



75-530.1

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SELECTION AND INSTALLATION INSTRUCTIONS

high altitude gas pressure adjustment and pressure switch kit for gas fired heating equipment listed in Table 1.1



WARNING

1. All field gas piping must be pressure/leak tested prior to operation. Never use an open flame. Use a soap solution or equivalent for testing.
2. Gas supply shall be shut-off and the electrical power disconnected before proceeding with the conversion. Failure to do so could result in fire, explosion, electrical shock, or the unit starting suddenly resulting in injury.

IMPORTANT

1. The use of this manual is specifically intended for a qualified installation and service agency. All installation and service of these kits must be performed by a qualified installation and service agency.
2. These instructions must also be used in conjunction with the Installation and Service Manual originally shipped with the appliance being converted, in addition to any other accompanying component supplier literature.

Modine's gas-fired equipment standard input ratings are certified by ETL. For elevations above 2,000 ft., ANSI Z223.1 requires ratings be reduced 4 percent for each 1000 ft. above sea level. For units in Canada, CSA requires that ratings be reduced 10 percent at elevations above 2,000 ft. The high altitude adjustment instructions and pressure switch kits appearing in this bulletin are for use with units that will be installed over 2,000 ft. These methods and kits comply with both ANSI Z223.1 and CSA requirements.

If a unit is to be installed at higher elevations AND converted from natural gas to propane gas operation, a propane conversion kit must be used in conjunction with the pressure adjustment methods and pressure switch kits listed herein. For the Selection and Installation Instructions for propane conversion kits, refer to the following:

- For units with **tubular** heat exchangers (HD, HDB, HDS, HDC, PTP, PTS, BTS, PTC, or BTC), please see the latest revision of Modine Bulletin 75-515.
- For units with **clamshell** heat exchangers (PDP or BDP, and duct furnace model "D", "H", "I", "O" series), please see the latest revision of Modine Bulletin 75-511.

Models Applicable to Kits Listed

These instructions apply to the following models:

Table 1.1 – Applicable Models

Unit Type	Model Series
Gas Fired Unit Heaters	HD/HDB, PDP/BDP, PTP, HDS/HDC, PTS/BTS, & PTC/BTC
Gas Fired Duct Furnaces & Make-Up Air Units	"D", "H", "I", & "O" Series

Selection of the Proper Pressure and Kit

To determine the proper manifold pressure at altitude and if required, the proper combustion air pressure switch kit, the full model number of the heater, the fuel to be used, and the altitude the unit will be installed at must be known. Refer to the unit serial plate or carton label to obtain the necessary information about the unit.

After obtaining this information, refer to the proper gas pressure and selection charts. The pressure chart is differentiated by elevation and fuel type. The selection charts are differentiated by product type, altitude and fuel type. **If converting from natural gas to propane gas and operation at high altitude, both a propane conversion kit and a pressure switch kit must be used (if applicable).** Selection charts include the proper kit FP number, when required.

Manifold Pressure Adjustment

The inlet pressure to the unit must be confirmed to be within acceptable limits (6-7" W.C. for natural gas and 11-14" W.C. for propane gas) before opening the shutoff valve or the combination gas valve may be damaged.

Heaters for use with **natural gas** have gas valves factory set at 3.5" W.C. manifold pressure at 7.0" W.C. inlet pressure.

Units for use with **propane gas** are set for 10.0" W.C. manifold pressure at 14.0" W.C. inlet pressure.

Installation above 2,000 ft. elevation requires adjustment of the manifold pressure as detailed in the following pages.

Manifold Pressure Adjustment

The unit manifold pressure is factory set for operation at elevations up to 2,000 feet as follows:

- For **Natural Gas** units, 3.5" W.C. based on a gas heating value of 1,050 BTU/ft³.
- For **Propane Gas** units, 10.0" W.C. based on a gas heating value of 2,500 BTU/ft³.

For higher elevations, some utility companies may derate the BTU content (heating value) of the gas provided at altitude to a lower value to allow certain heating appliances to be used with no manifold pressure adjustments. For this reason it is necessary that the supplying utility be contacted for detailed information about the gas type and BTU content (heating value) before operating any heater. Table 2.1 shows the standard derated heating values of natural and propane gases at various elevations.

