

Installation Instructions For Natural Gas Conversion

(Kit Part No. 1175405)

This kit is designed to convert PGX4 and PDX4 Two-Stage Gas units for use with Natural Gas.

Table 1	NATURAL GAS MANIFOLD PRESSURE																										
Heating Value at Altitude BTU/ CU. Ft.	MEAN ELEVATION FEET ABOVE SEA LEVEL																										
	0 to 2000			2001 to 3000			3001 to 4000			4001 to 5000			5001 to 6000			6001 to 7000			7001 to 8000			8001 to 9000			9001 to 10000		
	Orifice		Manifold Pressure	Orifice		Manifold Pressure	Orifice		Manifold Pressure	Orifice		Manifold Pressure	Orifice		Manifold Pressure	Orifice		Manifold Pressure	Orifice		Manifold Pressure	Orifice		Manifold Pressure	Orifice		Manifold Pressure
	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo
	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo	No.	Hi	Lo
700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47*	3.7	1.8	48*	3.6	1.8	49*	3.6	1.8	
725	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46*	3.6	1.7	47*	3.5	1.7	48*	3.4	1.7	49*	3.4	1.7
750	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46*	3.3	1.6	48*	3.7	1.8	49*	3.7	1.8	50*	3.7	1.8
775	-	-	-	-	-	-	-	-	-	-	-	-	46*	3.6	1.8	47*	3.5	1.7	48*	3.5	1.7	49*	3.5	1.7	50*	3.5	1.7
800	-	-	-	-	-	-	-	-	-	45*	3.7	1.8	46*	3.4	1.7	47*	3.3	1.6	48*	3.3	1.6	49*	3.3	1.6	50*	3.3	1.6
825	-	-	-	-	-	-	-	-	-	46*	3.7	1.8	47*	3.6	1.8	48*	3.6	1.7	49*	3.6	1.8	50*	3.6	1.8	51*	3.7	1.8
850	-	-	-	-	-	-	45*	3.7	1.8	46*	3.4	1.7	47*	3.4	1.7	48*	3.4	1.6	49*	3.4	1.7	50*	3.4	1.7	51*	3.5	1.7
875	-	-	-	-	-	-	46*	3.7	1.8	47*	3.7	1.8	48*	3.7	1.8	49*	3.7	1.8	49*	3.2	1.6	50*	3.2	1.6	51*	3.3	1.6
900	-	-	-	-	-	-	46*	3.5	1.7	47*	3.5	1.7	48*	3.5	1.7	49*	3.5	1.7	50*	3.6	1.8	51*	3.7	1.8	51*	3.1	1.5
925	43*	3.4	1.7	45*	3.6	1.8	46*	3.3	1.6	48*	3.7	1.8	48*	3.3	1.6	49*	3.3	1.6	50*	3.4	1.7	51*	3.5	1.7	52*	3.6	1.8
950	44	3.7	1.8	46*	3.6	1.8	47*	3.6	1.7	48*	3.6	1.7	49*	3.6	1.8	50*	3.7	1.8	50*	3.2	1.6	51*	3.3	1.6	52*	3.4	1.7
975	44	3.5	1.7	46*	3.4	1.7	47*	3.4	1.7	48*	3.4	1.7	49*	3.5	1.7	50*	3.5	1.7	51*	3.6	1.8	51*	3.1	1.5	52*	3.3	1.6
1000	44	3.3	1.6	47*	3.7	1.8	48*	3.7	1.8	48*	3.2	1.6	49*	3.3	1.6	50*	3.4	1.6	51*	3.4	1.7	52*	3.7	1.8	52*	3.1	1.5
1050	45*	3.6	1.8	47*	3.3	1.6	48*	3.3	1.6	49*	3.4	1.7	50*	3.5	1.7	-	-	-	-	-	-	-	-	-	-	-	-
1100	46*	3.5	1.7	48*	3.4	1.7	49*	3.6	1.7	50*	3.7	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: The orifice sizes in the chart above derate the input rate at 4% per 1000 feet above sea level for altitudes exceeding 2000 feet above sea level.

