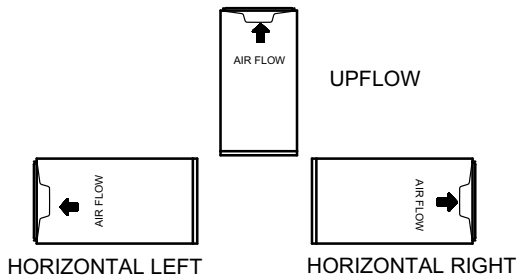




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Dallas, Texas, USA



INSTALLATION INSTRUCTIONS SLP98UHV

DAVE LENNOX SIGNATURE®
COLLECTION GAS FURNACE
UPFLOW / HORIZONTAL AIR DISCHARGE

TP Technical
Publications

507026-01
03/2014
Supersedes 01/2014

Litho U.S.A.

**THIS MANUAL MUST BE LEFT WITH THE
HOMEOWNER FOR FUTURE REFERENCE**



This is a safety alert symbol and should never be ignored. When you see this symbol on labels or in manuals, be alert to the potential for personal injury or death.

CAUTION

As with any mechanical equipment, personal injury can result from contact with sharp sheet metal edges. Be careful when you handle this equipment.

NOTICE

A thermostat is not included and must be ordered separately.

- The Lennox icomfort Wi-Fi® thermostat must be used in communicating applications.
- In non-communicating applications, the Lennox ComfortSense® 7000 thermostat may be used, as well as other non-communicating thermostats.

In all cases, setup is critical to ensure proper system operation.

Field wiring for both communicating and non-communicating applications is illustrated in diagrams, which begin on Page 32.

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer (or equivalent), service agency or the gas supplier.

Table of Contents

Unit Dimensions	2
Parts Arrangement	3
Gas Furnace	4
Shipping and Packing List	4
Safety Information	4
Use of Furnace as a Construction Heater	5
General	6
Setting Equipment	6
Filters	10
Duct System	11
Pipe and Fittings Specifications	11
Joint Cementing Procedure	12
Venting Practices	13
Vent Piping Guidelines	13
Gas Piping	27

Electrical	30
Integrated Control	38
Blower Motor Performance	42
Unit Start Up	47
Gas Pressure Measurement	48
High Altitude Information	50
Proper Combustion	50
Other Unit Adjustments	50
Heating Sequence of Operation	51
Service	53
Repair Parts List	54
Integrated Control Diagnostic Codes	55
Configuring Unit Size Codes	58
Troubleshooting	59

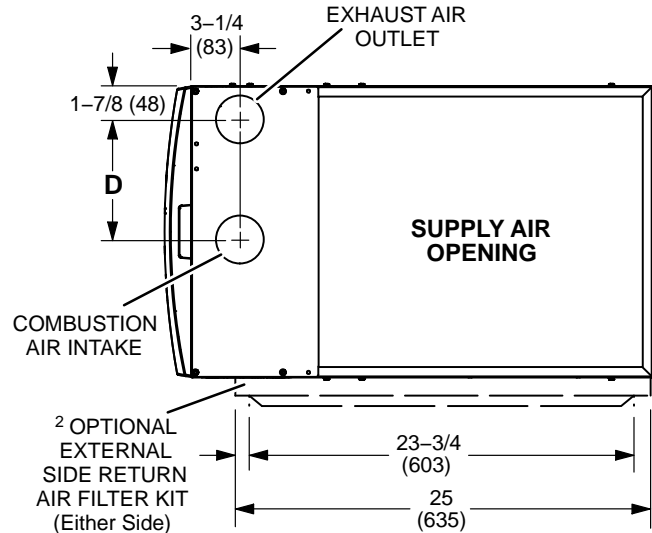


Unit Dimensions - inches (mm)

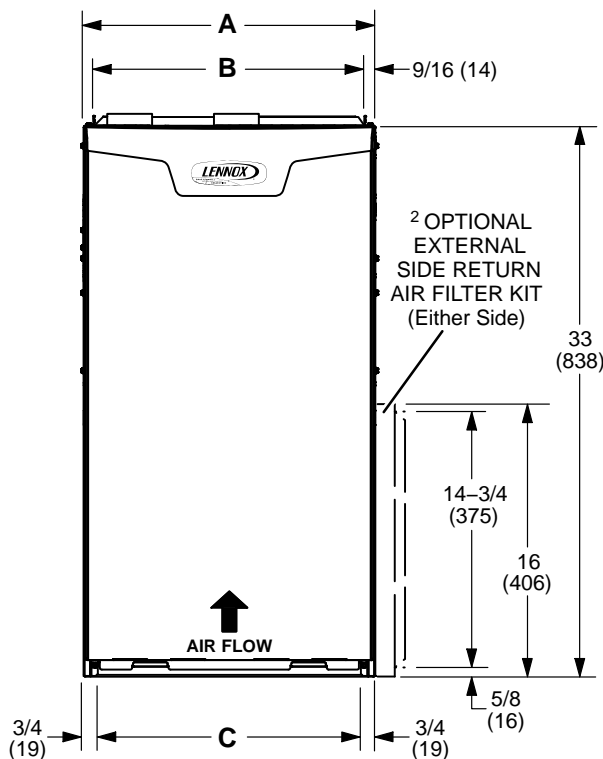
¹ NOTE – 60C and 60D size units that require second stage air volumes over 1800 cfm (850 L/s) must have one of the following:

1. Single side return air with transition, to accommodate 20 x 25 x 1 in. (508 x 635 x 25 mm) cleanable air filter. Required to maintain proper air velocity.
 2. Single side return air with optional return air base
 3. Bottom return air.
 4. Return air from both sides.
 5. Bottom and one side return air
- See blower performance tables for more information.

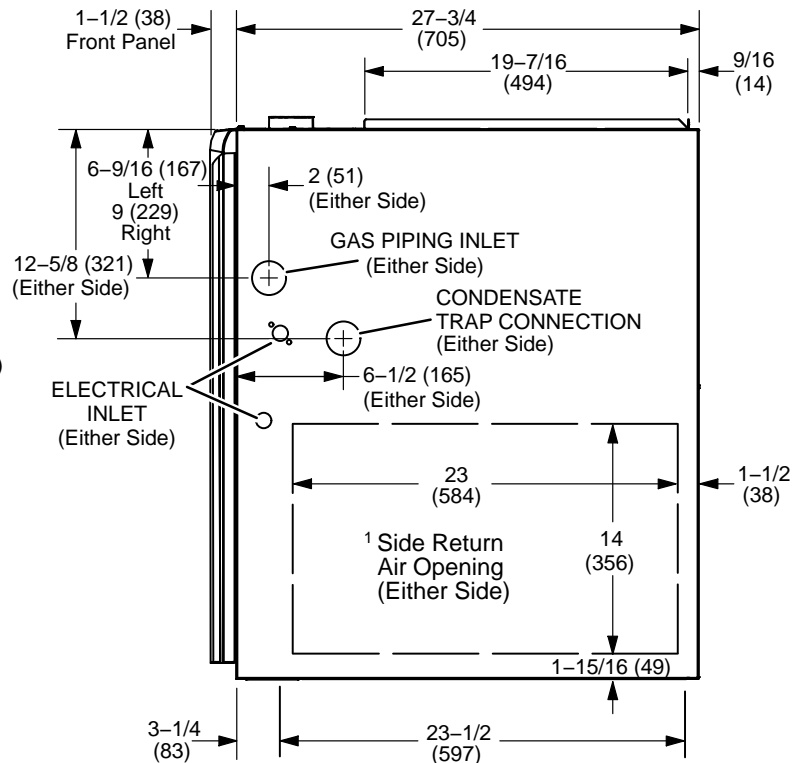
² Optional External Side Return Air Filter Kit is not for use with the optional RAB Return Air Base.



TOP VIEW



FRONT VIEW



SIDE VIEW

SLP98UH Model No.	A		B		C		D	
	in.	mm	in.	mm	in.	mm	in.	mm
070XV36B	17-1/2	446	16-3/8	416	16	406	7-5/8	194
090XV36C	21	533	19-7/8	505	19-1/2	495	9-3/8	238
090XV48C								
090XV60C								
110XV60C								
135XV60D	24-1/2	622	23-3/8	594	23	584	11-1/8	283

Parts Arrangement

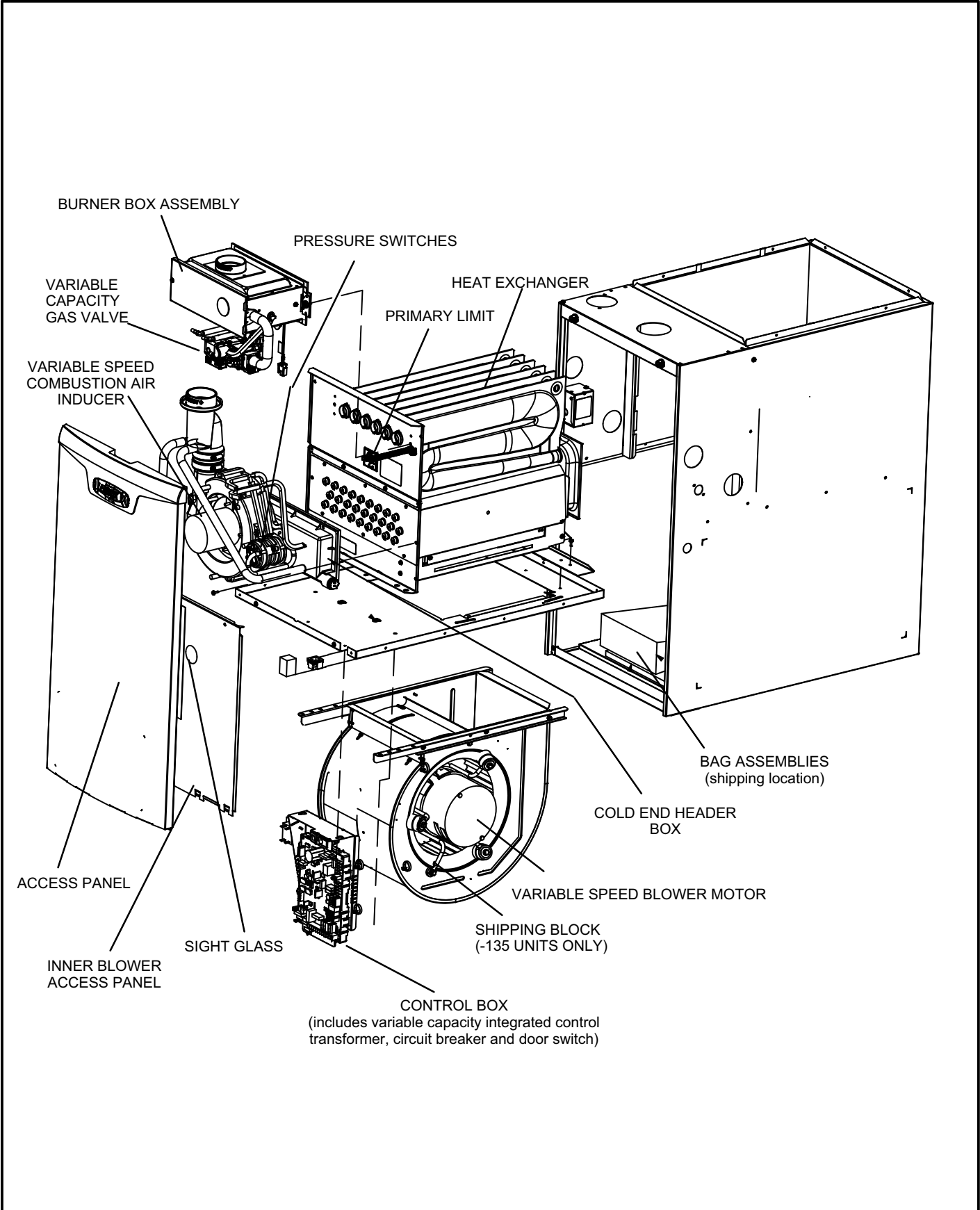


FIGURE 1

SLP98UHV Gas Furnace

The SLP98UHV category IV gas furnace is equipped with a variable-capacity, variable-speed integrated control. This control ensures compatibility with the Lennox icomfort Wi-Fi® thermostat, the Harmony III™ zone control system, or a thermostat which provides humidity control. Each SLP98UHV is shipped ready for installation in the upflow, horizontal left air discharge or horizontal right air discharge position.

The furnace is equipped for installation in natural gas applications only. A changeover kit may be ordered for LP applications.

The SLP98UHV must be installed only as a Direct Vent gas furnace.

NOTE - In Direct Vent installations, combustion air is taken from outdoors and flue gases are discharged outdoors. See figure 2 for applications including roof termination.

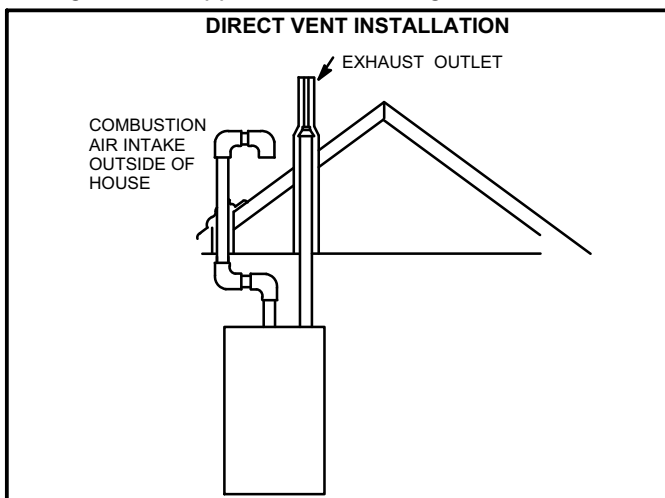


FIGURE 2

Shipping and Packing List

Package 1 of 1 contains

- 1 - Assembled SLP98UHV unit
- 1 - Bag assembly containing the following:
 - 1 - Snap bushing
 - 1 - Snap plug
 - 1 - Wire tie
 - 1 - Condensate trap
 - 1 - Condensate trap cap
 - 1 - Condensate trap cap clamp
 - 1 - 3/4" Threaded street elbow

Check equipment for shipping damage. If you find any damage, immediately contact the last carrier.

The following items may also be ordered separately:

- 1 - Thermostat
- 1 - Natural to LP gas conversion kit
- 1 - High altitude kit
- 1 - Horizontal suspension kit

⚠ DANGER

Danger of explosion.

There are circumstances in which odorant used with LP/propane gas can lose its scent. In case of a leak, LP/propane gas will settle close to the floor and may be difficult to smell. An LP/propane leak detector should be installed in all LP applications.

Safety Information

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional installer (or equivalent), service agency or the gas supplier.

⚠ CAUTION

As with any mechanical equipment, personal injury can result from contact with sharp sheet metal edges. Be careful when you handle this equipment.

Use only the type of gas approved for use with this furnace. Refer to unit nameplate.

Building Codes

In the USA, installation of gas furnaces must conform with local building codes. In the absence of local codes, units must be installed according to the current National Fuel Gas Code (ANSI-Z223.1/NFPA 54). The National Fuel Gas Code is available from the following address:

American National Standards Institute, Inc.
11 West 42nd Street
New York, NY 10036

Installed Locations

In Canada, installation must conform with current National Standard of Canada CSA-B149 Natural Gas and Propane Installation Codes, local plumbing or waste water codes and other applicable local codes.

This furnace is designed for installation clearances to combustible material as listed on the unit nameplate and in the tables in figures 10 and 11. Accessibility and service clearances must take precedence over fire protection clearances.

NOTE - For installation on combustible floors, the furnace shall not be installed directly on carpeting, tile, or other combustible material other than wood flooring.

For installation in a residential garage, the furnace must be installed so that the burner(s) and the ignition source are located no less than 18 inches (457 mm) above the floor. The furnace must be located or protected to avoid physical damage by vehicles. When a furnace is installed in a public

garage, hangar, or other building that has a hazardous atmosphere, the furnace must be installed according to recommended good practice requirements and current National Fuel Gas Code or CSA B149 standard.

NOTE - NOTE - Furnace must be adjusted to obtain a temperature rise (100% percent capacity) within the range(s) specified on the unit nameplate. Failure to do so may cause erratic limit operation and may also result in premature heat exchanger failure.

This SLP98UHV furnace must be installed so that its electrical components are protected from water.

Installed in Combination with a Cooling Coil

When this furnace is used with cooling units, it shall be installed in parallel with, or on the upstream side of, cooling units to avoid condensation in the heating compartment. With a parallel flow arrangement, a damper (or other means to control the flow of air) must adequately prevent chilled air from entering the furnace. If the damper is manually operated, it must be equipped to prevent operation of either the heating or the cooling unit, unless it is in the full **HEAT** or **COOL** setting. See figure 3.

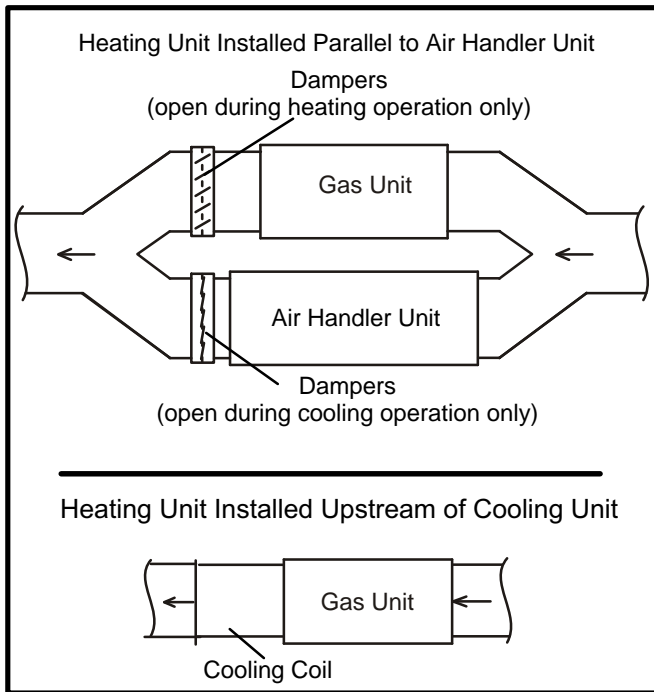


FIGURE 3

When installed, this furnace must be electrically grounded according to local codes. In addition, in the United States, installation must conform with the current National Electric Code, ANSI/NFPA No. 70. The National Electric Code (ANSI/NFPA No. 70) is available from the following address:

National Fire Protection Association
1 Battery March Park
Quincy, MA 02269

NOTE - This furnace is designed for a minimum continuous return air temperature of 60°F (16°C) or an intermittent operation down to 55°F (13°C) dry bulb for cases where a night setback thermostat is used. Return air temperature must not exceed 85°F (29°C) dry bulb.

In Canada, all electrical wiring and grounding for the unit must be installed according to the current regulations of the Canadian Electrical Code Part I (CSA Standard C22.1) and/or local codes.

⚠ CAUTION

Do not set thermostat below 60°F (16°C) in heating mode. Setting thermostat below 60°F (16°C) reduces the number of heating cycles. Damage to the unit may occur that is not covered by the warranty.

The SLP98UHV furnace may be installed in alcoves, closets, attics, basements, garages, and utility rooms.

This furnace is not designed for installation in mobile homes, recreational vehicles, or outdoors.

Never use an open flame to test for gas leaks. Check all connections using a commercially available soap solution made specifically for leak detection.

Use of Furnace as Construction Heater

Lennox does not recommend the use of SLP98UHV units as a construction heater during any phase of construction. Very low return air temperatures, harmful vapors and operation of the unit with clogged or misplaced filters will damage the unit.

SLP98UHV units may be used for heating of buildings or structures under construction, if the following conditions are met:

- The vent system must be permanently installed per these installation instructions.
- A room thermostat must control the furnace. The use of fixed jumpers that will provide continuous heating is not allowed.
- The return air duct must be provided and sealed to the furnace.
- Return air temperature range between 60°F (16°C) and 80°F (27°C) must be maintained.
- Air filters must be installed in the system and must be maintained during construction.
- Air filters must be replaced upon construction completion.
- The input rate and temperature rise must be set per the furnace rating plate.
- One hundred percent (100%) outdoor air must be provided for combustion air requirements during construction. Temporary ducting may supply outdoor air to the furnace. Do not connect duct directly to the furnace.
- The furnace heat exchanger, components, duct system, air filters and evaporator coils must be thoroughly cleaned following final construction clean-up.
- All furnace operating conditions (including ignition, input rate, temperature rise and venting) must be verified according to these installation instructions.

General

⚠ WARNING

The State of California has determined that this product may contain or produce a chemical or chemicals, in very low doses, which may cause serious illness or death. It may also cause cancer, birth defects or reproductive harm.

⚠ CAUTION

SLP98UHV unit should not be installed in areas normally subject to freezing temperatures.

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation.

In addition to the requirements outlined previously, the following general recommendations must be considered when installing a SLP98UHV furnace:

- Place the furnace as close to the center of the air distribution system as possible. The furnace should also be located close to the chimney or vent termination point.
- When the furnace is installed in an attic or other insulated space, keep insulation away from the furnace.
- When the furnace is installed in an unconditioned space, consider provisions required to prevent freezing of condensate drain system.
- The "A" coil drain pan is high quality engineering polymer with a maximum service temperature of 500° F. However, adequate space must be provided between the drain pan and the furnace heat exchanger. At least 2" space is required for sectionalized heat exchanger and 4" for drum-type or oil-fired furnace exchanger. Closer spacing may damage the drain pan and cause leaking.

Installation - Setting Equipment

⚠ WARNING

Do not connect the return air ducts to the back of the furnace. Doing so will adversely affect the operation of the safety control devices, which could result in personal injury or death.

⚠ WARNING

Do not install the furnace on its front or back. See figure 4.

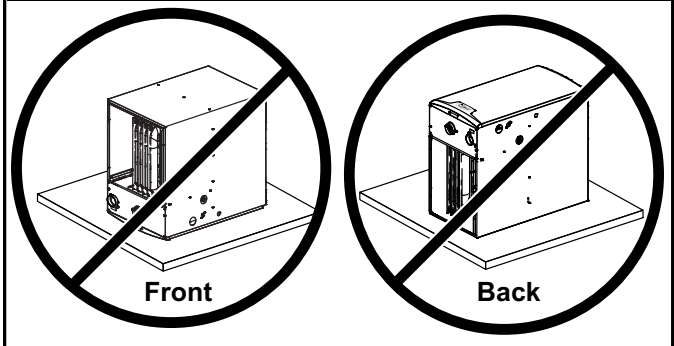


FIGURE 4

Upflow Applications

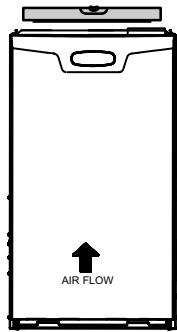
The SLP98UHV gas furnace can be installed as shipped in the upflow position. Refer to figure 10 for clearances.

Select a location that allows for the required clearances that are listed on the unit nameplate. Also consider gas supply connections, electrical supply, vent connection, condensate trap and drain connections, and installation and service clearances [24 inches (610 mm) at unit front]. *The unit must be level from side to side. Unit may be positioned from level to 1/2" toward the front to aid in draining. See figure 5.*

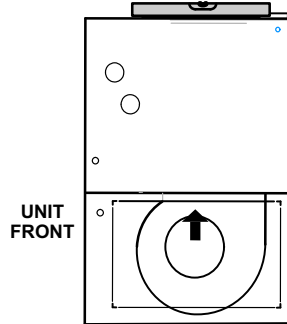
SETTING EQUIPMENT

Unit must be level side-to-side. Unit may be positioned from level to 1/2" toward the front to aid in draining.

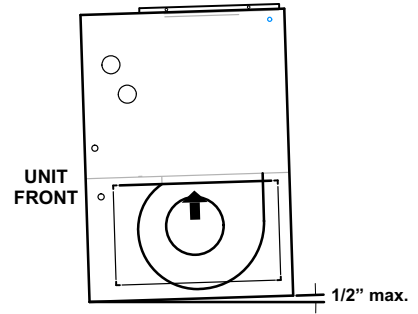
UPFLOW APPLICATION



FRONT VIEW

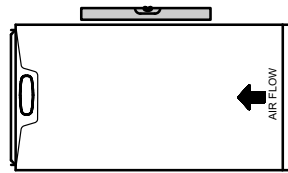


SIDE VIEW

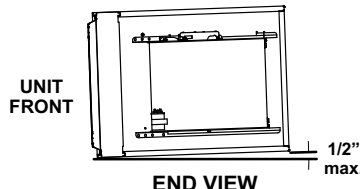


SIDE VIEW

HORIZONTAL APPLICATION



FRONT VIEW



END VIEW

FIGURE 5

Side Return Air (with transition and filter)

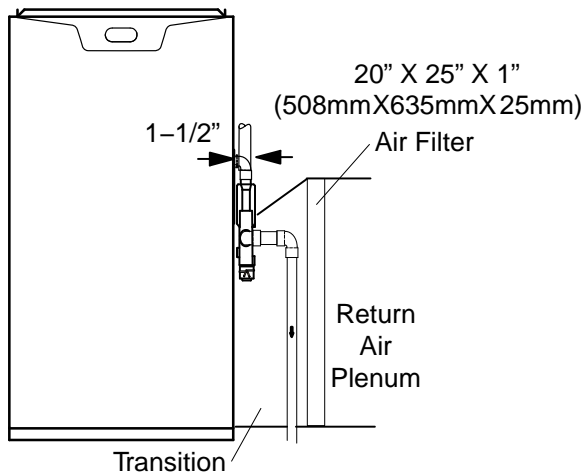


FIGURE 6

SLP98UHV applications which include side return air and a condensate trap installed on the same side of the cabinet (trap can be installed remotely within 5 feet) require either a return air base or field-fabricated transition to accommodate an optional IAQ accessory taller than 14.5". See figure 6.

Removing the Bottom Panel

Remove the two screws that secure the bottom cap to the furnace. Pivot the bottom cap down to release the bottom panel. Once the bottom panel has been removed, reinstall the bottom cap. See figure 7.

Removing the Bottom Panel

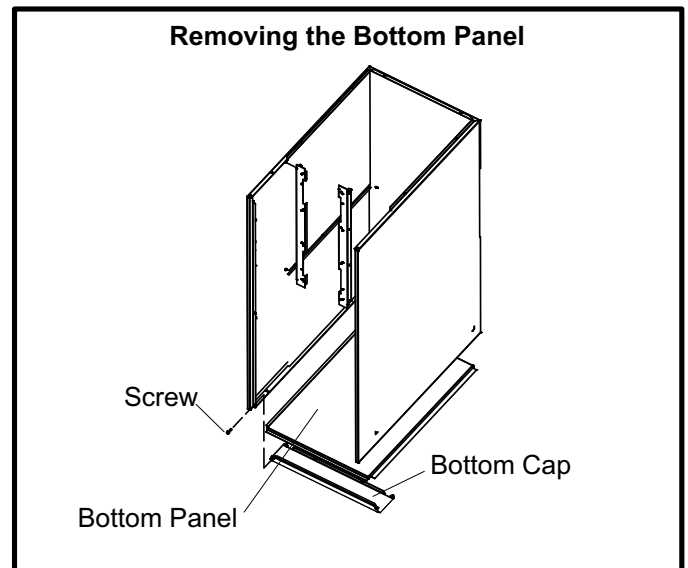


FIGURE 7

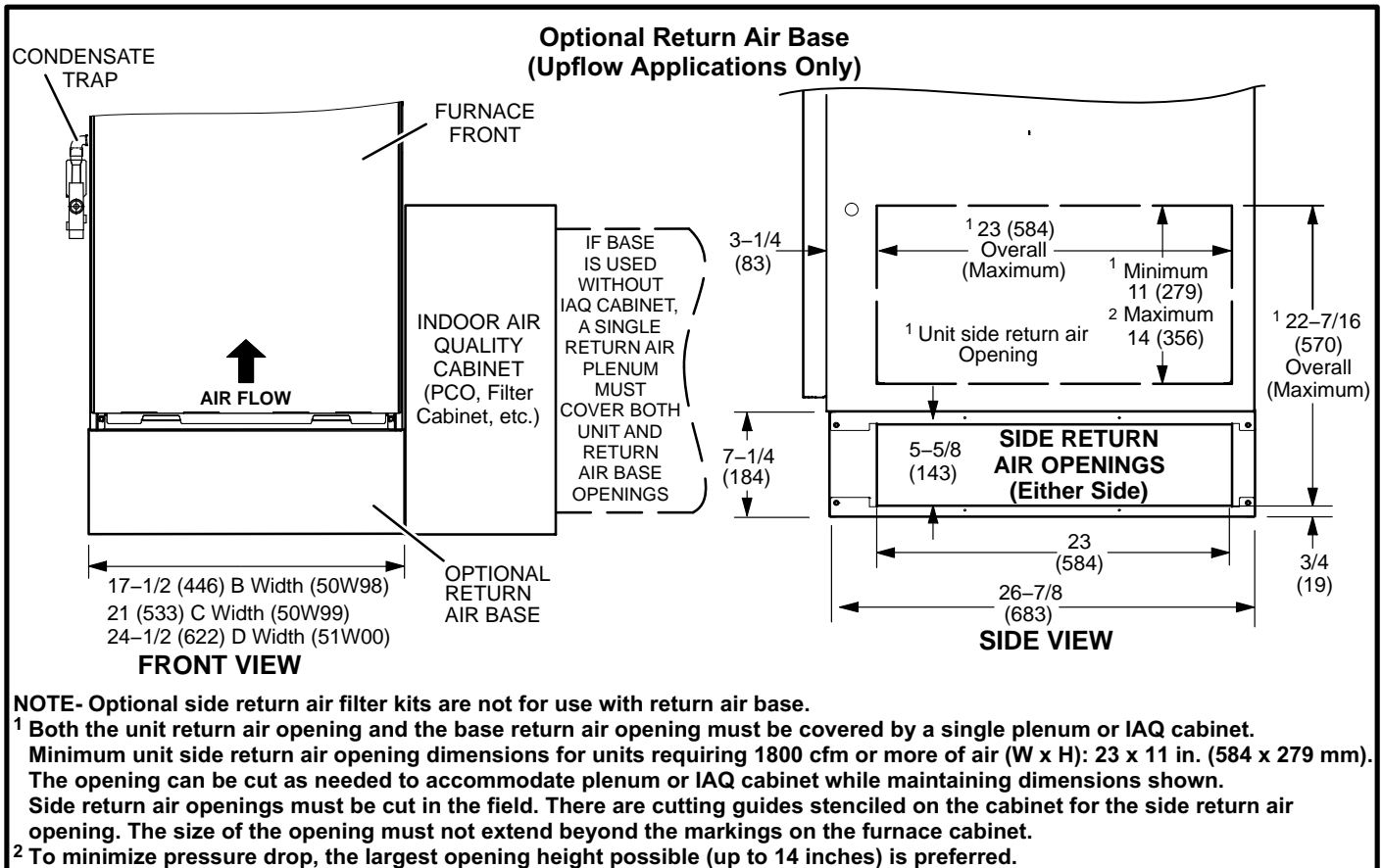


FIGURE 8

NOTE - Units with 1/2 hp blower motor are equipped with three flexible legs and one rigid leg. The rigid leg is equipped with a shipping bolt and a flat white plastic washer (rather than the rubber mounting grommet used with a flexible mounting leg). See figure 9. The bolt and washer must be removed before the furnace is placed into operation. After the bolt and washer have been removed, the rigid leg will not touch the blower housing.

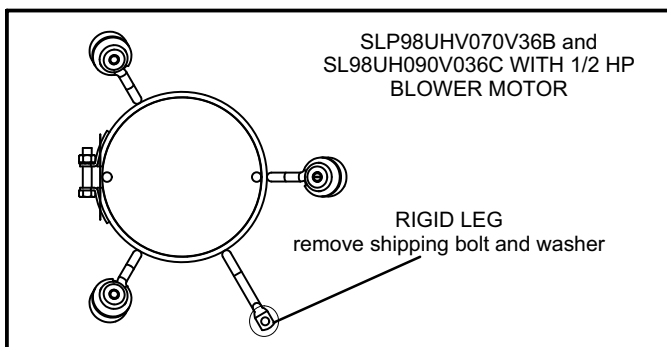


FIGURE 9

Allow for clearances to combustible materials as indicated on the unit nameplate. Minimum clearances for closet or alcove installations are shown in figures 10 and 11.

⚠ WARNING

Blower access panel must be securely in place when blower and burners are operating. Gas fumes, which could contain carbon monoxide, can be drawn into living space resulting in personal injury or death.

