INSTALLATION INSTRUCTIONS FOR HIGH ALTITUDE KITS: RXGY-F18, F19, F20, F21, F22, F34, F35, F36 & F37, F42

FOR USE WITH 90+ 2 STAGE UPFLOW (RGRL, RGRK & RGRM) AND MODULATING COMMUNICATING UPFLOW (RGFE) FURNACES

Recognize this symbol as an indication of Important Safety Information!

⚠WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED, LICENSED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING ANY MAINTENANCE OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE RESULTING IN FIRE, ELECTRICAL SHOCK, CARBON MONOXIDE POISONING, EXPLOSION, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

FOR CANADIAN INSTALLATIONS, THE CONVERSION SHALL BE CARRIED OUT BY A MANUFACTURER'S AUTHORIZED REPRESENTATIVE, IN ACCORDANCE WITH REQUIREMENTS OF THE MANUFACTURER, PROVINCIAL OR TERRITORIAL AUTHORITIES HAVING JURISDICTION AND IN ACCORDANCE WITH THE REQUIREMENTS OF THE CAN/CGA-B149.1 OR CAN/CGA-B149.2 INSTALLATION CODES.

RECOMMENDED TOOLS:

Slotted & Phillips screwdrivers
1/4″ Nut driver
Needle-nosed pliers
Pipe wrenches (2)
7/16″ Socket or wrench
Anaerobic Chemical Pipe Sealant (Pipe dope)

90 plus furnaces installed at high elevations require the installation of a high altitude kit for proper operation. The high altitude kit consists of a high altitude pressure switch assembly which replaces the pressure switch assembly connected to the induced draft blower. 90 plus gas furnaces installed above 5,000 ft require that the pressure switch be exchanged for those provided in the kit. Additionally, the burner orifices may also need to be changed depending on both altitude and gas heating value.

For **ALL** furnace models, an orifice change may be necessary depending on the elevation and gas heating value. *Elevations above 2000 ft. require the furnace to be de-rated 4% per thousand feet. This means that for every thousand feet of elevation, the furnace loses 4% of its heating capacity. Burner orifices must be adjusted in order to achieve the reduced rates.*
NOTE: Factory installed orifices are calculated and sized based on a sea level natural gas heating value of 1075 BTU per cubic ft. Regional reduced heating values may nullify the need to change orifices except at extreme altitudes. Consult the section titled *"Orifice Selection for High Altitude Applications"* of this document to determine if an orifice change will be necessary and what the new drill size will be for the orifices.

The high altitude kit consists of a high altitude pressure switch assembly that replaces the pressure switch assembly connected to the induced draft blower. The kit no longer contains additional orifices for high altitude applications as these may or may not be necessary and, if necessary, could be any of a number of different sizes. Please consult the section titled *"Orifice Selection for High Altitude Applications"* of this document for information on calculating the proper orifice drill size and where to order the necessary orifices.

Kit Selection: HIGH ALTITUDE FIELD CONVERSION

Based on the furnace model number, the proper kit to use must be selected from the list below:

RGRK FURNACE MODELS

HIGH ALTITUDE KIT	RGRK FURNACE INPUTS
RXGY-F18	45,000, 60,000 (17" cabinets) & 75,000 (21" cabinets) BTU's
RXGY-F19	75,000 (17" cabinet)
RXGY-F20	90,000
RXGY-F21	120,000
RXGY-F22	105,000

RGRL & RGRM FURNACE MODELS

HIGH ALTITUDE KIT	RGRL, RGRM FURNACE INPUTS
RXGY-F18	45,000 & 60,000 BTU's
NOT REQUIRED	75,000 (all cabinets)
RXGY-F20	90,000
RXGY-F21	120,000
RXGY-F42	105,000

RGFE FURNACE MODELS

HIGH ALTITUDE KIT	RGFE FURNACE INPUTS
RXGY-F34	60,000 BTU's
RXGY-F35	75,000
RXGY-F36	90,000
RXGY-F37	105,000 & 120,000

92-24096-06-04
SUPERSEDES 92-24096-06-03

PROCEDURE: CHANGING PRESSURE SWITCH ASSEMBLIES

All Models:

⚠ WARNING

1. **DISCONNECT THE MAIN ELECTRICAL POWER TO THE UNIT BEFORE ATTEMPTING ANY MAINTENANCE. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN SEVERE PERSONAL INJURY OR DEATH.**