Table 2.1 - Gas Heating Values at Altitude (Btu/ft³) ①②⑤

Altitude (ft)	Natural Gas	Propane
0-2,000	1,050	2,500
2,001-3,000	929 ③	2,212 ④
3,001-4,000	892 ③	2,123 ④
4,001-4,500	874 ③	2,080 ④
4,501-5,000	856	2,038
5,001-6,000	822	1,957
6,001-7,000	789	1,879
7,001-8,000	757	1,803
8,001-9,000	727	1,731
9,001-10,000	698	1,662

① Values shown are for 3.5" W.C. manifold pressure for Natural Gas and 10.0" W.C. for Propane Gas. If the local utility supplies gas with a different Btu/ft³ value, use Equation 2.1 to calculate the required manifold pressure.

② Gas heating values shown are derated 4% per 1,000' of elevation (10% between 2,000' and 4,500' elevation in Canada) in accordance with ANSI Z223.1 and CSA-B149, respectively.

③ 945 Btu/ft³ for Canada

④ 2,250 Btu/ft³ for Canada

⑤ When installed at altitudes above 2,000', a pressure switch may need to be changed. Refer to Table 3.1, footnote 3 to determine if a switch change is required.

If the heating value of the gas being supplied is different than the values shown in Table 2.1, use the following equation to determine the appropriate manifold pressure for the altitude and gas heating value being supplied.

Equation 2.1 – Manifold Pressure for Gas Heating Values Different Than Shown in Table 2.1

$$MP_{ELEV} = \left(\frac{BTU_{TBL}}{BTU_{ACT}} \right)^2 \times MP_{SL}$$

Where:

MP_{ELEV} = Manifold Pressure ("W.C.") at installed elevation

BTU_{TBL} = BTU/ft³ content of gas from Table 2.1

BTU_{ACT} = BTU/ft³ content of gas obtained from the utility company

MP_{SL} = Manifold Pressure (in. W.C.), at Sea Level (use 3.5" W.C. for Natural Gas and 10.0" W.C. for Propane)

NOTE: Only the primary Manifold Pressure should be adjusted on units equipped with two-stage or modulating gas controls. No adjustments to the Low Fire Manifold Pressure are necessary on these units.

Selection of the Proper High Altitude Kit

All units installed at elevations greater than 2,000 feet above sea level require a kit, in addition to potential manifold pressure adjustment outlined in the previous step. In some instances, the combustion air proving (pressure) switch may need to be changed. To determine the proper kit to use, refer to Table 3.1 on the next page. An example is shown as a guide to the proper selection of the kit and whether a pressure switch change is required.

High Altitude Kit Selection Guide

Select the Item Code of the kit that corresponds to the Model, Model Size, and Elevation Above Sea Level.

Example:

Select the appropriate kit for an HD 125AS0111FBAN for installation at 6,000' elevation.

From Table 3.1, in the row for Model HD, Model Size 125, and column 5,501-6,500 Feet Above Sea Level, it can be identified that the correct kit is Item Code 68408. According to footnote 3, all kits except the shaded 67248 include a new pressure switch to replace the standard switch. Kit 68408 therefore includes a new pressure switch.

