

INSTALLATION AND SERVICE MANUAL SUPPLEMENT GAS HEAT OPTION WITH FURNACE MODEL DIGIT 11=6, 9, A, B, C, OR D Packaged Ventilation/Dedicated Outside Air System (DOAS) model DLV



These instructions apply only to the gas control options identified on page 3.

- If the model DLV unit DOES NOT include the controls identified, these instructions are not applicable and not to be used.
- If the model DLV unit DOES include a gas heat option with control identified as applicable on page 3, these instructions must be used in conjunction with the Installation & Service Manual, Literature #LNx15-500.10 that shipped with the unit. Read those instructions thoroughly before installing or servicing this equipment.



! WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death, and could cause exposure to substances which have been determined by various state agencies to cause cancer, birth defects or other reproductive harm. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

! WARNING

FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in serious injury, death or property damage.

Be sure to read and understand the installation, operation and service instructions in this manual.

Improper installation, adjustment, alteration, service or maintenance can cause serious injury, death or property damage.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS:

- Do not try to light any appliance.
- Do not touch any electrical switch, do not use any phone in your building.
- Leave the building immediately.
- Immediately call your gas supplier from a phone remote from the building. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a qualified installer, service agency or the gas supplier.

THIS MANUAL IS THE PROPERTY OF THE OWNER.
PLEASE BE SURE TO LEAVE IT WITH THE OWNER WHEN YOU LEAVE THE JOB.

SPECIAL PRECAUTIONS

SPECIAL PRECAUTIONS

THE INSTALLATION AND MAINTENANCE INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED TO PROVIDE SAFE, EFFICIENT AND TROUBLE-FREE OPERATION. IN ADDITION, PARTICULAR CARE MUST BE EXERCISED REGARDING THE SPECIAL PRECAUTIONS LISTED BELOW. FAILURE TO PROPERLY ADDRESS THESE CRITICAL AREAS COULD RESULT IN PROPERTY DAMAGE OR LOSS, PERSONAL INJURY, OR DEATH. THESE INSTRUCTIONS ARE SUBJECT TO ANY MORE RESTRICTIVE LOCAL OR NATIONAL CODES.

HAZARD INTENSITY LEVELS

1. **DANGER:** Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.
2. **WARNING:** Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.
3. **CAUTION:** Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.
4. **IMPORTANT:** Indicates a situation which, if not avoided, MAY result in a potential safety concern.

DANGER

Appliances must not be installed where they may be exposed to a potentially explosive or flammable atmosphere.

WARNING

1. Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death, and could cause exposure to substances which have been determined by various state agencies to cause cancer, birth defects or other reproductive harm. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.
2. Disconnect power supply before making wiring connections or working on this equipment. Follow all applicable safety procedures to prevent accidental power up. Failure to do so can result in injury or death from electrical shock or moving parts and may cause equipment damage.
3. For units equipped for dual power supply sources, both sources of power must be disconnected to prevent electrical shock and equipment damage.
4. 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.
5. Gas pressure to appliance controls must never exceed 14" W.C. (1/2 psi).
6. To reduce the opportunity for condensation, the minimum sea level gas input to the appliance, as indicated on the serial plate, must not be less than 5% below the rated input, or 5% below the minimum rated input of dual rated units.
7. When the dead front disconnect switch(es) (for main unit and/or powered convenience outlet option) is in the "OFF" position, supply power remains energized at the line (supply) side of the dead front disconnect switch(es). The switch body is located inside of another junction box to protect against contact with the live wiring. The junction box must not be disassembled unless the main power supply from the building to the unit is de-energized.

WARNING

8. When servicing or repairing this equipment, use only factory-approved service replacement parts. Refer to the rating plate on the appliance for complete appliance model number, serial number, and company address. Any substitution of parts or controls not approved by the factory will be at the owner's risk.

CAUTION

1. As with any mechanical equipment, personal injury can result from contact with sharp sheet metal edges. Be careful when you handle this equipment.
2. Appliances are designed for outdoor installation only. **DO NOT LOCATE THIS APPLIANCE INDOORS.**
3. Purging of air from gas lines should be performed as described in ANSI Z223.1 - latest edition "National Fuel Gas Code", or in Canada in CAN/CGA-B149 codes.
4. When servicing the unit, some components may be hot enough to cause pain or injury. Allow time for cooling of hot components before servicing.
5. Do not reuse any mechanical or electrical component which has been wet. Such components must be replaced.

IMPORTANT

1. These instructions must also be used in conjunction with the Installation and Service Manual originally shipped with the model DLV unit, literature #LNX15-500.10, in addition to any other accompanying component supplier literature.
2. To prevent premature heat exchanger failure, do not locate ANY gas-fired appliances in areas where corrosive vapors (i.e. chlorinated, halogenated or acid) are present in the atmosphere.
3. To prevent premature heat exchanger failure, the input to the appliance, as indicated on the serial plate, must not exceed the rated input by more than 5%.
4. To prevent premature heat exchanger failure, check to be sure the blower has been set to deliver the proper airflow for the application. Refer to the Blower Adjustments section in LNX15-500.10.
5. Start-up and adjustment procedures must be performed by a qualified service agency.

GAS HEAT OPTION MODEL IDENTIFICATION

REVIEW BEFORE PROCEEDING

THIS SECTION APPLIES TO ONLY CERTAIN UNITS WITH OPTIONAL GAS HEAT (DLV MODEL DIGIT 17=2, 3, 5 OR 6). REVIEW THE SECTION BELOW TO DETERMINE IF THESE INSTRUCTIONS ARE APPLICABLE.

Gas Heating Option Identification

These instructions are supplemental to those in the main Installation and Service Manual, literature #LNX15-500.10. These supplemental instructions are only used for units that meet the following conditions:

- Digit 17 of the DLV unit model number (not the gas heat option model number) is 2, 3, 5, or 6 indicating the gas heat option. Example:

DLV20CD1A1A8S16D2KHDNNNN (Digit 17=2)

- Digit 11 of the gas heat option furnace model number (not the model DLV unit model number) is 6, 9, A, B, C, OR D. Example:

FMP0600SSN9H0A (Digit 11=9)

Refer to the Installation and Service Manual, Literature #LNX15-500.10 for full model nomenclature descriptions.

Identify the Gas Control Type

Before you begin, review the furnace serial plate to determine the model installed. The serial plate is located on the right hand access door for the furnace section. A sample is shown in Figure 3.1. Note that the furnace serial plate is separate from the unit (model DLV) serial plate.

