



# HANG13 & 14, HALP11, and HAPS28 & 29

## High Altitude Conversion Kit(s) Installation Instructions

### Description

This kit contains the appropriate burner orifices, and/or pressure switch assembly for the application of Amana Two-Stage Gas-Fired furnaces in installations above altitudes of 7,000 feet. 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)			7,001 - 9,000 Feet			9,001 - 11,000 Feet		
Furnace	Natural Gas Orifices	Propane Gas Orifices	ID Blwr Pressure Switch	Natural Gas Orifices	Propane Gas Orifices	ID Blwr Pressure Switch	Natural Gas Orifices	Propane Gas Orifices	ID Blwr Pressure Switch
GUVA045*X30 GUVA070*X40	No Change	LPTK09	No Change	HANG13	HALP11	HAPS28	HANG14	HALP11	HAPS28
GUVA090*X50 GUVA115*X50	No Change	LPTK09	No Change	HANG13	HALP11	HAPS29	HANG14	HALP11	HAPS29

**Table 1**

Above an altitude of 7,000 feet, 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. They will provide the appropriate derating for all GUVA furnaces (Table 2). Orifice selection is based on non-derated gas (approximately 1,000 BTU/ft<sup>3</sup> for propane. If your gas supply has been derated for altitude, contact your gas supplier for orifice sizing.

GUVA Derates		
Altitude (ft)	Natural Gas Derate	Propane Gas Derate
7,000 - 9,000	30.9 ± 4%	44.5 ± 4%
9,001 - 11,000	47.7 ± 4%	56.5 ± 4%

**Table 2**

Do not derate by adjusting the manifold pressure to a lower pressure setting than what is 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 of 7,000 feet. A high altitude pressure switch is necessary as a result of the reduction in air density and is required regardless of the heat content of the fuel used.

	Orifice Size	
	Natural	Propane
0 - 7000	#43	#55
7001 - 9000	#44	#56
9001- 11000	#45	#56

**Table 3**

*Due to policy of continual product improvement, the right is reserved to change specifications and design without notice.*

**Amana**

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**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. Often during installation or repair it is possible to place yourself in a position which is more hazardous than when the unit is in operation.

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.

## General Information



### WARNING

#### PERSONAL INJURY HAZARD

This conversion kit must be installed by a qualified 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, explosion or production of carbon monoxide can result causing property damage, personal injury or loss of life. The qualified service agency performing this work assumes responsibility for the proper conversion of this appliance with this kit.



### WARNING

#### PERSONAL INJURY HAZARD

To prevent death, personal injury, or property damage due to fire or explosion from a propane gas leak, install a gas detecting warning device suitable for propane gases. A gas detecting warning device is the only reliable way to detect a propane gas leak. Do not rely on odor as rust can reduce the level of odorant in propane gas.

#### Remember:

- Propane gas is heavier than air and leaking gas can settle in any low area or confined space.
- Propane gas odor can fade, making the gas undetectable.
- A warning device is a required item, if the propane gas unit is installed in either a basement, an excavated area or a confined space.

#### If the presence of gas is suspected:

- Do not try to light any appliance.
- Do not touch any electrical switch or 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.

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

IN CANADA "THE CONVERSION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROVINCIAL AUTHORITIES HAVING JURISDICTION AND IN ACCORDANCE WITH THE REQUIREMENTS OF THE CAN/CGS B149.1 AND B149.2 INSTALLATION CODE."

# HANG13, HANG14, and HALP11

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.



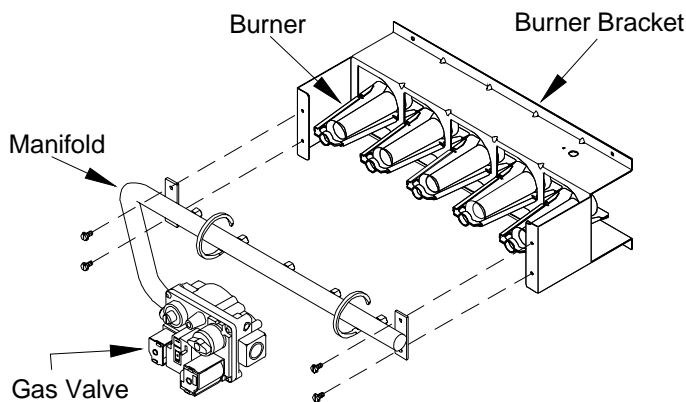
## PERSONAL INJURY HAZARD

**The gas supply must be shut off prior to disconnecting the electrical power, before proceeding with the installation.**

### Orifice Installation

#### GAS MANIFOLD REMOVAL

1. Disconnect wiring from the gas valve.
2. Where necessary, cut wire ties securing wiring to manifold.
3. 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. 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. Re-install 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.
2. Reconnect wiring to gas valve. Secure wiring to manifold using wire ties provided. **CAUTION:** Wiring must not interfere with orifices or burners, or contact any hot surfaces.
3. Refer to natural gas (*HANG13 & 14 Adjustments and Checks*) or propane gas (*HALP11 Adjustments and Checks*) section.