Table 3.1 – High Altitude Conversion Kits ①②③

Model	Model Size	Item Code by Elevation Above Sea Level (ft)										
		0-2,000	2,001-2,500	2,501-4,500	4,501-5,000	5,001-5,500	5,501-6,500	6,501-7,000	7,001-7,500	7,501-8,500	8,501-9,500	9,501-10,000
HD/HDB	30-60	N/A	67248	67248	67248	67248	67248	67248	67248	67248	67248	67248
	75	N/A	67248	67248	67248	67248	67248	67248	67248	67248	68405	68405
	100	N/A	67248	67248	67248	67248	67248	68408	68408	68408	68408	68408
	125	N/A	67248	67248	67248	67248	68408	68408	68408	68408	68408	68408
HDS/HDC	30	N/A	67248	67248	68407	68407	68409	68409	68409	68414	68414	68414
	45	N/A	67248	68406	68408	68408	68407	68410	68410	68414	68414	68415
	60	N/A	67248	68407	68407	68407	68409	68411	68411	68415	68415	68415
	75	N/A	67248	68407	68407	68407	68409	68411	68411	68415	68415	68415
	100	N/A	67248	67248	67248	67248	67248	68408	68408	68408	68408	68408
	125	N/A	67248	67248	67248	67248	68408	68408	68408	68408	68408	68408
PDP/BDP	150-400	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
PTP	150-250	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
	300	N/A	67248	67248	67248	67248	68412	68412	68412	CF ④	CF ④	CF ④
	350	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
	400	N/A	68413	68413	68413	68413	68413	68413	68413	CF ④	CF ④	CF ④
PTS/BTS	150-250	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
	300	N/A	67248	67248	67248	67248	68412	68412	68412	CF ④	CF ④	CF ④
	350	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
	400	N/A	68413	68413	68413	68413	68413	68413	68413	CF ④	CF ④	CF ④
PTC/BTC	55-310	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
DFG, IFG ⑤	All	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
DFP, IFP ⑤	75-350	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
	400	N/A	67248	67248	67248	67248	68409	68411	68411	CF ④	CF ④	CF ④
DFS, IFS ⑤	75	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
	100	N/A	67248	67248	67248	67248	77785	77785	68406	CF ④	CF ④	CF ④
	125	N/A	67248	77786	77786	77786	77785	77785	68406	CF ④	CF ④	CF ④
	150	N/A	77787	77786	77786	77786	77785	77785	68406	CF ④	CF ④	CF ④
	175	N/A	77786	77786	68408	68408	68408	68410	68410	CF ④	CF ④	CF ④
	200	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
	225	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
	250	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
	300	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④
	350	N/A	67248	67248	67248	77786	77785	77785	68406	CF ④	CF ④	CF ④
	400	N/A	77786	77786	77785	77785	77785	68410	68410	CF ④	CF ④	CF ④
HFG/HFP, OFG/OFP ⑤	75-400	N/A	67248	67248	67248	67248	67248	67248	67248	CF ④	CF ④	CF ④

① Applies to installations in both the U.S. and Canada.

② Applies to both natural and propane gas.

③ All kits include a High Altitude Conversion Label and Installation Instructions. Additionally, all kits except the shaded 67248 include a Pressure Switch to replace the standard switch. The shaded kit 67248 only includes the instructions and label.

④ CF=Contact Factory

⑤ For "H", "D", "I", and "O" Series Gas Fired Make-Up Air Units (packaged blower and duct furnace), refer to the duct furnace portion of the unit to determine the correct model to use. For example, an HBP400 uses an HFP400 duct furnace.

Kit Installation

1. Read these instructions carefully. Failure to follow instructions can damage product or cause a hazardous condition.
2. Adjustment of the manifold pressure and installation of the pressure switch (if applicable) must be performed by a qualified service person. The qualified service agency performing this work assumes responsibility for the proper conversion and adjustment of this appliance.
3. This procedure requires the following:
 - A conversion rating plate (see Figure 4.1)
 - In some cases, a new pressure switch (see Table 3.1, footnote 3)

