

Installation Instructions

Gas-Fired, Rear Diverter Boilers

High Altitude Conversion Kit – 5,401ft to 10,100ft

WARNING

Read these instructions carefully before installing. This kit is to be installed by a qualified installer, service agency, or gas supplier in accordance with the manufacturer's instructions and all codes and requirements of the authority having jurisdiction. Improper installation, adjustment, alteration, service, or maintenance can cause severe personal injury, death, or substantial property damage. For assistance or additional information, consult a qualified installer, service agency, or gas supplier.

DANGER

Explosion Hazard. Electrical Shock Hazard. Burn Hazard. This boiler uses flammable gas, high voltage electricity, moving parts, and very hot water under high pressure. Assure that all gas and electric power supplies are turned off and that water temperature is cool before attempting any disassembly or service.

WARNING

Asphyxiation Hazard. Proper operation of boiler depends upon use of correct burner orifice and blocked vent switch for fuel and altitude at which boiler is installed. Two section boilers are not to be installed above 5,400ft. Failure to properly configure this boiler for correct fuel or altitude could result in serious injury or property damage.

Table 1: These instructions are applicable to the following high altitude conversion kits.

Elevation	Model	Number of Sections							
		2**	3	4	5	6	7	8	9
5,401 -10,100ft	Nat Gas	N/A**	Kit # 112461-01						
	LP Gas, 84%AFUE* (not ES2 models)		Kit # 112462-01						

* AFUE can be found on Energy Guide label, boiler IO&S manual, boiler company website, and AHRI website.

** Two section boilers not to be installed above 5,400ft.

5,401 -10,100ft	LP Gas, <u>only ES2 models</u> 85%AFUE*	N/A**	Kit # 112464-01
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Included with kits listed in above tables:

- Blocked Vent Switch: 180°F set-point (Green Mark)
- Orifices: Natural Gas - #48; LP Gas, 84% AFUE - #56; LP Gas, 85% AFUE - 1.15mm
- Conversion label

Special consideration must be given to boiler installation at higher altitudes. For altitudes above 2,000ft, de-rate is 2.5% - 3% per 1,000ft as shown in tables 7 and 8. Up to and including 5,400ft, no modifications are required to the boiler. Above 5,400ft, this de-rate is accomplished through use of smaller main burner orifice and a lower temperature blocked vent switch.

⚠ WARNING

Gas Conversion Kits are required if also converting gas type. Failure to properly configure this boiler for correct fuel or altitude could result in serious injury or property damage.

If boiler is also intended to be converted for fuel type, a gas conversion kit is required. Follow gas conversion kit instructions to replace gas valve and pilot. Discard orifices in gas conversion kit. Use orifices in high altitude conversion kit.

1. Turn off gas supply and electrical power.

⚠ WARNING

Explosion Hazard. Gas supply must be off prior to disconnecting the electrical power, before proceeding with modification.

- a. Follow instructions TO TURN OFF GAS TO APPLIANCE. Refer to Operating Instructions inside front removable door or *Installation, Operating, and Service Instructions* (IO&S) provided with boiler or online.
 - b. Turn off electrical power at service switch or at circuit breaker, or fuse.
 - c. Turn off gas supply by closing manual shutoff valve at boiler or shutoff valve at gas meter.
2. Replace blocked vent switch on rear diverter with 180°F switch provided in altitude kit. See Figure 2.

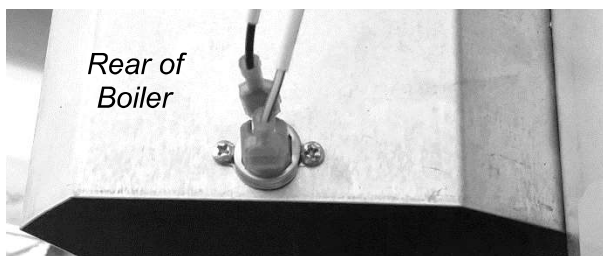


Figure 2: Blocked Vent Switch Location

⚠ WARNING

Orifices for this boiler cannot be drilled by installers. Improperly drilled orifices could result in serious injury or property damage.

3. Replace main burner orifices. See Figure 3.
 - a. Locate orifices in altitude kit. Do not use orifices in gas conversion kit (when also converting gas).
 - b. Remove front door.
 - c. Remove burner access panel by removing screw securing access panel to base.
 - d. Remove wires from flame rollout switch.
 - e. Disconnect pilot tubing at gas valve.

⚠ WARNING

Be careful handling pilot tubing. Do not crimp or crack gas pilot tube. Leaking pilot tubing could result in serious injury or substantial property damage.

- f. Remove main burners from boiler:
 - i. Starting from right side, remove burner by lifting front of burner off orifice and pulling forward.
 - ii. Burner with attached pilot:
 - When converting gas type, see gas conversion kit instructions to replace pilot.
 - Otherwise, it is not necessary to fully remove this burner from boiler, and stiffness of the pilot tubing increases difficulty removing. Instead, with adjacent main burners removed, lift front of burner and move to side of orifice.
 - iii. Remove remaining main burners from boiler.

