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Fisher Controls**Instruction Manual****Type S201 & S202
Gas Regulators****FISHER®**

September 1981

Form 5171

WARNING

Fisher regulators must be installed, operated, and maintained in accordance with federal, state, and local codes, rules and regulations, and Fisher instructions. For LP-gas service, an approved regulator (such as one listed by U.L.) should be used. The installation, in most states, must comply with NFPA standards.

If the regulator vents gas or a leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

Call a gas serviceman to service the unit. Only a qualified person must install or service the regulator.

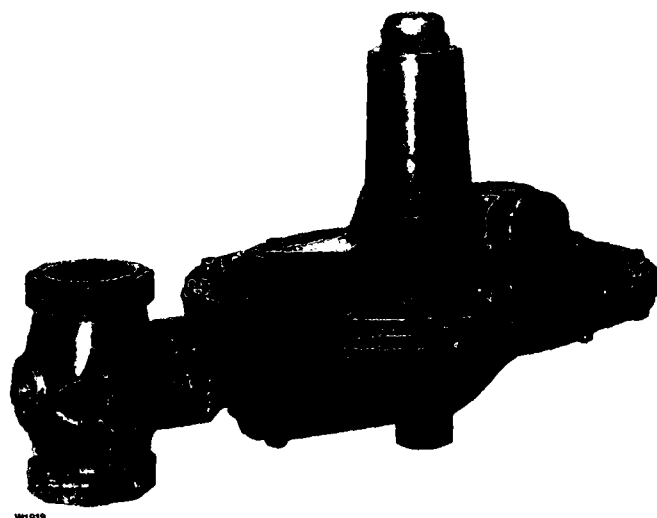


Figure 1. Typical S200 Series Gas Regulator

INTRODUCTION**Scope of Manual**

This instruction manual provides instructions and a parts list for Types S201, S201H, S201K, S202, and S202H gas service regulators.

Description

Type S201 and S202 series regulators are typically installed on industrial and commercial applications. The S202 and S202H units contain an internal relief valve. Units with a "H" or "K" suffix are similar to the basic regulators but deliver a higher outlet pressure (1 to 10 psig).

Specifications

Table 1 lists the specifications for the regulators. The following information is stamped on the regulator at the factory: type number, date of manufacture, spring range, port size, maximum inlet pressure, maximum operating outlet pressure, and outlet pressure which may damage regulator parts.

INSTALLATION**WARNING**

Personal injury or system damage may result if this regulator is installed, without appropriate overpressure protection, where service conditions could exceed the limits given on the regulator nameplate. Regulator installations should be adequately protected from physical damage.

All vents should be kept open to permit free flow of gas to the atmosphere. Protect openings against entrance of rain, snow, insects, or any other foreign material that may plug the vent or vent line. On outdoor installations, point the spring case vent downward to allow condensate to drain (see figure 2). This minimizes the possibility of freezing and of water or other foreign materials entering the vent and interfering with proper operation.

Type S201 and S202

Table 1. Specifications

BODY SIZES AND END CONNECTION STYLE	1-1/2 or 2 inch NPT screwed inlet and outlet ■ 2 inch class 125 ANSI flanged	SEAT RING DIAMETERS	1/4, 3/8, 1/2, 3/4, 1, and 1-3/16 inches
MAXIMUM ALLOWABLE INLET PRESSURES	See table 2	TEMPERATURE CAPABILITIES	-20° to +150° F (-29° to 66° C)
MAXIMUM EMERGENCY OUTLET PRESSURE	15 psig (1.03 bar)	PRESSURE REGISTRATION	Internal
OUTLET PRESSURE RANGE	2.0" W.C. to 10 psig (4.9 millibar to 0.69 bar)	APPROXIMATE WEIGHT	22 pounds (10 kg)

Under enclosed conditions or indoors, escaping gas may accumulate and be an explosion hazard. In these cases, the vent should be piped away from the regulator to the outdoors.

CAUTION

Like most regulators, S201 and S202 regulators have an outlet pressure rating lower than their inlet pressure rating. If actual inlet pressure can exceed the outlet pressure rating, outlet overpressure protection is necessary. However, overpressuring any portion of the regulators beyond the limits in table 2 may cause leakage, damage to regulator parts, or personal injury due to bursting of pressure-containing parts.

Some type of external overpressure protection should be provided if inlet pressure will be high enough to damage downstream equipment. Common methods of external overpressure protection include relief valves, monitoring regulators, shutoff devices, and series regulation.

If the regulator is exposed to an overpressure condition, it should be inspected for any damage that may have occurred. Regulator operation below these limits does not preclude the possibility of damage from external sources or from debris in the pipeline.

Before installing the regulator, check for damage which might have occurred in shipment. Also check for dirt or foreign matter which may have accumulated in the regulator body or in the pipeline. Apply pipe compound to the male threads of the pipeline and install the regulator so that flow is in the direction of the arrow cast on the body. The diaphragm casing assembly can be rotated to any position relative to the body. Loosen the two cap screws (key 18, figure 4) in order to rotate the diaphragm casing assembly.

Do not install the regulator in a location where there can be excessive water accumulation, such as directly beneath a down spout.

If the regulator is used in conjunction with a 289H relief valve, it should be installed as shown in figure 2. The out-

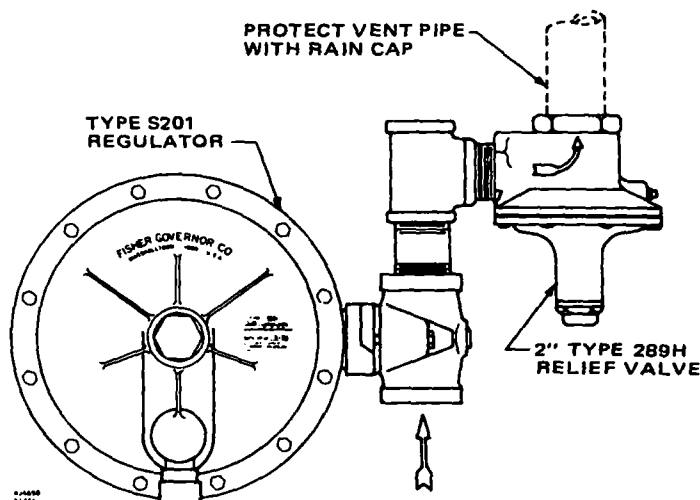


Figure 2. Type S201 Regulator Installed with the Vent Pointed Downward and with an H289 Relief Valve for High Capacity Relief

side end of the vent line should be protected with a rain-proof assembly.

The Type 289H should be set 10" W.C. higher than the outlet pressure setting of the regulator, up to 30" W.C. reduced pressure. For pressure greater than this, set the 289H 3/4 psi higher than the outlet pressure setting of the regulator.

The Type S201 and S202 regulators have 1-inch NPT screened vent openings in the spring case. If necessary to vent escaping gas away from the regulator, install a remote vent line in the spring case tapping. Vent piping should be as short and direct as possible with a minimum number of bends and elbows. The remote vent line should have the largest practical diameter. Vent piping on regulators with internal relief (S202 & S202H) must be large enough to vent all relief valve discharge to atmosphere without excessive back pressure and resulting excessive pressure in the regulator.

Periodically check all vent openings to be sure that they are not plugged.

Table 2. Inlet Pressure

Seat Ring Size		Inlet Pressure Setting			
Inches	mm	Optimum		Maximum	
		Psig	Bar	Psig	Bar
1/4	6.3	125	8.6	125	8.6
3/8	9.5	100	6.9	125	8.6
1/2	12.7	60	4.1	100	6.9
3/4	19.0	25	1.7	60	4.1
1	25.4	13	.9	25	1.7
1-3/16	30.2	5	.3	13	.9

Table 3. Maximum Outlet Pressure Setting

Type Number	Diaphragm Head	Maximum Outlet*
S201, S202	Light	30" W.C. (74.7 millibar)
S201H, S202H	Heavy	5 psig (0.34 bar)
S201K	Heavy	10 psig (0.69 bar)

* Maximum emergency outlet (casing) pressure for Series S200 is 15 psig.

Table 4. Spring Chart

Type Number	Spring Range		Part Number	Color Code
	Inches W.C.	Millibar		
S201, S202	2.0- 4.5	4.9-11.2	1D8925 27022	Brown
	3.5- 6.5	8.7-16.2	1D8926 27022	Red
	5.0- 9.0	12.4-22.4	1D8927 27012	Black
	8.5-18.0	21.2-44.8	1D8932 27032	Gray
	14.0-30.0	34.9-74.7	1D8933 27032	Dark Green
S201H, S202H	1.0-2.0 psig	.07-.14 bar	1H9758 27032	Dark Blue
	1.5-3.25 psig	.10-.22 bar	1H9759 27032	Orange
	2.0-5.0 psig	.14-.34 bar	1P6154 27142	Yellow
S201K	2.0-5.5 psig	.14-.38 bar	0Y0664 27022	Green Stripe
	4.0-10.0 psig	.28-.69 bar	1H8024 27032	Cadmium

Maximum outlet pressure settings are shown in table 3. Outlet pressure more than 2 psi (light diaphragm head) or 3 psi (heavy diaphragm head) above the set point may damage internal parts such as the diaphragm head and valve disc. The maximum emergency (casing) outlet pressure is 15 psig.

STARTUP

CAUTION

Pressure gauges should always be used to monitor downstream pressure during startup. Procedures used in putting this regulator into operation must be planned accordingly if the downstream system is pressurized by another regulator or by a manual bypass.

If the downstream system is not pressurized by another regulator or manual bypass valve, use the following procedure to start-up the regulator.

1. Check to see that all appliances are turned off.
2. Slowly open the upstream plug cock.
3. Check all connections for leaks.

4. Light the appliance pilots.

Adjustment

The range of allowable pressure settings is stamped on the nameplate. If the required setting is not within this range, substitute the correct spring (as shown in table 4). If the spring is changed, be sure to change the nameplate to indicate the new pressure range.

A pressure gauge should always be used to monitor downstream pressure while adjustments are being made.

1. Remove the closing cap (key 4, figure 4) or loosen the hex locknut.
2. To increase the outlet setting, turn the adjusting screw (key 3, figure 4) clockwise. To decrease the outlet setting, turn the adjusting screw counterclockwise.

3. Replace the closing cap or tighten the hex locknut.

SHUTDOWN

Installation arrangements may vary, but in any installation it is important that the valves be opened or closed slowly and that the outlet pressure be vented before venting inlet pressure to prevent damage caused by reverse pressurization of the regulator. The steps below apply to the typical installation as indicated.

1. Open valves downstream of the regulator.
2. Slowly close the upstream shutoff valve.
3. Inlet pressure will automatically be released downstream as the regulator opens in response to the lowered pressure on the diaphragm.

PRINCIPLE OF OPERATION

Refer to figure 3. When downstream demand decreases, the pressure under the diaphragm increases. This pressure overcomes the regulator setting (which is set by a spring). Through the action of the pusher post assembly, the valve disc moves closer to the seat ring and reduces gas flow. If demand downstream increases, pressure under the diaphragm decreases. Spring force pushes the pusher post assembly downward, the valve disc moves away from the seat ring, and the gas flow increases.

The Type S202 and S202H regulators include an internal relief valve for over pressure protection. If the downstream pressure exceeds the regulator setting by 7 inches W.C. to 2 psig (depending on the main spring used), the relief valve opens and excess gas is vented through the stabilizer vent in the upper spring case.

Type S201 and S202

Separate the upper spring case (key 1) from the lower casing assembly (key 9).

Note

If disassembling a Type S202 or S202H regulator, lift the upper spring case straight up in order to avoid hitting the stem (key 24).

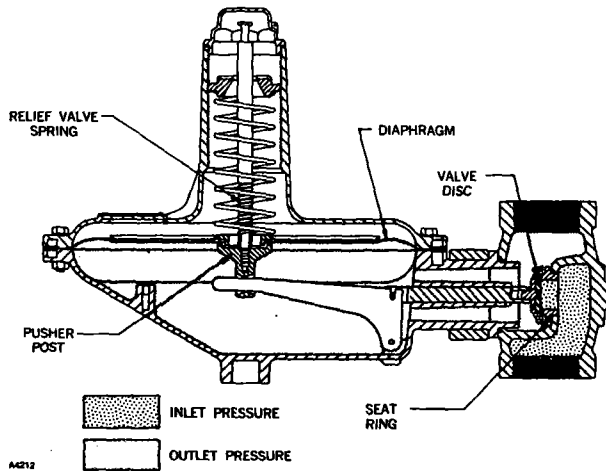


Figure 3. Type S202 Regulator Operational Schematic

MAINTENANCE

WARNING

To avoid personal injury or equipment damage, do not attempt any maintenance or disassembly without first isolating the regulator from system pressure and relieving all internal pressure as described in "Shutdown".

Regulators that have been disassembled for repair must be tested for proper operation before being returned to service. Only parts manufactured by Fisher should be used for repairing Fisher regulators. Relight pilot lights according to normal startup procedures.

Due to normal wear or damage that may occur from external sources, this regulator should be inspected and maintained periodically. The frequency of inspection and replacement of parts depends upon the severity of service conditions or the requirements of local, state, and federal rules and regulations.

Disassembly to Replace Diaphragm

1. Remove the closing cap (key 4, figure 4) or loosen hex locknut. Turn the adjusting screw or nut (key 3) counter-clockwise to ease spring compression.

2. On S201, S201H, S202, and S202H units, remove the adjusting screw and spring (key 2).

From Type S201K remove the adjusting screw, hex locknut, the closing cap (key 4), the upper spring seat (key 6), and spring (key 2).

3. Remove hex nuts (key 15) and cap screws (key 14).

4. Slide the diaphragm and diaphragm head assembly (key 7) away from the body (key 21) to unhook the pusher post (key 8) from the lever (key 10). Lift off the diaphragm and diaphragm head assembly.

5. Unscrew the cap screw or stem (key 24) which fastens the lower spring seat (key 6) to the pusher post and separate the lower spring seat, diaphragm and diaphragm head assembly, and pusher post. (The relief valve spring, key 25, will also have to be removed from Type S202 and S202H regulators.)

6. Reassemble the spring case unit in the reverse order of the above steps. Before tightening the cap screw or stem into the pusher post, place the loosely-assembled diaphragm assembly into position in the lower casing, being sure that the pusher post is hooked on the lever. Rotate the diaphragm so that the diaphragm and lower casing holes are aligned. Tighten the screw or stem.

CAUTION

Before tightening cap screws (key 14), replace the spring and adjusting screw. Turn the adjusting screw to about mid position. This will stretch the oversized diaphragm to ensure slack in the assembled diaphragm. The slack created by this method is necessary for good regulation. Be sure the diaphragm does not fold over at the flange when reassembling.

Disassembly to Replace Valve Disc and Seat Ring

1. Remove the bolts (key 18, figure 4) which hold the lower spring casing (key 9) to the body (key 21). Separate the lower spring casing from the body.

2. Check the body O-ring (key 19) for wear.

3. Examine the valve disc (key 16) for nicks, cuts, and other damage. Unscrew the disc holder assembly from the valve stem assembly (key 13) and replace it with a new part if necessary.

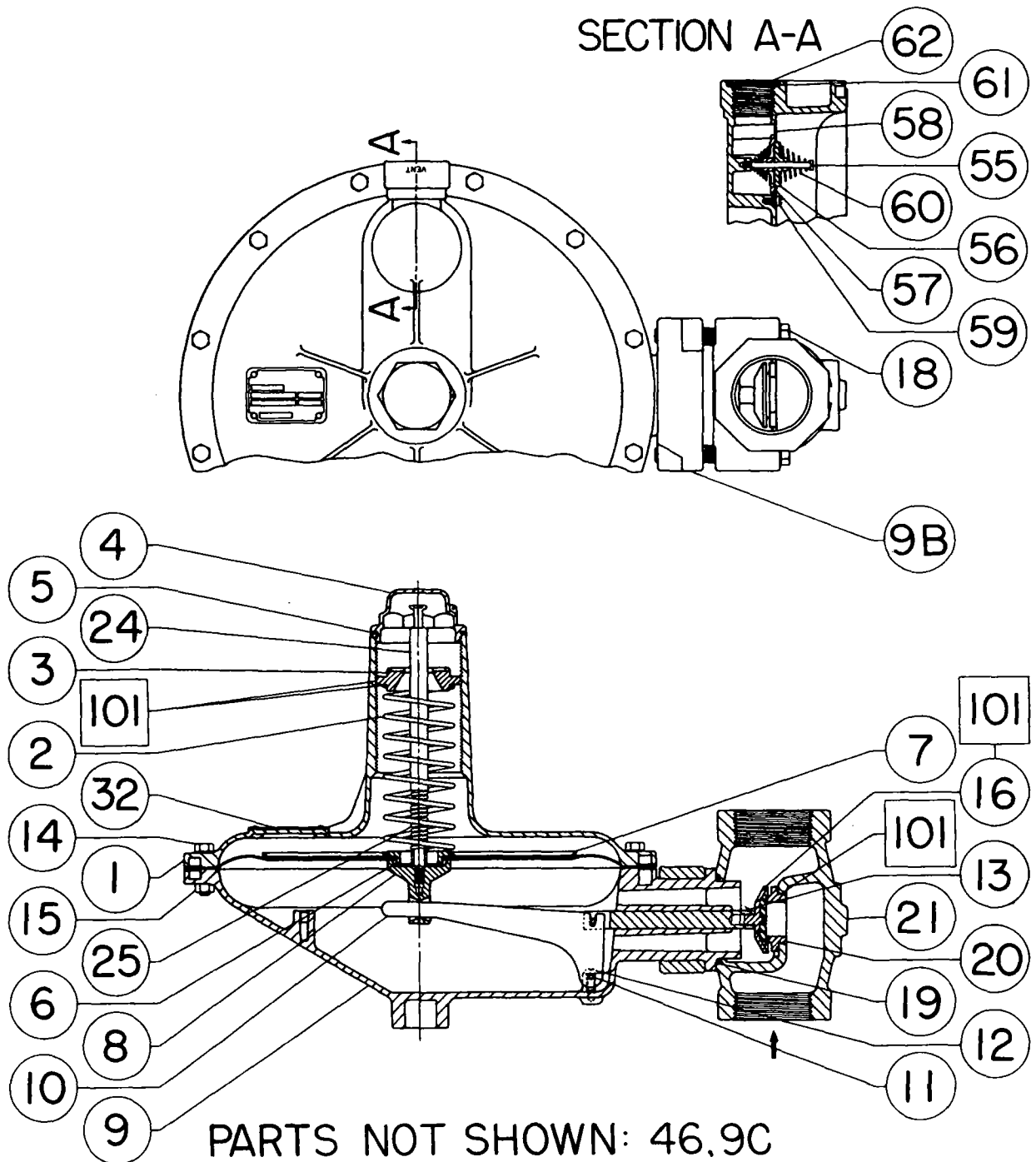
4. If the seating edge of the seat ring (key 20) is nicked or rough, remove the seat ring from the body. Change to a new part when reassembling the regulator. (If the seat ring is being replaced with a different sized port, change the nameplate to state the new size and maximum inlet pressure.)

5. Reassemble the regulator in reverse order of the above steps.

ORDERING PARTS

The type number, seat ring size, spring range, and date of manufacture are stamped on the nameplate. Always provide this information in any correspondence with your

Fisher representative regarding replacement parts or technical assistance. If construction changes are made in the field, be sure that the nameplate is also changed to reflect the most recent construction.