⚠ WARNING

Improper installation of the furnace can result in personal injury or death. Combustion and flue products must never be allowed to enter the return air system or air in the living space. Use sheet metal screws and joint tape to seal return air system to furnace. In platform installations with furnace return, the furnace should be sealed airtight to the return air plenum. A door must never be used as a portion of the return air duct system. The base must provide a stable support and an airtight seal to the furnace. Allow absolutely no sagging, cracks, gaps, etc. For no reason should return and supply air duct systems ever be connected to or from other heating devices such as a fireplace or stove, etc. Fire, explosion, carbon monoxide poisoning, personal injury and/or property damage could result.

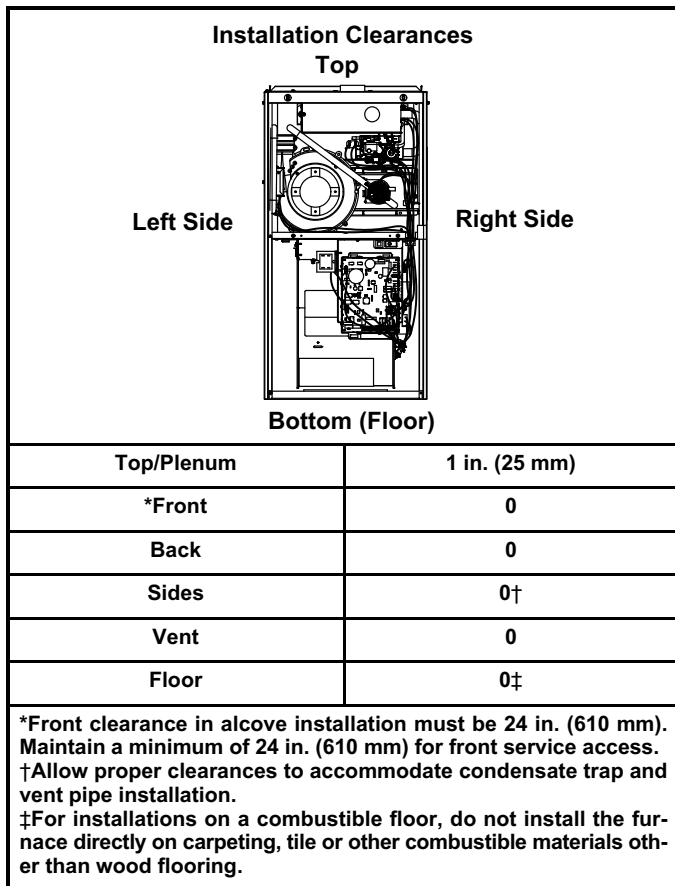


FIGURE 10

Return Air -- Upflow Units

Return air can be brought in through the bottom or either side of the furnace installed in an upflow application. If the furnace is installed on a platform with bottom return, make an airtight seal between the bottom of the furnace and the platform to ensure that the furnace operates properly and safely. The furnace is equipped with a removable bottom panel to facilitate installation.

Markings are provided on both sides of the furnace cabinet for installations that require side return air. Cut the furnace cabinet at the maximum dimensions shown on page 2.

Refer to Engineering Handbook for additional information.

Setting an Upflow Unit

When the side return air inlets are used in an upflow application, it may be necessary to install shims on the bottom of the furnace.

Horizontal Applications

The SLP98UHV furnace can be installed in horizontal applications with either right- or left-hand air discharge.

Refer to figure 11 for clearances in horizontal applications.

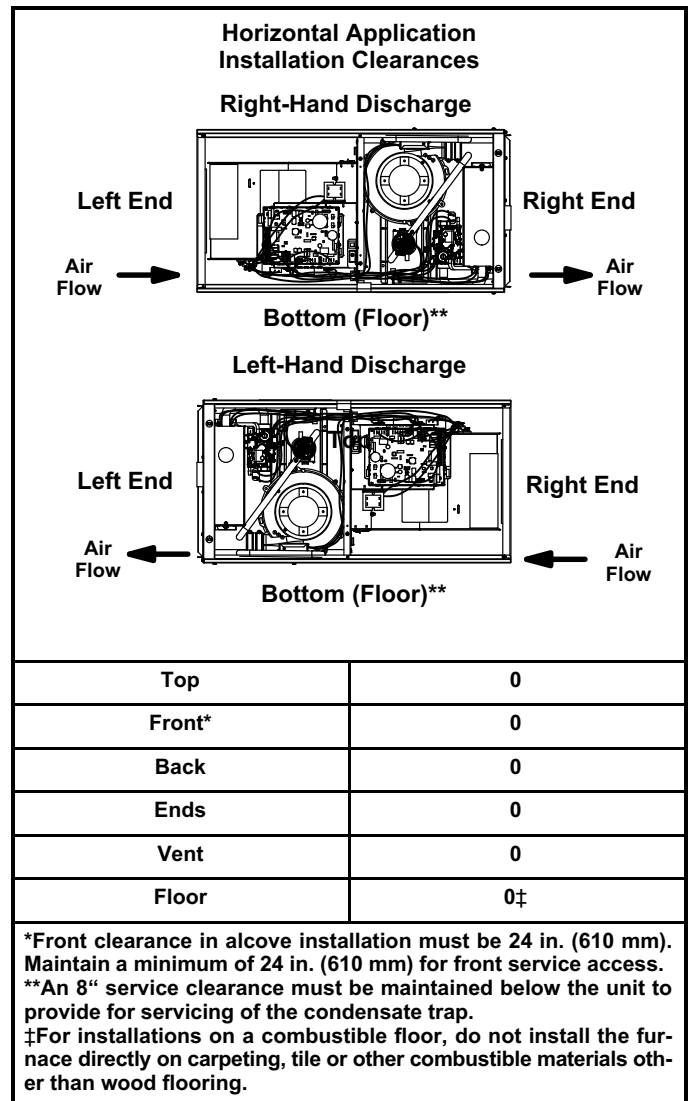


FIGURE 11

Suspended Installation of Horizontal Unit

This furnace may be installed in either an attic or a crawlspace. Either suspend the furnace from roof rafters or floor joists, as shown in figure 12, or install the furnace on a platform, as shown in figure 13. A horizontal suspension kit (51W10) may be ordered from Lennox or use equivalent.

*NOTE - Heavy-gauge sheet metal straps may be used to suspend the unit from roof rafters or ceiling joists. When straps are used to suspend the unit in this way, support must be provided for both the ends. The straps must not interfere with the plenum or exhaust piping installation. **Cooling coils and supply and return air plenums must be supported separately.***

NOTE - When the furnace is installed on a platform in a crawlspace, it must be elevated enough to avoid water damage and to allow the evaporator coil to drain.

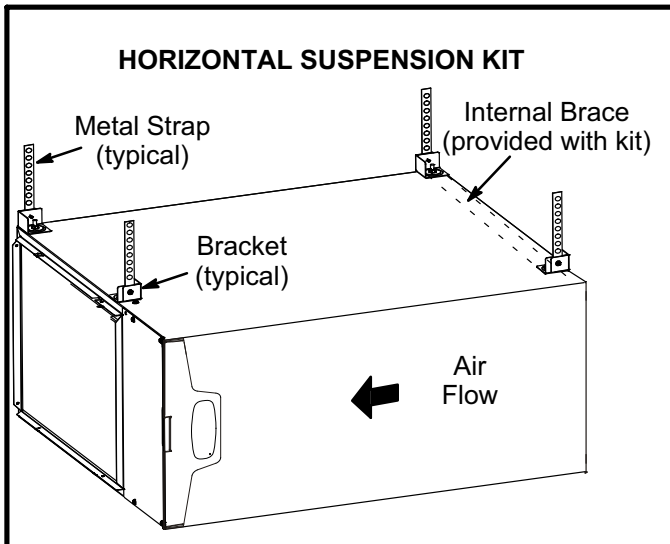


FIGURE 12

Platform Installation of Horizontal Unit

- 1 - Select location for unit keeping in mind service and other necessary clearances. See figure 11.
- 2 - Construct a raised wooden frame and cover frame with a plywood sheet. If unit is installed above finished space, fabricate an auxiliary drain pan to be installed under unit. Set unit in drain pan as shown in figure 13. Leave 8 inches for service clearance below unit for condensate trap.
- 3 - Provide a service platform in front of unit. When installing the unit in a crawl space, a proper support platform may be created using cement blocks.
- 4 - Route auxiliary drain line so that water draining from this outlet will be easily noticed by the homeowner.
- 5 - If necessary, run the condensate line into a condensate pump to meet drain line slope requirements. The pump must be rated for use with condensing furnaces. Protect the condensate discharge line from the pump to the outside to avoid freezing.
- 6 - Continue with exhaust, condensate and intake piping installation according to instructions.

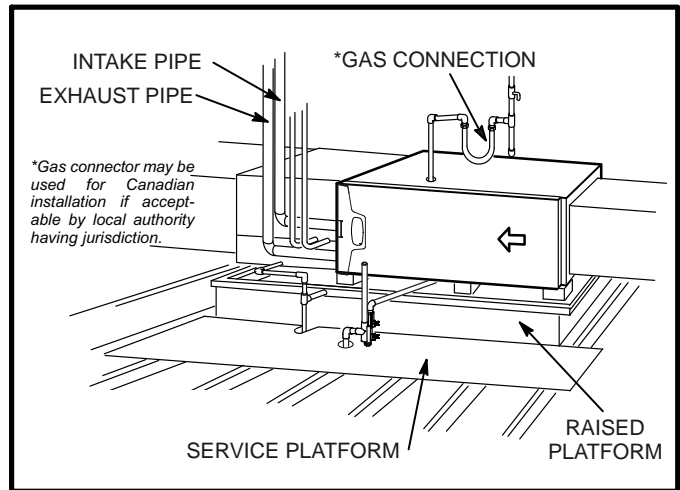


FIGURE 13

Return Air -- Horizontal Applications

Return air must be brought in through the end of a furnace installed in the horizontal position. The furnace is equipped with a removable bottom panel to facilitate installation. See figure 7.

Filters

This unit is not equipped with a filter or rack. A field-provided filter is required for the unit to operate properly. Table 1 lists recommended filter sizes.

▲ IMPORTANT

If a high-efficiency filter is being installed as part of this system to ensure better indoor air quality, the filter must be properly sized. High-efficiency filters have a higher static pressure drop than standard-efficiency glass/foam filters. If the pressure drop is too great, system capacity and performance may be reduced. The pressure drop may also cause the limit to trip more frequently during the winter and the indoor coil to freeze in the summer, resulting in an increase in the number of service calls.

Before using any filter with this system, check the specifications provided by the filter manufacturer against the data given in the appropriate Lennox Product Specifications bulletin. Additional information is provided in Service and Application Note ACC-00-2 (August 2000).

A filter must be in place when the unit is operating.

***NOTE** - In upflow applications where side return air filter is installed on same side as the condensate trap, make sure that clearance is maintained to ensure future access to the filter access panel.*

TABLE 1

Furnace Cabinet Width	Filter Size	
	Side Return	Bottom Return
17-1/2"	16 X 25 X 1 (1)	16 X 25 X 1 (1)
21"	16 X 25 X 1 (1)	20 X 25 X 1 (1)
24-1/2"	16 X 25 X 1 (2)	24 X 25 X 1 (1)

Duct System

Use industry-approved standards to size and install the supply and return air duct system. This will result in a quiet and low-static system that has uniform air distribution.

NOTE - Operation of this furnace in heating mode (indoor blower operating at selected heating speed) with an external static pressure which exceeds 0.8 inches w.c. may result in erratic limit operation.

Supply Air Plenum

If the furnace is installed without a cooling coil, a removable access panel should be installed in the supply air duct. The access panel should be large enough to permit inspection (by reflected light) of the heat exchanger for leaks after the furnace is installed. If present, this access panel must always be in place when the furnace is operating and it must not allow leaks into the supply air duct system.

Return Air Plenum

Return air must not be drawn from a room where this furnace, or any other gas-fueled appliance (i.e., water heater), or carbon monoxide-producing device (i.e., wood fireplace) is installed. When return air is drawn from a room, a negative pressure is created in the room. If a gas appliance is operating in a room with negative pressure, the flue products can be pulled back down the vent pipe and into the room. This reverse flow of the flue gas may result in incomplete combustion and the formation of carbon monoxide gas. This toxic gas might then be distributed throughout the house by the furnace duct system.

Return air can be brought in through the bottom or either side of the furnace (return air brought in through either side of the furnace allowed in upflow applications only). If a furnace with bottom return air is installed on a platform, make an airtight seal between the bottom of the furnace and the platform to ensure that the unit operates properly and safely. Use fiberglass sealing strips, caulking, or equivalent sealing method between the plenum and the furnace cabinet to ensure a tight seal. If a filter is installed, size the return air duct to fit the filter frame.

Pipe & Fittings Specifications

All pipe, fittings, primer and solvent cement must conform with American National Standard Institute and the American Society for Testing and Materials (ANSI/ASTM) standards. The solvent shall be free-flowing and contain no lumps, undissolved particles or any foreign matter that adversely affects the joint strength or chemical resistance of the cement. The cement shall show no gelation, stratification, or separation that cannot be removed by stirring. Refer to table 2 for approved piping and fitting materials.

**TABLE 2
PIPING AND FITTINGS SPECIFICATIONS**

Schedule 40 PVC (Pipe)	D1785
Schedule 40 PVC (Cellular Core Pipe)	F891
Schedule 40 PVC (Fittings)	D2466
Schedule 40 CPVC (Pipe)	F441
Schedule 40 CPVC (Fittings)	F438
SDR-21 PVC or SDR-26 PVC (Pipe)	D2241
SDR-21 CPVC or SDR-26 CPVC (Pipe)	F442
Schedule 40 ABS Cellular Core DWV (Pipe)	F628
Schedule 40 ABS (Pipe)	D1527
Schedule 40 ABS (Fittings)	D2468
ABS-DWV (Drain Waste & Vent) (Pipe & Fittings)	D2661
PVC-DWV (Drain Waste & Vent) Pipe & Fittings)	D2665
PRIMER & SOLVENT CEMENT	ASTM SPECIFICATION
PVC & CPVC Primer	F656
PVC Solvent Cement	D2564
CPVC Solvent Cement	F493
ABS Solvent Cement	D2235
PVC/CPVC/ABS All Purpose Cement For Fittings & Pipe of the same material	D2564, D2235, F493
ABS to PVC or CPVC Transition Solvent Cement	D3138
CANADA PIPE & FITTING & SOLVENT CEMENT	MARKING
PVC & CPVC Pipe and Fittings	ULCS636
PVC & CPVC Solvent Cement	
ABS to PVC or CPVC Transition Cement	
POLYPROPYLENE VENTING SYSTEM	ULC-S636
PolyPro by Duravent	

CAUTION

Solvent cements for plastic pipe are flammable liquids and should be kept away from all sources of ignition. Do not use excessive amounts of solvent cement when making joints. Good ventilation should be maintained to reduce fire hazard and to minimize breathing of solvent vapors. Avoid contact of cement with skin and eyes.

IMPORTANT

SLP98UHV exhaust and intake connections are made of PVC. Use PVC primer and solvent cement when using PVC vent pipe. When using ABS vent pipe, use transitional solvent cement to make connections to the PVC fittings in the unit.

Use PVC primer and solvent cement or ABS solvent cement meeting ASTM specifications, refer to Table 2. As an alternate, use all purpose cement, to bond ABS, PVC, or CPVC pipe when using fittings and pipe made of the same materials. Use transition solvent cement when bonding ABS to either PVC or CPVC.

Low temperature solvent cement is recommended. Metal or plastic strapping may be used for vent pipe hangers. Uniformly apply a liberal coat of PVC primer for PVC

**TABLE 3
OUTDOOR TERMINATION USAGE***

Input Size	Vent Pipe Dia. in.	STANDARD					CONCENTRIC		
		Flush-Mount Kit	Wall Kit		Wall Ring Kit	Field Fabricated	1-1/2 inch	2 inch	3 inch
			2 inch	3 inch	2 inch				
		51W11 (US) 51W12 (CA)	22G44 (US) 430G28 (CA)	44J40 (US) 481J20 (CA)	15F74		71M80 (US) 444W92 (CA)	69M29 (US) 444W92 (CA)	60L46 (US) 444W93 (CA)
045	2	³ YES	YES	¹ YES	¹ YES	⁵ YES	² YES		
	2-1/2	³ YES	YES	¹ YES	¹ YES	⁵ YES	² YES		
	3	³ YES	YES	¹ YES	¹ YES	⁵ YES	² YES		
070	2	³ YES	YES	¹ YES	¹ YES	⁵ YES	² YES		
	2-1/2	³ YES	YES	¹ YES	¹ YES	⁵ YES	² YES		
	3	³ YES	YES	¹ YES	¹ YES	⁵ YES	² YES		
090	2	³ YES		YES	YES	⁵ YES		YES	YES
	2-1/2	³ YES		YES	YES	⁵ YES		YES	YES
	3	³ YES		YES	YES	⁵ YES		YES	YES
110	2	YES		YES	YES	⁵ YES		YES	YES
	2-1/2	YES		YES		⁵ YES		YES	YES
	3	YES		YES		⁵ YES		YES	YES
135	3	YES		YES		⁵ YES			YES

NOTE - Standard Terminations do not include any vent pipe or elbows external to the structure. Any vent pipe or elbows external to the structure must be included in total vent length calculations. See vent length tables.

* Kits must be properly installed according to kit instructions.

¹Requires field-provided outdoor 1-1/2" exhaust accelerator.

²Concentric kits 71M80 and 44W92 include 1-1/2" outdoor accelerator, when used with 045 and 070 input models.

³Flush mount kits 51W11 and 51W12 includes 1-1/2 in. outdoor exhaust accelerator, required when used with 045, 070 and 090 input models.


⁴Termination kits 30G28, 44W92, 4493 and 81J20 are certified to ULC S636 for use in Canada only.

⁵See table 7 for vent accelerator requirements.

Joint Cementing Procedure

All cementing of joints should be done according to the specifications outlined in ASTM D 2855.

NOTE - A sheet metal screw may be used to secure the intake pipe to the connector, if desired. Use a drill or self tapping screw to make a pilot hole.



DANGER

DANGER OF EXPLOSION!

Fumes from PVC glue may ignite during system check. Allow fumes to dissipate for at least 5 minutes before placing unit into operation.

1 - Measure and cut vent pipe to desired length.

2 - Debur and chamfer end of pipe, removing any ridges or rough edges. If end is not chamfered, edge of pipe may remove cement from fitting socket and result in a leaking joint.

NOTE - Check the inside of vent pipe thoroughly for any obstruction that may alter furnace operation.

- 3 - Clean and dry surfaces to be joined.
- 4 - Test fit joint and mark depth of fitting on outside of pipe.
- 5 - Uniformly apply a liberal coat of PVC primer for PVC or use a clean dry cloth for ABS to clean inside socket surface of fitting and male end of pipe to depth of fitting socket.

- Promptly apply solvent cement to end of pipe and inside socket surface of fitting. Cement should be applied lightly but uniformly to inside of socket. Take care to keep excess cement out of socket. Apply second coat to end of pipe.

NOTE - Time is critical at this stage. Do not allow primer to dry before applying cement.

- Immediately after applying last coat of cement to pipe, and while both inside socket surface and end of pipe are wet with cement, forcefully insert end of pipe into socket until it bottoms out. Turn PVC pipe 1/4 turn during assembly (but not after pipe is fully inserted) to distribute cement evenly. DO NOT turn ABS or cellular core pipe.

NOTE - Assembly should be completed within 20 seconds after last application of cement. Hammer blows should not be used when inserting pipe.

- After assembly, wipe excess cement from pipe at end of fitting socket. A properly made joint will show a bead around its entire perimeter. Any gaps may indicate a defective assembly due to insufficient solvent.
- Handle joints carefully until completely set.

Venting Practices

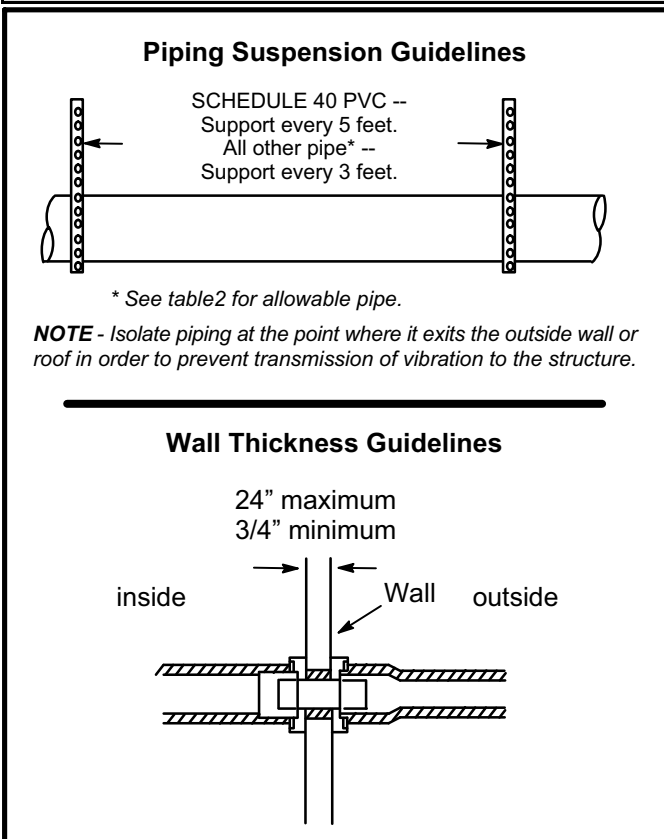


FIGURE 14

- In areas where piping penetrates joists or interior walls, hole must be large enough to allow clearance on all sides of pipe through center of hole using a hanger.
- When furnace is installed in a residence where unit is shut down for an extended period of time, such as a vacation home, make provisions for draining condensate collection trap and lines.

Exhaust Piping (Figures 18 and 19)

- Route piping to outside of structure. Continue with installation following instructions given in piping termination section.

Intake Piping (Figures 18 and 19)

The SLP98UHV furnace may be installed only in **direct vent** applications.

The SLP98UHV is designed for combustion air intake through an inlet in the unit's top cap. Intake air piping is independent of exhaust piping.

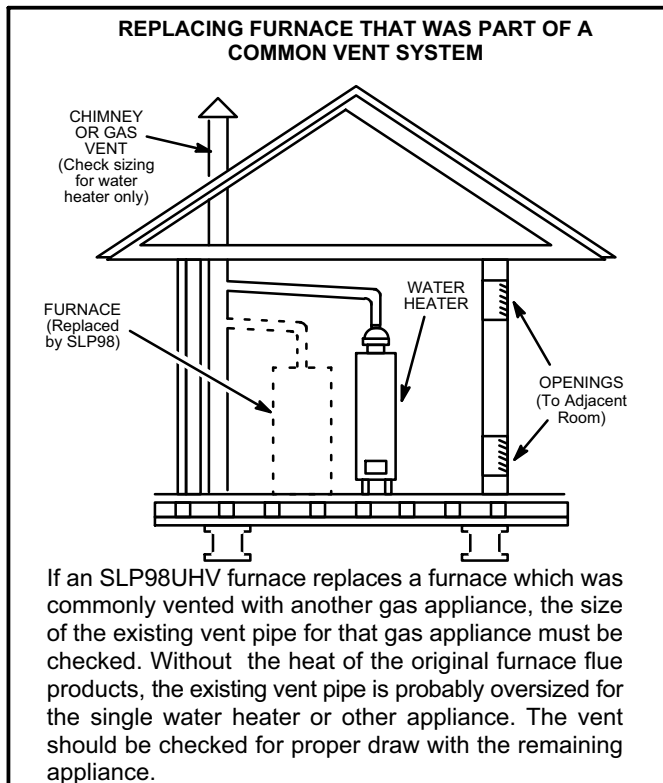


FIGURE 15

CAUTION

Do not discharge exhaust into an existing stack or stack that also serves another gas appliance. If vertical discharge through an existing unused stack is required, insert PVC pipe inside the stack until the end is even with the top or outlet end of the metal stack.

CAUTION

The exhaust vent pipe operates under positive pressure and must be completely sealed to prevent leakage of combustion products into the living space.

Vent Piping Guidelines

NOTE - Lennox has approved the use of DuraVent® manufactured vent pipe and terminations as an option to PVC. When using the PolyPro® by DuraVent venting system the vent pipe requirements stated in the unit installation instruction – minimum & maximum vent lengths, termination

clearances, etc. – apply and must be followed. Follow the instructions provided with PoyPro by DuraVent venting system for assembly or if requirements are more restrictive. The PolyPro by Duravent venting system must also follow the uninsulated and unconditioned space criteria listed in table 6.

The SLP98UHV is installed only as a Direct Vent gas central furnace.

NOTE - In Direct Vent installations, combustion air is taken from outdoors and flue gases are discharged outdoors.

Intake and exhaust pipe sizing -- Size pipe according to tables 4 and 5. Count all elbows inside and outside the home. Table 4 lists the *minimum* vent pipe lengths permitted. Table 5 lists the *maximum* pipe lengths permitted.

Regardless of the diameter of pipe used, the standard roof and wall terminations described in section *Exhaust Piping Terminations* should be used. Exhaust vent termination pipe is sized to optimize the velocity of the exhaust gas as it exits the termination. Refer to table 7.

In some applications which permit the use of several different sizes of vent pipe, a combination vent pipe may be used. Contact Lennox' Application Department for assistance in sizing vent pipe in these applications.

Use the steps in figure 17 to correctly size vent pipe diameter.

NOTE - It is acceptable to use any pipe size which fits within the guidelines allowed in table 5.

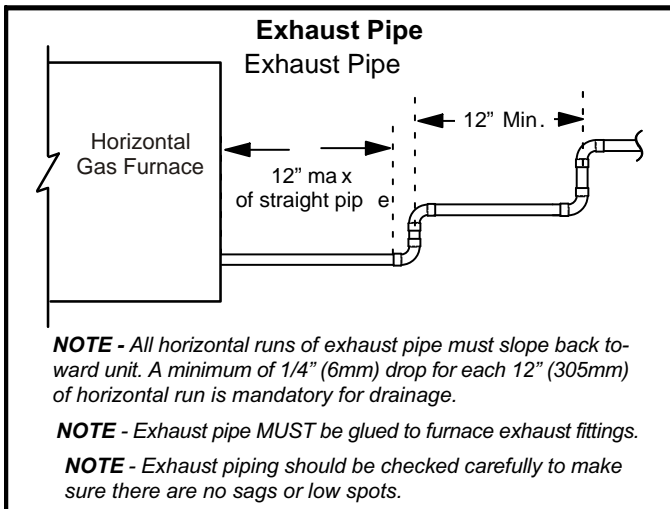


FIGURE 16

NOTE - The exhaust collar on all models is sized to accommodate 2" Schedule 40 vent pipe. In horizontal applications, any transition to exhaust pipe larger than 2" must be made in vertical runs of the pipe. Therefore a 2" elbow must be added before the pipe is transitioned to any size larger than 2". This elbow must be added to the elbow count used to determine acceptable vent lengths. Contact the Application Department for more information concerning sizing of vent systems which include multiple pipe sizes.

IMPORTANT

Do not use screens or perforated metal in exhaust or intake terminations. Doing so will cause freeze-ups and may block the terminations.

Piping Size Process

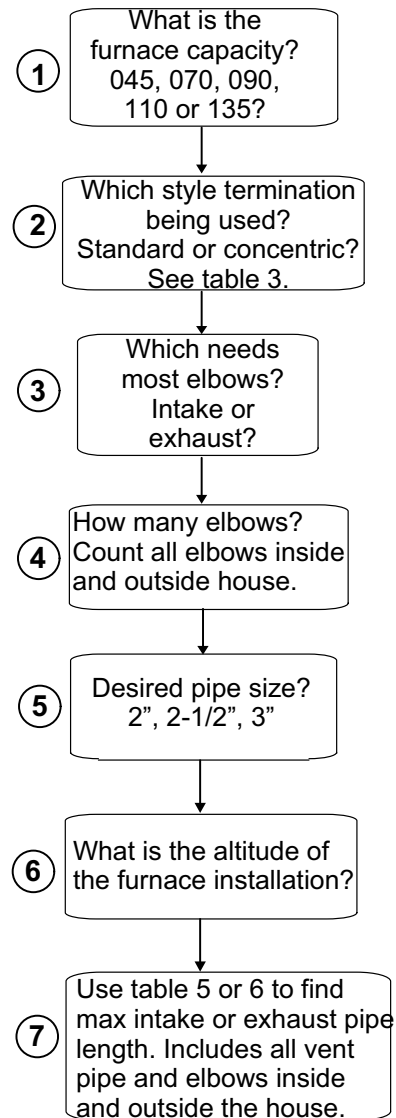


FIGURE 17

TABLE 4
MINIMUM VENT PIPE LENGTHS

SLP98UHV MODEL	MIN. EQUIV. VENT LENGTH	EXAMPLE
070, 090, 110	15 ft.*	5 ft. plus 2 elbows of 2", 2-1/2" or 3" diameter pipe
135		5 ft. plus 2 elbows of 3" diameter pipe

*Any approved termination may be added to the minimum equivalent length listed.

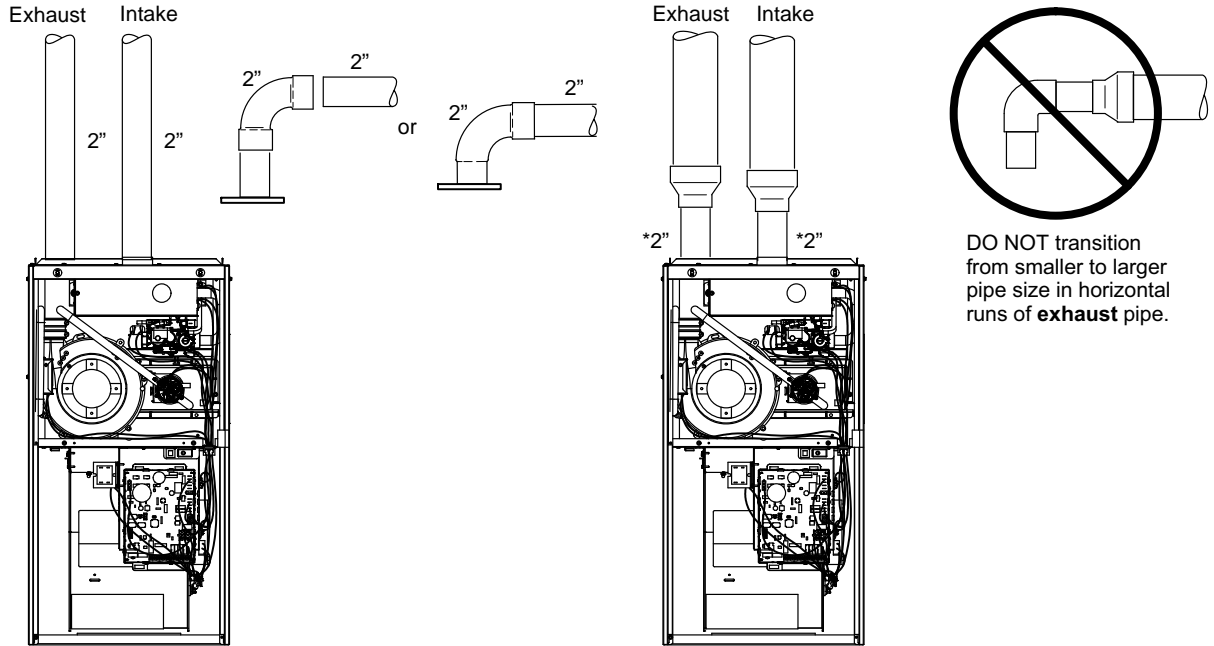
TABLE 5
Maximum Allowable Intake or Exhaust Vent Length in Feet

*Size intake and exhaust pipe length separately. Values in table are for Intake OR Exhaust, not combined total. Both Intake and Exhaust must be same pipe size.

NOTE - Additional vent pipe and elbows used to terminate the vent pipe outside the structure must be included in the total vent length calculation.

