000 5000 3500 7 1" w.c. Droop 15 9100 7000 5000 3500 7 Blue-Black Spring 25 12500 8700 6600 5100 2 143-82-021-01 40 10500 9000 7100 3 60 110500 9000 11000 9300 4 100 11000 11000 11000 3	7000	4500				
	125				10005503501900950550300013509003800700115051002400150071003200210093004400290010500560037001100070045006503005600950450350160077050025001250900350017001150510024001500710032002100930044002900105005600370011000700450065030010010500560037001100070004500650300100110004503501100013009001050024001500710032002100100045035010004503501000450350100010010010002400150010002400150010002400150010500560037001050056003700105005600370010500560037001050056003700105005600370010500560037001050056003700105005600370		
	1	1650	1150	1000	650	300	
	2	2700	2000	1400	1000	450	350
Setpoint 7" w.c. 1" w.c. Droop Blue-Black Spring 5" to 8½" w.c. 143-82-021-01	5	4800	3800	2600	1750	900	600
	10	7000	5400	4200	2800	1300	900
Setpoint 11" w.c.	15	9000	7400	5500	3600	1700	1100
Green-Black Spring	2 3200 2400 1550 1000 550 5 5200 3900 2700 1900 950 10 7400 5800 4500 3000 1350 15 9100 7100 5800 3800 1700 25 12500 8700 7200 6100 2400 40 10500 9200 7100 3200 60 11000 9300 4400 10500 5600 100 1000 11000 7000 5600 400 125 2700 1800 1350 950 450 2 2700 1800 1350 950 450 5 4800 3500 2350 1600 770 10 7000 5400 3900 2500 1250 15 9100 7000 5000 3000 1400 100 7000 5000 1100 7000 500<	1500					
6" to 14" w.c. 143-82-021-02	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.

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

				Orifice Size ar	nd Valve Angle		
Outlet Pressure and Spring	Inlet Pressure psi	1"	3/4"	1⁄2"	³ /8"	1⁄4"	0.207"
		30°	10°	10°	¾" ¾" 0.207" 10° 10° 10° 550 10° 900 450 350 900 450 350 1350 850 600 2400 1300 850 3400 1700 1050 5100 2400 1500 7100 3200 2100 9400 4400 2900 10500 5600 3700 10500 5600 3700 1000 7000 4500 1000 500 200 1200 500 200 3000 1500 200 4000 1850 200 10500 6000 200 11500 6000 200 11500 6000 200 11500 6000 200 12500 7000 300 1300 850 550 2200 1300<	10°	
	1	1500	1100	800	550		
Outlet Pressure and Spring Intel Pressure psi 1 10°	2	2100	1700	1300	900	450	350
	850	600					
	inter Pressure ing inter Pressure pel inter Net 30° int ^o <th< td=""><td>850</td></th<>	850					
Setpoint 18" w.c.		1700	1050				
Green Spring	25	11500	9100	7100	5100	2400	1500
12 to 28 w.c. 143-16-021-05	40		11000	9300	7100	3200	2100
	60			11000	9400	4400	2900
	80			12000	10500	5600	3700
	100				11000	7000	4500
	125					8000	5600
	2	4000	3500	1800 1200		500	
Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c.	5	6000	5000	3500	2200	1000	
	10	7500	7000	5000	3000	1500	
	15	9000	8000	6500	4000	1850	
	25	12000	10000	8000	5000	2000	
12" to 28" w.c.	40		12500	9500	7000	3000	
143-16-021-05	60			11500	9500	4500	
	125 2 4000 5 6000 10 7500 15 9000 0.31 psi Droop Green Spring 12" to 28" w.c. 25 12000 40 40 40 143-16-021-05 60 80 100 125 1200 22 2100 2100		12500	11500	6000		
	100				12500	7000	
	125	10 10 10 10 1500 1100 800 550 2100 1700 1300 900 4500 3400 2000 1350 6600 5700 3500 2400 8800 7100 5000 3400 11500 9100 7100 5100 11000 9300 7100 1000 11000 9300 7100 1000 11000 9300 7100 1000 1000 1000 9300 7100 1000 1000 3500 2200 7500 7000 5000 3000 9000 8000 6500 4000 12000 10000 8000 5000 12000 1000 8000 5000 12500 1500 12500 1500 12500 12500 1300 6500 4000 3200 2100 1300	8000	_			
	2	2100	1650	1200	850	450	
	5	4000	3200	2100	1300	850	550
	10	6500	5200	3100	2200	1300	800
Setpoint 1 psi	15	8400	6500	4400	3000	1700	1000
0.2 psi Droop Orange Spring	25	11000	8600	6500	4400	2400	1500
1 to 2 psi	40		11000	8600	6700	3200	2100
143-10-021-00	60			10500	9000	4400	2900
	80	1 1500 1100 800 550 2 2100 1700 1300 900 450 3 5 4500 3400 2000 1350 850 6 10 6600 5700 3500 2400 1300 8 15 8800 7100 5000 3400 1700 11 26 11500 9100 7100 5100 2400 12 40 11000 9300 7100 3200 2 60 1 11000 9300 7100 3200 2 60 1 11000 9300 7100 3200 2 800 1 1000 9400 4400 22 800 500 12000 10500 5600 33 100 7500 5000 3500 2200 1000 4400 15 9000 8000 6500 4000 1850 450 15 9000 8000 500 7000 3000	3700				
	100				11000	7000	4500
	1 1500 2 2100 5 4500 10 6600 15 8800 en Spring 25 11500 100 600 100 123" w.c. 40 60 80 100 125 1100 7500 15 15 9000 10 15 9000 10 15 9000 10 15 9000 10 15 9000 10 16-021-05 60 10 16-021-05 60 10 125 12000 12 16-021-05 60 10 125 100 125 100 125 100 15 8400 10 16-021-05 60 10 15 8400 10 16-021-05 60 10 16-021-05 60 10				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.