APPLY NEVER-SEEZ LUBRICATION COMPOUND

Figure 4. Type S202 Regulator

Type S201 and S202

PARTS LIST

Key	Description	Part Number	Key	Description	Part Number
1	Spring Case Aluminum Pinned for heavy spring	4L1423 08032 1J7186 99002	9	Lower Casing Assembly Aluminum	1H9751 X0012
2	Spring, steel, see table 4		9B	Union Ring, aluminum (2 req'd)	2H9734 08022
3	Adjusting Screw Aluminum (S201, S201H, S202, S202H)	1L9286 08012	10	Lever, steel	1H9740 28992
	Steel (S201K)	1R8085 T0012	11	Pin, 303 SST	1H9729 35032
4	Closing Cap Aluminum (S201, S201H, S202, S202H)	1L9283 08012	12	Machine Screw, steel (2 req'd)	1B4204 28982
	Brass (S201K)	1H7987 14012	13	Valve Stem Assembly	1H9748 000A2
5*	Closing Cap Gasket Neoprene	1N4462 06992	14	Cap Screw, steel (12 req'd)	1B1363 24052
6	Upper/Lower Spring Seat Aluminum (S201, S201H, S202, S202H)	1L9287 08012	15	Hex Nut, steel, Cd pl (12 req'd)	1A3093 24122
	Brass (S201K) (2 req'd)	1H7974 14012	16*	Disc Holder Assembly For Natural Gas Service	1P7349 000A2
7A*	Diaphragm, nitrile S201, S202 - Use with 1D8933 & lighter springs	1H9781 02072		For Manufactured Gas (3/4" & larger seat rings)	1J1680 X0012
	S201H, S202H	1L1543 02052	17	Diaphragm Plate Steel (S201K only)	1A3478 25022
	S201K	1K6496 02052	18	Cap Screw, steel, Cd pl (2 req'd)	1H9747 24052
7B	Diaphragm Head, steel S201, S202 - Use with 1D8933 & lighter springs	1H9779 28892	19*	O-Ring, nitrile	T 12587 T0012
	S201H, S202H	1H9780 25032	20	Seat Ring, aluminum 1/4" Port Diameter	1H9792 09022
	S201K	1A3478 25022		3/8" Port Diameter	1H9793 09022
8	Pusher Post, aluminum S201, S201H, S201K	2H9806 08012		1/2" Port Diameter	1H9794 09022
	S202, S202H	2H9752 08012		3/4" Port Diameter	1H9795 09022
				1" Port Diameter	1H9796 09022
				1-3/16" Port Diameter	1H9797 09022
			21	Body Cast Iron	1J1903 19012
				1-1/2" NPT	1H9749 19012
				2" NPT	2K1842 19012
				2" 125 lb. Flanged	2K1845 19012
				2" 250 lb. Flanged	
			21	Body (Continued)	
				With 1/8" NPT Test Gauge Connection	
				1-1/2" NPT	1P7992 19012
				2" NPT	1P7993 19012
				2" 125 lb. Flanged	2P8061 19012
				2" 250 lb. Flanged	2P8062 19012
				Steel	
				1-1/2" NPT	1K7879 22012
				2" NPT	1K7921 22012
				With 1/8" NPT Test Gauge Connection	
				1-1/2" NPT	1P7991 22012
				2" NPT	1P7994 22012
			24	Cap Screw, steel, Zinc pl	
				S201	1H9754 24272
				S201H	1A6678 24052
				S201K	1K4278 28982
				Stem, steel, Zinc pl	
				S202, S202H	1H9692 24272
			25	Relief Valve Spring, steel, Cd pl (S202, S202H)	
				Standard	1H9760 27012
				For U. L. listed units with 1D8933 or lighter springs	1R1004 27012
			32	Nameplate, aluminum	11A5497 X012
			46	Pipe Plug, 1/8" NPT Brass	1A6219 14012
			53	Hex Nut, steel, Cd pl S201K only	1A3524 24112
			55	Flapper Stem 302 SST	1H9763 35022
			56	Lower Flapper Nylon	1H9764 06992
			57	Upper Flapper, nylon	1H9765 06992
			58	Seat Ring, 302 SST	1H9766 36012
			59	Self-tapping Screw, steel (3 req'd)	1H9767 28982
			60	Spring, 302 SST (2 req'd)	1H9768 37022
			61	Screen, Monel †	1E5648 43122
			62	Snap Ring, 302 SST	1E5649 37022

* Recommended Spare Part

† Trademark of International Nickel Company

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The 627 Series self-operated pressure reducing regulators (figure 1) are for low and high pressure systems. These regulators can be used with natural gas, air, or a variety of other gases. Performance characteristics vary according to construction (see the Specifications table).

Features

- **Internal Relief Valve**—Type 627R and 627MR regulators have an internal relief valve, which in many cases eliminates the usual requirement for an external relief valve, thereby reducing equipment and maintenance costs. Refer to the Specifications table for capacity data.

- **Type 627R and 627MR Travel Stop**—The internal relief valve still works if the disk or linkage fails. The pusher post (figure 2) contacts the travel stop of the lever retainer and, as the diaphragm continues to rise, it opens the relief valve.

- **Relief Operation Indicator**—A rubber cap (figure 3) slipped on the vent assembly pops off when the relief valve opens, indicating the relief valve has opened since the last inspection.

- **Easy to Maintain**—Trim parts can be replaced without removing the regulator body from the pipeline. A two-bolt connection between the body and diaphragm casing simplifies disassembly for maintenance.

- **Installation Adaptability**—The diaphragm case and/or regulator body can be rotated in any of four positions to allow regulator installation in locations with limited space (figure 10). The regulator may be installed in any position without affecting operation as long as the spring case vent is protected from the elements.

- **Application Versatility**—The different 627 Series constructions can be used as farm tap regulators, regulator-relief valves, monitoring regulators, or high-pressure industrial regulators.



Figure 1. Typical 627 Series Self-Operated Pressure Reducing Regulator

- **Tamper-Resistant**—An adjusting screw locknut and protective cap (figure 4) is standard on all 627 Series regulators to discourage tampering with the pressure setting.

- **Wide Range of Flow Capabilities**—A selection of body sizes and port diameters is available to satisfy various flow requirements.

- **Tight Shutoff Capability**—A flat-faced disk of nitrile or nylon provides excellent shutoff capability.

Specifications

Available Constructions

Type 627: Self-operated pressure reducing regulator equipped with a pitot tube for greater regulated capacities (figure 4)

Type 627R: Type 627 with internal relief and open throat (figure 5)

Type 627H: Type 627 with a diaphragm limiter to deliver a higher outlet pressure (figure 7)

Type 627M: Type 627 with a stem seal between the body outlet pressure and diaphragm case. Pressure is measured under the diaphragm through the 1/4-inch NPT downstream control line connection (figure 4)

Type 627MR: Type 627M with internal relief (figure 6)

Type 627HM: Type 627H with a stem seal between the body outlet pressure and diaphragm case. Pressure is measured under the diaphragm through two 1/4-inch NPT downstream control line connections (figure 7)

Body Sizes⁽¹⁾

■ 3/4, ■ 1, or ■ 2-inch

End Connection Styles⁽¹⁾

NPT screwed with 3/4, 1, or 2-inch sizes
ANSI Class 300 and 600 raised face (RF)
flanged with 1 or 2-inch sizes

Maximum Inlet Pressure⁽²⁾ (Body Rating)

■ 2000 psig (138 bar) for screwed steel, ■ 1480 psig (102 bar) for RF flanged steel, or ■ 1000 psig (69 bar) for ductile iron

Maximum Valve Disk Inlet Pressure Rating⁽²⁾

■ 2000 psig (138 bar) for nylon disk, ■ 1000 psig (69 bar) for nitrile disk or ■ 200 psig (14 bar) for fluoroelastomer disk

Maximum Operating Inlet And Outlet Pressure Ranges⁽²⁾

See table 1 for pressures by port and spring range

Maximum Spring And Diaphragm Casing Pressure⁽²⁾

See table 2

Maximum Body Outlet Pressure⁽²⁾ (Type 627M, 627MR, and 627HM Only)

■ 2000 psig (138 bar) for screwed steel, ■ 1480 psig (102 bar) for RF flanged steel, or ■ 1000 psig (69 bar) for ductile iron. (Type 627, 627H, and 627R are limited by maximum diaphragm casing pressure)

Port Diameters

See table 1

Internal Relief Performance

Type 627R: See table 3 and figure 8

Type 627MR: Limited by field-installed control line piping

Regulator Capacities

Type 627, 627M, or 627MR: See table 4

Type 627H or 627HM: See table 5

Type 627R: See table 6

Flow Coefficients

See table 7

Construction Materials

Body: ■ Ductile iron or ■ steel

Spring Case and Diaphragm Case: ■ steel,

■ ductile iron, or ■ die cast aluminum

Seat Ring: ■ Aluminum (standard) or ■ stainless steel

Disk Holder with Valve Disk

2000 psig (138 bar) maximum pressure:

■ aluminum with nylon or

■ stainless steel with nylon

1000 psig (69 bar) maximum pressure:

■ aluminum with nitrile (standard) or

■ stainless steel with nitrile

200 psig (14 bar) maximum pressure:

Stainless steel with fluoroelastomer disk

O-Rings and Diaphragm: ■ Nitrile or

■ fluoroelastomer

Relief Indicator

For 627R and 627MR (see figure 3)

Temperature Capabilities⁽²⁾

−20 to 180°F (−29 to 82°C)

Pressure Registration

Type 627, 627H, or 627R: Internal

Type 627M, 627HM, or 627MR: External through 1/4-inch NPT female control line connection in the diaphragm case

De-icer System

See figure 9 and Type 627M De-Icer System Application section

Assembly Positions

See figure 10

Specifications (Continued)

Spring Case Vent Connection

3/4-inch NPT female with removable screened vent assembly

Approximate Weight

With Ductile Iron or Steel Casings: 10 pounds (4.5 kg)

With Aluminum Casings: 6.3 pounds (2.8 kg)

1. End connections threaded to other than ANSI standards can usually be supplied. Consult your Fisher sales office or sales representative.

External Dimensions

See figure 11

2. The pressure/temperature limits in this bulletin and any applicable standard or code limitation should not be exceeded.

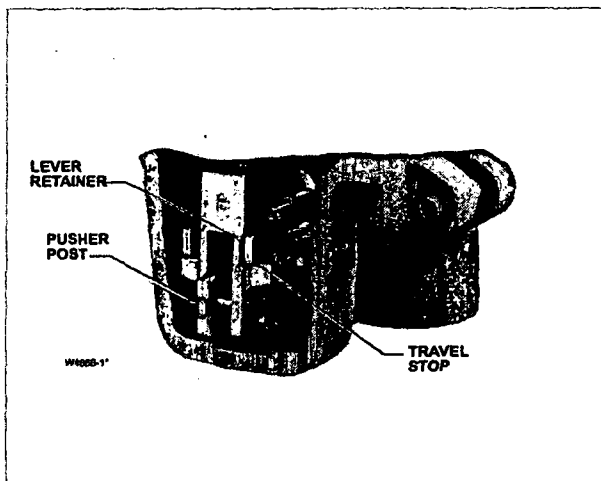


Figure 2. Internal Relief Construction Feature

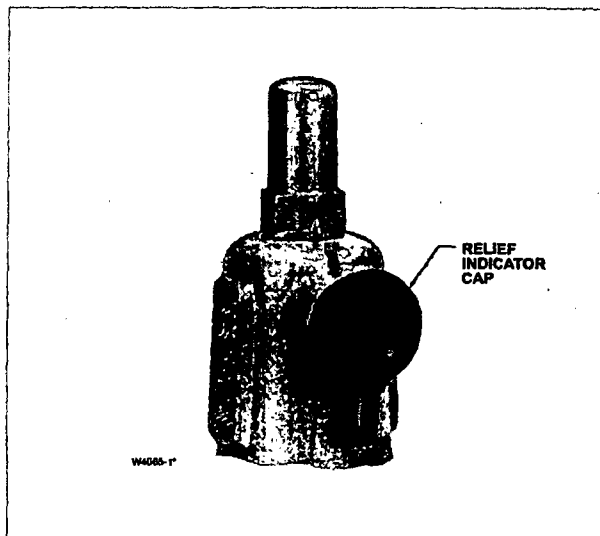


Figure 3. Relief Indicator

Product Description

Types 627 and 627H Self-Operated Pressure Reducing Regulators

The Types 627 and 627H regulators provide economical pressure reducing control for a variety of residential, commercial, and industrial applications. The regulator pitot tube located in a high velocity stream provides dynamic boost that compensates for outlet pressure drop (see table 4 or 5).

Internal Relief for Type 627R or 627MR Regulator

The Type 627R internal relief performance values (table 3) were obtained by removing the disk assembly from the regulator, see figure 8. For the Type 627R or 627MR regulator, the internal relief across the diaphragm (figure 5 or 6) provides overpressure protection in many applications. As outlet pressures build up above the start-to-discharge point, the diaphragm moves off the relief valve seat allowing the excess pressure to bleed out through the screened vent.

For extra protection, should failure conditions exist which would prevent normal operation of the regulator (for example, disk broken off or disk erosion), the pusher post contacts the lever retainer (figure 2) causing the relief valve assembly to open. Since the diaphragm continues to rise as downstream pressure builds, it opens the relief valve, thereby opening the valve. This internal relief may be adequate for the application.

Downstream Control Line for Type 627M, 627HM, or 627MR Regulator

A Type 627M, 627HM, or 627MR regulator has a blocking throat stem seal with O-rings and a 1/4-inch NPT control line connection in the diaphragm case (figure 6). A regulator with a downstream control line is used for monitoring applications or other applications where other equipment is installed between the regulator and the pressure control point. The stem seal separates the body outlet pressure from the diaphragm case.

