

INSTALLATION INSTRUCTIONS FOR HIGH ALTITUDE KITS: RXGY-F43, F44, F45, F46 & F47 (-)97V MODULATING UPFLOW FURNACES RXGY-F48, F49, F50, F51 & F52 (-)97V MODULATING DOWNFLOW/HORIZONTAL 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:

None Required

Kit Selection: (-)97V HIGH ALTITUDE FIELD CONVERSION

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

Model (USA)	Input (BTU)	Kit No.	Min. Alt. Kit required	Max. Alt kit applies	Model Data Card	High Altitude Data Card Conversion Label
(-)97V(-)060	56K	RXGY-F43	5000 ft. elevation	8000 ft. elevation	47-105682-01	92-105683-01
(-)97V(-)070	70K	RXG-F44	5000 ft. elevation	8000 ft. elevation	47-105682-02	92-105683-02
(-)97V(-)085	84K	RXGY-F45	5000 ft. elevation	8000 ft. elevation	47-105682-03	92-105683-03
(-)97V(-)100	98K	RXGY-F46	5000 ft. elevation	8000 ft. elevation	47-105682-04	92-105683-04
(-)97V(-)115	112K	RXGY-F47	5000 ft. elevation	8000 ft. elevation	47-105682-05	92-105683-05

FOR UPFLOW MODELS (USA)
USE THIS CHART FOR
PROPER KIT SELECTION

Model (KSA)	Input (BTU)	Kit No.	Min. Alt. Kit required	Max. Alt kit applies	Model Data Card	High Altitude Data Card Conversion Label
(-)97V(-)060	56K	RXGY-F48	5000 ft. elevation	8000 ft. elevation	47-105682-06	92-105683-06
(-)97V(-)070	70K	RXG-F49	5000 ft. elevation	8000 ft. elevation	47-105682-07	92-105683-07
(-)97V(-)085	84K	RXGY-F50	5000 ft. elevation	8000 ft. elevation	47-105682-08	92-105683-08
(-)97V(-)100	98K	RXGY-F51	5000 ft. elevation	8000 ft. elevation	47-105682-09	92-105683-09
(-)97V(-)115	112K	RXGY-F52	5000 ft. elevation	8000 ft. elevation	47-105682-10	92-105683-10

FOR DOWNFLOW MODELS (KSA)
USE THIS CHART FOR
PROPER KIT SELECTION

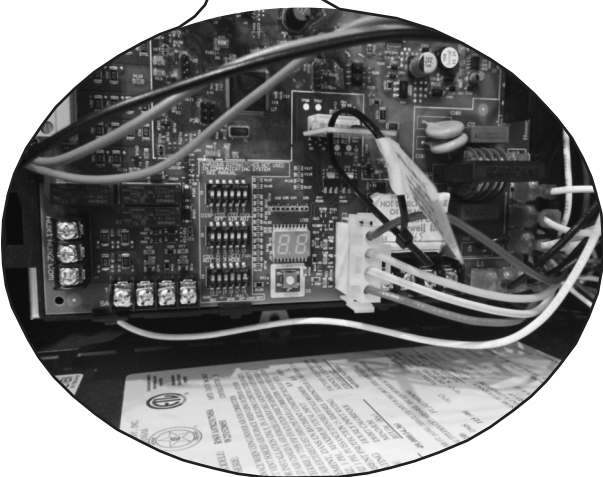
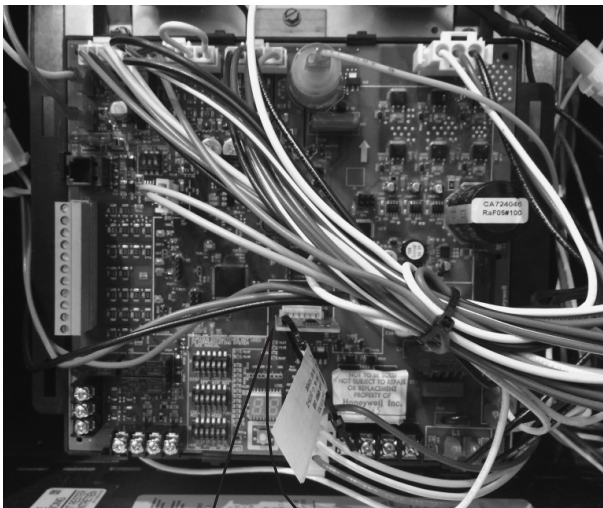
CONTENTS OF KIT:

- (1) Nylon Tie Strap 64-17606-01
- (1) High Altitude Data Card conversion label (Model and altitude specific)
- (1) Model Data Card (Model and altitude specific)
- (1) High Altitude unit conversion label 92-101842-02

The (-)97V series furnaces require a 2% de-rate per thousand ft. elevation starting above 2000 ft. At altitudes above 5000 ft. the Model Data Card (MDC) must also be changed as well as de-rating the input. The MDC change allows the unit to be operated from altitudes of 5000 ft. up to 8000 ft. elevation. MDC contains performance parameter corrections needed to ensure reliable unit operation at these higher elevations. No other hardware modifications are necessary other than rate adjustment. See heating airflow section for adjusted airflow parameters at altitude.