11/2" 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 Prespin 5 5 10 15 5 10 15 25 0.35 psi Droop 40 2 to 4¼ psi 60 143-16-021-07 60 100 125 5 100 100 100 125 5 0.6 psi Droop 10 15 25 0.6 psi Droop 15 13 25 0.6 psi Droop 25 143-16-021-07 60 143-16-021-07 60		Orifice Size and Valve Angle									
Outlet Pressure and Spring	Inlet Pressure	1"	³ /4"	1/2"	³ ⁄8"	%/// 1/4" 10° 10° 1100 900 1500 1000 2000 1400 3100 1800 4200 2200 6500 3000 8500 5000 9000 6000 2400 1300 3400 1700 5000 2400 9300 4400 11000 5600 12000 7000	0.207"				
opg		30°	10°	10°	10°	10°	10°				
	5	Orifice Size and Valve Angle 1" $3/4$ " $1/4$ " $3/4$ " 30° 10° 10° 10° 3000 1800 1200 1100 4000 2500 1800 1500 5200 4000 2850 2000 5200 4000 2850 2000 7000 5200 3600 3100 9000 5000 4200 8300 6500 10000 8500 9000 9000 9000 4400 3400 2400 1600 7100 5900 3600 2400 9600 7500 4800 3400 12500 10500 6500 5000 12500 13000 9600 7000 13500 11000 12000 12000	900								
Outlet Pressure and Spring Inlet Pressure psi 1" 30° 30° 30° 30° 5 3000 10 4000 15 5200 Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi 25 7000 40 25 7000 143-16-021-07 60 400 100 125 1250 Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi 10 7100 15 9600 15 10 7100 15 9600 Setpoint 3 psi 0.6 psi Droop Black Spring 2 to 4¼ psi 25 12500 0 143-16-021-07 60 100 100 100 143-16-021-07 60 100 100 100 100 125	2500	1800	1500	1000							
	15	5200	4000	½" ¾" ¼" 0.207" 10° 10° 10° 10° 10° 0 1200 1100 900 1000 1000 0 1800 1500 10							
Setpoint 3 psi	25	7000	5200	3600	¾" ¼" 0.207" 10° 10° 10° 1100 900 10° 1500 1000 2000 2000 1400 200 3100 1800 200 4200 2200 200 6500 3000 200 8500 5000 9000 6000 8000 200 1600 800 200 3400 1700 1000 5000 2400 1500 3000 4400 2900 11000 5600 3700 12000 7000 4500						
Black Spring	40		9000	5000	4200	2200					
2 to 4 ¼ psi 143-16-021-07	60			8300	6500	3000					
	80			8300 6500 3000 10000 8500 5000 9000 6000 8000							
80 100 125		9000	6000								
	125			½" ¾" ¼" 0.207" 10° 10° 10° 10° 10° 1200 1100 900 10° 10° 1800 1500 1000 900 10° 2850 2000 1400 200 200 3600 3100 1800 200 200 5000 4200 2200 200 200 8300 6500 3000 200 200 10000 8500 5000 200 200 2400 1600 800 750 3600 750 4800 3400 1700 1000 6500 2100 6500 5000 2400 1500 900 2100 9600 7000 3200 2100 1000 1000 12500 9300 4400 2900 3700 3700 13500 11000 5600 3700 4500 8000 56							
	Inlet Pressure psi 1" 30° 30° 5 3000 10 4000 15 5200 25 7000 40 - 60 - 80 - 100 7000 125 - 5 4400 100 7100 125 12500 40 - 60 - 10 7100 15 9600 25 12500 40 - 60 - 80 - 100 - 100 - 100 - 100 - 100 - 100 - 125 -	3400	2400	1600	800						
	10	7100	5900	3600	½" ¾" ¾" 10° 10° 10° 1200 1100 900 1800 1500 1000 2850 2000 1400 3600 3100 1800 5000 4200 2200 8300 6500 3000 10000 8500 5000 9000 6000 800 2400 1600 800 3600 2400 1300 4800 3400 1700 6500 5000 2400 12500 9300 4400 13500 11000 5600 12000 7000 8000	750					
	15	9600	7500	4800	3400	Argie ¼" 0.207" 0° 10° 10° 00 900 10° 00 900 10° 00 1000 100° 00 1000 100° 100 1400 10° 100 1800 200 200 2200 200 200 200 200 200 5000 3000 300 6000 300 400 1300 750 400 1700 1000 000 2400 1500 300 4400 2900 000 5600 3700 000 7000 4500	1000				
Setpoint 3 psi	25	12500	10500	6500	5000	2400	1500				
Black Spring	40		13000	9600	7000	3200	2100				
2 to 4¼ psi 143-16-021-07	60			12500	9300	4400	2900				
	80			13500	11000	5600	3700				
	100				12000	7000	4500				
	Spring psi					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.