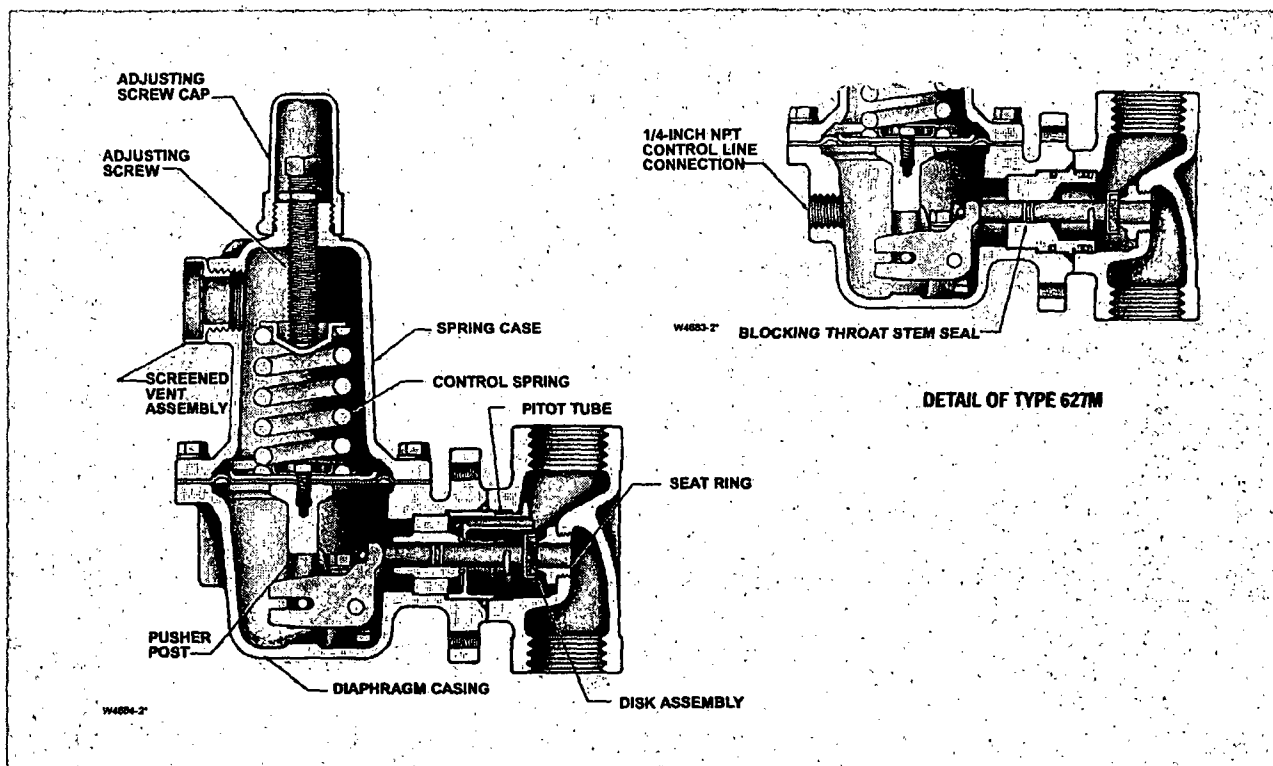


Figure 4. Type 627 and 627M Construction Details

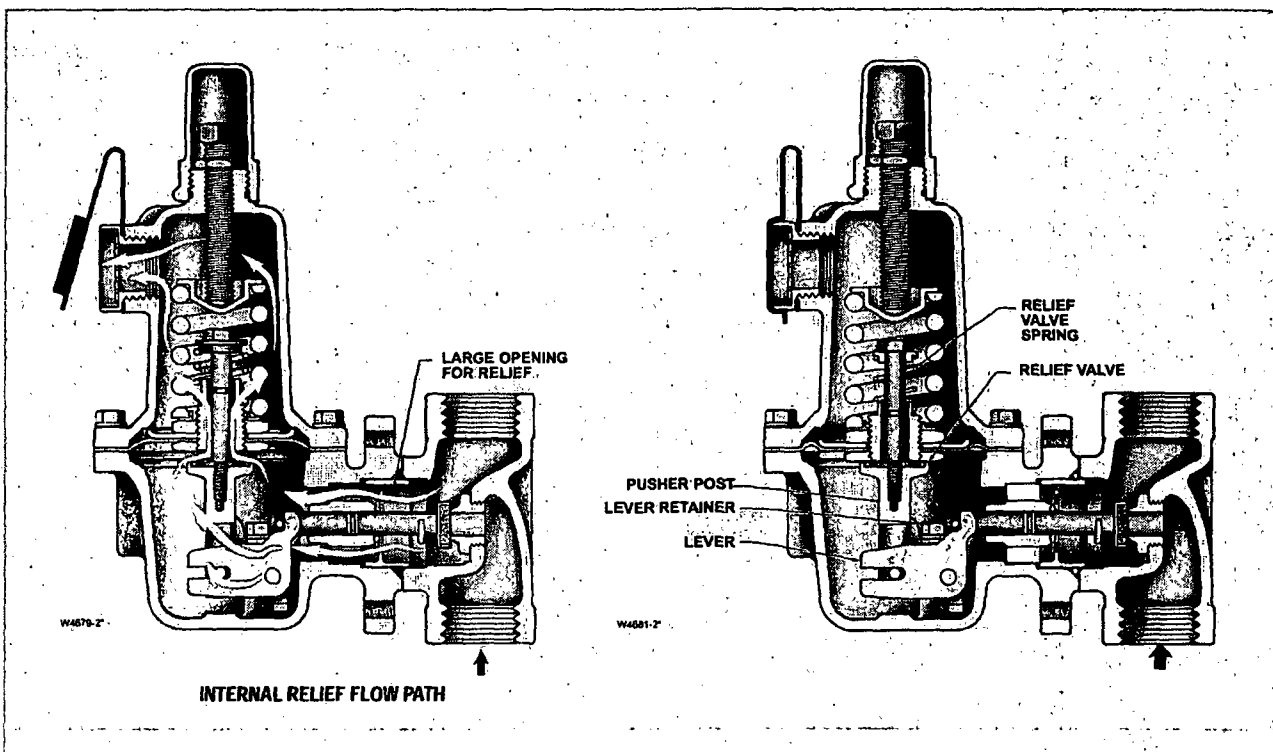


Figure 5. Type 627R Construction Details

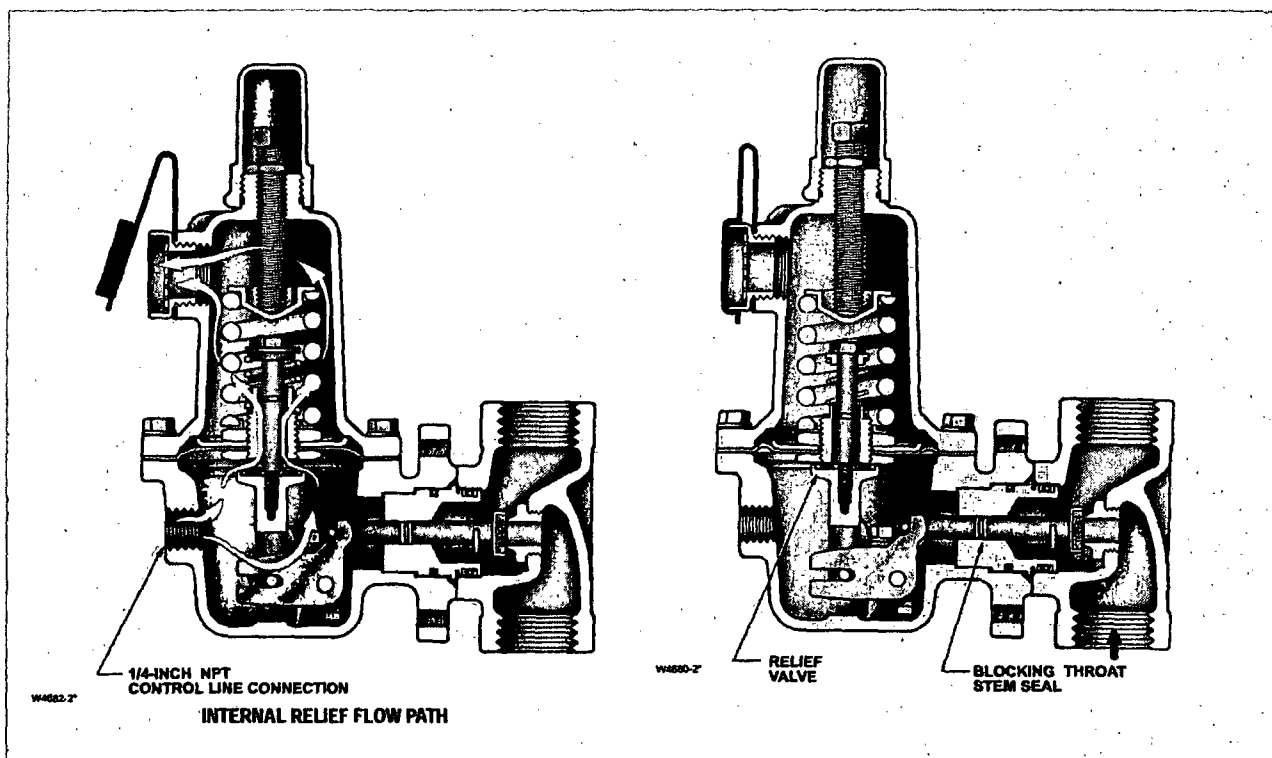


Figure 6. Type 627MR Construction Details

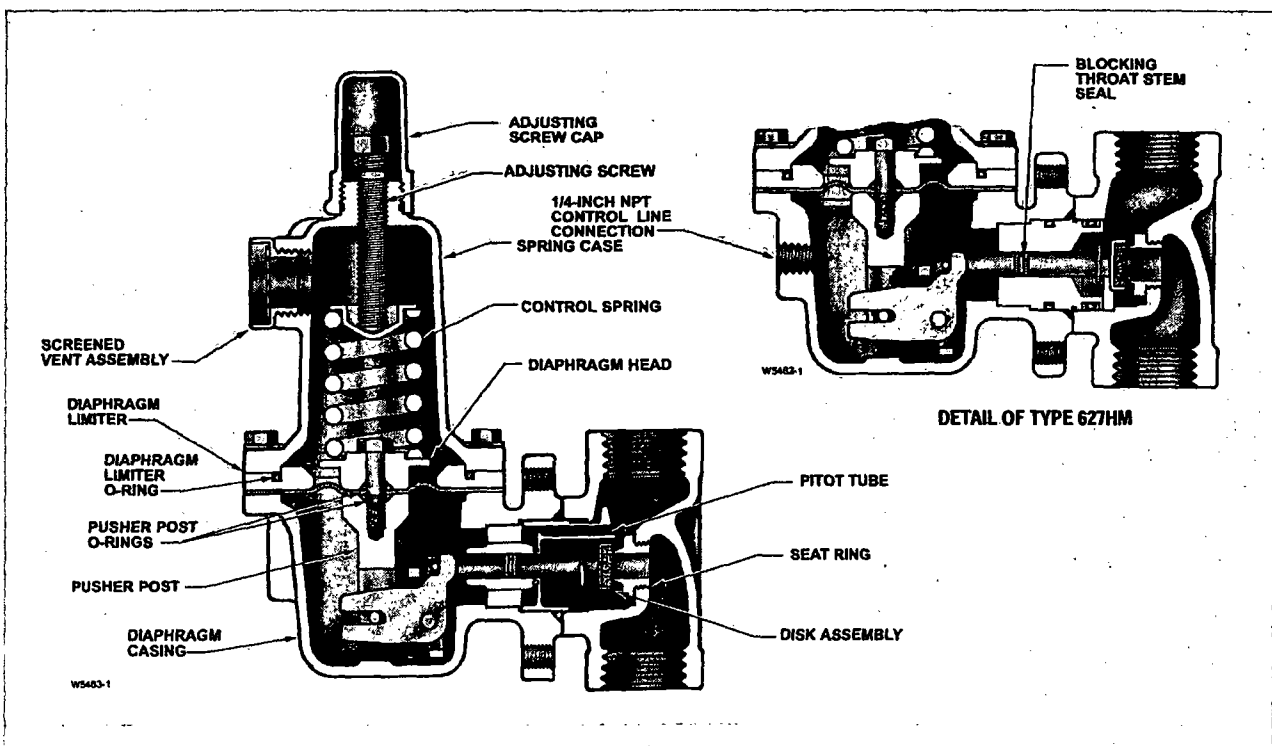


Figure 7. Type 627H and 627HM Construction Details

Table 1. Maximum Inlet Pressures, Differential Pressures and Outlet Pressure Ranges

TYPE NUMBER	OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	U.S. UNITS			METRIC UNITS		
		Port Dia., Inches	Maximum Inlet Pressure, Psig	Maximum Differential Pressure, Psid	Port Dia., mm	Maximum Inlet Pressure, Bar	Maximum Differential Pressure, Bar
627 and 627M ⁽³⁾	5(2) to 20 psig (0.34 to 1.4 bar) 10B3076 X012 (yellow)	3/32	2000 ⁽¹⁾	2000 ⁽¹⁾	2.4	138 ⁽¹⁾	138 ⁽¹⁾
		1/8	1000	1000	3.2	69.0	69.0
		3/16	750	70	4.8	51.7	51.7
		1/4	500	00	6.4	34.5	34.5
		3/8	300	300	9.5	20.7	20.7
		1/2	250	20	12.7	13.8	13.8
	15 to 40 psig (1.0 to 2.8 bar) 10B3077 X012 (green)	3/32	2000 ⁽¹⁾	2000 ⁽¹⁾	2.4	138 ⁽¹⁾	138 ⁽¹⁾
		1/8	1500 ⁽¹⁾	1500 ⁽¹⁾	3.2	103 ⁽¹⁾	103 ⁽¹⁾
		3/16	1000 ⁽¹⁾	1000	4.8	69.0	69.0
		1/4	750	750	6.4	51.7	51.7
		3/8	500	500	9.5	34.5	34.5
		1/2	300	300	12.7	20.7	20.7
	35 to 80 psig (2.4 to 5.5 bar) 10B3078 X012 (blue)	3/32	2000 ⁽¹⁾	2000 ⁽¹⁾	2.4	138 ⁽¹⁾	138 ⁽¹⁾
		1/8	2000 ⁽¹⁾	2000 ⁽¹⁾	3.2	138 ⁽¹⁾	138 ⁽¹⁾
		3/16	1750 ⁽¹⁾	1750 ⁽¹⁾	4.8	121 ⁽¹⁾	121 ⁽¹⁾
		1/4	1500 ⁽¹⁾	1500 ⁽¹⁾	6.4	103 ⁽¹⁾	103 ⁽¹⁾
		3/8	1000	1000	9.5	69.0	69.0
		1/2	750	750	12.7	51.7	51.7
	70 to 150 psig (4.8 to 10.3 bar) 10B3079 X012 (red)	3/32	2000 ⁽¹⁾	2000 ⁽¹⁾	2.4	138 ⁽¹⁾	138 ⁽¹⁾
		1/8	2000 ⁽¹⁾	2000 ⁽¹⁾	3.2	138 ⁽¹⁾	138 ⁽¹⁾
		3/16	2000 ⁽¹⁾	2000 ⁽¹⁾	4.8	138 ⁽¹⁾	138 ⁽¹⁾
		1/4	1750 ⁽¹⁾	1750 ⁽¹⁾	6.4	121 ⁽¹⁾	121 ⁽¹⁾
		3/8	1250 ⁽¹⁾	1250 ⁽¹⁾	9.5	86.2 ⁽¹⁾	86.2 ⁽¹⁾
		1/2	750	750	12.7	51.7	51.7
627R and 627MR	5(2) to 20 psig (0.34 to 1.4 bar) 10B3076 X012 (yellow)	3/32	2000 ⁽¹⁾	2000 ⁽¹⁾	2.4	138 ⁽¹⁾	138 ⁽¹⁾
		1/8	1000	1000	3.2	69.0	69.0
		3/16	750	750	4.8	51.7	51.7
		1/4	500	500	6.4	34.5	34.5
		3/8	300	300	9.5	20.7	20.7
		1/2	200	200	12.7	13.8	13.8
	15 to 40 psig (1.0 to 2.8 bar) 10B3077 X012 (green)	3/32	2000 ⁽¹⁾	2000 ⁽¹⁾	2.4	138 ⁽¹⁾	138 ⁽¹⁾
		1/8	1500 ⁽¹⁾	1500 ⁽¹⁾	3.2	103 ⁽¹⁾	103 ⁽¹⁾
		3/16	1000	100	4.8	69.0	69.0
		1/4	750	750	6.4	51.7	51.7
		3/8	300	300	9.5	20.7	20.7
		1/2	200	200	12.7	13.8	13.8
	35 to 80 psig (2.4 to 5.5 bar) 10B3078 X012 (blue)	3/32	2000 ⁽¹⁾	2000 ⁽¹⁾	2.4	138 ⁽¹⁾	138 ⁽¹⁾
		1/8	1750 ⁽¹⁾	1750 ⁽¹⁾	3.2	121 ⁽¹⁾	121 ⁽¹⁾
		3/16	1000	1000	4.8	69.0	69.0
		1/4	750	750	6.4	51.7	51.7
		3/8	300	300	9.5	20.7	20.7
		1/2	200	200	12.7	13.8	13.8
	70 to 150 psig (4.8 to 10.3 bar) 10B3079 X012 (red)	3/32	2000 ⁽¹⁾	2000 ⁽¹⁾	2.4	138 ⁽¹⁾	138 ⁽¹⁾
		1/8	1000	1000	3.2	69.0	69.0
		3/16	500	500	4.8	34.5	34.5
		1/4	300	300	6.4	20.7	20.7
		3/8	200	200	9.5	13.8	13.8
		1/2	200	200	12.7	13.8	13.8
627H and 627HM ⁽³⁾	140 to 250 psig (9.7 to 17.2 bar) 10B3078 X012 (blue)	3/32	2000 ⁽¹⁾	2000 ⁽¹⁾	2.4	138 ⁽¹⁾	138 ⁽¹⁾
		1/8	2000 ⁽¹⁾	2000 ⁽¹⁾	3.2	138 ⁽¹⁾	138 ⁽¹⁾
		3/16	1750 ⁽¹⁾	1750 ⁽¹⁾	4.8	121 ⁽¹⁾	121 ⁽¹⁾
		1/4	1500 ⁽¹⁾	1000	6.4	103 ⁽¹⁾	69.0
		3/8	1000	500	9.5	69.0	34.5
		1/2	750	250	12.7	51.7	13.8
	240 to 500 psig (16.5 to 34.5 bar) 10B3079 X012 (red)	3/32	2000	2000 ⁽¹⁾	2.4	138 ⁽¹⁾	138 ⁽¹⁾
		1/8	2000	2000 ⁽¹⁾	3.2	138 ⁽¹⁾	138 ⁽¹⁾
		3/16	1750	1750 ⁽¹⁾	4.8	121 ⁽¹⁾	121 ⁽¹⁾
		1/4	1500	1000	6.4	103 ⁽¹⁾	69.0
		3/8	1000	500	9.5	69.0	34.5
		1/2	750	250	12.7	51.7	13.8

1. For inlet pressure in excess of 1000 psig (69 bar), refer to the maximum body and disk pressure ratings in the specification table.
2. For pressure settings under 10 psig (0.69 bar), inlet pressure should be limited to approximately 100 psig (6.9 bar) so the set point adjustment can be obtained.

3. The unbalance forces change from the wide open monitor mode to an active regulator mode such that the Type 627M or 627HM should have a 3/8-inch (9.5 mm) or larger seat ring when used as a wide open monitor.

Table 2. Maximum Spring and Diaphragm Casing Pressure⁽¹⁾

	SPRING AND DIAPHRAGM CASING STYLE	TYPE 627		TYPE 629R		TYPE 627M		TYPE 627MR		TYPE 627H & 627HM	
		Psig	Bar	Psig	Bar	Psig	Bar	Psig	Bar	Psig	Bar
Maximum pressure to spring and diaphragm casings to prevent leak to atmosphere other than relief action (internal parts damage may occur)	Die Cast Aluminum	250	17.2	250	17.2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Ductile Iron	250	17.2	250	17.2	250	17.2	250	17.2	N.A.	N.A.
	Steel	250	17.2	250	17.2	250	17.2	250	17.2	800	55.2
Maximum pressure to spring and diaphragm casings to prevent burst of casings during abnormal operation (leak to atmosphere and internal parts damage may occur)	Die Cast Aluminum	375	25.9	375	25.9	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	Ductile Iron	465	32.0	465	32.0	465	32.0	465	32.0	N.A.	N.A.
	Steel	1500	103	1500	103	1500	103	1500	103	1500	103
Maximum diaphragm casing overpressure (above set point) to prevent damage to internal parts	All Styles	60	4.1	120	8.3	60	4.1	120	8.3	120	8.3
<small>1. If the spring case is pressurized, a metal adjusting screw cap is required. Contact the Fisher sales office or Fisher sales representative.</small>											

Revised casing pressures.

Overpressure Protection

Like most regulators, 627 Series regulators have outlet pressure ratings that are lower than their inlet pressure ratings. A pressure relieving or pressure limiting device must be provided by the user for the Type 627, 627M, and 627HM regulators if the inlet pressure can exceed the outlet pressure rating, since these regulators do not have internal relief.

Type 627R regulators provide internal relief which limits the total outlet pressure buildup over setpoint. Use table 3 and the following example to determine the maximum inlet pressure allowed to keep the maximum allowable downstream pressure from being exceeded.

Given:

40 psig Desired outlet pressure setting
125 psig Maximum allowable downstream pressure
1/4-inch Port diameter

What is the maximum inlet pressure?

35 to 80 psig Control spring range (first column)
40 psig Outlet pressure setting (second column)
125 psig Maximum allowable downstream pressure (third column)
1/4-inch Port diameter column across from the 125 maximum allowable pressure and the column under 1/4-inch port diameter

From table 3, the maximum inlet pressure for this example is 300 psig.

In many cases the internal relief of the Type 627R offers full capacity overpressure protection. No additional relief capacity is needed if the actual inlet pressure is equal to or

less than the inlet pressure shown under the Maximum Inlet Pressure column heading in table 3.

If the maximum allowable downstream system pressure is less than any of the pressures shown in the third column of table 3, use a separate relief valve or a monitor regulator since the internal relief will not open at pressures lower than shown in the table.

If the actual inlet pressure is higher than the pressure shown, in the Maximum Inlet Pressure column, to protect to the level shown, an additional relief valve is needed to supplement the relief capacity of the 627R internal relief or a full capacity separate relief valve or monitor regulator may be used.

To size a supplemental relief valve to use with the Type 627R:

1. Use the universal sizing equation to calculate the wide open capacity of the regulator port (Q_1) using:

a. Actual inlet pressure, PSIA (P_1)

b. Maximum allowable downstream system pressure (P_2) from table 3, column 3

c. C_g from table 7

2. Use the universal sizing equation to calculate the internal relief flow (Q_2) using:

a. Maximum inlet pressure (P_1) from table 3 columns 4 thru 9 (use the pressure from the table even though the actual pressure will be higher). Remember the equation requires pressures to be converted to PSIA.

b. Maximum allowable downstream system pressure (P_2) from table 3

c. C_g from table 7

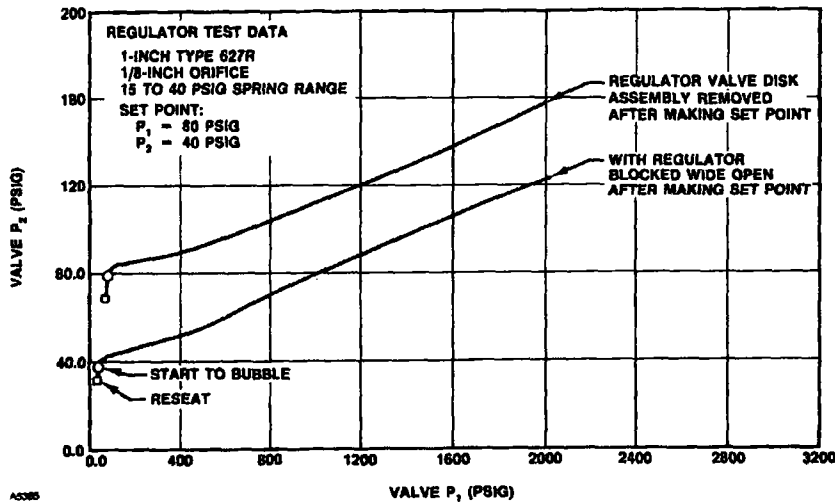


Figure 8. Relief Testing Methods, Outlet vs. Inlet Pressures

3. Calculate supplemental relief capacity:

a. Q supplemental relief = $Q_1 - Q_2$

Example:

10 psig Outlet pressure setting

60 psig Maximum allowable downstream system pressure

300 psig Inlet pressure

1/4-inch Port diameter

Step 1.

$P_1 = 300$ psig

$P_2 = 60$ psig

C_g , 1/4-inch port = 50

$Q_1 = 20,300$ SCFH

Step 2.

$P_1 = 190$ psig

$P_2 = 60$ psig

C_g , 1/4-inch port = 50

$Q_2 = 13,200$ SCFH

Step 3.

Q supplemental relief = $Q_1 - Q_2$

Q supplemental relief = $20,300 - 13,200 = 7,100$ SCFH

Overpressurizing any portion of a regulator or associated equipment may cause personal injury, leakage, or property damage due to bursting of pressure-containing parts or explosion of accumulated gas.

If needed, provide appropriate pressure relieving or pressure limiting devices to ensure that none of the limits in the specifications table is exceeded. Regulator operation within ratings does not prevent the possibility of damage from external sources such as debris in the pipeline.