**Figure 3.1
Serial Plate Example (D-Cabinet Heat Option Shown)**

Manufacturer Address 1 Address 2 Phone: xxx-xxx-xxxx		OUTDOOR GAS-FIRED DUCT FURNACE FOR INDUSTRIAL / COMMERCIAL USE CHAUDIERE A GAZ A CONDUIT POUR EXTÉRIEUR / POUR USAGE INDUSTRIEL/COMMERCIAL		DESIGN COMPLIES WITH DUCT FURNACE STANDARD: ANSI Z83.8-2016 CSA 2.6-2016			
MODEL NUMBER NUMÉRO DE MODÈLE FQP1600SSN8H0A		MIN. INLET BTU/HR DÉBIT CALORIFIQUE MIN. DÉBIT 100000		DESIGN CONFORMS TO: UL STD 1995 CERTIFIED TO CAN/CSA C22.2 NO. 236 APPROVED FOR USE IN MASSACHUSETTS APPROVED FOR USE BY THE DEC.		SERIAL NUMBER NUMÉRO DE SÉRIE 11051413-1037 T	
TYPE OF GAS TYPE DE GAZ NAT. GAS		MIN. INLET PRESS. FOR PURPOSE OF INPUT ADJUSTMENT / PRESSION D'ALIMENTATION EN GAZ MIN. ADMISE 6 IN W.C. PO. LIQ. E.		MIN. MANIFOLD PRESSURE PRESSION A LA TUBÉRIE D'ALIMENTATION 3.5 IN W.C. PO. LIQ. E.		TEMPERATURE RISE RANGE ÉLEVATION DE TEMPÉRATURE 70-120 °F	
MIN. MANIFOLD PRESSURE PRESSION A LA TUBÉRIE D'ALIMENTATION MIN. 0.25 IN W.C. PO. LIQ. E.		RECOMMENDED SERVICE CLEARANCE / DÉGAGEMENT DE SERVICE RECOMMANDÉ ACCESS DOOR CÔTE D'ACCÈS 48 IN PO.		MINIMUM CLEARANCE TO COMBUSTIBLES / DÉGAGEMENT MINIMUM DU COMBUSTIBLE 6 IN PO.		TYPICAL BTU/HR DÉBIT CALORIFIQUE TYPIQUE 1600000	
TYPICAL BTU/HR DÉBIT CALORIFIQUE TYPIQUE 1296000		TYPICAL BTU/HR DÉBIT CALORIFIQUE TYPIQUE 1440000		MAX. CFM 10000		MAX. CFM 17100	
TAG 0		VOLTAGE 120		PHASE 1		HERTZ 60	
AMPERE 5.2		GENERAL 1. FOR OUTDOOR INSTALLATIONS ONLY. 2. MINIMUM AMBIENT TEMPERATURE -40°F. 3. FOR INSTALLATION DOWNSTREAM OF REFRIGERATION SYSTEMS. 4. INSTALL ON THE POSITIVE PRESSURE SIDE OF AIR CIRCULATING BLOWER. 5. FOR UNITS WITH MANUAL RESET-HIGH LIMIT SWITCH, RESET BUTTON IS LOCATED IN ELECTRICAL JUNCTION BOX. 6. (IN USA) FOR INSTALLATIONS ABOVE 2000 FEET DEBATE A PERCENT FOR EACH 1000 FEET OF ELEVATION ABOVE SEA LEVEL. LIGHTING INSTRUCTIONS: 1. OPEN ALL GAS VALVES. TURN ON POWER. 2. SET THERMOSTAT TO DESIRED SETTING. SHUT DOWN INSTRUCTIONS: 1. TURN OFF POWER & CLOSE ALL GAS VALVES. REFER TO INSTALLATION & SERVICE MANUAL FOR MORE INSTRUCTIONS.		GENERAL 1. SÉLECTIONNER POUR L'INSTALLATION EXTÉRIEURE. 2. LA TEMPÉRATURE MINIMUM DE L'AIR DÉBITE EST -40°C. 3. POUR L'INSTALLATION QUE SUIVE LES SYSTÈMES RÉFRIGÉRANTS. 4. INSTALLER AU CÔTÉ DE LA PRESSION POSITIVE DU VENTILATEUR. 5. POUR APPAREILS AVEC INTERRUPTEUR BLOC MANUEL, BOUTON-RESET IDENTIFIÉ EST SITUÉ DANS LA BOÎTE JONCTION ÉLECTRIQUE. POUR RETOURNER À LA POSITION D'ALLUMAGE. 6. (EN USA) POUR LES INSTALLATIONS AU-DESSUS DE 2000 PIEDS DE HAUTEUR, RÉGLER LE DÉBITE À UN POUR CENT PAR CHAQUE 1000 PIEDS DE HAUTEUR AU-DESSUS DU NIVEAU DE LA MER. INSTRUCTIONS D'ÉCLAIRAGE: 1. OUVRIER TOUTES LES ROBINETS À GAZ. DONNER LE COURANT. 2. RÉGLER LE THERMOSTAT SUR LA POSITION DÉSIREE. INSTRUCTIONS DE FERMETURE: 1. COUPER LE COURANT ET FERMER TOUTES LES ROBINETS À GAZ. RÉFÉREZ AU MANUEL D'INSTALLATION ET DE SERVICE POUR PLUS D'INSTRUCTIONS.			
HEAT EXCHANGER CONFIGURATION							
LEFT				RIGHT			
HEAT EXCHANGER DESCRIPTION SLAVE A				HEAT EXCHANGER DESCRIPTION SLAVE B			
INPUT BTU/HR DÉBIT CALORIFIQUE BTU-HEURE 400000		(IN CANADA) 2000 TO 4500 FT. 610 ET 1370 M. 360000		INPUT BTU/HR DÉBIT CALORIFIQUE BTU-HEURE 400000		(IN CANADA) 2000 TO 4500 FT. 610 ET 1370 M. 360000	
ORIFICE SIZE DIM. DE L'INJECTEUR #36		ORIFICE SIZE DIM. DE L'INJECTEUR #36		ORIFICE SIZE DIM. DE L'INJECTEUR #36		ORIFICE SIZE DIM. DE L'INJECTEUR #36	
HEAT EXCHANGER DESCRIPTION SLAVE C				HEAT EXCHANGER DESCRIPTION MASTER			
INPUT BTU/HR DÉBIT CALORIFIQUE BTU-HEURE 400000		(IN CANADA) 2000 TO 4500 FT. 610 ET 1370 M. 360000		INPUT BTU/HR DÉBIT CALORIFIQUE BTU-HEURE 400000		(IN CANADA) 2000 TO 4500 FT. 610 ET 1370 M. 360000	
ORIFICE SIZE DIM. DE L'INJECTEUR #36		ORIFICE SIZE DIM. DE L'INJECTEUR #36		ORIFICE SIZE DIM. DE L'INJECTEUR #36		ORIFICE SIZE DIM. DE L'INJECTEUR #36	

Digit 11 of the furnace model number denotes the type of gas control used. These are defined below:

For B-Cabinet (DLV Model Digit 6) Units Only:

The unit includes one heat exchanger with control as follows, indicated by Digit 11:

- 6** - A single manifold with Beckett advanced modulation control which varies the manifold pressure and power exhauster speed based on demand. High turn down and more consistent efficiency are possible with this control.
- B** - A split manifold equipped with Beckett advanced modulation control on part of the manifold which varies the manifold pressure and fixed input on the rest of the manifold. This system varies power exhauster speed based on input. Highest possible turn down and more consistent efficiency are possible with this control.

For C and D-Cabinet with rating of 800MBH and lower:

The unit includes two heat exchangers with control as follows, indicated by Digit 11:

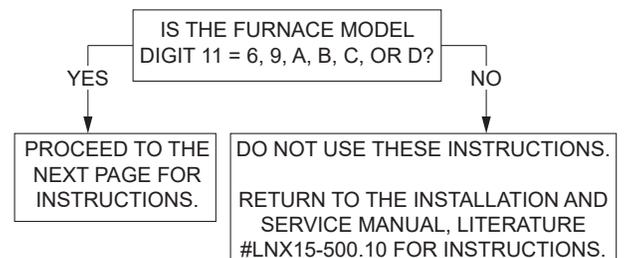
- 9** - One heat exchanger equipped with a single manifold with advanced Beckett modulation control and the other equipped with two stage control. The second heat exchanger is controlled by the Carel controller and will switch from high and low input and off based on demand.
- C** - One heat exchanger equipped with a split manifold with advanced Beckett modulation control and the other equipped with two stage control. The second heat exchanger is controlled by the Carel controller and will switch from high and low and off based on demand.

For D-Cabinet with rating of 900MBH and higher:

The unit includes four heat exchangers with control as follows, indicated by Digit 11:

- A** - One heat exchanger equipped with advanced Beckett modulation control and the others equipped with single stage control. Those heat exchangers are controlled by the Carel controller and will and turn on and off based on demand.
- D** - One heat exchanger equipped with a split manifold with advanced Beckett modulation control and the others equipped with single stage control. Those heat exchangers are controlled by the Carel controller and will turn on and off based on demand.

Refer to the following flowchart to determine next steps:



GAS HEAT START-UP PROCEDURE

Gas Heating Option Gas Pressure Setup

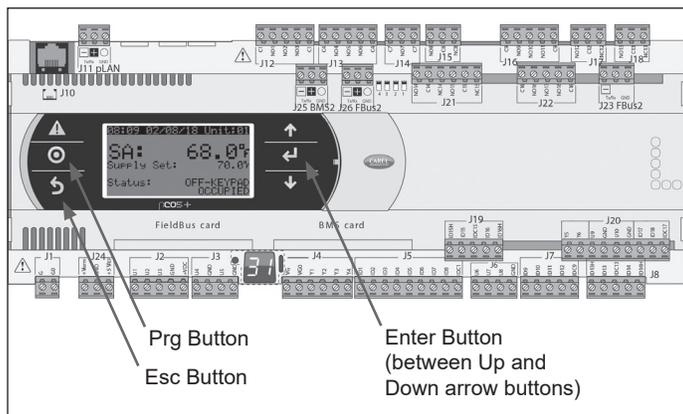
The Gas Heating Option requires gas pressure be measured and adjusted as required at several points on the unit. The instructions below must be followed and completed after all other steps have been completed through page 22 of Installation and Service Manual, literature #LNX15-500.10:

Carel Controller Settings

Setup of the gas heating option for units with furnace model number digit 11= 6, 9, A, B, C, OR D requires certain settings be entered in the main unit Carel controller to enable firing furnaces individually or together for testing. Refer to the following instructions when necessary (refer to the Controls Manual that shipped with the unit for further information):

1. From the home screen press the “Prg” button (center left button) to reach “Main Menu”. Refer to Figure 4.1 for location of buttons.