Standard Termination at Elevation 0 - 7500'												
Number Of 90° Elbows Used	2" Pipe				2-1/2" Pipe				3" Pipe			
	Model				Model				Model			
	070	090	110	135	070	090	110	135	070	090	110	135
1	91	69	14	n/a	140	93	43	n/a	162	143	118	114
2	86	64	9		135	88	38		157	138	113	109
3	81	59	n/a		130	83	33		152	133	108	104
4	76	54			125	78	28		147	128	103	99
5	71	49			120	73	23		142	123	98	94
6	66	44			115	68	18		137	118	93	89
7	61	39			110	63	13		132	113	88	84
8	56	34			105	58	n/a		127	108	83	79
9	51	29			100	53			122	103	78	74
10	46	24			95	48	117		98	73	69	
Standard Termination at Elevation 7501' - 10,000'												
Number Of 90° Elbows Used	2" Pipe				2-1/2" Pipe				3" Pipe			
	Model				Model				Model			
	070	090	110	135	070	090	110	135	070	090	110	135
1	66	44	n/a	n/a	115	68	n/a	n/a	137	118	93	89
2	61	39			110	63			132	113	88	84
3	56	34			105	58			127	108	83	79
4	51	29			100	53			122	103	78	74
5	46	24			95	48			117	98	73	69
6	41	19			90	43			112	93	68	64
7	36	14			85	38			107	88	63	59
8	31	n/a			80	33			102	83	58	54
9	26				75	28			97	78	53	49
10	21				70	23			92	73	48	44
Concentric Termination at Elevation 0 - 7500'												
Number Of 90° Ebows Used	2" Pipe				2-1/2" Pipe				3" Pipe			
	Mode				Model				Model			
	070	090	110	135	070	090	110	135	070	090	110	135
1	83	67	12	n/a	130	89	39	n/a	146	139	114	105
2	78	62	7		125	84	34		141	134	109	100
3	73	57	n/a		120	79	29		136	129	104	95
4	68	52			115	74	24		131	124	99	90
5	63	47			110	69	19		126	119	94	85
6	58	42			105	64	14		121	114	89	80
7	53	37			100	59	n/a		116	109	84	75
8	48	32			95	54			111	104	79	70
9	43	27			90	49			106	99	74	65
10	38	22			85	44	101		94	69	60	
Concentric Termination at Elevation 7501' - 10,000'												
Number Of 90° Elbows Used	2" Pipe				2-1/2" Pipe				3" Pipe			
	Model				Model				Model			
	070	090	110	135	070	090	110	135	070	090	110	135
1	58	42	n/a	n/a	105	64	n/a	n/a	121	114	89	80
2	53	37			100	59			116	109	84	75
3	48	32			95	54			111	104	79	70
4	43	27			90	49			106	99	74	65
5	38	22			85	44			101	94	69	60
6	33	17			80	39			96	89	64	55
7	28	12			75	34			91	84	59	50
8	23	n/a			70	29			86	79	54	45
9	18				65	24			81	74	49	40
10	13				60	19			76	69	44	35

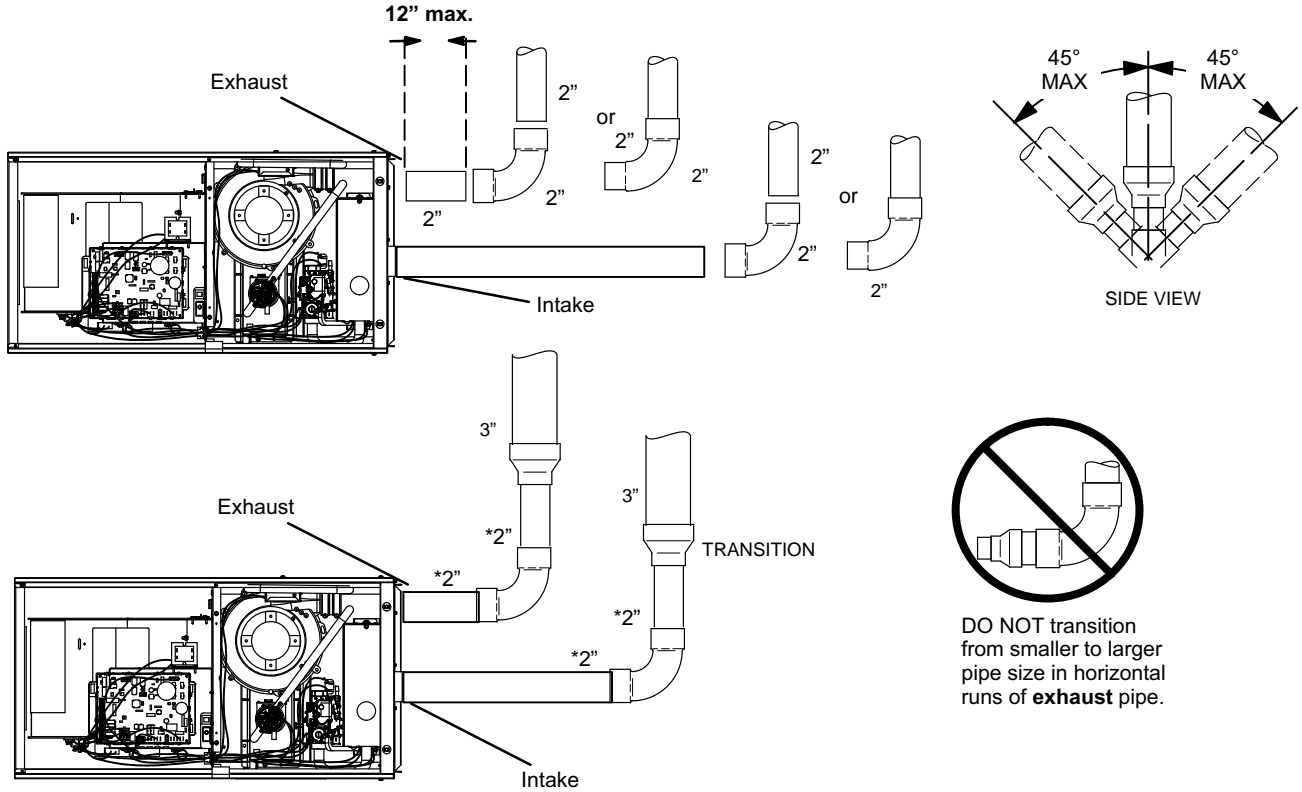
TYPICAL EXHAUST AND INTAKE PIPE CONNECTIONS IN UPFLOW APPLICATIONS



* When transitioning up in pipe size, use the shortest length of 2" PVC pipe possible.

FIGURE 18

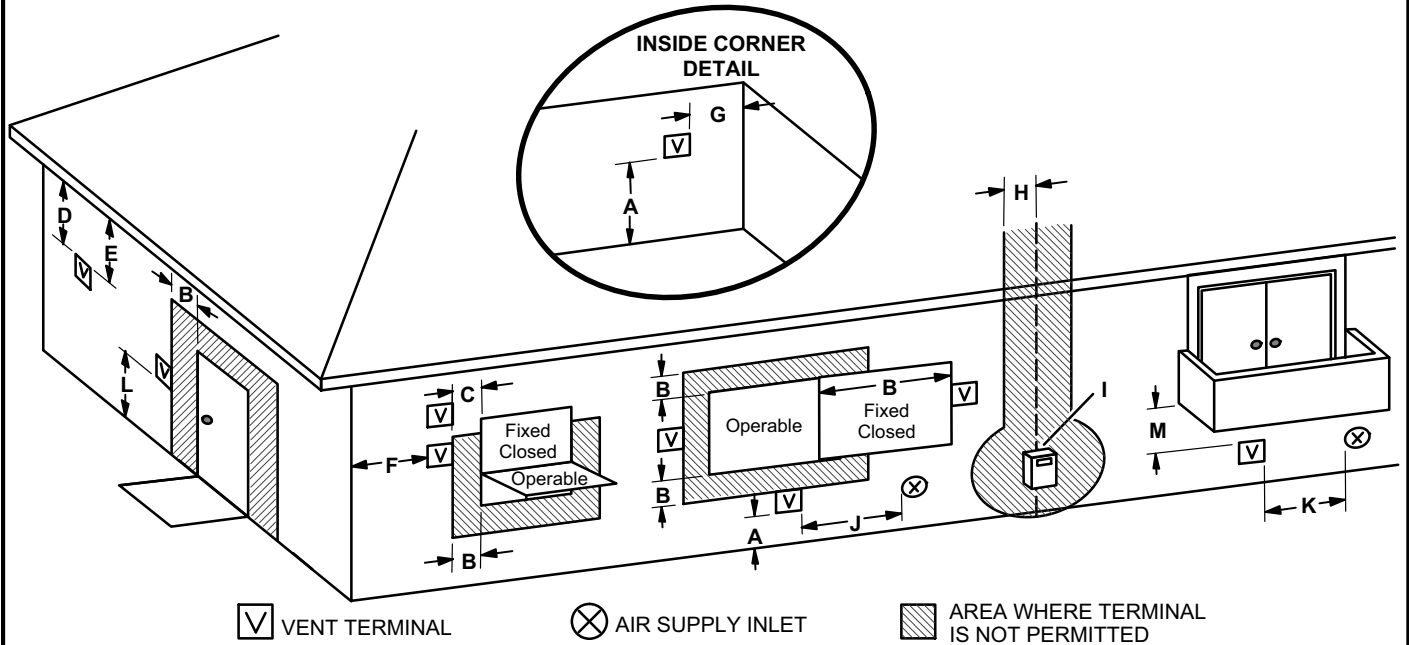
TYPICAL EXHAUST AND INTAKE PIPE CONNECTIONS IN HORIZONTAL AIR APPLICATIONS (RIGHT HAND DISCHARGE SHOWN)



* When transitioning up in pipe size, use the shortest length of 2" PVC pipe possible.

FIGURE 19

VENT TERMINATION CLEARANCES FOR DIRECT VENT INSTALLATIONS IN THE USA AND CANADA



	US Installations ¹	Canadian Installations ²	
A =	Clearance above grade, veranda, porch, deck or balcony	12 inches (305mm) or 12 in. (305mm) above average snow accumulation.	12 inches (305mm) or 12 in. (305mm) above average snow accumulation.
B =	Clearance to window or door that may be opened	6 inches (152mm) for appliances <10,000 Btuh (3kw), 9 inches (228mm) for appliances > 10,000 Btuh (3kw) and <50,000 Btuh (15 kw), 12 inches (305mm) for appliances > 50,000 Btuh (15kw)	6 inches (152mm) for appliances <10,000 Btuh (3kw), 12 inches (305mm) for appliances > 10,000 Btuh (3kw) and <100,000 Btuh (30kw), 36 inches (.9m) for appliances > 100,000 Btuh (30kw)
C =	Clearance to permanently closed window	* 12"	* 12"
D =	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (610mm) from the center line of the terminal	* Equal to or greater than soffit depth	* Equal to or greater than soffit depth
E =	Clearance to unventilated soffit	* Equal to or greater than soffit depth	* Equal to or greater than soffit depth
F =	Clearance to outside corner	* No minimum to outside corner	* No minimum to outside corner
G =	Clearance to inside corner	*	*
H =	Clearance to each side of center line extended above meter / regulator assembly	3 feet (.9m) within a height 15 feet (4.5m) above the meter / regulator assembly	3 feet (.9m) within a height 15 feet (4.5m) above the meter / regulator assembly
I =	Clearance to service regulator vent outlet	* 3 feet (.9m)	3 feet (.9m)
J =	Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance	6 inches (152mm) for appliances <10,000 Btuh (3kw), 9 inches (228mm) for appliances > 10,000 Btuh (3kw) and <50,000 Btuh (15 kw), 12 inches (305mm) for appliances > 50,000 Btuh (15kw)	6 inches (152mm) for appliances <10,000 Btuh (3kw), 12 inches (305mm) for appliances > 10,000 Btuh (3kw) and <100,000 Btuh (30kw), 36 inches (.9m) for appliances > 100,000 Btuh (30kw)
K =	Clearance to mechanical air supply inlet	3 feet (.9m) above if within 10 feet (3m) horizontally	6 feet (1.8m)
L =	Clearance above paved sidewalk or paved driveway located on public property	* 7 feet (2.1m)	7 feet (2.1m)†
M =	Clearance under veranda, porch, deck or balcony	*12 inches (305mm)‡	12 inches (305mm)‡

¹ In accordance with the current ANSI Z223.1/NFPA 54 Natural Fuel Gas Code

² In accordance with the current CSA B149.1, Natural Gas and Propane Installation Code

† A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.

‡ Permitted only if veranda, porch, deck or balcony is fully open on a minimum of two sides beneath the floor. Lennox recommends avoiding this location if possible.

*For clearances not specified in ANSI Z223.1/NFPA 54 or CSA B149.1, clearance will be in accordance with local installation codes and the requirements of the gas supplier and these installation instructions."

FIGURE 20

General Guidelines for Vent Terminations

In Direct Vent applications, combustion air is taken from outdoors and the flue gases are discharged to the outdoors. The SLP98UHV is classified as a direct vent, Category IV gas furnace.

In Direct Vent applications, the vent termination is limited by local building codes. In the absence of local codes, refer to the current National Fuel Gas Code ANSI Z223-1/NFPA 54 in U.S.A., and current CSA-B149 Natural Gas and Propane Installation Codes in Canada for details.

Position termination according to location given in figure 20. In addition, position termination so it is free from any obstructions and 12" above the average snow accumulation.

At vent termination, care must be taken to maintain protective coatings over building materials (prolonged exposure to exhaust condensate can destroy protective coatings). It is recommended that the exhaust outlet not be located within 6 feet (1.8m) of an outdoor AC unit because the condensate can damage the painted coating.

NOTE - See table 6 for maximum allowed exhaust pipe length without insulation in unconditioned space during winter design temperatures below 32°F (0°C). If required

exhaust pipe should be insulated with 1/2" (13mm) Armaflex or equivalent. In extreme cold climate areas, 3/4" (19mm) Armaflex or equivalent may be necessary. Insulation must be protected from deterioration. Armaflex with UV protection is permissible. Basements or other enclosed areas that are not exposed to the outdoor ambient temperature and are above 32 degrees F (0°C) are to be considered conditioned spaces.

IMPORTANT

Do not use screens or perforated metal in exhaust terminations. Doing so will cause freeze-ups and may block the terminations.

IMPORTANT

**For Canadian Installations Only:
In accordance to CSA International B149 installation codes, the minimum allowed distance between the combustion air intake inlet and the exhaust outlet of other appliances shall not be less than 12 inches (305mm).**

TABLE 6
Maximum Allowable Vent Pipe Length (in ft.) Without Insulation In Unconditioned Space For
Winter Design Temperatures Modulating High Efficiency Furnace

Winter Design Temperatures ¹ °F (°C)	Vent Pipe Diameter	Unit Input Size							
		070		090		110		135	
		PVC	2PP	PVC	2PP	PVC	2PP	PVC	2PP
32 to 21 (0 to -6)	2 in.	8	8	14	13	16	15	N/A	N/A
	2-1/2 in.	6	N/A	9	N/A	12	N/A	N/A	N/A
	3 in.	4	3	6	5	8	7	12	11
20 to 1 (-7 to -17)	2 in.	5	5	7	6	8	7	N/A	N/A
	2-1/2 in.	4	N/A	5	N/A	6	N/A	N/A	N/A
	3 in.	2	2	2	2	4	3	6	5
0 to -20 (-18 to -29)	2 in.	3	3	4	4	5	4	N/A	N/A
	2-1/2 in.	2	N/A	2	N/A	3	N/A	N/A	N/A
	3 in.	1	1	1	1	1	1	2	1

¹Refer to 99% Minimum Design Temperature table provided in the current edition of the ASHRAE Fundamentals Handbook.

² Poly-Propylene vent pipe (PP)

NOTE - Maximum uninsulated vent lengths listed may include the termination (vent pipe exterior to the structure) and cannot exceed 5 linear feet or the maximum allowable intake or exhaust vent length listed in table 5 or which ever is less.

NOTE - If insulation is required in an unconditioned space, it must be located on the pipe closest to the furnace. See figure 21.

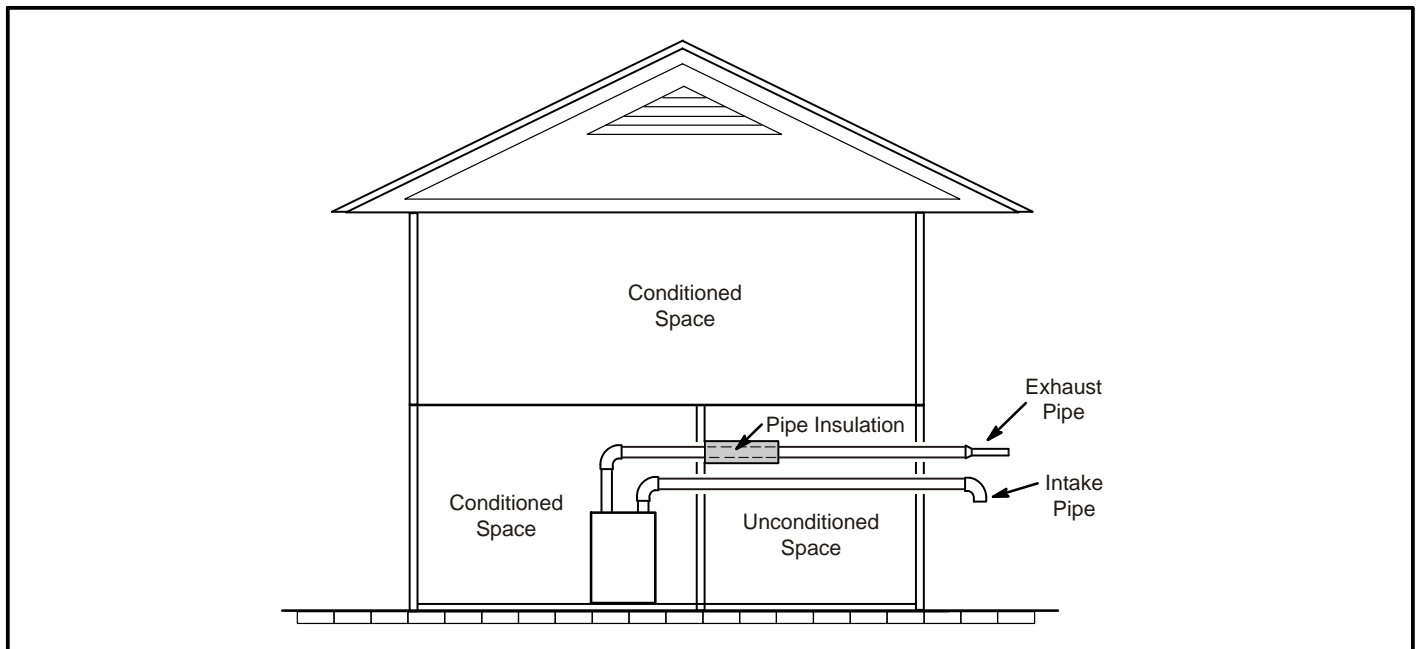


FIGURE 21

Details of Intake and Exhaust Piping Terminations for Direct Vent Installations

NOTE - In Direct Vent installations, combustion air is taken from outdoors and flue gases are discharged to outdoors.

NOTE - Flue gas may be slightly acidic and may adversely affect some building materials. If any vent termination is used and the flue gasses may impinge on the building material, a corrosion-resistant shield (minimum 24 inches square) should be used to protect the wall surface. If the optional tee is used, the protective shield is recommended. The shield should be constructed using wood, plastic, sheet metal or other suitable material. All seams, joints, cracks, etc. in the affected area should be sealed using an appropriate sealant. See figure 29.

Intake and exhaust pipes may be routed either horizontally through an outside wall or vertically through the roof. In attic or closet installations, vertical termination through the roof is preferred. Figures 22 through 30 show typical terminations.

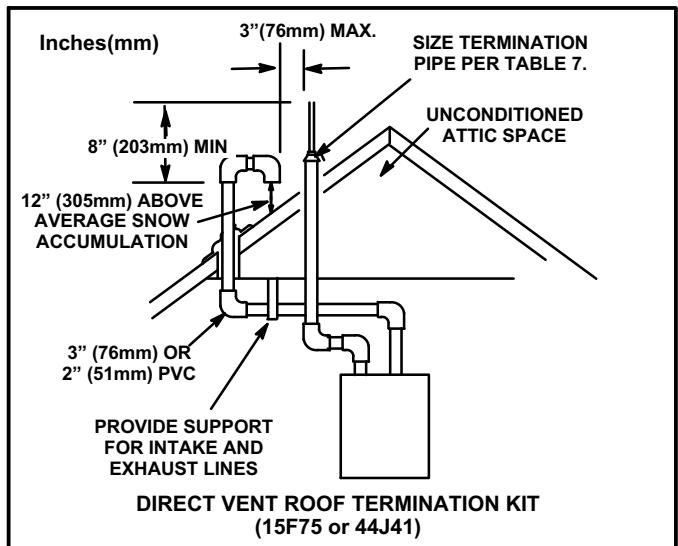


FIGURE 22

1 - Intake and exhaust terminations are not required to be in the same pressure zone. You may exit the intake on one side of the structure and the exhaust on another side (figure 23). You may exit the exhaust out the roof and the intake out the side of the structure (figure 24).

2 - Intake and exhaust pipes should be placed as close together as possible at termination end (refer to illustrations). Maximum separation is 3" (76mm) on roof terminations and 6" (152mm) on side wall terminations.

NOTE - When venting in different pressure zones, the maximum separation requirement of intake and exhaust pipe DOES NOT apply.

3 - On roof terminations, the intake piping should terminate straight down using two 90° elbows (See figure 22).

4 - Exhaust piping must terminate straight out or up as shown. A reducer may be required on the exhaust piping at the point where it exits the structure to improve the velocity of exhaust away from the intake piping. See table 7.

NOTE - Care must be taken to avoid recirculation of exhaust back into intake pipe.

5 - On field-supplied terminations for side wall exit, exhaust piping may extend a maximum of 12 inches (305mm) for 2" PVC and 20 inches (508mm) for 3" (76mm) PVC beyond the outside wall. Intake piping should be as short as possible. See figure 29.

6 - On field-supplied terminations, a minimum distance between the end of the exhaust pipe and the end of the intake pipe without a termination elbow is 8" and a minimum distance of 6" with a termination elbow. See figure 29.

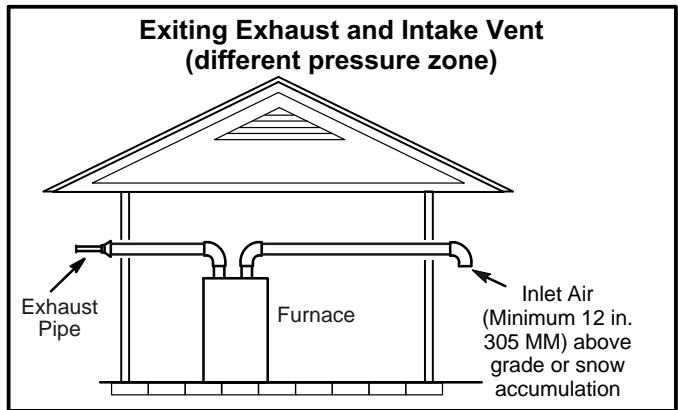


FIGURE 23

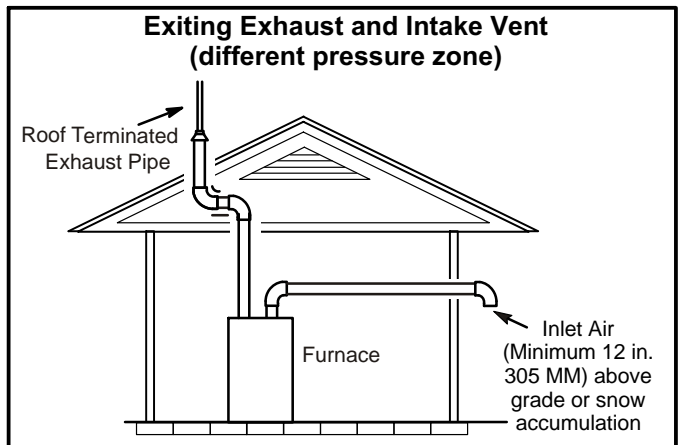


FIGURE 24

**TABLE 7
EXHAUST PIPE TERMINATION SIZE REDUCTION**

SLP98UHV MODEL	Termination Pipe Size
*070	1-1/2"
*090	2"
110	2"
135	2"

*SLP98UH-070 and -090 units with the flush-mount termination must use the 1-1/2" accelerator supplied with the kit.

- 7 - If intake and exhaust piping must be run up a side wall to position above snow accumulation or other obstructions, piping must be supported. At least one bracket must be used within 6" from the top of the elbow and then every 24" (610mm) as shown in figure 29, to prevent any movement in any direction. When exhaust and intake piping must be run up an outside wall, the exhaust piping must be terminated with pipe sized per table 7. The intake piping may be equipped with a 90° elbow turndown. Using turndown will add 5 feet (1.5m) to the equivalent length of the pip
- 8 - Based on the recommendation of the manufacturer, a multiple furnace installation may use a group of up to four terminations assembled together horizontally, as shown in figure 27.

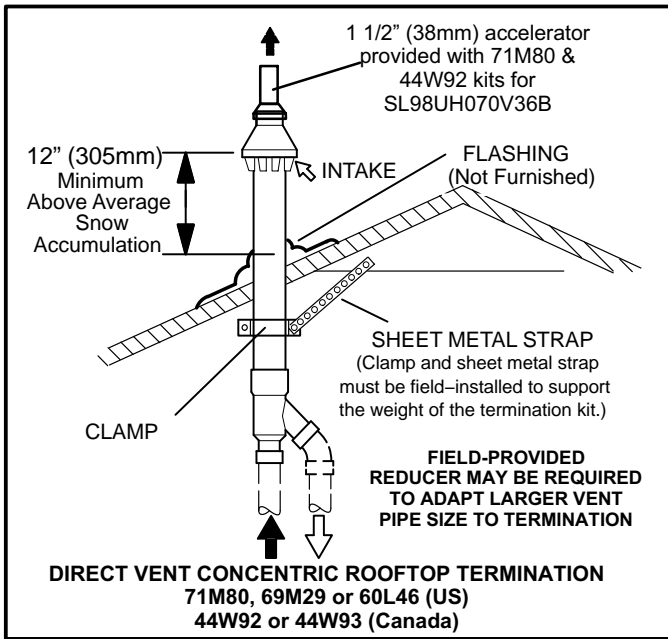


FIGURE 25

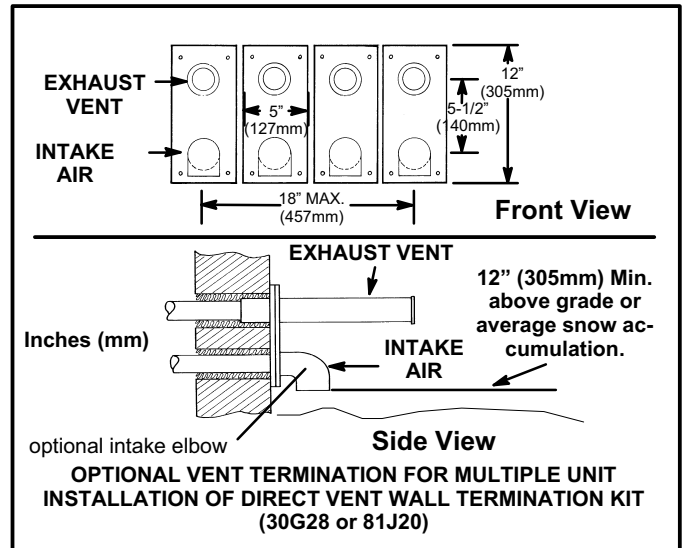


FIGURE 27

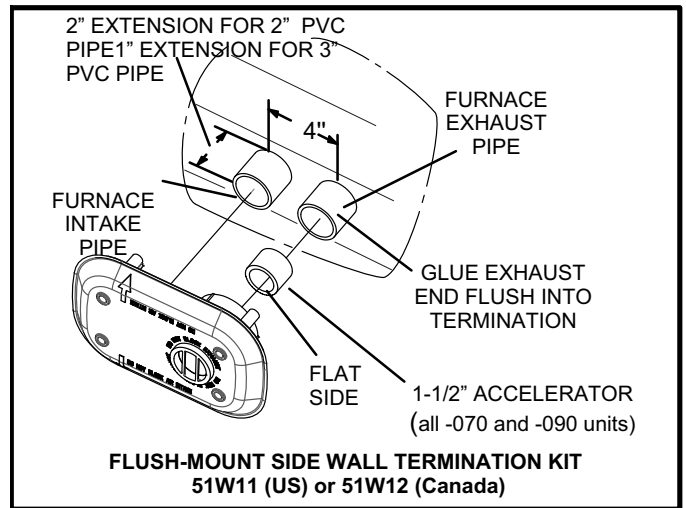


FIGURE 28

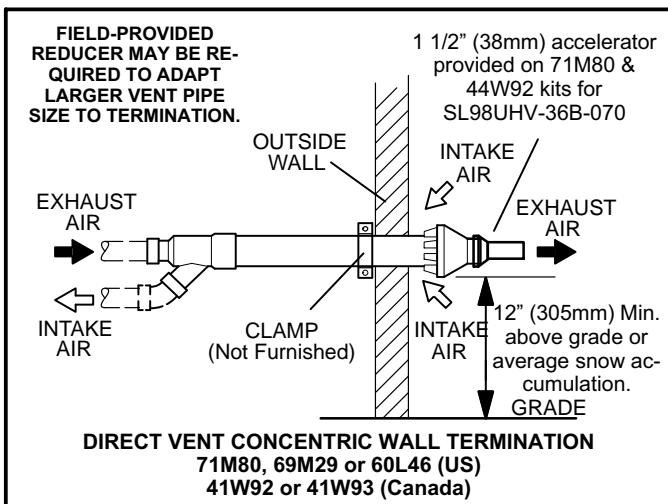
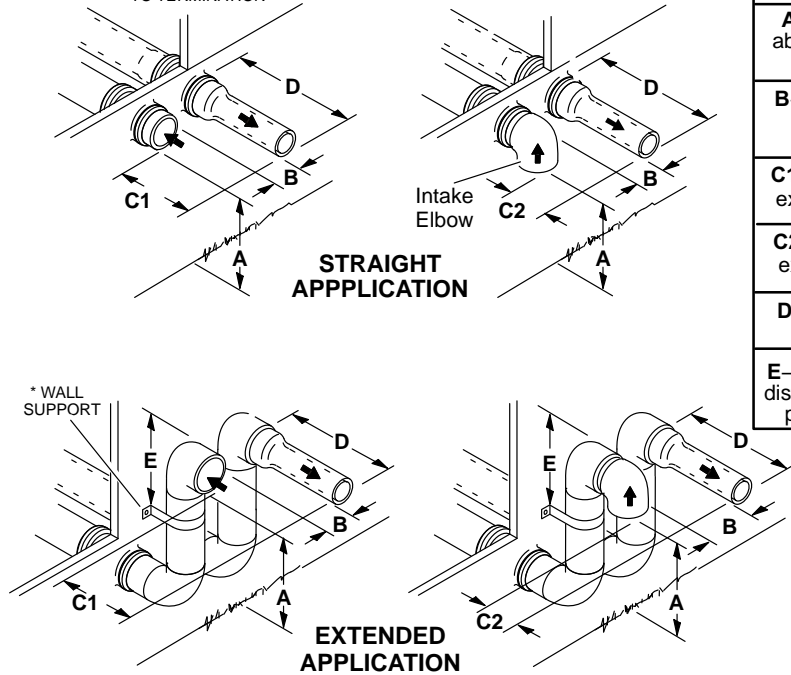


FIGURE 26

FIELD FABRICATED WALL TERMINATION

NOTE – FIELD-PROVIDED REDUCER MAY BE REQUIRED TO ADAPT LARGER VENT PIPE SIZE TO TERMINATION



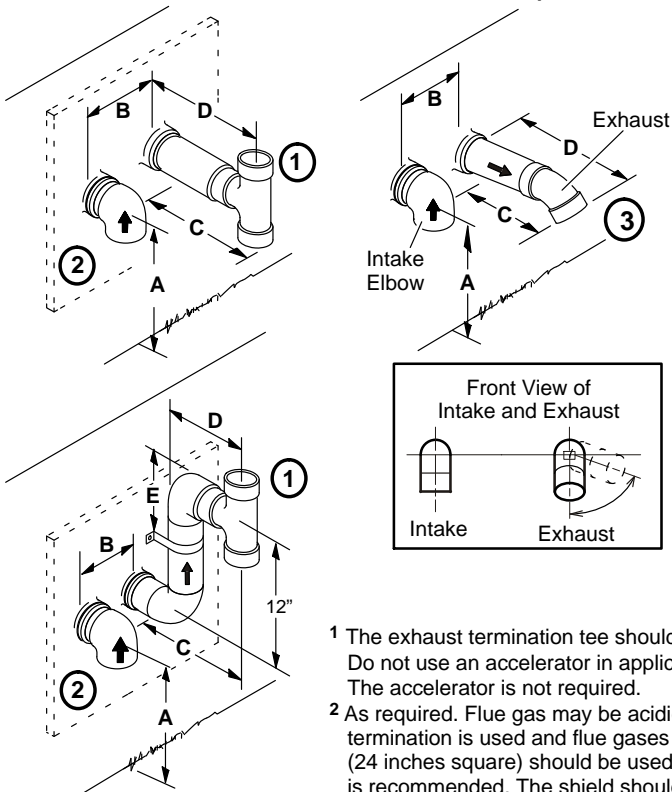
	2" (51mm) Vent Pipe	3" (76mm) Vent Pipe
A – Minimum clearance above grade or average snow accumulation	12" (305 mm)	12" (305 mm)
B – Maximum horizontal separation between intake and exhaust	6" (152 mm)	6" (152 mm)
C1 -Minimum from end of exhaust to inlet of intake	8" (203 mm)	8" (203 mm)
C2 -Minimum from end of exhaust to inlet of intake	6" (152 mm)	6" (152 mm)
D – Maximum exhaust pipe length	12" (305 mm)	20" (508 mm)
E – Maximum wall support distance from top of each pipe (intake/exhaust)	6" (152 mm)	6" (152 mm)

See venting table 5 for maximum venting lengths with this arrangement.

