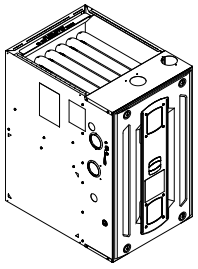
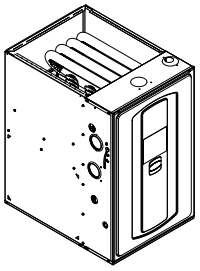
Installation, Operation, and Maintenance

Upflow/Horizontal and Dedicated Downflow Gas-Fired, Direct/Non-Direct Vent, Single Stage / Two Stage Condensing Furnaces with High Efficiency Motor

Upflow, Convertible to Horizontal Left and Horizontal Right
Dedicated Downflow
S9X1
S9X2
S9B1





Note: *Graphics in this document are for representation only. Actual model may differ in appearance.*

FNR-SVX002C-EN

⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

November 2026 **FNR-SVX002C-EN**

Introduction

Read this manual thoroughly before operating or servicing this unit.

This document is customer property and is to remain with this unit. Return to the service information pack upon completion of work.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
NOTICE	Indicates a situation that could result in equipment or property-damage only accidents.

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- **Before installing/servicing this unit, technicians MUST put on all PPE required for the work being undertaken (Examples; cut resistant gloves/ sleeves, butyl gloves, safety glasses, hard hat/ bump cap, fall protection, electrical PPE and arc flash clothing). ALWAYS refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.**
- **If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

©2026

⚠ WARNING

Follow EHS Policies!

Failure to follow instructions below could result in death or serious injury.

- **All Trane personnel must follow the Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, and lockout/tagout. Where local regulations are more stringent than these policies, those regulations supersede these policies.**
- **Non-Trane personnel should always follow local regulations.**

⚠ WARNING

Cancer and Reproductive Harm!

This product can expose you to chemicals, including lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

⚠ WARNING

Safety Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

This unit is not to be used by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.

Do not allow children to play or climb on the unit or to clean or maintain the unit without supervision.

⚠ WARNING

Fire Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

For installations with flammable refrigeration system, the furnace must be powered at all times except during servicing. The furnace must be installed and connected according to installation instructions and wiring diagrams provided with the evaporator coil.

⚠ WARNING

Explosion Hazard!

Failure to follow instruction below could result in death or serious injury or property damage.

Install a gas detector for leak warnings. The manufacturer does not test or endorse any specific brand or type of detector.

⚠ WARNING

Fire or Explosion Hazard!

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

Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections. A fire or explosion can result causing property damage, personal injury, or loss of life.

⚠ WARNING

Electrical Shock, Fire, or Explosion Hazard!

Failure to follow the 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 the furnace.**
- **When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.**
- **Verify proper operation after servicing.**

⚠ WARNING

Carbon Monoxide Poisoning!

Failure to follow instructions below could result in death or serious injury, or property damage.

- **To confirm the furnace is vented properly, do not replace factory-supplied venting components with field fabricated parts. Fabricating parts can result in damaged vents and components, allowing carbon monoxide to escape the venting system.**
- **Follow the service and/or periodic maintenance and installation and operation instructions for the furnace and the venting system. Do not attempt to change the venting system.**
- **Verify the blower door is in place and not ajar. Dangerous fumes could escape an improperly secured door.**
- **Inspect the chimney liner thoroughly to verify no cracks or other potential areas for flue gas leaks are present in the liner. Liner leaks will result in early damage to the chimney. Furnace venting into an unlined masonry chimney or concrete chimney is prohibited.**

⚠ WARNING

Carbon Monoxide Poisoning!

Failure to follow instructions below could cause result in death or serious injury, or property damage.

Follow the installation and operation instructions for the venting system. Do not attempt to change the venting system.

⚠ WARNING

Fire Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

Do not install the furnace directly on carpet or other combustible material other than wood flooring. Use subbase (BAYBASE205) between the furnace and combustible flooring for vertical downflow applications. When the downflow furnace is installed vertically with a cased coil, a subbase is not required.

⚠ WARNING

Explosion Hazard!

Failure to follow instruction below could result in death or serious injury or property damage.

Propane gas is heavier than air and can accumulate in low areas or confined spaces. Odorant fade may make it undetectable without a warning device. If a gas furnace is installed in a basement, excavated areas, or a confined space, it is strongly recommended to contact a gas supplier to install a gas detector for leak warnings. The manufacturer does not test or endorse any specific brand or type of detector.

⚠ WARNING

Electrical Shock Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

Do not bypass the door switch or the panel loop permanently.

⚠ WARNING

Electrical Shock Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

Do not touch any components other than the Menu and Option buttons on IFC when setting up the system or during fault code recovery.

⚠ WARNING

Risk of Fire or Explosion!

Failure to follow instruction below could result in death or serious injury or property damage.

Do NOT attempt to manually light the furnace.

⚠ WARNING

Electrical Shock Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

Disconnect power to the unit before removing the blower door and wait at least 10 seconds for the IFC power supply to discharge to 0 volts.

⚠ WARNING

Safety Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

These furnaces are not approved or intended for installation in trailers or recreational vehicles. Installation in manufactured (mobile) housing is only approved with BAYMFGH Kit.

⚠ WARNING

Explosion Hazard!

Failure to follow instruction below could result in death or serious injury or property damage.

If electrical, fuel, or mechanical failures occur, shut off the gas supply at the manual valve on the supply piping before turning off the furnace's electrical power. Contact your dealer's designated service agency.

⚠ WARNING

Safety Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

Do not use semi-rigid metallic gas connectors (flexible gas lines) within the furnace cabinet.

⚠ WARNING

High Voltage Moving Parts!

Failure to follow instructions below could result in death or serious injury or property damage due to high voltage electrical components, fast-moving fans, and combustible gas.

During installation and servicing, turn off the main gas valve and disconnect the electrical supply. If operating checks must be performed with the unit operating, the technician must recognize these hazards and proceed safely.

⚠ WARNING

Safety Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

Do not install the filter in the return duct directly above the furnace in horizontal applications. Install the filter remotely.

⚠ 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:

- **Seal any unused openings in the venting system.**
- **Inspect the venting system for proper size and horizontal pitch as required in the National Fuel Gas Code, ANSI Z223.1/NFPA 54 or the Natural Gas and Propane Installation Code, CSA B149.1 and these instructions. Determine there is no blockage or restriction, leakage, corrosion, or other deficiencies which could cause an unsafe condition.**
- **As far as practical, close all building doors and windows and all doors between the space in which the appliance(s) connected to the venting system are located and other spaces of the building.**
- **Close fireplace dampers.**
- **Turn on clothes dryers and any appliance not connected to the venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they are operating at maximum speed. Do not operate a summer exhaust fan.**
- **Follow the lighting instructions. Place the appliance being inspected into operation. Adjust the thermostat so appliance is operating continuously.**
- **Test for spillage from draft hood equipped appliances at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle.**
- **If improper venting is observed during any of the above tests, correct the venting system in accordance with the National Fuel Gas Code, ANSI Z223.1/NFPA and/or Natural Gas and Propane Installation Code, CSA B149.1 .**
- **After it has been determined that each appliance connected to the venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers, and any other gas-fired burning appliance to their previous conditions of use.**

⚠ WARNING

Safety Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

Turn off the power to the furnace before servicing filters to avoid contact with moving parts.

⚠ WARNING

Shock Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

If a disconnect switch is present, always lock in the open position before servicing the unit.

⚠ WARNING

Electrical Shock Hazard!

Failure to follow this warning could result in an electric shock, fire, injury, or death.

Ensure cabinet has an uninterrupted or unbroken ground in accordance with National Electrical Code, ANSI/NFPA 70 – latest edition and Canadian Electrical Code, CSA C22.1 or local codes in case of an electrical fault.

⚠ WARNING

Overheating and Explosion Hazard!

Failure to follow this warning could result in property damage, personal injury, or death.

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.

⚠ WARNING

Safety Hazard!

Failure to follow instructions below could result in death or serious injury or property damage.

The vent for this appliance must not terminate over public walkways, near soffit or crawl space vents, or where condensate could cause damage or be detrimental to the operation of regulators, relief valves, or other equipment.

⚠ WARNING

Hot Surface!

Failure to follow instructions below could result in minor to moderate injuries.

Do not touch igniter. It is extremely hot.

⚠ CAUTION

Improper Voltage Connection!

Failure to follow instructions below could result in personal injury or equipment damage.

Do NOT connect the furnace line voltage to a GFCI-protected circuit.

⚠ CAUTION

Corrosion Hazard!

Failure to follow instructions below could result in minor to moderate injury or property damage.

Do not install the furnace in a corrosive or contaminated atmosphere.

⚠ CAUTION

Sharp Edges!

Failure to follow instructions below could result in minor to moderate injury.

The service procedure described in this document involves working around sharp edges. To avoid being cut, technicians MUST put on all necessary Personal Protective Equipment (PPE), including gloves and arm guards.

⚠ CAUTION

Valve Damage!

Failure to follow instructions below could result in minor to moderate injury or equipment damage.

Use a backup wrench on the gas valve when installing gas piping to prevent damage to the valve and manifold assembly.

⚠ CAUTION

Freeze Damage!

Failure to follow instructions below could result in minor to moderate injury or property damage.

Insulate vent pipes with 1/2 inch (12.7 mm) Armaflex-type insulation or equivalent when passing through unheated spaces exposed to freezing temperatures. Insulation is not needed if the space is heated enough to prevent freezing. If domestic water pipes are not protected from freezing, the space is considered heated. Schedule qualified personnel to inspect the temperature if the house is vacant during freezing weather. A furnace failure could lead to frozen water pipes.

⚠ CAUTION

Freeze Damage!

Failure to follow instructions below could result in minor to moderate injury or property damage.

Take measures to prevent drains from freezing or causing slippery conditions. Excessive draining of condensate may cause saturated ground conditions that may result in damage to plants.

⚠ CAUTION

Ignition Function!

Failure to follow instructions below could result in minor to severe injury and result in poor ignition characteristics.

Maintain manifold pressure in high altitude installations.

⚠ CAUTION

Water Damage!

Failure to follow instructions below could result in minor to moderate injury or property damage.

Install an external overflow drain pan in all applications over a finished ceiling to prevent leaking condensate.

⚠ CAUTION

Furnace Service Caution!

Failure to follow instructions below could result in property damage or personal injury.

Label all wires prior to disconnection when servicing controls. Verify proper operation after servicing. Wiring errors can cause improper and dangerous operation.

⚠ CAUTION

Do NOT Use as Construction Heater!

Failure to follow instructions below could result in property damage or personal injury.

To prevent shortening its service life, do not use the furnace as a construction heater during the finishing phases of construction until the furnace installation guidelines are met. Condensate in the presence of chlorides and fluorides from paint, varnish, stains, adhesives, cleaning compounds, and cement, create a corrosive condition which may cause rapid deterioration of the heat exchanger.

⚠ CAUTION

Wiring Hazard!

Failure to follow instructions below could result in minor to moderate injury or property damage.

The integrated furnace control is polarity sensitive. Connect the hot leg of the 120 VAC power to the black field lead.

⚠ CAUTION

Venting Required!

Failure to follow instructions below could result in minor to moderate injury or property damage.

- **Condensing furnaces may be vented through unused chimneys. Do not vent through chimneys used for wood-burning, oil furnaces, incinerators or any other gas appliance. If remaining free area between single wall flue pipe and masonry chimney is used for another gas appliance, venting area must be sufficient and that appliance must be connected to the chimney with separate entry openings.**
- **The single wall flue pipe joints must be sealed. The 90° elbow connection to the vertical pipe must be sealed to prevent condensate leakage to base of the masonry chimney.**

⚠ CAUTION

Coil Requirement!

Failure to follow instructions below could result in minor to moderate injury or property damage.

For 4GXC* and 4MXC* coils on upflow furnaces in vertical, horizontal left, or horizontal right orientations without a factory-installed metal drain pan shield, must use a MAY*FERCOLKITAA kit. Coils installed on upflow furnaces must have drain pans suitable for 400° F (205° C) or metal drain pan shield. Downflow furnaces do not require a metal drain pan shield or MAY*FERCOLKITAA kit.

NOTICE

Equipment Damage!

Failure to follow instructions below could result in equipment damage.

UV light exposure can deteriorate plastic blower material, potentially damaging the blower housing. For units with plastic blower housings, do not install third-party UV air cleaners where the blower housing is exposed to UV light.

For more information, visit www.trane.com and www.americanstandardair.com or contact your installing dealer.

6200 Troup Highway

Tyler, TX 75707

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Additional Resources

Additional support (short videos) available at https://www.trane.com/fieldtechhelp/index.html.

Revision History

- Updated Safety Practices and Precautions and General Guidelines sections in the Furnace Installation Guidelines chapter.
- Updated the Accessories table in the Accessories chapter.
- Updated figures in the Wiring Diagrams chapter.
- Updated Gas flow in cubic feet per hour table in the Combustion and Input Check section in the Furnace General Installation chapter.
- Updated Fuel manifold pressure settings (inches w. c.) table in the Gas Valve Adjustment section in the Furnace General Installation chapter.
- Updated the figure in the Twinning section in the Furnace General Installation chapter.
- Updated the Maximum vent length table in the Maximum Vent Length chapter.
- Updated the Supply duct connections table in the Supply Duct Connections chapter.
- Updated the General Start-Up and Adjustment chapter.
- Updated the setting airflow on the 9–tap motor QR-code in the Setting Airflow chapter.
- Updated the figure in the Return Ducting General Guidelines chapter.
- Updated the fault code 6.2 and fault code 6.3 in the Troubleshooting chapter.
- The heater exchanger QR code is added in the Periodic Servicing Requirements chapter.

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Accessories

Table 1. Accessories

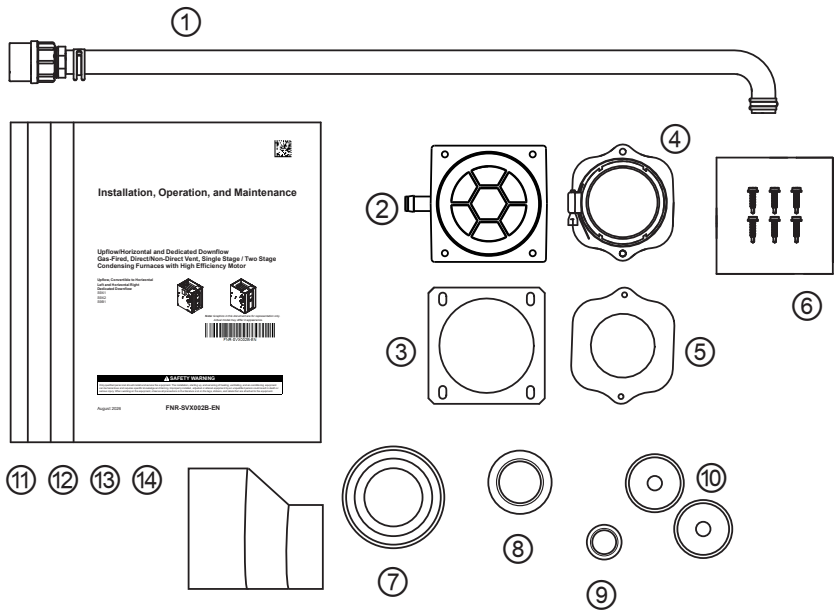
Model Number	Description	Use with
MAYBFERCOLKITA	Heat Shield Kit for B-width 4GXCB or 4MCXB Coils	B width 4GXCB or 4MCXB Coils when installed with Upflow Furnace in all orientations.
MAYCFERCOLKITA	Heat Shield Kit for C-width 4GXCC or 4MCXC Coils	C width 4GXCC or 4MCXC Coils when installed with Upflow Furnace in all orientations.
MAYDFERCOLKITA	Heat Shield Kit for D-width 4GXCD or 4MCXD Coils	D width 4GXCD or 4MCXD Coils when installed with Upflow Furnace in all orientations.
BAYHANG	Horizontal Hanging Kit	All Upflow Furnaces
BAYVENT200B	Sidewall Vent Termination Kit	All Furnaces
BAYVENTCN200B	Sidewall Vent Termination Kit (Canada - CPVC)	All Furnaces
BAYAIR30AVENTA	Concentric Vent Kit	All Furnaces
BAYAIR30CNVENT	Concentric Vent Kit (Canada - CPVC)	All Furnaces
BAYREDUCE	Reducing Coupling (Canada - CPVC)	All Furnaces
BAYLIFTB[a]	Dual Return Kit (B size extension)	B Cabinet Upflow Furnaces
BAYLIFTC[a]	Dual Return Kit (C size extension)	C Cabinet Upflow Furnaces
BAYLIFTD[a]	Dual Return Kit (D size extension)	D Cabinet Upflow Furnaces
BAYBASE205	Downflow Subbase	All Downflow Furnaces
BAYFLTR203	Horizontal Filter Kit	B Cabinet Furnaces in Downflow/Horizontal
BAYFLTR204	Horizontal Filter Kit	C Cabinet Furnaces in Downflow/Horizontal
BAYFLTR205	Horizontal Filter Kit	D Cabinet Furnaces in Downflow Horizontal
BAYFLTR206	Filter Access Door Kit (Downflow only)	All Downflow Furnaces
BAYSF1165[a] [b]	1-in. SlimFit Cabinet with MERV 4 Filter	All Upflow Furnaces
BAYSF1255[b]	1-in. SlimFit Rack with MERV 4 Filter	All Furnaces[c]
FLRSF1255	1-in. Filter Replacement (Qty 12)	BAYSF1255[b]
BAYLPSS400[b]	Propane Conversion Kit with Stainless Steel Burners	All Furnaces
BAYBURNERSS	All Stainless Steel Natural Gas Burners - Set of Six	All Upflow Furnaces - Special Case
BAYMFGH200B	Manufactured/Mobile Housing Kit	All Furnaces
BAYCNDTRAP2A	Inline Condensate Trap Kit used with Special Venting on 2-in. Vent Pipe	All Furnaces
BAYCNDTRAP3A	Inline Condensate Trap Kit used with Special Venting on 3-in. Vent Pipe	All Furnaces
BAYTWIN5AM22DA	Twinning Kit for A2L Refrigerant Systems	All Furnaces

[a] Airflow greater than 1600 CFM, Furnace will require air openings and filters on: (1) both sides, (2) one side and the bottom, or (3) just on the bottom.
[b] Latest revision.
[c] Designed to fit all S-Series furnaces with or without transition when used in side return. Fits B width cabinet without a transition in upflow/downflow application.

