

# HANG11, HANG12, HALP10, HAPS27 HIGH ALTITUDE CONVERSION KIT

## INSTALLATION INSTRUCTIONS

### Description

This kit contains the appropriate burner orifices, and/or pressure switch for the application of 90% furnaces in installations above their maximum (as shipped) rated altitudes. These kits are not applicable in Canada. Kits apply as shown in the table below.

"Standard" and "High Altitude" Kits		
0 - 7,000 Feet (Standard Altitude)		
Natural Gas Orifices	Propane Gas Orifices	Pressure Switch
No Change	LPM-06	No Change

7,001 - 9,000 Feet		
Natural Gas Orifices	Propane Gas Orifices	Pressure Switch
HANG11	HALP10	HAPS27

9,001 - 11,000 Feet		
Natural Gas Orifices	Propane Gas Orifices	ID Blwr Pressure Switch
HANG12	HALP10	HAPS27

Table 1

Above rated altitude, a derating of the appliance must be followed since the CFM moved by the induced draft blower remains almost constant while the pounds of oxygen in that air is reduced as altitude increases. If this procedure is not followed and the fuel input is not reduced the resulting combustion can be inefficient, incomplete, or possibly cause premature heat exchanger failure due to excessive temperature rise.

The burner orifices in the high altitude kits have been selected as a result of agency certified testing at high altitude and will provide the appropriate derating (Table 2). Orifice selection is based on non-derated gas [about 1000 BTU/Ft<sup>3</sup> for natural gas, and 2500 BTU/Ft<sup>3</sup> for propane gas]. **NOTE: "Point of use" Btu content will be less due to decreased atmospheric pressure.** If the Btu content of your gas supply has been artificially changed to account for altitude, contact your gas supplier for orifice sizing.

Altitude (ft)	Natural Gas Derate	Propane Gas Derate
7,001 - 9,000	15.3 + 4%	X
7,501 - 11,000	32.1 + 4%	X

Table 2

**Do not derate by adjusting the manifold pressure to a lower pressure setting than specified on the furnace nameplate.** A lower air density in combination with a lower manifold pressure at the burner orifice will prevent the orifice from aspirating the proper amount of air into the burner required for complete combustion.

In addition to using smaller orifices to reduce the fuel input, a different pressure switch must be used above the rated altitude shown in Table 1. A high altitude pressure switch is necessary as a result of the reduction in air density and is required regardless of the Btu content of the fuel used.

Altitude (ft)	Burner Orifice Size	
	Natural	Propane
7 001 - 9 000	#44	X
9001 - 11 000	#45	#56

Table 3



**RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION.**

## ATTENTION INSTALLING PERSONNEL

As a professional installer, you have an obligation to know the product better than the customer. This includes all safety precautions and related items.

Prior to actual installation, thoroughly familiarize yourself with this Instruction Manual. Pay special attention to all safety warnings.

Remember, it is **your** responsibility to install the product safely and to know it well enough to be able to instruct a customer in its safe use.

Safety is a matter of common sense...a matter of thinking before acting. Most dealers have a list of specific, good safety practices...follow them.

The precautions listed in this Installation Manual are intended as supplemental to existing practices. However, if there is a direct conflict between existing practices and the content of this manual, the precautions listed here take precedence.



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## IMPORTANT INFORMATION

 **WARNING**

**HIGH VOLTAGE**  
**DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**



 **WARNING**

**IF THE GAS FURNACE IS INSTALLED IN A BASEMENT, AN EXCAVATED AREA OR A CONFINED SPACE, IT IS STRONGLY RECOMMENDED TO CONTACT A PROPANE SUPPLIER TO INSTALL A GAS DETECTING WARNING DEVICE IN CASE OF A GAS LEAK.**

- **SINCE PROPANE GAS IS HEAVIER THAN AIR, ANY LEAKING GAS CAN SETTLE IN ANY LOW AREAS OR CONFINED SPACES.**
- **PROPANE GAS ODORANT MAY FADE, MAKING THE GAS UNDETECTABLE EXCEPT WITH A WARNING DEVICE.**