Figure 4.1 - Carel Controller Buttons and Screen



2. Arrow up or down to reach the “Service” menu and hit “Enter” (center right button). Arrow up or down to “g. Manual Management” and press “Enter”.
3. At the password prompt use the arrow and “Enter” buttons to enter the password 1500.
4. If the unit is configured with a 2-position type damper (unit model digit 7=D, E, or F) and the damper is closed, arrow up to “d. Relay Outputs” and press “Enter”. Use the arrow keys to find “OA Damper Open” and press “Enter”. The cursor should be on the “Manual Relay 05” line, set “Manual Relay 05” to “Yes” and press “Enter”. The cursor should now be on the “Manual Position” line. Set “Manual Position” to “On” and press “Enter”.
5. Arrow up to “e.Analog Outputs” and press “Enter”. If the main fan is operating, skip to step 8.
6. If the fan is not running, use the arrow buttons to find “Supply Fan” and press “Enter”.
7. The cursor should be on the “Manual Y5:” line. Set “Manual Y5:” to “On” and press “Enter”.
8. The cursor should now be on the “Manual Value:” line. Set the value to 10.0vDC for full speed fan operation and press “Enter”. Note that depending on unit configuration, the maximum value delivered to the VFD may be displayed at less than 10.0vDC. This is normal.
9. Use the arrow buttons to find “Analog Outputs” with the title “Furnace 1 Signal” on the next line below. Press “Enter”.
10. The cursor should go to the line “Manual Y4”. Use the arrow buttons to set the value to “On” and press “Enter”.
11. The cursor should now be in the “Manual Value” line. Press the down arrow button once to set the values to 10.0vDC for high fire. Values between 10.0vDC and 2.0vDC can be used to check modulation, if desired. If the unit is operating and this value is set to 1.5vDC or lower, the burners will turn off. If the unit is not operating, this value must be set above 2.0vDC to fire.
12. Hit “Esc” to return to the “Manual Management” menu.
13. Use the arrow buttons to select “d.Relay Outputs” and press “Enter”.
14. If the unit fan is running skip to step 15. Otherwise use the arrow buttons to find “Relay Output” with the label “Supply Fan” and press “Enter”.
15. Use the arrow buttons to set the “Manual Relay 08” to “Yes”, press “Enter” and then use the arrow buttons again to set “Manual Position” to “Yes”. At this point the supply air fan should start. Press “Esc”.
16. To operate the modulated furnace section use the arrows buttons to find “Relay Output” with the label “Furnace 1 Ignition” to start the modulated furnace and press “Enter”.
17. Use the arrow buttons to set the “Manual Relay 09” to “Yes”, press “Enter” and then use the arrow buttons again to set “Manual Position” to Yes. At this point, furnace 1 should initiate a start sequence even without pressing “Enter”. Changing “Manual Position” to “Yes” or “No” at this point can be used to initiate and end furnace 1 operation as desired. Once furnace 1 is fired, you can begin to program the main valve and modulating valve high and low settings as needed. You can also press “Esc” and go back to “e.Analog Outputs” shown in steps 8-11 above to test various demand points. When you have completed setting and testing furnace 1, set manual position in this condition before the control resets “Manual Relay” to “No” and turns off the furnace. If a longer run time is needed, reset the “Manual Relay” and “Manual Position” to “Yes” to restart.
18. **Furnace Digit 11=9 or C Only (dual furnaces with a two stage furnace section):** For units with dual furnaces, the “Relay Outputs” list will have one screen titled “Furnace 2 Stage 2” that controls high fire and “Furnace 2 Stage 1” that controls low fire. Each is controlled by setting the “Manual Relay” and “Manual Position” to “Yes”, similar to step 14 above. Note: Stage 1 “Manual Relay” and “Manual Position” must be set to “Yes” for the furnace to fire. The furnace will always fire on high input but will step to low after thirty seconds of burner operation. To operate at high fire continuously, “Furnace 2 Stage 2”, “Manual Relay” and “Manual Position” must also be set to “Yes”. This is accomplished by setting “Furnace 2 Stage1”, “Manual Relay” and “Manual Position” to “Yes.” After setting “Manual Position” to “Yes”, press “Enter” and you will be able to navigate to “Furnace 2 Stage 2” using the arrow buttons and again set “Manual Relay” and “Manual Position” to “Yes”. The furnaces will operate for 5 minutes at a time in this condition before the control resets “Manual Relay” to “No” and turns off the furnace. If a longer run time

GAS HEAT START-UP PROCEDURE

is needed, reset the “Manual Relay” and “Manual Position” to “Yes” to restart.

19. Furnace Digit 11=A or D Only (quad furnaces): For units with four furnace sections, furnace 1 is modulating. This furnace is controlled as described in 13 and 14 above. Furnaces 2, 3 and 4 are single stage furnaces controlled by “Relay Outputs” labeled “Furnace 2” through “Furnace 4”. Select the desired furnace and set both the “Manual Relay” and “Manual Position” to “Yes” to fire each furnace section. To turn off a furnace, set “Manual Relay” to “No”. As with the other furnaces described above, the furnaces will operate for 5 minutes at a time in this condition before the control resets “Manual Relay” to “No” and turns off the furnace. If a longer run time is needed, reset the “Manual Relay” and “Manual Position” to “Yes” to restart.

20. After testing is completed, press "Esc" multiple times until the control is back to the main SA (Supply Air) temp screen. Use the arrow buttons to navigate to the “Unit Status M99” screen. Press "Enter" and set “Reset Unit To Auto Mode:” to “Yes.” This will clear any changes made in the Carel program for manual operation and will return the unit to normal operation.

Check/Adjust Pressure Upstream of Unit

With the field installed manual gas shut-off valve in the “OFF” position, recheck the gas supply pressure at the field installed manual shut-off valve. The inlet pressure should be 6"-7" W.C. on natural gas (11"-14" W.C. on propane (LP) gas), while all burners are operating, but never more than 14" W.C when the burners are off. If inlet pressure is too high, install an additional pressure regulator upstream of the combination gas control.

Modulated Furnace/Manifold Section

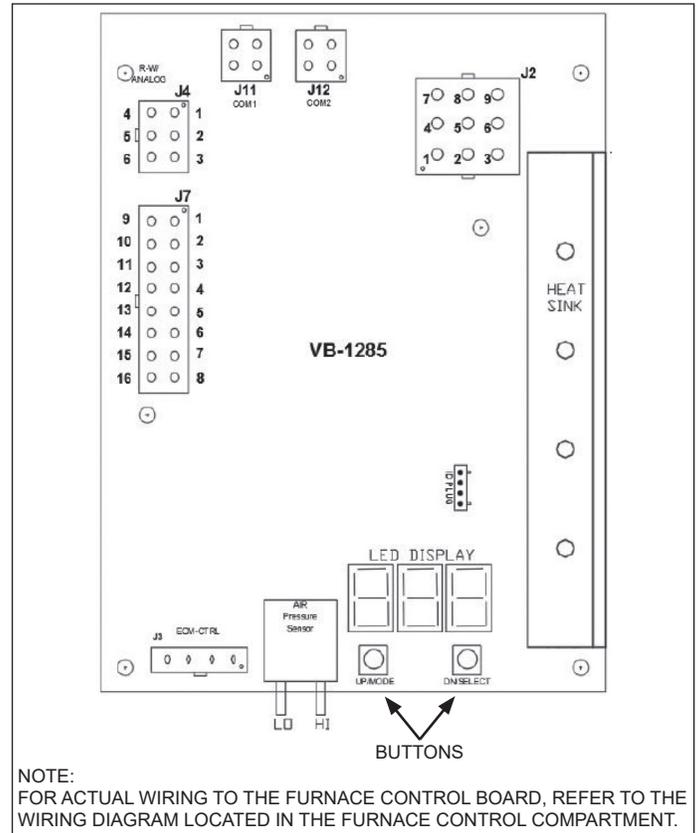
Gas pressure must be checked and adjusted as necessary, at both the combination gas valve (A) and at the manifold (B) to ensure appropriate gas pressures.