Refer to the relief sizing coefficients in table 7 and the Capacity Information section to determine the required external relief valve capacity.

Table 3. Type 627R Internal Relief Performance⁽¹⁾

OUTLET PRESSURE RANGE AND CONTROL SPRING INFORMATION	OUTLET PRESSURE SETTING, PSIG	MAXIMUM ALLOWABLE DOWNSTREAM SYSTEM PRESSURE, PSIG	MAXIMUM INLET PRESSURE - PSIG ⁽²⁾						OUTLET PRESSURE SETTING, BAR	MAXIMUM ALLOWABLE DOWNSTREAM SYSTEM PRESSURE, BAR	MAXIMUM INLET PRESSURE - BAR ⁽²⁾					
			Maximum Inlet Pressure To Keep Maximum Allowable Downstream System Pressure From Being Exceeded								Maximum Inlet Pressure To Keep Maximum Allowable Downstream System Pressure From Being Exceeded					
			Port Diameter - Inches								Port Diameter - mm					
			3/32	1/8	3/16	1/4	3/8	1/2			2.4	3.2	4.8	6.4	9.5	12.7
5 to 20 psig ⁽³⁾ (0.34 to 1.4 bar) 10B3076 X012 (yellow)	10	60	1250	740	320	190	95	75	0.69	4.1	86.2	51.0	22.1	13.1	6.6	5.2
		100	2000	1500	620	390	180	130		6.9	138	103	42.7	26.9	12.4	9.0
		125	2000	1900	830	480	220	160		8.6	138	131	57.2	33.1	15.2	11.0
		175	2000	2000	1100	670	320	220		12.1	138	138	75.8	46.2	22.1	15.2
		200	2000	2000	1300	770	360	260		13.8	138	138	89.6	53.1	24.8	17.9
		250	2000	2000	1600	960	450	320		17.2	138	138	110	66.2	31.0	22.1
	15	60	1000	620	260	170	90	70	1.0	4.1	69.0	42.7	17.9	11.7	6.2	4.8
		100	2000	1400	610	370	170	130		6.9	138	96.5	42.1	25.5	11.7	9.0
		125	2000	1900	810	480	220	160		8.6	138	131	55.8	33.1	15.2	11.0
		175	2000	2000	1100	670	320	220		12.1	138	138	75.8	46.2	22.1	15.2
		200	2000	2000	1300	770	360	260		13.8	138	138	89.6	53.1	24.8	17.9
		250	2000	2000	1600	960	450	320		17.2	138	138	110	66.2	31.0	22.1
	20	60	850	490	210	130	80	65	1.4	4.1	58.6	33.8	14.5	9.0	5.5	4.6
		100	2000	1300	600	360	170	120		6.9	138	89.6	41.4	24.8	11.7	8.3
		125	2000	1800	800	480	220	160		8.6	138	124	55.2	33.1	15.2	11.0
		175	2000	2000	1100	670	320	220		12.1	138	138	75.8	46.2	22.1	15.2
		200	2000	2000	1300	770	360	260		13.8	138	138	89.6	53.1	24.8	17.9
		250	2000	2000	1600	960	450	320		17.2	138	138	110	66.2	31.0	22.1
15 to 40 psig (1.0 to 2.8 bar) 10B3077 X012 (green)	15	60	1000	380	210	130	80	65	1.0	4.1	69.0	26.2	14.5	9.0	5.5	4.5
		100	2000	1300	590	350	170	120		6.9	138	89.6	40.7	24.1	11.7	8.3
		125	2000	1800	800	470	220	160		8.6	138	124	55.2	32.4	15.2	11.0
		175	2000	2000	1100	640	320	220		12.1	138	138	75.8	44.1	22.1	15.2
		200	2000	2000	1300	780	370	260		13.8	138	138	89.6	53.8	25.5	17.9
		250	2000	2000	1600	960	450	320		17.2	138	138	110	66.2	31.0	22.1
	20	60	630	200	150	100	70	65	1.4	4.1	43.4	13.8	10.3	6.9	4.8	4.5
		100	2000	1200	550	330	160	120		6.9	138	82.7	37.9	22.8	11.0	8.3
		125	2000	1700	760	450	210	160		8.6	138	117	52.4	31.0	14.5	11.0
		175	2000	2000	1100	630	320	220		12.1	138	138	75.8	43.4	22.1	15.2
		200	2000	2000	1300	770	360	260		13.8	138	138	89.6	53.1	24.8	17.9
		250	2000	2000	1600	960	460	320		17.2	138	138	110	66.2	31.7	22.1
	30	100	2000	950	450	260	140	110	2.1	6.9	138	65.5	31.0	17.9	9.7	7.6
		125	2000	1500	670	400	190	150		8.6	138	103	46.2	27.6	13.1	10.3
		175	2000	2000	1000	610	300	220		12.1	138	138	69.0	42.0	20.7	15.2
		200	2000	2000	1200	760	360	260		13.8	138	138	82.7	52.4	24.8	17.9
		250	2000	2000	1600	970	460	320		17.2	138	138	110	66.9	31.7	22.1
		40	100	1500	700	330	200	120		108	2.8	6.9	103	48.3	22.8	13.8
	125		2000	1300	560	340	180	140	8.6	138		89.6	38.6	23.4	12.4	9.7
	175		2000	1800	1000	550	290	220	12.1	138		124	69.0	37.9	20.0	15.2
	200		2000	2000	1200	730	350	250	13.8	138		138	82.7	50.3	24.1	17.2
	250		2000	2000	1600	970	460	320	17.2	138		138	110	66.9	31.7	22.1
	100		1500	700	330	200	120	108	6.9	103		48.3	22.8	13.8	8.3	7.4

- Continued -

Capacity Information

Natural gas regulating capacities at selected inlet pressures and outlet pressure settings are given in table 4 for the Type 627, in table 5 for the Type 627H, and in table 6 for the Type 627R regulator. Flows are in scfh (60°F and 14.7 psia) of 0.6 specific gravity natural gas at 60°F. To determine the equivalent capacities for other gases, multiply the

table capacity by the following appropriate conversion factor: 0.775 for air, 0.789 for nitrogen, 0.628 for propane, or 0.548 for butane. For gases of other specific gravities, multiply the given capacity by 0.775, and divide by the square root of the appropriate specific gravity.

Then, if capacity is desired in normal cubic meters per hour at 0°C and 1.01325 bar, multiply scfh by 0.0268.

Table 3. Type 627R Internal Relief Performance⁽¹⁾ (Continued)

OUTLET PRESSURE RANGE AND CONTROL SPRING INFORMATION	OUTLET PRESSURE SETTING, PSIG	MAXIMUM ALLOWABLE DOWNSTREAM SYSTEM PRESSURE, PSIG	MAXIMUM INLET PRESSURE - PSIG ⁽²⁾							OUTLET PRESSURE SETTING, BAR	MAXIMUM ALLOWABLE DOWNSTREAM SYSTEM PRESSURE, BAR	MAXIMUM INLET PRESSURE - BAR ⁽²⁾						
			Maximum Inlet Pressure To Keep Maximum Allowable Downstream System Pressure From Being Exceeded									Maximum Inlet Pressure To Keep Maximum Allowable Downstream System Pressure From Being Exceeded						
			Port Diameter - inches									Port Diameter - mm						
			3/32	1/8	3/16	1/4	3/8	1/2				2.4	3.2	4.8	6.4	9.5	12.7	
35 to 80 psig (2.4 to 5.5 bar) 10B3078 X012 (blue)	40	125	2000	1100	500	300	170	140	2.8	8.6	138	75.8	34.5	20.7	11.7	9.7		
		150	2000	1600	750	440	230	180			138	110	51.7	30.3	15.9	12.4		
		175	2000	2000	980	580	290	220			138	138	67.6	40.0	20.0	15.2		
		200	2000	2000	1200	720	340	250			138	138	82.7	49.6	23.4	17.2		
		250	2000	2000	1600	940	450	320			138	138	110	64.8	31.0	22.1		
	50	125	1400	820	400	230	150	140	3.4	8.6	96.5	56.5	27.6	15.9	10.3	9.7		
		150	2000	1400	650	370	210	170			138	96.5	44.8	25.5	14.5	11.7		
		175	2000	1900	700	530	270	210			138	131	48.3	36.5	18.6	14.5		
		200	2000	2000	1100	670	330	240			138	138	75.8	46.2	22.8	16.5		
		250	2000	2000	1500	920	430	320			138	138	103	63.4	29.6	22.1		
	60	125	900	450	270	190	140	130	4.1	8.6	62.1	31.0	18.6	13.1	9.7	9.0		
		150	1700	1100	540	300	190	160			117	75.8	37.2	20.7	13.1	11.0		
		175	2000	1700	780	470	250	200			138	117	53.8	32.4	17.2	13.8		
		200	2000	2000	1000	610	310	230			138	138	69.0	42.0	21.4	15.9		
		250	2000	2000	1400	880	420	310			138	138	96.5	60.7	29.0	21.4		
	70	150	1200	850	430	250	170	160	4.8	10.3	82.7	58.6	29.8	17.2	11.7	11.0		
		175	2000	1400	670	400	230	190			138	96.5	46.2	27.6	15.9	13.1		
		200	2000	2000	920	550	280	230			138	138	63.4	37.9	19.3	15.9		
		250	2000	2000	1300	830	400	310			138	138	89.6	57.2	27.6	21.4		
	80	150	800	500	300	200	160	150	5.5	10.3	55.2	34.5	20.7	13.8	11.0	10.3		
		175	1500	1200	550	330	210	190			103	82.7	37.9	22.8	14.5	13.1		
		200	2000	1700	800	480	270	220			138	117	55.2	33.1	18.6	15.2		
		250	2000	2000	1200	770	390	300			138	138	82.7	53.1	26.9	20.7		
	70 to 150 psig (4.8 to 10.3 bar) 10B3079 X012 (red)	70	175	1900	600	400	260	200	175	4.8	12.1	131	41.4	27.6	17.9	13.8	12.0	
200			2000	1200	630	380	250	210	138			82.7	43.4	26.2	17.2	14.5		
250			2000	2000	1100	680	360	290	138			138	75.8	46.9	24.8	20.0		
80		175	1400	250	240	200	190	175	5.5	12.1	96.5	17.2	16.5	13.8	13.1	12.1		
		200	2000	960	520	330	240	210			138	66.2	35.9	22.8	16.5	14.5		
		250	2000	2000	1000	620	350	280			138	138	69.0	42.7	24.1	19.3		
100		200	1500	250	240	230	210	210	6.9	13.8	103	17.2	16.5	15.9	14.5	14.5		
		250	2000	1600	770	520	320	270			138	110	53.1	35.9	22.1	18.6		
125		250	2000	1000	500	390	290	260	8.6	17.2	138	69.0	34.5	26.9	20.0	17.9		
150		250	1200	260	260	260	260	260	10.3	17.2	82.7	17.9	17.9	17.9	17.9	17.9		
1. The internal relief performance values are obtained by removing the disk assembly. 2. For inlet pressures in excess of 1000 psig (69 bar), refer to the maximum body and disk pressure ratings in the specification table. 3. For pressure setting under 10 psig (0.69 bar), inlet pressure should be limited to										approximately 100 psig (6.9 bar) so the set point adjustment can be obtained. Shaded areas indicate maximum inlet pressures allowed during system malfunction only. Table 1 gives the maximum inlet pressure for normal regulator operation.								

1. The internal relief performance values are obtained by removing the disk assembly.
2. For inlet pressures in excess of 1000 psig (69 bar), refer to the maximum body and disk pressure ratings in the specification table.
3. For pressure setting under 10 psig (0.69 bar), inlet pressure should be limited to

approximately 100 psig (6.9 bar) so the set point adjustment can be obtained.
Shaded areas indicate maximum inlet pressures allowed during system malfunction only. Table 1 gives the maximum inlet pressure for normal regulator operation.

To determine wide-open flow capacities for relief sizing use the following formula:

$$Q = \sqrt{\frac{520}{GT}} C_g P_1 \sin \left(\frac{3417}{C_1} \sqrt{\frac{\Delta P}{P_1}} \right) \text{ DEG}$$

where:

$C_1 = C_g/C_v$ (see table 7)

C_g = Gas sizing coefficient (see table 7)

G = Gas specific gravity (air = 1.0)

P_1 = Valve inlet pressure, psia

ΔP = Pressure drop across valve, psi

Q = Gas flow rate, scfh

T = Absolute temperature of gas at inlet, degree Rankine

To obtain the published capacities, the inlet and outlet piping should be the same as the regulator size.

Table 4. Type 627, 627M and 627MR Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾

					FOR TYPES 627, 627M, AND 627MR											
OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE		3/4 INCH BODY SIZE						1 INCH BODY SIZE					
	Psig	Bar	Psig	Bar	Port Diameter, Inches (mm)						Port Diameter, Inches (mm)					
					3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
5 to 20 psig ⁽²⁾ (0.34 to 1.4 bar) 10B3076 X012 (yellow)	5 ⁽³⁾	0.34	10	0.69	170	320	700	1060	1540	1900	170	330	710	1100	1900	2500
			15	1.0	240	330	810	1300	2150	3350	240	390	890	1600	2500	3350
			20	1.4	290	460	1140	1800	3050	4350	290	500	1160	2060	3400	4450
			30	2.1	380	610	1530	2490	3880	6850	380	670	1560	2800	4750	6900
			60	4.1	640	1170	2550	4240	6270	7370	640	1170	2600	4710	8140	13,700
			75	5.2	770	1410	3020	5100	6620	7700	770	1410	3150	5710	9790	14,500
	10	0.69	100	6.9	990	1800	3800	5980	7440	7900	990	1800	4070	7310	12,500	16,000
			15	1.03	210	320	800	1290	2100	3300	210	375	880	1590	2480	3300
			20	1.4	280	455	1130	1790	3000	4300	280	490	1150	2050	3380	4410
			30	2.1	380	610	1530	2480	3860	6830	380	670	1560	2800	4720	6840
			60	4.1	640	1170	2550	4240	6270	7370	640	1170	2600	4710	8140	13,700
			75	5.2	770	1410	3020	5100	6620	7700	770	1410	3150	5710	9790	14,500
			100	6.9	990	1800	3800	5980	7440	7900	990	1800	4070	7310	12,500	16,000
			150	10.3	1420	2580	5700	7130	8180	8200	1420	2580	5850	10,500	17,000	18,000
			200	13.8	1850	3370	6970	7250	8200	8300	1850	3370	7630	13,700	18,000	18,500
			300	20.7	2700	4910	8000	8050	8250		2700	4910	11,200	19,800	20,000	
			500	34.5	4010	8090	8060	8100			4400	8090	15,700	20,000		
			750	51.7	4400	8930	8950				5400	12,000	18,000			
			1000	69.0	4450	10,300					5800	14,000				
			1250	86.2	4540						6300					
			1500	103	4880						6600					
			1750	121	5230						6800					
			2000	138	5900						7600					
	20	1.4	30	2.1	350	620	1400	2490	4360	6290	350	620	1450	2580	4360	6290
			50	3.4	550	1000	2280	4010	7870	8500	550	1000	2280	4090	7870	14,100
			80	4.1	640	1170	2640	4680	8340	8940	640	1170	2640	4750	9690	14,500
			100	6.9	990	1800	3980	7220	11,500	12,600	990	1800	4070	7310	13,900	23,300
			150	10.3	1420	2580	5850	10,400	12,100	13,100	1420	2580	5850	10,500	17,700	34,200
			200	13.8	1850	3370	7340	12,000	13,200	13,700	1850	3370	7630	13,700	26,600	39,100
			300	20.7	2700	4910	11,200	13,000	15,600		2700	4910	11,200	20,100	37,000	
			500	34.5	4400	8090	18,300	15,100			4400	8090	18,300	32,900		
			750	51.7	6600	12,000	14,200				6600	12,000	23,600			
			1000	69.0	7300	14,600					8900	16,000				
			1250	86.2	7500						10,000					
			1500	103	7800						10,400					
			1750	121	8400						12,000					
			2000	138	8600						14,000					
15 to 40 psig (1.0 to 2.8 bar) 10B3077 X012 (green)	40	2.8	60	4.1	610	1090	2530	4350	8140	9420	610	1090	2530	4510	9290	9420
			75	5.2	760	1370	3080	5510	10,300	13,600	760	1370	3080	5640	10,800	16,500
			100	6.9	990	1790	4070	7220	13,200	15,300	990	1790	4070	7310	14,700	21,900
			150	10.3	1420	2580	5850	10,400	17,400	18,200	1420	2580	5850	10,500	20,500	34,500
			200	13.8	1850	3370	7630	13,500	18,000	18,500	1850	3370	7630	13,700	27,100	46,400
			300	20.7	2700	4910	11,200	18,500	20,000	20,700	2700	4910	11,200	20,100	40,100	67,100
			500	34.5	4400	8090	18,300	24,000	27,000		4400	8090	18,300	32,900	63,900	
			750	51.7	6600	12,000	23,000	24,200			6600	12,000	27,200	39,400		
			1000	69.0	8700	16,000	24,400				8700	16,000	36,100			
			1250	86.2	11,000	18,000					11,000	19,000				
			1500	103	12,000	21,000					13,000	22,000				
			1750	121	13,000						15,000					
			2000	138	14,000						17,000					

- Continued -

Table 4. Type 627, 627M and 627MR Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾ (Continued)