* Use wall support every 24" (610 mm). Use two wall supports if extension is greater than 24" (610 mm) but less than 48" (1219 mm).

NOTE – One wall support must be within 6" (152 mm) from top of each pipe (intake and exhaust) to prevent movement in any direction.

ALTERNATE TERMINATIONS (TEE & FORTY-FIVE DEGREE ELBOWS ONLY)

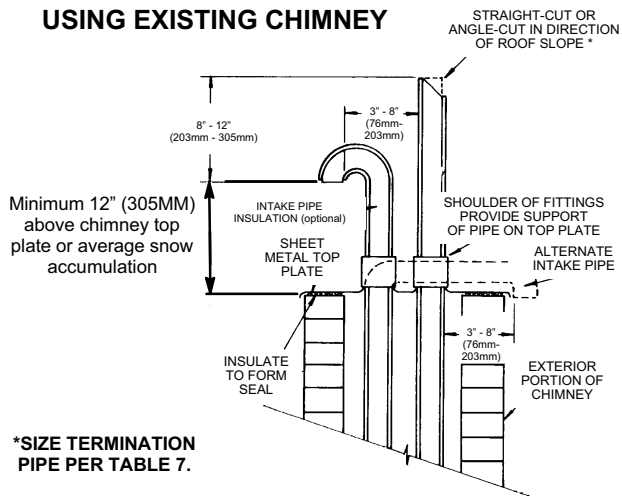


	2" (51MM) Vent Pipe	3" (76MM) Vent Pipe
A – Clearance above grade or average snow accumulation	12" (305 mm) Min.	12" (305 mm) Min.
B – Horizontal separation between intake and exhaust	6" (152 mm) Min. 24" (610 mm) Max.	6" (152 mm) Min. 24" (610 mm) Max.
C – Minimum from end of exhaust to inlet of intake	9" (227 mm) Min.	9" (227 mm) Min.
D – Exhaust pipe length	12" (305 mm) Min. 16" (405 mm) Max.	12" (305 mm) Min. 20" (508 mm) Max.
E – Wall support distance from top of each pipe (intake/exhaust)	6" (152 mm) Max.	6" (152 mm) Max.

- 1 The exhaust termination tee should be connected to the 2" or 3" PVC flue pipe as shown in the illustration. Do not use an accelerator in applications that include an exhaust termination tee. The accelerator is not required.
- 2 As required. Flue gas may be acidic and may adversely affect some building materials. If a side wall vent termination is used and flue gases will impinge on the building materials, a corrosion-resistant shield (24 inches square) should be used to protect the wall surface. If optional tee is used, the protective shield is recommended. The shield should be constructed using wood, sheet metal or other suitable material. All seams, joints, cracks, etc. in affected area, should be sealed using an appropriate sealant.
- 3 Exhaust pipe 45° elbow can be rotated to the side away from the combustion air inlet to direct exhaust away from adjacent property. The exhaust must never be directed toward the combustion air inlet.

FIGURE 29

SLP98 DIRECT VENT APPLICATION USING EXISTING CHIMNEY



*SIZE TERMINATION
PIPE PER TABLE 7.

NOTE - Do not discharge exhaust gases directly into any chimney or vent stack. If vertical discharge through an existing unused chimney or stack is required, insert piping inside chimney until the pipe open end is above top of chimney and terminate as illustrated. In any exterior portion of chimney, the exhaust vent must be insulated.

FIGURE 30

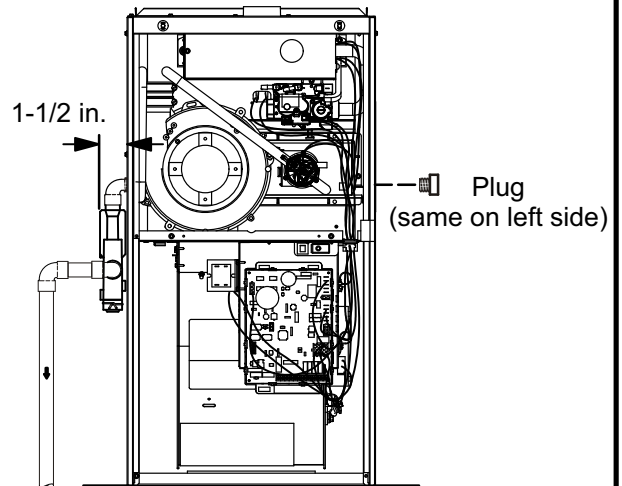
Condensate Piping

This unit is designed for either right- or left-side exit of condensate piping in upflow applications. In horizontal applications, the condensate trap must extend below the unit. An 8" service clearance is required for the condensate trap. Refer to figures 31 and 33 for condensate trap locations. Figure 39 shows trap assembly using 1/2" PVC or 3/4" PVC.

NOTE - If necessary the condensate trap may be installed up to 5' away from the furnace. Use PVC pipe to connect trap to furnace condensate outlet. Piping from furnace must slope down a minimum of 1/4" per ft. toward trap.

- 1 - Determine which side condensate piping will exit the unit, location of trap, field-provided fittings and length of PVC pipe required to reach available drain.
- 2 - Use a large flat head screw driver or a 1/2" drive socket extension and remove plug (figure 31) from the cold end header box at the appropriate location on the side of the unit. Install provided 3/4 NPT street elbow fitting into cold end header box. Use Teflon tape or appropriate pipe dope.
- 3 - Install the cap over the clean out opening at the base of the trap. Secure with clamp. See figure 39.
- 4 - Install drain trap using appropriate PVC fittings, glue all joints. Glue the provided drain trap as shown in figure 39. Route the condensate line to an open drain. Condensate line must maintain a 1/4" downward slope from the furnace to the drain.

CONDENSATE TRAP AND PLUG LOCATIONS (Unit shown in upflow position)



NOTE - In upflow applications where side return air filter is installed on same side as the condensate trap, filter rack must be installed beyond condensate trap or trap must be re-located to avoid interference.

FIGURE 31

- 5 - Figures 34 and 36 show the furnace and evaporator coil using a separate drain. If necessary the condensate line from the furnace and evaporator coil can drain together. See figures 35, 37 and 38.

Upflow furnace (figure 37) - In upflow furnace applications the field provided vent must be a minimum 1" to a maximum 2" length above the condensate drain outlet connection. Any length above 2" may result in a flooded heat exchanger if the combined primary drain line were to become restricted.

Horizontal furnace (figure 38) - In horizontal furnace applications the field provided vent must be a minimum 4" to a maximum 5" length above the condensate drain outlet connection. Any length above 5" may result in a flooded heat exchanger if the combined primary drain line were to become restricted.

NOTE - In horizontal applications it is recommended to install a secondary drain pan underneath the unit and trap assembly.

NOTE - Appropriately sized tubing and barbed fitting may be used for condensate drain. Attach to the drain on the trap using a hose clamp. See figure 32.

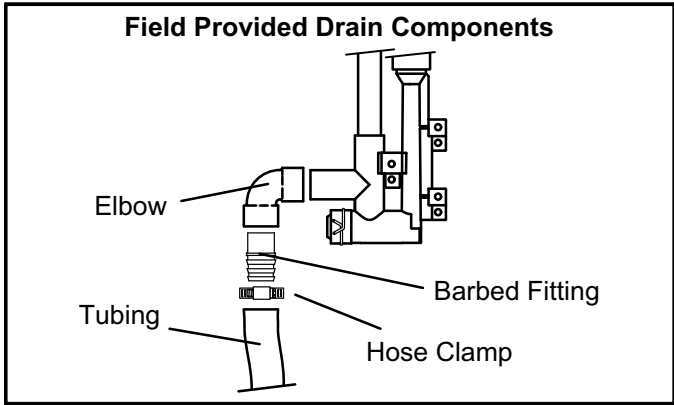


FIGURE 32

⚠ CAUTION

Do not use copper tubing or existing copper condensate lines for drain line.

6 - If unit will be started immediately upon completion of installation, prime trap per procedure outlined in Unit Start-Up section.

Condensate line must slope downward away from the trap to drain. If drain level is above condensate trap, condensate pump must be used. Condensate drain line should be routed within the conditioned space to avoid freezing of condensate and blockage of drain line. If this is not possible, a heat cable kit may be used on the condensate trap and line. Heating cable kit is available from Lennox in various lengths; 6 ft. (1.8m) - kit no. 26K68; 24 ft. (7.3m) - kit no. 26K69; and 50 ft. (15.2m) - kit no. 26K70.

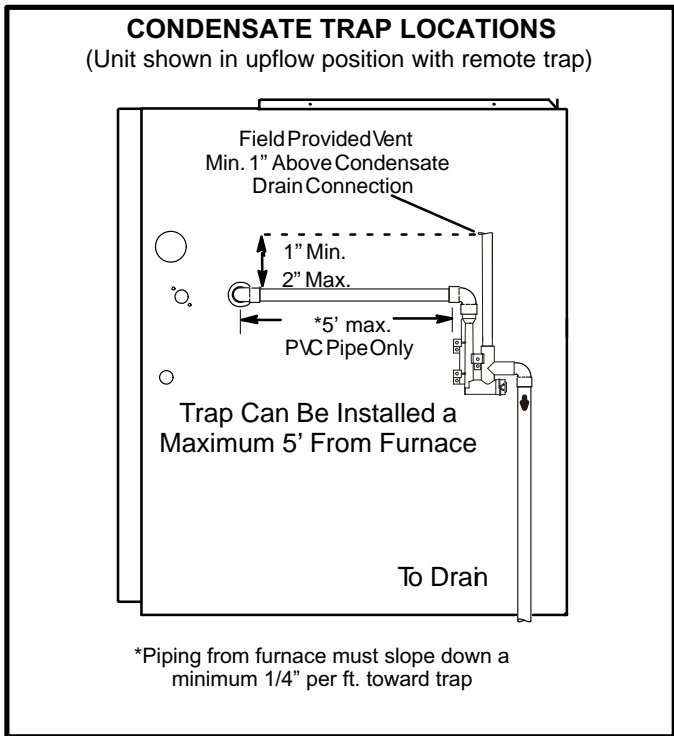


FIGURE 33

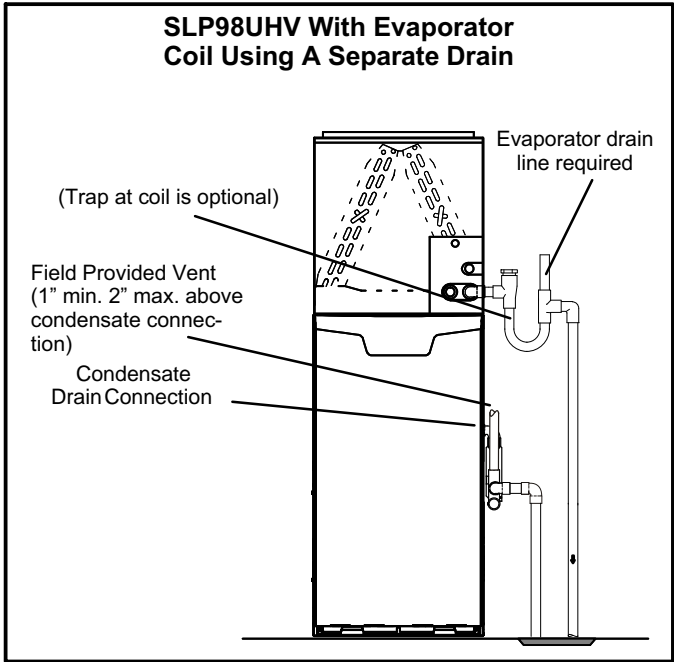


FIGURE 34

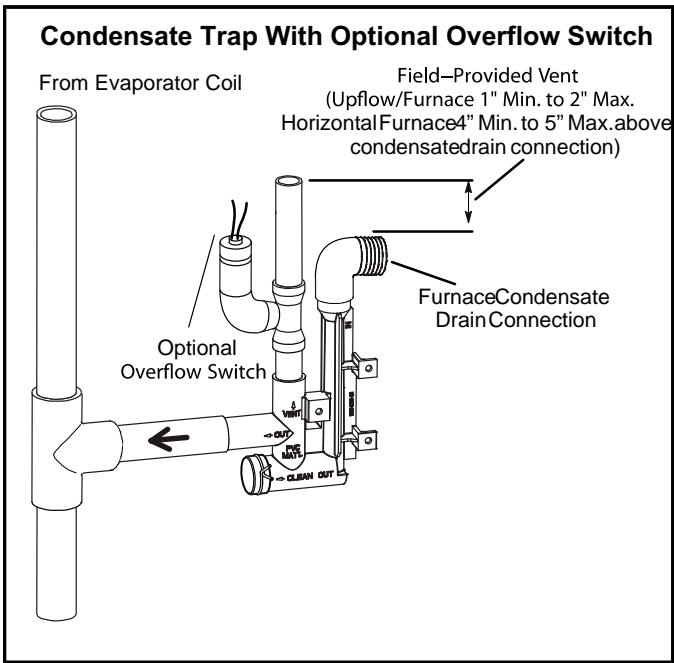


FIGURE 35

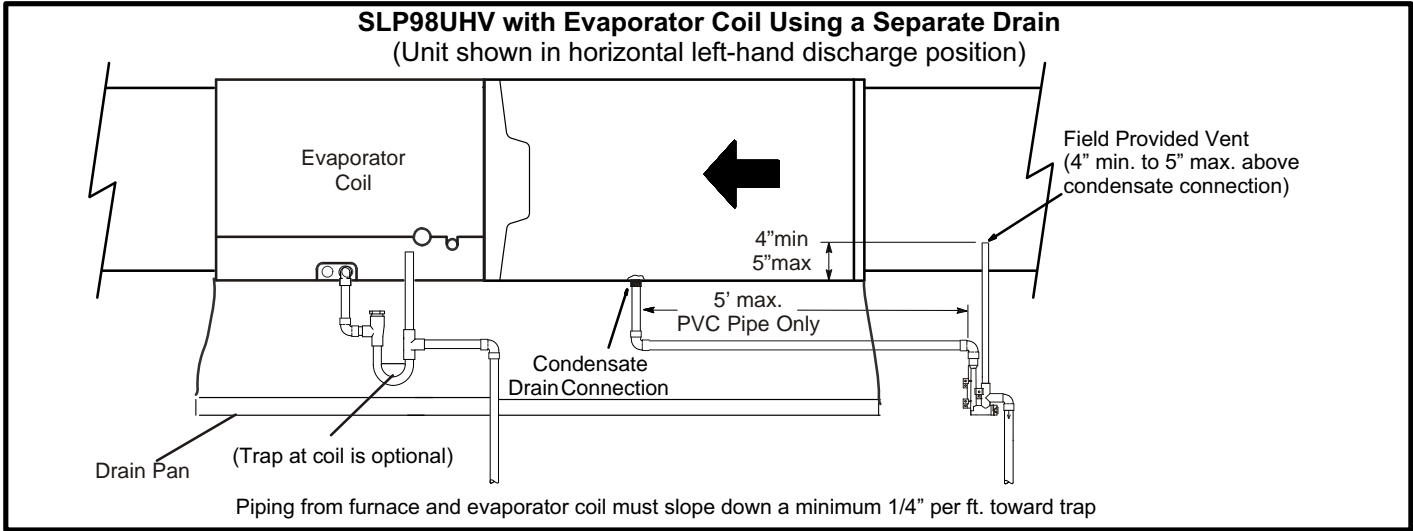


FIGURE 36

⚠ IMPORTANT

When combining the furnace and evaporator coil drains together, the A/C condensate drain outlet must be vented to relieve pressure in order for the furnace pressure switch to operate properly.

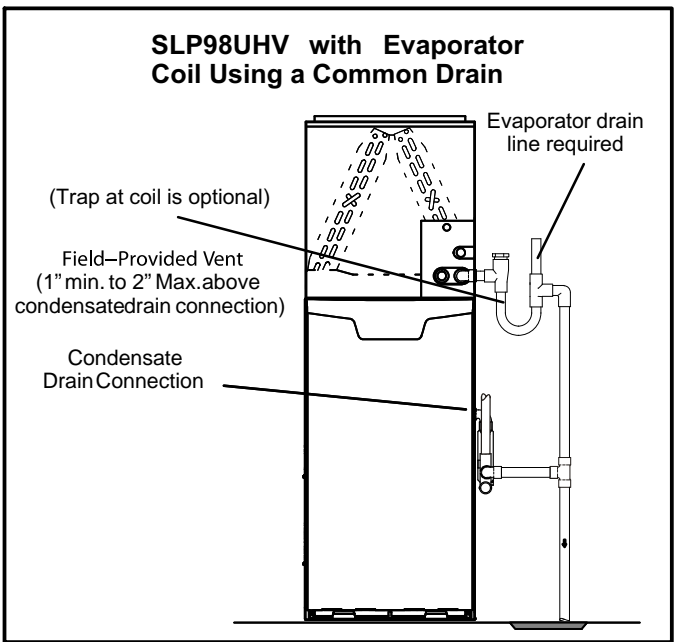


FIGURE 37

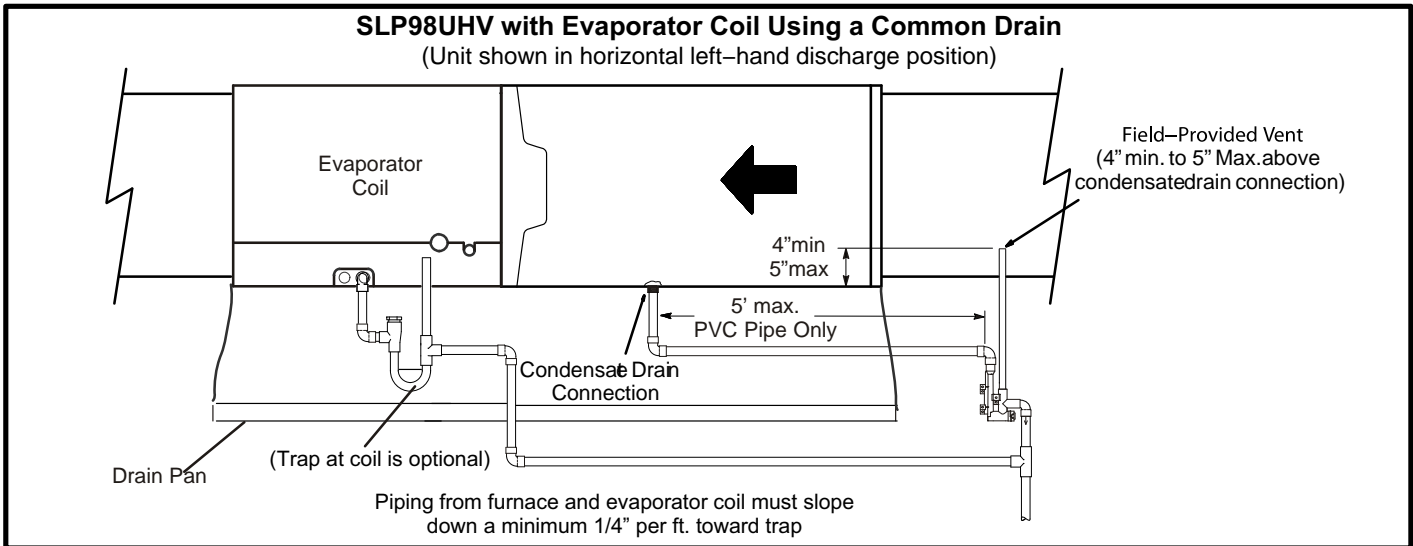
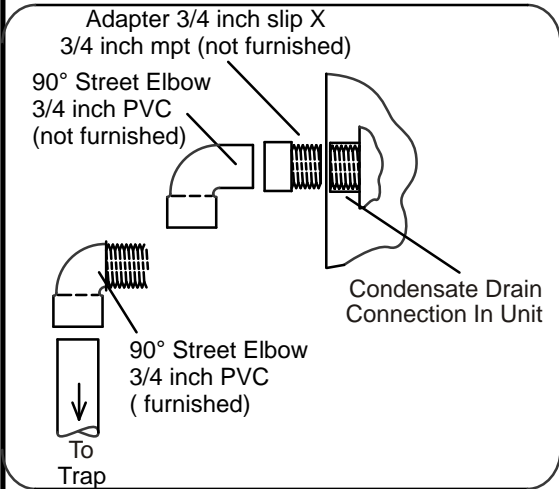


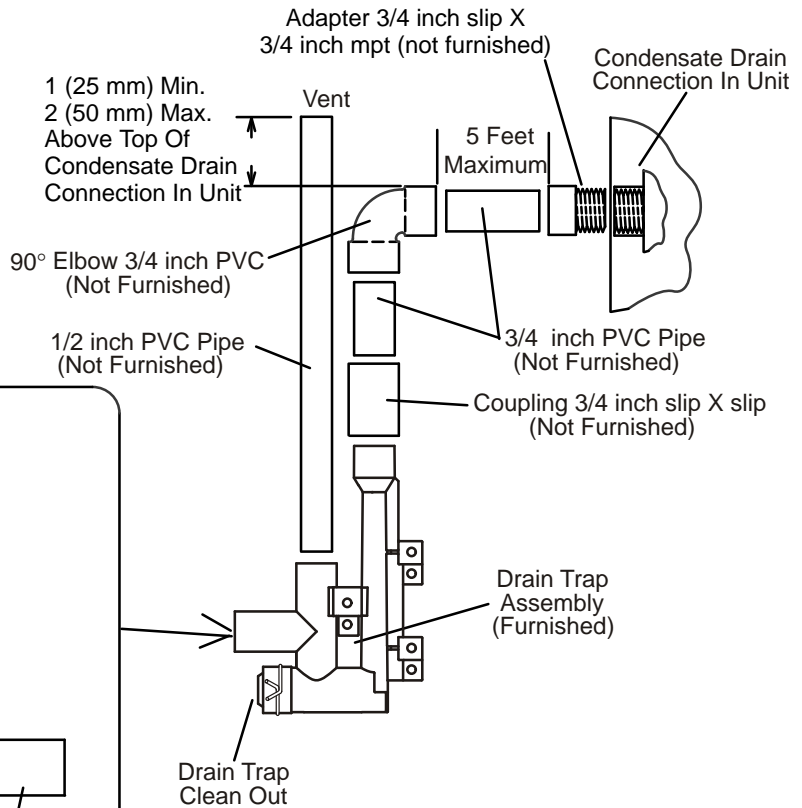
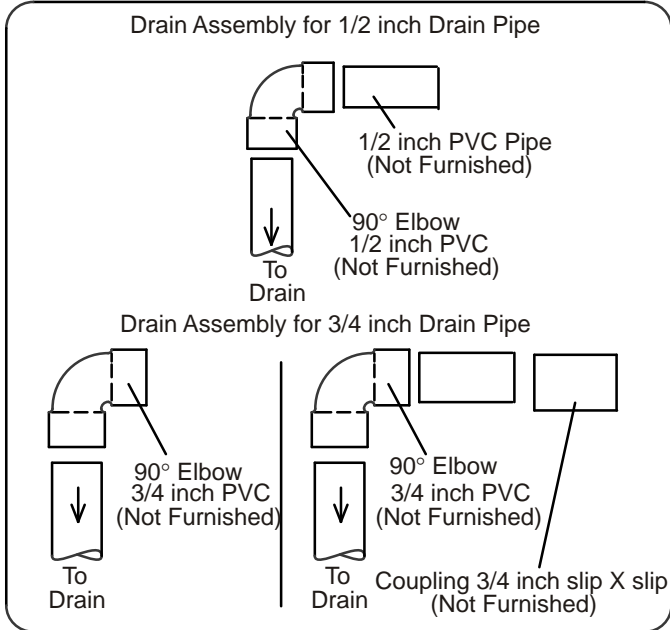
FIGURE 38

TRAP / DRAIN ASSEMBLY USING 1/2" PVC OR 3/4" PVC

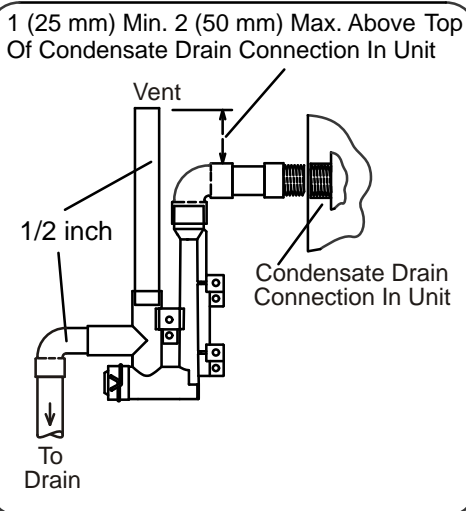
Optional Condensate Drain Connection



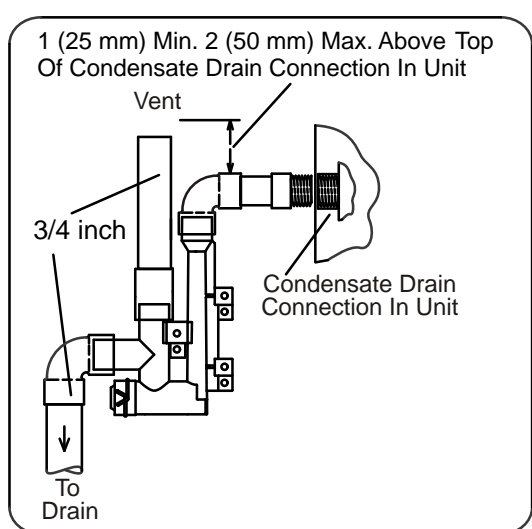
Optional Drain Piping From Trap



Drain Trap Assembly with 1/2 inch Piping



Drain Trap Assembly with 3/4 inch Piping



Drain Trap Assembly (Furnished)

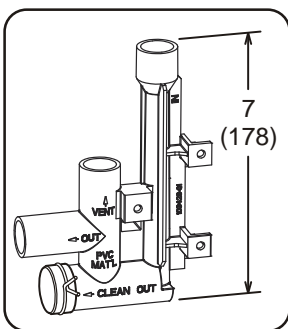


FIGURE 39

Gas Piping

⚠ CAUTION

If a flexible gas connector is required or allowed by the authority that has jurisdiction, black iron pipe shall be installed at the gas valve and extend outside the furnace cabinet. The flexible connector can then be added between the black iron pipe and the gas supply line.

⚠ WARNING

Do not exceed 600 in-lbs (50 ft.-lbs) torque when attaching the gas piping to the gas valve.

- 1 - Gas piping may be routed into the unit through either the left- or right-hand side in upflow applications, and either the top or bottom in horizontal applications. Supply piping enters into the gas valve from the side of the valve as shown in figures 41 and 42.
- 2 - When connecting gas supply, factors such as length of run, number of fittings and furnace rating must be considered to avoid excessive pressure drop. Table 8 lists recommended pipe sizes for typical applications.

NOTE - Use two wrenches when connecting gas piping to avoid transferring torque to the manifold.

- 3 - Gas piping must not run in or through air ducts, clothes chutes, chimneys or gas vents, dumb waiters or elevator shafts. Center gas line through piping hole. Gas line should not touch side of unit. See figures 41 and 42.
- 4 - Piping should be sloped 1/4 inch per 15 feet (6mm per 5.6m) upward toward the gas meter from the furnace. The piping must be supported at proper intervals, every 8 to 10 feet (2.44 to 3.05m), using suitable hangers or straps. Install a drip leg in vertical pipe runs to serve as a trap for sediment or condensate.
- 5 - A 1/8" N.P.T. plugged tap or pressure post is located on the gas valve to facilitate test gauge connection. See figures 48.
- 6 - In some localities, codes may require installation of a manual main shut-off valve and union (furnished by installer) external to the unit. Union must be of the ground joint type.

⚠ IMPORTANT

Compounds used on threaded joints of gas piping must be resistant to the actions of liquified petroleum gases.

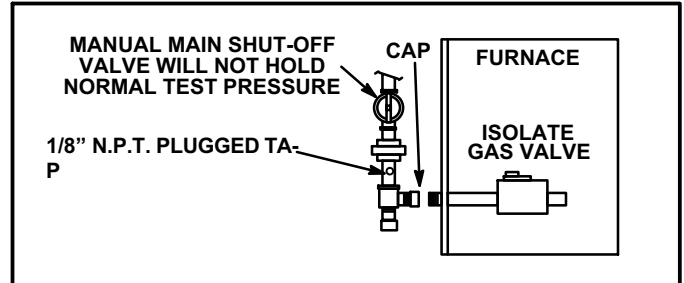


FIGURE 40

Leak Check

After gas piping is completed, carefully check all piping connections (factory- and field-installed) for gas leaks. Use a leak detecting solution or other preferred means.

The furnace must be isolated from the gas supply system by closing its individual manual shut-off valve during any pressure testing of the gas supply system at pressures less than or equal to 1/2 psig (3.48 kPa, 14 inches w.c.).

⚠ IMPORTANT

When testing gas lines using pressures in excess of 1/2 psig (3.48 kPa), gas valve must be disconnected and isolated. See figure 40. Gas valves can be damaged if subjected to pressures greater than 1/2 psig (3.48 kPa).

⚠ WARNING

FIRE OR EXPLOSION HAZARD

Failure to follow the safety warnings exactly could result in serious injury, death, or property damage. Never use an open flame to test for gas leaks. Check all connections using a commercially available soap solution made specifically for leak detection. Some soaps used for leak detection are corrosive to certain metals. Carefully rinse piping thoroughly after leak test has been completed.