Model 243 Capacity Tables 1¹/₄" 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	Outlet Pressure			Orific	Orifice Size and Valve Angle ½" ¾" ½ 10° 10° 1 700 500 3 1050 750 3 1500 1000 5 2200 1900 9 2900 2650 13 3600 2700 17 3800 3300 24 4100 3800 3300 24 4100 3800 3300 24 5600 5600 560 560 650 400 44 5600 2500 34 1900 1600 7 2600 2200 12 3100 2500 26 2600 2600 30 3100 2500 32 4600 4400 440 5600 5600 56 1000 6500 32 1350 10000 44 <th< th=""><th>Angle</th><th></th></th<>	Angle	
and Spring	and Spring	Inlet Pressure psi	3/4"	1⁄2"	³ /8"	%" ¼" 10° 10° 500 350 750 350 1000 550 1900 950 2650 1350 2700 1700 3300 2400 3800 3200 4400 4400 5600 5600 6000 6000 6000 6000 6000 300 950 450 1600 770 2200 1250 3300 2400 3300 2400 3300 2400 3300 2400 3300 2400 3800 3200 4400 450 1000 450 1000 450 1750 800 2450 1300 2450 1300 2450 1300 2450 1300 2450 1300<	0.207"
243-12	243-0		10°	10°	10°	10°	10°
		1⁄2	900	700	500		
		Sure g Intel Pressure psi N." N." N." N." 10° 10° 10° 10° 10° 10° 12 900 700 500 1 1 1600 1050 750 350 2 2250 1500 1000 550 5 2500 2200 1900 950 10 3100 2900 2650 1350 15 3550 3600 2700 1700 160 4200 3800 3300 2400 40 4200 4100 3800 3200 60 4800 4400 4400 4400 80 5600 5600 5600 5600 100 200 2660 4200 1250 11 1150 900 650 3000 21 750 650 400 400 20 3600 3300 2400	350				
		2	2250	½ ¼ ¾ ¼ ¼ ½ 10 100 100 100 100 100 100 1000	350		
		5	2500	2200	½" ¾" ¼" 0.207" 10° 10° 10° 10° 10° 500 10° 10° 1050 750 350 350 1250 1000 550 350 2200 1900 950 550 2900 2650 1350 900 3600 2700 1700 1050 3800 3300 2400 1500 4100 3800 3200 2100 4800 4400 4400 2900 5600 5600 5600 3700 6000 6000 6000 4500 1300 950 450 350 1900 650 300 2100 1300 950 450 350 1900 650 300 2100 3600 3300 2400 1500 3600 3300 2400 350 4600 <	550	
Setpoint 6" w.c.	Setpoint 6" w.c.	10	3100	2900		900	
1" w.c. Droop Red Spring	1" w.c. Droop Red-Black Spring	15	3550	3600	2700	¼"0.207"10°10°10°10°35035055035095055013509001350900170010502400150032002100600035006000560030035077050012509001250900125090012509001250900125090012509001250900100105030021001003500300550030055001300900100100100100100100100240010010030055030021001001001002400100300100100100300100300100300100100100300100100100300100100100100100100100300100100100300100100100100100100100100100100100100100100100100 <td>1050</td>	1050
3½" to 6" w.c.	3½" to 6½" w.c.	25	4200	3800	3300	2400	1500
143-10-021-03	143-02-021-00	40	4200	4100	3800	3200	2100
		60		4800	4400	4400	2900
		80		5600	5600	5600	3700
		100			6000	6000	4500
		125				6000	5600
		1⁄2	750	650	400		
		1	1150	900	650	300	
		2	1700	1300	950	450	350
		5	2300	1900	1600	770	500
Setpoint 7" w.c.	Setpoint 7" w.c.	10	2900	2600	2200	1250	900
1" w.c. Droop	1" w.c. Droop	15	3500	3100	2500	10° 10° 0 350 0 550 0 950 0 1350 0 950 0 1350 0 1350 0 1050 0 1700 0 2400 0 3200 0 3200 0 3200 0 5600 0 5600 0 5600 0 300 0 450 350 900 0 300 0 770 500 350 0 770 0 3200 10 1050 10 2400 10 3200 10 3200 10 4400 2900 100 10 300 10 4500 500 300	1050
5" to 8½" w.c.	5" to 8½" w.c.	25	4200	3600	3300	2400	1500
143-16-021-04	143-82-021-01	40	4800	4000	3800	3200	2100
		60		4600	4400	4400	2900
		80		5600	5600	5600	3700
		100			6000	10° 10° 350 350 550 350 950 550 1350 900 1350 900 1350 900 2400 1500 2400 2900 3200 2100 4400 2900 5600 3700 6000 4500 6000 5600 300 350 770 500 1250 900 1250 900 1250 900 1050 2400 1500 3700 4400 2900 5600 3700 4400 2900 5600 3700 4400 2900 5600 3700 1000 550 300 550 1300 900 1700 1100 2400 1500 3200 2100	
		125				6000	5600
		1	1150	1000	650	300	
		2	1850	1350	1000	450	350
		5	2500	2200	1750	800	550
		10	2900	2700	2450	1300	900
Setpoint 11" w.c.	Setpoint 11" w.c.	15	3700	3950	2600	1700	1100
Green Spring	Green-Black Spring	25	4250	4000	3300	2400	1500
143-16-021-05	143-82-021-02	40	5300	4200	3800	3200	2100
		60		4850	4400	Valve Angle V/" 0.207 10° 10° 10° 0 350 350 0 550 350 0 550 350 0 550 350 0 950 550 0 1700 1050 0 2400 1500 0 2400 1500 0 2400 2900 0 300 200 0 5600 3700 0 300 5600 0 450 350 0 770 500 0 450 350 0 770 500 0 300 200 0 450 350 0 2400 1500 0 300 200 0 450 350 0 4400 2900 0 300 500	2900
		80		700 500 1050 750 350 1500 1000 550 33 2200 1900 950 53 2900 2650 1350 99 3600 2700 1700 100 3800 3300 2400 15 4100 3800 3200 21 4800 4400 4400 29 5600 5600 5600 37 6000 6000 45 6000 45 6000 650 300 33 90 56 700 1600 770 50 33 90 56 900 650 300 33 90 350 33 1300 950 450 33 330 2400 100 3600 3300 2400 15 34 90 150 37 4600 4400 4400 29 5600 360 37 6000 5600 5600 300 32 <td>3700</td>	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 30° and 11/4" x 30° orifice and valve angle are available on the 11/4" 243-12-1 and 243-12-2 models.

