

Installation

WHEN INSTALLING THIS PRODUCT...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to ensure the product is suitable for your application.
3. Ensure installer is a trained, experienced service technician.
4. After installation is complete, use these instructions to check out product operation.

! WARNING

FIRE OR EXPLOSION HAZARD CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY, OR DEATH

Follow these warnings exactly:

1. Disconnect power supply before wiring to prevent electrical shock or equipment damage.
2. To avoid dangerous accumulation of fuel gas, turn off gas supply at the appliance service valve before starting installation, and perform Gas Leak Test after completion of installation.
3. Always install sediment trap in gas supply line to prevent contamination of gas control.
4. Do not force the gas control knob. Use only your hand to turn the gas control knob. Never use any tools. If the gas control knob will not operate by hand, the gas control should be replaced by a qualified service technician. Force or attempted repair may result in fire or explosion.

! CAUTION

Never apply a jumper across or short the valve coil terminals. This could burn out the heat anticipator in the thermostat or damage the electronic direct ignition (DI) module.

IMPORTANT: *These gas controls are shipped with protective seals over inlet and outlet tappings. Do not remove seals until ready to connect piping.*

Follow the appliance manufacturer's instructions if available; otherwise, use the instructions provided below.

CONVERTING BETWEEN NATURAL AND LP GAS

! WARNING

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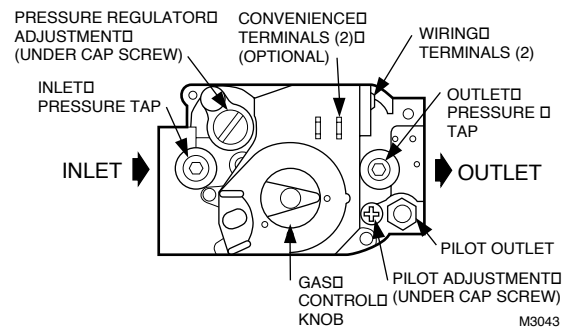
1. Do not use a gas control set for natural gas on LP gas or a gas control set for LP gas on natural gas.
2. When making conversion, main and pilot burner orifices **MUST** be changed to meet appliance manufacturer specifications.

Standard-opening or slow-opening gas controls are converted from one gas to another with a conversion kit. To convert from natural gas to LP, use the 393691 LP Conversion Kit that is included with the VR8305 Gas Control. To convert from LP to natural gas, use the 394588 Natural Gas Conversion Kit (order separately). Step-opening gas controls cannot be converted.

To convert control from one gas to another:

1. Turn off main gas supply to the appliance.
2. Remove the regulator cap screw and pressure regulator adjusting screw. See Fig. 2.

Fig. 2—Top view of gas control.




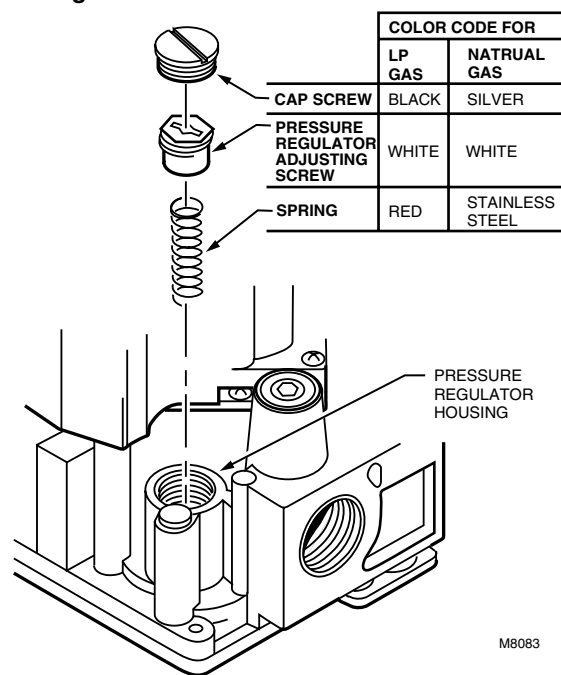
3. Remove the existing spring.
4. Insert the replacement spring with tapered end down. See Fig. 3.
5. Install the new plastic pressure regulator adjustment screw so that the top of the screw is flush (level) with the top of the regulator. Turn the pressure regulator adjustment screw clockwise  six complete turns. This provides a preliminary pressure setting of about 10.0 in. wc [2.5 kPa] for LP regulator and 3.5 in. wc [0.9 kPa] for natural gas regulator.