				FOR TYPES 627, 627M, AND 627MR												
OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE	3/4 INCH BODY SIZE							1 INCH BODY SIZE					
				Port Diameter, Inches (mm)							Port Diameter, Inches (mm)					
	Psig	Bar	Psig	Bar	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
35 to 80 psig (2.4 to 5.5 bar) 10B3078 X012 (blue)	60	4.1	75	5.2	700	1230	2760	4750	8620	15,200	700	1230	2760	4880	8630	16,100
			100	6.9	970	1740	4010	6990	12,800	17,300	970	1740	4010	7000	13,000	19,300
			150	10.3	1420	2580	5850	10,300	18,600	23,000	1420	2580	5850	10,500	18,900	32,800
			200	13.8	1850	3370	7630	13,500	21,600	27,400	1850	3370	7630	13,700	24,000	42,200
			300	20.7	2700	4910	11,200	19,800	26,100	30,100	2700	4910	11,200	20,100	32,500	69,100
			500	34.5	4400	8090	18,300	28,100	28,900	33,400	4400	8090	18,300	32,900	64,000	94,300
			750	51.8	6600	12,000	26,300	30,000	37,000	45,000	6600	12,000	27,200	43,380	66,000	130,000
			1000	69.0	8700	16,000	30,000	31,200	37,400	/	8700	16,000	36,100	50,300	67,700	/
			1250	86.2	11,000	19,000	31,600	34,000	/	/	11,000	19,000	45,000	57,000	/	/
			1500	103	13,000	22,000	30,400	36,000	/	/	13,000	22,000	54,000	63,000	/	/
			1750	121	15,000	25,000	34,000	/	/	/	15,000	25,000	63,000	/	/	/
			2000	138	17,000	28,000	/	/	/	/	17,000	28,000	/	/	/	/
	80	5.5	100	5.2	900	1600	3750	6490	12,200	17,300	900	1600	3750	6650	12,200	18,600
			150	10.3	1410	2580	5850	10,200	19,600	25,700	1410	2580	5850	10,500	21,100	33,600
			200	13.8	1850	3370	7630	13,500	25,400	29,300	1850	3370	7630	13,700	28,400	44,100
			300	20.7	2700	4910	11,200	19,800	32,700	33,500	2700	4910	11,200	20,100	43,300	75,400
			500	34.5	4400	8090	18,300	31,900	36,000	36,700	4400	8090	18,300	32,900	71,600	110,000
			750	51.8	6600	12,000	27,200	35,000	44,000	46,000	6600	12,000	27,200	48,900	105,500	135,000
			1000	69.0	8700	16,000	36,100	38,000	56,200	/	8700	16,000	36,100	64,900	118,000	/
			1250	86.2	11,000	19,000	37,000	40,000	/	/	11,000	19,000	45,000	80,000	/	/
70 to 150 psig (4.8 to 10.3 bar) 10B3079 X012 (red)	100	6.9	150	10.3	1170	2510	5540	8710	16,000	20,300	1170	2510	5540	8710	16,000	24,000
			200	13.8	1850	3370	7630	12,000	21,300	25,700	1850	3370	7630	12,000	21,300	34,100
			300	20.7	2700	4910	11,200	19,400	30,000	31,700	2700	4910	11,200	19,400	30,100	53,200
			500	34.5	4400	8090	18,300	31,800	39,000	39,200	4400	8090	18,300	31,800	66,500	83,900
			750	51.8	6600	12,000	27,200	39,000	39,200	45,900	6600	12,000	27,200	47,300	95,300	117,000
			1000	69.0	8700	16,000	36,100	40,000	40,500	47,000	8700	16,000	36,100	59,700	100,000	120,000
			1250	86.2	11,000	19,000	39,000	40,500	41,000	/	11,000	19,000	45,000	72,000	114,000	/
			1500	103	13,000	22,000	43,000	44,000	/	/	13,000	22,000	54,000	86,000	/	/
			1750	121	15,000	25,000	45,000	47,000	/	/	15,000	25,000	63,000	95,000	/	/
			2000	138	17,000	28,000	48,000	/	/	/	17,000	28,000	71,000	/	/	/
	125	8.6	150	10.3	1250	2340	5340	9130	15,700	20,800	1250	2340	5340	9470	15,700	20,800
			200	13.8	1830	3320	7550	13,160	22,500	28,600	1830	3320	7550	13,400	28,100	32,800
300			20.7	2700	4910	11,200	19,800	32,700	38,000	2700	4910	11,200	20,100	36,300	52,600	
500			34.5	4400	8090	18,300	32,500	43,800	51,700	4400	8090	18,300	32,900	70,800	109,000	
750			51.8	6600	12,000	27,200	48,300	49,900	71,400	6600	12,000	27,200	48,900	104,000	158,000	
1000			69.0	8700	16,000	36,100	50,000	52,900	72,000	8700	16,000	36,100	64,800	138,000	160,000	
1250			86.2	11,000	19,000	45,000	53,000	58,000	/	11,000	19,000	45,000	80,000	145,000	/	
1500			103	13,000	22,000	51,000	56,000	/	/	13,000	22,000	54,000	96,000	/	/	
150	10.3	1750	121	15,000	25,000	52,000	60,000	/	/	15,000	25,000	63,000	112,000	/	/	
		2000	138	17,000	28,000	53,000	/	/	/	17,000	28,000	71,000	/	/	/	
		200	13.8	1760	3200	7290	12,500	21,400	30,600	1760	3200	7290	12,900	21,400	33,600	
		300	20.7	2700	4910	11,200	17,200	34,700	48,000	2700	4910	11,200	17,200	40,100	55,900	
		500	34.5	4400	8090	18,300	32,500	48,900	59,700	4400	8090	18,300	32,900	70,300	111,000	
		750	51.8	6600	12,000	27,200	48,300	59,000	72,000	6600	12,000	27,200	48,900	104,000	160,000	
		1000	69.0	8700	16,000	36,100	64,100	81,100	85,000	8700	16,000	36,100	64,800	138,000	162,000	
		1250	86.2	11,000	19,000	45,000	68,000	90,000	/	11,000	19,000	45,000	80,000	150,000	/	
		1500	103	13,000	22,000	54,000	72,000	/	/	13,000	22,000	54,000	96,000	/	/	
		1750	121	15,000	25,000	63,000	77,000	/	/	15,000	25,000	63,000	112,000	/	/	
		2000	138	17,000	28,000	71,000	/	/	/	17,000	28,000	71,000	/	/	/	

- Continued -

Table 4. Type 627, 627M and 627MR Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾ (Continued)

OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE		FOR TYPE 627						FOR TYPES 627M, AND 627MR					
					2 INCH BODY SIZE						2 INCH BODY SIZE					
					Port Diameter, Inches (mm)						Port Diameter, Inches (mm)					
	Psig	Bar	Psig	Bar	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
5 to 20 psig ⁽²⁾ (0.34 to 1.4 bar) 10B3076 X012 (yellow)	5 ⁽³⁾	0.34	10	0.69	170	330	710	1080	1700	2400	170	330	710	1080	1700	2400
			15	1.0	240	390	890	1250	1900	2700	240	390	890	1250	1900	2700
			20	1.4	290	500	1160	1900	2650	3900	290	500	1160	1900	2650	3900
			30	2.1	380	670	1560	2800	3680	6500	380	670	1560	2800	3680	6500
			60	4.1	640	1170	2600	4750	7250	17,800	640	1170	2600	4750	7250	15,000
			75	5.2	770	1410	3150	5700	8060	22,400	770	1410	3150	5700	8060	17,900
			100	6.9	990	1790	4070	7310	16,200	28,700	990	1790	4070	7310	14,600	23,000
			15	1.03	210	375	880	1220	1860	2670	210	375	880	1220	1860	2670
	10	0.69	20	1.4	280	490	1150	1880	2610	3830	280	490	1150	1880	2610	3830
			30	2.1	380	670	1560	2760	3640	6460	380	670	1560	2760	3640	6460
			60	4.1	640	1170	2600	4750	7250	17,800	640	1170	2600	4750	7250	15,000
			75	5.2	770	1410	3150	5700	8060	22,400	770	1410	3150	5700	8060	17,900
			100	6.9	990	1790	4070	7310	16,200	28,700	990	1790	4070	7310	14,600	23,000
			150	10.3	1420	2580	5850	10,500	23,300		1420	2580	5850	10,500	21,000	33,000
			200	13.8	1850	3370	7630	13,700			1850	3370	7630	13,700	27,300	43,000
			300	20.7	2700	4910	11,200				2700	4910	11,200	20,100	40,100	
			500	34.5	4400	8090	18,300				4400	8090	18,300	32,900		
			750	51.7	6600	12,000	27,200				6600	12,000	27,200			
			1000	69.0	8700	16,000					8700	16,000				
			1250	86.2	11,000						11,000					
			1500	103	13,000						13,000					
			1750	121	15,000						15,000					
			2000	138							17,000					
	20	1.4	30	2.1	350	620	1450	2350	4300	6110	350	620	1450	2480	4300	6110
			50	3.4	550	1000	2280	4040	7100	12,800	550	1000	2280	4040	7100	12,800
			60	4.1	640	1170	2640	4750	8400	15,700	640	1170	2640	4750	8400	15,000
			100	6.9	990	1800	4070	7310	16,200	28,700	990	1800	4070	7310	14,600	23,000
			150	10.3	1420	2580	5850	10,500	23,300		1420	2580	5850	10,500	21,000	33,000
			200	13.8	1850	3370	7630	13,700			1850	3370	7630	13,700	27,300	43,000
			300	20.7	2700	4910	11,200	20,100			2700	4910	11,200	20,100	40,100	
			500	34.5	4400	8090	18,300	32,900			4400	8090	18,300	32,900		
			750	51.7	6600	12,000	27,200				6600	12,000	27,200			
			1000	69.0	8700	16,000					8700	16,000				
			1250	86.2	11,000						11,000					
			1500	103	13,000						13,000					
			1750	121	15,000						15,000					
			2000	138							17,000					
15 to 40 psig (1.0 to 2.8 bar) 10B3077 X012 (green)	40	2.8	60	4.1	610	1090	2530	4370	8680	13,300	610	1090	2530	4370	8680	13,300
			75	5.2	760	1370	3080	5540	11,900	19,300	760	1370	3080	5540	10,700	19,300
			100	6.9	990	1800	4070	7310	16,200	25,400	990	1800	4070	7310	14,600	25,400
			150	10.3	1420	2580	5850	10,500	23,300	41,300	1420	2580	5850	10,500	21,000	37,000
			200	13.8	1850	3370	7630	13,700	30,400	53,900	1850	3370	7630	13,700	27,300	48,000
			300	20.7	2700	4910	11,200	20,100	44,600		2700	4910	11,200	20,100	40,100	71,000
			500	34.5	4400	8090	18,300	32,900			4400	8090	18,300	32,900	65,000	
			750	51.7	6600	12,000	27,200				6600	12,000	27,200	48,900		
			1000	69.0	8700	16,000	36,100				8700	16,000	36,100			
			1250	86.2	11,000	19,000					11,000	19,000				
			1500	103	13,000	22,000					13,000	22,000				
			1750	121	15,000						15,000					
			2000	138	17,000						17,000					

- Continued -

Table 4. Type 627, 627M and 627MR Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾ (Continued)

OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE		FOR TYPE 627						FOR TYPES 627M, AND 627MR					
					2 INCH BODY SIZE						2 INCH BODY SIZE					
					Port Diameter, Inches (mm)						Port Diameter, Inches (mm)					
	Psig	Bar	Psig	Bar	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
35 to 80 psig (2.4 to 5.5 bar) 10B3078 X012 (blue)	60	4.1	75	5.2	700	1260	2760	4900	9000	12,300	700	1230	2760	4900	9000	12,300
			100	6.9	970	1740	4010	7000	15,000	20,400	970	1740	4010	7000	15,000	20,400
			150	10.3	1420	2580	5850	10,500	23,300	35,200	1420	2580	5850	10,500	23,300	35,200
			200	13.8	1850	3370	7630	13,700	30,400	53,900	1850	3370	7630	13,700	30,400	48,500
			300	20.7	2700	4910	11,200	20,100	44,600		2700	4910	11,200	20,100	44,600	71,000
			500	34.5	4400	8090	18,300	32,900			4400	8090	18,300	32,900	73,000	116,000
			750	51.8	6600	12,000	27,200			32,000	6600	12,000	27,200	48,900	108,000	172,000
			1000	69.0	8700	16,000	36,100		52,000		8700	16,000	36,100	65,000	144,000	
			1250	86.2	11,000	19,000	45,000				11,000	19,000	45,000	81,000		
			1500	103	13,000	22,000		43,000			13,000	22,000	54,000	97,000		
			1750	121	15,000	25,000	26,000				15,000	25,000	63,000			
			2000	138	17,000	28,000					17,000	28,000				
	80	5.5	100	5.2	900	1630	3750	6400	12,800	20,400	900	1630	3750	6400	12,800	20,400
			150	10.3	1410	2580	5850	10,500	23,300	41,300	1410	2580	5850	10,500	23,300	37,200
			200	13.8	1850	3370	7630	13,700	30,400	53,900	1850	3370	7630	13,700	30,400	48,500
			300	20.7	2700	4910	11,200	20,100	44,600		2700	4910	11,200	20,100	44,600	71,000
			500	34.5	4400	8090	18,300	32,900			4400	8090	18,300	32,900	73,000	116,000
			750	51.8	6600	12,000	27,200	48,900		44,000	6600	12,000	27,200	48,900	108,000	172,000
			1000	69.0	8700	16,000	36,100		63,000		8700	16,000	36,100	65,000	144,000	
			1250	86.2	11,000	19,000	45,000				11,000	19,000	45,000	81,000		
			1500	103	13,000	22,000	54,000	86,000			13,000	22,000	54,000	97,000		
			1750	121	15,000	25,000	63,000				15,000	25,000	63,000			
			2000	138	17,000	28,000					17,000	28,000				

- Continued -

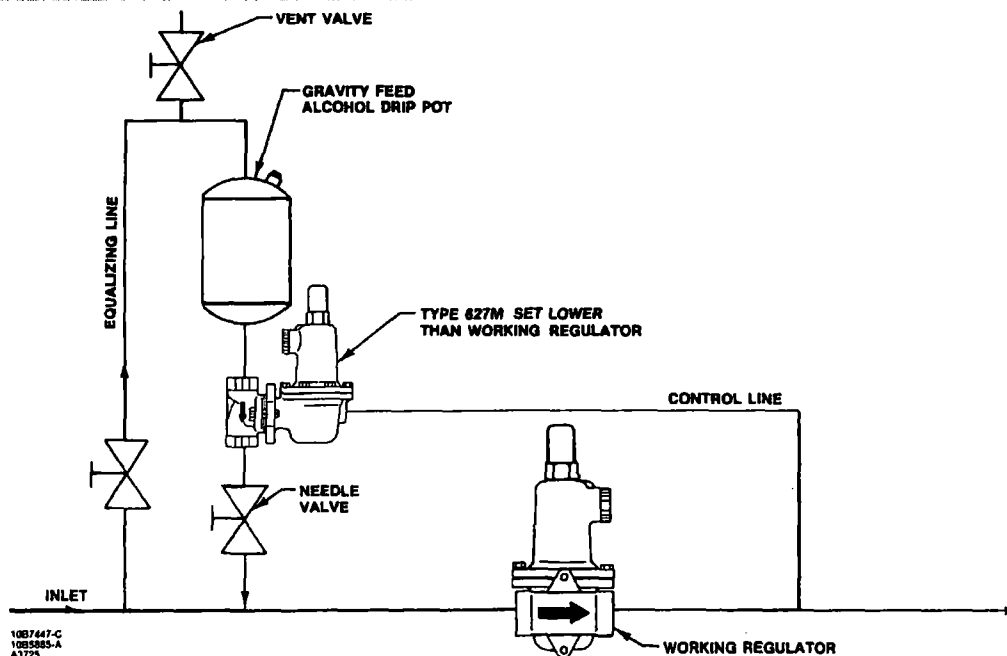


Figure 9. Schematic of De-Icer System

Table 4. Type 627, 627M and 627MR Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾ (Continued)

OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE		FOR TYPE 627						FOR TYPES 627M AND 627MR					
					2 INCH BODY SIZE						2 INCH BODY SIZE					
					Port Diameter, Inches (mm)						Port Diameter, Inches (mm)					
	Psig	Bar	Psig	Bar	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
70 to 150 psig (4.8 to 10.3 bar) 10B3079 X012 (red)	100	6.9	150	10.3	1170	2510	5540	8600	16,000	22,000	1170	2510	5540	8600	16,000	22,000
			200	13.8	1850	3370	7630	13,700	22,000	33,000	1850	3370	7630	13,700	22,000	33,000
			300	20.7	2700	4910	11,200	20,100	35,000	65,300	2700	4910	11,200	20,100	35,000	59,000
			500	34.5	4400	8090	18,300	32,900	73,000	129,000	4400	8090	18,300	32,900	73,000	116,000
			750	51.8	6600	12,000	27,200	48,900	108,000	172,000	6600	12,000	27,200	48,900	108,000	172,000
			1000	69.0	8700	16,000	36,100	64,800	144,000	219,000	8700	16,000	36,100	64,800	144,000	219,000
			1250	86.2	11,000	19,000	45,000	80,000	179,000	279,000	11,000	19,000	45,000	80,000	179,000	279,000
			1500	103	13,000	22,000	54,000	96,000	213,000	322,000	13,000	22,000	54,000	96,000	213,000	322,000
			1750	121	15,000	25,000	63,000	112,000	250,000	383,000	15,000	25,000	63,000	112,000	250,000	383,000
			2000	138	17,000	28,000	71,000	125,000	280,000	429,000	17,000	28,000	71,000	125,000	280,000	429,000
	125	8.6	150	10.3	1250	2340	5340	8600	16,000	24,000	1250	2340	5340	8600	16,000	24,000
			200	13.8	1830	3320	7550	13,000	24,000	36,000	1830	3320	7550	13,000	24,000	36,000
			300	20.7	2700	4910	11,200	20,100	39,000	65,300	2700	4910	11,200	20,100	39,000	59,000
			500	34.5	4400	8090	18,300	32,900	73,000	129,000	4400	8090	18,300	32,900	73,000	116,000
			750	51.8	6600	12,000	27,200	48,900	108,000	172,000	6600	12,000	27,200	48,900	108,000	172,000
			1000	69.0	8700	16,000	36,100	64,800	144,000	219,000	8700	16,000	36,100	64,800	144,000	219,000
			1250	86.2	11,000	19,000	45,000	80,000	179,000	279,000	11,000	19,000	45,000	80,000	179,000	279,000
			1500	103	13,000	22,000	54,000	96,000	213,000	322,000	13,000	22,000	54,000	96,000	213,000	322,000
			1750	121	15,000	25,000	63,000	112,000	250,000	383,000	15,000	25,000	63,000	112,000	250,000	383,000
			2000	138	17,000	28,000	71,000	125,000	280,000	429,000	17,000	28,000	71,000	125,000	280,000	429,000
	150	10.3	200	13.8	1760	3200	7290	13,000	24,000	38,000	1760	3200	7290	13,000	24,000	38,000
			300	20.7	2700	4910	11,200	20,100	44,600	64,200	2700	4910	11,200	20,100	44,600	58,000
			500	34.5	4400	8090	18,300	32,900	73,000	129,000	4400	8090	18,300	32,900	73,000	116,000
			750	51.8	6600	12,000	27,200	48,900	108,000	172,000	6600	12,000	27,200	48,900	108,000	172,000
			1000	69.0	8700	16,000	36,100	64,800	144,000	219,000	8700	16,000	36,100	64,800	144,000	219,000
			1250	86.2	11,000	19,000	45,000	80,000	179,000	279,000	11,000	19,000	45,000	80,000	179,000	279,000
			1500	103	13,000	22,000	54,000	96,000	213,000	322,000	13,000	22,000	54,000	96,000	213,000	322,000
			1750	121	15,000	25,000	63,000	112,000	250,000	383,000	15,000	25,000	63,000	112,000	250,000	383,000
			2000	138	17,000	28,000	71,000	125,000	280,000	429,000	17,000	28,000	71,000	125,000	280,000	429,000

1. Capacity is based on 20 percent droop unless otherwise noted below. See capacity information for conversion to equivalent capacities of other gases and/or normal m³/hr.

2. For pressure setting under 10 psig (0.69 bar), inlet pressure should be limited to approximately 100 psig (6.9 bar) so the set point adjustment can be obtained.

3. For 5 psig (0.34 bar) pressure set point the droop is 2 psig (0.14 bar).

Shaded areas indicate where capacities are based on 25 percent boost if setting is less than 12 psig (0.8 bar), 3 psig (0.2 bar) boost if setting is from 12 to 60 psig (0.8 to 4 bar), and 5 percent boost if setting is greater than 60 psig (4 bar).

Shaded area shows where a Type 627MR regulator should not be used because unbalanced forces can cause the internal relief valve to start to discharge during normal operation. Refer to table 1.

Shaded areas show where maximum operating inlet pressure for a given port diameter is exceeded for Type 627, 627M and 627MR regulators.

Type 627M or 627HM De-Icer System Application

A 627 Series regulator can be used in a de-icer application as shown in figure 9. As the seat ring in the working regulator begins to freeze, ice formation decreases the seat ring port diameter so that the working regulator is unable to supply enough flow to satisfy the downstream demand. When downstream pressure falls below the outlet pressure setting of the Type 627M regulator, the disk of the Type 627M

regulator moves off its seat ring and lets alcohol flow into the main gas line. The alcohol carried to the working regulator by the flow stream helps prevent additional ice formation on the seat ring. Normal flow then resumes, and as pressure in the downstream system is restored, the Type 627M regulator shuts off. This is an economy feature which conserves both the alcohol and the number of manhours required to maintain the alcohol supply. The alcohol is supplied to the working regulator only when icing conditions exist.