 **WARNING**

**IF THE INFORMATION IN THESE INSTRUCTIONS IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.**

- **DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.**
- **WHAT TO DO IF YOU SMELL GAS:**
  - **DO NOT TRY TO LIGHT ANY APPLIANCE.**
  - **DO NOT TOUCH ANY ELECTRICAL SWITCH; DO NOT USE ANY PHONE IN YOUR BUILDING.**
  - **IMMEDIATELY CALL YOUR GAS SUPPLIER FROM A NEIGHBOR’S PHONE. FOLLOW THE GAS SUPPLIER’S INSTRUCTIONS.**
  - **IF YOU CANNOT REACH YOUR GAS SUPPLIER, CALL THE FIRE DEPARTMENT.**
- **INSTALLATION AND SERVICE MUST BE PERFORMED BY A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.**

 **WARNING**

**PERSONAL INJURY OR DEATH MAY RESULT FROM IMPROPER INSTALLATION OR MAINTENANCE PERFORMED BY UNTRAINED PERSONNAL. CALL YOUR INSTALLING DEALER OR OTHER QUALIFIED SERVICE COMPANIES TO PERFORM THE INSTALLATION OR MAINTENANCE INSPECTION.**

 **WARNING**

**TO AVOID PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO EXPLOSION OR FIRE, INSTALL A GAS DETECTING WARNING DEVICE. SINCE THE ODORANT IN PROPANE GAS CAN BE REDUCED BY IRON OXIDE (RUST), A GAS DETECTING WARNING DEVICE IS THE ONLY RELIABLE METHOD TO DETECT PROPANE GAS LEAKS.**

*Contact a local propane gas supplier about installing a gas detecting warning device.*

**NOTE:** *To ensure proper operation, install, operate and maintain the unit in accordance with these installation instructions, all local building codes and ordinances. In their absence, follow the latest edition of the National Fuel Gas Code (NFPA 54/ANSI Z223.1), and/or CAN/CSA B149.1 Installation Codes.*

### HANG11, 12 and HALP10

The conversion from “standard altitude” orifices (as shipped from the factory) to “high altitude” orifices requires:

- Removing gas manifold
- Replacing burner orifices
- Reinstalling gas manifold

Before proceeding, shut OFF gas supply at manual shut-off and turn off power to the unit.

 **CAUTION**

**TO AVOID THE RISK OF PROPERTY DAMAGE, PERSONAL INJURY OR FIRE, SHUT OFF GAS SUPPLY FIRST, THEN DISCONNECT THE ELECTRICAL SUPPLY BEFORE PROCEEDING WITH CONVERSION.**

## ORIFICE INSTALLATION-HANG11, 12 AND HALP10

### GAS MANIFOLD REMOVAL

1. Shut OFF gas supply at manual shutoff and turn OFF power to the unit.

 <b>WARNING</b>	
<b>HIGH VOLTAGE</b> DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS KIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.	

2. Disconnect wiring from the gas valve.
3. Where necessary, cut wire ties securing wiring to manifold.
4. Remove the screws securing the gas manifold and valve to the burner bracket. Separate gas manifold and valve from burner bracket.

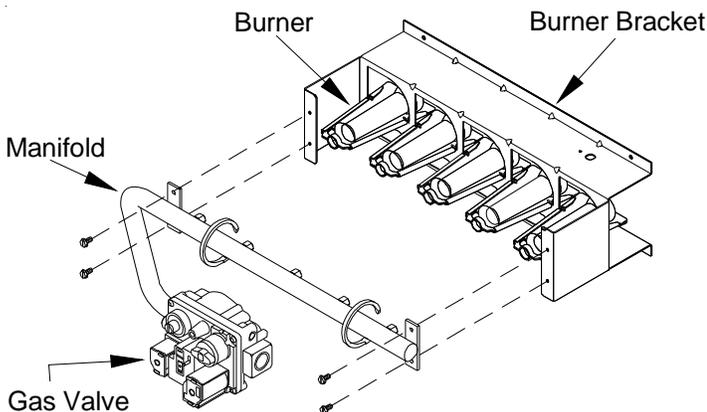


Figure 1  
Gas Manifold Removal

### BURNER ORIFICE REPLACEMENT

1. Remove **standard** altitude natural gas orifices from gas manifold using a box end wrench.
2. Install **high altitude** gas orifices supplied in the high altitude kit. Tighten orifices with a box-end wrench; do not use a socket wrench as it could damage the orifices; do not cross-thread or overtighten. Refer to Table 1 for the appropriate **high altitude** kit and orifice size. Orifice usage depends on an installation's gas usage (natural or propane) and altitude.