Document Pack Contents

Table 2. Document pack contents

Item	Qty.	Description
1	1	Condensate Drain Tube Assembly
2	1	Inlet Vent (2-in. - ADP01586 and 3-in. - ADP01587)[a]
3	1	Inlet Vent Gasket
4	1	Outlet Vent Assembly
5	1	Outlet Vent Gasket
6	6	Screws
7	1	Condensate Trap Grommet
8	1	Plug — Condensate/Gas
9	1	Plug — Electrical
10	2	Grommet — Condensate/Gas
11	1	Installation, Operation, and Maintenance
12	1	Owner Guide
13	1	Limited Warranty
14	1	2 to 3-in. Coupling — CPL01544 [b]
6	2	S9B1/S9X1 Tinnerman Clips (not pictured) ***Note:*** *Tinnerman Clips should be kept with unit and are used if the door panel flange hole(s) becomes stripped.*



[a] 3-in. inlet vent supplied with S9X1D120U, S9X1D120D, S9X2D120U, S9X2D120D, S9B1D120U, and S9B1D120D only. 2-in.inlet vent supplied with all other models.

[b] Supplied with S9X1D120U, S9X1D120D, S9X2D120U, S9X2D120D, S9B1D120U, and S9B1D120D only.

Product Specifications

Table 3. Models S9X1B040U3PSBB, S9X1B060U4PSBB, S9X1B080U4PSBB, S9X1C080U5PSBB, S9B1B040U3PSAB, S9B1B060U4PSAB, S9B1B080U4PSAB, and S9B1C080U5PSAB

Model Number	S9X1B040-U3PSBB	S9B1B040-U3PSAB	S9X1B060-U4PSBB	S9B1B060-U4PSAB	S9X1B080-U4PSBB	S9B1B080-U4PSAB	S9X1C080-U5PSBB	S9B1C080-U5PSAB
Type	Upflow / Horizontal		Upflow / Horizontal		Upflow / Horizontal		Upflow / Horizontal	
Ratings [a]								
Input BTUH	40,000		60,000		80,000		80,000	
Capacity BTUH (ICS) [b] [c]	39,000		58,300		77,200		77,800	
Temp. Rise (Min. - Max.) ° F	30 - 60		30 - 60		45 - 75		40-70	
AFUE (%) [c]	96.0	92.1	96.0	92.1	96.0	92.1	96.0	92.1
Return Air Temp. (Min.-Max.)	45°F - 80°F		45°F - 80°F		45°F - 80°F		45°F - 80°F	
CEE Tier	2	1	2	1	2	1	2	1
Energy Star Rated Region Before July 31, 2026	US - All / Canada	US - South	US - All / Canada	US - South	US - All / Canada	US - South	US - All / Canada	US - South
Energy Star Rated Region On or After July 31, 2026	US - South	N/A	US - South	N/A	US - South	N/A	US - South	N/A
Energy Star Orientation	Upflow / Horizontal		Upflow / Horizontal		Upflow / Horizontal		Upflow / Horizontal	
Integrated Furnace Control								
Input-Communication Protocol	24 Volts		24 Volts		24 Volts		24 Volts	
Blower Drive	Direct		Direct		Direct		Direct	
Diameter - Width (in.)	11 X 8		11 X 8		11 X 8		11 X 10	
No. Used	1		1		1		1	
Speeds (No.) [d]	9		9		9		9	
CFM vs. iwc.	See Airflow Table		See Airflow Table		See Airflow Table		See Airflow Table	
Motor HP	0.5		0.8		0.8		1.0	
R.P.M.	1075		1075		1075		1075	
Volts / Ph / Hz	120 / 1 / 60		120 / 1 / 60		120 / 1 / 60		120 / 1 / 60	
FLA	6.4		8.4		8.4		10.6	
Combustion Fan - Type	Centrifugal		Centrifugal		Centrifugal		Centrifugal	
Drive - No. Speeds	Direct - 1		Direct - 1		Direct - 1		Direct - 1	
Motor RPM	3300		3300		3300		3300	
Volts/Ph/Hz	120 / 1 / 60		120 / 1 / 60		120 / 1 / 60		120 / 1 / 60	
FLA	2.1		2.1		2.1		0.7	
Filter - Furnished?	No		No		No		No	
Type Recommended	High Velocity		High Velocity		High Velocity		High Velocity	
Hi Vel. (No.-Size-Thk.)	1 - 16 X 25 - 1 in.		1 - 16 X 25 - 1 in.		1 - 16 X 25 - 1 in.		1 - 20 X 25 - 1 in.	
Vent Pipe Diameter - Min. (in.) [e] [f]	2 Round		2 Round		2 Round		2 Round	
Heat Exchanger Type								
Fired	409 Stainless Steel		409 Stainless Steel		409 Stainless Steel		409 Stainless Steel	
Unfired	29-4C Stainless Steel		29-4C Stainless Steel		29-4C Stainless Steel		29-4C Stainless Steel	
Gauge (Fired)	20		20		20		20	
Orifices - Main								
Nat. Gas Qty. - Drill Size	2 - 45		3 - 45		4 - 45		4 - 45	
Propane Gas Qty. - Drill Size	2 - 56		3 - 56		4 - 56		4 - 56	

Table 3. Models S9X1B040U3PSBB, S9X1B060U4PSBB, S9X1B080U4PSBB, S9X1C080U5PSBB, S9B1B040U3PSAB, S9B1B060U4PSAB, S9B1B080U4PSAB, and S9B1C080U5PSAB (continued)

Model Number	S9X1B040-U3PSBB	S9B1B040-U3PSAB	S9X1B060-U4PSBB	S9B1B060-U4PSAB	S9X1B080-U4PSBB	S9B1B080-U4PSAB	S9X1C080-U5PSBB	S9B1C080-U5PSAB
Gas Valve	Redundant - One Stage		Redundant - One Stage		Redundant - One Stage		Redundant - One Stage	
Pilot Safety Device								
Type	120 V SiNi Igniter		120 V SiNi Igniter		120 V SiNi Igniter		120 V SiNi Igniter	
Burners - Type	Multiport Inshot		Multiport Inshot		Multiport Inshot		Multiport Inshot	
Number	2		3		4		4	
Power Conn. - V/Ph/Hz (g)	120 / 1 / 60		120 / 1 / 60		120 / 1 / 60		120 / 1 / 60	
Ampacity (Amps)	10.3		12.8		12.8		14.1	
Max. Overcurrent Protection (Amps)	15		15		15		15	
Pipe Conn. Size (in.)	1/2		1/2		1/2		1/2	

(a) For U.S. applications, above input ratings (BTUH) are up to 2,000 feet, derate 4% per 1,000 feet for elevations above 2,000 feet above sea level. For Canadian applications, above input ratings (BTUH) are up to 4,500 feet, derate 4% per 1,000 feet for elevations above 4,500 feet above sea level.
(b) Central Furnace heating designs are certified to ANSI Z21.47 / CSA 2.3 — latest edition.
(c) Based on U.S. government standard tests.
(d) 9 Speed constant torque ECM blower motor.
(e) See the Maximum Vent Length , p. 43 in this document.
(f) All furnace models have a vent outlet diameter that equals 2 in.
(g) The above wiring specifications are in accordance with National Electrical Code; however, installations must comply with local codes.

Table 4. Models S9X1C100U5PSBB, S9X1D120U5PSBB, S9X1B040D3PSBB, S9X1B060D3PSBB, S9B1C100U5PSAB, S9B1D120U5PSAB, S9B1B040D3PSAB, and S9B1B060D3PSAB

Model Number	S9X1C100-U5PSBB	S9B1C100-U5PSAB	S9X1D120-U5PSBB	S9B1D120-U5PSAB	S9X1B040-D3PSBB	S9B1B040-D3PSAB	S9X1B060-D3PSBB	S9B1B060-D3PSAB
Type	Upflow / Horizontal		Upflow / Horizontal		Downflow		Downflow	
Ratings (a)								
Input BTUH	100,000		120,000		40,000		60,000	
Capacity BTUH (ICS) (b) (c)	97,400		113,400		38,900		57,600	
Temp. Rise (Min. - Max.) ° F	40 - 70		40 - 70		30 - 60		35 - 65	
AFUE (%)	95.0	92.1	95.0	92.1	96.0	92.1	96.0	92.1
Return Air Temp. (Min.-Max.)	45°F - 80°F		45°F - 80°F		45°F - 80°F		45°F - 80°F	
CEE Tier	2	1	2	1	2	1	2	1
Energy Star Rated Region Before July 31, 2026	US - All / Canada	US - South	US - All / Canada	US - South	US - All / Canada	US - South	US - All / Canada	US - South
Energy Star Rated Region On or After July 31, 2026	US - South	N/A	US - South	N/A	US - South	N/A	US - South	N/A
Energy Star Orientation	Upflow / Horizontal		Upflow / Horizontal		Downflow		Downflow	
Integrated Furnace Control								
Input-Communication Protocol	24 Volts		24 Volts		24 Volts		24 Volts	
Blower Drive	Direct		Direct		Direct		Direct	
Diameter - Width (in.)	11 X 10		11 X 10		11 X 8		11 X 8	
No. Used	1		1		1		1	
Speeds (No.) (d)	9		9		9		9	
CFM vs. iwc.	See Airflow Table		See Airflow Table		See Airflow Table		See Airflow Table	
Motor HP	1.0		1.0		0.5		0.5	
R.P.M.	1075		1075		1075		1075	
Volts / Ph / Hz	120 / 1 / 60		120 / 1 / 60		120 / 1 / 60		120 / 1 / 60	
FLA	10.6		10.6		6.4		6.4	

Table 4. Models S9X1C100U5PSBB, S9X1D120U5PSBB, S9X1B040D3PSBB, S9X1B060D3PSBB, S9B1C100U5PSAB, S9B1D120U5PSAB, S9B1B040D3PSAB, and S9B1B060D3PSAB (continued)

Model Number	S9X1C100-U5PSBB	S9B1C100-U5PSAB	S9X1D120-U5PSBB	S9B1D120-U5PSAB	S9X1B040-D3PSBB	S9B1B040-D3PSAB	S9X1B060-D3PSBB	S9B1B060-D3PSAB
Combustion Fan - Type	Centrifugal		Centrifugal		Centrifugal		Centrifugal	
Drive - No. Speeds	Direct - 1		Direct - 1		Direct - 1		Direct - 1	
Motor RPM	3300		3300		3300		3300	
Volts/Ph/Hz	120 / 1 / 60		120 / 1 / 60		120 / 1 / 60		120 / 1 / 60	
FLA	0.7		0.7		2.1		2.1	
Filter - Furnished?	No		No		No		No	
Type Recommended	High Velocity		High Velocity		High Velocity		High Velocity	
Hi Vel. (No.-Size-Thk.)	1 - 20 X 25 - 1 in.		1 - 24 X 25 - 1 in.		1 - 16 X 25 - 1 in.		1 - 16 X 25 - 1 in.	
Vent Pipe Diameter - Min. (in.) (e) (f)	2 Round		3 Round		2 Round		2 Round	
Heat Exchanger Type								
Fired	409 Stainless Steel		409 Stainless Steel		409 Stainless Steel		409 Stainless Steel	
Unfired	29-4C Stainless Steel		29-4C Stainless Steel		29-4C Stainless Steel		29-4C Stainless Steel	
Gauge (Fired)	20		20		20		20	
Orifices - Main								
Nat. Gas Qty. - Drill Size	5 - 45		6 - 45		2 - 45		3 - 45	
Propane Gas Qty. - Drill Size	5 - 56		6 - 56		2 - 56		3 - 56	
Gas Valve	Redundant - One Stage		Redundant - One Stage		Redundant - One Stage		Redundant - One Stage	
Pilot Safety Device								
Type	120 V SiNi Igniter		120 V SiNi Igniter		120 V SiNi Igniter		120 V SiNi Igniter	
Burners - Type	Multiport Inshot		Multiport Inshot		Multiport Inshot		Multiport Inshot	
Number	5		6		2		3	
Power Conn. - V/Ph/Hz (g)	120 / 1 / 60		120 / 1 / 60		120 / 1 / 60		120 / 1 / 60	
Ampacity (Amps)	14.1		14.1		10.3		10.3	
Max. Overcurrent Protection (Amps)	15		15		15		15	
Pipe Conn. Size (in.)	1/2		1/2		1/2		1/2	

(a) For U.S. applications, above input ratings (BTUH) are up to 2,000 feet, derate 4% per 1,000 feet for elevations above 2,000 feet above sea level. For Canadian applications, above input ratings (BTUH) are up to 4,500 feet, derate 4% per 1,000 feet for elevations above 4,500 feet above sea level.
(b) Central Furnace heating designs are certified to ANSI Z21.47 / CSA 2.3 — latest edition.
(c) Based on U.S. government standard tests.
(d) 9 Speed constant torque ECM blower motor.
(e) See the Maximum Vent Length , p. 43 in this document.
(f) All furnace models have a vent outlet diameter that equals 2 in.
(g) The above wiring specifications are in accordance with National Electrical Code; however, installations must comply with local codes.

Table 5. Models S9X1B080D4PSBB, S9X1C100D5PSBB, S9X1D120D5PSBB, S9B1B080D4PSAB, S9B1C100D5PSAB, and S9B1D120D5PSAB

Model Number	S9X1B080D4PS-BB	S9B1B080D4PS-AB	S9X1C100D5PS-BB	S9B1C100D5PS-AB	S9X1D120D5PS-BB	S9B1D120D5PS-AB
Type	Downflow		Downflow		Downflow	
Ratings (a)						
Input BTUH	80,000		100,000		120,000	
Capacity BTUH (ICS) (b) (c)	76,900		96,800		115,500	
Temp. Rise (Min. - Max.) °F	45-75		40-70		45-75	
AFUE (%) (c)	95.0	92.1	96.0	92.1	95.0	92.1
Return Air Temp. (Min.-Max.)	45°F - 80°F		45°F - 80°F		45°F - 80°F	
CEE Tier	2	1	2	1	2	1
Energy Star Rated Region Before July 31, 2026	US - All / Canada	US - South	US - All / Canada	US - South	US - All / Canada	US - South

Table 5. Models S9X1B080D4PSBB, S9X1C100D5PSBB, S9X1D120D5PSBB, S9B1B080D4PSAB, S9B1C100D5PSAB, and S9B1D120D5PSAB (continued)

Model Number	S9X1B080D4PS-BB	S9B1B080D4PS-AB	S9X1C100D5PS-BB	S9B1C100D5PS-AB	S9X1D120D5PS-BB	S9B1D120D5PS-AB
Energy Star Rated Region On or After July 31, 2026	US - South	N/A	US - South	N/A	US - South	N/A
Energy Star Orientation	Downflow		Downflow		Downflow	
Integrated Furnace Control						
Input-Communication Protocol	24 Volts		24 Volts		24 Volts	
Blower Drive	Direct		Direct		Direct	
Diameter - Width (in.)	11 X 8		11 X 10		11 X 10	
No. Used	1		1		1	
Speeds (No.) [d]	9		9		9	
CFM vs. iwc.	See Airflow Table		See Airflow Table		See Airflow Table	
Motor HP	0.8		1.0		1.0	
R.P.M.	1075		1075		1075	
Volts / Ph / Hz	120 / 1 / 60		120 / 1 / 60		120 / 1 / 60	
FLA	9.3		10.6		10.6	
Combustion Fan - Type	Centrifugal		Centrifugal		Centrifugal	
Drive - No. Speeds	Direct - 1		Direct - 1		Direct - 1	
Motor RPM	3300		3300		3300	
Volts/Ph/Hz	120 / 1 / 60		120 / 1 / 60		120 / 1 / 60	
FLA	2.1		0.7		0.7	
FILTER - Furnished?	No		No		No	
Type Recommended	High Velocity		High Velocity		High Velocity	
Hi Vel. (No.-Size-Thk.)	1 - 16 X 25 - 1 in.		1 - 20 X 25 - 1 in.		1 - 24 X 25 - 1 in.	
Vent Pipe Diameter - Min. (in.) [e] [f]	2 Round		2 Round		3 Round	
Heat Exchanger Type						
Fired	409 Stainless Steel		409 Stainless Steel		409 Stainless Steel	
Unfired	29-4C Stainless Steel		29-4C Stainless Steel		29-4C Stainless Steel	
Gauge (Fired)	20		20		20	
Orifices - Main						
Nat. Gas Qty. - Drill Size	4 - 45		5 - 45		6 - 45	
Propane Gas Qty. - Drill Size	4 - 56		5 - 56		6 - 56	
Gas Valve	Redundant - One Stage		Redundant - One Stage		Redundant - One Stage	
Pilot Safety Device						
Type	120 V SiNi Igniter		120 V SiNi Igniter		120 V SiNi Igniter	
Burners - Type	Multiport Inshot		Multiport Inshot		Multiport Inshot	
Number	4		5		6	
Power Conn. - V/Ph/Hz [g]	120 / 1 / 60		120 / 1 / 60		120 / 1 / 60	
Ampacity (Amps)	13.9		14.1		14.1	
Max. Overcurrent Protection (Amps)	15		15		15	
Pipe Conn. Size (in.)	1/2		1/2		1/2	

[a] For U.S. applications, above input ratings (BTUH) are up to 2,000 feet, derate 4% per 1,000 feet for elevations above 2,000 feet above sea level. For Canadian applications, above input ratings (BTUH) are up to 4,500 feet, derate 4% per 1,000 feet for elevations above 4,500 feet above sea level.