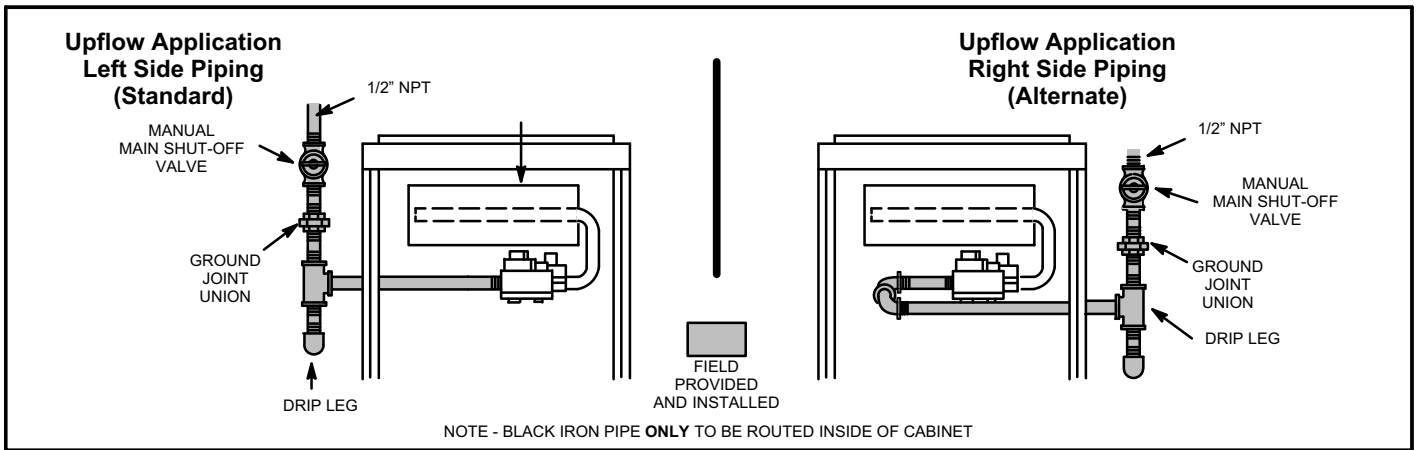


FIGURE 41

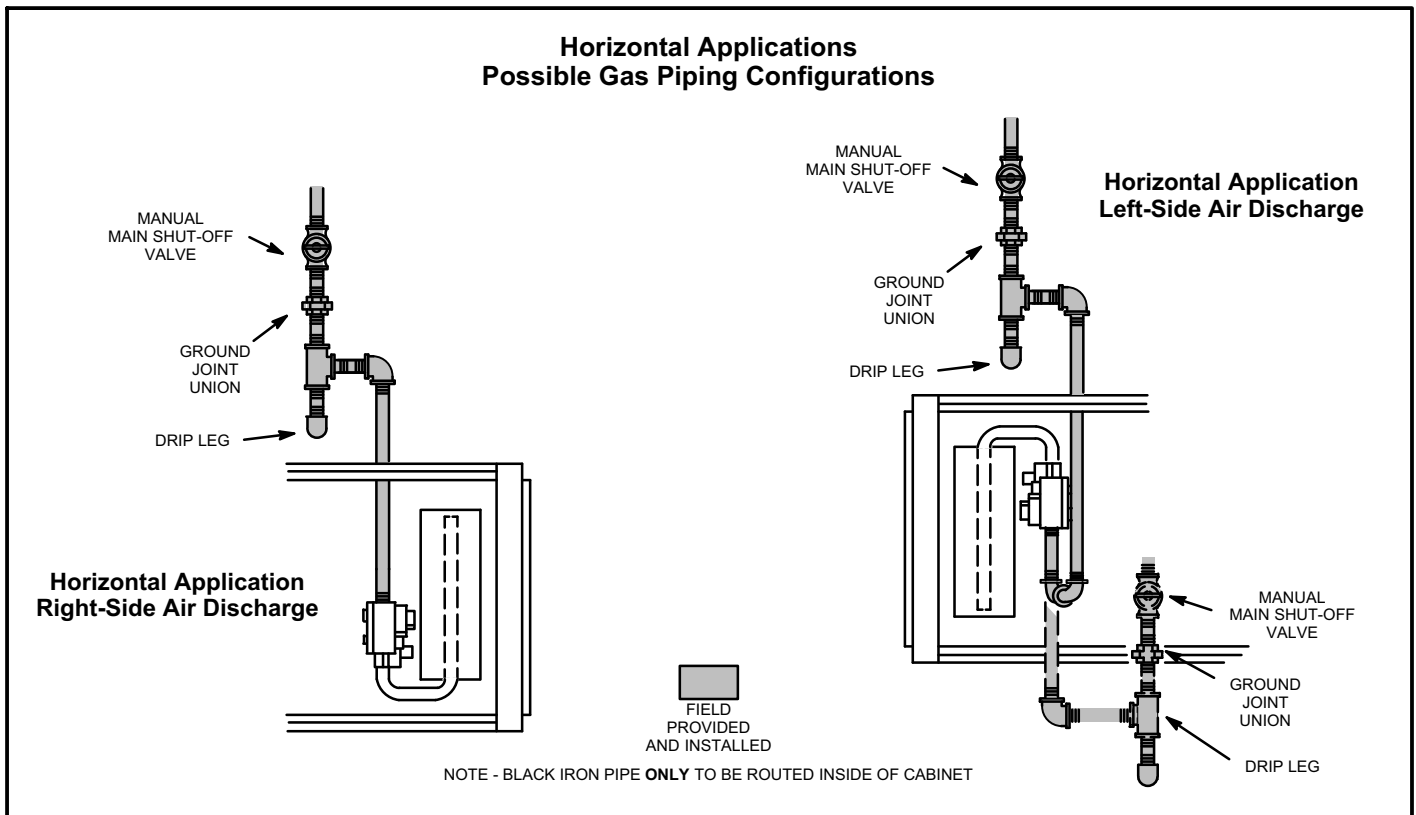


FIGURE 42

Removal of the Furnace from Common Vent

In the event that an existing furnace is removed from a venting system commonly run with separate gas appliances, the venting system is likely to be too large to properly vent the remaining attached appliances.

Conduct the following test while each appliance is operating and the other appliances (which are not operating) remain connected to the common venting system. If the venting system has been installed improperly, you **must** correct the system as indicated in the general venting requirements section.

⚠ WARNING

CARBON MONOXIDE POISONING HAZARD

Failure to follow the steps outlined below for each appliance connected to the venting system being placed into operation could result in carbon monoxide poisoning or death.

The following steps shall be followed for each appliance connected to the venting system being placed into operation, while all other appliances connected to the venting system are not in operation:

- 1 - Seal any unused openings in the common venting system.
- 2 - Inspect the venting system for proper size and horizontal pitch. Determine that there is no blockage, restriction, leakage, corrosion, or other deficiencies which could cause an unsafe condition.

- 3 - Close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any appliances not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
- 4 - Follow the lighting instructions. Turn on the appliance that is being inspected. Adjust the thermostat so that the appliance operates continuously.
- 5 - After the main burner has operated for 5 minutes, test for leaks of flue gases at the draft hood relief opening. Use the flame of a match or candle.
- 6 - After determining that each appliance connected to the common venting system is venting properly, (step 3) return all doors, windows, exhaust fans, fireplace dampers, and any other gas-burning appliances to their previous mode of operation.
- 7 - If a venting problem is found during any of the preceding tests, the common venting system must be modified to correct the problem.

Resize the common venting system to the minimum vent pipe size determined by using the appropriate tables in Appendix G. (These are in the current standards of the National Fuel Gas Code ANSI Z223.1.

**TABLE 8
GAS PIPE CAPACITY - FT³/HR (KL/HR)**

Nominal Iron Pipe Size inches (mm)	Internal Diameter inches (mm)	Length of Pipe - feet (m)									
		10 (3.048)	20 (6.096)	30 (9.144)	40 (12.192)	50 (15.240)	60 (18.288)	70 (21.336)	80 (24.384)	90 (27.432)	100 (30.480)
1/2 (12.7)	.622 (17.799)	172 (4.87)	118 (3.34)	95 (2.69)	81 (2.29)	72 (2.03)	65 (1.84)	60 (1.69)	56 (1.58)	52 (1.47)	50 (1.42)
3/4 (19.05)	.824 (20.930)	360 (10.19)	247 (7.00)	199 (5.63)	170 (4.81)	151 (4.28)	137 (3.87)	126 (3.56)	117 (3.31)	110 (3.11)	104 (2.94)
1 (25.4)	1.049 (26.645)	678 (19.19)	466 (13.19)	374 (10.59)	320 (9.06)	284 (8.04)	257 (7.27)	237 (6.71)	220 (6.23)	207 (5.86)	195 (5.52)
1-1/4 (31.75)	1.380 (35.052)	1350 (38.22)	957 (27.09)	768 (22.25)	657 (18.60)	583 (16.50)	528 (14.95)	486 (13.76)	452 (12.79)	424 (12.00)	400 (11.33)
1-1/2 (38.1)	1.610 (40.894)	2090 (59.18)	1430 (40.49)	1150 (32.56)	985 (27.89)	873 (24.72)	791 (22.39)	728 (20.61)	677 (19.17)	635 (17.98)	600 (17.00)
2 (50.8)	2.067 (52.502)	4020 (113.83)	2760 (78.15)	2220 (62.86)	1900 (53.80)	1680 (47.57)	1520 (43.04)	1400 (39.64)	1300 (36.81)	1220 (34.55)	1160 (32.844)
2-1/2 (63.5)	2.469 (67.713)	6400 (181.22)	4400 (124.59)	3530 (99.95)	3020 (85.51)	2680 (75.88)	2480 (70.22)	2230 (63.14)	2080 (58.89)	1950 (55.22)	1840 (52.10)
3 (76.2)	3.068 (77.927)	11300 (319.98)	7780 (220.30)	6250 (176.98)	5350 (151.49)	4740 (134.22)	4290 (121.47)	3950 (111.85)	3670 (103.92)	3450 (97.69)	3260 (92.31)

Electrical

ELECTROSTATIC DISCHARGE (ESD)

Precautions and Procedures

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions during furnace installation and service to protect the furnace's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the furnace, the control and the technician at the same electrostatic potential. Neutralize electrostatic charge by touching hand and all tools on an unpainted unit surface, such as the gas valve or blower deck, before performing any service procedure.

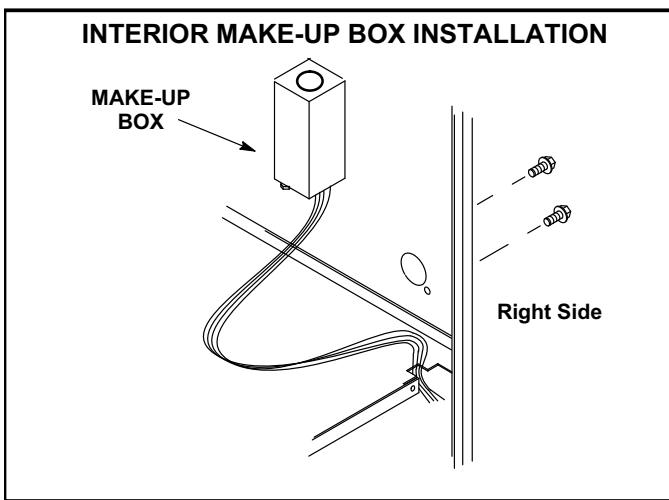


FIGURE 43

The unit is equipped with a field make-up box on the left hand side of the cabinet. The make-up box may be moved to the right side of the furnace to facilitate installation. If the make-up box is moved to the right side, clip the wire ties that bundle the wires together. The excess wire must be pulled into the blower compartment. Secure the excess wire to the existing harness to protect it from damage.

Refer to figure 46 for unit field wiring. See figures 44 and 45 for icomfort Wi-Fi® thermostat wiring in communicating applications. Table 12 shows DIP switch and on-board link settings for non-communicating thermostat applications. Typical wiring schematic is shown in figure 46.

- 1 - The power supply wiring must meet Class I restrictions. Protected by either a fuse or circuit breaker, select circuit protection and wire size according to unit nameplate.

NOTE - Unit nameplate states maximum current draw. See table for maximum over-current protection.

TABLE 9

SLP98UHV Model	Maximum Over-Current Protection (Amps)
070-36B, 090-36C, 090-48C	15
090-60C, 110-60C, 135-60D	20

- 2 - Holes are on both sides of the furnace cabinet to facilitate wiring.
- 3 - Install a separate (properly sized) disconnect switch near the furnace so that power can be turned off for servicing.
- 4 - Before connecting the thermostat or the power wiring, check to make sure the wires will be long enough for servicing at a later date. Remove the blower access panel to check the length of the wire.
- 5 - Complete the wiring connections to the equipment. Use the provided unit wiring and field wiring diagram shown in figure 46 and table 12. Use 18-gauge wire or larger that is suitable for Class II rating for thermostat connections.

NOTE - Do NOT make a wire connection between the room thermostat L terminal and the L terminal of the SLP98UHV integrated control unless this is a communicating thermostat installation with a non-communicating outdoor unit.

- 6 - Electrically ground the unit according to local codes or, in the absence of local codes, according to the current National Electric Code (ANSI/NFPA No. 70) for the USA and current Canadian Electric Code part 1 (CSA standard C22.1) for Canada. A green ground wire is provided in the field make-up box.
- 7 - One line voltage "EAC" 1/4" spade terminal is provided on the furnace integrated control. Any electronic air cleaner or other 120V accessory rated up to one amp can be connected to this terminal with the neutral leg of the circuit being connected to one of the provided neutral terminals. See figure 47 for location of terminal. This terminal is energized when the indoor blower is operating.
- 8 - One line voltage "HUM" 1/4" spade terminal is provided on the furnace integrated control. Any humidifier or other 120V accessory rated up to one amp can be connected to this terminal with the neutral leg of the circuit being connected to one of the provided neutral terminals. See figure 47 for location of terminal. This terminal is energized in the heating mode when the indoor blower is operating.
- 9 - One 24V "H" terminal is provided on the furnace integrated control terminal block. Any humidifier rated up to 0.5 amp can be connected to this terminal with the ground leg of the circuit being connected to either ground or the "C" terminal. See figure 47 for location of terminal.

10 -Install the room thermostat according to the instructions provided with the thermostat. See table 12 for thermostat connections. If the furnace is being matched with a heat pump, refer to the instruction packaged with the dual fuel thermostat.

NOTE - The discharge air temperature sensor is intended to be mounted downstream of the heat exchanger and air conditioning coil. It must be placed in free airflow, where other accessories (humidifiers, UV lights etc.) will not interfere with its accuracy. Wiring distance between the furnace and discharge air sensor should not exceed 10 ft. when wired with 18-gauge thermostat wire.

TABLE 10
Run Length — Non Communicating

Wire Run Length	AWG #	Insulation/Core Types
Less than 100' (30m)	18	Color-coded, temperature rating 95°F (35°C) minimum, solid core. (Class II Rated Wiring)
More than 100' (30m)	16	

TABLE 11
Run Length — Communicating

Wire Run Length	AWG #	Insulation/Core Types
Maximum length of wiring for all connections on the RSBus is limited to 1500 feet (457 meters).	18	Color-coded, temperature rating 95°F (35°C) minimum, solid core. (Class II Rated Wiring)

Thermostat Selection

The SLP98UHV is designed to operate in a variable rate capacity mode using a two-stage thermostat. The SLP98UHV will automatically adjust firing rate based upon thermostat cycle times.

The icomfort Wi-Fi® thermostat must be used in communicating applications. Refer to the instructions provided with the thermostat for installation, set-up and operation.

For optimal performance in non-communicating applications, Lennox recommends use of a ComfortSense® 7000 high quality electronic digital thermostat or any other with adjustable settings for 1st stage / 2nd stage on / off differentials and adjustable stage timers.

Lennox recommends the following two-stage thermostat set-up for optimal variable rate capacity mode: First heat stage differential set to 1/2 to 1 degree F; second heat stage differential set to 1/2 or 1 degree F; second heat stage upstage timer disabled, or set to maximum (1 hr minimum).

Indoor Blower Speeds

NOTE - When the SLP98UHV is used with icomfort Touch™ thermostat, proper indoor blower speed selections are made by the communicating thermostat.

- 1 - When the thermostat is set to "FAN ON," the indoor blower will run continuously at a percentage of the second-stage cooling speed when there is no cooling or heating demand. The percentage is set using DIP switches 6 and 7.
- 2 - When the SLP98UHV is running in the heating mode, the integrated control will automatically adjust the blower speed to match the furnace firing rate. This speed can be adjusted up or down by 7.5% or 15% using DIP switches 14 through 16 for the low heat speed and 17 through 19 for the high heat speed.
- 3 - When there is a cooling demand, the indoor blower will run on the cooling speed designated by the positions of DIP switches 8 through 11.

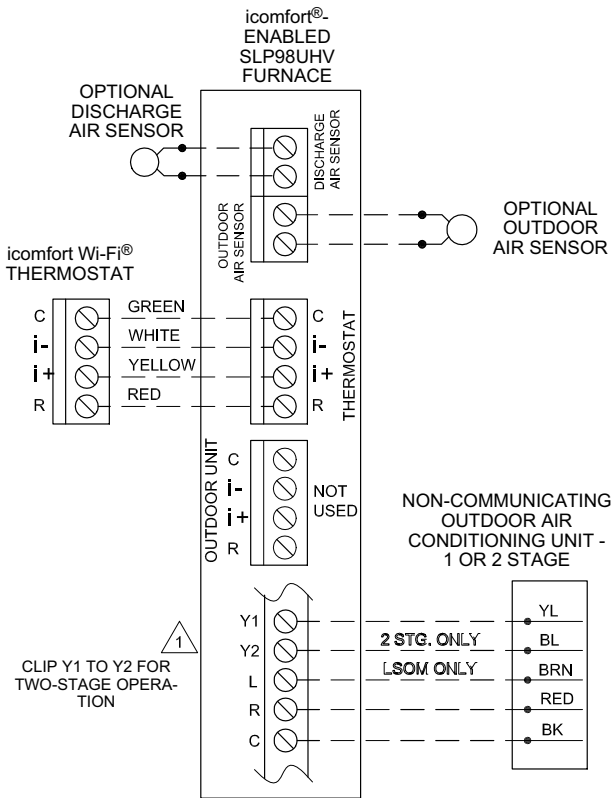
Generator Use - Voltage Requirements

The following requirements must be kept in mind when specifying a generator for use with this equipment:

- The furnace requires 120 volts ± 10% (Range: 108 volts to 132 volts).
- The furnace operates at 60 Hz ± 5% (Range: 57 Hz to 63 Hz).
- The furnace integrated control requires both polarity and proper ground. Both polarity and proper grounding should be checked before attempting to operate the furnace on either permanent or temporary power.
- Generator should have a wave form distortion of less than 5% THD (total harmonic distortion).

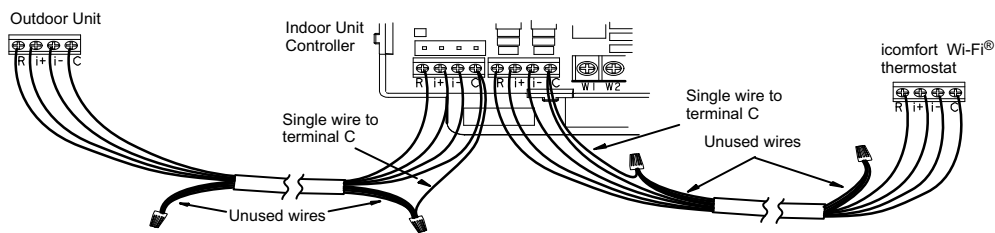
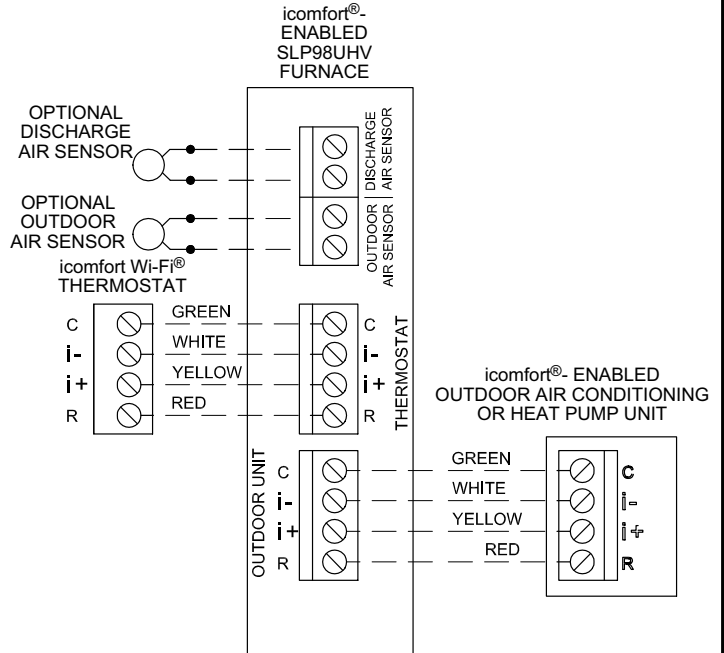
icomfort Wi-Fi® Thermostat with SLP98UHV and Non-Communicating Outdoor Unit

icomfort Wi-Fi® Thermostat
icomfort®-Enabled SLP98UHV Indoor Furnace
Non-Communicating Outdoor Air Conditioner



icomfort Wi-Fi® Thermostat with SLP98UHV and icomfort™ -ENABLED Outdoor Unit

icomfort Wi-Fi® Thermostat
icomfort®-Enabled SLP98UHV Indoor Furnace
icomfort®-Enabled Outdoor Air Conditioner or Heat Pump



Communicating systems using the icomfort Wi-Fi® thermostat require four thermostat wires between the thermostat and the furnace/air handler control and four wires between the outdoor unit and the furnace/air handler control. When a thermostat cable with more than four wires is used, the extra wires must be properly connected to avoid electrical noise. The wires must not be left disconnected. Use wire nuts to bundle the four unused wires at each end of the cable. A single wire should then be connected to the indoor unit end of the wire bundle and attached to the "C" terminals as shown in the diagram above.

FIGURE 44

Optional Accessories for use with any icomfort® System

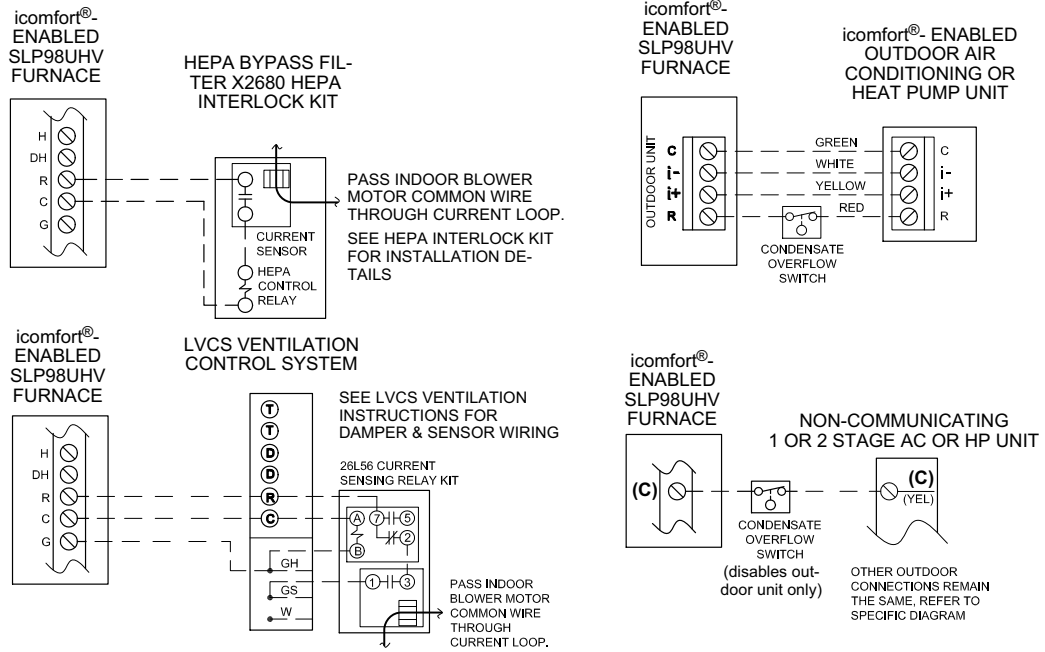
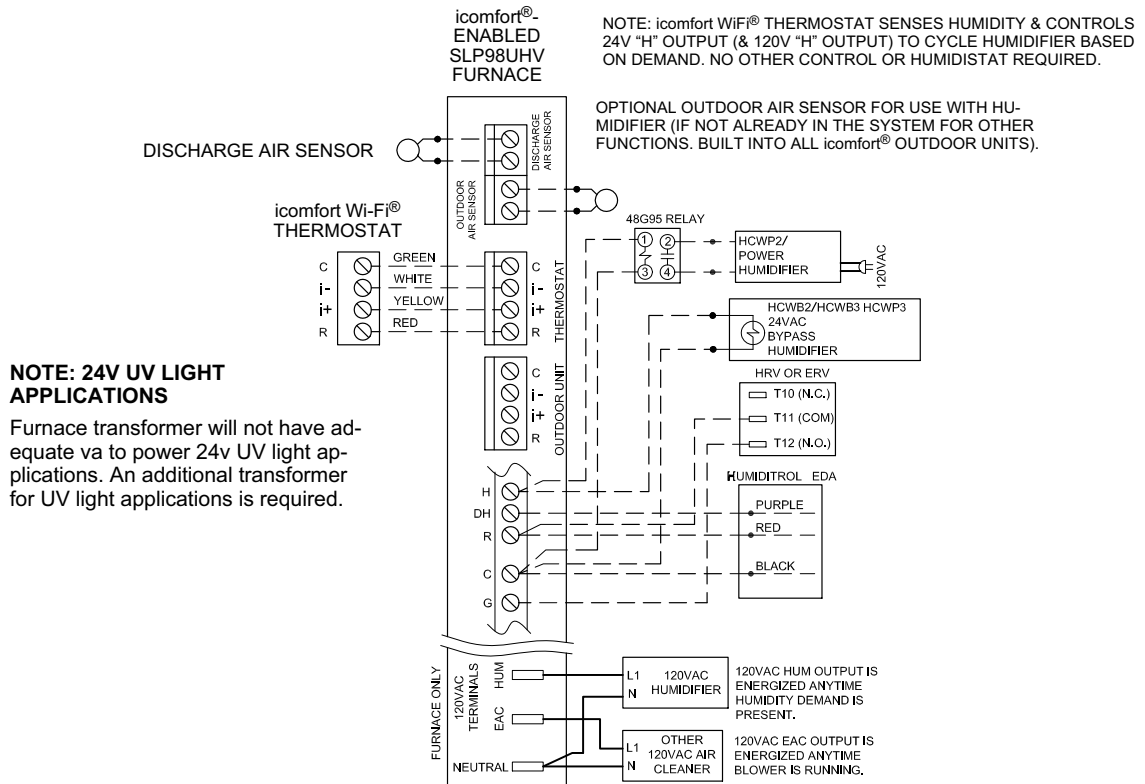


FIGURE 45

TABLE 12
Field Wiring Connections for Non-Communicating Thermostat Applications

Thermostat	DIP Switch Settings and On-Board Links (figure 47)			Wiring Connections	
	DIP Switch 1	W915 (Y1 to Y2) Two-Stage Cooling	W914 (DS to R) Dehumidifi- cation or Harmony III™		W951 (O to R) Heat Pumps
1Heat / 1 Cool <i>NOTE - Use DIP switch 3 to set second-stage heat ON delay. OFF-7 minutes. ON-12 minutes.</i>	ON	Intact	Intact	Intact	
1 Heat / 2 Cool <i>NOTE - Use DIP switch 3 to set second-stage heat ON delay. OFF-7 minutes. ON-12 minutes.</i>	ON	Cut	Intact	Intact	
1 Heat / 2 Cool with t'stat with dehumidification mode <i>NOTE - Use DIP switch 3 to set second-stage heat ON delay. OFF-7 minutes. ON-12 minutes.</i>	ON	Cut	Cut	Intact	

* "R" required on some units.

TABLE 12
Field Wiring for Non-Communicating Applications (Continued)

Thermostat	DIP Switch Settings and On-Board Links (figure 47)				Wiring Connections
	DIP Switch 1	W915 (Y1 to Y2) Two-Stage Cooling	W914 (DS to R) Dehumidifi- cation or Harmony III™	W951 (O to R) Heat Pumps	
2 Heat / 2 Cool	OFF	Cut	Intact	Intact	
2 Heat / 2 Cool with t'stat with dehumidifica- tion mode	OFF	Cut	Cut	Intact	
2 Heat / 1 Cool	OFF	Intact	Intact	Intact	

* "R" required on some units.

TABLE 12
Field Wiring for Non-Communicating Applications (Continued)

Thermostat	DIP Switch Settings and On-Board Links (figure 47)			Wiring Connections	
	DIP Switch	W915 (Y1 to Y2) Two-Stage Cooling	W914 (DS to R) Dehumidifi- cation or Harmony III™		W951 (O to R) Heat Pumps
Dual Fuel Single-Stage Heat Pump ComfortSense® 7000 L7742U thermostat w/ dual fuel capa- bilities Capable of 2-stage gas heat control	DIP Switch 1 OFF	Intact	Intact	Cut	
Dual Fuel Two Stage Heat Pump ComfortSense® 7000 L7742U thermostat w/ dual fuel capa- bilities Capable of 2-stage gas heat control	DIP Switch 1 OFF	Cut	Intact	Cut	

* Connect W1 to W1 ONLY if using defrost tempering kit 67M41.

NOTE - **Do NOT** make a wire connection between the room thermostat L terminal and the L terminal of the SLP98UHV integrated control.

TYPICAL SLP98UHV WIRING DIAGRAM

BLOWER SPEED CHART			
UNIT	FACTORY SHIPPED SETTINGS		
	HEAT	COOL	ADJUST
070V36B	2	4	NORM
090V36C	2	4	NORM
090V48C	2	4	NORM
090V80C	2	4	NORM
110V80C	2	4	NORM
135V80D	2	4	NORM

NOTE: SEE INSTALLATION INSTRUCTIONS FOR PROCEDURE TO SET CORRECT BLOWER SPEED FOR SPECIFIC COOLING TONNAGE BEING APPLIED, AND HEATING TEMPERATURE RISE DESIRED.

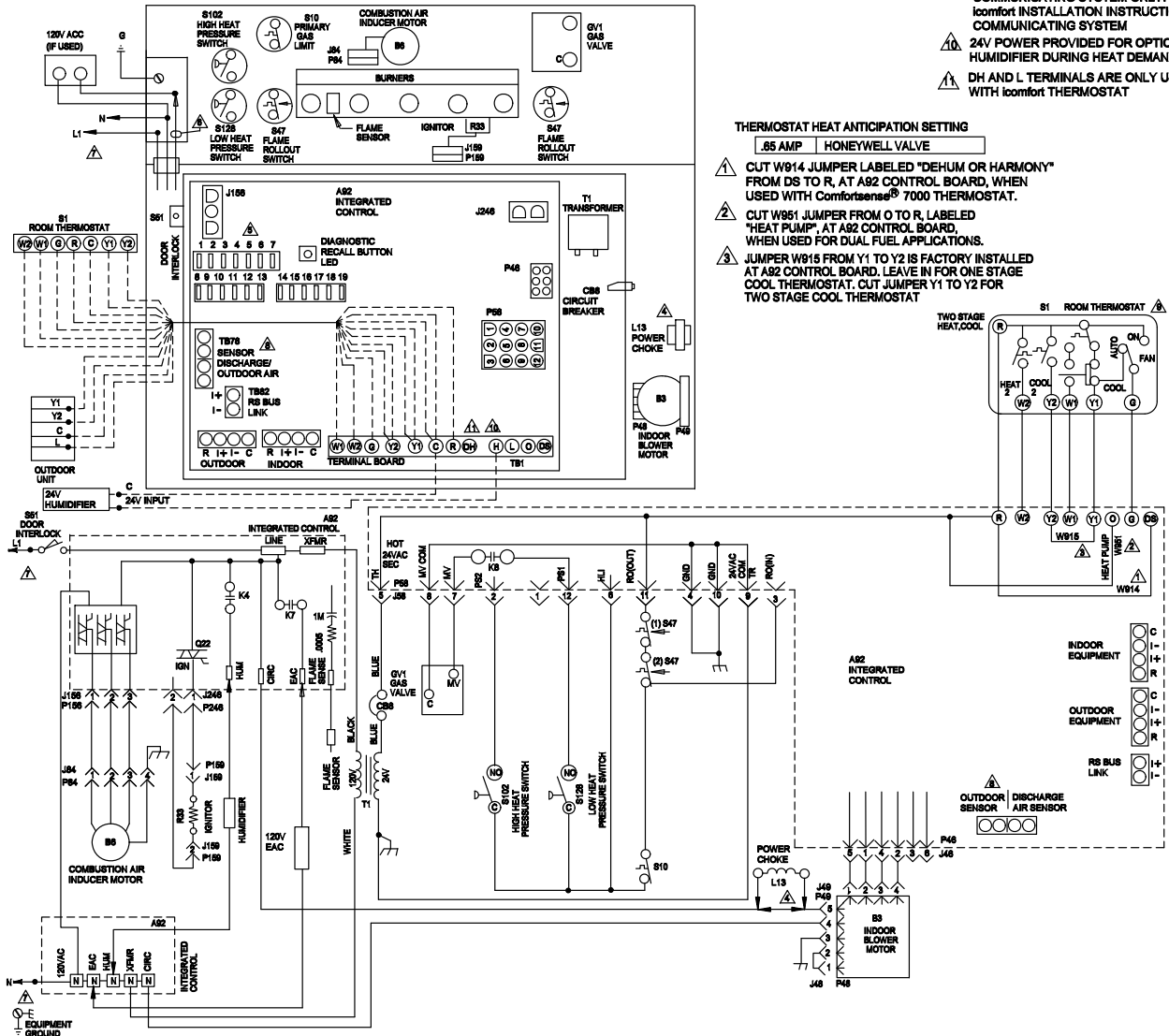
TYPICAL SYSTEM SHOWN FOR 2 HEAT/2 COOL WITH A CONVENTIONAL THERMOSTAT. SEE INSTALLATION INSTRUCTIONS FOR CONNECTIONS TO OTHER EQUIPMENT AND ACCESSORIES.