### GAS MANIFOLD RE-INSTALLATION

1. Reinstall gas manifold and valve. Make certain that the orifices are inserted in each burner and that each burner remains properly seated in the burner bracket.  
**(NOTE:** Secure green burner assembly ground wire with manifold screw).
2. Reconnect wiring to gas valve. Secure wiring to manifold using wire ties provided.

 <b>CAUTION</b>
<b>WIRING MUST NOT INTERFERE WITH ORIFICES OR BURNERS, OR CONTACT ANY HOT SURFACES.</b>

3. Refer to the following sections detailing *Adjustments and Checks* for natural gas (HANG11 & 12) or *Propane Spring Change* for propane gas (HALP10).

## HAPS27

### PRESSURE SWITCH INSTALLATION

 <b>WARNING</b>	
<b>HIGH VOLTAGE</b> DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.	

1. Shut off gas and disconnect power supply to furnace.
2. Locate the induced draft blower pressure

 <b>CAUTION</b>
<b>TO AVOID PERSONAL INJURY OR PROPERTY DAMAGE DUE TO FIRE, MAKE CERTAIN ALL WIRES DISCONNECTED FROM THE PRESSURE SWITCH DURING THIS PROCEDURE ARE PROPERLY RECONNECTED.</b>

3. Disconnect the pressure switch hose from the pressure switch.
4. Disconnect the yellow and orange wires from pressure switch.
5. Remove pressure switch.

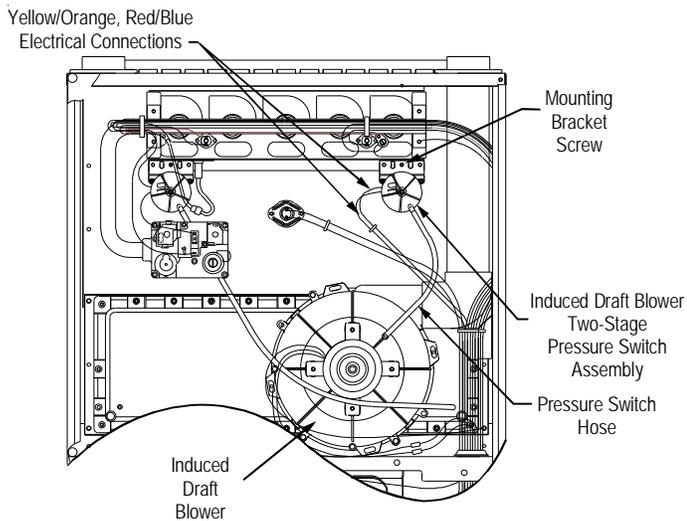
*Upflow models (Figure 2):*

Remove pressure switch mounting bracket screw securing pressure switch and mounting bracket to partition panel.