Orifice selection on these models are based on a 2% de-rate per thousand ft. elevation. Proper orifice selection is key to optimal performance. Orifice selection is based on gas sea level heating values that are corrected to deliver the proper supply of gas at the given altitude. See orifices selection chart.

FIGURE 1



Installing High Altitude Model Data Card:

Turn off power to unit. Note routing of existing nylon tie strap (**Figure 1**). Cut tie strap and remove existing Model Data Card. Install model specific High Altitude MDC and lace new tie strap through card, high altitude data card conversion label and wire harness as noted above; do not over tighten strap. To apply high altitude data card conversion label, peel the label off of the backing and wrap around provided tie strap evenly in order to properly display both faces of the label. Tie strap should not pull or apply any force on MDC that may cause the card to disconnect from the IFC during operation. Turn on power and follow normal startup procedures as stated in installation and operation manual that came with unit.

Install Correct Altitude Orifices:

Install correct orifices based on:

- Gas; either Natural or LLP
- Rate, corrected to altitude. 2% per thousand ft. elevation de-rate required.
- Natural Gas Heating Value; See **Table 1** for Natural gas.
- LP – Heating value does not vary as it is a manufactured gas. 2450 per cu. ft. is the national average. LP conversion kit is required (RXGY- FP37). See **Table 2**.

Example:

(-)97V070 to be installed at 7750 ft. elevation. Sea level natural gas heating value is 950 BTU per cu. ft. The input at altitude must be reduced at a 2% per thousand ft. Sea level input per burner is 14 MBTU for all units in the (-)97V series.

The formula for determining the new input rate based on altitude is as follows:

$$\text{New Input} = \text{Nameplate Input} \times (1 - ((\text{Elevation in Ft}/1000\text{Ft}) \times 0.02))$$
$$14000 \text{ BTU} \times (1 - ((7750\text{ft}/1000\text{ft}) \times 0.02)) = 11830 \text{ BTU}$$

In this case there are 5 burners installed in the unit so expected TOTAL unit input is adjusted to 59150 BTU @ 7750 ft. (5 x 11830).

The de-rate per burner is calculated in the charts below. Use the Gas Suppliers provided, sea level heating value and select the orifice for your altitude.

Natural Gas Orifice Selection

All (-)97V units are factory equipped with orifices sized for 1100 sea level heating value gas. Local utilities adjust the sea level heating value of gas used at higher elevations to compensate for operation at altitude

Installer must be aware of the local heating value (sea level standard) to use the chart below. This chart is based on natural gas with a specific gravity of .60. The recommended orifices below allow the furnace to operate within 5% of design rate. Furnace operation is optimized when operating at design rate. Installer is responsible to verify rate.

Note: Above 5,000 ft., the last 2 elbows on an alternate horizontal termination which are on the exterior of the building will

TABLE 1
ORIFICE SELECTION BASED ON 2% DE-RATE PER 1000 FT., HEATING VALUE* & ELEVATION

		ELEVATION							
		Heating Value	Sea Level to 2,000'	2,001' to 3,000'	3,001' to 4,000'	4,001' to 5,000'	5,001' to 6,000'	6,001' to 7,000'	7,001' to 8,000'
Gas Heating Value (BTU's/ft ³) @ Sea Level**	1,000-1,100	1100	51	51	51	50	50	50	50
		1050	50	50	50	50	50	50	50
		1000	50	50	50	49	49	49	49
	900-999	999	50	50	50	49	49	49	49
		950	49	49	49	49	49	49	49
		900	49	48	48	48	48	48	48
	800-899	899	49	48	48	48	48	48	48
		850	48	48	48	47	47	47	47
		800	47	47	47	46	46	46	46
	700-799	799	47	47	47	46	46	46	46
		750	46	46	46	46	46	46	45
		700	44	44	44	44	44	48	49
Rate per orifice avg.		14000	13440	13160	12880	12600	12320	12040	

*Chart is based on Natural Gas with a specific gravity of 0.60

**Be sure to use sea level heating value. When requesting the heating value from a local utility, it must be converted to seal level equivalent in order to use this table.

be counted in the maximum vent length and maximum number of elbows permitted.

LP Gas Orifice Selection

LP gas is a manufactured gas that has a consistent heating value across most regions. The recommended orifices below allow the furnace to operate within 5% of design rate. It is notable that the 1.10mm orifice is used at all altitudes. The lower barometric pressure at altitudes allows a "natural de-rate" to occur resulting in a 2% de-rate with minor adjustments to manifold pressures. Furnace operation is optimized when operating at design rate. Installer is responsible to verify rate. LP Conversion Kit RXGY- FP37 contains instructions and required valve conversion parts and 1.10mm orifices.