Fig. 3—Installation of conversion kit in regulated gas control.



6. Check the regulator setting either with a manometer or by clocking the gas meter. Refer to Start-Up and Checkout on page 8.

7. Install the new cap screw.

8. Mount conversion label on control.

9. Install control and appliance according to appliance manufacturer's instructions.

INSTALL ADAPTERS TO GAS CONTROL

Install adapters to gas control as follows:

Flanges

1. Choose the appropriate flange for your application.
2. Remove seal over gas control inlet or outlet.
3. Ensure the O-ring is fitted in the groove of flange. If the O-ring is not attached or is missing, do not use flange.
4. With O-ring facing gas control, align the screw holes on the control with the holes in the flange. Insert and tighten the screws provided with the flange. See Fig. 4. Tighten the screws to 25 inch pounds of torque to provide a gas-tight seal.

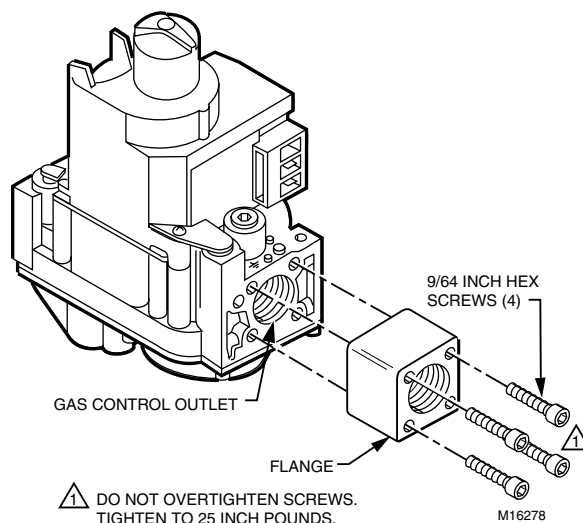
Bushings

1. Remove seal over gas control inlet or outlet.
2. Apply moderate amount of good quality pipe compound to bushing, leaving two end threads bare. On LP installation, use compound resistant to LP gas. Do NOT use Teflon tape.
3. Insert bushing in gas control and carefully thread pipe into bushing until tight.

USING ADAPTERS TO SOLVE SWING RADIUS PROBLEMS

In some field service applications, it is difficult or impossible to thread the control onto the gas supply pipe because of

Fig. 4—Install flange to gas control.



space limitations. This problem can be resolved for most installations by using an adapter. The adapter is installed on the end of the supply pipe in place of the gas control, following the same precautions and instructions that are used for installing the gas control. After the adapter is installed, the gas control is attached to the adapter as outlined above. Note that using an adapter increases the overall length of the gas control.

CHOOSE GAS CONTROL LOCATION

Do not locate the gas control where it can be affected by steam cleaning, high humidity, dripping water, corrosive chemicals, dust or grease accumulation, or excessive heat. To ensure proper operation, follow these guidelines:

- Locate gas control in a well ventilated area.
- Mount gas control high enough above the cabinet bottom to avoid exposure to flooding or splashing water.
- Ensure the ambient temperature does not exceed the ambient temperature ratings for each component.
- Cover gas control if appliance is cleaned with water, steam, or chemicals or to avoid dust and grease accumulation.
- Avoid locating gas control where exposure is possible to corrosive chemical fumes or dripping water.

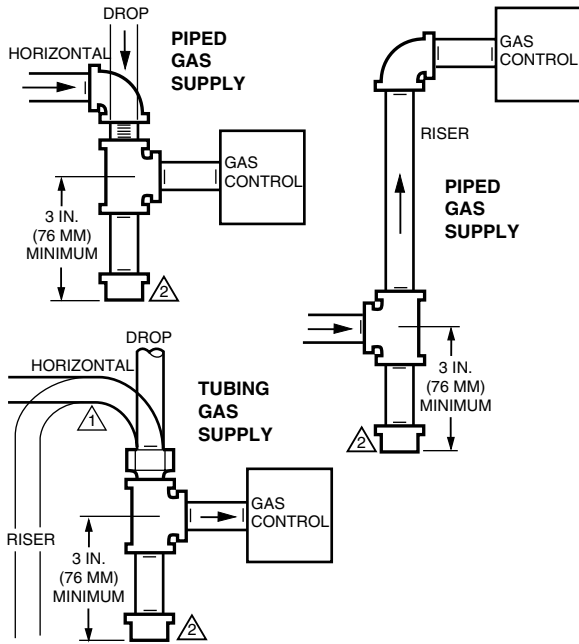
Locate the gas control in the appliance vestibule on the gas manifold. In replacement applications, locate the gas control in the same location as the old gas control.