Table 5. Type 627H and 627HM Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾

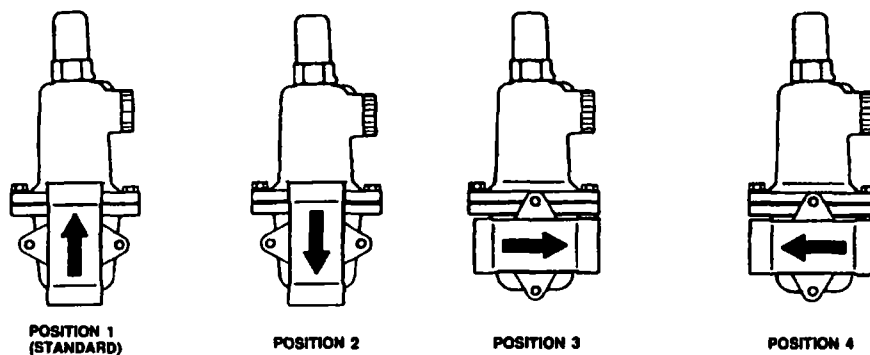
OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE		3/4 INCH BODY PORT DIAMETER, INCHES (mm)						1 INCH BODY PORT DIAMETER, INCHES (mm)					
	Psig	Bar	Psig	Bar	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
140 to 250 psig (9.7 to 17.2 bar) 10B3078 X012 (blue)	150	10.3	200	13.8	1760 ⁽²⁾	3200 ⁽²⁾	7290	11,500	21,600	31,000	1760 ⁽²⁾	3200 ⁽²⁾	7290	11,500	21,600	31,000
			250	17.2	2260 ⁽²⁾	4100 ⁽²⁾	9200	15,400	28,600	40,000	2260 ⁽²⁾	4100 ⁽²⁾	9200	15,400	28,600	40,000
			300	20.7	2700	4910	11,200	19,300	31,000	46,000	2700	4910	11,200	19,300	31,000	46,000
			400	27.6	3600	6500	14,800	24,700	40,000	50,000	3600	6500	14,800	25,000	40,000	50,000
			500	34.5	4400	8090	18,300	29,700	51,000	/	4400	8090	18,300	32,000	51,000	/
			750	51.7	6600	12,000	27,200	43,000	/	/	6600	12,000	27,200	46,000	/	/
			1000	69.0	8700	16,000	36,100	57,000	/	/	8700	16,000	36,100	60,000	/	/
			1250	86.2	11,000	19,000	45,000	/	/	/	11,000	19,000	45,000	/	/	/
			1500	103	13,000	22,000	54,000	/	/	/	13,000	22,000	54,000	/	/	/
			1750	121	15,000	25,000	63,000	/	/	/	15,000	25,000	63,000	/	/	/
			2000	138	17,000	28,000	/	/	/	/	17,000	28,000	/	/	/	/
	200	13.8	250	17.2	2160 ⁽²⁾	3850 ⁽²⁾	8400	15,000	31,000	41,000	2160 ⁽²⁾	3850 ⁽²⁾	8400	15,000	31,000	41,000
			300	20.7	2700 ⁽²⁾	4910 ⁽²⁾	11,200	19,500	36,000	52,000	2700 ⁽²⁾	4910 ⁽²⁾	11,200	19,500	36,000	52,000
			400	27.6	3600	6500	14,800	25,500	52,000	68,000	3600	6500	14,800	26,500	52,000	68,000
			500	34.5	4400	8090	18,300	31,000	61,000	/	4400	8090	18,300	33,000	61,000	/
			750	51.7	6600	12,000	27,200	45,500	/	/	6600	12,000	27,200	49,000	/	/
			1000	69.0	8700	16,000	36,100	60,000	/	/	8700	16,000	36,100	65,000	/	/
			1250	86.2	11,000	19,000	45,000	/	/	/	11,000	19,000	45,000	/	/	/
			1500	103	13,000	22,000	54,000	/	/	/	13,000	22,000	54,000	/	/	/
			1750	121	15,000	25,000	63,000	/	/	/	15,000	25,000	63,000	/	/	/
			2000	138	17,000	28,000	/	/	/	/	17,000	28,000	/	/	/	/
	250	17.2	300	20.7	2500 ⁽²⁾	4500 ⁽²⁾	9900	18,500	37,000	52,000	2500 ⁽²⁾	4500 ⁽²⁾	9900	18,500	37,000	75,000
			400	27.6	3600 ⁽²⁾	6400 ⁽²⁾	14,300	26,000	55,000	74,000	3600 ⁽²⁾	6400 ⁽²⁾	14,300	26,000	55,000	81,000
			500	34.5	4400	8090	18,300	33,000	64,000	87,000	4400	8090	18,300	33,000	64,000	95,000
			750	51.7	6600	12,000	27,200	49,000	93,000	/	6600	12,000	27,200	49,000	102,000	/
			1000	69.0	8700	16,000	36,100	65,000	/	/	8700	16,000	36,100	65,000	/	/
			1250	86.2	11,000	19,000	45,000	81,000	/	/	11,000	19,000	45,000	81,000	/	/
			1500	103	13,000	22,000	54,000	/	/	/	13,000	22,000	54,000	/	/	/
			1750	121	15,000	25,000	63,000	/	/	/	15,000	25,000	63,000	/	/	/
			2000	138	17,000	28,000	71,000	/	/	/	17,000	28,000	71,000	/	/	/
240 to 500 psig (16.5 to 34.5 bar) 10B3079 X012 (red)	250	17.2	300	20.7	2500 ⁽²⁾	4500 ⁽²⁾	9300	14,000	25,000	37,000	2500 ⁽²⁾	4500 ⁽²⁾	9300	14,000	25,000	37,000
			400	27.6	3600 ⁽²⁾	6400 ⁽²⁾	14,300	21,400	36,000	49,000	3600 ⁽²⁾	6400 ⁽²⁾	14,300	21,400	36,000	49,000
			500	34.6	4400	8090	18,300	26,300	42,000	62,000	4400	8090	18,300	26,300	42,000	62,000
			750	51.7	6600	12,000	27,200	37,100	57,000	/	6600	12,000	27,200	37,100	57,000	/
			1000	69.0	8700	16,000	36,100	47,400	/	/	8700	16,000	36,100	47,400	/	/
			1250	86.2	11,000	19,000	45,000	57,000	/	/	11,000	19,000	45,000	57,000	/	/
			1500	103	13,000	22,000	54,000	/	/	/	13,000	22,000	54,000	/	/	/
			1750	121	15,000	25,000	63,000	/	/	/	15,000	25,000	63,000	/	/	/
			2000	138	17,000	28,000	71,000	/	/	/	17,000	28,000	71,000	/	/	/
	300	20.7	350	24.1	2900 ⁽²⁾	5150 ⁽²⁾	11,300	18,400	31,000	45,000	2900 ⁽²⁾	5150 ⁽²⁾	11,300	18,400	31,000	45,000
			400	27.6	3500 ⁽²⁾	6200 ⁽²⁾	13,700	23,400	40,000	52,000	3500 ⁽²⁾	6200 ⁽²⁾	13,700	23,400	40,000	52,000
			500	34.5	4400	8090	18,300	32,000	53,000	67,000	4400	8090	18,300	32,000	53,000	67,000
			750	51.7	6600	12,000	27,200	48,000	80,000	/	6600	12,000	27,200	48,000	80,000	/
			1000	69.0	8700	16,000	36,100	62,000	/	/	8700	16,000	36,100	62,000	/	/
			1250	86.2	11,000	19,000	45,000	79,000	/	/	11,000	19,000	45,000	79,000	/	/
			1500	103	13,000	22,000	54,000	/	/	/	13,000	22,000	54,000	/	/	/
			1750	121	15,000	25,000	63,000	/	/	/	15,000	25,000	63,000	/	/	/
			2000	138	17,000	28,000	71,000	/	/	/	17,000	28,000	71,000	/	/	/

- Continued -

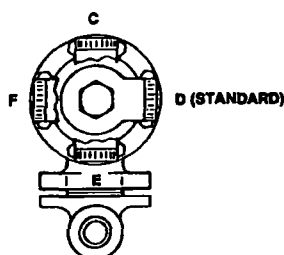
Table 5. Type 627H and 627HM Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾ (Continued)

OUTLET PRESSURE RANGE AND CONTROL SPRING(COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE		3/4 INCH BODY Port Diameter, Inches (mm)						1 INCH BODY Port Diameter, Inches (mm)					
	Psig	Bar	Psig	Bar	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
240 to 500 psig (16.5 to 34.5 bar) 10B3079 X012 (red)	400	27.6	450	31.0	3600 ⁽²⁾	6400 ⁽²⁾	14,000	25,000	47,000	67,000	3600 ⁽²⁾	6400 ⁽²⁾	14,000	25,000	47,000	67,000
			500	34.6	4400 ⁽²⁾	8090 ⁽²⁾	18,300	32,000	54,000	77,000	4400 ⁽²⁾	8090 ⁽²⁾	18,300	32,000	54,000	77,000
			750	51.7	6600	12,000	27,200	49,000	91,000	/	6600	12,000	27,200	49,000	91,000	/
			1000	69.0	8700	16,000	36,100	65,000	/	/	8700	16,000	36,100	65,000	/	/
			1250	86.2	11,000	19,000	45,000	81,000	/	/	11,000	19,000	45,000	81,000	/	/
			1500	103	13,000	22,000	54,000	/	/	/	13,000	22,000	54,000	/	/	/
			1750	121	15,000	25,000	63,000	/	/	/	15,000	25,000	63,000	/	/	/
			2000	138	17,000	28,000	71,000	/	/	/	17,000	28,000	71,000	/	/	/
	500	34.5	550	37.9	4300 ⁽²⁾	7700 ⁽²⁾	16,800	33,000	62,000	90,000	4300 ⁽²⁾	7700 ⁽²⁾	16,800	33,000	62,000	90,000
			600	41.4	4900 ⁽²⁾	8800 ⁽²⁾	19,400	37,000	70,000	104,000	4900 ⁽²⁾	8800 ⁽²⁾	19,400	37,000	70,000	104,000
			750	51.7	6600	12,000	27,200	49,000	88,000	137,000	6600	12,000	27,200	49,000	88,000	140,000
			1000	69.0	8700	16,000	36,100	65,000	130,000	/	8700	16,000	36,100	65,000	130,000	/
			1250	86.2	11,000	19,000	45,000	81,000	/	/	11,000	19,000	45,000	81,000	/	/
			1500	103	13,000	22,000	54,000	97,000	/	/	13,000	22,000	54,000	97,000	/	/
			1750	121	15,000	25,000	63,000	/	/	/	15,000	25,000	63,000	/	/	/
			2000	138	17,000	28,000	71,000	/	/	/	17,000	28,000	71,000	/	/	/

- Continued -



BODY-SPRING CASE ORIENTATION



SPRING CASE VENT LOCATION

10B7447-C
A3726

Figure 10. Type 627 Spring Case and Vent Location

Table 5. Type 627H and 627 HM Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾ (Continued)

OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE		2 INCH BODY PORT DIAMETER, INCHES (mm)					
	Psig	Bar	Psig	Bar	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
140 to 250 psig (9.7 to 17.2 bar) 10B3078 X012 (blue)	150	10.3	200	13.8	1760 ⁽²⁾	3200 ⁽²⁾	7290	13,700	24,100	31,000
			250	17.2	2260 ⁽²⁾	4100 ⁽²⁾	9200	16,100	28,600	40,000
			300	20.7	2700	4910	11,200	19,300	31,000	46,000
			400	27.6	3600	6500	14,800	25,000	40,000	50,000
			500	34.5	4400	8090	18,300	32,000		
			750	51.7	6600	12,000	27,200	48,000		
			1000	69.0	8700	16,000	36,100	65,000		
			1250	86.2	11,000	19,000	45,000			
			1500	103	13,000	22,000	54,000			
			1750	121	15,000	25,000	63,000			
	2000	138	17,000	28,000						
	200	13.8	250	17.2	2160 ⁽²⁾	3850 ⁽²⁾	8400	16,100	33,000	41,000
			300	20.7	2700 ⁽²⁾	4910 ⁽²⁾	11,200	20,100	36,000	52,000
			400	27.6	3600	6500	14,800	26,500	52,000	68,000
			500	34.5	4400	8090	18,300	33,000	61,000	
			750	51.7	6600	12,000	27,200	49,000		
			1000	69.0	8700	16,000	36,100	65,000		
			1250	86.2	11,000	19,000	45,000			
			1500	103	13,000	22,000	54,000			
			1750	121	15,000	25,000	63,000			
			2000	138	17,000	28,000				
	250	17.2	300	20.7	2500 ⁽²⁾	4500 ⁽²⁾	9900	18,500	37,000	75,000
			400	27.6	3600 ⁽²⁾	6400 ⁽²⁾	14,300	26,000	55,000	81,000
			500	34.5	4400	8090	18,300	33,000	64,000	95,000
			750	51.7	6600	12,000	27,200	49,000	102,000	
			1000	69.0	8700	16,000	36,100	65,000		
			1250	86.2	11,000	19,000	45,000	81,000		
			1500	103	13,000	22,000	54,000			
			1750	121	15,000	25,000	63,000			
			2000	138	17,000	28,000	71,000			
67240 to 500 psig (16.5 to 34.5 bar) 10B3079 X012 (red)			250	17.2	300	20.7	2500 ⁽²⁾	4500 ⁽²⁾	9300	14,000
	400	27.6			3600 ⁽²⁾	6400 ⁽²⁾	14,300	21,400	36,000	49,000
	500	34.6			4400	8090	18,300	26,300	42,000	62,000
	750	51.7			6600	12,000	27,200	37,100	57,000	
	1000	69.0			8700	16,000	36,100	47,400		
	1250	86.2			11,000	19,000	45,000	57,000		
	1500	103			13,000	22,000	54,000			
	1750	121			15,000	25,000	63,000			
	2000	138			17,000	28,000	71,000			
	300	20.7	350	24.1	2900 ⁽²⁾	5150 ⁽²⁾	11,300	18,400	31,000	45,000
			400	27.6	3500 ⁽²⁾	6200 ⁽²⁾	13,700	23,400	40,000	52,000
			500	34.5	4400	8090	18,300	32,000	53,000	67,000
			750	51.7	6600	12,000	27,200	48,000	80,000	
			1000	69.0	8700	16,000	36,100	62,000		
			1250	86.2	11,000	19,000	45,000	79,000		
			1500	103	13,000	22,000	54,000			
			1750	121	15,000	25,000	63,000			
			2000	138	17,000	28,000	71,000			

- Continued -

Table 5. Type 627H and 627HM Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾ (Continued)

OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE		2 INCH BODY PORT DIAMETER, INCHES (mm)					
	Psig	Bar	Psig	Bar	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
240 to 500 psig (16.5 to 34.5 bar) 10B3079 X012 (red)	400	27.6	450	31.0	3600 ⁽²⁾	6400 ⁽²⁾	14,000	25,000	47,000	67,000
			500	34.6	4400 ⁽²⁾	8090 ⁽²⁾	18,300	32,000	54,000	77,000
			750	51.7	6600	12,000	27,200	49,000	91,000	
			1000	69.0	8700	16,000	36,100	65,000		
			1250	86.2	11,000	19,000	45,000	81,000		
			1500	103	13,000	22,000	54,000			
			1750	121	15,000	25,000	63,000			
			2000	138	17,000	28,000	71,000			
	500	34.5	550	37.9	4300 ⁽²⁾	7700 ⁽²⁾	16,800	33,000	62,000	90,000
			600	41.4	4900 ⁽²⁾	8800 ⁽²⁾	19,400	37,000	70,000	104,000
			750	51.7	6600	12,000	27,200	49,000	88,000	140,000
			1000	69.0	8700	16,000	36,100	65,000	130,000	
			1250	86.2	11,000	19,000	45,000	81,000		
			1500	103	13,000	22,000	54,000	97,000		
			1750	121	15,000	25,000	63,000			
			2000	138	17,000	28,000	71,000			

1. Capacity is based on 20 percent drop. See capacity information for conversion to equivalent capacities of other gases and/or normal m³/hr.
2. Small orifices and low pressure drops may cause set point to shift ± 15 psig

(1.03 bar) Shaded areas show where maximum operating inlet pressure for a given port diameter is exceeded for Type 627H and 627HM regulators.

Table 6. Type 627R Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾

OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE		3/4 INCH BODY SIZE						1 INCH AND 2 INCH BODY SIZES					
	Psig	Bar	Psig	Bar	Port Diameter, Inches (mm)						Port Diameter, Inches (mm)					
					3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
5 to 20 psig ⁽²⁾ (0.34 to 1.4 bar) 10B3076 X012 (yellow)	5	0.34	10	0.69	170	320	710	1050	1500	1850	170	330	710	1080	2000	2150
			15	1.0	240	330	810	1290	2100	2850	240	390	890	1500	2350	3000
			20	1.4	290	460	1090	1750	2750	3850	290	500	1160	1900	2750	3900
			30	2.1	380	610	1470	2490	3600	4800	380	690	1500	2500	3600	4900
			60	4.1	640	1170	2460	3690	5270	6120	640	1170	2460	3690	5650	6900
			75	5.2	770	1410	2880	4150	5760	6900	770	1410	2880	4150	6450	7490
			100	6.9	990	1690	3540	4790	6200	7600	990	1800	3540	5790	7520	8150
			15	1.03	210	320	800	1290	2100	2820	210	390	840	1480	2300	2930
	10	0.69	20	1.4	280	450	1070	1740	2700	3800	280	500	1100	1880	2700	3830
			30	2.1	380	610	1470	2430	3550	4780	380	690	1500	2460	3550	4840
			60	4.1	640	1170	2460	3690	5270	6120	640	1170	2460	3690	5650	6900
			75	5.2	770	1410	2880	4150	5760	6900	770	1410	2880	4150	6450	7490
			100	6.9	990	1690	3540	4790	6200	7600	990	1800	3540	4790	7520	8150
			150	10.3	1420	2430	4000	5680	6250	7630	1420	2580	4660	5680	9980	10,800
			200	13.8	1850	3070	4200	6200	6380	7680	1850	3370	5620	6360	11,000	12,900
			300	20.7	2700	3970	4270	6250	6500		2700	4880	6890	7780	13,600	
			500	34.5	4010	4240	5640	6520			4400	6720	8570	11,600		
			750	51.7	4400	5120	6400				5400	8850	9000			
			1000	69.0	4450	6220					5800	9500				
			1250	86.2	4540						6300					
			1500	103	4880						6600					
			1750	121	5230						6800					
			2000	138	5900						7600					

-Continued -

Table 6. Type 627R Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾ (Continued)

OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE		3/4 INCH BODY SIZE						1 INCH AND 2 INCH BODY SIZES					
					Port Diameter, Inches (mm)						Port Diameter, Inches (mm)					
	Psig	Bar	Psig	Bar	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
5 to 20 psig ⁽²⁾ (0.69 to 1.4 bar) 10B3076 X012 (yellow)	20	1.4	30	2.1	350	590	1390	2480	4350	4970	350	600	1390	2580	4350	6290
			50	3.4	550	980	2240	4000	7450	8000	550	1000	2250	4090	7600	8000
			60	4.1	640	1170	2610	4680	7800	8900	640	1170	2630	4750	7800	10,600
			100	6.9	990	1800	3980	6700	9750	10,400	990	1800	4070	7310	10,800	13,400
			150	10.3	1420	2580	5600	8790	10,000	10,800	1420	2580	5720	10,300	13,500	14,000
			200	13.8	1850	3370	7050	9000	10,200	10,800	1850	3370	7050	10,500	14,000	14,400
			300	20.7	2700	4910	7300	9500	10,500		2700	4910	9250	10,800	14,900	
			500	34.5	4400	5200	7400	9760			4400	7830	11,800	13,300		
			750	51.7	6600	5360	8870				6600	9000	12,000			
			1000	69.0	7300	6500					8700	9660				
			1250	86.2	7500						10,000					
			1500	103	7800						10,400					
			1750	121	8400						12,000					
			2000	138	8600						14,000					
15 to 40 psig (1.0 to 2.8 bar) 10B3077 X012 (green)	40	2.8	60	4.1	610	1090	2270	4230	8100	9100	610	1090	2430	4510	9200	9400
			75	5.2	760	1370	3080	5330	10,300	11,600	760	1370	3080	5640	10,800	16,300
			100	6.9	990	1790	4070	6840	11,900	13,400	990	1790	4070	7310	13,500	17,600
			150	10.3	1420	2580	5850	9320	13,500	13,800	1420	2580	5850	10,500	18,000	22,200
			200	13.8	1850	3370	7630	11,000	16,300	17,100	1850	3370	7630	11,000	21,400	24,600
			300	20.7	2700	4910	11,200	14,700	17,800		2700	4910	11,200	14,900	24,400	
			500	34.5	4400	8090	14,500	14,800			4400	8090	16,300	21,800		
			750	51.7	6600	10,800	14,800	14,900			6600	12,000	20,200	23,600		
			1000	69.0	8700	13,100	16,300				8700	16,000	23,200			
			1250	86.2	11,000	13,800					11,000	19,000				
			1500	103	12,000	14,000					13,000	21,000				
			1750	121	13,000						15,000					
			2000	138	14,000						17,000					
35 to 80 psig (2.4 to 5.5 bar) 10B3078 X012 (blue)	60	4.1	75	5.2	700	1230	2760	4700	8170	12,600	700	1230	2760	4860	8600	12,800
			100	6.9	970	1740	3910	6690	11,900	14,400	970	1740	3910	7000	12,500	16,700
			150	10.3	1420	2580	5850	9740	15,700	18,700	1420	2580	5850	10,500	16,800	23,000
			200	13.8	1850	3370	7630	12,400	18,400	21,200	1850	3370	7630	13,700	20,900	27,700
			300	20.7	2700	4910	11,200	17,700	20,200		2700	4910	11,200	20,100	28,100	
			500	34.5	4400	8090	18,300	20,000			4400	8090	18,300	28,500		
			750	51.8	6600	12,000	18,900	21,400			6600	12,000	22,800	29,500		
			1000	69.0	8700	16,000	19,000				8700	16,000	26,800			
			1250	86.2	11,000	18,700					11,000	19,000				
			1500	103	13,000	19,000					13,000	22,000				
	80	5.5	1750	121	15,000	20,000					15,000	25,000				
			2000	138	17,000						17,000					
			100	5.2	900	1630	3570	6490	12,000	17,200	900	1630	3570	6650	12,000	17,400
			150	10.3	1410	2580	5750	10,500	18,900	25,000	1410	2580	5750	10,500	20,100	26,000
			200	13.8	1850	3370	7630	13,700	23,000	29,000	1850	3370	7630	13,700	25,100	31,800
			300	20.7	2700	4910	11,200	20,100	26,000		2700	4910	11,200	20,100	32,600	
			500	34.5	4400	8090	18,300	29,000			4400	8090	18,300	30,300		
			750	51.8	6600	12,000	23,100	30,900			6600	12,000	27,200	37,400		
			1000	69.0	8700	16,000	27,400				8700	16,000	33,300			
			1250	86.2	11,000	19,000					11,000	19,000				
			1500	103	13,000	22,000					13,000	22,000				
			1750	121	15,000	25,000					15,000	25,000				
			2000	138	17,000						17,000					

- Continued -

Table 6. Type 627R Regulator Capacities in Scfh of 0.6 Specific Gravity Natural Gas⁽¹⁾ (Continued)

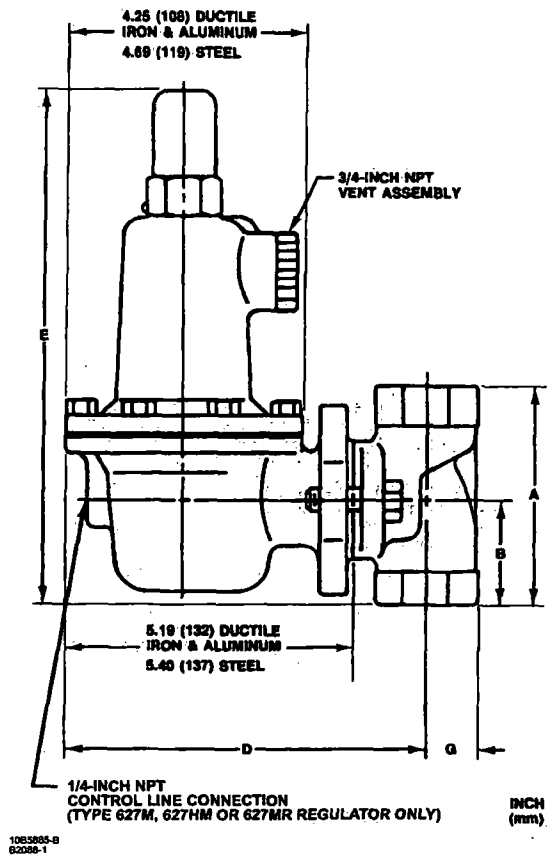
OUTLET PRESSURE RANGE AND CONTROL SPRING (COLOR)	OUTLET PRESSURE SETTING		INLET PRESSURE		3/4 INCH BODY SIZE						1 INCH AND 2 INCH BODY SIZE					
	Psig	Bar	Psig	Bar	Port Diameter, Inches (mm)						Port Diameter, Inches (mm)					
					3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	3/32 (2.4)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)
70 to 150 psig (4.8 to 10.3 bar) 10B3079 X012 (red)	100	6.9	150	10.3	1170	2510	5540	8310	15,500	20,300	1170	2510	5540	8310	15,500	20,300
			200	13.8	1850	3370	7630	12,000	20,100	25,700	1850	3370	7630	12,000	20,100	26,700
			300	20.7	2700	4910	11,200	18,200			2700	4910	11,200	18,200		
			500	34.5	4400	8090	18,300				4400	8090	18,300			
			750	51.8	6600	12,000					6600	12,000				
			1000	69.0	8700	16,000					8700	16,000				
			1250	86.2	11,000						11,000					
			1500	103	13,000						13,000					
			1750	121	15,000						15,000					
			2000	138	17,000						17,000					
	125	8.6	150	10.3	1250	2330	5090	9130	15,700	20,800	1250	2330	5090	9470	15,700	20,800
			200	13.8	1830	3320	7360	13,160	22,400	28,600	1830	3320	7360	13,400	23,600	31,300
			300	20.7	2700	4910	11,200	19,700			2700	4910	11,200	19,700		
			500	34.5	4400	8090	18,300				4400	8090	18,300			
			750	51.8	6600	12,000					6600	12,000				
			1000	69.0	8700	16,000					8700	16,000				
			1250	86.2	11,000						11,000					
			1500	103	13,000						13,000					
			1750	121	15,000						15,000					
			2000	138	17,000						17,000					
	150	10.3	200	13.8	1760	3200	7020	12,500	21,400	30,600	1760	3200	7020	12,900	21,400	33,300
			300	20.7	2700	4910	11,200	17,200			2700	4910	11,200	17,200		
			500	34.5	4400	8090	18,300				4400	8090	18,300			
			750	51.8	6600	12,000					6600	12,000				
			1000	69.0	8700	16,000					8700	16,000				
			1250	86.2	11,000						11,000					
			1500	103	13,000						13,000					
			1750	121	15,000						15,000					
			2000	138	17,000						17,000					

1. Capacities are based on 20 percent droop. See capacity information for conversion of equivalent capacities of other gases and/or normal m³/hr.
2. For pressure setting under 10 psig (0.69 bar), inlet pressure should be limited to

approximately 100 psig (6.9 bar) so the set point adjustment can be obtained.
Shaded areas show where maximum operating inlet pressure for a given port diameter is exceeded for a Type 627R regulator.

Table 7. Flow Coefficients

PORT DIAMETER		3/4-INCH BODY		1- INCH BODY		2-INCH BODY	
Inch	mm	Wide-Open C _g for External Relief Sizing	C ₁	Wide-Open C _g for External Relief Sizing	C ₁	Wide-Open C _g for External Relief Sizing	C ₁
3/32	2.4	6.9	29.2	6.9	28.5	6.9	29.7
1/8	3.2	12.5	29.1	12.5	29.4	12.5	29.2
3/16	4.8	29	28.6	29	31.2	29	28.5
1/4	6.4	50	30.6	50	29.3	52	31.3
3/8	9.5	108	36.1	108	31.6	115	33.9
1/2	12.7	190	39.0	190	35.9	200	39.9



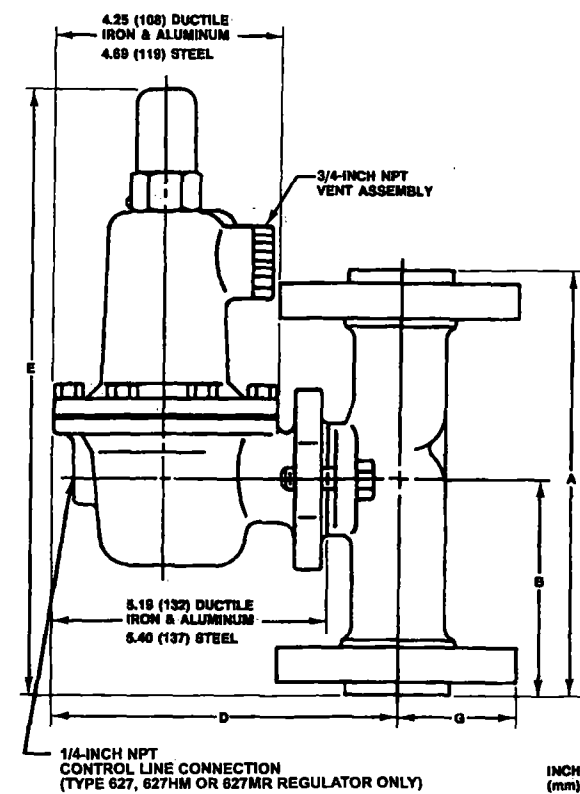
TYPES 627, 627R, 627M, AND 627MR

SCREWED BODY						
US Units						
Body Size, Inches	A	B	D		E	G
			Ductile Iron	Steel		
3/4 and 1	4.06	1.94	6.50	6.75	9.56	1.00
2	5.00	2.50	6.88	7.12	10.12	1.69
Metric Units						
3/4 and 1	103	49	165	172	243	25
2	127	64	175	181	257	43

TYPE 627H OR 627HM

SCREWED BODY					
US Units					
Body Size, Inches	A	B	D	E	G
3/4 and 1	4.06	1.94	6.75	9.88	1.00
2	5.00	2.50	7.12	10.44	1.69
Metric Units					
3/4 and 1	103	49	172	251	25
2	127	64	181	265	43

Figure 11. Dimensions



11B1643-A

INCH
(mm)

TYPES 627, 627R, 627M, AND 627MR

FLANGED BODY									
US Units									
Body Size, Inches	A		B		D		E		G
	Class		Class		Ductile Iron	Steel	Class		
	300	600	300	600			300	600	
1	7.75	8.25	3.88	4.12	6.50	6.75	11.50	11.75	2.44
2	10.50	11.25	5.25	5.62	6.88	7.12	12.88	13.25	3.25
Metric Units									
1	197	210	99	105	165	172	292	298	62
2	267	286	134	143	175	181	327	337	83

TYPE 627H OR 627HM

FLANGED BODY								
US Units								
Body Size, Inches	A		B		D	E		G
	Class		Class			Class		
	300	600	300	600		300	600	
1	7.75	8.25	3.88	4.12	6.75	11.82	12.06	2.44
2	10.50	11.25	5.25	5.62	7.12	13.19	13.56	3.25
Metric Units								
1	197	210	99	105	172	300	306	62
2	267	286	134	143	181	335	344	83

Figure 11. Dimensions (Continued)

Ordering Information

Application

When ordering, specify:

1. Type of regulator
2. Body size
3. Body material and trim material
4. Port diameter in inches (millimeters)
5. Control spring range in psig (bar)

Construction

Refer to the specifications and to each referenced table; specify the desired selection whenever there is a choice to be made. The standard assembly position is 1D as shown in figure 10, but an alternate assembly position may be factory-ordered or can be accomplished in the field by unbolt-
ing the body or spring case using the instructions in the appropriate section of the instruction manual. For installation dimensions, refer to figure 10.

While this information is presented in good faith and believed to be accurate, Fisher Controls does not guarantee satisfactory results from reliance upon such information. *Nothing contained herein is to be construed as a warranty or guarantee, express or implied, regarding the performance, merchantability, fitness*

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CATA-DYNE™ HEATER

STANDARD HEATER APPLICATIONS

INSTALLATION & OPERATION INSTRUCTIONS THERMAL SYSTEMS DIVISION CANADA



ISO 9002 REGISTERED QUALITY SYSTEM

The Cata-Dyne™ heater can be used in all industrial indoor locations where a source of infrared radiant heat is required, providing adequate ventilation is available.

CERTIFICATION

The model "WX" Series Cata-Dyne™ Explosion-proof, flameless infrared catalytic gas heater is certified by the Canadian Standards Association (CSA)/Canadian Gas Association (CGA) for use in Class I, Divisions 1 and 2, Group D hazardous locations and by Factory Mutual Global (FM), for use in Class I, Division 1, Group D hazardous locations, temperature code T2C at an ambient temperature of 40°C (104°F).

The model "BX" Series "G" heater is certified by CSA/CGA and FM for use in ordinary locations. Models listed are certified for industrial use only, for either natural gas or propane gas. CCI Thermal maintains an ISO-9002 registered quality management system at its Edmonton location.

INSTALLATION

To ensure maximum efficiency of your Cata-Dyne™ heater, it should be installed with the heating surface positioned plus or minus 45° from the vertical plane at a height of no more than 8 ft (2.44m). All heaters must be installed in accordance with the latest revisions of the Canadian Electrical Code, CAN/CGA-B149.1, the Natural Gas Installation Code and/or CAN/CGA-B149.2, the Propane Installation Code and/or any local codes and regulations. Before installing the heater, all information on the heater nameplate must be carefully reviewed. The nameplate lists all the fuel and electrical requirements for the heater.

Cata-Dyne™ Heater - Models Available

Model "WX" Series "X"	Specifications (BTU/h Input Ratings) For Both Natural and Propane Gas		Model "BX" Series "X"	Specifications (BTU/h Input Ratings) For Both Natural and Propane Gas	
	Max. BTU/h	Max. kW			
WX 6x6	1,000 BTU/h	0.293 kW	BX 6x6	1,500 BTU/h	0.4 kW
WX 6x12	2,000 BTU/h	0.586 kW	BX 6x12	3,000 BTU/h	0.9 kW
WX 8x8	1,778 BTU/h	0.521 kW	BX 8x8	3,500 BTU/h	1.0 kW
WX 6x24	4,000 BTU/h	1.171 kW	BX 6x24	6,000 BTU/h	1.8 kW
WX 10x12	3,333 BTU/h	0.976 kW	BX 10x12	5,000 BTU/h	1.5 kW
WX 12x12	4,000 BTU/h	1.171 kW	BX 12x12	6,000 BTU/h	1.8 kW
WX 12x24	8,000 BTU/h	2.343 kW	BX 12x24	12,000 BTU/h	3.5 kW
WX 12x36	12,000 BTU/h	3.514 kW	BX 12x36	18,000 BTU/h	5.3 kW
WX 12x48	16,000 BTU/h	4.686 kW	BX 12x48	24,000 BTU/h	7.0 kW
WX 12x60	20,000 BTU/h	5.857 kW	BX 12x60	30,000 BTU/h	8.8 kW
WX 12x72	24,000 BTU/h	7.029 kW	BX 12x72	36,000 BTU/h	10.5 kW
WX 18x24	12,000 BTU/h	3.514 kW	BX 18x24	18,000 BTU/h	5.3 kW
WX 18x30	15,000 BTU/h	4.393 kW	BX 18x30	22,500 BTU/h	6.6 kW
WX 18x36	18,000 BTU/h	5.272 kW	BX 18x36	27,000 BTU/h	7.9 kW
WX 18x48	24,000 BTU/h	7.029 kW	BX 18x48	36,000 BTU/h	10.5 kW
WX 18x60	30,000 BTU/h	8.786 kW	BX 18x60	45,000 BTU/h	13.2 kW
WX 18x72	36,000 BTU/h	10.543 kW	BX 18x72	54,000 BTU/h	15.8 kW
WX 24x24	16,000 BTU/h	4.686 kW	BX 24x24	24,000 BTU/h	7.0 kW
WX 24x30	20,000 BTU/h	5.857 kW	BX 24x30	30,000 BTU/h	8.8 kW
WX 24x36	24,000 BTU/h	7.029 kW	BX 24x36	36,000 BTU/h	10.5 kW
WX 24x48	32,000 BTU/h	9.372 kW	BX 24x48	48,000 BTU/h	14.1 kW
WX 24x60	40,000 BTU/h	11.715 kW	BX 24x60	60,000 BTU/h	17.5 kW
WX 24x72	48,000 BTU/h	14.058 kW	BX 24x72	72,000 BTU/h	21.0 kW

Model "WX" Series Heaters are certified for use in Class I, Division 1 and 2, Group D hazardous locations by both FM and CSA/CGA

Model "BX" Series Heaters are certified for use in Class I, Division 2, Group D hazardous locations by FM and for Class I, Division 1 and 2, Group D hazardous locations by CSA/CGA

The "WX" Series Cata-Dyne™ features an improved efficiency catalyst pad that requires 1/3 less fuel to generate the same heat value as our "BX" Series Cata-Dyne™ heater.



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SPECIFICATIONS

Clearances

Appropriate clearances from the heating surface must be observed during the installation of the Cata-Dyne™ heaters (See Figure 1).

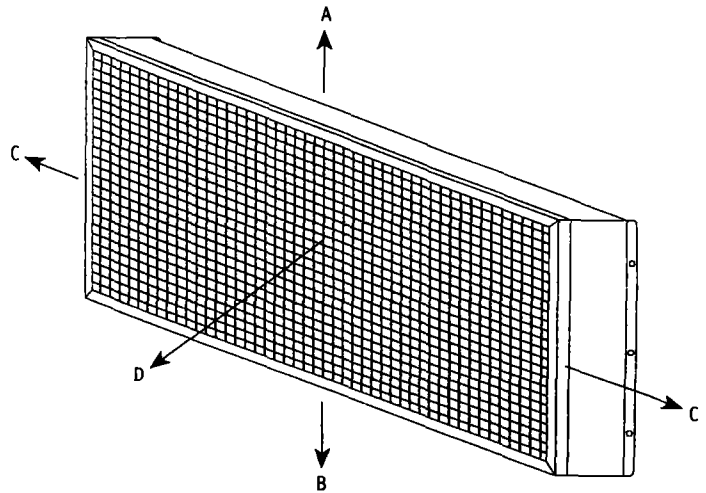
Fuels

The Cata-Dyne™ flameless gas heater is designed to operate on clean, dry natural or propane gas as specified on the heater nameplate.

Natural Gas—these heaters are designed to use natural gas (1000 BTU/ft³, 37 MJ/m³) at 7 in w.c. (1.73 kPa), 4.5 in w.c. (1.12 kPa), or 3.5 in w.c. (0.86 kPa).

Propane—these heaters are designed to use propane gas (2500 BTU/ft³, 88 MJ/m³) at 11 in w.c. (2.72 kPa).