If converting from Propane gas to Natural Gas, use kit number 1175405 for altitudes up to 2000 feet above sea level.

If converting from Propane gas to Natural Gas, use kit number 1175405 and altitudes exceeding 2000 feet above sea level, use kit number 1175405 with field-supplied orifices.

Natural gas data is based on .6 specific gravity.

For fuels with different specific gravity, consult the National Fuel Gas Code ANSI Z223.1 - 2006/NFPA 54-2006 or National Standard of Canada, Natural Gas and Propane Installation Code CSA B149.1-05.


* Field-Supplied

Parts List Kit # 1175405

Description	Part #	Qty
Burner Orifice #44	1011352	6
Honeywell Conv. Kit #396025	1172951	1
Label, Field Conversion	1009678	1
Natural Conversion Label	1175471	1
Instructions	462 06 1801 00	1
Gas Valve Plug	1175472	1

Installing and servicing heating equipment can be hazardous due to gas and electrical components. Only trained and qualified personnel should install, repair, or service heating equipment. Untrained service personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on heating equipment, observe precautions in the literature, on tags, and on labels attached to or shipped with the appliance and other safety precautions that may apply.

SAFETY REQUIREMENTS

Recognize safety information. This is the safety-alert symbol . When you see this symbol in instruction manuals be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, or CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards, those that will result in severe personal injury or death. WARNING signifies a hazard that could result in personal injury or death. CAUTION is used to identify unsafe practices that may result in minor personal injury or product and property damage. NOTE is used to highlight suggestions that will result in enhanced installation, reliability, or operation.

Follow all safety codes. In the United States, follow all safety codes including the National Fuel Gas Code (NFPA) ANSI Z223.1-2006/NFPA 54-2006. In Canada, refer to the National Standard of Canada Natural Gas and Propane Installation Code (NSCNGPIC) CSA B149.1-05. Wear safety glasses and work gloves. Have fire extinguisher available during start-up and adjustment procedures and service calls.

These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances, these instructions exceed certain local codes and ordinances, especially those that may not have kept up with changing residential construction practices. We require these instructions as a minimum for a safe installation.

Important Information

This kit is for conversion of furnaces equipped with Honeywell VR8205Q two-stage gas valves certified for use with Propane Gas (and so marked) to units functionally the same as the certified furnace for use with Natural Gas. A gas valve conversion kit must be installed and main burner orifices must be replaced with orifices in this kit.

The orifices provided in this kit are stamped to indicate the size (twist drill number) and are sized for commercially pure natural gas ONLY. Do NOT use them with butane or a mixture of butane and propane. The parts list specifies the size orifices supplied in the kit. Compare the size marking on the orifices with the sizes as listed in the parts list. Make sure you have the correct main burner orifices. Refer to Table 1 for proper orifice size for specific installation altitude. Orifices for high altitude conversion are not included in kit.

Extreme care is used to assure that this kit contains the proper orifices. **Oversized orifices could result in hazardous conditions, especially if the venting is inadequate.** For that reason, we recommend that the installer check the size of the orifice with a new twist drill of the correct size. This procedure assures that the orifices provided are the correct size.

- Shut off gas supply to furnace at manual shut-off valve before starting installation.

⚠ **WARNING**

EXPLOSION HAZARD
Failure to follow this warning could result in personal injury, death and/or property damage.
If unit is still running, allow 3 minutes after gas shut off before turning off power, Shut Off electric power at unit disconnect and service panel.

- Disconnect electric power supply to the furnace before starting installation.
- Check for gas leaks after installation of kit and before attempting to start furnace.
- Locate the Natural Gas Conversion Label next to the furnace rating plate.
- Fill out and attach the Field Conversion Label to the front exterior of the furnace.