A. Check/Adjust Pressure at Combination Gas Valve

The following steps are required to check/adjust the manifold pressure on the combination gas valve:

1. Open the field installed manual gas shut-off valve and set the combination gas control valve to the “ON” position. Note for C- and D-Cabinet sized units and units equipped with split manifolds, the Gas Heating Option consists of one or more heating sections that are not modulated. For this step, only one combination gas valve on the modulated furnace or manifold section is to be set to the “ON” position.
2. Enable the unit controls. The LED display on the furnace control board (Figure 5.1) will briefly display the heat exchanger size being modulated. Refer to Table 5.1. Verify that the model readout is correct for the unit being started.
3. Ensure that the supply fan blower is operating at the proper airflow and adjust the Carel controller as described in "Carel Controller Settings" to create a call for heat.
4. Check the ignition control and gas valve for electrical operation.
5. Check to make sure that the main gas valve opens while the supply fan blower is operating.
6. Check the gas pressure at the INLET to the combination gas control valve (refer to figures on pages 10 through 15)

Figure 5.1 - Primary Furnace Control Board



**Table 5.1
Furnace Control Board Modulated Heat Rating Display**

Furnace Model Digits 4-7	Cabinet		Furnace Model Digits 4-7	Cabinet
	B	C		D
0150	150	-	0350	175
0175	175	-	0400	200
0200	200	-	0450	225
0225	225	-	0500	250
0250	250	-	0600	300
0300	300	150	0620	310
0310	310	-	0800	400
0350	-	175	0850 thru 1000	250
0400	400	200	1200, 1220	300
0450	-	225	1400 thru 1600	400
0500	-	250		
0600	-	600		

7. Check gas pressure on the OUTLET of the combination gas control valve (refer to figures on pages 10 through 15) when the burners are functioning. This should be set to 4.0-4.5" W.C. for Natural Gas (10.5-11" W.C. for Propane) for the modulated furnace or manifold section (see gas valve instruction sheet for location.)

GAS HEAT START-UP PROCEDURE

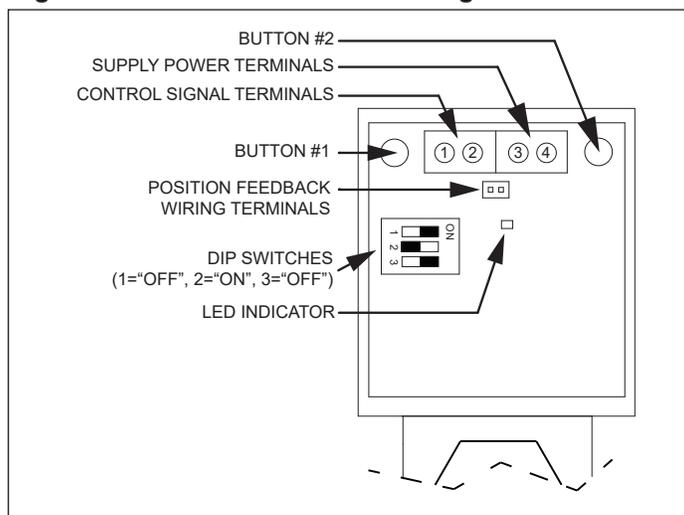
8. Check to ensure that gas controls sequence properly (refer to the Controls Manual for additional information).
9. Reinstall the pressure fittings and move to the modulated section.

B. Check/Adjust Pressure at the Modulated HX/Manifold

The following steps are required to check/adjust the manifold pressure on modulated heat exchanger/manifold sections:

1. Move the field installed manual shut-off valve to the "OFF" position.
2. Remove the 1/8" pipe plug in the pipe tee of the manifold or in the manifold itself for split manifold units of the modulated furnace.
3. Attach a digital or "U" tube type water manometer which is at least 12" high and capable of reading to 0.1" W.C.
4. The Maxitrol EXA modulating valve series (refer to figures on pages 10 through 15) has a cover secured with two screws that must be removed. Once removed, there are a bank of (3) DIP switches, two buttons, and a communication LED for the user interface as shown in Figure 6.1.
5. Verify that the DIP switches are properly set to the settings shown in Figure 6.1.

Figure 6.1 - Maxitrol EXA Modulating Valve



6. Move the field installed manual gas shut-off valve to the "ON" position.
7. Adjust the High Fire Setting as follows:
 - a. Enable the unit controls.
 - b. Press and hold Button #1 on the modulating valve until the LED lights solid red, then release.
 - c. With the valve now in the high fire setting mode, confirm or adjust the high fire manifold pressure to be 3.5" W.C. for Natural Gas (10.0" W.C. for Propane). If the pressure needs to be adjusted, press or hold Button #1 to increase gas flow and press or hold Button #2 to decrease gas flow.
 - d. If 3.5" W.C. for Natural Gas (10.0" W.C. for Propane) cannot be attained, recheck the inlet gas pressure as described previously. After addressing any issues, if 3.5" W.C. for Natural Gas (10.0" W.C. for Propane) still cannot be attained, step the valve closed using

button #2 to the point where manifold pressure begins to be impacted. If the pressure at that point is less than 3.3" W.C. for Natural Gas (9.5" W.C. for Propane), corrective action is required.

- e. Save the setting by simultaneously holding Buttons #1 and #2 until the LED turns OFF. If this is not performed within 5 minutes, the control will default to the previously saved settings and return to normal operating mode.
8. Adjust the Low Fire Setting as follows:
 - a. Press and hold Button #2 on the modulating valve until the LED light blinks red, then release.
 - b. With the valve now in the low fire setting mode, confirm or adjust the low fire manifold pressure to be no less than the minimum shown on the furnace serial plate in the box called "Min. Manifold Pressure". If the pressure needs to be adjusted, press or hold Button #1 to increase gas flow and Button #2 to decrease gas flow. It is best to press and release button #2 to single step the valve to the minimum manifold pressure. Holding the button is likely to cause the valve to close too far and lose flame. Save the setting by simultaneously holding buttons #1 and #2 until the LED turns OFF. If this is not performed within 5 minutes, the control will default to the previously saved settings and return to normal operating mode.
9. For furnace models with Digit 11=6 or higher, if no errors or alerts were recorded by the board (these will be on the 3 LED displays as an "A" or "E" followed by a number), proceed to the next step. If any alerts or errors were logged by the board, refer to the "Clearing Furnace Control Board Error Codes" section on the next page to clear the errors.
10. For furnace models with Digit 11=6 or higher, verify the Carel control is communicating properly with the furnace control board and modulating valve by adjusting the demand or "Manual Value" as described in item 10 of the "Carel Controller Settings" section on page 4 from 10.0 vDC to 2.0vDC with the up and down buttons.
 - The high fire manifold pressure may be in the range of 3.3" W.C to 3.5" W.C. for Natural Gas (9.5 to 10.0" W.C. for Propane) at the 10.0 Fire Rate Input setting.
 - The low fire manifold pressure must not go below the minimum value specified on the serial plate of the furnace section at the 2.0vDC "Manual Value" demand setting. If the manifold pressure drops below the minimum specified value or flame is lost, repeat the "Check/Adjust Pressure at Combination Gas Valve" section on page 5 and then repeat the "Low Fire Setting" sequence described above.
11. Once the setting of the modulating valve has been completed, replace the valve cover that was removed earlier.
12. Move the field installed manual shut-off valve to the "OFF" position, remove the manometer, and replace the 1/8" pipe plug.
13. After the plug is in place, move the field installed manual shut-off valve to the "ON" position and recheck all pipe plugs for gas leaks with soap solution.

GAS HEAT START-UP PROCEDURE

Single and Two Stage Furnace / Manifold Section (applies to C- and D-Cabinet units only)

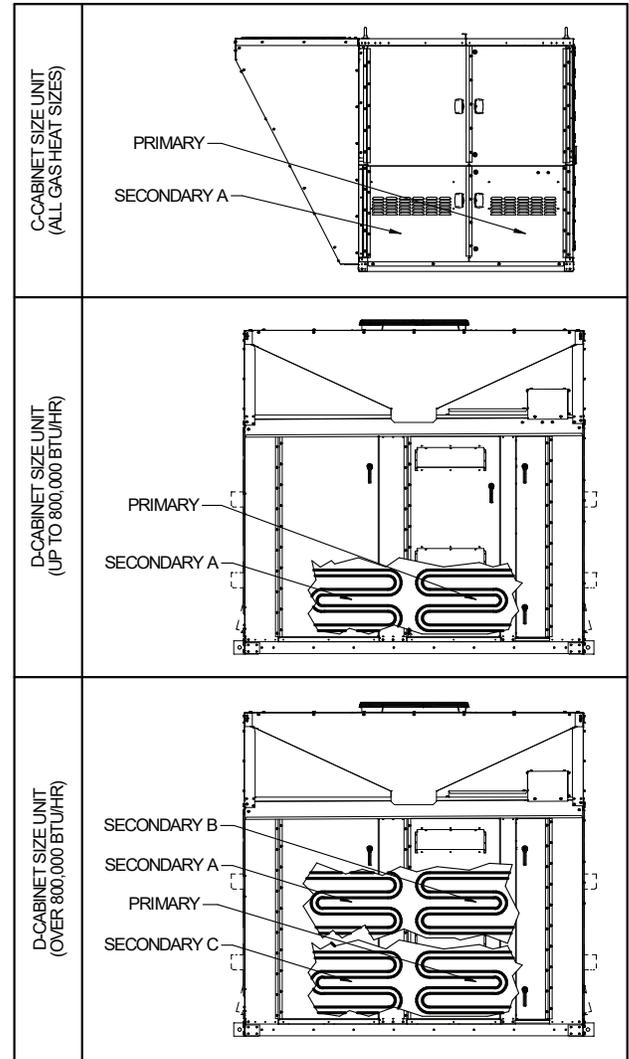
The following steps are required to check/adjust the manifold pressure on the combination gas valve for staged furnaces (multiple furnace units only).