FIGURE 1



	Radiant Surface			Sides	Top			Bottom		
Radiant Surface Position	Heaters Up To 12,000 BTU/h	Over 12,000 Up To 48,000 BTU/h	Over 48,000 Up To 72,000 BTU/h	All Heaters Up To 72,000 BTU/h	Heaters Up To 12,000 BTU/h	Over 12,000 Up To 48,000 BTU/h	Over 48,000 Up To 72,000 BTU/h	Heaters Up To 12,000 BTU/h	Over 12,000 Up To 48,000 BTU/h	Over 48,000 Up To 72,000 BTU/h
Vertical (0°)	28 in	42 in	60 in	12 in	18 in	18 in	42 in	7 in	12 in	18 in
0-45° up	28 in	42 in	60 in	12 in	18 in	32 in	54 in	0 in	12 in	18 in
0-45° down	28 in	42 in	60 in	12 in	18 in	18 in	18 in	22 in	24 in	42 in

Piping

1. A main shut-off valve must be installed upstream of all auxiliary heater controls.
2. The 100% safety shut-off valve and appliance regulator (natural gas heaters only) must be installed in the upright position.
3. The thermostatic temperature controller should be installed with the dial shaft in the horizontal position.
4. The maximum inlet pressure to the 100% safety shut-off valve, thermostatic temperature controller and appliance regulator is 1/2 psi (3.4 kPa). If the inlet pressure is higher than this, a low pressure regulator must be installed upstream of these components.
5. The maximum inlet pressure to the low pressure regulator is 250 psi (1.7 MPa). If the inlet pressure is higher than this, a high pressure regulator must be installed upstream.
6. All components should be installed as indicated in Figure 2.

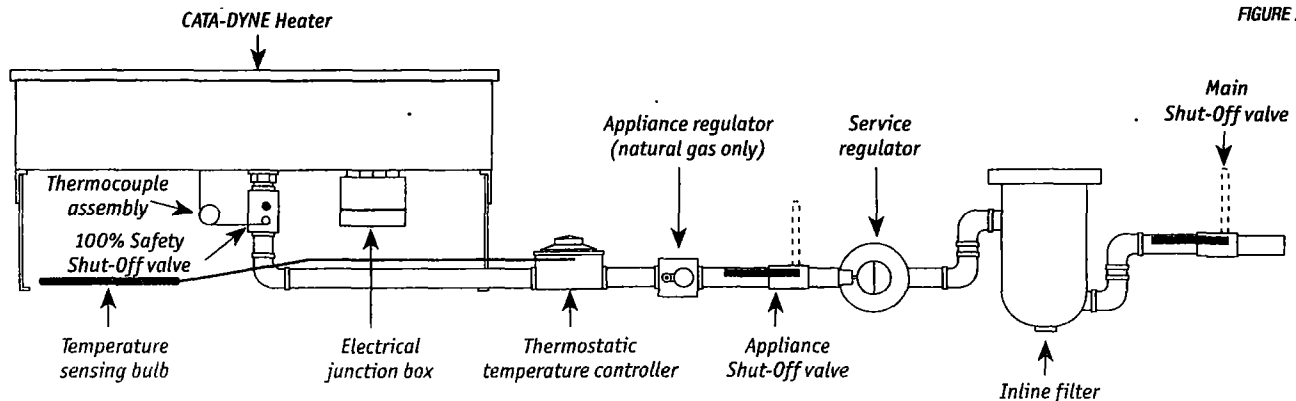


FIGURE 2

Electrical

1. All wiring is to be installed in accordance with the latest revisions of the Canadian Electrical Code and/or any applicable local codes.
2. It is desirable to install an indicating light on all starting systems. This will reduce the possibility of the power being left on once the heater is started, which can severely reduce the lifespan of the heater.
3. Ground connections for 120V and above heaters are required as indicated in Figures 3 and 4.
4. The number of terminals in the junction box can be two or four depending on the number of elements used in the fabrication of the heater. The connection procedure for the different combinations is as described in Figures 3 and 4:

Ventilation

The catalytic reaction in Cata-Dyne™ heaters occurs when natural gas or propane reacts with oxygen to produce water vapor, carbon dioxide and infrared energy. Ventilation must be provided to allow an adequate supply of oxygen for the reaction.

For every 1.0 ft² (0.093 m²) of heater surface, 60 ft³/hr (1.7 m³/hr) of air supply is required. For example, a BX 24x24 heater (24,000 BTU/hr 7.0 kW) would require 240 ft³/hr (6.8 m³) of air to ensure proper operation of the Cata-Dyne™ heater.

To reduce the carbon dioxide and water vapor concentrations in the building, a vent hood assembly can be installed to provide positive ventilation from the heater (See Figure 5).

FIGURE 3

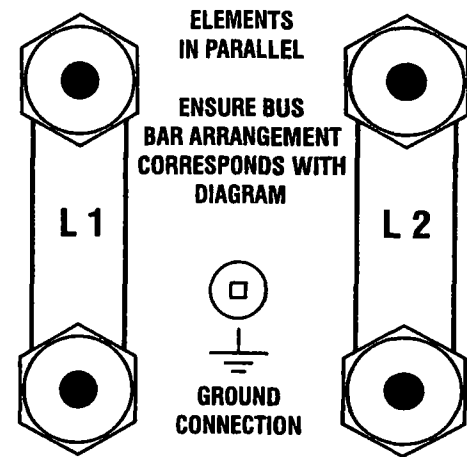


FIGURE 4

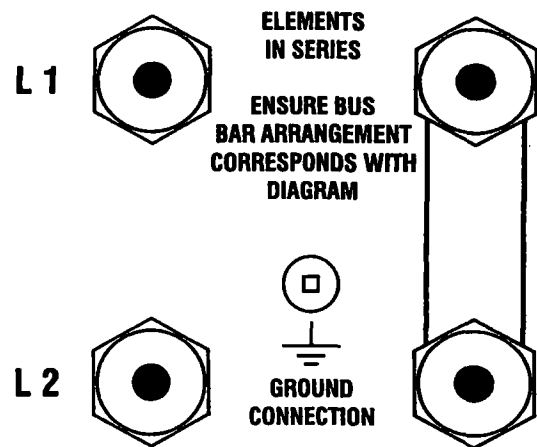
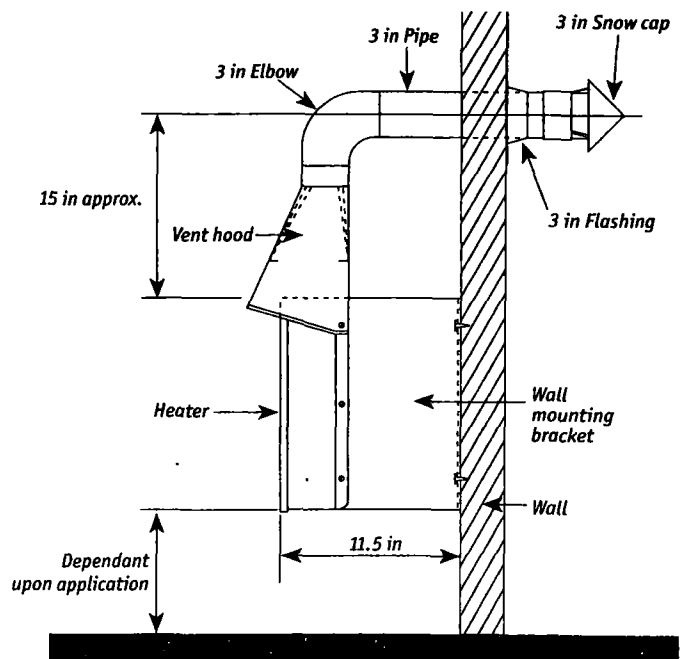


FIGURE 5



OPERATION

All Cata-Dyne™ heaters are supplied with a Safety Shut-Off Valve (SSOV)/Thermocouple assembly to ensure the safe operation of the heater. Under no circumstances should the reset button be held or locked into the depressed position by use of a mechanical restraint. A tamper resistant model SSOV is available if desired.

Start-up

1. Ensure the heater has been installed according to all instructions and relevant codes.
2. Turn on the main gas supply to the system.
3. If the heater is equipped with a thermostatic temperature controller, rotate the dial completely clockwise to the fully open position.
4. Turn on the power to the electrical elements.
5. After 15 minutes, depress the reset button on the top of the 100% safety shut-off valve. The button should return to the original position and internally open the valve and allow gas to flow to the heater. If the valve does not stay open when the reset button is released, it may be necessary to wait an additional few minutes and then depress the reset button again. This will allow the electrical elements additional time to warm up.
6. When the catalytic reaction is well established, turn off the electrical power to the elements.
7. If the heater is equipped with a thermostatic temperature controller, it can be set to the desired setting after the catalytic reaction has been established for at least one hour.

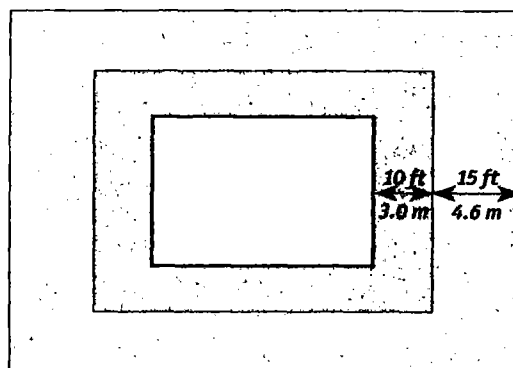
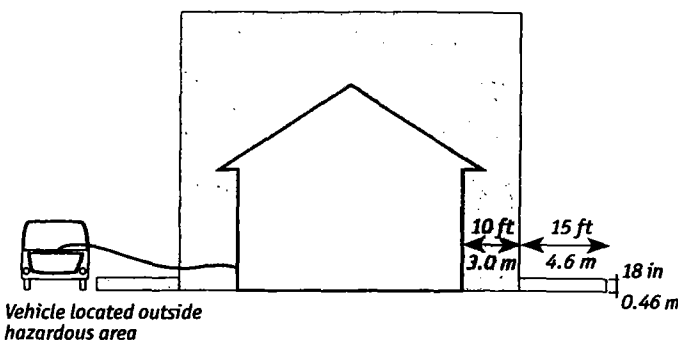
Shut down

Turn off the gas supply to the heater.

Multi-heater start-up

Cata-Dyne™ heaters can also be purchased/installed in multi-heater assemblies. If these assemblies are 12V, each heater must be started individually. This ensures the correct voltage and current will be reaching the heater from the power supply.

12 V HAZARDOUS ELECTRICAL INSTALLATIONS



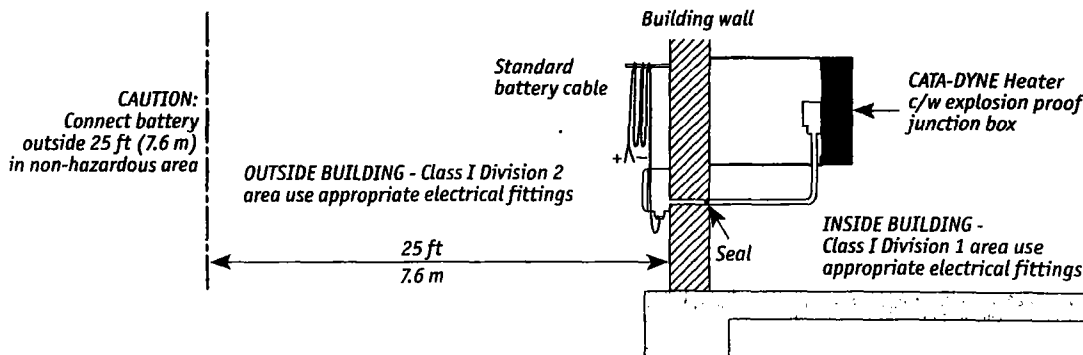
Class I Division 1
Class I Division 2

Class I Division 2
18 in (0.46 m) from ground
Subject to possible transient vapour

Most oil and gas production buildings have an area classification as follows:

1. Class I, Division 1, within the building.
2. Class I, Division 2, outside the building for a distance of 10 ft (3.0 m) from the building at all elevations.
3. Class I, Division 2, outside the building for a distance of 25 ft (4.5 m) from the building at an elevation of 18 in (0.45 m) from the ground.

All electrical apparatus and wiring within this area must conform to the appropriate codes. Connection to the power supply must be outside of the Class I, Division 2 location.



SPOT HEATING

There are several factors to consider when Cata-Dyne™ heaters are utilized for spot heating.

Infrared energy travels in straight lines from the face of the Cata-Dyne™ heater covering approximately 160° of arc and is inversely proportional to the square of the distance. The heater should therefore be mounted as close as practical (min. of 8 in (20 cm)) to the object requiring heat for maximum temperature rise.

Match the shape of the object requiring heat with the appropriate Cata-Dyne™ heater, e.g. WX/BX 6x24 for long narrow objects or WX/BX 12x12 for a square object.

Objects requiring heat should be painted dull, dark colors for maximum infrared absorption and objects not requiring heat should be painted light or reflective colors.

Maintain nameplate clearances from combustible materials such as wood, cloth, paper, etc.

Insulate and protect plastic, rubber and similar materials from direct intense infrared heat.

SPACE HEATING

A separate heat load calculation should be done for each building in which a Cata-Dyne™ will be installed for space heating purposes.

The heat load calculation determines the building heat losses through the structure and allows for air infiltration (refer to the sample Heat Load Calculation in the Cata-Dyne™ catalogue).

Cata-Dyne™ heaters produce low intensity infrared heat that is absorbed by objects within the range of the heat source. The closer the object is to the source of heat, the more heat the object will absorb. Cata-Dyne™ heaters should be placed close to the floor level within the building to heat objects close to the floor.

Ideally, Cata-Dyne™ heaters should be mounted 1-3 ft (0.3-1 m) from the floor and equally spaced around the building perimeter for space heating applications.

If low mounting is not practical, then overhead mounting may be utilized. Overhead mounted heaters should be sloped face down to a maximum 45° angle to direct the infrared energy towards the floor. Overhead mounting should be restricted to heaters of 30,000 BTU/hr (8.8 kW) capacity and larger.

If the building requires only one heater, place the Cata-Dyne™ heater as close as possible to the centre of the longest wall.

For multiple heater installations, space the Cata-Dyne™ heaters as evenly as possible around the perimeter of the building.

Make sure the piping is large enough to handle the gas load (refer to the sample Piping Calculation in the Cata-Dyne™ catalogue for sizing information).

Make sure the electrical starting system has sufficient current carrying capacity and conforms to all applicable electrical codes.

It is advisable to install an indicator light in the electrical circuit to reduce the possibility of the power being left on once the heater is started.

PERSONAL SAFETY

The Cata-Dyne™ flameless infrared catalytic gas heater does not produce harmful carbon monoxide gas when used with natural gas or propane. Adequate ventilation must be incorporated in any building design to ensure oxygen replenishment and removal of any carbon dioxide. Protective grills should be used on any installation where personnel may come in contact with the face of the heater.

ORDERING INFORMATION

You can order any of CCI Thermal's products by telephone, fax, mail or e-mail. To assist us in processing your order as quickly and efficiently as possible, please provide us with the following information:

- ◆ Cata-Dyne™ product name
- ◆ Cata-Dyne™ model number
- ◆ Fuel gas - natural gas or propane
- ◆ Starting voltage - 12, 24, 120, 208, 240, 480, or 600 volt
- ◆ Accessories required:
 - Protection Grill
 - Wall Mount Brackets
 - Thermostat
 - Regulator
 - Start Up Leads (12 volt system only)
 - Vent Hood
 - Other
- ◆ Company name and contact
- ◆ Billing address, phone number, fax or e-mail
- ◆ Shipping address and phone number
- ◆ Shipping instructions
- ◆ Special tagging instructions
- ◆ Date required
- ◆ Method of payment:
 - on account - P.O. number required
 - credit card - Visa or Mastercard number
 - cash or cheque

GUARANTEE

CCI Thermal warrants all Cata-Dyne™ flameless infra-red heaters sold to be free from defects in material or workmanship under normal use and service. The company agrees to repair or replace any Cata-Dyne™ heater which, upon its examination, reveals it to have been defective due to faulty workmanship or material, if returned to our factory, transportation PREPAID, within one (1) year from date of purchase. The company does not assume responsibility for misuse or misapplication of its heaters.

Warranty is void if heaters are used with sour, dirty or wet gas, or where sulphur content is greater than allowable for utility gas specifications. Warranty is void if, upon our inspection, the heater has been tampered with. Neither CCI Thermal nor the selling dealer shall be held responsible for loss of time, inconvenience, commercial loss or consequential damages relating to the use of Cata-Dyne™ heaters.

RETURN GOODS POLICY

Prior written approval must be obtained from CCI Thermal for the return of any Cata-Dyne™ product(s). A restocking charge of 15% will apply. All returns must be shipped to our factory in Edmonton, freight prepaid. Final acceptance will be contingent on inspection at our factory.

REPAIRS

Cata-Dyne™ heaters may require periodic maintenance or repair. Our factory is staffed with technicians who are qualified to perform any required repairs. The procedure to follow to have a heater repaired is as follows.

Send the heater to our factory in Edmonton. Include the following information with the heater:

- ◆ Company name and address
- ◆ Contact name
- ◆ Telephone number/fax number/e-mail
- ◆ P.O. number
- ◆ Advise if an estimate is required prior to starting the repair
- ◆ Details on the repair or conversion required
- ◆ Return shipping instructions

NOTE: Under the terms of our certification, all repairs must be performed at our factory in Edmonton.

TROUBLE SHOOTING

1. Ensure that the fuel matches that listed on the nameplate.
2. Ensure that the voltage matches that listed on the nameplate.
3. Check for any physical damage. All signs of physical damage to the catalyst pad such as holes, tears or a general deterioration of the catalyst bed signal that it is time to have the heater repaired.
4. Check the gas supply pressure at the heater-7 in w.c. (1.73 kPa), 4.5 in w.c. (1.12 kPa), or 3.5 in w.c. (0.86 kPa) for natural gas and 11 in w.c. (2.72 kPa) for propane.
5. Check the gas orifice for obstructions or dirt and ensure the size matches that listed on the nameplate. It may be necessary to install a filter upstream of the heater or regulator if the gas supply is dirty. If the fuel supply is constantly dirty and/or wet it would be advisable to use bottled propane fuel.
6. Check the mounting position of the heater. The face of the heater should be preferably in the vertical position and should not vary more than 45° from the vertical position for maximum efficiency.
7. Check for saturation of the catalyst face caused by condensation or rain running down the face of the heater. If the heater has been exposed to water, it is advisable to place the unit in a warm area for a period of a few hours or longer if required. Once the moisture is removed, the heater can be re-installed and re-started.
8. Check the jumper cable size to ensure that the resistance of the cable is not reducing the current to the heater. This would not allow sufficient power to the electrical element to preheat the catalyst to the activity temperature. It is recommended to run the service vehicle at fast idle while starting the heater.
9. Cata-Dyne™ heaters are designed to use clean fuel and to be used in non-contaminated atmospheres. Sulphur compounds in the fuel or atmosphere will poison the catalyst bed over a period of time and render the heater inoperative. If the heater has been exposed to sulphur compounds, it should be sent to the factory for service.
10. Avoid spraying the face of the heater with high pressure air, steam or water because this can damage the catalyst bed. If physical damage is visible, return the heater to the factory for servicing.
11. The temperature controller corresponds to the heater(s) it is controlling and must match the fuel and model size listed on the nameplate. If temperature controller is too low, the heater will not have sufficient fuel rating to operate and will stop.

Separate Installation and Operation Instructions are available for oven and industrial heating applications.