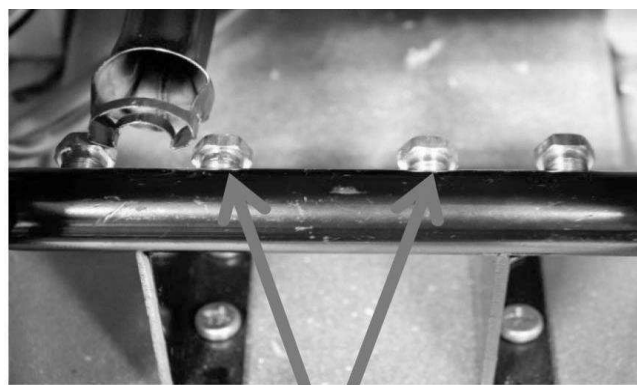


Figure 3: Orifice Location

- g. Remove all gas orifices from burner manifold. Orifices are 1/2 inch Hex Head.

⚠ WARNING

Ensure orifice holes are not obstructed. Do not use Teflon tape.

- h. Use soft pipe sealant on first couple of threads on each orifice supplied with the altitude kit. Install into manifold. See Figure 4.



*Orifice with soft
set pipe sealant*

Figure 4: Orifice Sealing

- i. Screw in each orifice hand tight and then tighten until snug (up to additional two full clockwise turns maximum). Do not over-tighten.

⚠ WARNING

Ensure burner tube is properly seated over each orifice. Misalignment of burners could result in serious injury or substantial property damage.

- j. Install burners in reverse order they were removed. Seat folded end of burner into vertical slot at rear of burner tray. Each burner tube needs to be installed such that bracket at end of burner tube will seat over orifice on gas manifold. See Figure 5.



*Vertical slots at
rear of burner area
where burner tubes
are mounted.*

Figure 5: Burner Support

- k. When converting gas type, follow gas conversion kit instructions to replace gas valve.
- l. Reconnect pilot tubing to gas valve. Check connection for leaks when leak testing piping. If connection leaks, compression fitting must be replaced.
- m. Verify pilot burner is not dislodged from main burner orifices.
- n. Reconnect wires to flame rollout switch.
- o. Replace burner access panel and securing screw.

4. Leak Test Connections

⚠ WARNING

Boiler and its gas connections must be leak tested and leak free before placing boiler in operation. Gas leaks could result in serious injury or substantial property damage.

⚠ DANGER

Explosion Hazard. Do not use matches, candles, open flames, or other ignition source to check for leaks. Failure to comply could result in severe personal injury, death or substantial property damage.

- a. Start boiler according to OPERATING INSTRUCTIONS located on boiler and in IO&S manual.
 - b. Locate and address leaks using listed combustible gas detector, a noncorrosive leak detection fluid or other listed leak detection method.
 - c. Check piping between gas valve and orifices.
 - d. Check piping between gas valve and pilot.
 - e. Tighten appropriate pipe connections.
8. Check gas input rate to boiler.
 - a. When checking rate, ensure all other appliances connected to same meter as boiler are off.
 - b. See Table 7 for maximum input rates for boilers at 84% AFUE (models other than ES2), and Table 8 for maximum input rates for boilers at 85% AFUE (ES2 models).
 9. Measure carbon monoxide (CO) level in vent after 5 minutes of main burner operation. CO should not exceed 400ppm air free.
 10. Continue with additional steps outlined in "Startup and Checkout" section in IO&S manual.
 11. Complete and attach conversion label supplied with kit beside existing rating label. See Figure 6.

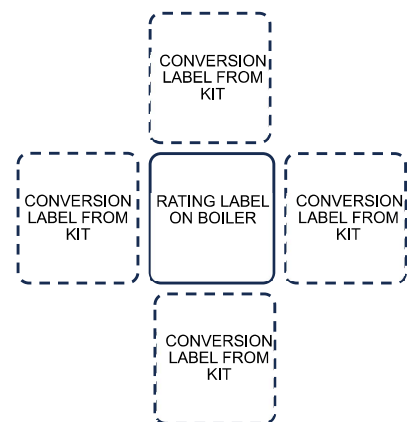


Figure 6: Rating Label Installation

Table 7: Reduced Input Rates for Models with 84% AFUE (models other than ES2)

Section Size	Max. Input (MBH)**						
	Rating Label	5,401ft	6,000ft	7,000ft	8,000ft	9,000ft	10,100ft
3	70	60.5	59.5	58.0	56.0	54.5	52.5
4	105	91.0	89.5	86.5	84.0	81.5	78.5
5	140	121.0	119.0	115.5	112.0	108.5	104.5
6	175	151.5	149.0	144.5	140.0	135.5	131.0
7	210	181.5	178.5	173.5	168.0	163.0	157.0
8	245	212.0	208.5	202.0	196.0	190.0	183.0
9	280	242.0	238.0	231.0	224.0	217.0	209.5

** Approximate 2.5% derate per 1000 ft.

Table 8: Reduced Input Rates for Models with 85% AFUE (ES2 models)

Section Size	Max. Input (MBH)**						
	Rating Label	5,401ft	6,000ft	7,000ft	8,000ft	9,000ft	10,100ft
3	70	58.5	57.5	55.5	53.0	51.0	49.0
4	105	88.0	86.0	83.0	80.0	76.5	73.0
5	140	117.5	115.0	110.5	106.5	102.0	97.5
6	175	146.5	143.5	138.5	133.0	128.0	122.0
7	210	176.0	172.0	166.0	159.5	153.5	146.5
8	245	205.5	201.0	193.5	186.0	179.0	171.0
9	280	234.5	229.5	221.0	213.0	204.5	195.0

** Approximate 3% derate per 1000 ft.