[b] Central Furnace heating designs are certified to ANSI Z21.47 / CSA 2.3 — latest edition.

[c] Based on U.S. government standard tests.

[d] 9 Speed constant torque ECM blower motor.

[e] See the Maximum Vent Length , p. 43 in this document.

[f] All furnace models have a vent outlet diameter that equals 2 in.

[g] The above wiring specifications are in accordance with National Electrical Code; however, installations must comply with local codes.

Table 6. Models S9X2B040U3PSBB, S9X2B060U4PSBB, S9X2B080U4PSBB, and S9X2C080U5PSBB

Model Number	S9X2B040U3PSBB	S9X2B060U4PSBB	S9X2B080U4PSBB	S9X2C080U5PSBB
Type	Upflow / Horizontal	Upflow / Horizontal	Upflow / Horizontal	Upflow / Horizontal
Ratings [a]				
1st Stage Input BTUH	26,000	39,000	52,000	52,000
1st Stage Capacity BTUH (ICS)	25,220	37,830	50,440	50,440
2nd Stage Input BTUH	40,000	60,000	80,000	80,000
2nd Stage Capacity BTUH (ICS) [b] [c]	38,800	58,200	77,600	77,600
1st Stage Temp. Rise (Min. - Max.) °F	25 - 55	25 - 55	30 - 60	30 - 60
2nd Stage Temp. Rise (Min. - Max.) ° F	30 - 60	30 - 60	45 - 75	40-70
AFUE (%) [c]	96.0	96.0	96.0	95.0
Return Air Temp. (Min.-Max.)	45°F - 80°F	45°F - 80°F	45°F - 80°F	45°F - 80°F
CEE Tier	2	2	2	2
Energy Star Rating Before July 31, 2026	US - All / Canada	US - All / Canada	US - All / Canada	US - All / Canada
Energy Star Rating On or After July 31, 2026	US - South	US - South	US - South	US - South
Energy Star Orientation	Upflow / Horizontal	Upflow / Horizontal	Upflow / Horizontal	Upflow / Horizontal
Integrated Furnace Control				
Input-Communication Protocol	24 Volts	24 Volts	24 Volts	24 Volts
Blower Drive	Direct	Direct	Direct	Direct
Diameter - Width (in.)	11 X 8	11 X 8	11 X 8	11 X 10
No. Used	1	1	1	1
Speeds (No.) [d]	9	9	9	9
CFM vs. iwc	See Airflow Table	See Airflow Table	See Airflow Table	See Airflow Table
Motor HP	1/2	3/4	3/4	1
R.P.M.	1075	1075	1075	1075
Volts / Ph / Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	6.4	8.4	8.4	10.6
Combustion Fan - Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Drive - No. Speeds	Direct - 2	Direct - 2	Direct - 2	Direct - 2
Motor HP - RPM	3300/2600	3300/2600	3300/2600	3300/2600
Volts/Ph/Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	0.66	0.66	0.66	0.66
Filter - Furnished?	No	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 16 X 25 - 1 in.	1 - 16 X 25 - 1 in.	1 - 16 X 25 - 1 in.	1 - 20 X 25 - 1 in.
Vent Pipe Diameter - Min. (in.) [e] [f]	2 Round	2 Round	2 Round	2 Round
Heat Exchanger Type				
Fired	409 Stainless Steel	409 Stainless Steel	409 Stainless Steel	409 Stainless Steel
Unfired	29-4C Stainless Steel	29-4C Stainless Steel	29-4C Stainless Steel	29-4C Stainless Steel
Gauge (Fired)	20	20	20	20
Orifices - Main				
Nat. Gas Qty. - Drill Size	2 - 45	3 - 45	4 - 45	4 - 45
L.P. Gas Qty. - Drill Size	2 - 56	3 - 56	4 - 56	4 - 56
Gas Valve	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
Pilot Safety Device				
Type	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter
Burners - Type	Multiport Inshot	Multiport Inshot	Multiport Inshot	Multiport Inshot
Number	2	3	4	4
Power Conn. - V/Ph/HZ [g]	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
Ampacity (Amps)	8.8	11.3	11.3	14.1

Table 6. Models S9X2B040U3PSBB, S9X2B060U4PSBB, S9X2B080U4PSBB, and S9X2C080U5PSBB (continued)

Model Number	S9X2B040U3PSBB	S9X2B060U4PSBB	S9X2B080U4PSBB	S9X2C080U5PSBB
Max. Overcurrent Protection (Amps)	15	15	15	15
Pipe Conn. Size (in.)	1/2	1/2	1/2	1/2

(a) For U.S. applications, above input ratings (BTUH) are up to 2,000 feet, derate 4% per 1,000 feet for elevations above 2,000 feet above sea level. For Canadian applications, above input ratings (BTUH) are up to 4,500 feet, derate 4% per 1,000 feet for elevations above 4,500 feet above sea level.
(b) Central Furnace heating designs are certified to ANSI Z21.47 / CSA 2.3 — latest edition.
(c) Based on U.S. government standard tests.
(d) 9 Speed constant torque ECM blower motor.
(e) See the Maximum Vent Length , p. 43 in this document.
(f) All furnace models have a vent outlet diameter that equals 2 in.
(g) The above wiring specifications are in accordance with National Electrical Code; however, installations must comply with local codes.

Table 7. Models S9X2C100U5PSBB, S9X2D120U5PSBB, S9X2B040D3PSBB, and S9X2B060D3PSBB

Model Number	S9X2C100U5PSBB	S9X2D120U5PSBB	S9X2B040D3PSBB	S9X2B060D3PSBB
Type	Upflow / Horizontal	Upflow / Horizontal	Downflow	Downflow
Ratings (a)				
1st Stage Input BTUH	65,000	78,000	26,000	39,000
1st Stage Capacity BTUH (ICS)	63,050	75,660	25,220	37,830
2nd Stage Input BTUH	100,000	120,000	40,000	60,000
2nd Stage Capacity BTUH (ICS) (b) (c)	97,000	116,400	38,800	58,200
1st Stage Temp. Rise (Min. - Max.) °F	25 - 55	30 - 60	25 - 55	25 - 55
2nd Stage Temp. Rise (Min. - Max.) ° F	40 - 70	40 - 70	30 - 60	35 - 65
AFUE (%) (c)	96.0	96.0	96.0	95.0
Return Air Temp. (Min.-Max.)	45°F - 80°F	45°F - 80°F	45°F - 80°F	45°F - 80°F
CEE Tier	2	2	2	2
Energy Star Rating Before July 31, 2026	US - All / Canada	US - All / Canada	US - All / Canada	US - All / Canada
Energy Star Rating On or After July 31, 2026	US - South	US - South	US - South	US - South
Energy Star Orientation	Upflow / Horizontal	Upflow / Horizontal	Downflow	Downflow
Integrated Furnace Control				
Input-Communication Protocol	24 Volts	24 Volts	24 Volts	24 Volts
Blower Drive	Direct	Direct	Direct	Direct
Diameter - Width (in.)	11 X 10	11 X 10	11 X 8	11 X 8
No. Used	1	1	1	1
Speeds (No.) (d)	9	9	9	9
CFM vs. iwc	See Airflow Table	See Airflow Table	See Airflow Table	See Airflow Table
Motor HP	1	1	1/2	1/2
R.P.M.	1075	1075	1075	1075
Volts / Ph / Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	10.6	10.6	6.4	6.4
Combustion Fan - Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Drive - No. Speeds	Direct - 2	Direct - 2	Direct - 2	Direct - 2
Motor HP - RPM	3300/2600	3300/2600	3300/2600	3300/2600
Volts/Ph/Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	0.66	0.66	0.66	0.66
Filter - Furnished?	No	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 20 X 25 - 1 in.	1 - 24 X 25 - 1 in.	2 - 14 x 20 - 1 in.	2 - 14 x 20 - 1 in.
Vent Pipe Diameter - Min. (in.) (e) (f)	2 Round	3 Round	2 Round	2 Round
Heat Exchanger Type				
Fired	409 Stainless Steel	409 Stainless Steel	409 Stainless Steel	409 Stainless Steel
Unfired	29-4C Stainless Steel	29-4C Stainless Steel	29-4C Stainless Steel	29-4C Stainless Steel

Table 7. Models S9X2C100U5PSBB, S9X2D120U5PSBB, S9X2B040D3PSBB, and S9X2B060D3PSBB (continued)

Model Number	S9X2C100U5PSBB	S9X2D120U5PSBB	S9X2B040D3PSBB	S9X2B060D3PSBB
Gauge (Fired)	20	20	20	20
Orifices - Main				
Nat. Gas Qty. - Drill Size	5 - 45	6 - 45	2 - 45	3 - 45
L.P. Gas Qty. - Drill Size	5 - 56	6 - 56	2 - 56	3 - 56
Gas Valve	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
Pilot Safety Device				
Type	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter
Burners - Type	Multiport Inshot	Multiport Inshot	Multiport Inshot	Multiport Inshot
Number	5	6	2	3
Power Conn. - V/Ph/HZ [g]	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
Ampacity (Amps)	14.1	14.1	8.8	8.8
Max. Overcurrent Protection (Amps)	15	15	15	15
Pipe Conn. Size (in.)	1/2	1/2	1/2	1/2

[a] For U.S. applications, above input ratings (BTUH) are up to 2,000 feet, derate 4% per 1,000 feet for elevations above 2,000 feet above sea level. For Canadian applications, above input ratings (BTUH) are up to 4,500 feet, derate 4% per 1,000 feet for elevations above 4,500 feet above sea level.
[b] Central Furnace heating designs are certified to ANSI Z21.47 / CSA 2.3 — latest edition.
[c] Based on U.S. government standard tests.
[d] 9 Speed constant torque ECM blower motor.
[e] See the Maximum Vent Length , p. 43 in this document.
[f] All furnace models have a vent outlet diameter that equals 2 in.
[g] The above wiring specifications are in accordance with National Electrical Code; however, installations must comply with local codes.

Table 8. Models S9X2B080D4PSBB, S9X2C100D5PSBB, and S9X2D120D5PSBB

Model Number	S9X2B080D4PSBB	S9X2C100D5PSBB	S9X2D120D5PSBB
Type	Downflow	Downflow	Downflow
Ratings [a]			
1st Stage Input BTUH	52,000	65,000	78,000
1st Stage Capacity BTUH (ICS)	50,440	63,050	75,660
2nd Stage Input BTUH	80,000	100,000	120,000
2nd Stage Capacity BTUH (ICS) [b] [c]	77,600	97,000	116,400
1st Stage Temp. Rise (Min. - Max.) °F	30 - 60	25-55	30 - 60
2nd Stage Temp. Rise (Min. - Max.) °F	45-75	40-70	45-75
AFUE (%) [c]	96.0	95.0	96.0
Return Air Temp. (Min.-Max.)	45°F - 80°F	45°F - 80°F	45°F - 80°F
CEE Tier	2	2	2
Energy Star Rating Before July 31, 2026	US - All / Canada	US - All / Canada	US - All / Canada
Energy Star Rating On or After July 31, 2026	US - South	US - South	US - South
Energy Star Orientation	Downflow	Downflow	Downflow
Integrated Furnace Control			
Input-Communication Protocol	24 Volts	24 Volts	24 Volts
Blower Drive	Direct	Direct	Direct
Diameter - Width (in.)	11 X 8	11 X 10	11 X 10
No. Used	1	1	1
Speeds (No.) [d]	9	9	9
CFM vs. iwc	See Airflow Table	See Airflow Table	See Airflow Table
Motor HP	3/4	1	1
R.P.M.	1075	1075	1075
Volts / Ph / Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	9.3	10.6	10.6
Combustion Fan - Type	Centrifugal	Centrifugal	Centrifugal
Drive - No. Speeds	Direct - 2	Direct - 2	Direct - 2
Motor HP - RPM	3300/2600	3300/2600	3300/2600

Table 8. Models S9X2B080D4PSBB, S9X2C100D5PSBB, and S9X2D120D5PSBB (continued)

Model Number	S9X2B080D4PSBB	S9X2C100D5PSBB	S9X2D120D5PSBB
Volts/Ph/Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	0.66	0.66	0.66
Filter - Furnished?	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	2 - 14 x 20 - 1 in.	2 - 16 x 20 - 1 in.	2 - 16 x 20 - 1 in.
Vent Pipe Diameter - Min. (in.) [e] [f]	2 Round	2 Round	3 Round
Heat Exchanger Type			
Fired	409 Stainless Steel	409 Stainless Steel	409 Stainless Steel
Unfired	29-4C Stainless Steel	29-4C Stainless Steel	29-4C Stainless Steel
Gauge (Fired)	20	20	20
Orifices - Main			
Nat. Gas Qty. - Drill Size	4 - 45	5 - 45	6 - 45
L.P. Gas Qty. - Drill Size	4 - 56	5 - 56	6 - 56
Gas Valve	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
Pilot Safety Device			
Type	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter
Burners - Type	Multiport Inshot	Multiport Inshot	Multiport Inshot
Number	4	5	6
Power Conn. - V/Ph/HZ [g]	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
Ampacity (Amps)	12.4	14.1	14.1
Max. Overcurrent Protection (Amps)	15	15	15
Pipe Conn. Size (in.)	1/2	1/2	1/2

[a] For U.S. applications, above input ratings (BTUH) are up to 2,000 feet, derate 4% per 1,000 feet for elevations above 2,000 feet above sea level. For Canadian applications, above input ratings (BTUH) are up to 4,500 feet, derate 4% per 1,000 feet for elevations above 4,500 feet above sea level.
[b] Central Furnace heating designs are certified to ANSI Z21.47 / CSA 2.3 — latest edition.
[c] Based on U.S. government standard tests.
[d] 9 Speed constant torque ECM blower motor.
[e] See the Maximum Vent Length , p. 43 in this document.
[f] All furnace models have a vent outlet diameter that equals 2 in.
[g] The above wiring specifications are in accordance with National Electrical Code; however, installations must comply with local codes.

Furnace Installation Guidelines

The following sections give general guidelines for the installation of the gas furnaces.

Safety Practices and Precautions

The following safety practices and precautions must be followed during the installation, servicing, and operation of this Furnace.

1. Use only with the type gas approved for this Furnace. See the Furnace rating plate.
2. Install the Furnace only in a location and position as specified in “Locations and Clearances,” p. 20 of these instructions.
3. Provide adequate combustion and ventilation air to the Furnace space as specified in “Air for Combustion and Ventilation,” p. 51 of these instructions.
4. Combustion products must be discharged outdoors. Connect this Furnace to an approved vent system only, as specified in the “Horizontal Venting,” p. 44 section of these instructions.
5. Never test for gas leaks with an open flame. Use a commercially available soap solution made specifically for the detection of leaks to check all connections, as specified in the “Gas Piping,” p. 34 section of these instructions.
6. Always install the Furnace to operate within the Furnace’s intended temperature-rise range with a duct system which has an external static pressure within the allowable range, as specified on the unit rating plate. Airflow within temperature rise for cfm versus static is shown in the CFM Versus Temperature Rise section in this document accompanying this Furnace.
7. When a Furnace is installed so that the supply ducts carry air circulated by the Furnace to areas outside the space containing the Furnace, the return air shall also be handled by a duct(s) sealed to the Furnace casing and terminating outside the space containing the Furnace.
8. A gas-fired Furnace for installation in a residential garage must be installed as specified in “Locations and Clearances,” p. 20 section of these instructions.
9. The furnace may be used for temporary heating of buildings or structures under construction only when the following conditions have been met:
   a. The Furnace venting system must be complete and installed per manufacturer’s instructions.
   b. The Furnace is controlled only by a room Comfort Control (no field jumpers).
   c. The Furnace return air duct must be complete and sealed to the Furnace.
   d. The Furnace input rate and temperature rise must be verified to be within the nameplate marking.
   e. A minimum 4-inch MERV 11 air filter must be in place.
   f. 100% of the Furnace combustion air requirement must come from outside the structure.
   g. The Furnace return air temperature range is between 55 and 80 Fahrenheit.

      80% models = 55°F

      90%+ models = 45°F.

   h. Clean the Furnace, duct work, and components upon substantial completion of the construction process, and verify Furnace operating conditions including ignition, input rate, temperature rise, and venting, according to the manufacturer’s instructions.
10. The installer must verify that at least one carbon monoxide alarm has been installed within the residential living space or home following the alarm manufacturer's instructions and applicable local codes before putting the appliance into operation.

This Furnace is certified to leak 1% or less of nominal air conditioning CFM delivered when pressurized to 0.5-inch water column with all inlets, outlets, and drains sealed.

General Guidelines

The manufacturer assumes no responsibility for equipment installed in violation of any code or regulation.

It is recommended that Manual J of the Air Conditioning Contractors Association (ACCA) or A.R.I. 230 be followed in estimating heating requirements. When estimating heating requirements for installation at Altitudes above 2000 ft., remember the gas input must be reduced. See “Combustion and Input Check,” p. 35.

Material in this shipment has been inspected at the factory and released to the transportation agency without known damage. Inspect exterior of carton for evidence of rough handling in shipment. Unpack carefully after moving equipment to approximate location. If damage to contents is found, report the damage immediately to the delivering agency.

Codes and local utility requirements governing the installation of gas fired equipment, wiring, plumbing, and flue connections must be adhered to. In the absence of local codes, the installation must conform with latest edition of the National Fuel Gas Code ANSI Z223.1 / NFPA 54 • National Installation Code, CAN/CGA B149.1. The latest code may be obtained from the National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts, 02169-7471, 1-800-344-3555, or www.nfpa.org.

These furnaces have been classified as CATEGORY IV furnaces in accordance with latest edition of ANSI Z21.47 standards • CSA 2.3. Category IV furnaces operate with positive vent static pressure and with a flue loss less than 17 percent. These conditions require special venting

systems, which must be gas tight and water tight. These Category IV Direct Vent furnaces are approved for installation in Manufactured/ Mobile housing when used with BAYMFGH200B.