# HANG13, HANG14, and HALP11

## Adjustments and Checks - HANG13 & 14

The following adjustments and checks are 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

#### PERSONAL INJURY HAZARD

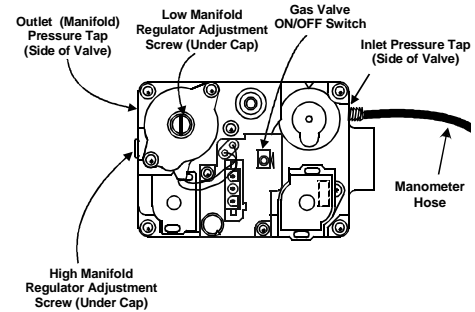
**To prevent death, personal injury or property damage due to fire or explosion, do not use a flame to check for leaks.**

#### 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 to the "inlet pressure tap" of the gas valve 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.



**Figure 2**  
**White-Rodgers 36E54**

#### MANIFOLD PRESSURE CHECK

Only small variations in gas flow should be made by adjusting the gas valve pressure regulator. See Table 4 for the required natural gas manifold pressure.

Natural Gas Manifold Pressure(s)	
Low Stage	High Stage
1.6 to 2.2" W.C.	3.0 to 3.6" W.C.

**Table 4**

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 *high stage* manifold pressure regulator adjustment location.
5. Using an Allen wrench, adjust *high stage* manifold regulator to the required manifold pressure (Table 2).
6. Reinstall the *high stage* manifold regulator cap screw. Confirm *high stage* manifold pressure.
7. Remove the cap screw from the *low stage* manifold pressure regulator adjustment location.
8. Using an Allen wrench, adjust *low stage* manifold pressure to the required manifold pressure.
9. Reinstall the *low stage* manifold regulator cap screw. Confirm *low stage* manifold pressure.
10. Turn OFF gas supply to unit. Disconnect manometer and reinstall manifold pressure tap plug.

# HANG13, HANG14, and HALP11

## Unit Operation Checks - HANG13 & 14

### 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, time and record one complete revolution of the small gas meter dial.
3. Calculate the number of seconds per cubic foot (sec/ft<sup>3</sup>) of gas being delivered to the furnace. If the dial is a one-cubic foot dial, divide the seconds recorded in step 2 by 1. If the dial is a two-cubic foot dial, divide the 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 conversion factor (hours to seconds) divided by the number of seconds per cubic foot. The measured input must not be greater than the input indicated on the unit rating plate.

#### INPUT CALCULATION EXAMPLE:

Installation's gas heating (HTG) value: 1,000 BTU/ft<sup>3</sup>  
(Obtained from gas supplier)

Installation's seconds per cubic foot: 34 sec/ft<sup>3</sup>

Conversion Factor (hours to seconds): 3600 sec/hr

Input = (Htg. value x 3600) ÷ seconds per cubic foot

Input = (1,000 BTU/ft<sup>3</sup> x 3600 sec/hr) ÷ 34 sec/ft<sup>3</sup>

Input = 106,000 BTU/hr

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

#### Derating Example 1: GUA115AX50 at 8,000 ft.

Sea level input = 115,000 BTU/hr [High Stage]

From Table 1: Derate at 8,000 ft. = 30.9 ± 4%

Since this range is at the mid point of the elevation range, use the mid point of the derate: 30.9%.

New Input = 115,000 x (1 - .309) = 79,465 BTU/hr

#### Derating Example 2: GUA115AX50 at 7,001 ft.

Sea level input = 115,000 BTU/hr [High Stage]

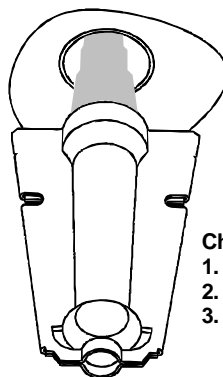
From Table 1: Derate at 7,001 ft. = 30.9 ± 4%

Since this range is at the lower end of the elevation range, use the lower derate: (30.9 - 4) = 26.9%.

New Input = 115,000 x (1 - .269) = 84,065 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 3**  
**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.

## Adjustments and Checks - HALP11

The following adjustments and checks are 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.)