NOTE: The performance data is based on normal testing at 70°F flowing temperature.

Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables 1¹/₄" 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	Outlet Pressure			Orific	e Size and Valve	Angle	
and Spring	and Spring	Inlet Pressure psi	3⁄4"	1⁄2"	3/8 ''	1⁄4"	0.207"
243-12	243-8		10°	10°	10°	10°	10°
		1	1100	800	500		
Setpoint 18" w.c. 3" w.c. Droop 3" w.c. Droop 5 2250 10 2950 10 2950 12" to 28" w.c. 15 3450 3450 12" to 28" w.c. 143-16-021-05 4400 5300 60 100 25 4400 5300 60	1250	900	450	350			
		Multi Pressure and Spring 243-8 Inlet Pressure psi N." N." N." N." N." 0.207 10° <td>550</td>	550				
		10	2950	½" ¾" ¾" ½" 0.207" 10° 10° 10° 10° 10° 800 500 350 350 1250 900 450 350 1700 1350 750 550 2250 2100 1300 850 3600 2450 1700 1050 3750 3300 2400 1500 4100 3800 3200 2100 4800 4400 4400 2900 4850 5600 5600 3700 4850 5600 5600 3700 4850 5600 5600 3700 400 3000 1000 1000 3000 2000 1000 1000 4000 3000 1500 100 4000 3000 5100 200 6400 4500 2200 100 8500 6500 500 500			
Setpoint 18" w.c.	Setpoint 18" w.c.	15	3450	3600	%" ¼" 0.207" 10° 10° 10° 500 350 900 450 350 1350 750 550 2100 1300 850 2450 1700 1050 3300 2400 1500 3800 3200 2100 4400 4400 2900 5600 5600 3700 6000 7000 4500 2000 1000 5600 1200 500 5600 3000 1500 500 3000 1500 500 3000 1500 500 3000 5100 500 4500 2200 500 8500 6500 500 8500 6500 500 1350 750 500 1350 750 500 1950 1300 800 2050 1700		
Orange Spring	Green Spring	25	4400	3750	3300	2400	1500
12" to 28" w.c. 143-16-021-06	12" to 28" w.c. 143-16-021-05	40	5300	4100	3800	3200	2100
		60		4800	4400	4400	2900
		80		4850	5600	5600	3700
		100			6000	7000	4500
		125				8000	5600
		2	3000	1800	1200	500	
		5	4000	3000	2000	1000	
		10	5000	4000	3000	1500	
Setpoint 1 psi	Setnoint 1 nsi	15	6000	5100	3900	1900	
0.31 psi Droop	0.31 psi Droop	25	7500	6400	4500	2200	
12" to 28" w.c.	12" to 28" w.c.	40	4850 5600 5600 6000 7000 8000 8000 3000 1800 1200 500 4000 3000 2000 1000 5000 4000 3000 1500 6000 5100 3900 1900 7500 6400 4500 2200 8000 7400 6100 2600 8000 7350 4000 8500 8000 5100 8500 6500 7000	2600			
143-16-021-06	143-16-021-05	60		8000	7350	4000	
		80		8500	8000	5100	
		100	111 1100 <th1< td=""><td></td></th1<>				
		125				7000	
		2	1850	1150	850	450	
		5	2100	1700	1350	750	500
		10	2700	2000	1950	1300	800
Setpoint 1 psi	Setpoint 1 psi	15	3150	3100	2050	1700	1000
0.2 psi Droop	0.2 psi Droop	25	4150	3250	2850	2400	1500
1 to 2 psi	1 to 2 psi	40	5300	3800	3600	3200	2100
14 <i>3</i> -16-021-0 <i>1</i>	143-10-021-06	60		4600	4250	4400	2900
		80		½" ¾" ¾" ¾" 0.207 10° 10° 10° 10° 10° 10° 800 500 550 350 1250 900 450 350 1250 900 450 350 550 2250 2100 1300 850 3600 2450 1700 1050 3750 3300 2400 1500 4100 3800 3200 2100 4800 4400 2900 4800 4400 4400 2900 4500 3700 4850 5600 5600 3700 4500 3000 3700 4850 5600 7000 4500 3000 5600 3700 1800 1200 500 3000 1000 3000 1500 3000 5600 3000 5600 300 3000 500 300 300 500 300 300 300 300 300 300 <	3700		
		100	A A A A A A 10° 10° 10° 10° 10° 10° 1 1100 800 500 1 2 1900 1250 900 450 5 2250 1700 1350 750 10 2950 2250 2100 1300 15 3450 3600 2450 1700 25 4400 3750 3300 2400 40 5300 4100 3800 3200 60 4800 4400 4400 800 4850 5600 5600 00 6000 7000 25 8000 2 3000 1800 1200 500 5 4000 3000 2000 1000 15 6000 5100 3900 1900 25 7500 6400 4500 200 600 74	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 30° and 11/4" x 30° orifice and valve angle are available on the 11/4" 243-12-1 and 243-12-2 models.