A manufactured (mobile) home installation must conform with the *Manufactured Home Construction and Safety Standard, Title 24 CFR, Part 3280,* or when this standard is not applicable, the *Standard for Model Manufactured Home Installation, NFPA 225,*or the *Canadian Standard for Manufactured Homes, CSA Z240 MH.*

Locations and Clearances

The location of the furnace is normally selected by the architect, the builder, or the installer. However, before the furnace is moved into place, be sure to consider the following requirements:

1. Is the location selected as near the chimney or vent and as centralized for heat distribution as practical?
2. Do all clearances between the furnace and enclosure equal or exceed the minimums stated in the table below?

Table 9. Location and clearances

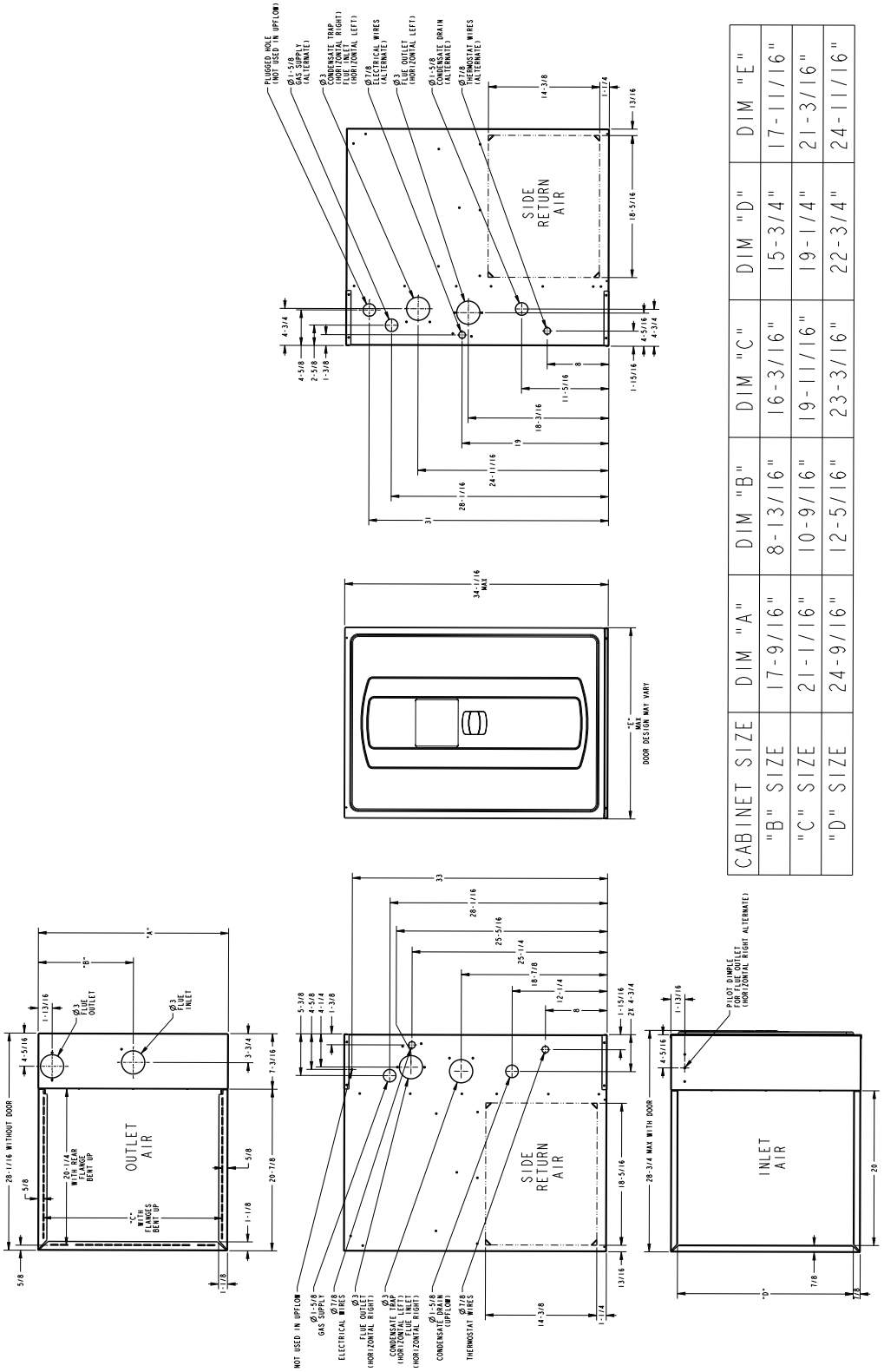
Minimum clearance to combustible materials (in.)	
Closet	
Sides	0
Back	1
Top	1
Front	0
Bottom	0
Flue	0
24-in. minimum front clearance recommended for service	
Horizontal Closet and Alcove	
Right Side	0
Left Side	0
Back	1
Top	1
Bottom	0
Flue	0
Horizontal Flue (discharge on left)	
Closet	
Right Side	0
Left Side	0
Rear	1
Top	1
Bottom	0
Flue	0

3. Is there sufficient space for servicing the furnace and other equipment? A minimum of 24 inches front accessibility to the furnace must be provided. Any access door or panel must permit removal of the largest component.
4. Are there at least 3 inches of clearance between the furnace combustion air openings in the front panel and any closed panel or door provided?
5. Are the ventilation and combustion air openings large enough and will they remain unobstructed? If outside air is used, are the openings set 12-inch above the highest snow accumulation level?
6. Allow sufficient height in supply plenum above the furnace to provide for cooling coil installation, if the cooling coil is not installed at the time of this furnace installation.
7. The furnace shall be installed so electrical components are protected from water.
8. A vertical downflow furnace without a coil, must use BAYBASE205 when installed on combustible flooring.
9. If the furnace is installed in a garage, it must be installed so that the burners, and the ignition source are located not less than 18 inches above the floor and the furnace must be located or protected to avoid physical damage from vehicles.
10. The gas furnace must not be located where excessive exposure to contaminated combustion air will result in safety and performance related problems. Avoid the following contaminants:
    - Permanent wave solutions
    - Chlorinated waxes and cleaners
    - Chlorine based swimming pool chemicals
    - Water softening chemicals
    - De-icing salts or chemicals
    - Carbon tetrachloride
    - Halogen type refrigerants
    - Cleaning solvents (such as perchloroethylene)
    - Printing inks, paint removers, varnishes, etc.
    - Hydrochloric acid, Cements and glues
    - Antistatic fabric softeners for clothes dryers
    - Masonry acid washing materials

Important: *The furnace must be installed level. The only allowable variation would be slightly to the left and/or forward in upflow or downflow installations or slightly toward the front in horizontal installations. This is necessary for proper condensate drainage.*

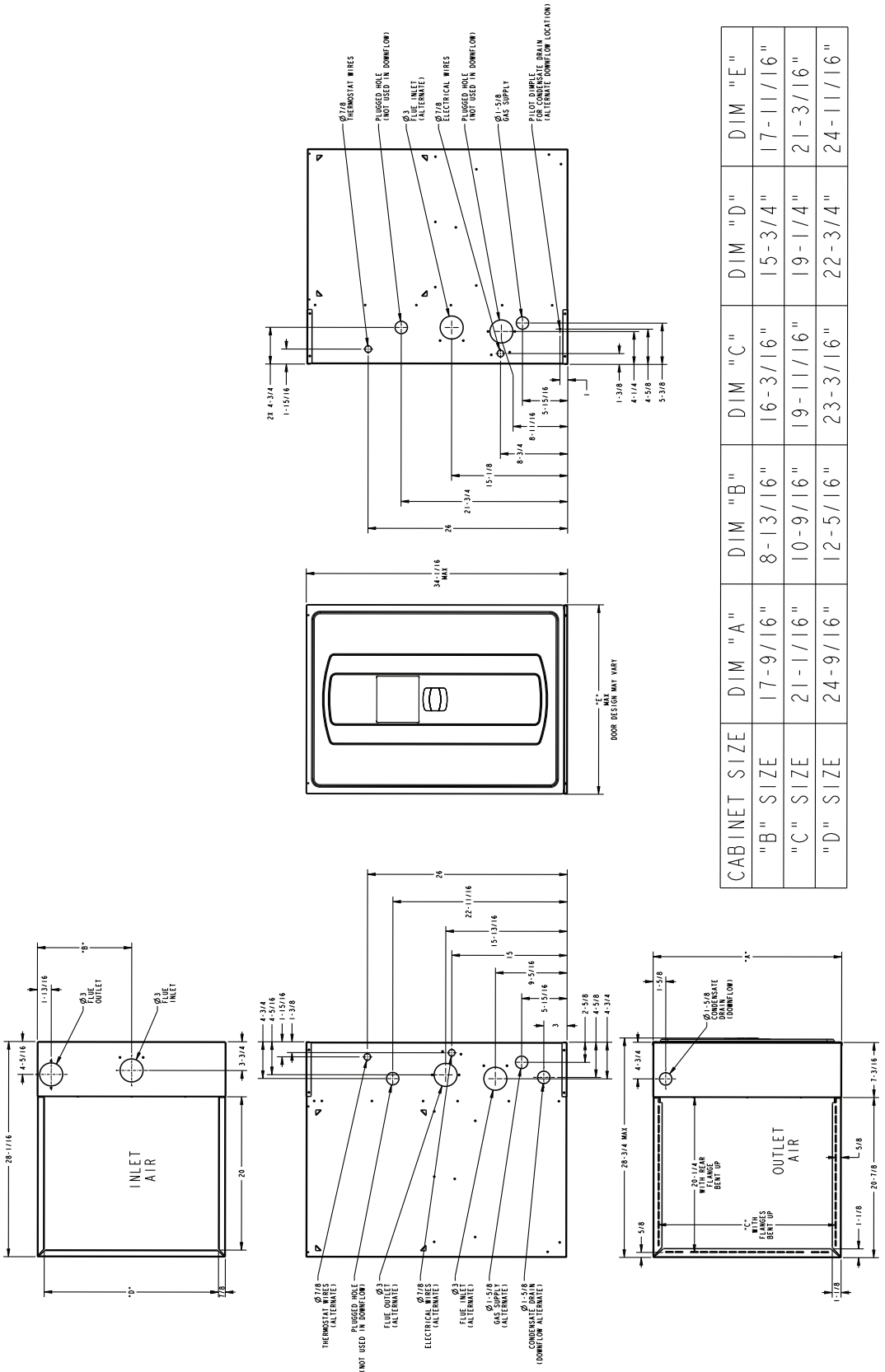
Dimensional Data

Figure 1. Upflow cabinets — 17.5-inch, 21-inch, and 24.5-inch



CABINET SIZE	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"
"B" SIZE	17-9/16"	8-13/16"	16-3/16"	15-3/4"	17-11/16"
"C" SIZE	21-1/16"	10-9/16"	19-11/16"	19-1/4"	21-3/16"
"D" SIZE	24-9/16"	12-5/16"	23-3/16"	22-3/4"	24-11/16"

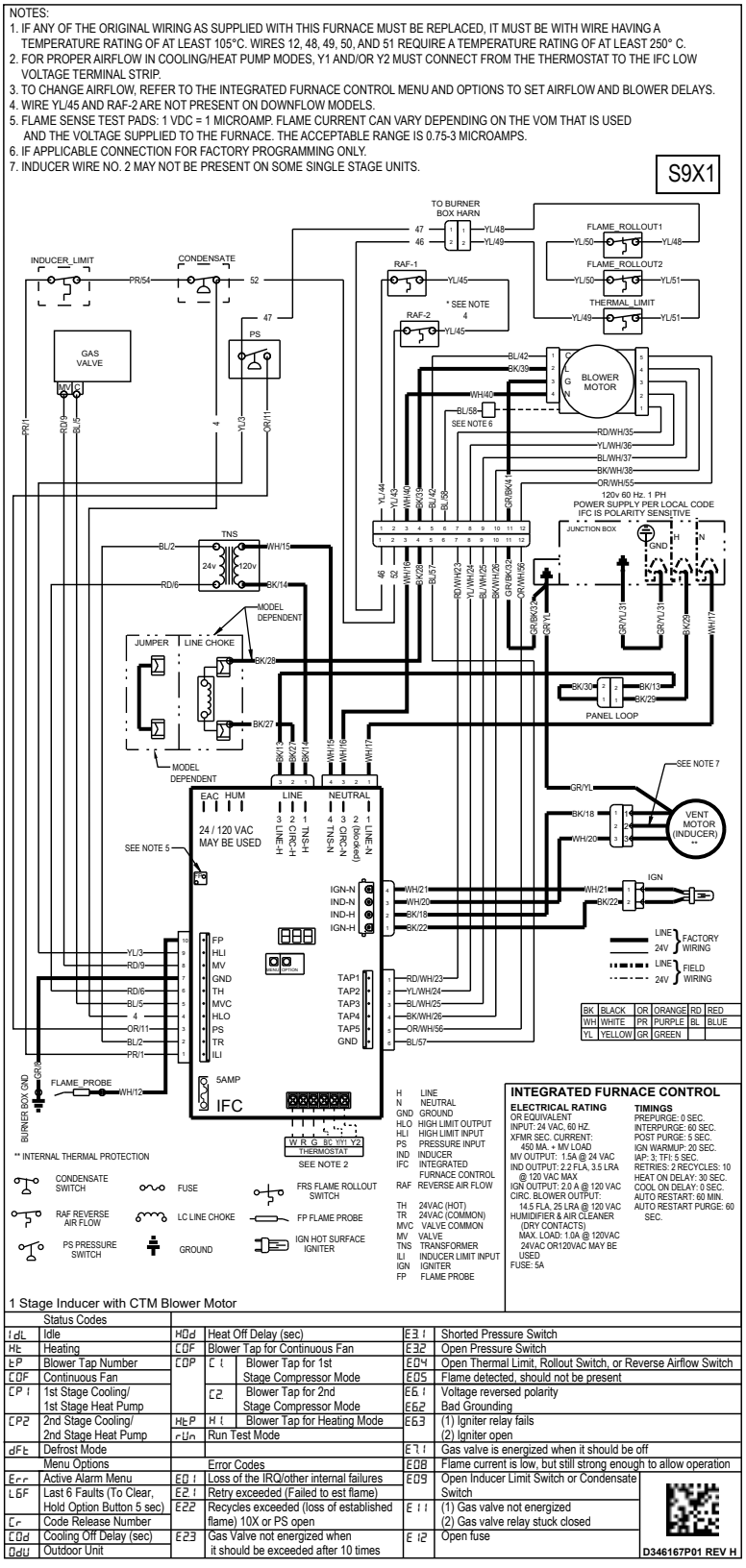
Figure 2. Downflow cabinets — 17.5-inch, 21-inch, and 24.5-inch



CABINET SIZE	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"
"B" SIZE	17-9/16"	8-13/16"	16-3/16"	15-3/4"	17-11/16"
"C" SIZE	21-1/16"	10-9/16"	19-11/16"	19-1/4"	21-3/16"
"D" SIZE	24-9/16"	12-5/16"	23-3/16"	22-3/4"	24-11/16"

Wiring Diagrams

Figure 3. S9X1 wiring diagram



1 Stage Inducer with CTM Blower Motor

Status Codes							
idL	Idle	HOd	Heat Off Delay (sec)		E31	Shorted Pressure Switch
Ht	Heating	COF	Blower Tap for Continuous Fan		E32	Open Pressure Switch
tP	Blower Tap Number	COP	C1	Blower Tap for 1st Stage Compressor Mode	E04	Open Thermal Limit, Rollout Switch, or Reverse Airflow Switch
COF	Continuous Fan				E05	Flame detected, should not be present
CP1	1st Stage Cooling/ 1st Stage Heat Pump		C2	Blower Tap for 2nd Stage Compressor Mode	E61	Voltage reversed polarity
					E62	Bad Grounding
CP2	2nd Stage Cooling/ 2nd Stage Heat Pump	HtP	Ht	Blower Tap for Heating Mode	E63	(1) Igniter relay fails (2) Igniter open
		run	Run Test Mode			
dFt	Defrost Mode				E71	Gas valve is energized when it should be off
	Menu Options		Error Codes		E08	Flame current is low, but still strong enough to allow operation
Err	Active Alarm Menu	E01	Loss of the IRQ/other internal failures		E09	Open Inducer Limit Switch or Condensate Switch
L6F	Last 6 Faults (To Clear, Hold Option Button 5 sec)	E21	Retry exceeded (Failed to est flame)			
		E22	Recycles exceeded (loss of established flame) 10X or PS open		E11	(1) Gas valve not energized (2) Gas valve relay stuck closed
Cr	Code Release Number					
COd	Cooling Off Delay (sec)	E23	Gas Valve not energized when it should be exceeded after 10 times		E12	Open fuse
OdU	Outdoor Unit					