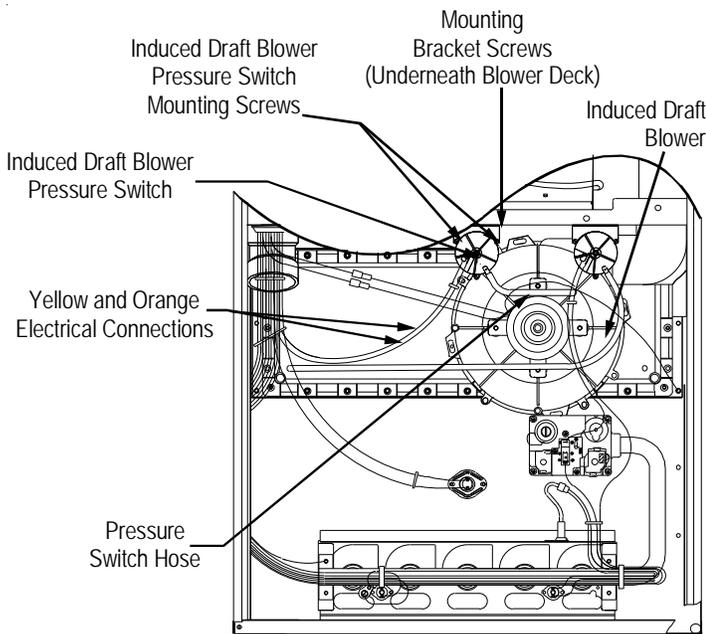
*Counterflow models (Figure 3):*

Remove mounting bracket screws securing pressure switch and mounting bracket to blower deck.

6. Remove screws from mounting bracket and transfer the bracket to the HAPS27 pressure switch. Be sure to maintain the same orientation as on the standard altitude switch.
7. Install the HAPS27 pressure switch using screw(s) removed in step 5.
8. Connect the yellow and orange wires to the HAPS 27 pressure switch.
9. Reconnect the pressure switch hose to new switch.
10. Verify proper furnace operation.



**Figure 2**  
**Induced Draft Blower Pressure Switch Location**



**Figure 3**  
**Induced Draft Blower Pressure Switch Location**

## HALP10

### PROPANE GAS UNIT KIT INSTALLATION - HALP10

#### **WARNING**

**IF THE GAS FURNACE IS INSTALLED IN A BASEMENT, AN EXCAVATED AREA OR A CONFINED SPACE, IT IS STRONGLY RECOMMENDED TO CONTACT A PROPANE SUPPLIER TO INSTALL A GAS DETECTING WARNING DEVICE IN CASE OF A GAS LEAK.**

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#### **WARNING**

**TO AVOID PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO EXPLOSION OR FIRE, INSTALL A GAS DETECTING WARNING DEVICE. SINCE THE ODORANT IN PROPANE GAS CAN BE REDUCED BY IRON OXIDE (RUST), A GAS DETECTING WARNING DEVICE IS THE ONLY RELIABLE METHOD TO DETECT PROPANE GAS LEAKS.**

#### **CAUTION**

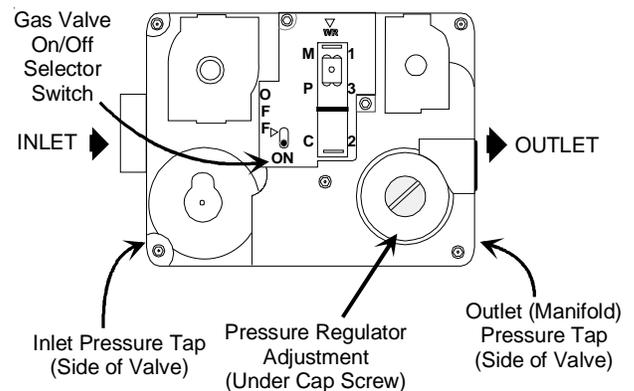
**TO PREVENT UNSATISFACTORY FURNACE OPERATION, THE PROPER GAS CONVERSION KIT MUST BE USED FOR EACH VALVE. USE THE WHITE-RODGERS SPRING KIT ONLY WITH THE WHITE-RIDGERS GAS VALVE AND THE HONEYWELL SPRING KIT WITH THE HONEYWELL GAS VALVE. THE SPRING KITS ARE NOT INTERCHANGEABLE.**