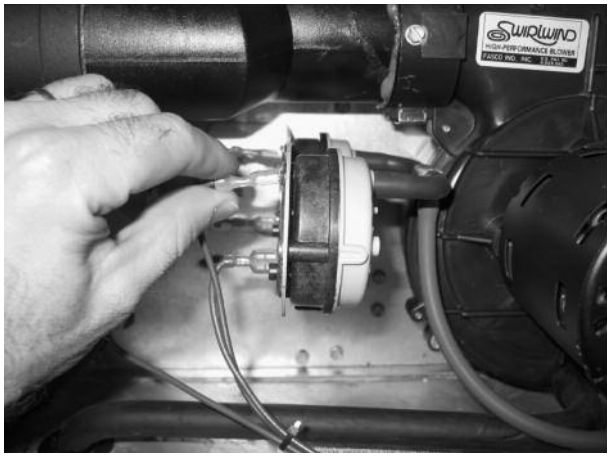
⚠ WARNING

2. **SHUT OFF THE GAS SUPPLY AT A MANUAL VALVE IN THE SUPPLY PIPING TO THE UNIT BEFORE ATTEMPTING MAINTENANCE. FAILURE TO DO SO CAN CAUSE FIRE OR AN EXPLOSION RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**
3. Turn the thermostat to the “off” position.
4. Remove the burner door and blower door.

TO REPLACE THE PRESSURE SWITCH ASSEMBLY:

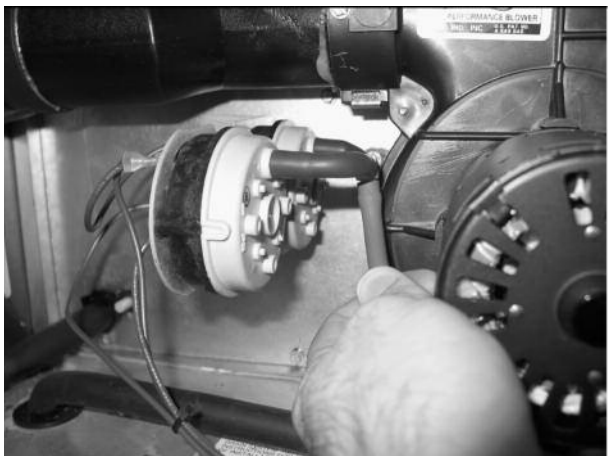
5. Remove the wiring from the existing pressure switch assembly. (See Fig 1).

FIGURE 1
REMOVE THE WIRES FROM THE PRESSURE SWITCH ASSEMBLY.



6. Disconnect the pressure switch hose which runs to the induced draft blower. (See Fig. 2).

FIGURE 2
REMOVE THE HOSE FROM THE PRESSURE SWITCH ASSEMBLY.



7. Remove the pressure switch assembly by removing the two screws which attach the switch assembly to the furnace center panel.
8. For all models, remove the existing high-fire pressure switch (the switch with the more negative setting) from the assembly and replace with the high-fire switch supplied in the kit. Both a Honeywell and MPL Pressure switch are included in the kit. Use the appropriate switch and discard the other.
9. For 75,000 (21” cabinet) and 120,000 BTU models, also remove the low-fire switch from the assembly and replace with the low fire switch (the switch with the less negative setting) supplied in the kit. Both a Honeywell and MPL Pressure switch are included in the kit. Use the appropriate switch and discard the other.
10. Use the existing screws to mount the high altitude pressure switch assembly to the center panel in the same location.
11. Re-attach the hose from the induced draft blower to the pressure switch assembly.
12. Re-attach all wires to the pressure switch assembly. Reference the wiring diagram attached to the unit.
13. If conversion requires an orifice change, continue on to next section. If not, replace the doors, turn on the electrical power and the main gas supply to the unit. Set the thermostat at a temperature which will cause the unit to operate in heat mode. Let the furnace operate through several cycles to confirm proper operation.

AT CERTAIN ELEVATIONS, BOTH THE PRESSURE SWITCH ASSEMBLY AND THE ORIFICES MUST BE CHANGED. FOLLOWING IS A PROCEDURE FOR DETERMINING AT WHAT ELEVATION THE ORIFICES WILL NEED TO BE CHANGED AND WHAT DRILL SIZE THEY MUST HAVE. THE INSTRUCTIONS ARE BASED ON ALTITUDE AND GAS HEATING VALUE. THE INSTALLER WILL NEED TO DETERMINE BOTH THE ELEVATION AND THE HEATING VALUE (BTU/FT^3) OF THE GAS AT SEA LEVEL BEFORE MAKING THE CALCULATIONS.

ORIFICE SIZE ADJUSTMENTS NEED TO BE CALCULATED AND APPROPRIATE ORIFICES INSTALLED BASED ON THE ACTUAL HEATING VALUE AND ALTITUDE USING GUIDELINES SET FORTH BY THE *NATIONAL FUEL GAS CODE* and (for Canada) *The NATURAL GAS AND PROPANE INSTALLATION CODE* and *GAS FIRED APPLIANCES FOR USE AT HIGH ALTITUDES* (CGA 2.17-M91)

ORIFICE SELECTION FOR HIGH ALTITUDE APPLICATIONS

⚠ CAUTION

The National Fuel Gas Code (NFGC) and (for Canada) *The Natural Gas and Propane Installation Code* and *Gas-Fired Appliances for Use at High Altitudes* (CGA 2.17-M91) guidelines should be followed when converting these furnaces for high altitude operation.