Install Piping to Gas Control

All piping must comply with local codes and ordinances or with the National Fuel Gas Code (ANSI Z223.1 NFPA No. 54), whichever applies. Tubing installation must comply with approved standards and practices.

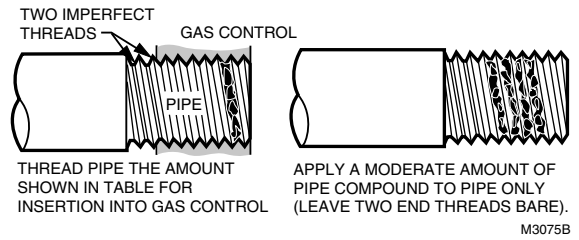
1. Use new, properly reamed pipe free from chips. If

Fig. 5—Install sediment trap.



- 1 ALL BENDS IN METALLIC TUBING SHOULD BE SMOOTH.
- 2 CAUTION: SHUT OFF THE MAIN GAS SUPPLY BEFORE REMOVING END CAP TO PREVENT GAS FROM FILLING THE WORK AREA. TEST FOR GAS LEAKAGE WHEN INSTALLATION IS COMPLETE. M3077

Fig. 6—Use moderate amount of pipe compound.



tubing is used, ensure the ends are square, deburred and clean. All tubing bends must be smooth and without deformation.

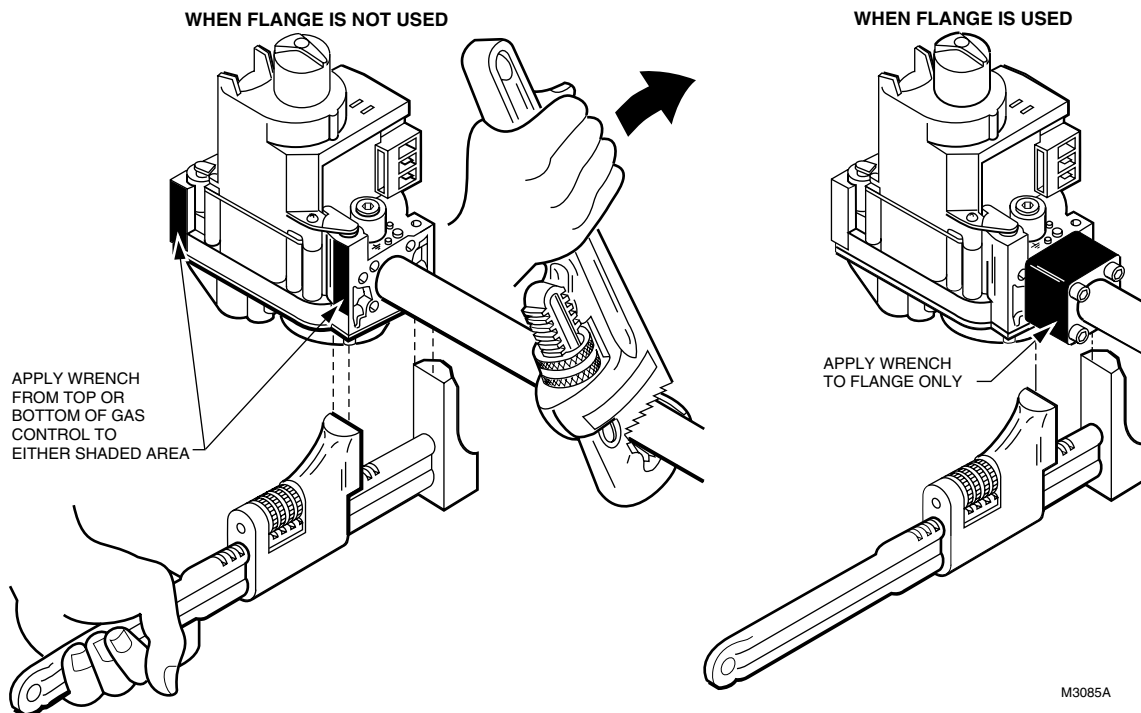
2. Run pipe or tubing to the gas control. If tubing is used, obtain a tube-to-tube coupling to connect the tubing to the gas control.
3. Install sediment trap in the supply line to the gas control. See Fig. 5.