⚠ **WARNING**

FIRE, EXPLOSION, CARBON MONOXIDE POISONING HAZARD.
Failure to follow this warning could result in personal injury, death and/or property damage.
This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, an explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit.

Gas Pressure

- Refer to the furnace rating plate for the approved gas input rating.
- Gas input to burners MUST NOT exceed the rated input shown on rating plate.
- Do NOT** allow minimum gas supply pressure to vary downward. Doing so will decrease input to furnace. Refer to **Table 1** for gas manifold pressures and **Table 2** for supply gas pressures.

Table 2		Supply Gas Pressures		
Gas Type	Supply Pressure			
	Recommended	Max.	Min.	
Natural	7" (1.74kPa)	13" (3.24kPa)	4.5" (1.12kPa)	

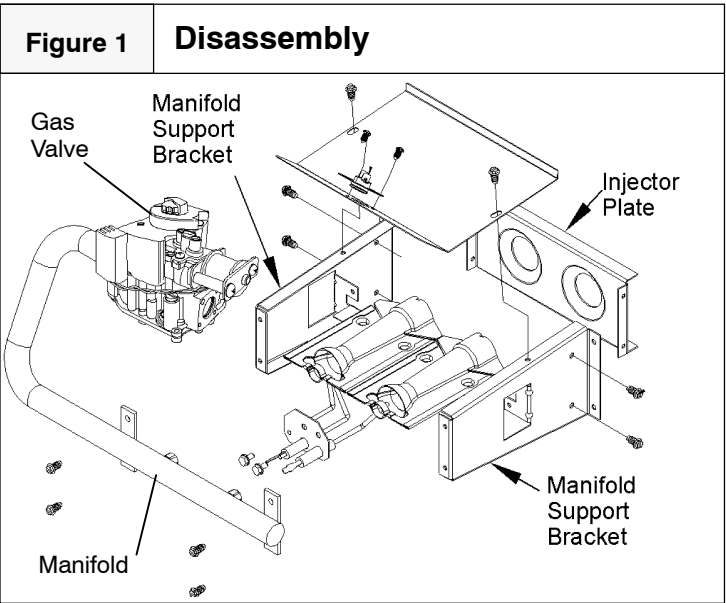
Installation

⚠ **WARNING**

ELECTRIC SHOCK HAZARD/FIRE AND/OR EXPLOSION HAZARD.
Failure to follow this warning could result in equipment damage, personal injury, death and/or property damage.
The gas supply shall be shut OFF prior to disconnecting the electrical power, before proceeding with the conversion.
Turn OFF electric power supply at disconnect switch or service panel before starting installation.

Disassembly

Refer to Figure 1 and the following steps.



- After shutting off gas supply and electric power to the unit remove the access door, exposing gas valve and burner compartment.
- Disconnect gas line from gas valve so manifold assembly can be removed.
- Disconnect wiring at gas valve. Be sure to note the proper location of any and all electrical wiring disconnected.
- Remove the four (4) screws holding the manifold and gas valve

to the manifold supports. Do Not discard any screws.

5. Carefully remove the manifold assembly.
6. If converting from Propane Gas to Natural Gas in the state of California, NOx baffles must be installed to comply with California law. NOx baffles can be ordered from Fast Parts. Remove the four (4) screws holding the Burner Assembly in place. Install the correct NOx baffle for the unit, if required, and replace the Burner Assembly using the original four screws, (figure 2). **NOTE:** PGX4 and PDX4 models with a "1" in the twelfth digit of the model number have NOx baffles factory installed.