1. With supply pressure set as described in the sections above, manually set the unit demand at 10.0 vDC for the furnace being tested as described in the "Carel Controller Settings" section on page 4.
2. On split manifold units (furnace model digit 11=B, C, or D), verify that the combination valve on fixed input portion of the manifold supplies a pressure of 3.5 +/- 0.2"WC for Natural Gas (10.0 +/- 0.2"WC for LP) on the outlet of the valve when all burners are operating.
3. On heat exchangers with two stage controls (C and D-Cabinet units up to 800MBH):
 - a. Reduce the heat demand until the non-modulated furnace is operating at low input. This will typically occur between 50 and 75% demand. The easiest way is to drive Furnace 2 to low fire by following step 17 on page 4.
 - b. Verify that the combination valve supplies a manifold pressure of 1.0 +/- 0.2"WC for Natural Gas (2.5 +/- 0.2"WC for LP) on the outlet of the valve when all burners are operating at reduced demand.
4. On heat exchangers with single stage controls (D-Cabinet units 900MBH and larger), verify that the combination valve supplies a manifold pressure of 3.5 +/- 0.2"WC for Natural Gas (10.0 +/- 0.2"WC for LP) on the outlet of the valve when all burners are operating at full demand.
5. Once the setting of the valve(s) has been completed, move the field installed manual shut-off valve to the "OFF" position, remove the manometer, and replace the 1/8" pipe plug.
6. After the plug is in place, move the field installed manual shut-off valve to the "ON" position and recheck all pipe plugs for gas leaks with soap solution.

Clearing Furnace Control Board Error Codes

1. Error codes on the primary control board (VB1285) can be viewed by pressing the UP/MODE button for at least 4 seconds until the LED display changes to display "Lo9" and release the button. Refer to Figure 5.1 for location of buttons and LED display and Table 8.1 for a listing of error codes.
2. Briefly press the UP/MODE button again to review the error codes. If there are no alerts or error codes currently stored in the history log, the display will instead revert back to the original normal display mode. If any error codes are currently stored in the history log, then they will be displayed beginning with the most recently recorded. The UP/MODE and DN/SELECT buttons will navigate through the log.
3. To clear the error codes from memory, press the DN/SELECT button until "CLr" is displayed. Press and hold the DN/SELECT button for 4 seconds to clear the memory. The board will then revert to normal operation.
4. To exit the History Log without clearing the log and revert to normal operation depress the UP/MODE button for 4 seconds.
5. On the secondary staged control boards (United Technologies), refer to the LED indicator and Tables 9.1 and 9.2 for a listing of error codes.

Figure 7.1 - Furnace Primary/Secondary Locations ①



① Furnace locations are shown for reference, not the location of the furnace controls. Refer to the figures on pages 11 through 15 for controls location.

Final Check

1. Operate furnace (all furnaces for units with multiple heat exchangers) at high fire and verify that gas pressure to the INLET of the combination gas control valve is maintained at 6"-7" W.C. on natural gas (11"-14" W.C. on propane (LP) gas). If the pressure cannot be maintained while operating at high fire, the gas supply system is undersized and must be corrected and the entire check and adjustment of gas pressures section must be repeated.
2. Once all gas pressures have been checked and are at the proper settings, shut the unit down and move the field installed manual shut-off valve to the "OFF" position.
3. Remove all testing equipment and replace any hardware (plugs, covers, etc.)
4. After the plug is in place, move the field installed manual shut-off valve to the "ON" position and recheck all pipe plugs for gas leaks with soap solution.
5. Close the unit access doors.
6. **Resume with instructions on page 32 of the Installation and Service Manual, literature #LNX15-500.10.**

FURNACE CONTROLLER ERROR CODES

Furnace Controller Error Codes

Tables 8.1 through 9.2 are for the furnace controllers on gas heat option furnace model digit 11= 6, 9, A, B, C, or D). Refer to the Troubleshooting section in the model DLV Installation and Service Manual, Literature LNX15-500.10 for a listing of Possible Causes and Remedies for the full unit.

Table 8.1 - Primary Furnace Control Board (VB1285) Error Codes ①

(Applies to all units with Gas Heat Option furnace model number Digit 11= 6, 9, A, B, C, or D)

Display Code	Code Type	Description	Additional Notes
888	10s L/O	Board Failure (<i>Up to 10 sec @ power up</i>)	Verify 24 VAC signal input at connector J6.
Off	Status	UP Mode: Burner state = Off	Normal Operation
Pur	Status	UP Mode: Burner state = Purge	
Ign	Status	UP Mode: Burner state = Ignition	
HEA	Status	UP Mode: Burner state = Warmup	
Run	Status	UP Mode: Burner state = Run	
rEt	Status	UP Mode: Burner state = Retry (<i>with A01 or A02</i>)	
A01	Alert	Failed ignition attempt	
A02	Alert	Lost Flame	Ignition was successful but then flame disappeared.
A03	Alert	Insufficient Combustion Air	Blocked vent with modulator position de-rated by >20% from Fire Rate Input (demand) setting.
A04	Alert	Limited Low Fire (due to Lost Flame Auto-Adaptation)	Flame loss at low fire results in an auto-adjustment limit of the burner turndown by adjusting the minimum modulation voltage during the rest of the current cycle or until a CPU reset.
A05	Alert	Weak Flame Signal	Flame presence signal of less than 1.5µA indicates an aged flame rod.
A07	Alert	Loss of Inducer Motor Control	The Air Pressure is not modulating down at minimum inducer drive.
A08	Alert	Air Sensor Null Pressure Check out-of-tolerance	The Air Pressure sensor zero reading appears to be out-of-tolerance.
A11	Alert	Failed Ignition – Split Manifold	Failed Ignition, Split manifold burner, retries exhausted.
A15	Alert	Weak Flame Signal – split manifold	Weak Flame Signal, one or more split-manifold staged burners.
E01	1hr L/O	Failed Ignition	Four failed ignition attempts have occurred.
E02	10s L/O	Primary Limit Failure	Verify Primary Limit input at connector J8 and fuse at F1.
E03	10s L/O	Modulation Valve Failure	The Valve Actuator did not reach a Park or Full On position.
E04	30s L/O	Air Sensor Failure - <i>Pressure Reading Low</i>	Includes air switch failure to open during pre-purge switch check, includes insufficient air lockout due to blocked vent.
E05	30s L/O	Air Sensor Failure - <i>Pressure Reading High</i>	Includes air switch failure to close during pre-purge switch check.
E08	10s L/O	Improper Flame	
E09		No R-W Enable	An R-W open circuit is preventing the control from operating on a non-zero Firing Rate Demand or Firing Rate Input.
E13	10s L/O	Open Fuse	
Eld	10s L/O	Invalid I.D. Plug Installed	

① To clear furnace control board error codes, refer to the section “Clearing Furnace Control Board Error Codes” on page 7.

FURNACE CONTROLLER ERROR CODES

Table 9.1 - Staged Furnace Control Boards (United Technologies Two Stage Control) Error Codes

(Applies only to C- and D-Cabinet Units with Gas Heat Option furnace model number Digit 11=9 or C) ①

Display Code	Description	Additional Notes
Heartbeat	Normal operation	
1 Flash	Pressure switch open, Inducer on	Check inducer, pressure switch and tubing.
2 Flashes	Pressure switch open, Inducer off after 5 min. run.	Check inducer, pressure switch and tubing.
3 Flashes	Limit switch open	Unit overheat or switch/wiring issue.
4 Flashes	Lockout: Five ignition trials in a call for heat	Will reset on next call for heat or in 1 hr.
5 Flashes	Not used	
6 Flashes	Lockout: Five limit switch trips in a call for heat	Will reset in 1 hr. or with power cycle.
7 Flashes	Lockout: five many flame losses in a call for heat	Will reset on next call for heat or in 1 hr.