**NOTE:** Propane gas conversions of two-stage gas valves do not require a regulator spring replacement.



**WARNING**

### PERSONAL INJURY HAZARD

**To prevent death, personal injury or property damage due to fire or explosion, do not use a flame to check for leaks.**

### ORIFICE LEAK CHECK

Leak check burner orifice threads using a soap solution.

# HANG13, HANG14, and HALP11

## Adjustments and Checks - HALP11 Cont'd

### 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.
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. See *Figure 2, page 5*.

### 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 propane gas manifold pressure.

Propane Gas Manifold Pressure(s)	
Low Stage	High Stage
5.7 to 6.3" W.C.	9.7 to 10.3" 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 *low stage* manifold pressure regulator adjustment location.
5. Using an Allen wrench, increase *low stage* manifold pressure by adjusting the *low stage* manifold regulator so the furnace will light and carry over.
6. Remove the cap screw from the *high stage* manifold pressure regulator adjustment location.
7. Using an Allen wrench, adjust *high stage* manifold regulator to the required manifold pressure (Table 5).
8. Reinstall the *high stage* manifold regulator cap screw. Confirm *high stage* manifold pressure.
9. Using an Allen wrench, adjust *low stage* manifold regulator to the required pressure.

10. Reinstall the low stage manifold regulator cap screw. Confirm *low stage* manifold pressure.
11. Turn OFF gas supply to unit. Disconnect manometer, reinstall manifold pressure tap plug.

## Unit Operation Checks - HALP11

### 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)

Ensure that the appropriate orifices have been installed and the manifold pressure has been set as specified in these instructions.

### 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 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.

### LABEL ATTACHMENT

Attach conversion data plate, with correct input rating, adjacent to the unit rating plate. Use Table 6 to determine the correct data plate to be applied.

Two-Stage Units Input Rating (Propane Gas: Standard Altitude)			
Size	Models	High Stage Input (BTU/hr)	Low Stage Input (BTU/hr)
045	GUVA	41,400	32,000
070	GUVA	62,100	48,000
090	GUVA	82,800	64,000
115	GUVA	103,500	80,000

**Table 6**

Post "conversion date certificate" adjacent to the unit rating plate.

# HAPS28 and HAPS 29

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

- Removing standard altitude two-stage pressure switch assembly
- Installing high altitude two-stage pressure switch assembly

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



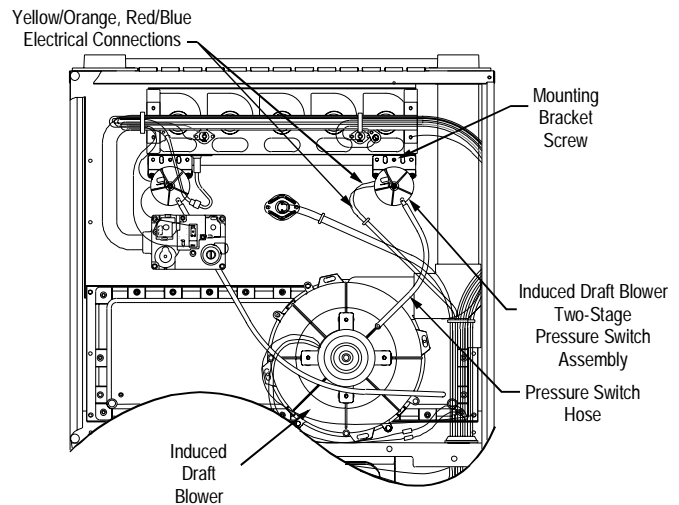
**CAUTION**

## PERSONAL INJURY HAZARD

**The gas supply must be shut off prior to disconnecting the electrical power, before proceeding with the installation.**

### Pressure Switch Assembly Removal/Replacement

1. Locate induced draft blower two-stage pressure switch assembly.
2. Disconnect the pressure switch hose from the pressure switch assembly tee.
3. Disconnect high stage (yellow and orange) and low stage (red and blue) wiring from pressure switches.
4. Remove mounting bracket screw securing standard altitude assembly to partition panel.
5. Install high altitude pressure switch assembly using screw removed in step 4. Refer to Table 1 for proper pressure switch kit.
6. Reconnect high stage (yellow and orange) and low stage (red and blue) wiring to pressure switches.
7. Reconnect pressure switch hose to new assembly.
8. Verify proper furnace operation.



**Figure 4**  
**Induced Draft Blower**  
**Pressure Switch Location**

7,001 - 11,000 ft				
	Kit	Two-Stage Pressure Switch Assembly	Low Stage Set Point	High Stage Set Point
GUVA045**30 GUVA070**40	HAPS28	11177115	-0.22	-0.55
GUVA090**50 GUVA115**50	HAPS29	11177116	-0.38	-0.82

**Table 7**  
**Pressure Switch Kits**