Note: Above 5,000 ft., the last 2 elbows on an alternate horizontal termination which are on the exterior of the building will be counted in the maximum vent length and maximum number of elbows permitted.

Heating airflow adjustment chart

The MDC change at 5000 ft. corrects heating cfm delivery at altitudes of 5000 ft. to 8000 ft. No dipswitch adjustment of airflow is required at 5000 ft. elevation when unit is operating at

TABLE 2

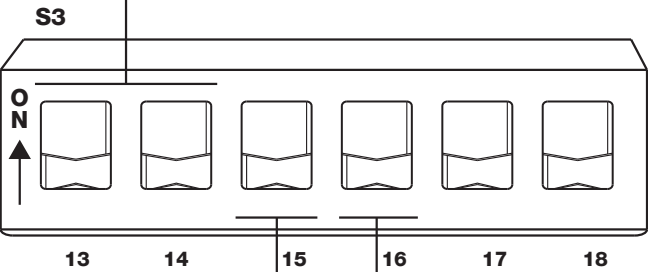
For US and Canada L.P. Gas Orifice Drill Size (2% Per 1000ft. De-Rate) 90+ Burner input (per burner) 14,000 @ sea level		
Altitude	Input per burner avg.	Orifice size
0-2000 ft	14000	1.10mm
2001 to 3000ft	13440	1.10mm
3001 to 4000ft	13160	1.10mm
4001 to 5000ft	12880	1.10mm
5001 to 6000ft	12600	1.10mm
6001 to 7000ft	12320	1.10mm
7001 to 8000ft	12040	1.10mm

the proper de-rate for 5000 ft. At altitudes above 5000 ft. select proper heating airflow adjustments (decrease in cfm to raise temperature rise).

Integrated Furnace Control Dipswitches

Switch Pair 13 & 14
Heat Adjustment

Switch Setting	Temp Trim
A  *	None
B 	High Ht. Only
C 	Low Ht. Only
D 	Both



Switch 16
2F/4F
Temperature Rise

Switch Setting	Adjustment
 *	2 Deg F
	4 Deg F

Switch 15
+/- Temperature Rise

Switch Setting	Adjustment
 *	Positive
	Negative

ST-A1194-90-00

Gas Heat Rise (Airflow) Adjustment; SW13, SW14, SW15 & SW16

Four dipswitches are to be provided to adjust the low and high heating temperature rise by changing the airflow. The switches are to be labeled “HEAT ADJ” (SW13 & SW14), “+/- ” (SW15) and “2F/4F” (SW16). These switches will adjust the temperature rise by changing the airflow only when SW13 and SW14 are NOT set to OFF/OFF. SW13 and SW14 will select the method of temperature rise adjustment as follows:

Selection	SW13	SW14	Description
A	OFF	OFF	No Adjustment (Factory Setting)
B	ON	OFF	Adjust High Heat Only
C	OFF	ON	Adjust Low Heat Only
D	ON	ON	Adjust BOTH Low and High Heat Together by the same amount.

SW15 (“+/- ”) is mapped as follows:
SW15 OFF = Positive Temperature Rise Adjustment (Airflow is Reduced) (Factory Default)
SW15 ON = Negative Temperature Rise Adjustment (Airflow is Increased)

SW16 (“2F/4F”) is mapped as follows:
SW16 OFF = 2 Deg F Temperature Rise Adjustment (Factory Default)
SW16 ON = 4 Deg F Temperature Rise Adjustment

Additionally, the adjustment to the low-end will affect a linear adjustment to the entire range of heating airflow except at the 100% rate. The adjustment to the range will be such that the 40% heating rate will be adjusted up or down as specified by the dipswitch settings, the 100% heating rate may also be adjusted up or down and all points in between will fall on a line created by the adjusted 40% heating airflow rate and the adjusted (or unadjusted) 100% heating airflow rate.

Further, for communicating systems, the above selections (made with dipswitches SW13, SW14, SW15, and SW16 in legacy mode) can be made via the Econet control center.

Install The High Altitude Unit Conversion Label

Once all other work has been done, install the “High Altitude Unit Conversion Label” supplied in the kit (part number 92-101842-02). The label must be properly filled out and placed near the unit rating plate to complete the job. The label is self-adhering, to install, simply remove the backing of the label and stick it to the appropriate surface. The label includes information about elevation, manifold pressure, fuel type, 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. See Figure 2

FIGURE 2
HIGH ALTITUDE UNIT CONVERSION LABEL

THIS APPLIANCE HAS BEEN CONVERTED FOR A USE AT AN ALTITUDE OF: _____	
ORIFICE SIZE: _____	CONVERTED BY: _____
MANIFOLD PRESSURE: _____ INPUT: _____	
TYPE OF FUEL: _____	
DATE OF CONVERSION: _____	
MODEL DATA CARD PART #: _____	92-101842-02-00