① To clear furnace control board error codes, refer to the section "Clearing Furnace Control Board Error Codes" on page 7.

Table 9.2 - Staged Furnace Control Boards (United Technologies Single Stage Control) Error Codes

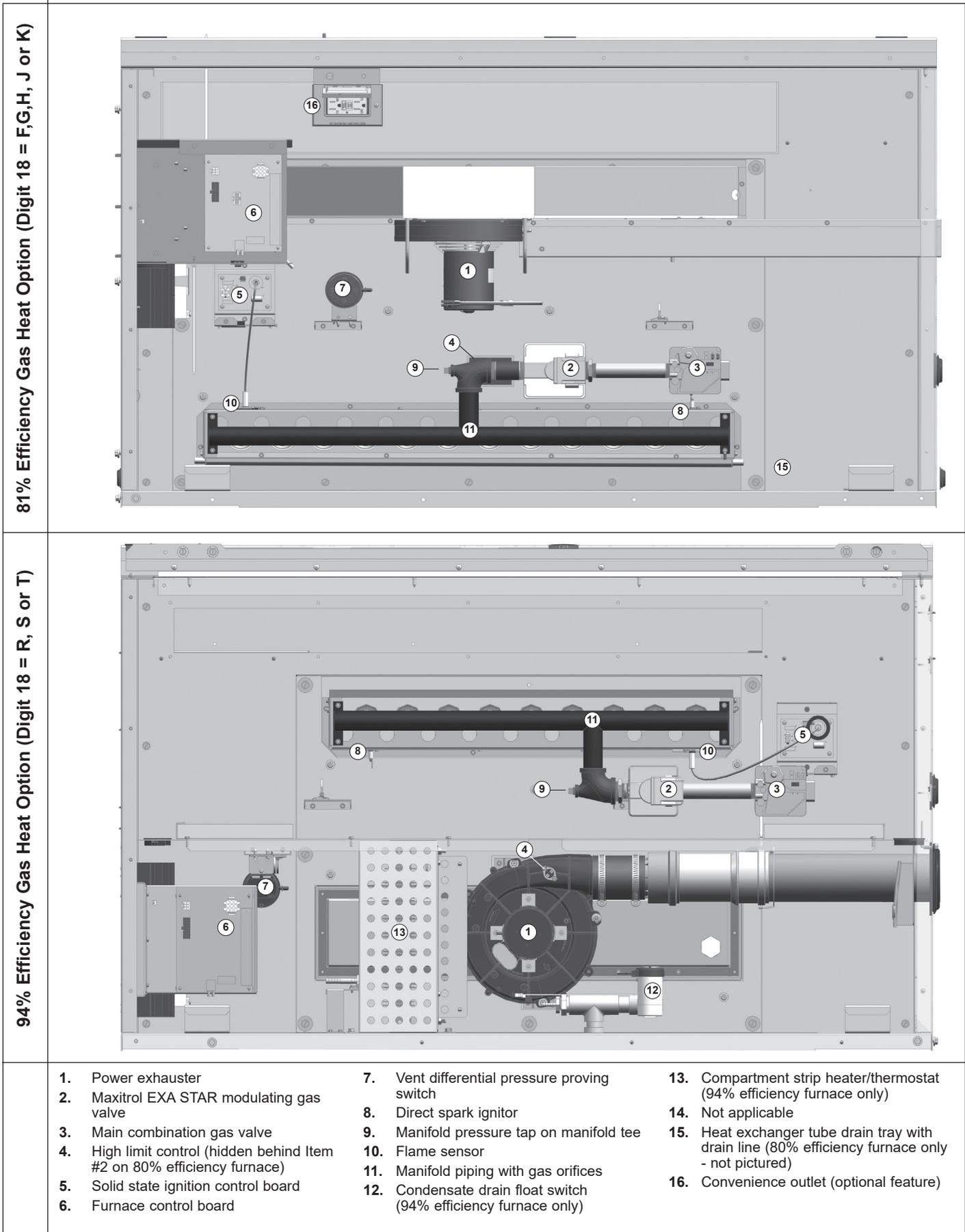
(Applies only to D-Cabinet Units with Gas Heat Option furnace model number Digit 11=A or D) ①

Display Code	Description	Additional Notes
Steady On	Green	Normal Operation
	Amber	Flame is sensed, Normal operation
1 Flash	Pressure switch open, Inducer on	Check inducer, pressure switch and tubing.
2 Flashes	Pressure switch open, Inducer off after 5 min. run.	Check inducer, pressure switch and tubing.
3 Flashes	Limit switch open	Unit overheat or switch/wiring issue.
4 Flashes	Lockout: Five ignition trials in a call for heat	Will reset on next call for heat or in 1 hr.
5 Flashes	Not used	
6 Flashes	Lockout: Five limit switch trips in a call for heat	Will reset in 1 hr. or with power cycle.
7 Flashes	Lockout: five many flame losses in a call for heat	Will reset on next call for heat or in 1 hr.

① To clear furnace control board error codes, refer to the section "Clearing Furnace Control Board Error Codes" on page 7.