TABLE 1
NATURAL GAS ORIFICE DRILL SIZE (4% PER 1000 FT. DE-RATE) BURNER INPUT (PER BURNER) 15,000 BTU @ SEA LEVEL

Annual Avg. Heat Value (btu per ft³)	Sea level to 1999 ft.	2000 to 2999 ft.	3000 to 3999 ft.	4000 to 4999 ft.	5000 to 5999 ft.	6000 to 6999 ft.	7000 to 7999 ft.	8000 to 8999 ft.
850	47	48	48	49	49	49	50	50
900	48	49	49	49	50	50	50	51
1000	49	50	50	50	51	51	51	52
1075	50	51	51	51	51	52	52	52
1170	51	51	52	52	52	53	53	53

Examples of orifice sizing using the National Fuel Gas Code Appendix F:

In addition to any necessary pressure switch changes, installations at elevations above 2000 ft. require the furnace to be de-rated 4% per thousand feet. *Note that #50 Factory installed orifices are calculated and sized based on a sea level Natural Gas heating value of 1075 BTU per cubic ft. Regional reduced heating values may nullify the need to change orifices except at extreme altitudes.* Table 1 shows some quick conversions based on elevation and gas heating value. This table is combined and simplified from Tables F1 and F4 of the NFGC. **IMPORTANT:** TO CALCULATE THE NEW ORIFICE SIZE, THE EQUIVALENT HEATING VALUE OF THE GAS AT SEA LEVEL MUST BE KNOWN. THE VALUE MUST BE THAT OF SEA LEVEL BEFORE ANY CALCULATIONS ARE PERFORMED. THIS INFORMATION CAN BE OBTAINED FROM THE LOCAL GAS SUPPLIER.

Example 1: 900 BTU/ft³ Regional Natural Gas Heating Value

I / H = Q
15000 / 900 = 16.68 ft³/hr

I = Sea Level input (per burner): 15000
H = Sea Level Heating Value: 900
Q = 16.68 ft³ Natural Gas per hour.

From Table F.1 of *National Fuel Gas Code Handbook, 2002* (3.5" w.c. column)
Orifice required at Sea Level: # 48
From Table F.4 of *National Fuel Gas Code Handbook, 2002*
Orifice required at 5000 ft. elevation (4% de-rate per thousand ft): # 50
Orifice required at 8000 ft. elevation (4% de-rate per thousand ft): # 51

Example 2: 1050 BTU/ft³ Regional Natural Gas Heating Value

I / H = Q
15000 / 1050 = 14.63 ft³/hr

I = Sea Level input (per burner): 15000
H = Sea Level Heating Value: 1050
Q = 14.28 ft³ Natural Gas per hour.

From Table F.1 of *National Fuel Gas Code Handbook, 2002* (3.5" w.c. column)
Orifice required at Sea Level: # 50
From Table F.4 of *National Fuel Gas Code Handbook, 2002*
Orifice required at 5000 ft. elevation (4% de-rate per thousand ft): # 51
Orifice required at 8000 ft. elevation (4% de-rate per thousand ft): # 52

LP Gas

LP Gas is a manufactured gas that has consistent heating value across most regions.

The National Fuel Gas Code guidelines are used with the following exception:

The recommended LP Gas high altitude orifice selections differ slightly in that the NFGC LP orifice chart, as they are not accurate for Rheem products. The National Fuel Gas Code LP orifices are based on an 11" of water column pressure at the orifice, which differs from Rheem products that use 10" of water column at the orifice. This difference requires a deviation from the NFGC orifice size recommendations. The Sea Level input should still be reduced by 4% per thousand ft. and the orifice size must be selected based on the reduced input selection chart shown in Table 2.

TABLE 2
LP GAS ORIFICE DRILL SIZE (4% PER 1000 FT DE-RATE).
BURNER INPUT = 15,000 BTU @ SEA LEVEL.

Altitude	Input (BTU per burner) 25000	Orifice Size
0 to 2000 ft	15000	1.15 mm (factory)
2001 to 3000	13200	1.15 mm
3001 to 4000	12600	1.10 mm
4001 to 5000	12000	#58
5001 to 6000	11400	#59
6001 to 7000	10800	#60
7001 to 8000	10200	#62
8001 to 9000	9600	#63
9001 to 10000	9000	#64

Orifice Ordering Information

Orifices may be ordered from Rheem/Ruud Prostock parts departments by specifying the Rheem/Ruud part number. Orifice sizes are selected by adding the 2-digit drill size required in the orifice part number. Drill sizes available are 39 though 64; metric sizes available 1.10mm (-90) and 1.15mm (-91):

Orifice Part Number 62-22175-(drill size)
Example 1:
60 drill size orifice required
Part # 62-22175-60

Example 2:

1.15mm drill size orifice required
Part # 62-22175-91

TO REPLACE THE ORIFICES:

Once it has been determined (using the method above) that the orifices need to be changed, the following procedure should be followed to replace the orifices.