⚠ WARNING

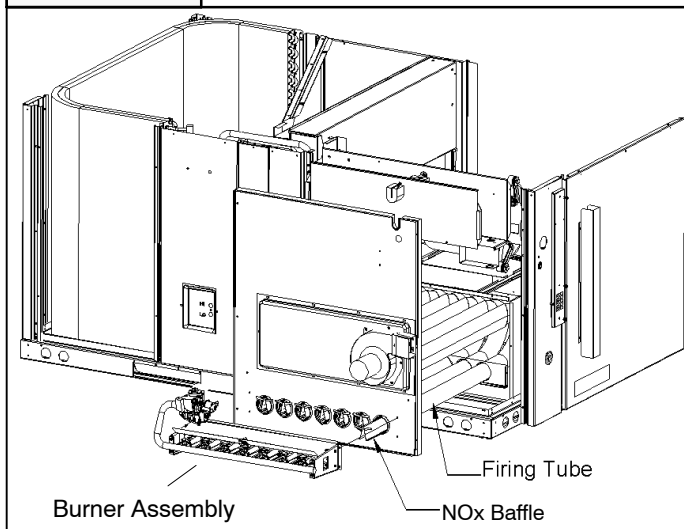
CARBON MONOXIDE HAZARD.

Failure to follow this warning could result in personal injury and/or death.

NOx baffles for use with Natural Gas units ONLY. If Propane Gas is required, NOx inserts must be removed.

Figure 2

Installing NOx Baffles

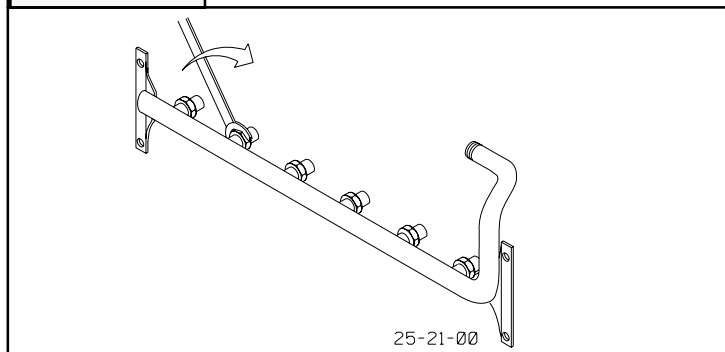


Changing Main Burner Orifices

1. Remove the Propane gas (silver) burner orifices from the manifold assembly using a box end wrench or socket wrench, and replace them with the proper orifice size (brass) for the installation altitude (Figure 3, Table 1). This kit includes the proper orifices for Natural Gas Heating values of 950, 975, and 1000 (BTU/CU.FT.) at 0 feet to 2,000 feet above sea level. For other Natural Gas Heating Values and altitudes above 2,000 feet above sea level, the required orifices are field-supplied.

Figure 3

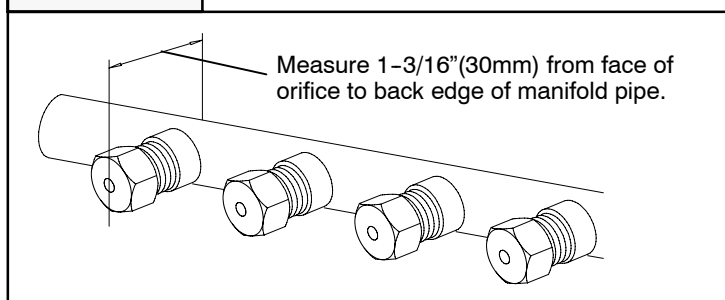
Changing Orifices



2. Tighten the orifices so they are $1\frac{3}{16}$ " (30mm) from the face of the orifice to the backside of the manifold (See Figure 4). Make sure orifice is installed straight so that it forms a right angle (90°) to the manifold.