Figure 4. S9X1 ladder diagram

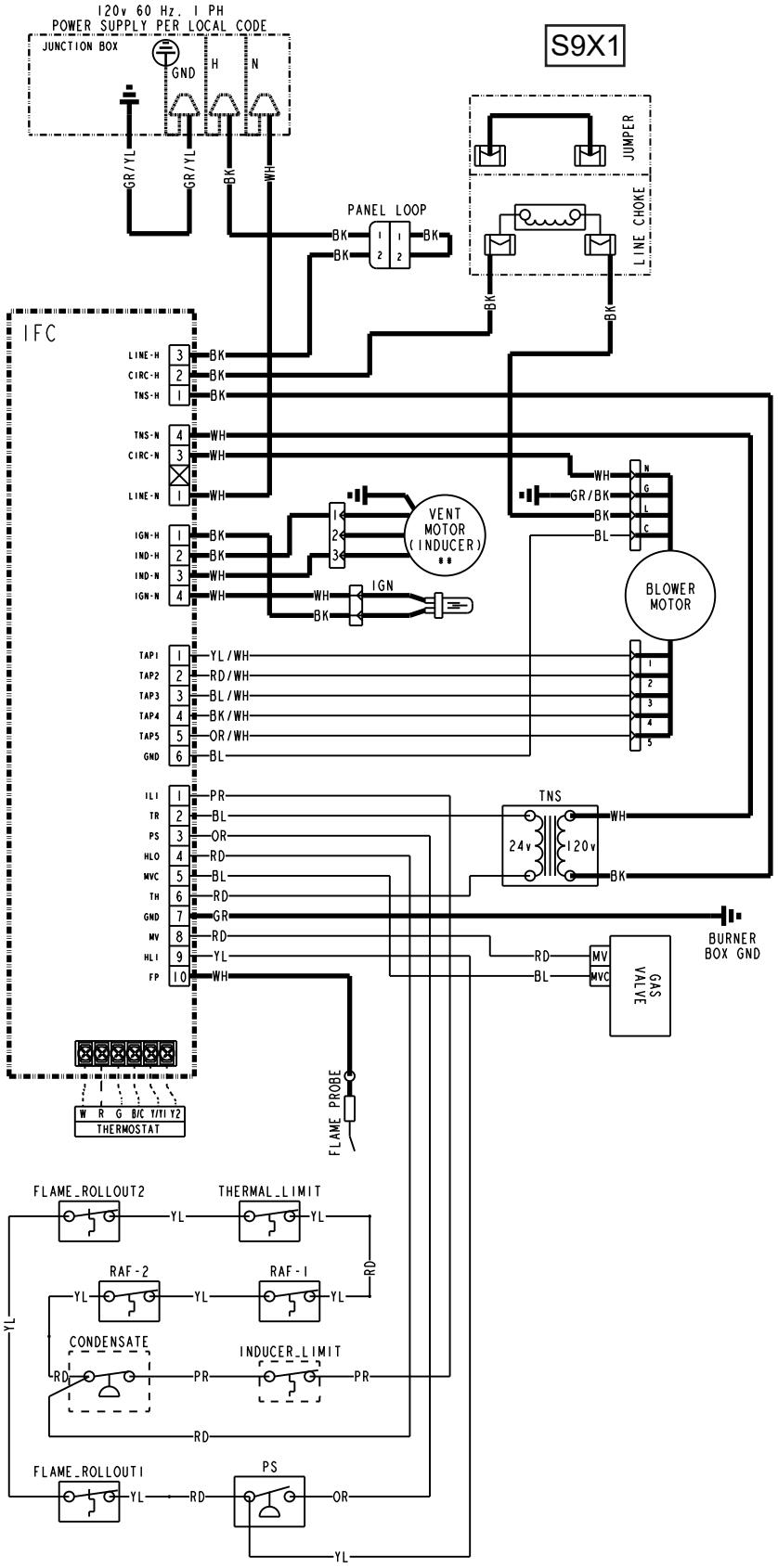
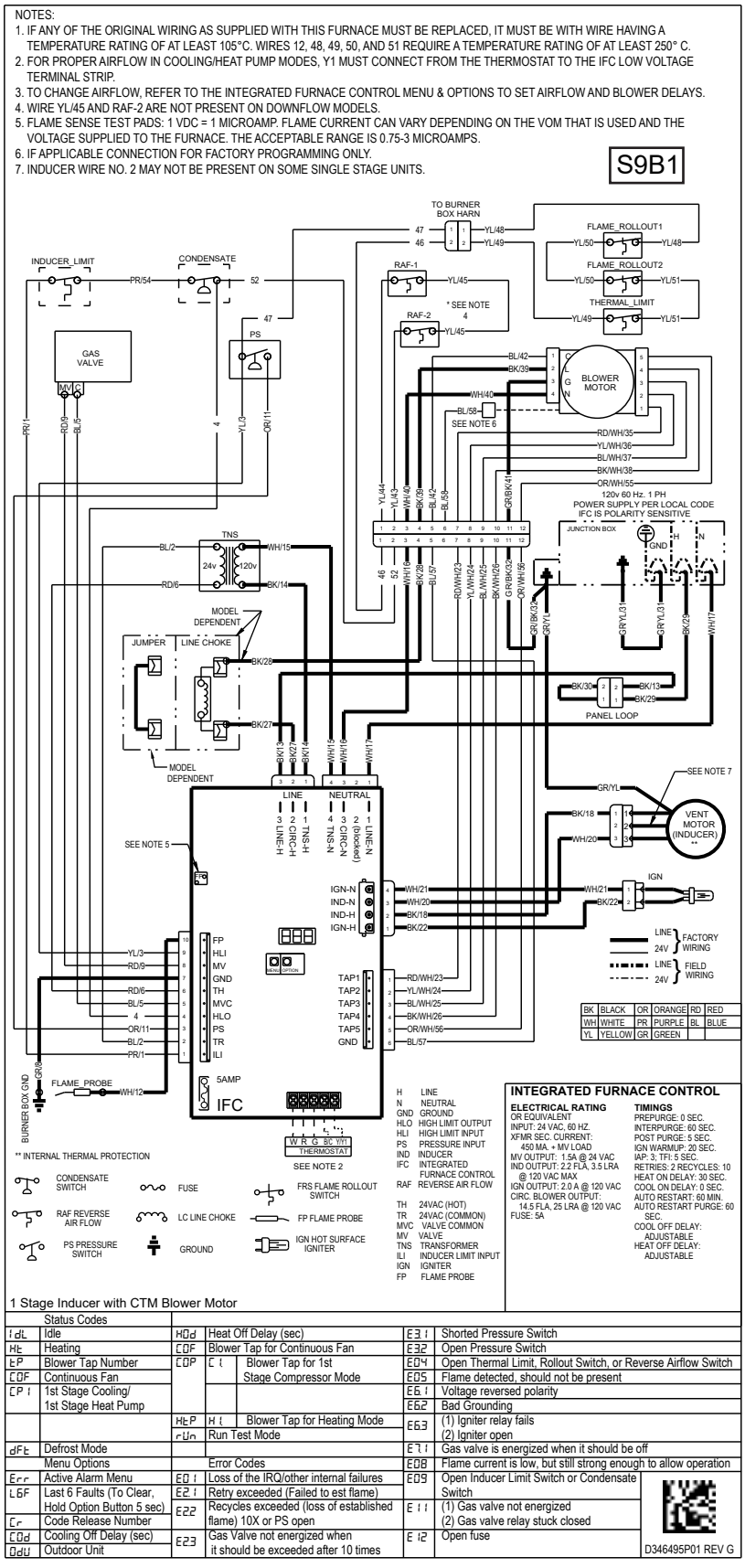


Figure 5. S9B1 wiring diagram



1 Stage Inducer with CTM Blower Motor

Status Codes						Status Codes					
tdL	Idle	HOd	Heat Off Delay (sec)			E31	Shorted Pressure Switch				
Ht	Heating	COF	Blower Tap for Continuous Fan			E32	Open Pressure Switch				
tP	Blower Tap Number	COP	C t	Blower Tap for 1st Stage Compressor Mode		E04	Open Thermal Limit, Rollout Switch, or Reverse Airflow Switch				
COF	Continuous Fan					E05	Flame detected, should not be present				
CP1	1st Stage Cooling/ 1st Stage Heat Pump					E61	Voltage reversed polarity				
						E62	Bad Grounding				
		HtP	H t	Blower Tap for Heating Mode		E63	(1) Igniter relay fails (2) Igniter open				
		rUn	Run Test Mode								
dFt	Defrost Mode					E71	Gas valve is energized when it should be off				
	Menu Options		Error Codes			E08	Flame current is low, but still strong enough to allow operation				
Err	Active Alarm Menu	E01	Loss of the IRQ/other internal failures			E09	Open Inducer Limit Switch or Condensate Switch				
L6F	Last 6 Faults (To Clear, Hold Option Button 5 sec)	E21	Retry exceeded (Failed to est flame)			E11	(1) Gas valve not energized (2) Gas valve relay stuck closed				
Cr	Code Release Number	E22	Recycles exceeded (loss of established flame) 10X or PS open			E12	Open fuse				
COd	Cooling Off Delay (sec)	E23	Gas Valve not energized when it should be exceeded after 10 times								
OdU	Outdoor Unit										

D346495P01 REV G

Figure 6. S9B1 ladder diagram

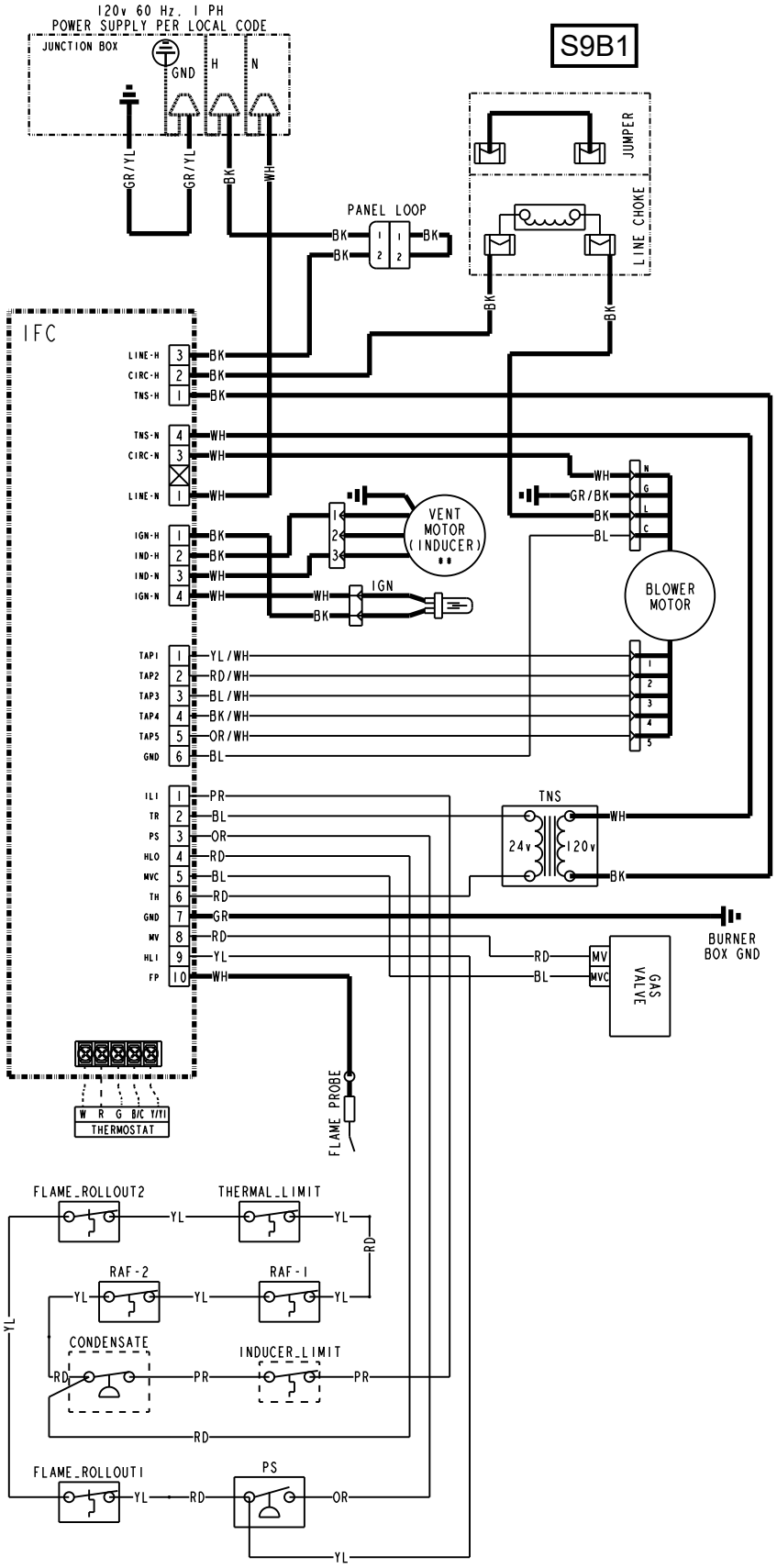


Figure 7. S9X2 wiring diagram

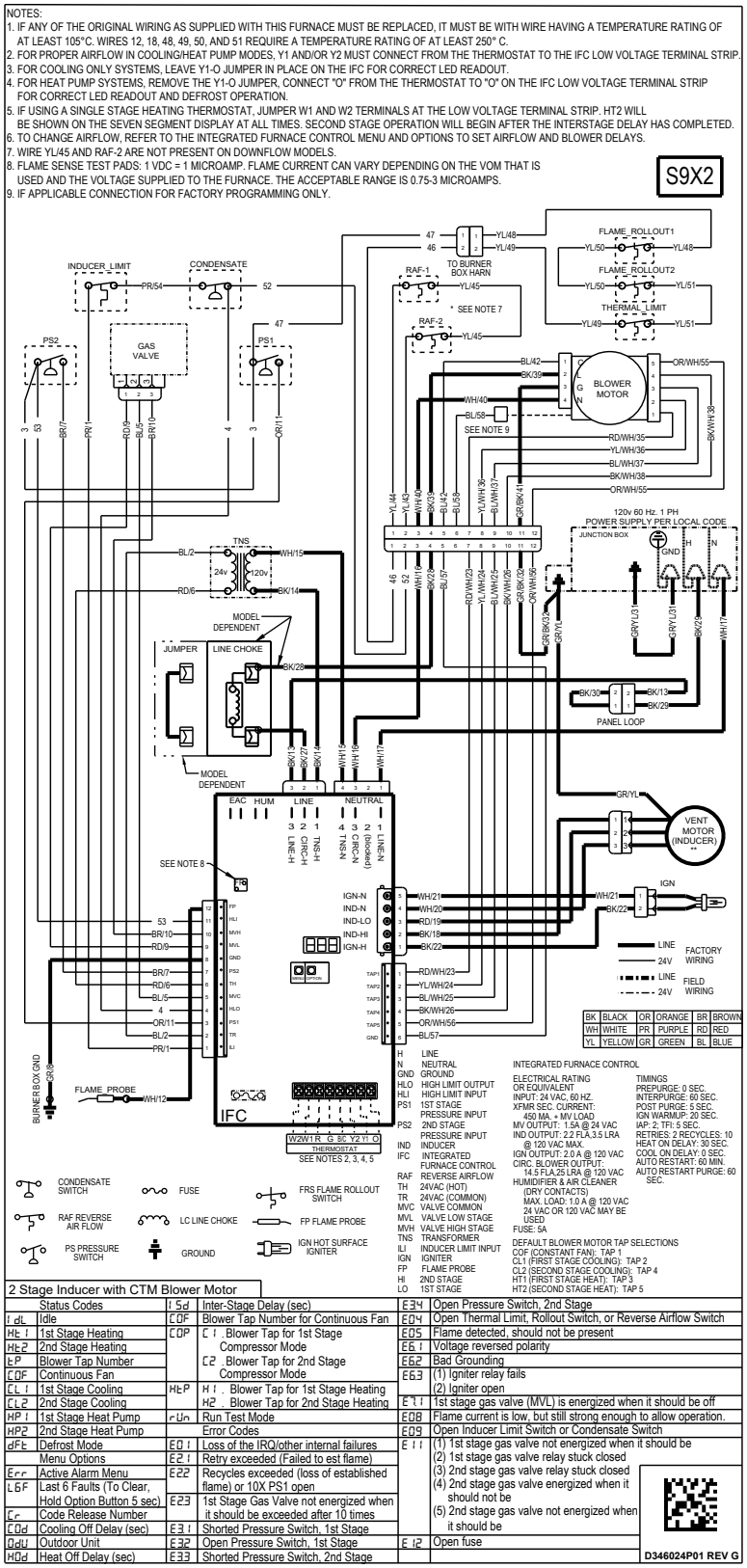
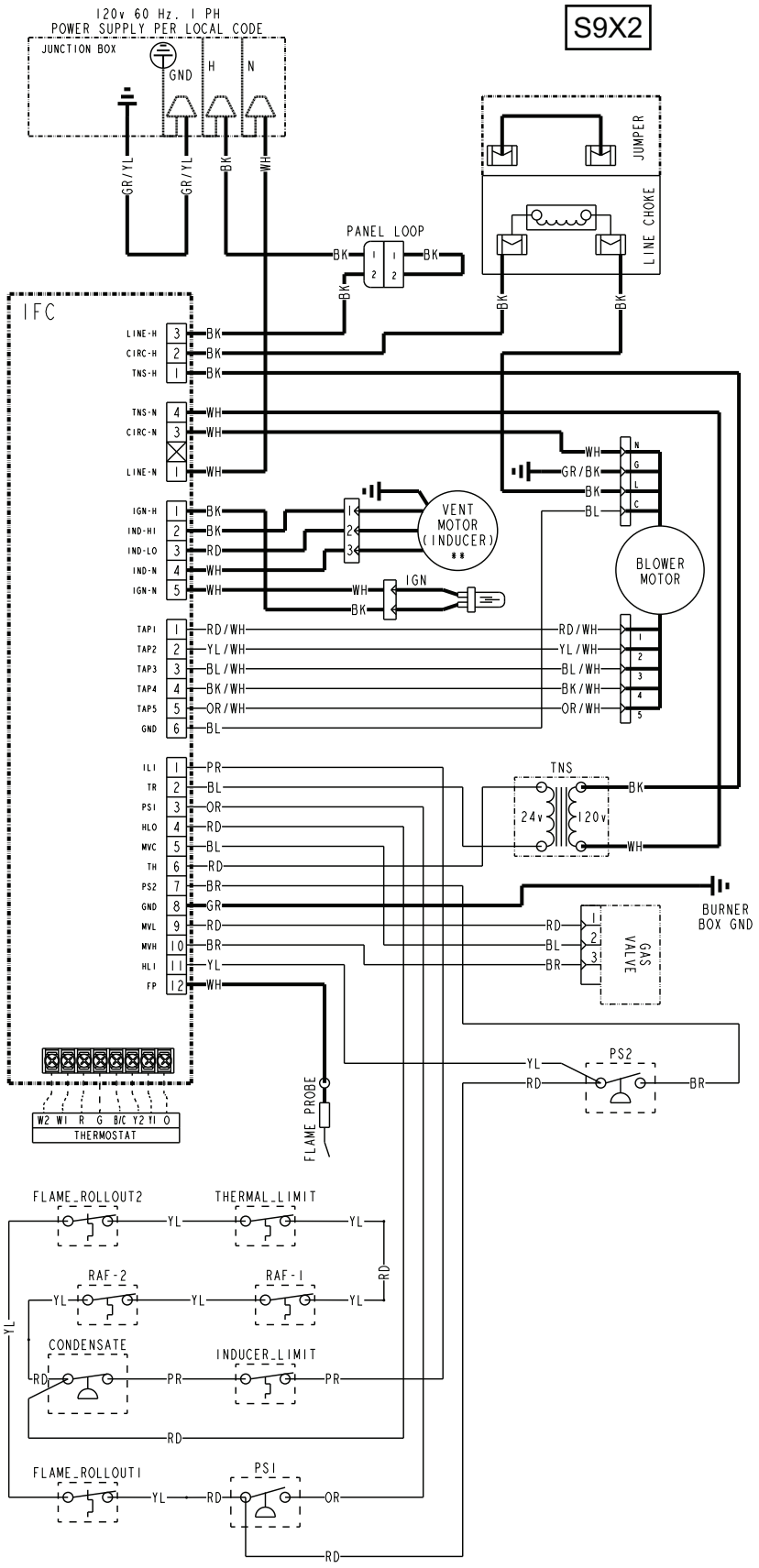