**IMPORTANT:** Propane gas is heavier than air and does not vent upward as natural gas fuels.

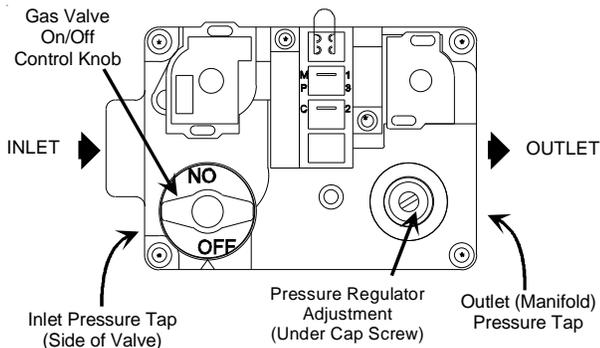
### PROPANE SPRING CHANGE - HALP10

1. Replace the gas valve regulator spring with one of the new springs included in this propane gas conversion kit.
  - If the unit is equipped with a *White-Rodgers 36E* gas valve, (Figures 4, 5 or 6), use *Spring Kit #92-0659*.
  - If the unit is equipped with a *Honeywell VR8205* gas valve, (Figure 7), use *Spring Kit #393691*.

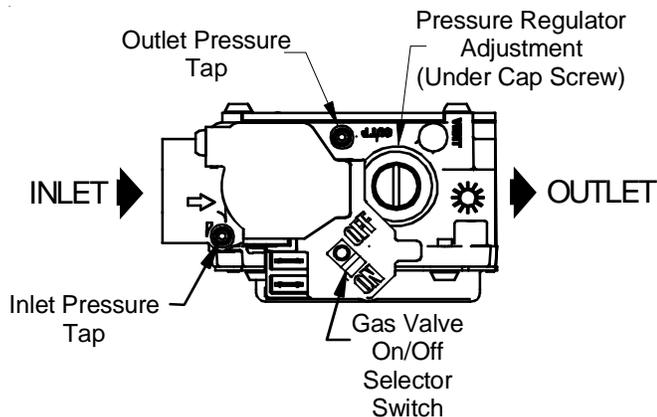
In each case, change the regulator spring per instructions included with that particular regulator spring. Discard unused spring kits.
2. Attach the label (found in the spring kit) to the gas valve, indicating propane conversion.
3. Attach conversion data plate, with correct input rating, adjacent to the unit rating plate.
4. Post "conversion date certificate" on or adjacent to the furnace.



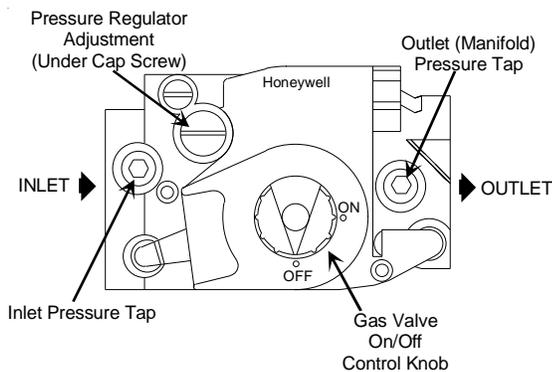
**Figure 4**  
**White-Rodgers 36E22 Gas Valve**



**Figure 5**  
**White-Rodgers Model 36E36**



**Figure 6**  
**White-Rodgers Model 36G22 Gas Valve**



**Figure 7**  
**Honeywell VR8205 Gas Valve**

## **HANG11, 12 AND HALP10**

### **ADJUSTMENTS AND CHECKS**

The following adjustments and checks are a required part of this conversion. Adjustments and checks include:

- Leak checking orifices
- Checking and adjusting line and manifold gas pressures
- Verifying proper unit operation (input rate, operational sequence, burner flame, temperature rise, etc.)

### **! WARNING**

**TO AVOID THE POSSIBILITY OF EXPLOSION OR FIRE, NEVER USE A MATCH OR OPEN FLAME TO TEST FOR LEAKS.**

### **ORIFICE LEAK CHECK**

Leak check burner orifice threads using a soap solution.

### **FURNACE OPERATION CHECK**

Start the furnace using the procedures found in the furnace's installation instructions section, "Startup Procedures and Adjustments". The line pressure supplied to the gas valve must be within the range specified below. The supply pressure can be measured at the gas valve inlet pressure tap or at a hose fitting installed in the gas piping drip leg. The supply pressure must be measured with the burners operating. To measure the gas supply pressure, use the following procedure.

Inlet Gas Supply Pressure	
Natural Gas	Minimum:5.0" W.C. Maximum :10.0" W.C.
Propane Gas	Minimum:11.0" W.C. Maximum :13.0" W.C.