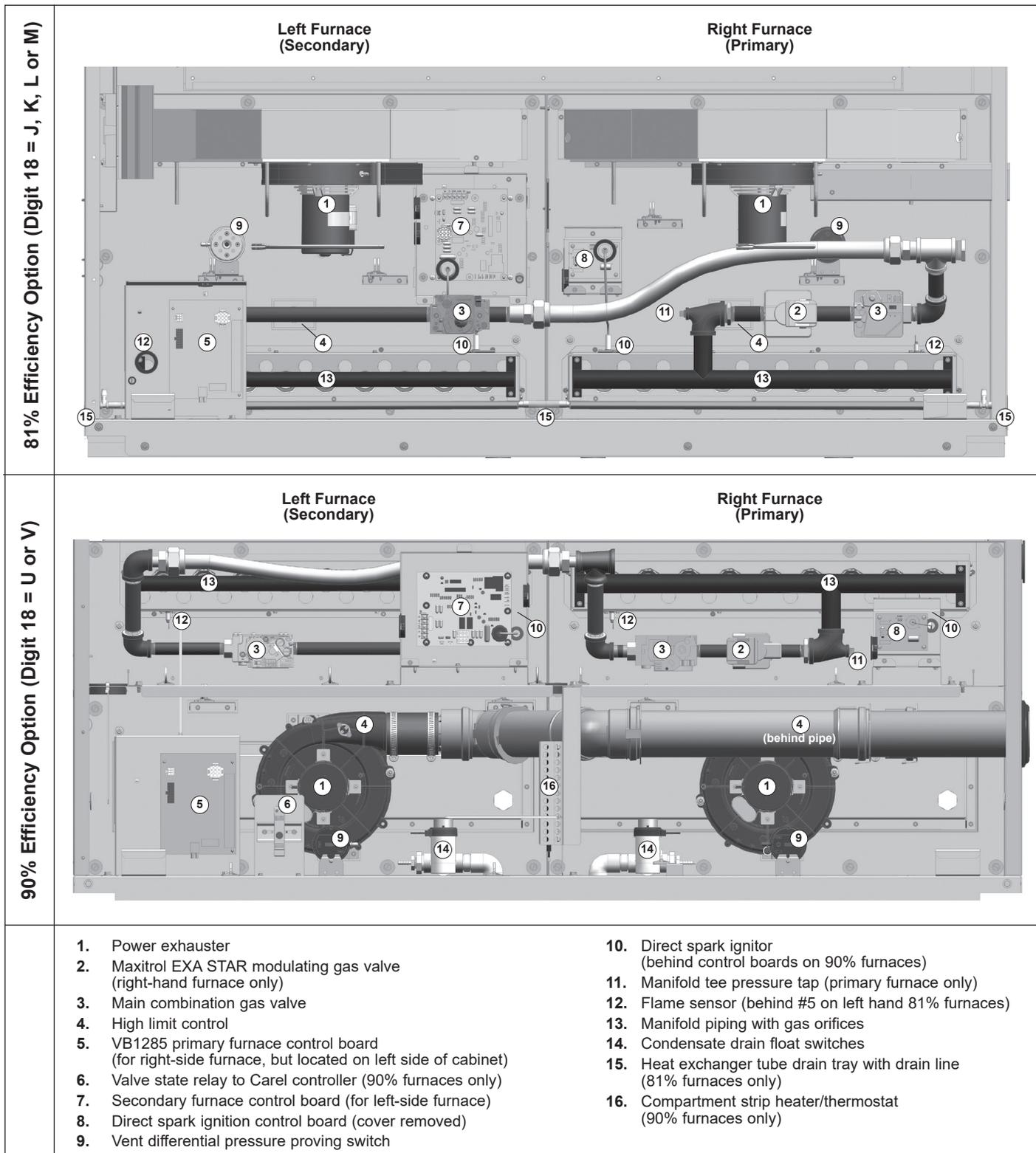
GAS HEAT OPTION COMPONENT LOCATION

Figure 10.1 - Gas Heat Option Gas Controls - B-Cabinet Sized Units



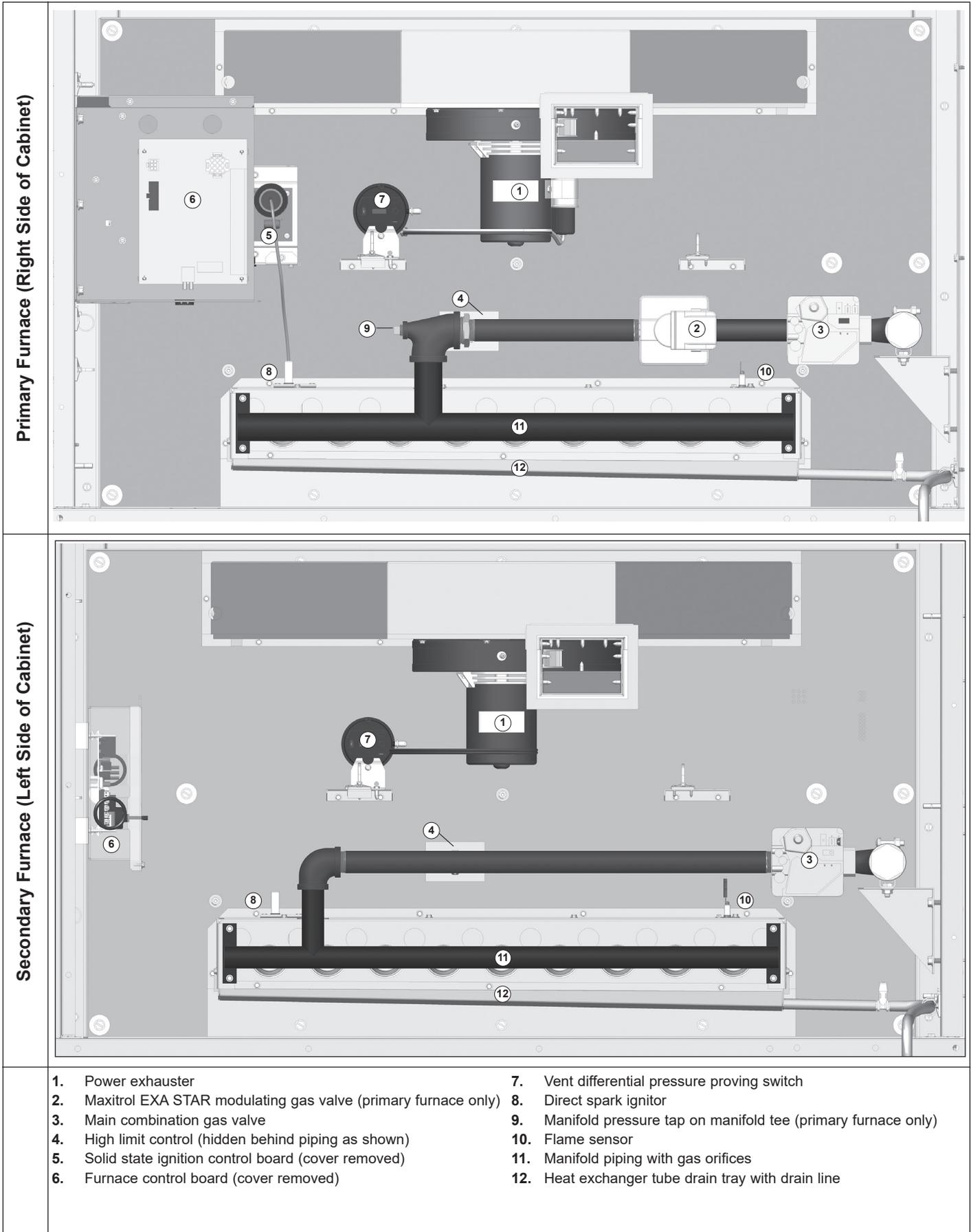
GAS HEAT OPTION COMPONENT LOCATION

Figure 11.1 - Gas Heat Option Gas Controls - C-Cabinet Sized Units



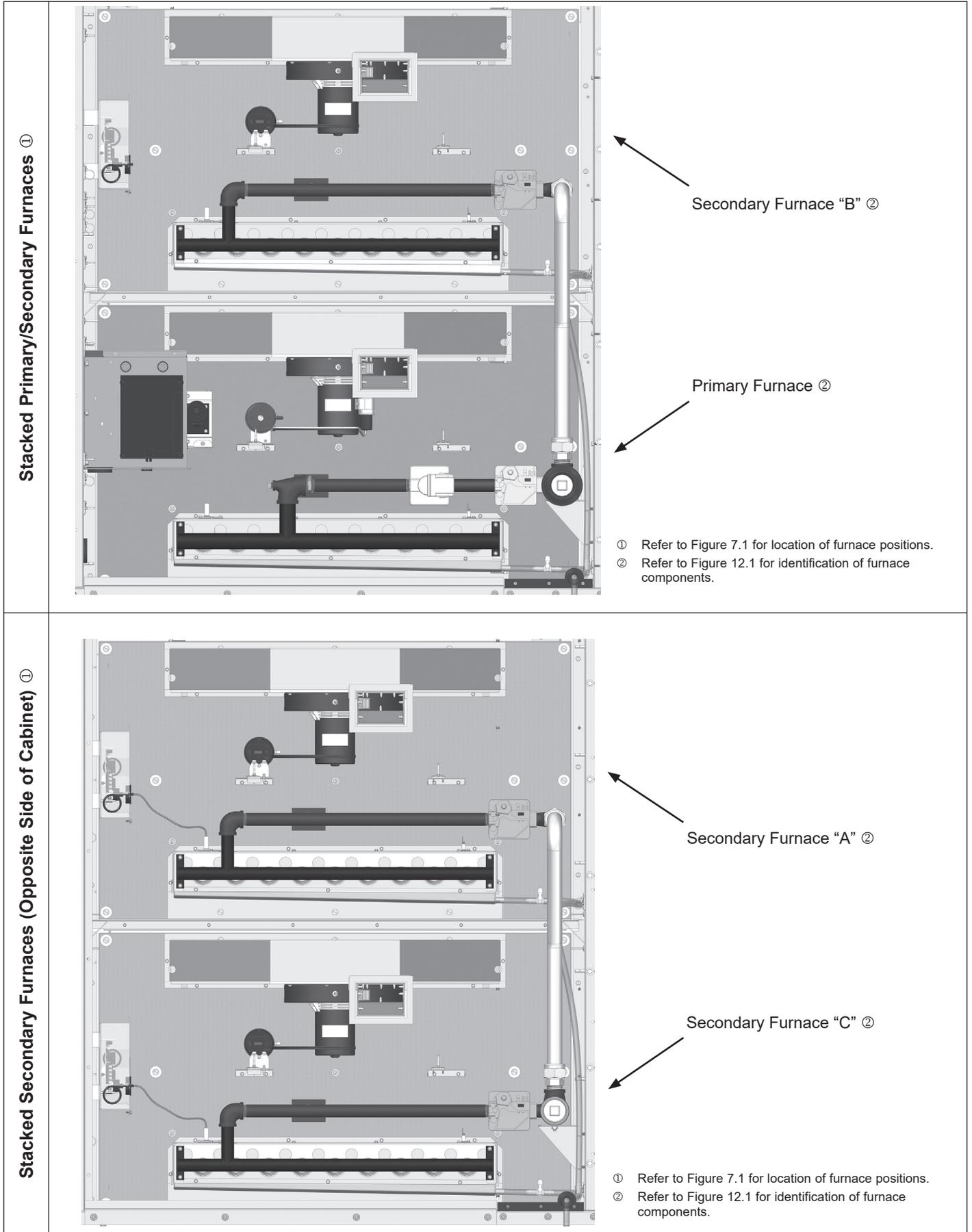
GAS HEAT OPTION COMPONENT LOCATION

Figure 12.1 - Gas Heat Option Gas Controls - D-Cabinet Sized Units - 800,000 Btu/hr and Smaller (81% Eff)