A TWO STAGE THERMOSTAT MUST BE USED WITH THIS FURNACE IN VARIABLE CAPACITY MODE. REFER TO INSTALLATION INSTRUCTIONS FOR MORE INFORMATION ON RECOMMENDED TYPES OF THERMOSTATS AND SETTINGS FOR OPTIMAL PERFORMANCE

JACKPLUG CHART	
J.P46	JACK/PLUG-CONTROL, VARIABLE SPEED
J.P48	JACK/PLUG-MOTOR, VARIABLE SPEED
J.P49	JACK/PLUG-MOTOR, VARIABLE SPEED
J.P58	JACK/PLUG-BURNER CONTROL
J.P64	JACK/PLUG-COMB. AIR INDUCER
J.P156	JACK/PLUG-INDUCER/IGNITOR
J.P159	JACK/PLUG-IGNITOR
J.P248	JACK/PLUG-BOARD IGNITION

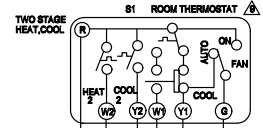
FURNACE SIZE SELECTION CODE		
CODE ON 7 SEGMENT LED	FURNACE MODEL SLP98UH	INDOOR BWR MOTOR HP SIZE
A	070V36B	1/2
b	090V36C	1/2
c	090V48C	3/4
d	090V80C	1
E	110V80C	1
F	135V80D	1

- ⚠ L13 USED ON 3/4 AND 1 HP ONLY
- ⚠ DIP SWITCH FACTORY DEFAULT IS FOR A TWO STAGE THERMOSTAT
- ⚠ FIELD SUPPLIED ACC WIRE
- ⚠ USE COPPER CONDUCTORS ONLY
- ⚠ DISCHARGE AND OUTDOOR AIR TERMINALS ARE FOR *icomfort* USE ONLY
- ⚠ THERMOSTAT CONNECTIONS ARE FOR NON-COMMUNICATING SYSTEM ONLY. REFER TO *icomfort* INSTALLATION INSTRUCTIONS FOR COMMUNICATING SYSTEM
- ⚠ 24V POWER PROVIDED FOR OPTIONAL HUMIDIFIER DURING HEAT DEMAND
- ⚠ DH AND L TERMINALS ARE ONLY USED WITH *icomfort* THERMOSTAT



THERMOSTAT HEAT ANTICIPATION SETTING

- ⚠ .85 AMP HONEYWELL VALVE
- ⚠ CUT W914 JUMPER LABELED "DEHUM OR HARMONY" FROM DS TO R, AT A82 CONTROL BOARD, WHEN USED WITH *ComforSense*® 7000 THERMOSTAT.
- ⚠ CUT W861 JUMPER FROM O TO R, LABELED "HEAT PUMP", AT A82 CONTROL BOARD, WHEN USED FOR DUAL FUEL APPLICATIONS.
- ⚠ JUMPER W915 FROM Y1 TO Y2 IS FACTORY INSTALLED AT A82 CONTROL BOARD. LEAVE IN FOR ONE STAGE COOL THERMOSTAT. CUT JUMPER Y1 TO Y2 FOR TWO STAGE COOL THERMOSTAT



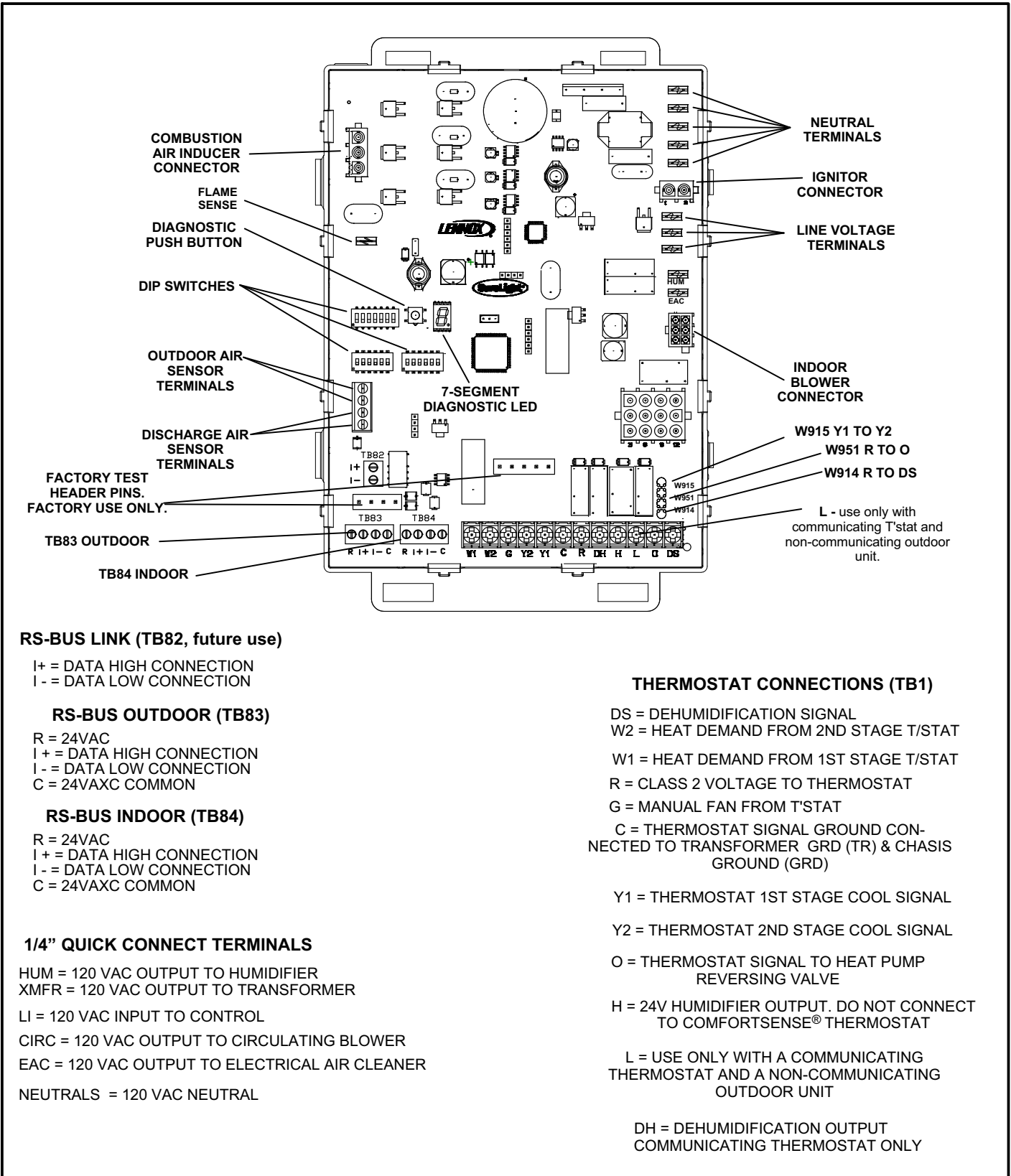
— LINE VOLTAGE FIELD INSTALLED
 - - - CLASS II VOLTAGE FIELD WIRING
 ← DENOTES OPTIONAL COMPONENTS

WARNING-
 ELECTRIC SHOCK HAZARD, CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.

NOTE-
 IF ANY WIRE IN THIS APPLIANCE IS REPLACED, IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING, INSULATION THICKNESS, AND TERMINATION.

FIGURE 46

Integrated Control



RS-BUS LINK (TB82, future use)

I+ = DATA HIGH CONNECTION
 I- = DATA LOW CONNECTION

RS-BUS OUTDOOR (TB83)

R = 24VAC
 I+ = DATA HIGH CONNECTION
 I- = DATA LOW CONNECTION
 C = 24VACX COMMON

RS-BUS INDOOR (TB84)

R = 24VAC
 I+ = DATA HIGH CONNECTION
 I- = DATA LOW CONNECTION
 C = 24VACX COMMON

1/4" QUICK CONNECT TERMINALS

HUM = 120 VAC OUTPUT TO HUMIDIFIER
 XMFR = 120 VAC OUTPUT TO TRANSFORMER
 LI = 120 VAC INPUT TO CONTROL
 CIRC = 120 VAC OUTPUT TO CIRCULATING BLOWER
 EAC = 120 VAC OUTPUT TO ELECTRICAL AIR CLEANER
 NEUTRALS = 120 VAC NEUTRAL

THERMOSTAT CONNECTIONS (TB1)

DS = DEHUMIDIFICATION SIGNAL
 W2 = HEAT DEMAND FROM 2ND STAGE T/STAT
 W1 = HEAT DEMAND FROM 1ST STAGE T/STAT
 R = CLASS 2 VOLTAGE TO THERMOSTAT
 G = MANUAL FAN FROM T'STAT
 C = THERMOSTAT SIGNAL GROUND CONNECTED TO TRANSFORMER GRD (TR) & CHASIS GROUND (GRD)
 Y1 = THERMOSTAT 1ST STAGE COOL SIGNAL
 Y2 = THERMOSTAT 2ND STAGE COOL SIGNAL
 O = THERMOSTAT SIGNAL TO HEAT PUMP REVERSING VALVE
 H = 24V HUMIDIFIER OUTPUT. DO NOT CONNECT TO COMFORTSENSE® THERMOSTAT
 L = USE ONLY WITH A COMMUNICATING THERMOSTAT AND A NON-COMMUNICATING OUTDOOR UNIT
 DH = DEHUMIDIFICATION OUTPUT COMMUNICATING THERMOSTAT ONLY

FIGURE 47

TABLE 13
Thermostat Selection Switch Settings

Operation	Thermostat	Switch 1	Switch 2	Switch 3
Variable Capacity Heat (35% to 100%)	Two-Stage	Off	On	Off
Three-Stage Heat (35%, 70%, 100%)	Single-Stage	On	Off	2nd stage delay OFF = 7 minutes ON = 12 minutes 3rd stage delay 10 minutes fixed
Two-Stage Heat (W1 70%, W2 100%)	Two-Stage	Off	Off	Off

NOTE - When the SLP98UHV is used with an icomfort Touch™ communicating thermostat, all indoor blower speed selections and DIP switch settings are made by the communicating thermostat.

SLP98UHV units are equipped with an integrated control. This control manages ignition timing, combustion air inducer speed, heating mode fan off delays and indoor blower speeds based on selections made using the icomfort Touch™ thermostat or the control DIP switches and on-board links. The control includes an internal Watchguard feature which automatically resets the ignition control when it has been locked out.

NOTE - All DIP switches are factory shipped in the "OFF" position.

Heating Operation DIP Switch Settings -- Figure 47

Switch 1 -- Thermostat Selection -- This unit may be used with either a single-stage or two-stage thermostat. The thermostat selection is made using a DIP switch which must be properly positioned for the particular application. The DIP switch is factory-positioned for use with a two-stage thermostat. If a single-stage thermostat is to be used, the DIP switch must be repositioned. See table 13.

Switch 2 -- Operating Mode with Two-Stage Thermostat -- If a two-stage thermostat is used, the furnace can operate in either variable-capacity or conventional two-stage mode. When variable-capacity mode is selected, the firing rate of the unit is varied to maximize comfort. Conventional two-stage mode is the factory default setting. See table 13.

Switch 3 -- Second-Stage Heat On Delay -- If a single-stage thermostat is used, the integrated control can be used to energize second-stage heat after either 7 minutes or 12 minutes of first-stage heat operation. See table 13.

Switches 4 and 5 -- Blower-Off Delay -- The blower-on delay of 30 seconds is not adjustable. The blower-off delay (time that the blower operates after the heating demand has been satisfied) can be adjusted by moving switches 4

and 5 on the integrated control. The unit is shipped from the factory with a blower-off delay of 90 seconds. The blower-off delay affects comfort and is adjustable to satisfy individual applications. Adjust the blower off delay to achieve a supply air temperature between 90° and 110°F at the exact moment that the blower is de-energized. Longer off delay settings provide lower supply air temperatures; shorter settings provide higher supply air temperatures. Table 14 provides the blower-off timings that will result from different switch settings.

TABLE 14
Blower-Off Delay Switch Settings

Blower-Off Delay (Seconds)	Switch 4	Switch 5
60	Off	On
90 (factory)	Off	Off
120	On	Off
180	On	On

Indoor Blower Operation DIP Switch Settings

Switches 6 and 7 -- Continuous Indoor Fan Operation-Blower Speed -- The unit is shipped from the factory with the DIP switches positioned for medium low (2) speed during continuous indoor blower operation. The table below provides the continuous blower speeds that will result from different switch settings. Refer to tables beginning on page 42 for corresponding cfm values.

TABLE 15
Continuous Indoor Blower Operation -- Blower Speeds

Speed	Switch 6	Switch 7
1 - Low (28%)*	Off	On
2 - Medium Low (38%)* Factory	Off	Off
3 - Medium High (70%)*	On	Off
4 - High (100%)*	On	On

* Percentage of high speed cooling

Switches 8 and 9 – Cooling Mode Blower Speed -- The unit is shipped from the factory with the DIP switches positioned for high speed (4) indoor blower motor operation during the cooling mode. The table below provides the cooling mode blower speeds that will result from different switch settings. Refer to tables beginning on page 42 for corresponding cfm values.

TABLE 16
Cooling Mode Blower Speeds

Speed	Switch 8	Switch 9
1 - Low	On	On
2 - Medium Low	Off	On
3 - Medium High	On	Off
4 - High (Factory)	Off	Off

Switches 10 and 11 – Cooling Mode Blower Speed Adjustment -- The unit is shipped from the factory with the DIP switches positioned for NORMAL (no) adjustment. The DIP switches may be positioned to adjust the blower speed by +10% or -10% to better suit the application. Table 17 provides blower speed adjustments that will result from different switch settings. Refer to tables beginning on page 42 for corresponding cfm values.

With switches 10 and 11 set to ON, motor will bypass ramping profiles and all delays and will immediately run at selected COOLING speed upon a call for cool. LED will continue to operate as normal. This mode is used to check motor operation.

TABLE 17
Cooling Mode Blower Speed Adjustment

Adjustment	Switch 10	Switch 11
+10% (approx.)	On	Off
DEFAULT COOL CFM	Off	Off
-10% (approx.)	Off	On
MOTOR TEST	On	On

Switches 12 and 13 -- Cooling Mode Blower Speed Ramping -- Blower speed ramping may be used to enhance dehumidification performance. The switches are factory set at option A which has the greatest effect on blower motor performance. Table 18 provides the cooling mode blower speed ramping options that will result from different switch settings. The cooling mode blower speed ramping options are detailed below.

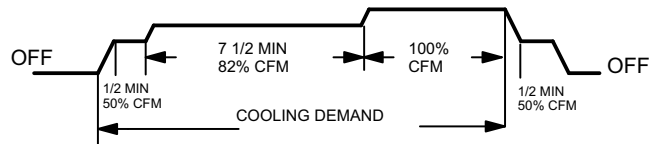
NOTE - The off portion of the selected ramp profile only applies during heat pump operation in dual fuel applications.

TABLE 18
Cooling Mode Blower Speed Ramping

Ramping Option	Switch 12	Switch 13
A (Factory)	Off	Off
B	On	Off
C	Off	On
D	On	On

Ramping Option A (Factory Selection)

- Motor runs at 50% for 30 seconds.
- Motor then runs at 82% for approximately 7-1/2 minutes.
- If demand has not been satisfied after 7-1/2 minutes, motor runs at 100% until demand is satisfied.
- Once demand is met, motor runs at 50% for 30 seconds then ramps down to stop.



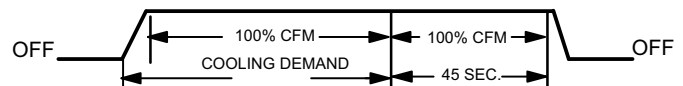
Ramping Option B

- Motor runs at 82% for approximately 7-1/2 minutes. If demand has not been satisfied after 7-1/2 minutes, motor runs at 100% until demand is satisfied.
- Once demand is met, motor ramps down to stop.



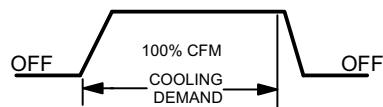
Ramping Option C

- Motor runs at 100% until demand is satisfied.
- Once demand is met, motor runs at 100% for 45 seconds then ramps down to stop.



Ramping Option D

- Motor runs at 100% until demand is satisfied.
- Once demand is met, motor ramps down to stop.



Switches 14 through 19 -- Heating Mode Blower Speed

-- These switches are factory set at the OFF position which provides 100 % of normal speed during HIGH HEAT demand, 70% of normal speed during MID-RANGE HEAT demand and 35% of normal speed during LOW HEAT demand. Switches 14, 15 and 16 are used to adjust the LOW HEAT blower motor speed. Switches 17, 18 and 19 are used to adjust the HIGH HEAT blower motor speed. Table 19 provides the heating mode blower speeds that will result from different switch settings. Refer to tables beginning on page 42 for corresponding cfm values.

TABLE 19
Low Heat Blower Speeds

Thermostat Demand	Blower Speed Adjustments	DIP SWITCH SETTINGS		
		14	15	16
Low Heat (R to W1)	+15%	On	Off	On
	+7.5%	On	Off	Off
	Normal	Off	Off	Off
	-7.5%	On	On	Off
	-15%	On	On	On

TABLE 20
High Heat Blower Speeds

Thermostat Demand	Blower Speed Adjustments	DIP SWITCH SETTINGS		
		17	18	19
High Heat (R to W1 & W2)	+15%	On	Off	On
	+7.5%	On	Off	Off
	Normal	Off	Off	Off
	-7.5%	On	On	Off
	-15%	On	On	On

On-Board Links

On-Board links must be clipped (when applicable) before unit is placed into operation with a non-communicating thermostat.

On-Board Link W914 DS to R (Figure 47)

On-board link W914, is a clippable connection between terminals DS and R on the integrated control. W914 must be cut when the furnace is installed with either the Harmony III™ zone control or a thermostat which features humidity control. If the link is left intact the PMW signal from the Harmony III control will be blocked and also lead to control damage. Refer to table 21 for operation sequence in applications including SLP98UHV, a thermostat which features humidity control and a single-speed outdoor unit. Table 22 gives the operation sequence in applications with a two-speed outdoor unit.

On-Board Link W951 R to O (Figure 47)

On-board link W951 is a clippable connection between terminals R and O on the integrated control. W951 must be cut when the furnace is installed in applications which include a heat pump unit and a thermostat which features dual fuel use. If the link is left intact, terminal "O" will remain energized eliminating the HEAT MODE in the heat pump.

On-Board Link W915 Y1 to Y2 (Figure 47)

On-board link W915 is a clippable connection between terminals Y1 and Y2 on the integrated control. W915 must be cut if two-stage cooling will be used. If the link is not cut the outdoor unit will operate in second-stage cooling only.

Diagnostic LED (Figure 47)

The seven-segment diagnostic LED displays operating status, target airflow, error codes and other information. The table beginning on Page 55 lists diagnostic LED codes.

Diagnostic Push Button (Figure 47)

The diagnostic push button is located adjacent to the seven-segment diagnostic LED. This button is used to enable the Error Code Recall mode and the Field Test mode. Press the button and hold it to cycle through a menu of options. Every five seconds a new menu item will be displayed. When the button is released, the displayed item will be selected. Once all items in the menu have been displayed, the menu resumes from the beginning until the button is released.

Error Code Recall Mode

Select "E" from the menu to access the most recent 10 error codes. Select "c" from the Error Code Recall menu to clear all error codes. Button must be pressed a second time while "c" is flashing to confirm command to delete codes. Press the button until a solid "≡" is displayed to exit the Error Code Recall mode.

Field Test Mode

Use the diagnostic push button to scroll through the menu as described above. Release the button when the LED flashes "-" to select the Field Test mode.

While in the Field Test mode the technician can:

- Initiate furnace ignition and move to and hold low-fire rate by applying a R to W1 jumper.
- Initiate furnace ignition sequence and move to and hold high-fire rate by applying a jumper from R to W1 and W2.
- Initiate furnace ignition sequence and move to and hold mid-fire rate by applying a jumper to R and W2.
- Apply then remove the jumper from R to W1 and W2 to change the firing rate from low fire to mid fire and high fire.
- A vent calibration sequence can be initiated even if a thermostat signal is not present. Press and hold the push button until a solid "C" is displayed. Release the button and calibration will begin. The furnace will perform the high-fire and low-fire pressure switch calibrations and display "CAL". After calibration, the LED will return to the flashing "-" display.

During Field Test mode operation, all safety switches are still in the circuit (they are not by-passed) and indoor blower performance and timings will match DIP switch selections. Current furnace firing rate, indoor blower CFM and flame signal will be displayed. To exit the Field Test mode, press and hold the button. The menu will resume from the beginning. Also, cycle the main power to exit the Field Test mode. The integrated control will automatically exit the Field Test mode after 45 minutes of operation.

BLOWER DATA

SLP98UH070V36B BLOWER PERFORMANCE (less filter)

BOTTOM RETURN AIR

HEATING BLOWER PERFORMANCE - 0 through 0.8 in. w.g. External Static Pressure Range

Heating Adjust CFM Selections	Heating Input Range and Blower Volume - CFM							
	35%	40%	50%	60%	70%	80%	90%	100%
Increase (+15%) Heat CFM	489	538	636	735	833	931	1030	1128
Increase (+7.5%) Heat CFM	450	496	588	680	772	864	956	1048
Default Heat CFM	410	453	539	624	710	796	881	967
Decrease (-7.5%) Heat CFM	380	419	498	578	657	736	815	895
Decrease (-15%) Heat CFM	349	385	458	531	604	676	749	822

COOLING BLOWER PERFORMANCE - 0 through 1.0 in. w.g. External Static Pressure Range

Cooling Adjust CFM Selections	Blower Speed Selections							
	First Stage Cool Speed - cfm				Second Stage Cool Speed - cfm			
	Low	Medium-Low	Medium High	High (Default)	Low	Medium-Low	Medium High	High (Default)
Increase (+10%) Cool CFM	600	740	840	970	860	1060	1215	1365
Default Cool CFM	555	665	770	855	810	960	1130	1265
Decrease (-10%) Cool CFM	500	600	680	790	705	840	1005	1140

SLP98UH090V36C BLOWER PERFORMANCE (less filter)

BOTTOM RETURN AIR

HEATING BLOWER PERFORMANCE - 0 through 0.8 in. w.g. External Static Pressure Range

Heating Adjust CFM Selections	Heating Input Range and Blower Volume - CFM							
	35%	40%	50%	60%	70%	80%	90%	100%
Increase (+15%) Heat CFM	687	734	827	921	1014	1108	1201	1295
Increase (+7.5%) Heat CFM	654	697	782	867	953	1038	1123	1209
Default Heat CFM	621	660	737	814	891	968	1045	1122
Decrease (-7.5%) Heat CFM	581	616	687	757	828	899	970	1041
Decrease (-15%) Heat CFM	540	572	637	701	766	830	895	959

COOLING BLOWER PERFORMANCE - 0 through 1.0 in. w.g. External Static Pressure Range

Cooling Adjust CFM Selections	Blower Speed Selections							
	First Stage Cool Speed - cfm				Second Stage Cool Speed - cfm			
	Low	Medium-Low	Medium High	High (Default)	Low	Medium-Low	Medium High	High (Default)
Increase (+10%) Cool CFM	625	710	830	950	875	1040	1210	1360
Default Cool CFM	565	670	760	860	800	945	1100	1240
Decrease (-10%) Cool CFM	520	610	685	785	720	840	970	1115

The effect of static pressure is included in air volumes shown.

The following control configurations are available. See Installation Instructions for details and DIP switch settings.

Heat Modes Available (Heating Blower Performance Table):

Single stage thermostat:

- 35%, 70%, 100% input (three-stage) with time delays in-between

Two-stage thermostat:

- Variable Rate Capacity Mode - furnace automatically adjusts firing rate based on first- and second-stage cycle times
- W1 demand at 70% input, W2 demand at 100% input. No delay between stages

icomfort Touch™ Communicating Thermostat:

- Variable Rate Capacity Mode - furnace automatically adjusts firing rate based on first- and second-stage cycle times
- 35%, 60%, 80%, 100% (four-stage) with time delays in-between

Cool Mode Available (Cooling Blower Performance table):

First stage COOL (two-stage air conditioning units only) is approximately 70% of the same second stage COOL speed position.

Continuous Fan speeds are approximately 28%, 38%, 70% and 100% (DIP switch selectable) of the same second-stage COOL speed position minimum 250 cfm.

Lennox Harmony III™ Zoning System Applications - Minimum blower speed is 250 cfm.

BLOWER DATA

SLP98UH090V48C BLOWER PERFORMANCE (less filter)

BOTTOM RETURN AIR

HEATING BLOWER PERFORMANCE - 0 through 0.8 in. w.g. External Static Pressure Range

Heating Adjust CFM Selections	Heating Input Range and Blower Volume - CFM							
	35%	40%	50%	60%	70%	80%	90%	100%
Increase (+15%) Heat CFM	769	835	968	1101	1234	1367	1500	1633
Increase (+7.5%) Heat CFM	713	776	902	1028	1155	1281	1407	1534
Default Heat CFM	656	716	836	955	1075	1195	1314	1434
Decrease (-7.5%) Heat CFM	595	652	767	882	997	1112	1227	1342
Decrease (-15%) Heat CFM	534	589	699	809	919	1029	1139	1249

COOLING BLOWER PERFORMANCE - 0 through 1.0 in. w.g. External Static Pressure Range

Cooling Adjust CFM Selections	Blower Speed Selections							
	First Stage Cool Speed - cfm				Second Stage Cool Speed - cfm			
	Low	Medium-Low	Medium High	High (Default)	Low	Medium-Low	Medium High	High (Default)
Increase (+10%) Cool CFM	840	1005	1155	1315	1165	1375	1580	1770
Default Cool CFM	780	915	1045	1190	1075	1265	1440	1645
Decrease (-10%) Cool CFM	690	835	955	1070	935	1145	1320	1465

SLP98UH090V60C BLOWER PERFORMANCE (less filter)

BOTTOM RETURN AIR

HEATING BLOWER PERFORMANCE - 0 through 0.8 in. w.g. External Static Pressure Range

Heating Adjust CFM Selections	Heating Input Range and Blower Volume - CFM							
	35%	40%	50%	60%	70%	80%	90%	100%
Increase (+15%) Heat CFM	583	665	830	995	1159	1324	1488	1653
Increase (+7.5%) Heat CFM	540	618	774	930	1085	1241	1397	1553
Default Heat CFM	497	571	718	865	1012	1159	1306	1453
Decrease (-7.5%) Heat CFM	439	507	644	781	917	1054	1191	1328
Decrease (-15%) Heat CFM	380	443	570	697	823	950	1076	1203

COOLING BLOWER PERFORMANCE - 0 through 1.0 in. w.g. External Static Pressure Range

Cooling Adjust CFM Selections	Blower Speed Selections							
	First Stage Cool Speed - cfm				Second Stage Cool Speed - cfm			
	Low	Medium-Low	Medium High	High (Default)	Low	Medium-Low	Medium High	High (Default)
Increase (+10%) Cool CFM	1050	1270	1445	1620	1590	1815	2010	2195
Default Cool CFM	975	1120	1295	1460	1460	1645	1845	2010
Decrease (-10%) Cool CFM	865	1010	1120	1290	1320	1500	1645	1860

The effect of static pressure is included in air volumes shown.

The following control configurations are available. See Installation Instructions for details and DIP switch settings.

Heat Modes Available (Heating Blower Performance Table):

Single stage thermostat:

- 35%, 70%, 100% input (three-stage) with time delays in-between

Two-stage thermostat:

- Variable Rate Capacity Mode - furnace automatically adjusts firing rate based on first- and second-stage cycle times
- W1 demand at 70% input, W2 demand at 100% input. No delay between stages

icomfort Touch™ Communicating Thermostat:

- Variable Rate Capacity Mode - furnace automatically adjusts firing rate based on first- and second-stage cycle times
- 35%, 60%, 80%, 100% (four-stage) with time delays in-between

Cool Mode Available (Cooling Blower Performance table):

First stage COOL (two-stage air conditioning units only) is approximately 70% of the same second stage COOL speed position.

Continuous Fan speeds are approximately 28%, 38%, 70% and 100% (DIP switch selectable) of the same second-stage COOL speed position minimum 380 cfm.

Lennox Harmony III™ Zoning System Applications - Minimum blower speed is 380 cfm.

BLOWER DATA

SLP98UH110V60C BLOWER PERFORMANCE (less filter)

BOTTOM RETURN AIR

HEATING BLOWER PERFORMANCE - 0 through 0.8 in. w.g. External Static Pressure Range

Heating Adjust CFM Selections	Heating Input Range and Blower Volume - CFM							
	35%	40%	50%	60%	70%	80%	90%	100%
Increase (+15%) Heat CFM	767	861	1049	1237	1424	1612	1800	1988
Increase (+7.5%) Heat CFM	738	825	1000	1174	1349	1524	1699	1874
Default Heat CFM	708	789	951	1112	1274	1436	1597	1759
Decrease (-7.5%) Heat CFM	655	731	883	1035	1187	1339	1491	1644
Decrease (-15%) Heat CFM	602	673	816	958	1101	1243	1386	1528

COOLING BLOWER PERFORMANCE - 0 through 1.0 in. w.g. External Static Pressure Range

Cooling Adjust CFM Selections	Blower Speed Selections							
	First Stage Cool Speed - cfm				Second Stage Cool Speed - cfm			
	Low	Medium-Low	Medium High	High (Default)	Low	Medium-Low	Medium High	High (Default)
Increase (+10%) Cool CFM	1060	1245	1345	1545	1560	1740	1930	2125
Default Cool CFM	970	1145	1265	1395	1405	1565	1775	1945
Decrease (-10%) Cool CFM	885	1025	1110	1250	1270	1425	1610	1770

SLP98UH135V60D BLOWER PERFORMANCE (less filter)

BOTTOM RETURN AIR

HEATING BLOWER PERFORMANCE - 0 through 0.8 in. w.g. External Static Pressure Range

Heating Adjust CFM Selections	Heating Input Range and Blower Volume - CFM							
	35%	40%	50%	60%	70%	80%	90%	100%
Increase (+15%) Heat CFM	949	1033	1200	1367	1534	1701	1868	2035
Increase (+7.5%) Heat CFM	879	957	1113	1269	1426	1582	1738	1895
Default Heat CFM	808	881	1026	1172	1317	1463	1608	1754
Decrease (-7.5%) Heat CFM	748	817	956	1095	1235	1374	1513	1652
Decrease (-15%) Heat CFM	687	753	886	1019	1152	1284	1417	1550

COOLING BLOWER PERFORMANCE - 0 through 1.0 in. w.g. External Static Pressure Range

Cooling Adjust CFM Selections	Blower Speed Selections							
	First Stage Cool Speed - cfm				Second Stage Cool Speed - cfm			
	Low	Medium-Low	Medium High	High (Default)	Low	Medium-Low	Medium High	High (Default)
Increase (+10%) Cool CFM	1070	1260	1410	1555	1565	1750	1970	2190
Default Cool CFM	980	1115	1255	1430	1445	1615	1805	1985
Decrease (-10%) Cool CFM	865	1020	1115	1280	1290	1470	1650	1805

The effect of static pressure is included in air volumes shown.

The following control configurations are available. See Installation Instructions for details and DIP switch settings.

Heat Modes Available (Heating Blower Performance Table):

Single stage thermostat:

- 35%, 70%, 100% input (three-stage) with time delays in-between

Two-stage thermostat:

- Variable Rate Capacity Mode - furnace automatically adjusts firing rate based on first- and second-stage cycle times
- W1 demand at 70% input, W2 demand at 100% input. No delay between stages

icomfort Touch™ Communicating Thermostat:

- Variable Rate Capacity Mode - furnace automatically adjusts firing rate based on first- and second-stage cycle times
- 35%, 60%, 80%, 100% (four-stage) with time delays in-between

Cool Mode Available (Cooling Blower Performance table):

First stage COOL (two-stage air conditioning units only) is approximately 70% of the same second stage COOL speed position.

Continuous Fan speeds are approximately 28%, 38%, 70% and 100% (DIP switch selectable) of the same second-stage COOL speed position minimum 450 cfm.

Lennox Harmony III™ Zoning System Applications - Minimum blower speed is 450 cfm.