**Table 4**

### **LINE PRESSURE CHECK**

1. Shut OFF gas at the manual gas shutoff valve and turn OFF power to the unit.

### **! WARNING**

**HIGH VOLTAGE**  
**DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**



2. Connect a calibrated water manometer or appropriate gas pressure gauge at either the gas valve **inlet** pressure tap or gas piping drip leg.
3. Turn ON the power and gas, put the unit into heating cycle and turn on all other gas consuming appliances.
4. Measure the gas supply pressure with the burners firing. The inlet gas pressure for natural gas should be between **5.0** and **10.0 inches W.C.** If supply pressure differs from required, make necessary adjustments to pressure regulator(s), gas piping, etc.
5. Turn OFF gas to the unit at the manual shutoff valve and disconnect manometer. Reinstall line pressure tap plug. Turn OFF any unnecessary appliances started in step 3.

## MANIFOLD PRESSURE CHECK

Only small variations in gas flow should be made by adjusting the gas valve pressure regulator. See Table 5 for the required natural gas manifold pressure.

Manifold Gas Pressure	
Natural Gas	3.5" w.c.
Propane Gas	10.0" w.c.

**Table 5**

1. Turn OFF gas to the unit at the manual gas shutoff valve.
2. Connect a calibrated water manometer or appropriate gas pressure gauge at the gas valve **outlet** pressure tap.
3. Turn ON gas supply and operate unit.
4. Remove the cap screw from the manifold pressure regulator adjustment location.
5. Adjust the manifold pressure regulator to the required manifold pressure (Table 5).
6. Reinstall the manifold pressure regulator cap screw. Confirm manifold pressure.
7. Turn OFF gas supply to unit. Disconnect manometer and reinstall manifold pressure tap plug.

## HANG 11, 12 and HALP10

### UNIT OPERATION CHECKS - HANG11 AND 12

#### CHECK NORMAL OPERATING SEQUENCE

#### OF IGNITION SYSTEM

Check the normal operating sequence of the ignition system to ensure burners light properly.

#### VERIFY GAS INPUT RATE(S)

1. Turn OFF gas supply to all other gas-burning appliances except the furnace.
2. While the furnace is operating, record the time required (in seconds) for one complete revolution of the small gas meter dial.
3. Calculate the number of seconds per cubic foot ( $\text{sec}/\text{ft}^3$ ) of gas being delivered to the furnace. If the dial is a one-cubic foot dial, divide the number of seconds recorded in step 2 by 1. If the dial is a two-cubic foot dial, divide the number of seconds recorded in step 2 by 2.
4. Calculate the furnace input rate in BTUs per hour (Btu/hr). Input equals in the sum of: the installation's heating value and a conversion factor (hours to seconds) divided by the number of seconds per cubic foot. The measured input must agree with the expected input calculated in step 5.

## INPUT CALCULATION EXAMPLE:

Installation's gas heating value (**from gas supplier**)

1,000 Btu/ $\text{ft}^3$  (at standard conditions)

715 Btu/ $\text{ft}^3$  (at elevation)

Installation's seconds per cubic foot: 32  $\text{sec}/\text{ft}^3$

Conversion Factor (hours to seconds): 3600  $\text{sec}/\text{hr}$

Input = (Htg. value x 3600)  $\div$  seconds per cubic foot

Input = (715 Btu/ $\text{ft}^3$  x 3600  $\text{sec}/\text{hr}$ )  $\div$  32  $\text{sec}/\text{ft}^3$

Input = 80,438 Btu/hr

This measured input must agree with the derates for your unit and altitude as indicated in Table 2.

5. Compare measured input rate with expected input resulting from altitude derate.

#### Derating Example 1: 11,500 BTU at 8000 ft.

Sea level (nameplate) input = 115,000 Btu/hr

From Table 2: Derate at 8000 ft. = 15.3 $\pm$ 4%

Since this installation is approximately at the mid point of the elevation range, use the mid point of the derate: 15.3%.