Install Gas Control

TABLE 4—NPT PIPE THREAD LENGTH IN INCHES.

Pipe Size	Thread Pipe This Amount	Maximum Depth Pipe Can Be Inserted Into Control
3/8	9/16	3/8
1/2	3/4	1/2
3/4	13/16	3/4

Fig. 7—Proper use of wrench on gas control with and without flanges.



1. This gas control can be mounted 0-90 degrees, in any direction including vertically, from the upright position of the gas control knob.

2. Mount the gas control so gas flow is in the direction of the arrow on the bottom of the control.

3. Thread pipe the amount shown in Table 4 for insertion into the gas control. **DO NOT THREAD PIPE TOO FAR.** Valve distortion or malfunction may result if the pipe is inserted too deeply into the gas control.

4. Apply a moderate amount of good quality pipe compound (*do not* use Teflon tape) to pipe only, leaving two end threads bare. On LP installations, use compound resistant to LP gas. Refer to Fig. 6.

5. Remove seals over gas control inlet and outlet if necessary.

6. Connect pipe to gas control inlet and outlet. Use wrench on the square ends of the gas control. If an adapter is used, place wrench on adapter rather than gas control. Refer to Figs. 2 and 7.

WIRING

Follow the wiring instructions furnished by the appliance manufacturer, if available, or use the general instructions provided below.

All wiring must comply with applicable electrical codes and ordinances.

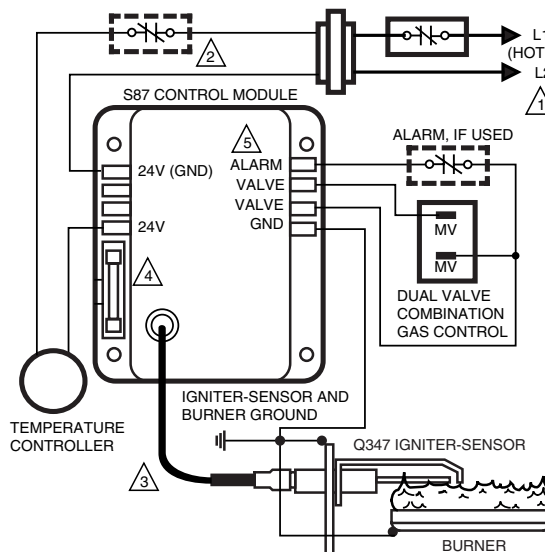
Disconnect power supply before making wiring connections to prevent electrical shock or equipment damage.

1. Check the power supply rating on the valve and ensure it matches the available supply. Install transformer, thermostat, and other controls as required.

2. Connect control circuit to gas control terminals. See Figs. 2, 8 and 9.

3. Adjust thermostat heat anticipator to 0.70 rating stamped on valve operator.

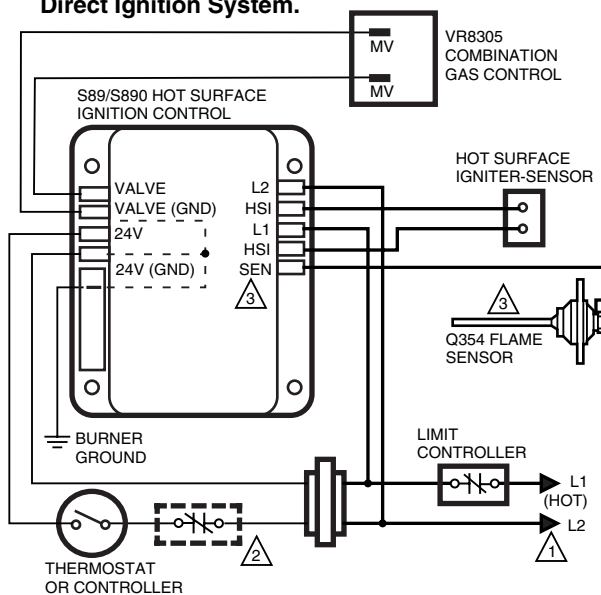
Fig. 8—VR8305 Wiring Connections in S87 Direct Ignition System.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
- 2 ALTERNATE LIMIT CONTROLLER LOCATION.
- 3 MAXIMUM IGNITER-SENSOR CABLE LENGTH: 3 ft. [.9 m] OR LESS.
- 4 3A REPLACEABLE FUSE.
- 5 ALARM TERMINAL PROVIDED ON SOME MODELS.