Figure 4

Orifices Clearances



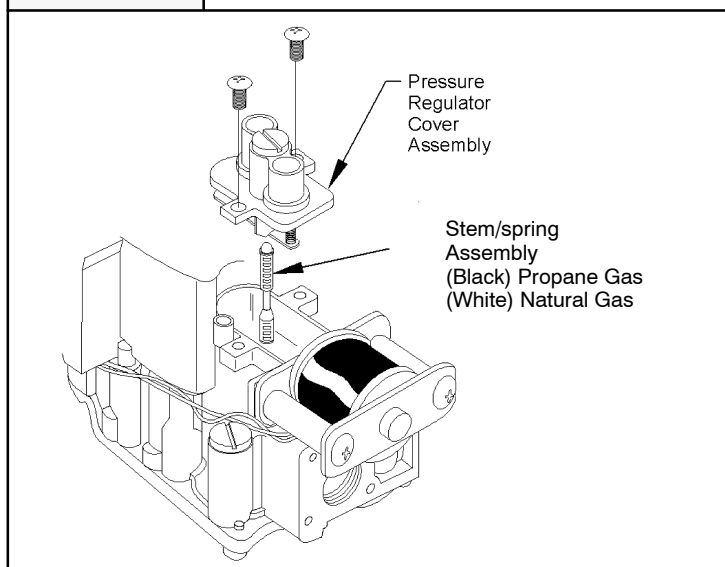
Gas Valve Conversion

Conversion of Honeywell VR8205Q two-stage Gas Valves using Natural Gas Conversion Kit #396025.

1. Remove the pressure regulator cover assembly. (See Figure 5)

Figure 5

Stemspring Assembly



2. Remove the existing stem/spring assembly. (See Figure 5)
3. Insert the replacement stem/spring assembly. (White = Natural Gas Stem)

- Replace the pressure regulator cover assembly and tighten screws.
- Attach gas valve conversion label (found in Honeywell conversion kit) to gas valve.

Reassembly

Reassemble all parts in reverse order as removed. Attach Natural Gas Conversion Label next to the unit rating plate. Fill out and attach the Field conversion Label to the front exterior of the furnace.

- Manifold Assembly** – Be sure to engage the main burner orifices in the proper openings in the burners.
- Testing for leaks** – After reassembly, turn the gas on and check all joints for gas leaks using a soapy solution. All leaks must be repaired immediately.

! WARNING

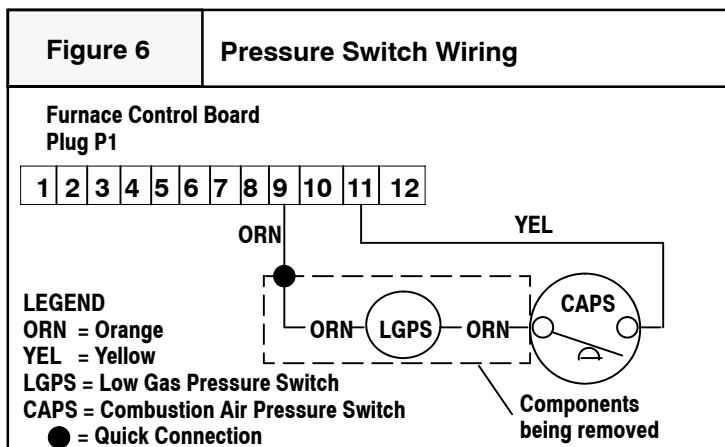
FIRE AND/OR EXPLOSION HAZARD

Failure to follow this warning could result in personal injury and/or death, and/or property damage.

Never use matches, candles, flame, or other sources of ignition to check for gas leakage. Use a soap-and-water solution to check for leaks.

Low Gas Pressure Switch Removal, Start-up and Check-out

- Begin removing the Low Gas Pressure Switch (LGPS) by disconnecting the two orange wires at the “Quick Connection” (**Figure 6**). Disconnect the orange wire from the Combustion Air Pressure Switch (CAPS). Disconnect and remove the two orange wires from the Low Gas Pressure Switch (LGPS). There should be one orange wire remaining, with one end connected to pin number 9 on Plug P1 of the Furnace Control Board and one loose end containing a 1/4” female quick connect. Connect this loose end to the vacant 1/4” male terminal on the CAPS.