Figure 8. S9X2 ladder diagram



Airflow Tables

Table 10. Upflow — models S9X1B040U3PSBB, S9B1B040U3PSAB, and S9X2B040U3PSBB

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S9X1B040U3PSBB S9B1B040U3PSAB S9X2B040U3PSBB	1	SCFM / Watts	510 / 34	314 / 43	118 / 52	-	-
	2	SCFM / Watts	532 / 36	341 / 45	150 / 54	-	-
	3	SCFM / Watts	877 / 91	748 / 104	620 / 118	491 / 131	362 / 144
	4	SCFM / Watts	933 / 106	813 / 120	693 / 133	573 / 147	452 / 161
	5	SCFM / Watts	1056 / 140	950 / 156	843 / 172	737 / 188	631 / 204
	6	SCFM / Watts	1111 / 157	1009 / 174	908 / 190	806 / 207	705 / 223
	7	SCFM / Watts	1174 / 182	1078 / 199	983 / 216	887 / 233	791 / 251
	8	SCFM / Watts	1376 / 285	1297 / 305	1218 / 325	1140 / 344	1061 / 364
	9	SCFM / Watts	1512 / 382	1445 / 403	1378 / 424	1312 / 445	1245 / 466

Table 11. Upflow — models S9X1B060U4PSBB, S9B1B060U4PSAB, and S9X2B060U4PSBB

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S9X1B060U4PSBB S9B1B060U4PSAB S9X2B060U4PSBB	1	SCFM / Watts	840 / 91	702 / 101	565 / 111	427 / 121	290 / 130
	2	SCFM / Watts	1001 / 137	893 / 149	786 / 162	678 / 174	571 / 186
	3	SCFM / Watts	1140 / 193	1051 / 207	963 / 221	875 / 235	786 / 249
	4	SCFM / Watts	1208 / 223	1128 / 238	1048 / 253	969 / 268	889 / 283
	5	SCFM / Watts	1299 / 270	1224 / 284	1148 / 298	1073 / 312	998 / 327
	6	SCFM / Watts	1413 / 343	1348 / 359	1283 / 375	1217 / 391	1152 / 406
	7	SCFM / Watts	1444 / 354	1380 / 370	1315 / 386	1251 / 403	1186 / 419
	8	SCFM / Watts	1727 / 612	1674 / 631	1622 / 650	1570 / 668	1518 / 687
	9	SCFM / Watts	1790 / 694	1741 / 712	1691 / 729	1642 / 747	1593 / 765

Table 12. Upflow — models S9X1B080U4PSBB, S9B1B080U4PSAB, and S9X2B080U4PSBB

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S9X1B080U4PSBB S9B1B080U4PSAB S9X2B080U4PSBB	1	SCFM / Watts	911 / 94	766 / 104	622 / 115	477 / 125	332 / 136
	2	SCFM / Watts	1075 / 139	963 / 153	851 / 168	740 / 182	628 / 197
	3	SCFM / Watts	1215 / 185	1121 / 202	1028 / 219	934 / 236	840 / 253
	4	SCFM / Watts	1250 / 203	1164 / 221	1077 / 239	990 / 257	903 / 274
	5	SCFM / Watts	1349 / 251	1272 / 271	1194 / 291	1116 / 310	1039 / 330
	6	SCFM / Watts	1453 / 313	1387 / 335	1321 / 356	1254 / 378	1188 / 400
	7	SCFM / Watts	1505 / 340	1438 / 362	1372 / 384	1305 / 406	1239 / 427
	8	SCFM / Watts	1657 / 453	1597 / 477	1538 / 500	1479 / 524	1419 / 547
	9	SCFM / Watts	1878 / 669	1815 / 686	1752 / 702	1690 / 718	1627 / 735

Table 13. Upflow — models S9X1C080U5PSBB, S9B1C080U5PSAB, and S9X2C080U5PSBB

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S9X1C080U5PSBB S9B1C080U5PSAB S9X2C080U5PSBB	1	SCFM / Watts	643 / 45	384 / 53	125 / 62	-	-
	2	SCFM / Watts	1125 / 126	982 / 142	838 / 158	694 / 174	551 / 190
	3	SCFM / Watts	1192 / 140	1038 / 157	884 / 174	730 / 191	576 / 208
	4	SCFM / Watts	1509 / 245	1377 / 268	1246 / 291	1115 / 314	983 / 337
	5	SCFM / Watts	1548 / 257	1428 / 281	1308 / 304	1187 / 328	1067 / 352
	6	SCFM / Watts	1602 / 320	1467 / 345	1331 / 371	1196 / 396	1061 / 421
	7	SCFM / Watts	1640 / 352	1512 / 379	1383 / 406	1255 / 433	1127 / 459
	8	SCFM / Watts	1831 / 521	1778 / 550	1726 / 579	1673 / 608	1621 / 637
	9	SCFM / Watts	2351 / 886	2278 / 918	2204 / 950	2131 / 982	2058 / 1014

Table 14. Upflow — models S9X1C100U5PSBB, S9B1C100U5PSAB, and S9X2C100U5PSBB

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S9X1C100U5PSBB S9B1C100U5PSAB S9X2C100U5PSBB	1	SCFM / Watts	1013 / 104	847 / 116	680 / 129	514 / 142	348 / 155
	2	SCFM / Watts	1261 / 168	1126 / 185	990 / 202	854 / 219	718 / 236
	3	SCFM / Watts	1519 / 267	1407 / 290	1296 / 313	1184 / 336	1072 / 358
	4	SCFM / Watts	1554 / 283	1446 / 307	1337 / 330	1229 / 353	1120 / 377
	5	SCFM / Watts	1749 / 385	1651 / 411	1554 / 436	1457 / 462	1359 / 488
	6	SCFM / Watts	1868 / 464	1778 / 491	1688 / 519	1599 / 546	1509 / 574
	7	SCFM / Watts	2018 / 573	1936 / 602	1853 / 631	1770 / 660	1688 / 689
	8	SCFM / Watts	2191 / 718	2112 / 750	2033 / 782	1954 / 815	1875 / 847
	9	SCFM / Watts	2395 / 966	2303 / 981	2212 / 996	2120 / 1012	2028 / 1027

Table 15. Upflow — models S9X1D120U5PSBB, S9B1D120U5PSAB, and S9X2D120U5PSBB

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S9X1D120U5PSBB S9B1D120U5PSAB S9X2D120U5PSBB	1	SCFM / Watts	707 / 46	443 / 55	179 / 64	-	-
	2	SCFM / Watts	1344 / 163	1218 / 183	1092 / 202	966 / 222	840 / 241
	3	SCFM / Watts	1532 / 225	1419 / 247	1307 / 268	1195 / 290	1083 / 312
	4	SCFM / Watts	1584 / 247	1477 / 270	1370 / 292	1263 / 315	1156 / 338
	5	SCFM / Watts	1915 / 401	1818 / 428	1722 / 454	1625 / 480	1529 / 506
	6	SCFM / Watts	2104 / 525	2016 / 553	1927 / 582	1839 / 610	1750 / 639
	7	SCFM / Watts	2132 / 546	2045 / 575	1958 / 604	1870 / 633	1783 / 662
	8	SCFM / Watts	2410 / 833	2328 / 868	2247 / 903	2165 / 937	2084 / 972
	9	SCFM / Watts	2472 / 909	2401 / 944	2329 / 979	2257 / 1013	2186 / 1048

Table 16. Downflow — models S9X1B040D3PSBB, S9B1B040D3PSAB, and S9X2B040D3PSBB

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S9X1B040D3PSBB S9B1B040D3PSAB S9X2B040D3PSBB	1	SCFM / Watts	378 / 28	153 / 32	-	-	-
	2	SCFM / Watts	514 / 35	330 / 45	145 / 55	- / 64	- / 74
	3	SCFM / Watts	765 / 69	618 / 81	471 / 93	324 / 105	178 / 116
	4	SCFM / Watts	827 / 81	691 / 94	554 / 106	418 / 119	281 / 132
	5	SCFM / Watts	988 / 124	879 / 140	770 / 156	661 / 171	553 / 187
	6	SCFM / Watts	1085 / 156	986 / 173	887 / 190	787 / 207	688 / 224
	7	SCFM / Watts	1125 / 170	1030 / 188	934 / 205	839 / 222	743 / 239
	8	SCFM / Watts	1129 / 170	1035 / 187	941 / 204	847 / 221	753 / 239
	9	SCFM / Watts	1492 / 369	1419 / 390	1346 / 411	1273 / 431	1200 / 452

Table 17. Downflow — models S9X1B060D3PSBB, S9B1B060D3PSAB, and S9X2B060D3PSBB

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S9X1B060D3PSBB S9B1B060D3PSAB S9X2B060D3PSBB	1	SCFM / Watts	624 / 47	451 / 57	277 / 68	104 / 79	-
	2	SCFM / Watts	866 / 89	734 / 102	602 / 116	470 / 129	338 / 142
	3	SCFM / Watts	949 / 113	833 / 128	718 / 142	602 / 156	486 / 171
	4	SCFM / Watts	1122 / 165	1025 / 182	928 / 200	831 / 217	733 / 235
	5	SCFM / Watts	1178 / 191	1087 / 209	996 / 227	905 / 246	814 / 264
	6	SCFM / Watts	1260 / 233	1180 / 252	1100 / 271	1021 / 290	941 / 309
	7	SCFM / Watts	1370 / 296	1299 / 316	1228 / 336	1158 / 355	1087 / 375
	8	SCFM / Watts	1480 / 365	1416 / 387	1352 / 408	1287 / 429	1223 / 450
	9	SCFM / Watts	1504 / 384	1440 / 406	1376 / 427	1312 / 449	1249 / 470

Table 18. Downflow — models S9X1B080D4PSBB, S9B1B080D4PSAB, and S9X2B080D4PSBB

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S9X1B080D4PSBB S9B1B080D4PSAB S9X2B080D4PSBB	1	SCFM / Watts	499 / 36	306 / 43	113 / 49	-	-
	2	SCFM / Watts	1017 / 143	922 / 158	828 / 173	734 / 188	640 / 203
	3	SCFM / Watts	1119 / 176	1029 / 192	940 / 207	850 / 223	761 / 239
	4	SCFM / Watts	1205 / 215	1125 / 233	1044 / 250	964 / 268	883 / 285
	5	SCFM / Watts	1237 / 231	1160 / 250	1083 / 268	1006 / 286	928 / 305
	6	SCFM / Watts	1378 / 315	1309 / 334	1240 / 354	1172 / 373	1103 / 393
	7	SCFM / Watts	1453 / 360	1389 / 380	1324 / 399	1260 / 419	1195 / 439
	8	SCFM / Watts	1618 / 496	1562 / 518	1505 / 540	1449 / 561	1392 / 583
	9	SCFM / Watts	1794 / 682	1742 / 704	1691 / 726	1639 / 748	1587 / 770

Table 19. Downflow — models S9X1C100D5PSBB, S9B1C100D5PSAB, and S9X2C100D5PSBB

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S9X1C100D5PSBB S9B1C100D5PSAB S9X2C100D5PSBB	1	SCFM / Watts	1002 / 103	823 / 117	644 / 130	465 / 144	285 / 157
	2	SCFM / Watts	1385 / 223	1276 / 243	1167 / 264	1057 / 284	948 / 304
	3	SCFM / Watts	1527 / 286	1430 / 310	1333 / 333	1236 / 357	1139 / 380
	4	SCFM / Watts	1610 / 328	1516 / 352	1421 / 377	1326 / 401	1231 / 425
	5	SCFM / Watts	1761 / 433	1677 / 459	1593 / 486	1509 / 512	1425 / 538
	6	SCFM / Watts	1861 / 492	1783 / 520	1706 / 549	1628 / 577	1551 / 605
	7	SCFM / Watts	1984 / 548	1902 / 577	1820 / 606	1738 / 635	1656 / 663
	8	SCFM / Watts	2173 / 728	2097 / 760	2020 / 792	1944 / 824	1867 / 856
	9	SCFM / Watts	2342 / 945	2269 / 973	2196 / 1002	2123 / 1031	2050 / 1060

Table 20. Downflow — models S9X1D120D5PSBB, S9B1D120D5PSAB, and S9X2D120D5PSBB

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S9X1D120D5PSBB S9B1D120D5PSAB S9X2D120D5PSBB	1	SCFM / Watts	680 / 47	419 / 56	159 / 66	-	-
	2	SCFM / Watts	1481 / 236	1372 / 259	1264 / 282	1155 / 304	1046 / 327
	3	SCFM / Watts	1566 / 268	1461 / 292	1357 / 316	1253 / 340	1149 / 363
	4	SCFM / Watts	1803 / 393	1711 / 420	1619 / 446	1527 / 472	1435 / 498
	5	SCFM / Watts	1891 / 445	1801 / 472	1711 / 500	1621 / 527	1532 / 555
	6	SCFM / Watts	2132 / 568	2025 / 601	1919 / 633	1812 / 666	1705 / 698
	7	SCFM / Watts	2154 / 644	2068 / 675	1982 / 705	1896 / 736	1810 / 766
	8	SCFM / Watts	2344 / 837	2267 / 870	2190 / 902	2113 / 934	2035 / 967
	9	SCFM / Watts	2414 / 896	2333 / 928	2251 / 961	2170 / 993	2088 / 1026

CFM Versus Temperature Rise

S9X1 and S9B1 furnaces have one stage heating.

S9X2 furnaces have two stage heating. First stage is low heating and second stage is high heating.