**TABLE 21
COOLING OPERATING SEQUENCE
SLP98UHV and Single-Stage Outdoor Unit**

OPERATING SEQUENCE		SYSTEM DEMAND					SYSTEM RESPONSE		
System Condition	Step	Demand			Relative Humidity		Compressor	Blower CFM (COOL)	Comments
		1st stage	O	G	Status	D*			
<i>NO CALL FOR DEHUMIDIFICATION</i>									
Normal Operation	1	On	On	On	Acceptable	24 VAC	High	100%	Compressor and indoor blower follow thermostat demand
<i>BASIC MODE (only active on a Y1 thermostat demand)</i>									
Normal Operation	1	On	On	On	Acceptable	24 VAC	High	100%	Thermostat energizes Y1 and de-energizes D on a call for de-humidification
Dehumidification Call	2	On	On	On	Demand	0 VAC	High	70%	
<i>PRECISION MODE (operates independent of a Y1 thermostat demand)</i>									
Normal Operation	1	On	On	On	Acceptable	24 VAC	High	100%	Dehumidification mode begins when humidity is greater than set point
Dehumidification call	2	On	On	On	Demand	0 VAC	High	70%	
Dehumidification call ONLY	1	On	On	On	Demand	0 VAC	High	70%	Thermostat will keep outdoor unit energized after cooling temperature set-point has been reached in order to maintain room humidity setpoint.
On-board links at indoor unit with a single-stage outdoor unit: With Condensing unit - Cut W914 (R to DS) on SureLight® control; With Heat Pump - Cut W914 (R to DS) & W951 (R to O) on SureLight® control. *ComfortSense® 7000 thermostat only									

**TABLE 22
COOLING OPERATING SEQUENCE
SLP98UHV and Two-Stage Outdoor Unit**

OPERATING SEQUENCE		SYSTEM DEMAND						SYSTEM RESPONSE		
System Condition	Step	Demand				Relative Humidity		Compressor	Blower CFM (COOL)	Comments
		1st stage	2nd stage	O	G	Status	D*			
NO CALL FOR DEHUMIDIFICATION										
Normal Operation - Y1	1	On		On	On	Acceptable	24 VAC	Low	70%	Compressor and indoor blower follow thermostat demand
Normal Operation - Y2	2	On	On	On	On	Acceptable	24 VAC	High	100%	
ROOM THERMOSTAT CALLS FOR FIRST STAGE COOLING										
<i>BASIC MODE (only active on a Y1 thermostat demand)</i>										
Normal Operation	1	On		On	On	Acceptable	24 VAC	Low	70%	Thermostat energizes 2nd stage and de-energizes D on a call for dehumidification
Dehumidification Call	2	On	On	On	On	Demand	0 VAC	High	70%	
<i>PRECISION MODE (operates independent of a Y1 thermostat demand)</i>										
Normal Operation	1	On		On	On	Acceptable	24 VAC	Low	70%	Dehumidification mode begins when humidity is greater than set point
Dehumidification call	2	On	On	On	On	Demand	0 VAC	High	70%	
Dehumidification call ONLY	1	On	On	On	On	Demand	0 VAC	High	70%	Thermostat will keep outdoor unit energized after cooling temperature setpoint has been reached in order to maintain room humidity setpoint.*
ROOM THERMOSTAT CALLS FOR FIRST AND SECOND STAGE COOLING										
<i>BASIC MODE (only active on a Y1 thermostat demand)</i>										
Normal Operation	1	On	On	On	On	Acceptable	24 VAC	High	100%	Thermostat energizes 2nd stage and de-energizes D on a call for dehumidification
Dehumidification Call	2	On	On	On	On	Demand	0 VAC	High	70%	
<i>PRECISION MODE (operates independent of a Y1 thermostat demand)</i>										
Normal Operation	1	On		On	On	Acceptable	24 VAC	Low	70%	Dehumidification mode begins when humidity is greater than set point
Dehumidification call	2	On	On	On	On	Demand	0 VAC	High	70%	
Dehumidification call ONLY	1	On	On	On	On	Demand	0 VAC	High	70%	Thermostat will keep outdoor unit energized after cooling temperature setpoint has been reached in order to maintain room humidity setpoint.
	<p>On-board links at indoor unit with a two-stage outdoor unit: Cut factory link from Y1 to Y2 or cut W915 (Y1 to Y2) on SureLight® integrated control. With Condensing unit - Cut W914 (R to DS) on SureLight® integrated control; With Heat Pump - Cut W914 (R to DS) & W951 (R to O) on SureLight® integrated control. *ComfortSense® 7000 thermostat only</p>									

Unit Start-Up

FOR YOUR SAFETY READ BEFORE OPERATING

⚠ WARNING

Do not use this furnace if any part has been underwater. A flood-damaged furnace is extremely dangerous. Attempts to use the furnace can result in fire or explosion. Immediately call a qualified service technician to inspect the furnace and to replace all gas controls, control system parts, and electrical parts that have been wet or to replace the furnace, if deemed necessary.

⚠ WARNING



Danger of explosion. Can cause injury or product or property damage. Should the gas supply fail to shut off or if overheating occurs, shut off the gas valve to the furnace before shutting off the electrical supply.

⚠ CAUTION

Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch.

⚠ WARNING

During blower operation, the ECM motor emits energy that may interfere with pacemaker operation. Interference is reduced by both the sheet metal cabinet and distance.

Priming Condensate Trap

The condensate trap should be primed with water prior to start-up to ensure proper condensate drainage. Either pour 10 fl. oz. (300 ml) of water into the trap, or follow these steps to prime the trap:

- 1 - Follow the lighting instructions to place the unit into operation.
- 2 - Set the thermostat to initiate a heating demand.
- 3 - Allow the burners to fire for approximately 3 minutes.
- 4 - Adjust the thermostat to deactivate the heating demand.
- 5 - Wait for the combustion air inducer to stop. Set the thermostat to initiate a heating demand and again allow the burners to fire for approximately 3 minutes.
- 6 - Adjust the thermostat to deactivate the heating demand and again wait for the combustion air inducer to stop. At this point, the trap should be primed with sufficient water to ensure proper condensate drain operation.

BEFORE PLACING THE UNIT INTO OPERATION, smell all around the furnace area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

The gas valve on the SLP98UHV is equipped with a gas control switch. Use only your hand to move the control switch. Never use tools. If the switch will not move by hand, do not try to repair it. Force or attempted repair may result in a fire or explosion.

Placing the furnace into operation:

SLP98UHV units are equipped with an automatic ignition system. Do not attempt to manually light burners on this furnace. Each time the thermostat calls for heat, the burners will automatically light. The ignitor does not get hot when there is no call for heat on units with this ignition system.

⚠ WARNING

If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or death.

Gas Valve Operation (Figure 48)

- 1 - **STOP!** Read the safety information at the beginning of this section.
- 2 - Set the thermostat to the lowest setting.
- 3 - Turn off all electrical power to the unit.
- 4 - This furnace is equipped with an ignition device which automatically lights the burners. Do **not** try to light the burners by hand.
- 5 - Remove the access panel.
- 6 - Move the gas valve switch to the **OFF** position. See figure 48.
- 7 - Wait five minutes to clear out any gas. If you then smell gas, **STOP!** Immediately call the gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you do not smell gas go to next step.
- 8 - Move gas valve switch to the **ON** position. See figure 48. Do not force.

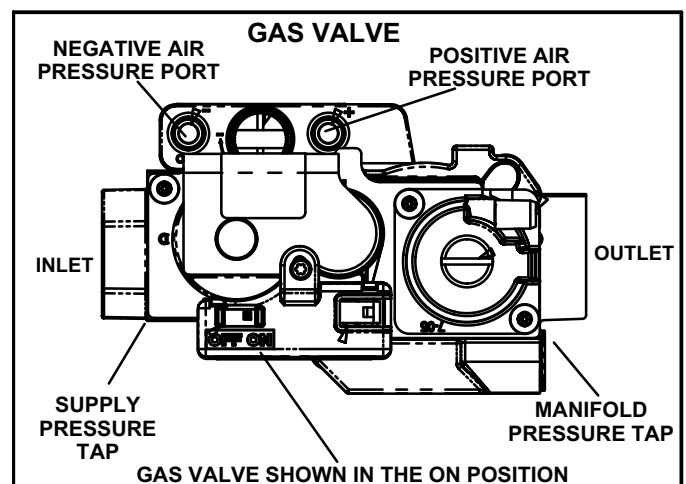


FIGURE 48

- 9 - Replace the access panel.
 - 10- Turn on all electrical power to the unit.
 - 11- Set the thermostat to desired setting.
- NOTE** - When unit is initially started, steps 1 through 11 may need to be repeated to purge air from gas line.
- 12- If the appliance will not operate, follow the instructions "Turning Off Gas to Unit" and call the gas supplier.

Turning Off Gas to Unit

- 1 - Set the thermostat to the lowest setting.
- 2 - Turn off all electrical power to the unit if service is to be performed.
- 3 - Remove the access panel.
- 4 - Move the gas valve switch to the **OFF** position.
- 5 - Replace the access panel.

Failure To Operate

If the unit fails to operate, check the following:

- 1 - Is the thermostat calling for heat?
- 2 - Are access panels securely in place?
- 3 - Is the main disconnect switch closed?
- 4 - Is there a blown fuse?
- 5 - Is the filter dirty or plugged? Dirty or plugged filters will cause the limit control to shut the unit off.
- 6 - Is gas turned on at the meter?
- 7 - Is the manual main shut-off valve open?
- 8 - Is the gas valve turned on?
- 9 - Is the unit ignition system in lock out? If the unit locks out again, inspect the unit for blockages.
- 10 - Is blower harness connected to ignition control? Furnace will not operate unless harness is connected.

Gas Pressure Measurement

Gas Flow (Approximate)

TABLE 23

GAS METER CLOCKING CHART				
SLP98 Unit	Seconds for One Revolution			
	Natural		LP	
	1 cu ft Dial	2 cu ft Dial	1 cu ft Dial	2 cu ft DIAL
-70	55	110	136	272
-90	41	82	102	204
-110	33	66	82	164
-135	27	54	68	136
Natural-1000 btu/cu ft		LP-2500 btu/cu ft		

Furnace should operate at least 5 minutes before checking gas flow. Determine time in seconds for **two** revolutions of gas through the meter. (Two revolutions assures a more accurate time.) **Divide by two** and compare to time in table 23 below. If manifold pressure matches table 27 and rate is incorrect, check gas orifices for proper size and restriction. Remove temporary gas meter if installed.

NOTE - To obtain accurate reading, shut off all other gas appliances connected to meter.

Supply Pressure Measurement

A threaded plug on the inlet side of the gas valve provides access to the supply pressure tap. Remove the threaded plug, install a field-provided barbed fitting and connect a manometer to measure supply pressure. Replace the threaded plug after measurements have been taken.

Manifold Pressure Measurement (Figure 49)

To correctly measure manifold pressure, the differential pressure between the positive gas manifold and the negative burner box must be considered. Use pressure test adapter kit (available as Lennox part 10L34) to assist in measurement.

- 1 - Remove the threaded plug from the outlet side of the gas valve and install a field-provided barbed fitting. Connect measuring device "+" connection to barbed fitting to measure manifold pressure.
- 2 - Tee into the gas valve regulator vent hose and connect measuring device "-" connection.
- 3 - Start unit on low heat (35% rate) and allow 5 minutes for unit to reach steady state.
- 4 - While waiting for the unit to stabilize, notice the flame. Flame should be stable and should not lift from burner. Natural gas should burn blue.
- 5 - After allowing unit to stabilize for 5 minutes, record manifold pressure and compare to value given in table 24.
- 6 - Repeat steps 3, 4 and 5 on high heat.

NOTE - Shut unit off and remove manometer as soon as an accurate reading has been obtained. Take care to remove barbed fitting and replace threaded plug.

⚠ CAUTION

Do not attempt to make adjustments to the gas valve.

Operating Pressure Signal (Delta P) Measurement (Figure 50)

Operating pressure signal can be taken while the manifold pressure check is taken (using two measuring devices). Or, taken after the manifold pressure measurement is complete.

- 1 - Tee into the negative line between the gas valve and pressure switch and connect to measuring device negative "-".
- 2 - Tee into the positive line between the gas valve and pressure switch and connect to measuring device positive "+".
- 3 - Start unit on low heat (35% rate) and allow 5 minutes for unit to reach steady state.
- 4 - After allowing unit to stabilize for 5 minutes, record operating pressure signal and compare to value given in table 24.
- 5 - Repeat steps 3 on 4 high heat.

MANIFOLD PRESSURE MEASUREMENT

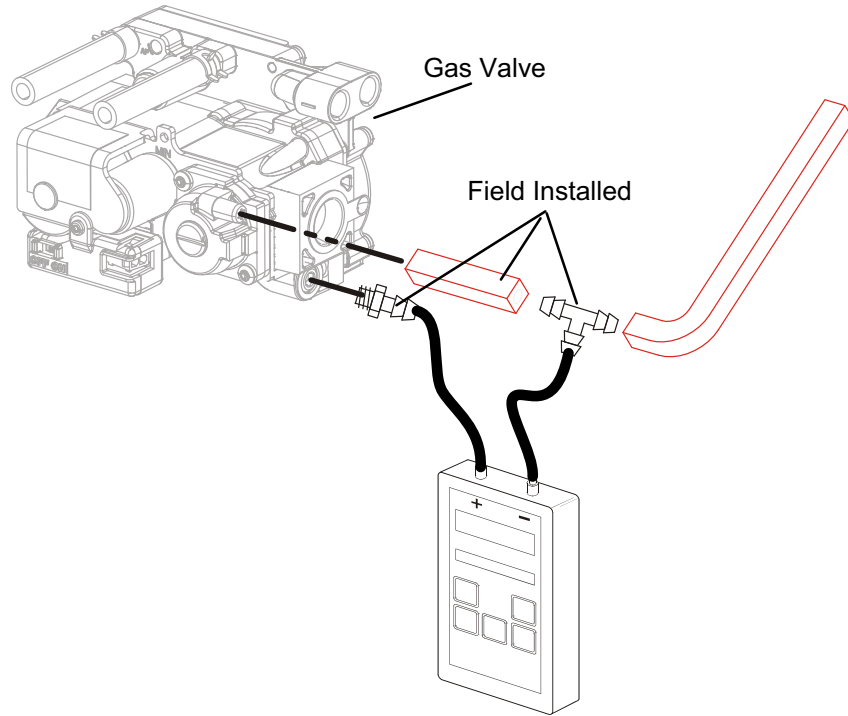


FIGURE 49

Operating Signal (Delta P) Measurement

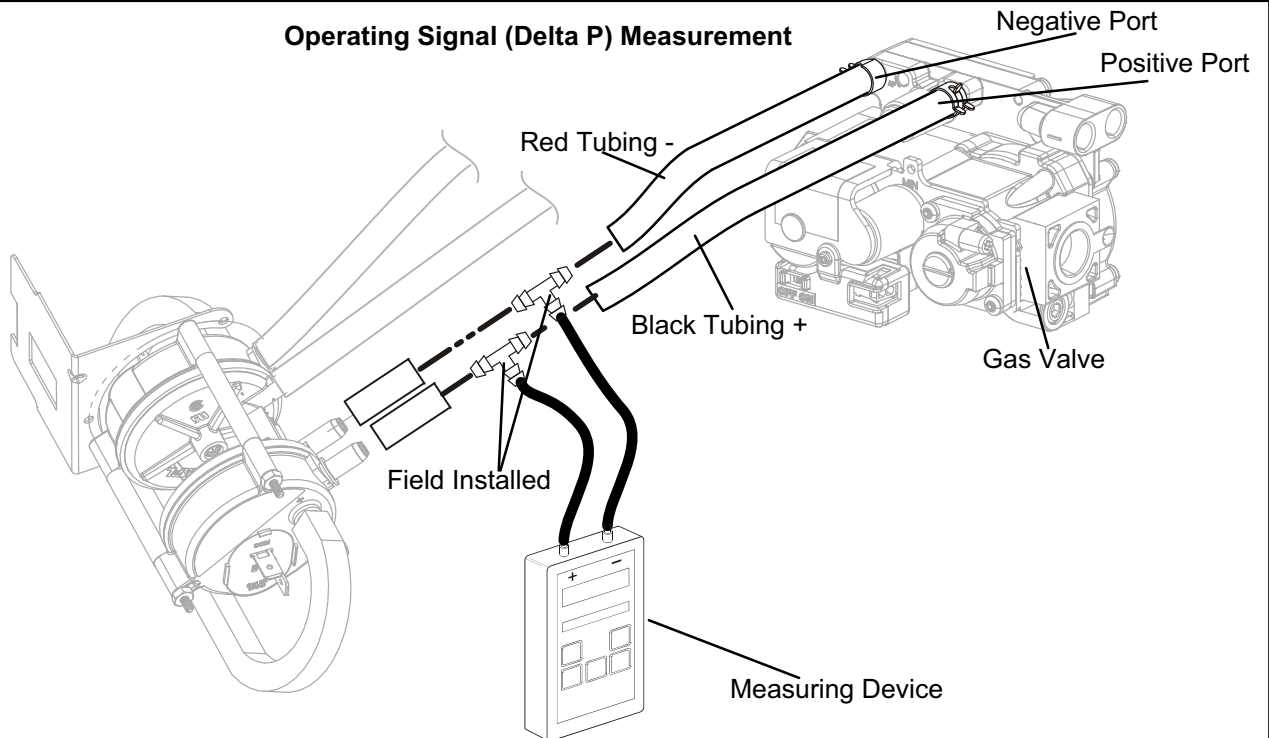


FIGURE 50

TABLE 24
Manifold and Operating Signal Pressures in inches 0 - 7500 ft (0 - 2286 m)

SLP98 Firing Rate	Manifold Pressure Nat Gas			Manifold Pressure LP/Propane			Operating Pressure Signal (Delta P)		
	Min	Normal	Max	Min	Normal	Max	Min	Normal	Max
35%	0.4	0.5	0.6	1.2	1.5	1.8	0.25	0.30	0.35
70%	1.7	1.9	2.1	5.1	5.5	5.9	0.60	0.65	0.70
100%	3.2	3.5	3.8	9.5	10.0	10.5	1.10	1.15	1.20

NOTE - A natural to LP/propane gas changeover kit (table 27) is necessary to convert this unit. Refer to the changeover kit installation instruction for the conversion procedure.

Proper Combustion

Furnace should operate a minimum of 15 minutes with correct manifold pressure and gas flow rate before checking combustion. Take combustion sample beyond the flue outlet and compare to the tables below. The maximum carbon monoxide reading should not exceed 50 ppm.

TABLE 25
High Fire

Model Input Size	CO ₂ % For Nat	CO ₂ % For L.P.
070	7.6 - 8.6	9.1 - 10.1
090		
110		
135		

TABLE 26
Low Fire

Model Input Size	CO ₂ % For Nat	CO ₂ % For L.P.
070	5.7	7.2 - 8.2
090	5.3 - 6.3	6.8 - 7.8
110		
135		

High Altitude Information

NOTE - In Canada, certification for installations at elevations over 4500 feet (1372 m) is the jurisdiction of local authorities.

SLP98UHV units require no manifold pressure adjustments for operation at altitudes up to 10,000 feet (3048 m) above sea level. Units installed at altitude of 7,501 to 10,000 feet (2287 to 3048m) require a pressure switch change per table 27. Table 27 also lists conversion kit requirements.

The® combustion air pressure switch is factory-set and requires no adjustment.

TABLE 27
Conversion Kit Requirements

Model Input Size	LP/Propane Kit	High Altitude Pressure Switch Kit	
	0 - 10,000 (0 - 3048 m)	0 - 7,500 (0 - 2286 m)	7,501 - 10,000 (2287 - 3048m)
070	65W77	Not required	93W75
090			
110			
135			

Other Unit Adjustments

Primary Limit

The primary limit is located on the heating compartment vestibule panel. This limit is factory set and require no adjustment.

Flame Rollout Switches (Two)

These manually reset switches are located on the inside of the burner box. If tripped, check for adequate combustion air before resetting.

Pressure Switches (Two)

The pressure switches are located on the cold end header box. These switches check for proper combustion air inducer operation before allowing ignition trial. The switches are factory-set and require no adjustment. Pressure switch tubing installation is critical for safe operation. See figure 51.

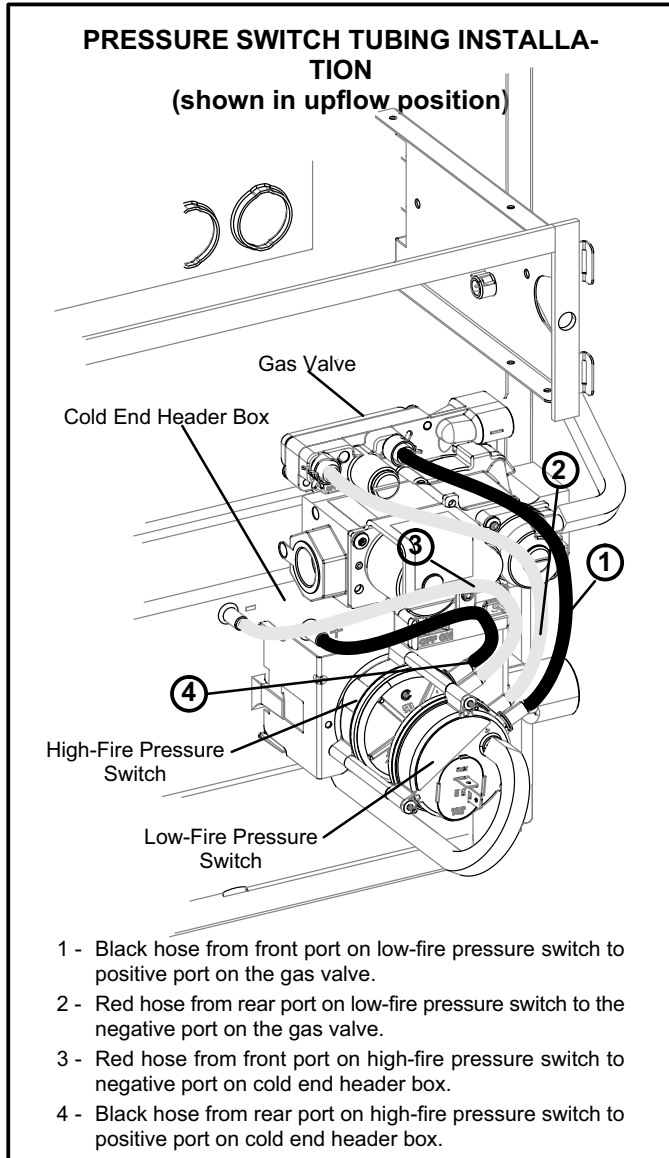


FIGURE 51

Temperature Rise

After the furnace has been started and supply and return air temperatures have been allowed to stabilize, check the temperature rise with the unit operating at 100 percent firing rate. If necessary, adjust the blower speed to maintain the temperature rise within the range shown on the unit nameplate. Increase the blower speed to decrease the temperature. Decrease the blower speed to increase the temperature rise. Failure to adjust the temperature rise may cause erratic limit operation.

Electronic Ignition

The integrated control has an added feature of an internal Watchguard control. The feature serves as an automatic reset device for ignition control lockout caused by ignition failure. This type of lockout is usually due to low gas line pressure. After one hour of continuous thermostat demand for heat, the Watchguard will break and remake thermostat demand to the furnace and automatically reset the control to begin the ignition sequence.

Exhaust and Air Intake Pipe

- 1 - Check exhaust and air intake connections for tightness and to make sure there is no blockage.
- 2 - Are pressure switches closed? Obstructed exhaust pipe will cause unit to shut off at pressure switches. Check termination for blockages.
- 3 - Reset manual flame rollout switches on burner box cover.

Heating Sequence of Operation

The integrated control initiates a pressure switch calibration at the initial unit start-up on a call for heat. The ignition control will also initiate a calibration any time main power is turned off and back on and a heating demand is present. Additional calibrations may be initiated by the service technician during field test sequence. The following heating sequence of operation assumes completion of a successful calibration.

NOTE - In *icomfort Touch™* communicating applications, the sequence of operation is the same but all DIP switch settings are overridden by the thermostat.

NOTE - The thermostat selection DIP switch on the integrated control is factory-set in the "TWO-STAGE" position.

Applications Using a Two-Stage Thermostat

A - Heating Sequence -- Control Thermostat Selection DIP switch in "Two-Stage" Position (Factory Setting)

- 1 - On a call for heat, thermostat first-stage contacts close sending a signal to the integrated control. The integrated control runs a self-diagnostic program and checks high temperature limit switches for normally closed contacts and pressure switches for normally open contacts. The combustion air inducer is energized at ignition speed, which is approximately the same as the inducer speed at 70 percent firing rate.
- 2 - Once the control receives a signal that the low-fire pressure switch has closed, the combustion air inducer begins a 15-second pre-purge in the ignition speed.
- 3 - After the pre-purge is complete, a 20-second initial ignitor warm-up period begins. The combustion air inducer continues to operate at the ignition speed.
- 4 - After the 20-second warm-up period has ended, the gas valve is energized and ignition occurs. At the same time, the control module sends a signal to begin an indoor blower 30-second ON-delay. When the delay ends, the indoor blower motor is energized at a speed that matches the firing rate. After the 10-second

ignition stabilization delay expires, the inducer speed is adjusted to the appropriate target rate. The inducer will remain at the 70 percent speed as long as the thermostat has a first-stage heating demand.

- 5 - If second-stage heat is required, the thermostat second-stage heat contacts close and send a signal to the integrated control. The integrated control initiates a 30-second second-stage recognition delay.
- 6 - At the end of the recognition delay and on all subsequent calls for heat in the same heating cycle, the integrated control energizes the combustion air inducer at high speed. The control also checks the high-fire pressure switch to make sure it is closed. As the inducer speed is increased to high, the indoor blower motor is adjusted to a speed which is appropriate for the target rate.
- 7 - When the demand for high-fire (second stage) heat is satisfied, the gas valve is de-energized and the field-selected indoor blower off delay begins. The combustion air inducer begins a 20-second post-purge period.
- 8 - When the combustion air post-purge period is complete, the inducer is de-energized. The indoor blower is de-energized at the end of the off delay.

Applications Using a Two-Stage Thermostat

B - Heating Sequence -- Control Thermostat Selection DIP switch in "Variable Capacity" Position

- 1 - On a call for heat, thermostat first-stage contacts close sending a signal to the integrated control. The integrated control runs a self-diagnostic program and checks high temperature limit switches for normally closed contacts and pressure switches for normally open contacts. The combustion air inducer is energized at ignition speed, which is approximately the same as the inducer speed at 70 percent firing rate.
- 2 - Once the control receives a signal that the low-fire pressure switch has closed, the combustion air inducer begins a 15-second pre-purge in low speed.
- 3 - After the pre-purge is complete, a 20-second initial ignitor warm-up period begins. The combustion air inducer continues to operate at the ignition speed.
- 4 - After the 20-second warm-up period has ended, the gas valve is energized and ignition occurs. At the same time, the control module begins an indoor blower 30-second ON-delay. When the delay ends, the indoor blower motor is energized at a speed that matches the firing rate. After the 10-second ignition stabilization delay expires, the inducer speed is adjusted to the appropriate target rate. If the furnace is operating in the initial heating cycle after power-up, the initial firing rate will be approximately 35 percent. The firing rate on subsequent cycles will be automatically adjusted by the integrated control based on thermostat cycles. The firing rate will vary and will range from 35 percent to 90 percent. The furnace will continue this operation as long as the thermostat has a first-stage heating demand.

- 5 - If second-stage heat is required, the thermostat second-stage heat contacts close and send a signal to the integrated control. The integrated control either increases the firing rate to 70 percent (if the current rate is at or below 60 percent) or increases the firing rate by 10 percent (if the current rate is above 60 percent). If the call for heat continues 5 minutes beyond this initial upstage, the rate will be increased by 10 percent every 5 minutes until the call for heat is satisfied or the furnace reaches 100 percent rate. As the firing rate increases, the indoor blower motor is adjusted to a speed which is appropriate for the target rate.
- 6 - If second-stage heat demand is satisfied, but first stage is still present, the furnace will continue to operate at the present firing rate until the heat cycle ends.
- 7 - When the demand for first- and second-stage heat is satisfied, the gas valve is de-energized and the field-selected indoor blower off delay begins. The combustion air inducer begins a 20-second post-purge period.
- 8 - When the combustion air post-purge period is complete, the inducer is de-energized. The indoor blower is de-energized at the end of the off delay.

Applications Using A Single-Stage Thermostat

C - Heating Sequence -- Control Thermostat Selection DIP switch in "Single-Stage" Position

- 1 - On a call for heat, thermostat first-stage contacts close sending a signal to the integrated control. The integrated control runs a self-diagnostic program and checks high temperature limit switches for normally closed contacts and pressure switches for normally open contacts. The combustion air inducer is energized at the ignition speed, which is approximately the same as the inducer speed at 70 percent firing rate.
- 2 - Once the control receives a signal that the low-fire pressure switch has closed, the combustion air inducer begins a 15-second pre-purge at the ignition speed.
- 3 - After the pre-purge is complete, a 20-second initial ignitor warm-up period begins. The combustion air inducer continues to operate at the ignition speed.
- 4 - After the 20-second warm-up period has ended, the gas valve is energized and ignition occurs, which initiates a 10-second ignition stabilization delay. At the same time, the control module sends a signal to begin an indoor blower 30-second ON-delay. When the delay ends, the indoor blower motor is energized at a speed which is appropriate for the firing rate. After the 10-second ignition stabilization delay expires, the inducer speed is adjusted to 35 percent speed. The integrated control also initiates a second-stage on delay (factory-set at 7 minutes; adjustable to 12 minutes).
- 5 - If the heating demand continues beyond the second-stage on delay, the integrated control energizes the combustion air inducer at 70 percent speed. The indoor blower motor is adjusted to a speed which matches the target rate. A fixed, 10-minute third-stage on delay is initiated.

- 6 - If the heating demand continues beyond the third-stage on delay, the integrated control energizes the inducer at high speed. The indoor blower motor is adjusted to a speed which is appropriate for the target rate.
- 7 -When the thermostat heating demand is satisfied, the gas valve is de-energized and the combustion air inducer begins a 20-second post-purge. The field-selected indoor blower off delay begins.
- 8 - When the combustion air post-purge period is complete, the inducer is de-energized. The indoor blower is de-energized at the end of the off delay.

Service

⚠ WARNING

ELECTRICAL SHOCK, FIRE, OR EXPLOSION HAZARD.

Failure to follow safety warnings exactly could result in dangerous operation, serious injury, death or property damage.
 Improper servicing could result in dangerous operation, serious injury, death, or property damage.
 Before servicing, disconnect all electrical power to furnace.
 When servicing controls, label all wires prior to disconnecting. Take care to reconnect wires correctly.
 Verify proper operation after servicing.

At the beginning of each heating season, system should be checked as follows by a qualified service technician:

Blower

Check the blower wheel for debris and clean if necessary. The blower motors are prelubricated for extended bearing life. No further lubrication is needed.

⚠ WARNING

The blower access panel must be securely in place when the blower and burners are operating. Gas fumes, which could contain carbon monoxide, can be drawn into living space resulting in personal injury or death.

Filters

All SLP98UHV filters are installed external to the unit. Filters should be inspected monthly. Clean or replace the filters when necessary to ensure proper furnace operation. Table 1 lists recommended filter sizes.

Exhaust and air intake pipes

Check the exhaust and air intake pipes and all connections for tightness and to make sure there is no blockage.

NOTE - After any heavy snow, ice or frozen fog event, the furnace vent pipes may become restricted. Always check the vent system and remove any snow or ice that may be obstructing the plastic intake or exhaust pipes.

Electrical

- 1 - Check all wiring for loose connections.
- 2 - Check for the correct voltage at the furnace (furnace operating). Correct voltage is 120VAC + 10%.
- 3 - Check amp-draw on the blower motor with inner blower panel in place.
 Motor Nameplate _____ Actual _____

Winterizing and Condensate Trap Care

- 1 - Turn off power to the unit.
- 2 - Have a shallow pan ready to empty condensate water.
- 3 - Remove the drain plug from the condensate trap and empty water. Inspect the trap then reinstall the drain plug and refill trap with water.

Cleaning the Burner Assembly

- 1 - Turn off electrical and gas power supplies to furnace. Remove upper and lower furnace access panels.
- 2 - Disconnect the 2-pin plug from the gas valve.
- 3 - Remove the burner box cover.
- 4 - Disconnect the gas supply line from the gas valve. Remove gas valve/manifold assembly.
- 5 - Mark and disconnect sensor wire from the sensor. Disconnect wires from flame rollout switches.
- 6 - Remove four screws which secure burner box assembly to vest panel. Remove burner box from the unit.
- 7 - Use the soft brush attachment on a vacuum cleaner to gently clean the face of the burners. Visually inspect the inside of the burners and crossovers for any blockage caused by foreign matter. Remove any blockage.
- 8 - Reinstall the burner box assembly using the existing four screws. Make sure that the burners line up in the center of the burner ports.
- 9 - Reconnect the sensor wire and reconnect the 2-pin plug to the ignitor wiring harness. Reconnect wires to flame rollout switches.
- 10 - Reinstall the gas valve manifold assembly. Reconnect the gas supply line to the gas valve. Reinstall the burner box cover.
- 11 - Reconnect 2-pin plug to gas valve.
- 12 - Replace the blower compartment access panel.
- 13 - Refer to instruction on verifying gas and electrical connections when re-establishing supplies.
- 14 - Follow lighting instructions to light and operate furnace for 5 minutes to ensure that heat exchanger is clean and dry and that furnace is operating properly.
- 15 - Replace heating compartment access panel.