- The Low Gas Pressure Switch (LGPS), 1/8” NPT pipe and 1/8” NPT fittings should be in the position shown in **Figure 7**. For ease of removal, rotate the LGPS, 1/8” NPT pipe, and 1/8” NPT fittings counter-clockwise 90 degrees as shown in **Figure 8**. Remove the LGPS, 1/8” NPT pipe, and 1/8” NPT fittings from the Inlet Pressure Tap of the Gas Valve, see **Figure 9**.
- Install a “U” tube manometer that connects to the Inlet Pressure Tap location on the inlet side of the gas valve, see **Figure 9**.

Figure 7 Typical Honeywell 2-Stage Gas Valve VR8205 with LGPS installed

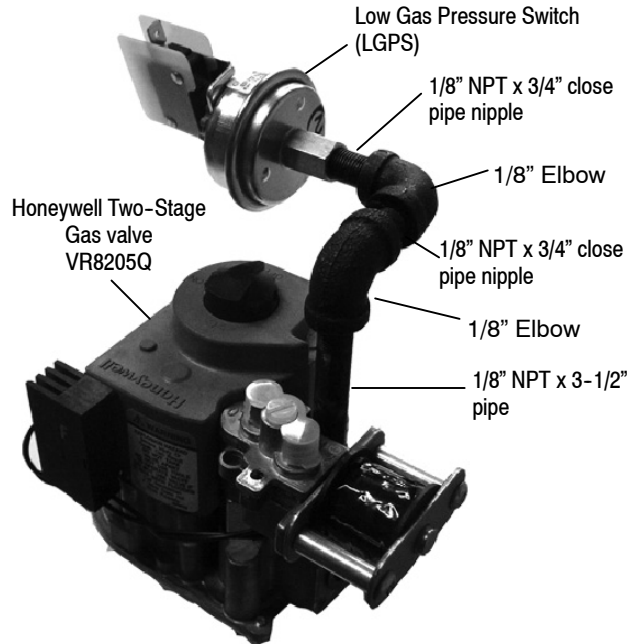
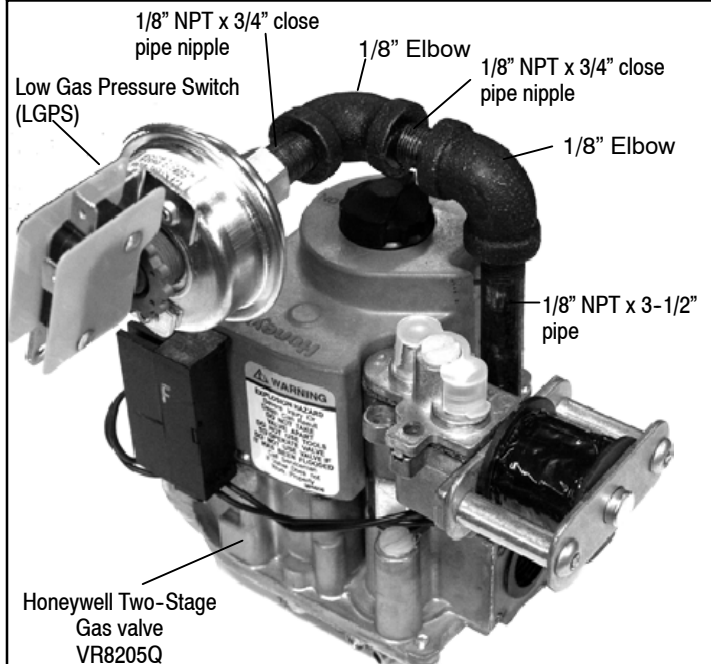
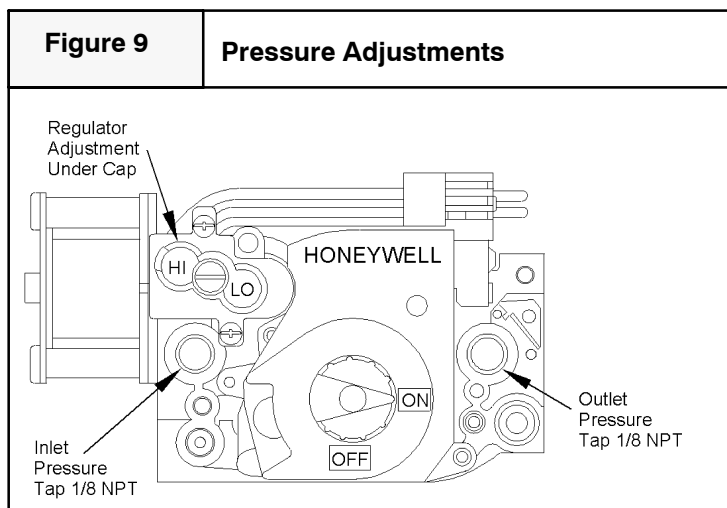