Table 21. Heating table - upflow

CFM VS. Temperature Rise																		
Model	CFM (Cubic Feet Per Minute)																	
	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
S9X1B040U3PSBB S9B1B040U3PSAB	60	51	45	40	36	33	30	—	—	—	—	—	—	—	—	—	—	—
S9X1B060U4PSBB S9B1B060U4PSAB	—	—	—	60	54	49	45	42	39	36	34	32	30	—	—	—	—	—
S9X1B080U4PSBB S9B1B080U4PSAB	—	—	—	—	72	65	60	55	51	48	45	—	—	—	—	—	—	—
S9X1C080U5PSBB S9B1C080U5PSAB	—	—	—	—	—	65	60	55	51	48	45	42	40	—	—	—	—	—
S9X1C100U5PSBB S9B1C100U5PSAB	—	—	—	—	—	—	—	68	63	59	55	52	49	47	44	42	40	—
S9X1D120U5PSBB S9B1D120U5PSAB	—	—	—	—	—	—	—	—	—	—	66	63	59	56	53	51	48	46

Table 22. Heating table - downflow

CFM VS. Temperature Rise																		
MODEL	CFM (Cubic Feet Per Minute)																	
	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
S9X1B040D3PSBB S9B1B040D3PSAB	60	51	45	40	36	33	30	—	—	—	—	—	—	—	—	—	—	—
S9X1B060D3PSBB S9B1B060D3PSAB	—	—	—	60	54	49	45	42	39	36	—	—	—	—	—	—	—	—
S9X1B080D4PSBB S9B1B080D4PSAB	—	—	—	—	71	64	59	55	51	47	—	—	—	—	—	—	—	—
S9X1C100D5PSBB S9B1C100D5PSAB	—	—	—	—	—	—	—	69	64	60	56	53	50	47	45	43	41	—
S9X1D120D5PSBB S9B1D120D5PSAB	—	—	—	—	—	—	—	—	—	71	66	63	59	56	53	51	48	46

Table 23. 2nd stage heating table - upflow

CFM VS. Upflow 1st Stage Temperature Rise																		
Model	CFM (Cubic Feet Per Minute)																	
	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
S9X2B040U3PSBB	60	51	45	40	36	33	30	—	—	—	—	—	—	—	—	—	—	—
S9X2B060U4PSBB	—	—	—	60	54	49	45	42	39	36	34	32	30	—	—	—	—	—
S9X2B080U4PSBB	—	—	—	—	72	65	60	55	51	48	45	—	—	—	—	—	—	—
S9X2C080U5PSBB	—	—	—	—	—	64	59	55	51	47	44	42	40	—	—	—	—	—
S9X2C100U5PSBB	—	—	—	—	—	—	—	69	64	60	56	53	50	47	45	43	41	—
S9X2D120U5PSBB	—	—	—	—	—	—	—	—	—	—	67	63	60	57	54	51	49	47

Table 24. 1st stage heating table - upflow

CFM VS. Upflow 2nd Stage Temperature Rise																	
Model	CFM (Cubic Feet Per Minute)																
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100
S9X2B040U3PSBB	47	39	34	29	26	—	—	—	—	—	—	—	—	—	—	—	—
S9X2B060U4PSBB	—	—	50	44	39	35	32	29	27	25	—	—	—	—	—	—	—
S9X2B080U4PSBB	—	—	—	58	52	47	43	39	36	34	31	—	—	—	—	—	—

Table 24. 1st stage heating table - upflow (continued)

CFM VS. Upflow 2nd Stage Temperature Rise																	
Model	CFM (Cubic Feet Per Minute)																
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100
S9X2C080U5PSBB	—	—	—	58	51	46	42	39	36	33	31	—	—	—	—	—	—
S9X2C100U5PSBB	—	—	—	—	—	—	53	49	45	42	39	37	34	33	31	29	28
S9X2D120U5PSBB	—	—	—	—	—	—	—	58	54	50	47	44	41	39	37	35	34

Table 25. 2nd stage heating table – downflow

CFM VS. Downflow 2nd Stage Temperature Rise																		
Model	CFM (Cubic Feet Per Minute)																	
	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
S9X2B040D3PSBB	60	51	45	40	36	33	30	—	—	—	—	—	—	—	—	—	—	—
S9X2B060D3PSBB	—	—	—	59	53	48	44	41	38	36	—	—	—	—	—	—	—	—
S9X2B080D4PSBB	—	—	—	—	72	65	60	55	51	48	45	—	—	—	—	—	—	—
S9X2C100D5PSBB	—	—	—	—	—	—	—	68	63	59	55	52	49	47	44	42	40	—
S9X2D120D5PSBB	—	—	—	—	—	—	—	—	—	72	67	63	60	57	54	51	49	47

Table 26. 1st stage heating table – downflow

CFM VS. Downflow 1st Stage Temperature Rise																	
Model	CFM (Cubic Feet Per Minute)																
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100
S9X2B040D3PSBB	47	39	34	29	26	—	—	—	—	—	—	—	—	—	—	—	—
S9X2B060D3PSBB	—	—	50	43	39	35	32	29	27	25	—	—	—	—	—	—	—
S9X2B080D4PSBB	—	—	—	58	52	47	43	39	36	34	31	—	—	—	—	—	—
S9X2C100D5PSBB	—	—	—	—	—	—	52	48	44	41	39	36	34	32	31	29	28
S9X2D120D5PSBB	—	—	—	—	—	—	—	58	54	50	47	44	41	39	37	35	33

Furnace General Installation

The following sections give general instructions for the installation of the gas furnaces.

Notes:

- *For S9X2 furnaces, use a 5/16-inch Allen wrench to turn the four latches on the front panel a quarter turn.*
- *For S9X1 and S9B1 furnaces, use a 1/4-inch nut driver to remove the two screws on the front panel.*

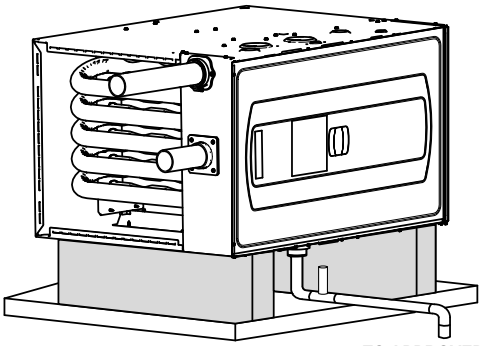
Horizontal Installation in an Attic or Crawlspace

The S-Series upflow condensing furnace may be installed in an attic or crawl space in the horizontal let or right position for needed airflow direction. The horizontal furnace installation in an attic should be on a service platform large enough to allow for proper clearances on all sides and service access to the front of the furnace. See "Locations and Clearances," p. 20. Line contact is only permissible between lines formed by intersections of the top and two sides of the furnace casing and building joists, studs, or framing.

The furnace may be placed horizontally in a crawl space on a pad or other noncombustible material which will raise the unit for sufficient protection from moisture.

The Furnace must be supported at both ends and the middle when installed horizontally. The Furnace must also be elevated approximately 6 inches to allow clearance for the condensate drain to exit the cabinet in the *horizontal position.*

Figure 9. Horizontal installation in an attic or crawlspace



FURNACE MUST BE SUPPORTED AT ALL FOUR CORNERS. BAYHANG - OPTIONAL HORIZONTAL HANGING BRACKET KIT

TO APPROVED OPEN / VENTED DRAIN

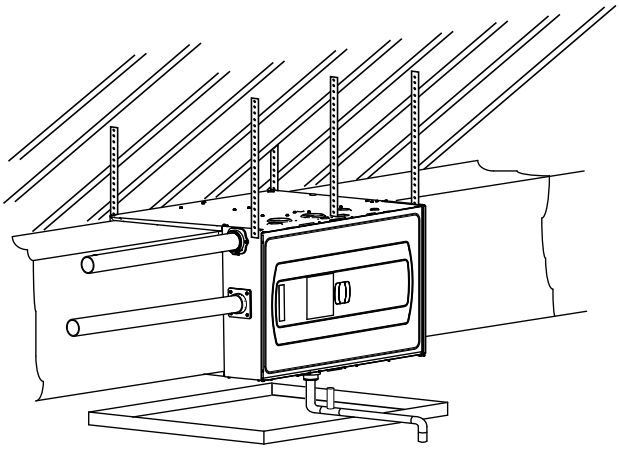
Note: The overflow stand pipe termination must be even with or slightly below the bottom of the condensate trap.

Note: Water from the overflow pipe must drain into the emergency drain pan.

Horizontal Installation Hanging using Straps

The furnace may be installed hanging in a horizontal position using straps. The furnace should be supported at both ends and have an additional support in the center of the furnace in front.

Figure 10. Horizontal installation hanging using straps



Gas Piping

Important: *When converting the gas piping from the factory default, the plug must be removed from the new gas piping location and swapped with the grommet from the default location. The upflow furnace default is left side gas piping. The downflow furnace default is right side gas piping.*

Figure 11. Representative vertical furnace with gas piping on left side

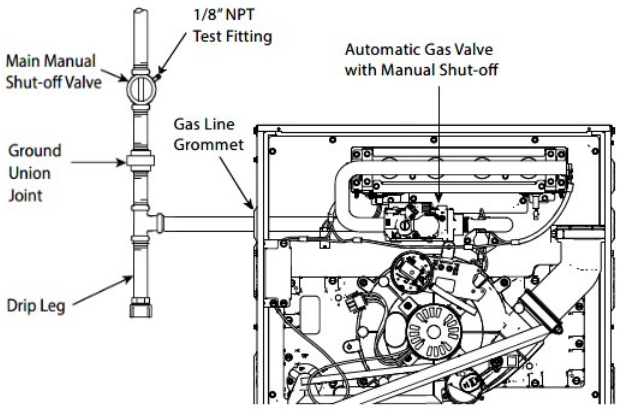


Figure 12. Representative vertical furnace with gas piping on right side

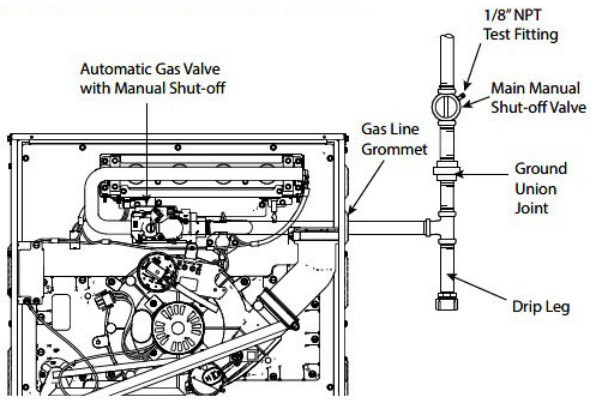
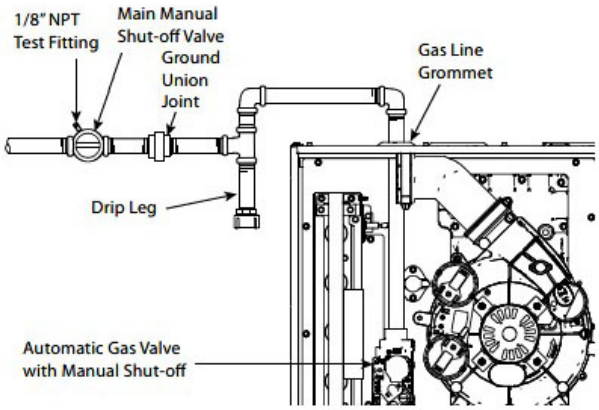


Figure 13. Representative horizontal left furnace with gas piping out right side



The upflow/horizontal furnace is shipped standard for left side installation of gas piping. An opening with plug is provided on the right side for an alternate gas piping arrangement.

The installation of piping shall be in accordance with piping codes and the regulations of the local gas company. Pipe joint compound must be resistant to the chemical reaction with liquefied petroleum gases.

Important: *If local codes allow the use of flexible gas appliance connector, always use a new listed connector. Do not use a connector which has previously serviced another gas appliance.*

Refer to the piping table for delivery sizes. Connect gas supply to the unit, using a ground joint union and a manual shut-off valve. National codes require a condensation drip leg to be installed ahead of the gas valve.

The furnace and its individual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.5 kPa).

The furnace must be isolated from the gas supply piping by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig (3.5 kPa).

Note: *Maximum pressure to the gas valve for natural gas is 13.8-inch W.C. Minimum pressure is 5.0-inch W.C. Maximum pressure to the gas valve for propane is 13.8-inch W.C. Minimum pressure is 11.0-inch W.C.*

Table 27. Cubic feet per hour of gas for various pipe sizes and lengths (natural gas only)

Pipe Size	Length of Pipe						
	10	20	30	40	50	60	70
1/2	131	90	72	62	55	50	46
3/4	273	188	151	129	114	104	95
1	514	353	284	243	215	195	179
1–1/4	1060	726	583	499	442	400	368

Note: This table is based on Pressure Drop of 0.3 inch W.C. and 0.6 SP.GR. Gas

Note: *All gas fittings must be checked for leaks using a soapy solution before lighting the furnace. Do not check with an open flame!*

For propane conversions on all S-Series Furnaces, use BAYLPSS400* conversion kit with stainless steel burners.

When installing our furnaces in a manufactured house, use Manufactured Housing Accessory Kit, BAYMFGH200B.

Combustion and Input Check

1. Make sure all gas appliances are off except the furnace.
2. Clock the gas meter with the furnace operating (determine the dial rating of the meter) for one revolution.
3. Match the "Sec" column in the gas flow table with the time clocked.
4. Read the "Flow" column opposite the number of seconds clocked.
5. Use the following factors if necessary:
   a. For 1 Cu. Ft. Dial Gas Flow CFH = Chart Flow Reading ÷ 2
   b. For 1/2 Cu Ft. Dial Gas Flow CFH = Chart Flow Reading ÷ 4
   c. For 5 Cu. Ft. Dial Gas Flow CFH = 10X Chart Flow Reading ÷ 4
6. Multiply the final figure by the heating value of the gas obtained from the utility company and compare to the nameplate rating. This must not exceed the nameplate rating.

Table 28. Gas flow in cubic feet per hour, 2 cubic foot dial

Sec.	Flow	Sec.	Flow	Sec.	Flow	Sec.	Flow
30	244	46	159	64	114	100	73
31	236	47	156	66	111	104	70

Table 28. Gas flow in cubic feet per hour, 2 cubic foot dial (continued)

Sec.	Flow	Sec.	Flow	Sec.	Flow	Sec.	Flow
32	229	48	153	68	108	108	68
33	222	49	149	70	105	112	65
34	215	50	146	72	102	116	63
35	209	51	144	74	99	120	61
36	203	52	141	76	96	130	56
37	198	53	138	78	94	140	52
38	193	54	136	80	92	150	49
39	188	55	133	82	89	160	46
40	183	56	131	84	87	170	43
41	179	57	128	86	85	180	41
42	174	58	126	88	83	190	39
43	170	59	124	90	81	200	37
44	166	60	122	94	78	—	—
45	163	62	118	98	75	—	—

Note: Excerpted from NFPA 54/ANSI Z223.1 Table A.11.1.1

Gas Valve Adjustment

Changes can be made by adjusting the manifold pressure, or changing orifices (orifice change may not always be required). To adjust the manifold pressure:

1. Turn off all electrical power to the system.
2. Loosen (Do not remove) the pressure tap test set screw one turn with 3/32-inch hex wrench.
   a. The pressure tap adjustment kit (KIT07611) contains a 3/32-inch hex wrench, a 5/16-inch hose and a connector and can be ordered through Global Parts.
3. Attach a manifold pressure gauge with flexible tubing to the outlet pressure boss marked OUT P.
4. Turn on system power with no call for heat. For single stage furnaces, skip to Step 7.

Note: *2nd stage manifold pressure should be adjusted first. To shorten the amount of time it takes for 2nd stage to be energized, set the ISD (Interstage Delay) to zero (000) using the Menu and Option buttons on the IFC. This will energize 2nd stage heating immediately after the blower on delay from 1st stage is complete. This is ~30 seconds after 1st stage flame has been sensed.*

5. Make a call for 2nd stage heating. Insure that the unit is in 2nd stage heating by verifying 24 VAC is measured between C and HI on the gas valve.

Important: *Adjust 2nd stage on the gas valve before attempting to adjust 1st stage.*

6. Adjust 2nd stage gas heat by removing the high (HI) adjustment regulator cover screw.
   a. To increase outlet pressure, turn the regulator adjust screw clockwise.
   b. To decrease outlet pressure, turn the regulator adjust screw counterclockwise.
   c. Adjust regulator until pressure shown on manometer matches the pressure specified in the table.

      The input of no more than nameplate rating and no less than 93% of the nameplate rating, unless the unit is derated for high altitude.
   d. Replace and tighten the regulator cover screw securely.
   e. Remove call for second stage heat, first stage heat is now running.
7. Adjust 1st stage gas heat by removing the low (LO) adjustment regulator cover screw. For single stage furnaces, refer to top figure and remove the outlet regulator cover screw.
   a. To increase outlet pressure, turn the regulator adjust screw clockwise.
   b. To decrease outlet pressure, turn the regulator adjust screw counterclockwise.
   c. Adjust regulator until pressure shown on manometer matches the pressure specified in the table.

      The input of no more than nameplate rating and no less than 93% of the nameplate rating, unless the unit is derated for high altitude.
   d. Replace and tighten the regulator cover screw securely.
8. Cycle the valve several times to verify regulator setting.
   a. Repeat Step 5. to Step 7. if needed.
9. Turn off all electrical power to the system.
10. Remove the manometer and flexible tubing and tighten the pressure tap screw.
11. Using a leak detection solution or soap suds, check for leaks at the pressure outlet boss and pressure tap test screw.
12. Turn on system power and check operation of the unit.

Figure 14. Single-stage gas valve

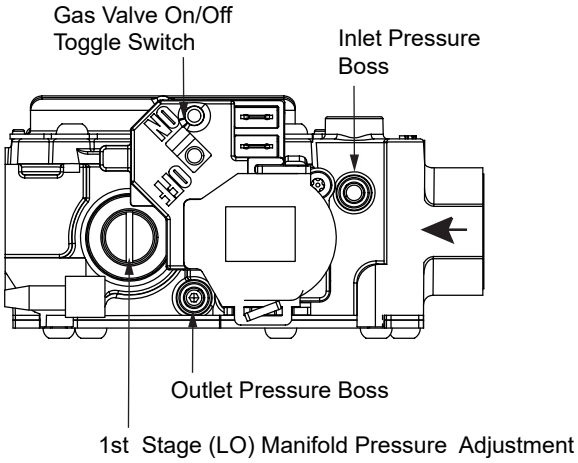


Figure 15. Two-stage gas valve

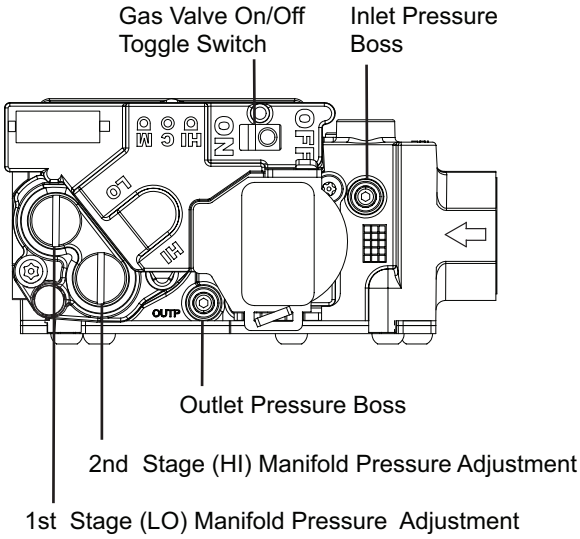


Table 29. Maximum and minimum inlet pressure (inches w.c.)

	Maximum	Minimum
Natural Gas	13.8	5.0
Propane Gas	13.8	11.0

Table 30. Fuel manifold pressure settings (inches w. c.)

	S9X1 / S9B1	S9X2 2nd Stage Max.	S9X2 1st Stage Max.
Natural Gas	3.5	3.5	1.7
Propane Gas	10.0	10.0	6.0

High Altitude Derate

Input ratings (BTUH) of these Furnaces are based on sea level operation and should not be changed at elevations up to 2,000 ft. (610 m).

If the installation is 2,000 ft. (610 m) or above, the Furnace input rate (BTUH) shall be reduced 4% for each 1,000 ft. above sea level.

Installations of this furnace at altitudes above 2,000 ft. (610 m) shall be made utilizing the Vent Length table and/or Part Numbers for Replacement Orifices table in these installation instructions.