NOTE: The performance data is based on normal testing at 70°F flowing temperature.

Changes in performance can occur at extreme low flowing temperatures.

Model 243 Capacity Tables 1¹/₄" 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	Outlet Pressure			Orific	e Size and Valve	Angle	
and Spring	and Spring	Inlet Pressure psi	³ /4"	1⁄2"	³ ⁄8"	Number of the second	0.207"
243-12	243-8		10°	10°	10°	10°	10°
		5	1200	1000	800	500	
Setpoint 3 psi 0.35 psi Droop Cadmium Spring 1½ to 3 psi 143-16-021-08		10	2000	1800	1400	1000	
		Pressure Spring 243-8 Inlet Pressure psi χ'' χ''' χ''' χ''' χ''' χ''' χ'''' $\chi''''''''''''''''''''''''''''''''''''$					
Setpoint 3 psi	Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 41⁄c psi	25	Orifice Size and Valve Angle ½" ½" ½" ½" 0.207" 10° 10° 10° 10° 10° 10° 1200 1000 800 500				
Cadmium Spring		40	6300	10° 10° 10° 10° 10° 200 1000 800 500 200 1800 1400 1000 300 2800 1800 1400 700 3300 2300 1650 300 4900 2800 2000 5800 5000 2800 2000 6500 6400 4600 4600 6500 6400 4750 5000 200 1950 1650 700 200 1950 1650 700 200 3400 2350 1700 1000 300 3400 3250 2400 1500 300 4300 3700 3200 2100			
1½ to 3 psi 143-16-021-08	2 to 4¼ psi 143-16-021-07	60					
		80					
		100	80 6500 6400 4600 100 6500 4750 125 5000				
		125				5000	
		5	2200	1950	1650	700	
	3 Black Spring 2 to 4¼ psi 143-16-021-07 Setpoint 3 psi 0.6 psi Droop Black Spring	10	3600	2300	2150	1300	750
		15	3800	3400	10° 10° 10° 10° 1000 800 500 10° 1800 1400 1000 2800 1400 2800 1800 1400 1000 2800 2800 3300 2300 1650 4900 2800 2000 5800 5800 5800 5800 2800		
Setpoint 3 psi	Setpoint 3 psi	25	5000	3900	3250	2400	1500
Cadmium Spring	Black Spring	40	6300	4300	3700	3200	2100
1½ to 3 psi 143-16-021-08	2 to 4 ¼ psi 143-16-021-07	60		5500	4400	4400	2900
		80		5500	5850	5600	3700
		100			6550	7000	4500
		psi 10° 5 1200 10 2000 11 2000 15 3300 25 4700 40 6300 60 80 1000 125 25 2200 10 3600 15 3800 25 5000 40 6300 60 6300 10 3600 15 3800 25 5000 40 6300 60 80 100 125 100 125			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 30° and 1¼" x 30° orifice and valve angle are available on the 1¼" 243-12-1 and 243-12-2 models.