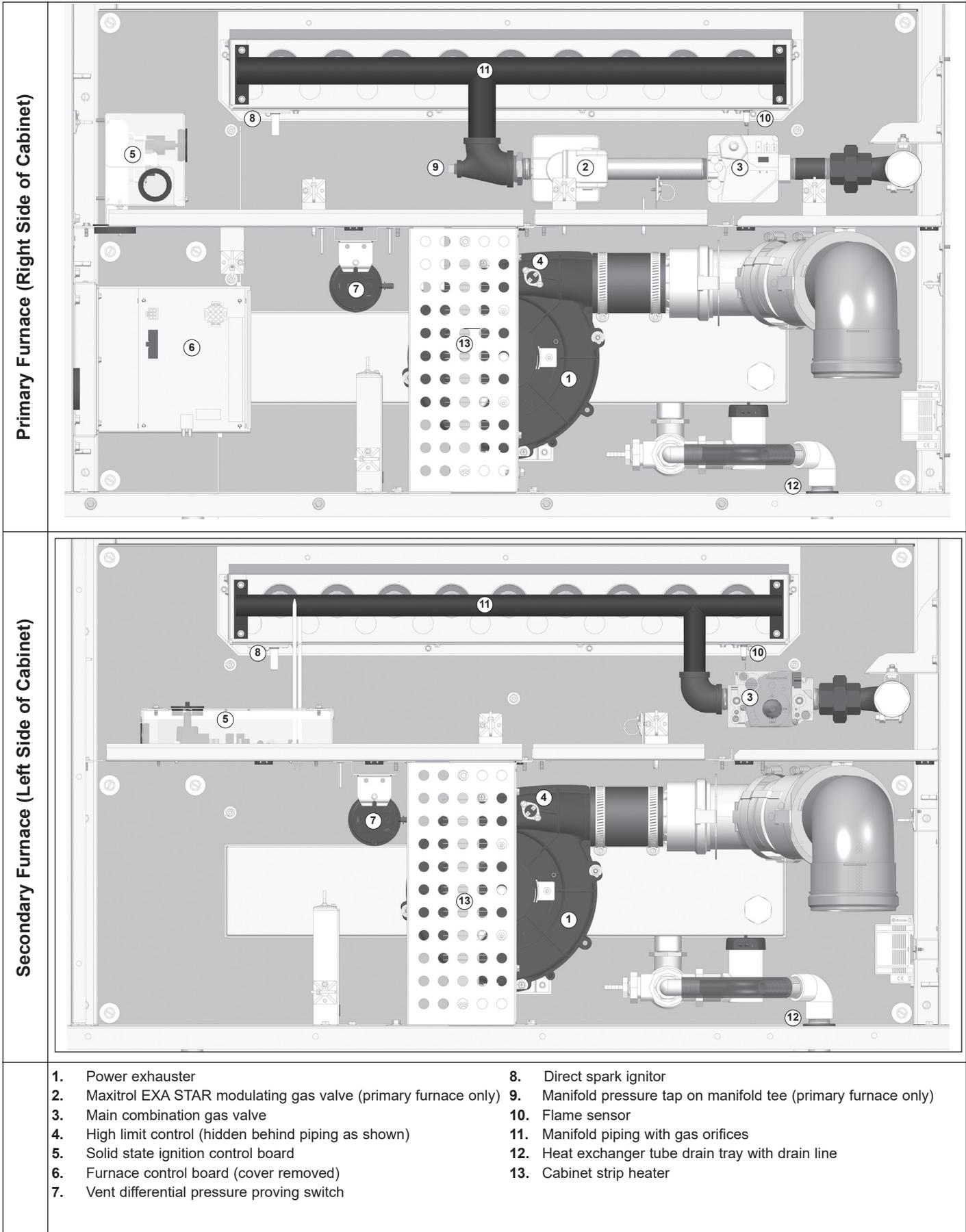
GAS HEAT OPTION COMPONENT LOCATION

Figure 13.1 - Gas Heat Option Gas Controls - D-Cabinet Sized Units - 900,000 Btu/hr and Larger (81% Eff)



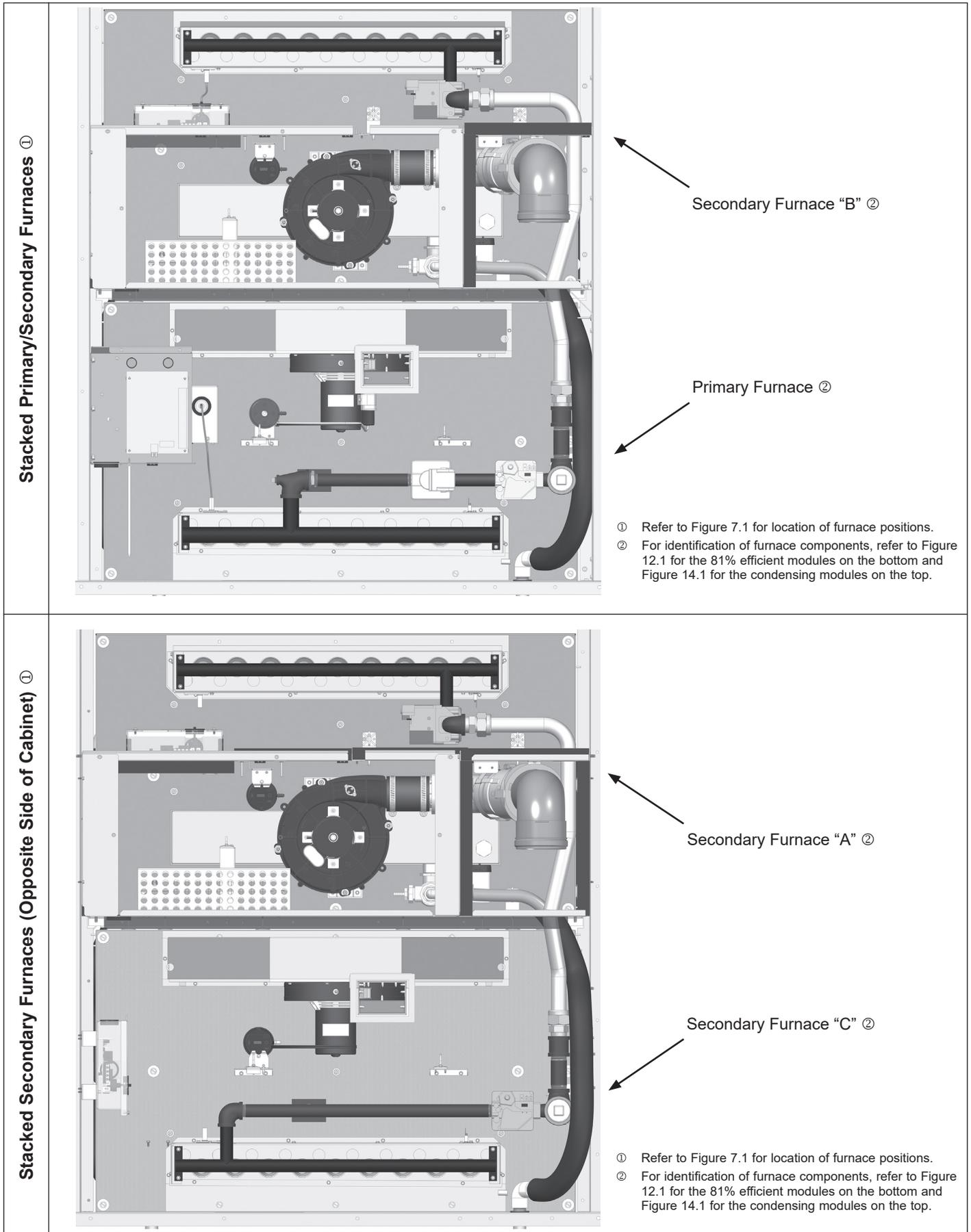
GAS HEAT OPTION COMPONENT LOCATION

Figure 14.1 - Gas Heat Option Gas Controls - D-Cabinet Units - 620,000 Btu/hr and Smaller (94% Eff)



GAS HEAT OPTION COMPONENT LOCATION

Figure 15.1 - Gas Heat Option Gas Controls - D-Cabinet Units - 850,000 Btu/hr and Larger (Hybrid 87% Eff)



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