Figure 8 Typical Honeywell 2-Stage Gas Valve VR8205Q



- Open manual gas line valve to unit. Check for gas leaks using a soapy solution and correct as necessary. Check supply gas pressure. Refer to **Table 2** for proper supply pressure values. If not within these limitations, **DO NOT OPERATE UNIT**, contact gas supplier.
- Close manual gas line valve to unit and remove manometer. Install the 1/8” gas valve plug (Part # 1175472) (**See Figure 10**) supplied in kit into the Inlet Pressure Tap location on the inlet side of the gas valve using a 3/16” hex wrench and an adjustable wrench. (**See Figure 9**) Use pipe thread dope or tape (field-supplied and must be certified for use with Natural Gas) on

the Gas Valve Plug, making sure not to get any excess on the plug or in the Gas Valve.



6. With the gas valve knob in the OFF position, remove the plug from the outlet pressure tap location on the outlet side of the gas valve using a 3/16" hex wrench. **(See Figure 9)** and install a "U" tube manometer.
7. Turn the gas valve knob to the ON position. Check for gas leaks using a soapy solution and correct as necessary. Restore electrical power to unit. Cycle the main burner on and off several

times to stabilize the pressure regulator diaphragm. This **MUST** be done before an accurate pressure reading can be obtained. While cycling the main burners, verify proper ignition and proper sequence of operation. **(See Table 3)**
 With the main burners on, read the manifold pressure indicated on the "U" tube manometer.

See Table 1 for proper low stage and high stage manifold pressures for the specific installation altitude. Remove cap covering regulator adjustment screw. **(See Figure 9)** Adjust the gas valve setting for low and high stages by turning the regulator adjustment screws clockwise to increase pressure and counter-clockwise to decrease pressure for the respective stages.

Refer to **Table 4** for required input rates. Burner input must not exceed these input rates for standard altitude (0-2,000 feet above seal level). High altitude is de-rated 4% per 1,000 feet for every 1000 feet above sea level. Refer to section "**Heating Input Rate Check**". Make sure that the unit is operating in the same stage as the stage adjustment on the gas valve. Consult thermostat instructions to understand thermostat staging. Replace cap over regulator adjustment screws.

8. Turn gas valve knob to OFF. Remove the "U" tube manometer and replace the plug in the outlet pressure tap location. **(See Figure 9)**
9. Turn gas valve knob to ON. Restart unit and leak check all gas connections including the main service connection and gas valve with a soapy solution. Repair leaks as necessary. Observe furnace through two or more complete cycles to be sure all controls are operating correctly. While Main burners are operating, check for the following during both low and high stages.
 - Stable and blue flames for each burner **(see Figure 11)**. Dust may cause orange tips or wisps of yellow, but flames **MUST NOT** have solid, yellow tips.
 - Flames extending directly from burner into heat exchanger.
 - Flames **DO NOT** touch sides of heat exchanger.
10. After all leaks have been eliminated and unit has proven to operate correctly, re-install service panel.