M9043

Fig. 9—VR8305 Wiring Connections in S89C Direct Ignition System.



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED. MAKE SURE L1 AND L2 ARE NOT REVERSED; THIS WOULD PREVENT FLAME DETECTION.
- 2 ALTERNATE LIMIT CONTROLLER LOCATION.
- 3 SEN TERMINAL AND Q354 FLAME SENSOR ON D MODELS ONLY.

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Start-Up and Checkout

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1. Do not force the gas control knob. Use only your hand to turn the gas control knob. Never use any tools.
2. If the gas control knob will not operate by hand, the gas control should be replaced by a qualified service technician.

GAS CONTROL KNOB SETTINGS

The gas control knob has two settings:

- OFF prevents main burner gas flow.
- ON permits main burner gas flow. Under control of the thermostat and direct ignition module, gas can flow to the main burner.

NOTE: Controls are shipped with the gas control knob in the ON position.

PERFORM GAS LEAK TEST

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Check for gas leaks with rich soap and water solution any time work is done on a gas control.

GAS LEAK TEST

1. Paint all pipe connections upstream of the gas control with a rich soap and water solution. Bubbles indicate a gas leak.
2. If a gas leak is detected, tighten the pipe connection.
3. Stand clear while lighting main burner to prevent injury caused from hidden gas leaks that could cause flashback in the appliance vestibule. Light the main burner.
4. With the main burner in operation, paint all pipe joints (including adapters) and gas control inlet and outlet with rich soap and water solution.
5. If another gas leak is detected, tighten adapter screws, joints, and pipe connections.
6. Replace the part if gas leak cannot be stopped.

TURN ON SYSTEM

Rotate the gas control knob counterclockwise  to ON.

TURN ON MAIN BURNER

Follow instructions provided by appliance manufacturer or turn thermostat up to call for heat.



CHECK AND ADJUST GAS INPUT TO MAIN BURNER

CAUTION



1. Do not exceed the input rating stamped on the appliance nameplate, or manufacturer's recommended burner orifice pressure for the size orifice used. Ensure the main burner primary air supply is properly adjusted for complete combustion (refer to the appliance manufacturer's instructions).
2. IF CHECKING GAS INPUT BY CLOCKING THE GAS METER:
 - Ensure that the only gas flow through the meter is that of the appliance being tested.
 - Ensure that other appliances are turned off and that their pilot burners are extinguished (or deduct their gas consumptions from the meter reading).
 - Convert the flow rate to Btuh as described in the Gas Controls Handbook (form 70-2602) and compare to the Btuh input rating on the appliance nameplate.
3. IF CHECKING GAS INPUT WITH A MANOMETER (PRESSURE GAUGE):
 - Ensure the gas control knob is in the PILOT position before removing the outlet pressure tap plug to connect the manometer.
 - Turn the gas control knob back to PILOT when removing the manometer and replacing outlet pressure tap plug.
 - Shut off the gas supply at the appliance service valve or, for LP gas, at the gas tank before removing the outlet pressure tap plug and before disconnecting the manometer to replace the outlet pressure tap plug.
 - Perform the Gas Leak Test at the inlet pressure tap plug.

Standard-Opening and Slow-Opening Pressure Regulator

1. The gas control outlet pressure should match the manifold pressure listed on the appliance nameplate.
2. With the main burner operating, check the gas control flow rate using the meter clocking method or check the gas pressure using a manometer connected to the gas control outlet pressure tap. Refer to Fig. 2.
3. If necessary, adjust the pressure regulator to match the appliance rating. Refer to Table 5 or 6 for the factory set nominal outlet pressures and adjustment ranges.