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

				Orifice Size ar	d Valve Angle		
Outlet Pressure and Spring	Inlet Pressure psi	1"	3⁄4"	3/4"	1⁄2"	3/8"	1⁄4"
		30°	30°	10°	10°	%" ¼" 10° 10° 600 500 950 500 1400 900 2400 1400 3800 1700 5600 2400 7400 3400 10000 4600 11000 5600 12000 7000 1000 500 1000 500 1000 500 1000 500 1000 1000 3000 1500 1000 2500 1000 3200 1000 4600 1000 900 1000 4600 13800 6100 13800 6100 1300 900 2200 1400 3100 1700 4800 2400 7000 3400 9500 4600 10500 5600 10500	10°
	1	1500	1200	1100	800	600	
Outlet Pressure and Spring Intel Pressure pil 1 100 100 100 100 1 1500 1200 1100 800 600 2 2400 1800 1700 1250 950 5 5500 3700 3600 2300 1400 10 9400 8400 6000 3700 2400 5 5500 12000 1100 800 6600 3800 11 12000 12000 1100 800 6600 3800 5600 3800 10000 1000 1000 10000 1000 10000 10000 10000 100 10	1700	1250	950	500			
	1400	900					
	Image region 1° $\frac{1}{2}$	1400					
Setpoint 18" w.c.	15	12000	12000	¾" ¾" ¾" ¾" 30° 10° 10° 10° 10° 1200 1100 800 600 1800 1700 1250 950 500 3700 3500 2300 1400 900 8400 6000 3700 2400 1400 12000 8100 5600 3800 1700 17500 10000 8200 5600 2400 20000 12000 11500 7400 3400 20000 1200 11500 7400 3600 10000 8200 5600 2400 3600 1000 10000 11000 5600 3600 3600 1000 10000 4000 1000 5600 3000 1000 12800 10000 5500 3000 1500 3000 1500 14000 13900 7750 4500 1800 6100 14	1700		
Green Spring	25	14500	17500	10000	8200	5600	2400
12" to 28" W.C. 143-16-021-05	40		20000	12000	11500	7400	3400
	60				13500	10000	4600
	80				14000	11000	5600
	1 1500 1200 2 2400 1800 5 5500 3700 10 9400 8400 3" w.c. Droop Green Spring 12" to 28" w.c. 15 12000 12000 143-16-021-05 40 20000 20000 60			12000	7000		
	125			Orifice Size and Valve Angle 3/4" 1/4" 3/4" 10° 10° 10° 0 1100 800 600 0 1700 1250 950 0 3500 2300 1400 0 6000 3700 2400 0 6000 3700 2400 00 6000 3700 2400 00 6000 3700 2400 00 8100 5600 3800 00 10000 8200 5600 100 12000 11500 7400 11000 12000 11000 12000 100 12000 10000 10000 100 7000 4000 1900 100 13900 7750 4500 100 16500 11500 7400 100 1700 13800 14000 100 1700 13800 200	-	8000	
	2	5000	4000	4000	3000	1000	500
2 5000 4000 4000 3000 1000 5 8000 7000 7000 4000 1900 10 14000 12800 10000 5500 3000 Setpoint 1 psi 0.31 psi Droop Green Spring 12" to 28" w.c. 15 16500 14000 13900 7750 4500 12" to 28" w.c. 40 18000 16500 11500 7400	5	8000	7000	7000	4000	1900	1000
	3000	1500					
	15	16500	14000	13900	7750	4500	1800
0.31 psi Droop	toto toto toto toto toto toto toto 5 8000 7000 7000 4000 1900 10 14000 12800 10000 5500 3000 11 psi Droop 25 17700 16900 15000 9000 5500 11 psi Droop 25 17700 16900 15000 9000 5500 11 psi Droop 25 17700 16900 15000 9000 5500 11 psi Droop 40 18000 16500 11500 7400	5500	2500				
12" to 28" w.c.	40		18000	8100 5600 3800 1700 10000 8200 5600 2400 12000 11500 7400 3400 12000 11500 7400 3400 13500 10000 4600 14000 11000 5600 14000 11000 5600 12000 7000 8000 4000 3000 1000 500 7000 4000 1900 1000 10000 5500 3000 1500 10000 5500 2500 3200 13900 7750 4500 1800 15000 9000 5500 2500 16500 11500 7400 3200 15000 10000 4600 9000 17000 13800 6100 17000 1200 850 450 3300 2200 1300 900 5400 3500 2200 1400 <	3200		
143-16-021-05	60				15000	10000	4600
	80				17000	13800	6100