Table 3 - Sequence of Operations
Inducer Pre-Purge Period: When the inducer motor comes up on high speed, the pressure switch closes, and the furnace control board begins a 15 second pre-purge period. If the pressure switch fails to remain closed, the inducer will remain running. After the pressure switch re-closes, the furnace control board will begin a 15 second pre-purge period.
Trial-for-Ignition Sequence: The spark igniter will spark for 3 seconds, the main gas valve relay contact closes to energize the gas valve on low stage. After 5 seconds, the igniter is de-energized and a 2 second flame-proving period begins.
NOTE: The unit always lights on high speed inducer and low stage gas valve operation.
Flame Proving: When the burner flame is proved at the flame-proving sensor, the furnace control board determines which heating stage to run based on feedback from the thermostat. If the thermostat is asking for low stage gas heat, the furnace control board will change the inducer speed to low speed and keep the gas valve energized on low stage. If the thermostat is asking for high stage gas heat, the furnace control board will maintain running the inducer on high speed and energize the gas valve's high stage relay to increase gas flow.

**Table 4 - Rated Heating Input, Natural
(0-2,000 ft. Altitude)**

Nameplate Input, High Stage (Btu/hr)	Rated Heating Input Natural (Btu/hr)	
	High Stage	Low Stage
40,000	40,000	28,000
60,000	60,000	42,000
80,000	80,000	56,000
100,000	100,000	70,000
120,000	120,000	84,000

Example: Assume the installation of a PGX448100 at an altitude of 2000 feet. Assume that the size of the meter dial is 1 cu. ft., one revolution takes 37 seconds on high stage, and the heating value of Natural gas is 1050 Btu/ft³. Proceed as follows:

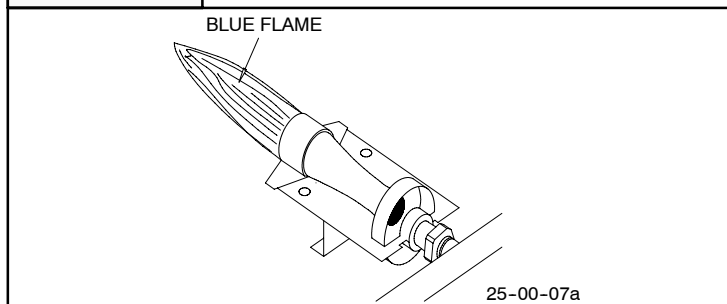
1. 37 sec. To complete 1 revolution
2. $3600/37 = 97.3$
3. $97.3 \times 1 = 97.3$
4. $97.3 \times 1050 = 102,165$ Btu/hr

For this example, the rated heating input is 100,000 Btu/hr for high stage, so only a minor decrease in manifold pressure is required. In no case should the final manifold pressure vary more than +/- .3 in wc (+/- 74Pa) from the values in **Table 1**. Never exceed the required input rate (**Table 4**).

Repeat this process to check the low stage heating input rate.

Figure 11

Main Burner



⚠ WARNING

FIRE AND/OR EXPLOSION HAZARD

Failure to follow this warning could result in personal injury, death, and/or property damage.

Do NOT attempt to light the burner with a match or flame of any kind.

Heating Input Rate Check

The gas input to the unit is determined by measuring the gas flow at the meter. Measuring gas flow at the meter is recommended for all units. To measure the heating input, perform the following steps:

1. Turn off all other gas appliances that use the same meter.
2. Turn off gas supply to unit and attach a "U" tube manometer as instructed in the "Low Gas Pressure Switch Installation, Start-Up and Check-Out" section.
3. With gas **ON** to the unit and the unit operating, record the number of seconds for the gas meter dial to make one revolution.
4. Divide number of seconds in Step 3 into 3600 (number of seconds in 1 hour).
5. Multiply result of Step 4 by the number of cubic feet shown for one revolution of the meter dial to obtain the cubic feet of gas flow per hour.
6. Multiply result of Step 5 by Btu heating value of gas to obtain total measured input in Btu/hr. Compare this input rate with the Required Input Rate, as shown in **Table 4**. Consult with local gas supplier if the heating value of gas is not known.