- a. Remove the pressure regulator adjustment cap and screw.
 - b. Using a screwdriver, turn the inner adjustment screw clockwise  to increase or counterclockwise  to decrease the main burner gas pressure.
 - c. Always replace the cap screw and tighten firmly to ensure proper operation.
4. If the desired outlet gas pressure or gas flow rate cannot be achieved by adjusting the gas control, check the gas control inlet pressure using a manometer at the inlet pressure tap. If the inlet pressure is in the normal range (refer to Table 5 or 6), replace the gas control. Otherwise, take the necessary steps to provide proper gas pressure to the gas control.

Step-Opening Pressure Regulator

- 1. The gas control outlet pressure should match the manifold pressure listed on the appliance nameplate.
- 2. With main burner operating, check the gas control flow rate using the meter clocking method or check the gas pressure using a manometer connected to the gas control outlet pressure tap. Refer to Fig. 2.
- 3. If necessary, adjust the pressure regulator to match the appliance rating. Refer to Table 5 or 6 for factory set nominal outlet pressures and adjustment ranges.
 - a. Remove the pressure regulator adjustment cap screw.
 - b. Using a screwdriver, turn the inner adjustment screw clockwise  to increase or counterclockwise  to decrease the main burner gas pressure.
 - c. Always replace the cap screw and tighten firmly to ensure proper operation.
- 4. If desired outlet pressure or flow rate cannot be achieved by adjusting the gas control, check the inlet pressure using a manometer at inlet pressure tap or upstream of the gas control. If the inlet pressure is in the normal range (refer to Table 5 or 6), replace the existing gas control. Otherwise, take the necessary steps to provide proper gas pressure to the gas control.
- 5. Carefully check main burner lightoff at the step pres-

sure. Ensure the main burner lights smoothly and without flashback to the orifice and that all ports remain lit. Cycle the main burner several times, allowing at least 30 seconds between cycles for the regulator to resume the step function. Repeat after allowing main burner to cool. Readjust the full rate outlet pressure, if necessary, to improve lightoff characteristics.

CHECK SAFETY SHUTDOWN PERFORMANCE



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Perform the safety shutdown test anytime work is done on a gas system.

NOTE: Read steps 1-7 below before starting and compare to the safety shutdown or safety lockout tests recommended for the direct ignition (DI) module. Where they differ, use the procedure recommended for the module.

- 1. Turn off gas supply.
- 2. Set thermostat or controller above room temperature to call for heat.
- 3. Watch for ignition spark or for glow at hot surface igniter either immediately or following prepurge. See DI module specifications.
- 4. Time length of igniter operation. See DI module specifications.
- 5. After the module locks out, open gas control and ensure there is no gas flow to main burner.
- 6. Set thermostat below room temperature and wait one minute.
- 7. Operate system through one complete cycle to ensure all controls operate properly.

TABLE 5—PRESSURE REGULATOR SPECIFICATION PRESSURES IN INCHES WC.

Model	Type of Gas	Nominal Inlet Pressure Range	Outlet Pressure			
			Nominal Factory Setting		Setting Range	
			Step	Full Rate	Step	Full Rate
Standard, Slow-opening	Natural	5.0 - 7.0	—	3.5	—	3.0 - 5.0
	LP	12.0 - 14.0	—	10.0	—	8.0 - 12.0
Step-opening	Natural	5.0 - 7.0	0.9	3.5	—	3.0 - 5.0
	LP	12.0 - 14.0	2.2	10.0	—	8.0 - 12.0

TABLE 6—PRESSURE REGULATOR SPECIFICATION PRESSURES IN kPa.

Model	Type of Gas	Nominal Inlet Pressure Range	Outlet Pressure			
			Nominal Factory Setting		Setting Range	
			Step	Full Rate	Step	Full Rate
Standard, Slow-opening	Natural	1.2 - 1.7	—	0.9	—	0.7 - 1.2
	LP	2.9 - 3.9	—	2.7	—	2.0 - 3.0
Step-opening	Natural	1.2 - 1.7	0.2	0.9	—	0.7 - 1.2
	LP	2.9 - 3.9	0.9	2.7	—	2.0 - 3.0