	10 Setpoint 1 psi .31 psi Droop 3reen Spring 2" to 28" w.c. 43-16-021-05 60 80 100 125					14000	7000
	125				10° 10° 10° 800 600 500 1250 950 500 2300 1400 900 3700 2400 1400 5600 3800 1700 8200 5600 2400 11500 7400 3400 13500 10000 4600 14000 11000 5600 14000 1000 500 3000 1000 500 4000 1900 1000 5500 3000 1500 7750 4500 1800 9000 5500 2500 11500 7400 3200 15000 10000 4600 10000 4600 100 15000 10000 4600 1000 2200 1300 900 2200 1300 900 3500 2400 3500 2200 1400 100 10		
	2	2400	1800	1700	1200	850	450
	5	4000	3400	3300	2200	1300	900
	10	7000	6000	5400	3500	2200	1400
Setpoint 1 psi	15	11000	9000	7000	4600	3100	1700
0.2 psi Droop	25	14500	15000	10000	7400	4800	2400
1 to 2 psi	40		17500	12000	10500	7000	3400
143-10-021-06	60				12500	9500	4600
	80		1800 1700 1250 950 500 3700 3500 2300 1400 900 8400 6000 3700 2400 1400 12000 8100 5600 3800 1700 17500 10000 8200 5600 2400 20000 12000 11500 7400 3400 20000 12000 11500 7400 3400 14000 10000 5600 2400 14000 1000 5600 3400 14000 1000 5600 3600 7000 7000 4000 1000 500 12800 10000 5500 3000 1500 14000 13900 7750 4500 1800 16900 1500 9000 5500 2500 18000 16500 11500 7400 3200 18000 1600 13800 6100 18000 3300<	5600			
	100					11000	7000
	tipoint 18" w.c. 2 2400 1800 5 5500 3700 10 9400 8400 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 12000 11 12000 1000 11 11 11 12 11 11 13 15 16500 10 14000 12800 10 14000 18000 11 125 11000 100 1000 1100 10 100 1000 10 100 1000 10 10 100				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" 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 Setpoint 3 psi 0.35 psi Droop Black Spring 2 to 4¼ psi 143-16-021-07		Orifice Size and Valve Angle									
Outlet Pressure and Spring	Inlet Pressure psi	1"	3/4" 3/4" <th< th=""><th>3/8"</th><th>1⁄4"</th></th<>	3/8"	1⁄4"						
		30°	30°	10°	10°	10°	10°				
Outlet Pressure and Spring Inlet Pressure psi 1" ¼" 30°	5	2000	1600	1600	1400	1000	500				
	3000	3000	3000 2000		1000						
	15	5800	1" ¾"<								
Setpoint 3 psi	25	7500	5200	5000	½" ¾" ¼" 10° 10° 10° 10° 1400 1000 500 2000 1400 1000 2600 1800 1500 3900 2750 2300 6500 5800 3100 10000 7500 4600 14000 10000 6000 14000 10000 6000 14000 10000 6000 14000 10000 6000 14000 10000 6000 14000 1600 800 3600 2400 1300 4800 3500 1700 8000 5100 2400 11000 7000 3400 14000 9600 4600 15000 11000 5600 12000 7000 8000						
Black Spring	40		9100	9000	6500	5800	3100				
2 to 4¼ psi 143-16-021-07	60				10000	7500	4600				
80 14000 1000 100 1200 125	10000	6000									
	100					12000	7000				
	125		1" ¾"<		9000						
	5	4400	3400	3300	2400	1600	800				
	10	7600	6000	5800	¾" ¾"<	1300					
	15	11000	9000	7500	4800	½" ¾" ¼" 10° 10° 10° 1400 1000 500 2000 1400 1000 2600 1800 1500 3900 2750 2300 6500 5800 3100 10000 7500 4600 14000 10000 6000 14000 10000 6000 14000 10000 6000 14000 1600 800 3600 2400 1300 4800 3500 1700 8000 5100 2400 14000 9600 4600 14000 9600 4600 14000 9600 4600 15000 11000 5600 15000 1000 5600 12000 7000 8000					
Setpoint 3 psi	25	15000	15000	10500	8000	5100	2400				
Black Spring	40		17500	13000	11000	7000	3400				
2 to 4¼ psi 143-16-021-07	60				14000	9600	4600				
	80				15000	11000	5600				
8.6 psi Dioop Black Spring 2 to 4¼ psi 143-16-021-07	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.