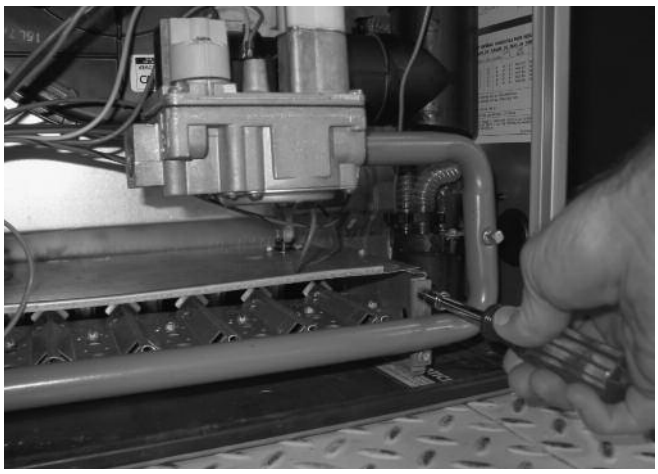
⚠ WARNING

1. DISCONNECT THE MAIN ELECTRICAL POWER FROM THE UNIT BEFORE ATTEMPTING ANY MAINTENANCE. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN SEVERE PERSONAL INJURY OR DEATH.

⚠ WARNING

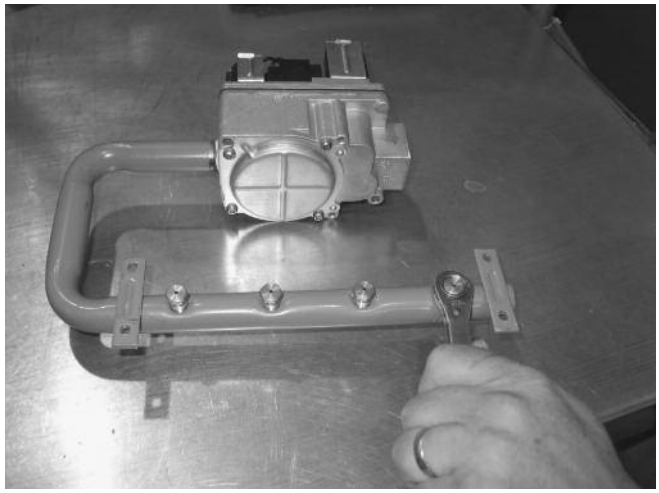
2. SHUT OFF THE GAS SUPPLY AT A MANUAL VALVE IN THE SUPPLY PIPING TO THE UNIT BEFORE ATTEMPTING MAINTENANCE. FAILURE TO DO SO CAN CAUSE FIRE OR AN EXPLOSION RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.
3. Disconnect the gas supply line from the system at the union inside the furnace.
4. Remove all necessary wiring to permit removal of the manifold assembly.
5. Remove the four screws holding the gas manifold to the burner brackets and remove the manifold assembly. See Figure 3.

FIGURE 3
REMOVE THE MANIFOLD ASSEMBLY



6. Remove the existing orifices from the manifold using a 7/16” socket or wrench. See Figure 4.

FIGURE 4
ORIFICE REMOVAL



7. Replace the orifices with the proper high-altitude orifices. Screw them in hand tight and secure in place (with the wrench or socket) 1/4 turn from hand tight.
8. Replace the manifold assembly on the burner assembly with the four screws removed in step 5.
9. Replace all wiring removed in step 4.
10. Re-attach the gas line at the union. Tighten securely with a pipe wrench. **IMPORTANT:** When tightening gas pipe connections, use a back-up wrench to prevent any twisting of the control assembly and/or the gas valve.
11. Turn on the gas at the manual gas valve and check for any leaks using soap and water solution or other approved method.

⚠ WARNING

DO NOT USE AN OPEN FLAME TO CHECK FOR LEAKS. USE OF AN OPEN FLAME CAN CAUSE A FIRE OR EXPLOSION RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

12. Turn on the electrical power to the unit. Set the thermostat at a temperature which causes the unit to operate in the heat mode. Let the furnace operate through several cycles to confirm proper operation.

INSTALL THE CONVERSION LABEL

Once all other work has been done, install the “High Altitude Conversion Label” supplied in the kit (part number 92-101842-01). This label must be installed and properly filled out to complete the job. The label includes information about elevation, manifold pressure and etc to indicate that the furnace has been properly converted by the installer for the particular installation in question. The label must be filled out by the installer.