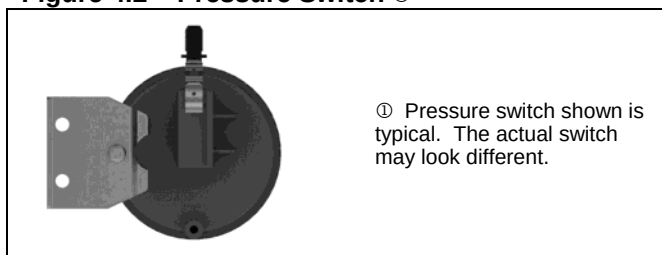
Figure 4.1 – Conversion Rating Plate

⚠ WARNING / ⚠ AVERTISSEMENT					
This appliance has been converted for high altitude. Cet appareil a été converti pour la haute altitude.					
This appliance has been converted for high altitude at the time of installation by _____, which accepts responsibility for proper conversion. Cet appareil a été converti pour la haute altitude au moment de l'installation par _____, qui accepte la responsabilité de conversion appropriée.					
Altitude of installation:	<table border="1"> <tr> <td></td> <td>Feet</td> </tr> <tr> <td></td> <td>Meters</td> </tr> </table>		Feet		Meters
	Feet				
	Meters				
Input at altitude:	<table border="1"> <tr> <td></td> <td>Btu/hr</td> </tr> <tr> <td></td> <td>Btu/heure</td> </tr> </table>		Btu/hr		Btu/heure
	Btu/hr				
	Btu/heure				
Output at altitude:	<table border="1"> <tr> <td></td> <td>Btu/hr</td> </tr> <tr> <td></td> <td>Btu/heure</td> </tr> </table>		Btu/hr		Btu/heure
	Btu/hr				
	Btu/heure				
Single stage or two stage high fire manifold pressure at altitude:	<table border="1"> <tr> <td></td> <td>Inch WC</td> </tr> <tr> <td></td> <td>Po d'eau</td> </tr> </table>		Inch WC		Po d'eau
	Inch WC				
	Po d'eau				
Two stage or modulating low fire manifold pressure at altitude:	<table border="1"> <tr> <td></td> <td>Inch WC</td> </tr> <tr> <td></td> <td>Po d'eau</td> </tr> </table>		Inch WC		Po d'eau
	Inch WC				
	Po d'eau				
Part number of pressure switch at altitude:	<table border="1"> <tr> <td></td> <td>Référence du pressostat en altitude:</td> </tr> </table>		Référence du pressostat en altitude:		
	Référence du pressostat en altitude:				

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4. On the High Altitude Conversion Label included with these instructions, write the new manifold pressure at both high and low fire, installation elevation, derated input, and derated output at high fire in permanent marker.
5. Remove the access panel to the heater.
6. For units requiring a pressure switch change (refer to Table 3.1, footnote 3), disconnect wires and remove screws. Install new switch and attach wires. Note: wires are interchangeable. See Figure 4.2.

Figure 4.2 – Pressure Switch ①



Modine Manufacturing Company has a continuous product improvement program, and therefore reserves the right to change design and specifications without notice.

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7. Affix the High Altitude Conversion Label that came with the unit or kit on the heater near the serial plate on the same panel as the common replacement parts label.

Check

1. See the original rating plate for the unit heater's rated input and verify by checking the correct main burner orifice size and manifold pressure. This information is presented in the unit Installation & Service (I&S) manual.
 2. Remove the inlet and outlet pressure tap plugs and place pressure taps on both the inlet and outlet pressure tap of the gas valve.
 3. Connect a pressure-measuring device capable of reading inches of water column onto the inlet and outlet pressure taps.
 4. Follow lighting instructions on the unit. Turn up thermostat setting to call for high stage heating. After the main burners light, measure the outlet (manifold) pressure of the combination gas valve. The pressure should be as determined on page 2 or as calculated with Equation 2.1, whichever is applicable. The outlet pressure can be adjusted at the valve's regulator. Turning the adjustment clockwise will increase the outlet pressure, while turning it counterclockwise will decrease the pressure.
 5. Repeat the process for low stage heating by turning the thermostat setting down to call for low stage heating. Verify the manifold pressure setting is correct per the I&S manual that came with the unit. Adjust as necessary using the instructions in the I&S manual.
 6. There are no adjustments that can be made to the burner flame on units with tubular heat exchangers. Units with clamshell heat exchangers may have air shutters for flame adjustment. If the flame is lifting or rising above the burner port, loosen the thumb screw on the air shutter and slide it forward toward the mixer tube. If the majority of the flame is yellow, move the air shutter back away from the mixer tube. Some yellow in the flame is acceptable on propane flames as long as no carbon (black soot) is being formed.
- For more specific flame control adjustment instructions, see the I&S manual that came with the unit.
7. Turn the heater off and replace the inlet and outlet pressure tap plugs.
 8. Place the heater back into service and leak test the inlet and outlet pressure tap plugs, as well as the connection between the gas valve and the manifold piping and supply piping to the gas valve.