Expected Input = 115,000 x (1 - .153) = 97,405 Btu/hr

#### Derating Example 2: 11,500 BTU at 7001 ft.

Sea level (nameplate) input = 115,000 Btu/hr

From Table 2: Derate at 7001 ft. = 15.3 $\pm$ 4%

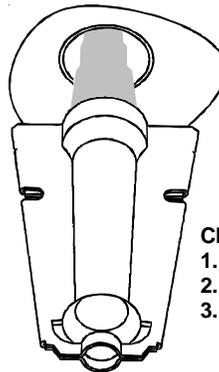
Since this installation is at the lower end of the elevation range, use the lower derate:

(15.3 - 4) = 11.3%.

Expected Input = 115000 x (1 - .113) = 102,005 Btu/hr

## INSPECT BURNER FLAME

The burner flames should be stable, soft and blue (dust may cause orange tips but they must not be yellow). They should extend directly outward from the burners without curling, floating, or lifting off.



Check the burner flames for:

1. Good adjustment
2. Stable, soft and blue
3. Not curling, floating, or lifting off.

**Figure 8**  
**Burner Flame**

## CHECK AND ADJUST UNIT TEMPERATURE RISE

Check and adjust unit temperature rise(s) as described in the installation manual.

Temperature rise must be within the range shown on the furnace rating plate.

## HANG11 and 12 and HALP10

The following adjustments and checks are a required part of this conversion. Adjustments and checks include:

- Leak checking orifices
- Checking and adjusting line and manifold gas pressures
- Verifying proper unit operation (input rate, operational sequence, burner flame, temperature rise, etc.)



### WARNING

**TO AVOID THE POSSIBILITY OF EXPLOSION OR FIRE, NEVER USE A MATCH OR OPEN FLAME TO TEST FOR LEAKS.**

## ORIFICE LEAK CHECK

**Leak check burner orifice threads using a soap solution.**

## LINE PRESSURE CHECK

1. Shut OFF gas at the manual gas shutoff valve and turn OFF power to the unit.
2. Connect a calibrated water manometer or appropriate gas pressure gauge at either the gas valve **inlet** pressure tap or gas piping drip leg (see Figures 2 and 3).
3. Turn ON the power and gas, put the unit into heating cycle and turn on all other gas consuming appliances.
4. Measure the gas supply pressure with the burners firing. The inlet gas pressure for propane gas must be between **11.0 and 13.0 inches W.C.** If supply pressure differs from required, make necessary adjustments to pressure regulator(s), gas piping, etc.
5. Turn OFF gas to the unit at the manual shutoff valve and disconnect manometer. Reinstall line pressure tap plug. Turn OFF any unnecessary appliances started in step 3.

## MANIFOLD PRESSURE CHECK

Only small variations in gas flow should be made by adjusting the gas valve pressure regulator. See Table 6 for the required propane gas manifold pressure.

### Propane Gas Manifold Pressure

9.7 to 10.3" W.C.

Table 6

1. Turn OFF gas to the unit at the manual gas shutoff valve.
2. Connect a calibrated water manometer or appropriate gas pressure gauge at the gas valve **outlet** pressure tap.
3. Turn ON gas supply and operate unit.
4. Remove the cap screw from the manifold pressure regulator adjustment location.
5. Adjust the manifold regulator to the required manifold pressure (Table 6).
6. Reinstall the manifold regulator cap screw. Confirm manifold pressure.
7. Turn OFF gas supply to unit. Disconnect manometer, re-install manifold pressure tap plug.

## UNIT OPERATION CHECKS - HALP10

Verify the gas input rate by checking that the appropriate orifices have been installed and the manifold pressure has been set as stated in these instructions.

**NOTE: SPECIFICATIONS AND PERFORMANCE DATA LISTED HEREIN ARE SUBJECT TO CHANGE WITHOUT NOTICE**

**Quality Makes the Difference!**

All of our systems are designed and manufactured with the same high quality standards regardless of size or efficiency. We have designed these units to significantly reduce the most frequent causes of product failure. They are simple to service and forgiving to operate. We use quality materials and components. Finally, every unit is run tested before it leaves the factory. That's why we know. . .**There's No Better Quality.**

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