Repair Parts List

The following repair parts are available through Lennox dealers. When ordering parts, include the complete furnace model number listed on the nameplate -- Example: SLP98UH070XV36B. **All service must be performed by a licensed professional installer (or equivalent), service agency, or gas supplier.**

Cabinet Parts

- Outer access panel
- Blower access panel
- Top cap

Control Panel Parts

- Transformer
- Integrated control
- Door interlock switch
- Circuit breaker

Blower Parts

- Blower wheel
- Motor
- Motor mounting frame
- Blower housing cut-off plate

Power choke (1HP only)

Heating Parts

- Flame sensor
- Heat exchanger assembly
- Gas manifold
- Combustion air inducer
- Gas valve
- Main burner cluster
- Main burner orifices
- Pressure switches
- Ignitor
- Primary limit control
- Flame rollout switches

Integrated Control Diagnostic Codes

Press the diagnostic push button and hold it to cycle through a menu of options. Every five seconds a new menu item will be displayed. Release the button when the desired mode is displayed.

When a solid "P" is displayed, the furnace capacity/ size is programmed.

When the solid "E" is displayed, the control enters the Error Code Recall mode. Error Code Recall mode menu options: No change (displaying error history) remains in Error Code Recall mode; solid "b" exits Error Code Recall mode; and solid "c" clears the error history. Must press button while flashing "c" is displayed to clear error codes.

When the solid "-" is displayed, the control enters the Field Test mode. Field Test mode menu options: Solid "C" starts pressure switch calibration; blinking "-" exits Field Test mode.

Code	Diagnostic Codes/Status of Equipment	Action Required to Clear and Recover
.	Idle mode (Decimal blinks at 1 Hertz -- 0.5 second ON, 0.5 second OFF).	
A	Cubic feet per minute (cfm) setting for indoor blower (1 second ON, 0.5 second OFF) / cfm setting for current mode displayed.	
C	Cooling stage (1 second ON, 0.5 second OFF) / 1 or 2 displayed / Pause / cfm setting displayed / Pause / Repeat codes).	
d	Dehumidification mode (1 second ON) / 1 second OFF) / cfm setting displayed / Pause / Repeat Codes).	
h	Variable Capacity Heat (1 second ON, 0.5 second OFF) / % of input rate displayed / Pause/ cfm setting / Pause/ Repeat codes.	
H	Heat Stage (1 second ON, 0.5 second OFF) / 1 or 2 displayed / Pause / cfm setting displayed / Pause / Repeat codes.	
df	Defrost mode.	
E 105	Device communication problem - No other devices on BUS (Communication system).	Equipment is unable to communicate. Check for mis wire and loose connections and check for a high voltage source of noise close to the system. (welder etc.).
E 110	Low line voltage.	Line Voltage low (Voltage lower than nameplate rating) Check voltage.
E 113	High line voltage.	Line Voltage High (Voltage higher than nameplate rating) Check voltage.
E 114	Line voltage frequency out-of-range.	No 60 hertz power (Check voltage and frequency).
E 115	Low 24V - Control will restart if the error recovers.	24 voltage low (Range is 18 to 30 volts) Check voltage.
E 120	Unresponsive device.	Usually caused by delay in outdoor unit responding to indoor unit polling recycle power, check wiring.
E 124	Active communicating thermostat signal missing for more than 3 minutes.	Equipment lost communication with the thermostat. Check connections and cycle power on the thermostat.
E 125	Control failed self-check, internal error, failed hardware. Will restart if error recovers. Integrated furnace control not communicating. Covers hardware errors (flame sense circuit faults, pin shorts, etc.).	Hardware problem on the control board. Cycle power on control. Replace if problem prevents service and is persistent.
E 126	Failed internal control communication between microcontrollers.	Hardware problem on the control board. Cycle power on control. Replace if problem prevents service and is persistent.
E 131	Corrupted control parameters (Verify configuration of system).	Reconfigure the system. Replace board if service (heating/cooling) is unavailable.
E 180	Outdoor air sensor failure - NO error if disconnected. Only shown if shorted or out-of-range.	Compare outdoor sensor resistance to temperature resistance charts in installation instructions. Replace if necessary.
E 200	Hard lockout - Rollout circuit open or previously open.	Correct unit cause of rollout trip or replace flame rollout switch and test furnace operation.
E 201	Indoor blower communication failure - Unable to communicate with blower motor.	Indoor blower communication failure including power outage.
E 202	Indoor blower motor mis-match - Indoor motor horsepower does not match unit capacity.	Incorrect furnace size code selected. Check unit size codes on configuration guide or in installation instructions.
E 203	Appliance capacity / size is NOT programmed. Invalid unit codes refer to configuration flow chart in installation instructions.	No furnace size code selected. Check unit size codes on configuration guide or in installation instructions.
E 204	Gas valve mis-wired.	Check operation of gas valve.
E 205	Gas valve control relay contact shorted.	Check operation of gas valve.
E 207	Hot surface ignitor sensed open - Refer to troubleshooting in installation instruction.	Measure resistance of Hot Surface Ignitor, replace if open or not within specification.

Integrated Control Diagnostic Codes (continued)

Code	Diagnostic Codes/Status of Equipment	Action Required to Clear and Recover
E 223	Low pressure switch failed open - Refer to troubleshooting in installation instruction.	Check inches of water column pressure during operation of low pressure switch on heat call, measure inches of water column of operating pressure, inspect vent and combustion air inducer for correct operation and restriction.
E 224	Low pressure switch failed closed - Refer to troubleshooting in installation instruction.	Check low pressure switch for closed contacts, measure inches of water column of operating pressure, inspect vent and combustion air inducer for correct operation and restriction.
E 225	High pressure switch failed open - Refer to troubleshooting in installation instruction.	Check inches of water column pressure of high pressure switch on heat call, measure inches of water column of operating pressure, inspect vent and combustion air inducer for correct operation and restriction.
E 226	High pressure switch failed closed - Refer to troubleshooting in installation instruction.	Check high pressure switch for closed contacts, measure inches of water column of operating pressure, inspect vent and combustion air inducer for correct operation and restriction.
E 227	Low pressure switch open during trial for ignition or run mode. Refer to troubleshooting in installation instruction.	Check inches of water column pressure during operation of low pressure switch on heat call, measure inches of water column of operating pressure, inspect vent and combustion air inducer for correct operation and restriction.
E 228	Unable to perform successful pressure switch calibration.	Retry after 300 seconds. Error counter cleared when exiting lockout, unable to perform pressure switch calibration. Check vent system and pressure switch wiring connections.
E 240	Low flame current - Run mode - Refer to troubleshooting in installation instruction.	Check micro amperes of flame sensor, clean or replace sensor. Measure voltage of neutral to ground for good unit ground.
E 241	Flame sensed out of sequence - Flame still present.	Shut off gas, check for gas valve leak.
E 250	Limit switch circuit open - Refer to troubleshooting in installation instruction.	Check why limit is tripping, overfired, low air flow.
E 252	Discharge air temperature too high (gas heat only).	Check temperature rise, air flow and input rate.
E 270	Soft lockout - Exceeded maximum number of retries. No flame current sensed.	Check for gas flow, ignitor lighting burner, flame sensor current.
E 271	Soft lockout - Exceeded maximum number of retries. Last retry failed due to the pressure switch opening.	See E 223.
E 272	Soft lockout - Exceeded maximum number of recycles. Last recycle due to the pressure switch opening.	See E 223 and E 225.
E 273	Soft lockout - Exceeded maximum number of recycles. Last recycle due to flame failure.	See E 240.
E 274	Soft lockout - Exceeded maximum number of recycles. Last recycle failed due to the limit circuit opening or limit remained open longer than 3 minutes.	See E 250.
E 275	Soft lockout - Flame sensed out of sequence from code 241 fault. Flame signal is gone.	See E 241.
E 276	Soft lockout - Exceeded maximum number of calibration retries.	See E 228.
E 290	Ignitor circuit fault - Failed ignitor or triggering circuitry.	See E 207.
E 291	Restricted air flow - Cubic feet per minute is lower than what is needed for minimum firing rate.	Check for dirty filter, unit air flow restriction, blower performance.
E 292	Indoor blower motor unable to start - Seized bearings, stuck wheel, etc.	Indoor blower motor unable to start (seized bearing, stuck wheel, etc), replace motor or wheel if assembly does not operate or meet performance.
E 294	Combustion air inducer motor amp draw is too high.	Check combustion blower bearings, wiring, amperes, replace if it does not operate or meet performance.

Integrated Control Diagnostic Codes (continued)

Code	Diagnostic Codes/Status of Equipment	Action Required to Clear and Recover
E 295	Indoor blower motor temperature is too high.	Indoor blower motor over temperature (motor tripped on internal protector), Check motor bearings, amperes. Replace if necessary.
E 310	Discharge error sensor failure - No error if disconnected. Only shown if shorted or out-of-range.	Discharge air temperature(DATS) out of range, code is activated during "Field test mode".
E 311	Heat rate reduced to match indoor blower air flow. Replace filter or repair duct restriction.	Furnace blower in cutback mode due to restricted airflow. Check filter and ductwork. To clear replace filter if needed or repair/ add ductwork.
E 312	Restricted air flow in cooling or continuous fan mode is lower than cfm setting.	Restricted airflow - Indoor blower is running at a reduced cubic feet per minute (Cutback Mode) - The variable speed motor has pre-set speed and torque limiters to protect the motor from damage caused by operating out of its designed parameters (0 to 0.8 inches water column total external static pressure). Check filter and ductwork. To clear replace filter if needed or repair/ add ductwork.
E 313	Indoor or outdoor unit capacity mismatch.	Incorrect Indoor /outdoor capacity code selected. Check for proper configuration in installation instructions. Alarm is just a warning. The system operation is not impacted at all and alarm would clear when Commissioning is exited.
E 331	Global network connection - Communication link problem.	For Future Use.
E 347	No 24 Volt output on Y1 to C with non-communicating outdoor unit.	Y1 relay / Stage 1 failed (Pilot relay contacts did not close or the relay coil did not energize).
E 348	No 24 Volt output on Y2 to C with non-communicating outdoor unit.	Y2 relay / Stage 2 failed (Pilot relay contacts did not close or the relay coil did not energize).
E 349	No 24 Volts between R & O with non-communicating outdoor unit (Dual fuel module required for heat pump application).	Configuration link R to O needs to be cut on control board.
E 401	LSOM - Compressor ran more than 18 hours in air conditioning mode.	Compressor protector is open. Check for high head pressure, check compressor supply voltage. Outdoor unit power disconnect is open , compressor circuit breaker or fuse(s) is open, broken wire or connector is not making contact. Low or high pressure switch open if present in the system. Compressor contactor has failed to close.
E 402	LSOM - Outdoor unit system pressure trip.	Compressor ran over 18 hours in air conditioning mode.
E 403	LSOM - Compressor short-cycling (Running less than 4 minutes).	Outdoor unit pressure trip. Check dirty coil, fan motor, refrigerant charge.
E 404	LSOM - Compressor rotor locked.	Compressor short cycling (Running less than 4 minutes).
E 405	LSOM - Compressor open circuit.	Check capacitor, wiring, hard start kit , replace compressor.
E 406	LSOM - Compressor open start circuit.	Check compressor for hot (cool down) , check pressures, fan motor etc. Replace compressor if unable to get circuit to close and compressor to operate.
E 407	LSOM - Compressor open run circuit.	
E 408	LSOM - Compressor contactor is welded.	
E 409	LSOM - Compressor low voltage.	Replace contactor.

Configuring Unit Size Codes

Power-Up - Number displayed represents by integrated control unit size code (furnace model and capacity). If three horizontal bars are displayed followed by continuous E203, furnace control does not recognize **unit size code**. Configure per the following:



Furnace control in **IDLE** mode
No heating, cooling or indoor fan operation)

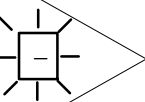
Yes

No

To enter **Field Test Mode**: push and hold button next to 7-segment LED display until **solid dash** symbol appears. Release button.



If alarm is present, furnace control will display error code. If alarm is not present **solid dash** starts blinking on 7-segment LED display.

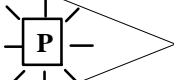


Push and hold button until the **solid P** symbol is displayed on the 7-segment LED. Release button. This mode allows the user to select a unit size code number that matches the furnace model size and capacity.



IMPORTANT: Field replacement controls may need to be manually configured to validate furnace unit size code.

Solid **P** starts blinking on 7-Segment LED



Push and hold button. Integrated control will display unit size code number for each furnace model for five seconds.

Turn room thermostat to **OFF**

UNIT SIZE CODE FURNACE MODEL

A	SLP98UHXV-070-36B
b	SLP98UHXV-090-36C
C	SLP98UHXV-090-48C
d	SLP98UHXV-090-60C
E	SLP98UHXV-110-60C
F	SLP98UHXV-135-60D

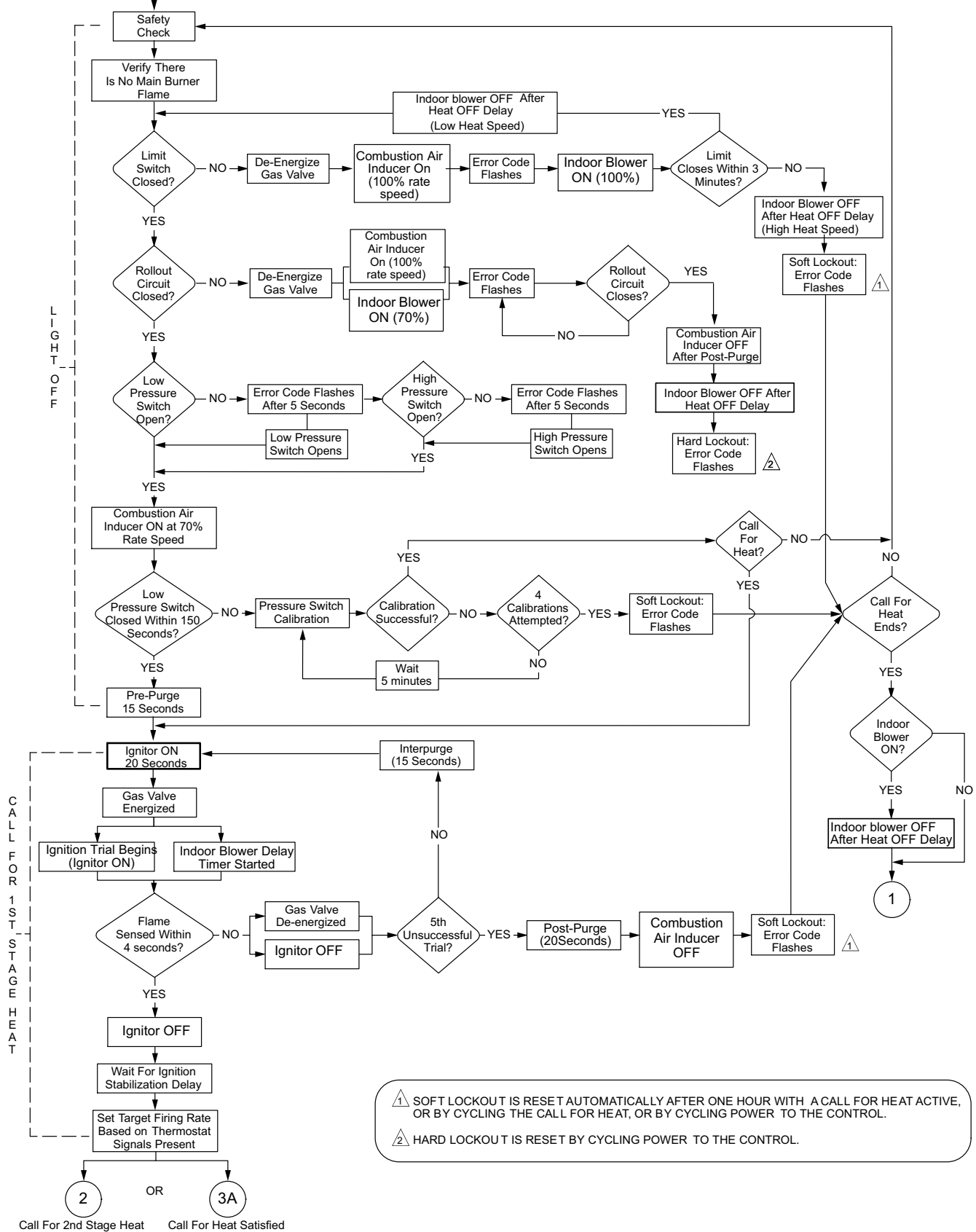
When the correct unit size code is displayed, release button. Selected code will flash for 10-second period. During that period, hold push button until code stops blinking (disappear for 2 seconds). Integrated control will store code in memory and will automatically exit **Field Test Mode** and reset. (If second period expires or push button is held less than five seconds, control will automatically exit **Field Test Mode** and go into **IDLE** mode without storing unit size code. If this happens, programming function must be repeated).

Verify that the selected **unit size code** is correct and stored in non-volatile memory by cycling the 24 volt power to the furnace control. (At 24 volt power-up of the furnace control, the 7-segment LED will display a **unit size code**. If three horizontal bars display, board does not recognize **unit size code**. Programming function must be repeated)

FINISHED

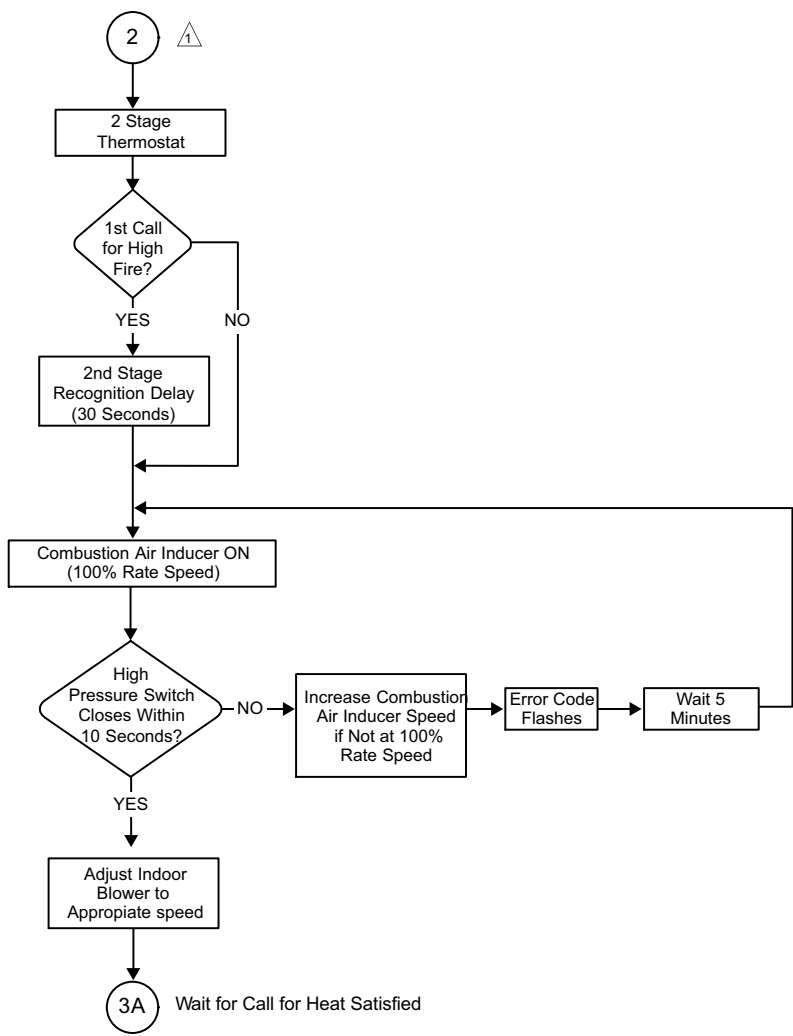
Troubleshooting: Heating Sequence of Operation

IGNITION AND CALL FOR LOW FIRE WITH TWO-STAGE THERMOSTAT



Troubleshooting: Heating Sequence of Operation (Continued)

CALL FOR HIGH FIRE WITH TWO-STAGE THERMOSTAT



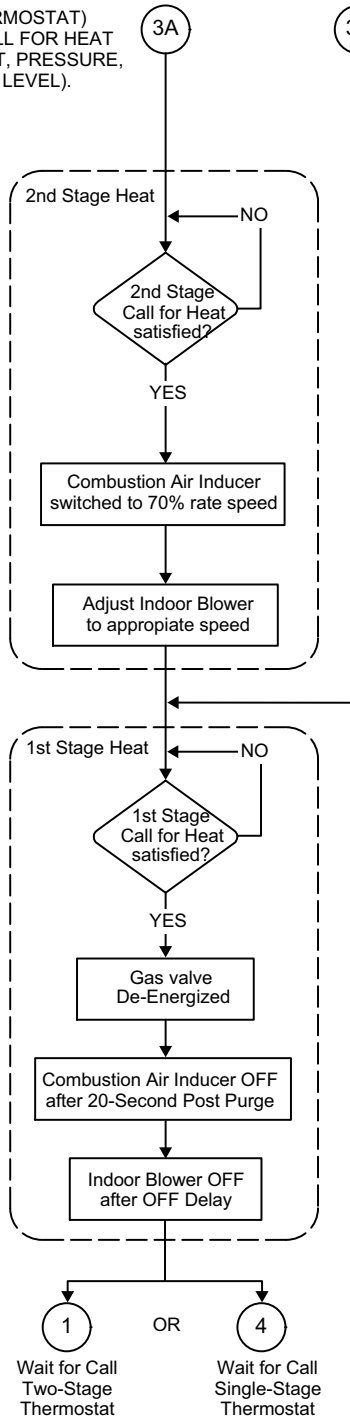
- ⚠️ 1 System will always light at 70% even if 2nd stage call for heat is in place
- ⚠️ 2 If the high pressure switch does not close within 5 attempts, the system will operate at low fire for the remainder of the call for heat at request

Troubleshooting: Heating Sequence of Operation (Continued)

CALL FOR HEAT SATISFIED

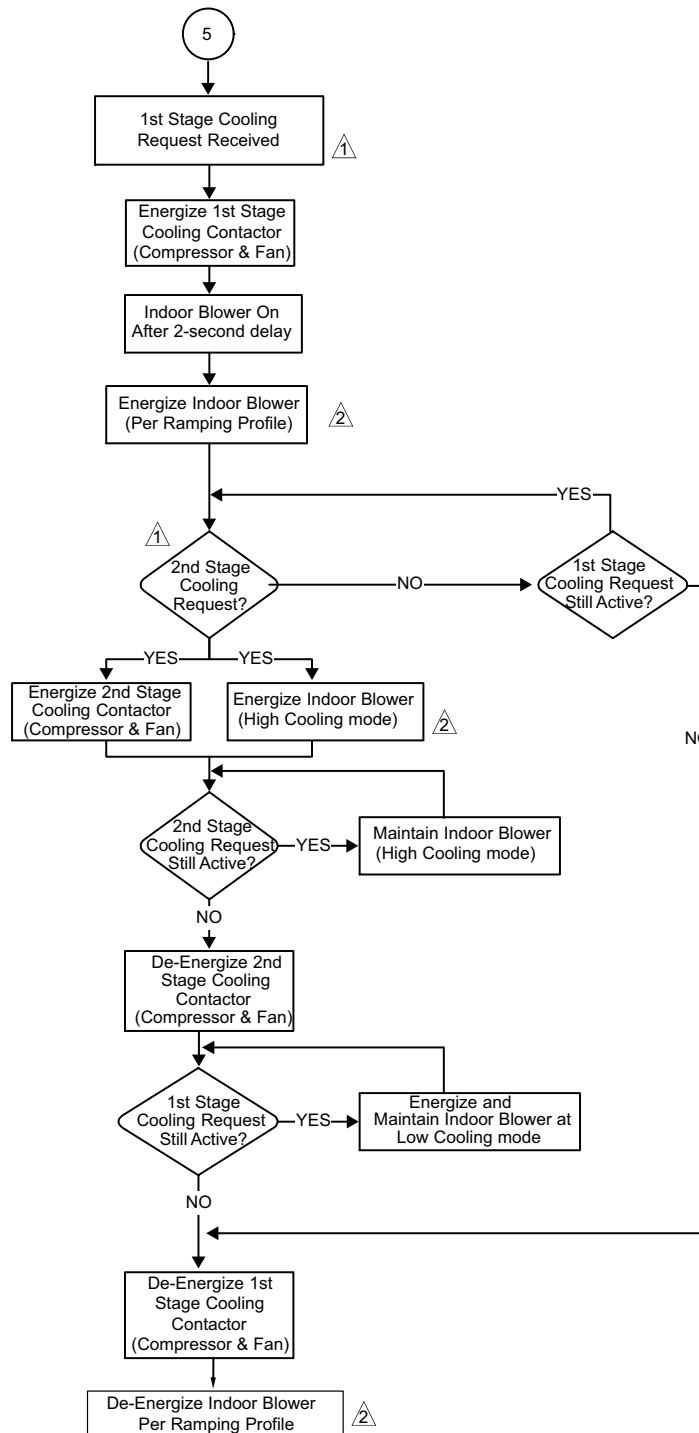
RUN MODE (TWO-STAGE THERMOSTAT)
FIRST OR SECOND-STAGE CALL FOR HEAT
ALL INPUTS MONITORED (LIMIT, PRESSURE,
CALL FOR HEAT/COOL, FLAME LEVEL).

RUN MODE (SINGLE-STAGE THERMOSTAT)
ALL INPUTS MONITORED (LIMIT, PRESSURE,
CALL FOR HEAT/COOL, FLAME LEVEL).



Troubleshooting: Cooling Sequence of Operation

CALL FOR COOLING

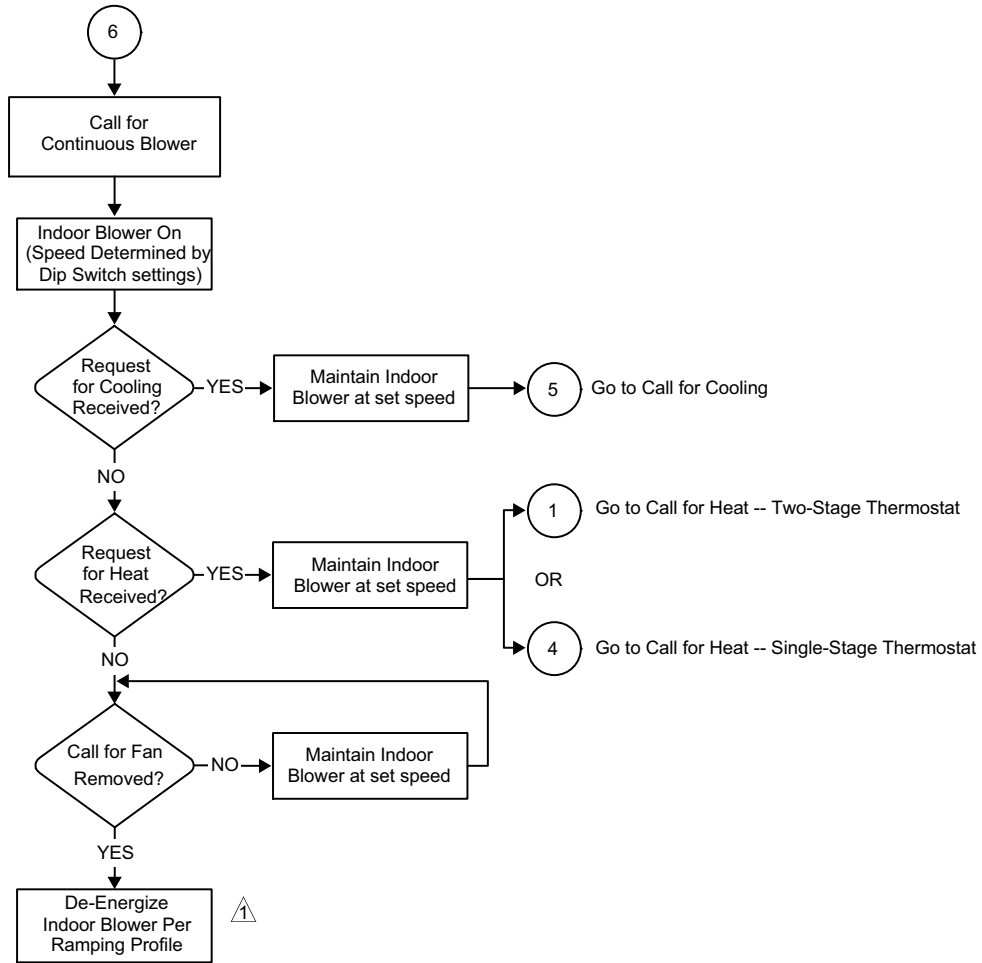


⚠ 1 2nd stage cooling operation requires a 2-stage thermostat, a 2-stage cooling system and on-board link W915 must be cut. The control will not respond to a 2nd stage cooling request unless a 1st stage cooling request is active

⚠ 2 Indoor blower cooling mode and high cooling mode have a specific ON, OFF and speed ramping profiles. The specific profile is selected using the DIP switches on the control.

Troubleshooting: Continuous Fan Sequence of Operation

CONTINUOUS LOW SPEED INDOOR BLOWER SEQUENCE OF OPERATION



⚠ Indoor blower low cooling mode and high cooling mode, have specific ON - OFF and speed ramping profiles. The specific profile is selected using the dip switches on the control.

Requirements for Commonwealth of Massachusetts

Modifications to NFPA-54, Chapter 10

Revise NFPA-54 section 10.8.3 to add the following requirements:

For all side wall, horizontally vented, gas-fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side wall exhaust vent termination is less than seven (7) feet above the finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:

- 1 - **INSTALLATION OF CARBON MONOXIDE DETECTORS.** At the time of installation of the side wall, horizontally vented, gas-fueled equipment, the installing plumber or gasfitter shall observe that a hard-wired carbon monoxide detector with an alarm and battery backup is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery-operated or hard-wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side wall, horizontally vented, gas-fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professionals for the installation of hard-wired carbon monoxide detectors.
 - a - In the event that the side wall, horizontally vented, gas-fueled equipment is installed in a crawl space or an attic, the hard-wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.
 - b - In the event that the requirements of this subdivision cannot be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery-operated carbon monoxide detector with an alarm shall be installed.
- 2 - **APPROVED CARBON MONOXIDE DETECTORS.** Each carbon monoxide detector as required in accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.
- 3 - **SIGNAGE.** A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented, gas-fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size, "GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS."

- 4 - **INSPECTION.** The state or local gas inspector of the side wall, horizontally vented, gas-fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08(2)(a) 1 through 4.

EXEMPTIONS: The following equipment is exempt from 24 CMR 5.08(2)(a) 1 through 4:

- 1 - The equipment listed in Chapter 10 entitled "Equipment Not Required to Be Vented" in the most current edition of NFPA 54 as adopted by the Board; and
- 2 - Product Approved side wall, horizontally vented, gas-fueled equipment installed in a room or structure separate from the dwelling, building or structure used in whole or in part for residential purposes.

MANUFACTURER REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM PROVIDED.

When the manufacturer of Product Approved side wall, horizontally vented, gas-fueled equipment provides a venting system design or venting system components with the equipment, the instructions provided by the manufacturer for installation of the equipment and the venting system shall include:

- 1 - Detailed instructions for the installation of the venting system design or the venting system components: and
- 2 - A complete parts list for the venting system design or venting system.

MANUFACTURER REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM NOT PROVIDED.

When the manufacturer of Product Approved side wall, horizontally vented, gas-fueled equipment does not provide the parts for venting the flue gases, but identifies "special venting systems," the following requirements shall be satisfied by the manufacturer:

- 1 - The referenced "special venting system" instructions shall be included with the appliance or equipment installation instructions; and
- 2 - The "special venting systems" shall be Product Approved by the Board, and the instructions for that system shall include a parts list and detailed installation instructions.

A copy of all installation instructions for all Product Approved side wall, horizontally vented, gas-fueled equipment, all venting instructions, all parts lists for venting instructions, and/or all venting design instructions shall remain with the appliance or equipment at the completion of the installation.

FOR THE PROVINCE OF ONTARIO, HORIZONTAL SIDEWALL VENT APPLICATIONS ONLY

For exterior horizontal venting applications, the 2" X 1.5" reducer for 2" venting at the point where the exhaust pipe exits the structure is not required in direct or non-direct vent applications in the Province of Ontario. In these applications, the vent should be oriented such that the exhaust

plume is unobjectionable. If the installation requires more separation between the flue gases and the building structure, a reducer may be installed on the exhaust pipe to increase the flue gas velocity.