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

			1¼" Mode	1 243-8HP			1½"	Model 243	-8HP			2" N	lodel 243-	BHP	
Outlet Pressure	Inlet Pressure	Orifi	ice Size ar	nd Valve A	ngle		Orifice Si	ze and Va	lve Angle			Orifice Si	ze and Val	lve Angle	
	psi	³⁄₄" 10°	½" 10°	³⁄ଃ" 10°	¼" 10°	1" 30°	³⁄₄" 10°	½" 10°	³⁄ଃ" 10°	1⁄4" 10°	1" 30°	³ ⁄4" 10°	½" 10°	³∕8" 10°	¼" 10°
	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
Setpoint 5 psi	25	4400	3650	3050	2400	12000	9300	6100	4800	2400	13000	8200	6100	4800	2400
1 psi Droop	40	5800	3800	3200	3200		12000	8500	6100	3200		12000	8700	6100	3400
Spring	60		4400	4100	4400			10000	8700	4400			10000	8700	4600
3 to 6½ psi 143-16-021-08	80		4500	5300	5600			11000	10000	5600			11500	10000	5600
	100			6000	7000				11000	7000			•	11000	7000
	125				8000					8000					8000
	10	2300	2000	1800	1000	2500	2300	2000	1600	1000	2700	2500	2100	1600	1000
Setpoint	15	3000	2800	2200	1400	5000	4000	2500	2200	1500	5900	4300	2800	2400	1500
7 psi	25	5400	4100	3300	2000	8500	6500	4300	3500	2000	8600	6600	4600	3600	2000
1 psi Droop Cadmium-	40	7600	5600	4800	2800		9500	6500	5000	3000		10000	7200	5600	3000
White Springs	60		7500	6200	3800			9000	6500	4000			9700	7000	4500
6 to 10 psi	80		8800	7200	5200			11000	8500	5000			12000	9000	5500
143-16-021-03	100			8600	5800				10500	5500			•	11500	7000
	125				7000					5500					5500
	10	5400	3500	2500	1400	8000	5500	3500	2500	1300	8600	6000	4300	2700	1400
Setnoint	15	7400	5000	3500	1800	10500	8000	5000	3500	1700	12700	8900	5700	3800	1800
7 psi	25	10000	7600	5500	2500	15000	12000	8000	5000	2300	18600	13500	8600	5700	2400
2 psi Droop Cadmium-	40	12500	10000	7500	3500		16000	11500	7500	3300		19000	12500	8000	3500
White Springs	60		12500	9500	4800			15000	9500	4500			17000	10000	4800
6 to 10 psi	80		14000	11500	6100			17500	12500	5500			20000	13500	6200
143-10-021-03	100			13500	7200				15500	7000				16500	7300
	125				8800					7000					8100
	15	2500	2200	1800	1200	3500	3000	2000	1300	1000	3600	3000	2000	1800	1000
Setpoint	25	4800	3500	2800	1900	6500	5000	3500	2500	1900	6800	5700	4000	3000	1900
1 psi Droop	40	7200	5000	4000	2500		8000	5500	4300	2500		8600	5700	4600	2800
Cadmium- White	60		6700	5700	3500		10500	7500	6000	3500			8600	6400	4300
Springs 6 to 10 psi	80		7800	6600	4600			9000	7500	4500			10500	8400	5200
143-16-021-03	100			7800	5400				9500	6000				10700	6500
	125				6500					7000					8000
	15	6000	4000	2800	1700	8500	6500	4000	2500	1500	9000	6600	4800	3000	1500
Setpoint	25	9000	6500	5000	2500	12000	10500	7000	4500	2300	15500	11000	7400	5000	2400
2 psi Droop	40	12000	9000	7000	3500		15000	10000	7500	3000		16500	11000	7700	3200
White	60		12000	9400	4700			14000	10000	4500			15000	10700	4800
Springs 6 to 10 psi	80		13000	11000	6000			17000	12000	5500			18500	13000	6000
143-16-021-03	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.

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.

243 MONITOR SET



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.**

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.

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.



3

CDF1306-065



Model	243-12	243-8	243-8HP
А	14"	10¾16"	103⁄16"
**B	9 ³ ⁄4"	9¾ "	-
B1	-	-	12¾"
С	5¾"	5¾"	5¾"
***C1	71⁄2"	71⁄2"	7½"
C ²	71/8"	71/8"	71/8"
D	21/8"	21/8"	21/8"
Е	10 ¹³ / ₃₂ "	8 ¹⁹ / ₃₂ "	8 ¹⁹ / ₃₂ "
F	61/32"	4 ²⁷ / ₃₂ "	4 ²⁷ / ₃₂ "
G	4 ¹¹ / ₃₂ "	45/32"	45/32"
Shipping Weight*	27 Ibs.	25 Ibs.	29 Ibs.

* Add 9 lbs. for flanges on 2" body

** 10" for 243-12-1 and 243-12-4, which include travel stop *** ANSI flanges

CDF1306-070

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 S	eals Buna-N
Adjustment Spring B	utton & Seal Cap, Std.
	Zinc Die Casting
Adjustment Screw, 2	43-8HP 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.	$Q = K\sqrt{P_o}$	$\overline{(P_i - P_o)}$ (for $\frac{P_i}{P_o}$ less than 1.894)
2.	$Q = \frac{KP_i}{2}$	(for $\frac{P_i}{P_0}$ 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"	1⁄4"	3∕8 "	1/2"	³ ⁄4"	1"	1¼"
К	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:

CORRECTION FACTOR = $\sqrt{}$

0.60 Specific gravity of the gas

While used primarily on natural gas services, Model 243 regulators perform equally as well on LPG vapor, air, CO₂, nitrogen and other inert gas applications. Please contact your Sensus 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 CO₂,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 %" %" 1" 1%" pipe sizes	
Inlet pressuresto 125 p Outlet pressures	osi osi
Model 143-80 %", 1", 1%" pipe sizes Inlet pressuresto 125 p Outlet pressures	osi osi

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	
3/4", 1" and 11/4" 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.

to 150 psi

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

Notes:

BR-G-REG-1306-0313-01-A Model 243 Service Regulators Construction and Design Features

Authorized Distributor:

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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



Valve Body Sizes	i
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

12-12	



12-3







6-3

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.

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12-6

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.

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Calculations for Other Gases					
Туре	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- 0.60					
corrosive gases	Specific Grav	ity of the Gas			

Full	Open	Cap	acity	Cal	culatio	ons
	opon	oup	aony	000	ounding	21.10

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

P₁ = absolute inlet pressure (psia)

P₂ = absolute outlet pressure (psia)







- 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



- Split, multiplit and VRF/VRV systems SUITABILIT
 - 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
 - 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)



CONTENTS



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

INSTALLATION OPTIONS



WIRING - COMMERCIAL



FLOW RATE



WIRING - RESIDENTIAL



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