The Furnace input rate shall be checked by clocking the gas flow rate (CFH) and multiplying by the heating value obtained from the local utility supplier for the gas being delivered at the installed altitude. Input rate changes can be made by adjusting the Manifold Pressure (min 3.0 - max 3.7 in. W.C. - Natural Gas) or changing orifices (orifice change may not always be required).

If the desired input rate can not be achieved with a change in Manifold Pressure, then the orifices must be changed. Propane installations will require an orifice change.

Important: *Reinstall the replacement orifices to the same depth as the orifices supplied with the equipment.*

See the table for help in selecting orifices if orifice change is required. Furnace input rate and temperature rise should be checked again after changing orifices to confirm the proper rate for the altitude.

The vent length table shows the required vent lengths for installations at various altitudes. Optional high altitude kits are available for installations over 5000 feet. Installations above 12,000 feet are not allowed.

Slide the main gas valve control switch within the unit to OFF. Turn the external gas valve to ON. Purge the air from the gas lines. After purging, check all gas connections for leaks with a soapy solution – do not check with an open flame. Allow 5 minutes for any gas that might have escaped to dissipate.

Propane gas being heavier than air may require forced ventilation. Slide the control switch on the gas valve in the unit to ON.

Table 31. Part numbers for replacement orifices

Drill Size	Part Number	Drill Size	Part Number
44	ORF00501	54	ORF00555
45	ORF00644	55	ORF00693
47	ORF00910	56	ORF00907
49	ORF00503	58	ORF01338
—	—	59	ORF01339

Note: If 46, 48, 50, or 57 orifice is required, use the next smaller drill size and reduce the manifold pressure to achieve rate.

The table lists the main burner orifices used with the furnace. If a change of orifices is required to correct the

furnace input rating refer to the part number for replacement orifices table.

Installation of this furnace at altitudes above 2000 ft (610m) shall be in accordance with local codes, or in the absence of local codes, the *National Fuel Gas Code, ANSI Z223.1/ NFPA 54* or *National Standard of Canada, Natural Gas and Propane Installation Code, CSA B149.1*. Installation of this furnace at altitudes above 2,000 ft (610 m) shall be made in accordance with the listed high altitude conversion kit available with the furnace.

Table 32. Main burner orifices

Orifice Twist Drill Size If Installed at Sea Level	Altitude Above Sea Level and Orifice Required at Other Elevations								
	2000	3000	4000	5000	6000	7000	8000	9000	10000
42	42	43	43	43	44	44	45	46	47
43	44	44	44	45	45	46	47	47	48
44	45	45	45	46	47	47	48	48	50
45	46	47	47	47	48	48	49	49	50
46	47	47	47	48	48	49	49	50	51
47	48	48	49	49	49	50	50	51	52
54	54	55	55	55	55	55	56	56	56
55	55	55	55	56	56	56	56	56	57
56	56	56	57	57	57	58	59	59	60
57	58	59	59	60	60	61	62	63	63
58	59	60	60	61	62	62	63	63	64

Note: From National Fuel Gas Code — Table E.1.1(d)

General Venting

Furnace exhaust must be vented to the outdoors. These furnaces are induced draft vented and must not be connected to any vent serving another appliance. Please note that these furnaces use positive-pressure vent systems.

Proper venting is essential to obtain maximum efficiency from a condensing furnace. Proper installation of the vent system is necessary to assure drainage of the condensate and prevent deterioration of the vent system.

ETL has certified the design of condensing furnaces for a minimum of 0-inch clearance from combustible materials to single wall plastic vent pipe.

The recommended system is assembled from 2-inch or 3-inch plastic pipe and fittings found in the Table 33, p. 43. Where the system is routed to the outdoors through an existing masonry chimney containing flue products from another gas appliance, or where required by local codes, then 3-inch venting of Type 29- 4C stainless steel must be used in place of PVC material.

These Furnaces have been classified as Category IV Furnaces in accordance with ANSI Z21.47 “latest edition” standards. Category IV - a central furnace that operates with a positive vent static pressure and with a flue loss less than 17 percent. These conditions require special venting systems, which must be gas tight and water tight.

Note: *When an existing Furnace is removed from a venting system serving other gas appliances, the venting system is likely to be too large to properly vent the remaining attached appliances.*

Important:

- *These Furnaces may be installed as Direct Vent (sealed combustion) or as Nondirect Vent (single pipe). The Furnaces are shipped Direct Vent with sealed combustion.*
- *Products installed in Canada must use vent systems that are certified to the Standard for Type BH Gas Venting Systems (ULC S636) for Class II-A venting systems (up to 65°C). Components of the vent system must not be interchanged with other vent systems or unlisted pipe or fittings. Plastic components, specified primers, and glues must be from a single system manufacturer and not intermixed with other system manufacturer's vent system parts. In addition, the first three feet of the vent pipe must be visible for inspection.*

When the vent pipe is exposed to temperatures below freezing, that is, when it passes through unheated spaces, the pipe must be insulated with 1/2-inch (12.7 mm) thick Armaflex-type insulation or equal.

If the space is heated sufficiently to prevent freezing, then the insulation will not be required. If domestic water pipes

are not protected from freezing then the space meets the condition of a heated space.

3-Inch Venting Requirements

Important:

- *To determine if your application requires 3-inch venting, see the "Maximum Vent Length ," p. 43.*
- *Horizontal venting application must use the 2-inch x 3-inch offset reducing coupling. Vertical venting applications do not require the reducing coupling to be offset.*

Notes:

- *If your furnace comes with a factory supplied 2-inch x 3-inch offset reducing coupling it is used for 3-inch vent pipe installation. Make sure the marking "TOP" is located on the top side of the pipe in horizontal venting applications. The straight side of the coupling must be on bottom for proper drainage of condensate.*
- *For Canadian applications, BAYREDUCE 2-inch x 3-inch offset reducing coupling meets ULC-S636 requirements. Make sure the marking "TOP" is located on the top side of the pipe. The straight side of the coupling must be on bottom for proper drainage of condensate in horizontal venting.*

Figure 16. Horizontal coupling

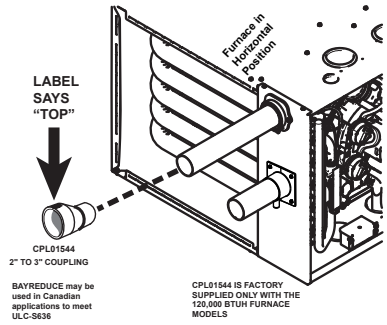
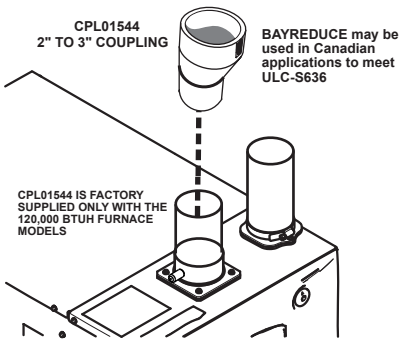


Figure 17. Vertical coupling



Typical Venting

This combustion air intake has a built-in condensate collection system. Condensate that may collect is drained by field supplied 1/2-inch ID tubing. The tubing must be routed to form a trap and water seal (see Figure 19, p. 39, Figure 20, p. 40, and Figure 21, p. 40).

A field supplied hose clamp is recommended but not be required. The tubing is not under pressure.

Combustion air piping must be square cut and de-burred for proper drainage. For side entry combustion inlet applications, ensure the drain is pointed downwards.

Figure 18. Condensing furnace vent design

Condensing Furnace Vent Design

Figure 19. Upflow top entry

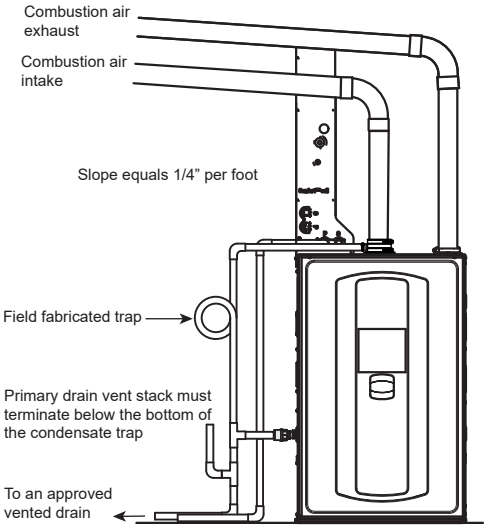


Figure 20. Horizontal top entry

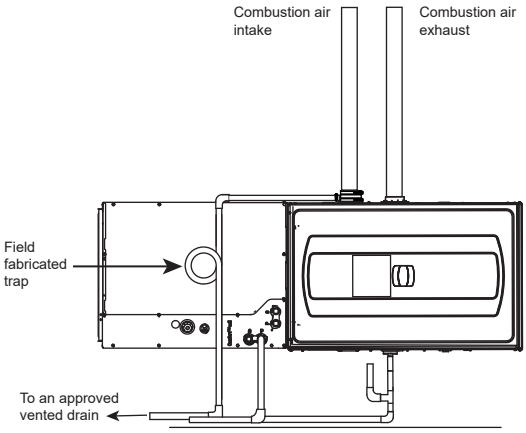
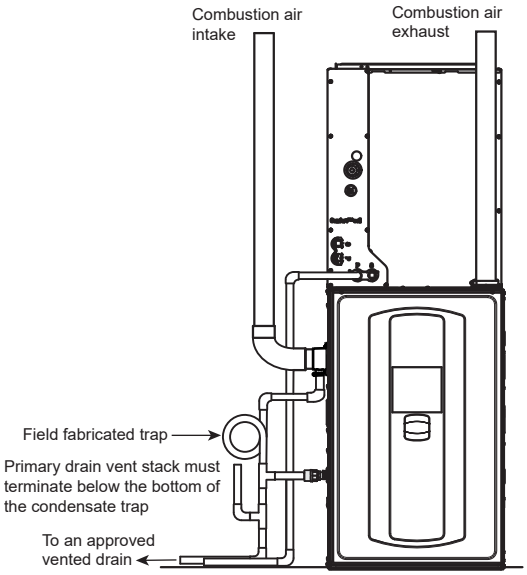


Figure 21. Upflow side entry



Note: *Primary drain vent stack must terminate below the bottom of the condensate trap.*

Special Case Venting

Below are instructions for direct vent furnace air intake.

In certain applications, particularly when the furnace is located in a basement, there are certain conditions that can be met where warm humid air from the outside is drawn into combustion air piping. If the area where the piping is located is conditioned below 70° F, condensation could occur inside the piping and ultimately drain into the furnace compartment, which could lead to premature component failure.

Note: *Inlet air piping is not considered to be part of the venting system. The inlet air piping may be made from PVC.*

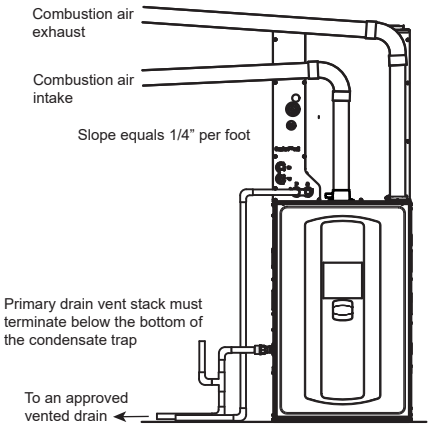
We recommend following one of the options to prevent this condition from occurring and possibly damaging components within the furnace:

Option 1

If possible, slope the inlet combustion air piping away from the furnace. Condensation that may occur will now drain outside of the home. The combustion air outlet piping must remain sloped back to the furnace.

Note: *Combustion air drain fitting must remain capped if not using the drain function. See "Condensate Drain Instructions," p. 64 section.*

Figure 22. Option 1

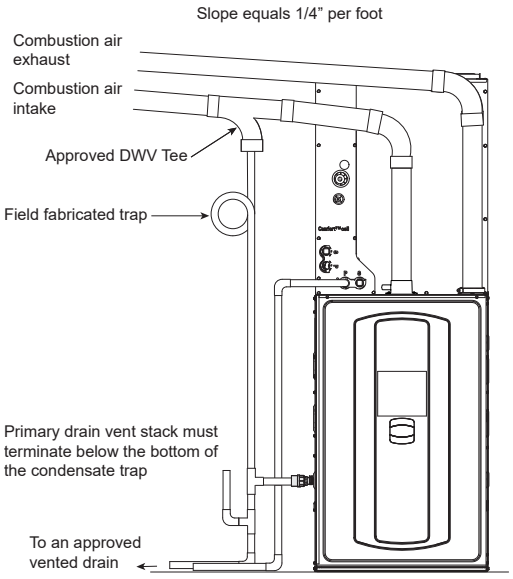


Option 2 - Top combustion air intake

If sloping the combustion air intake pipe is not possible, install a DWV Tee as close to the furnace as possible with drain and trap to prevent condensation from occurring in the furnace cabinet. Do not tee AC condensate and combustion air condensate trap together.

Note: *Combustion air drain fitting must remain capped if not using the drain function. See "Condensate Drain Instructions," p. 64 section.*

Figure 23. Option 2

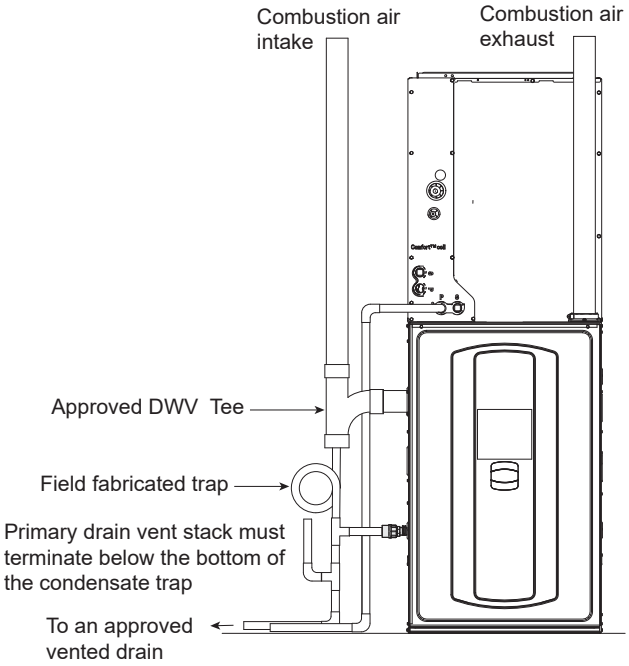


Option 3 - Side combustion air intake

If sloping the combustion air intake pipe is not possible, install an approved DWV Tee as close to the furnace as possible with drain and trap.

Note: *Combustion air drain fitting must remain capped if not using the drain function. See "Condensate Drain Instructions," p. 64 section.*

Figure 24. Option 3



Vent Terminations

Direct Vent Application: The furnaces must be vented to the exterior of the house and combustion air must come through the inlet air pipe from outside air.

Note: *BAYVENT* accessories can be used for inlet and outlet terminals when the pipes do not exit the structure together. For Canadian applications, venting systems must meet ULC-S636 requirements.*

Non-direct Vent Application: The furnace shall be vented to the exterior of the house, but combustion air may enter from the surrounding area as long as combustion air requirements are met. (See "Air for Combustion and Ventilation," p. 51)

Vent terminations:

- BAYVENT200B
- BAYAIR30AVENTA

Vent terminations — Canadian applications. Meets ULC-S636 requirements:

- BAYVENTCN200B
- BAYAIR30CNVENT

Important: *Furnace Vent / Inlet Pipe Installation in Two Pressure Zone Configurations are not allowed.*

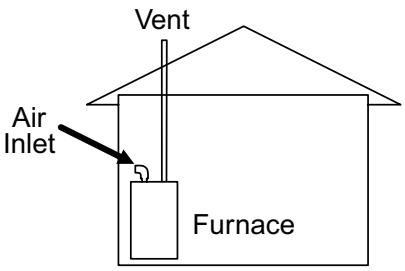
Note: *For single pressure zone applications, see the "Horizontal Venting," p. 44 section.*

The following are examples only.

Note: *If only the flue gas pipe is to the outside of the structure, a straight section of pipe (long enough to exit the furnace cabinet) must be attached to the inlet air side with an elbow (which is 5 to 10 equiv. ft.) installed on the end to prevent dust and debris from falling directly into the furnace.*

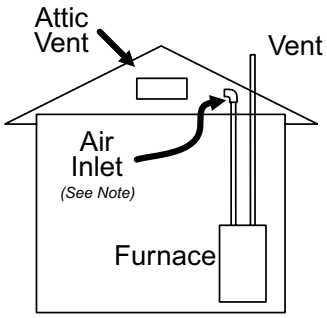
Example 1: shows the vent pipe exhausting through the roof and the inlet air coming from the interior of the house. The inlet air coming from the interior of the house must meet combustion requirements for area as shown in "Air for Combustion and Ventilation," p. 51.

Figure 25. Example 1 - single pipe venting



Example 2: shows the inlet air may come from the attic if the requirements for combustion air are met as shown in "Air for Combustion and Ventilation," p. 51. The inlet air does not have to come from outside the structure.

Figure 26. Example 2 - single pipe venting



Attaching Vent Piping

Vent Fitting Material – Plastic

Gas and liquid tight single wall vent fittings, designed for resistance to corrosive flue condensate, MUST be used throughout.

Listed in the Approved Vent Pipe Materials table are designations for different types of 2-inch and 3-inch size pipe and fittings that meet these requirements. The materials listed are various grades of PVC, CPVC, ABS, PolyPro® by DuraVent , Z-Dens by Novaflex Group, Innoflue® by Centrotherm, ECCO™ polypropylene venting system, and PolyFlue™ polypropylene venting systems.

Important: *Products installed in Canada must use vent systems that are certified to the Standard for Type BH Gas Venting Systems (ULC S636) for Class II-A venting systems (up to 65°C). Components of the vent system must not be interchanged with other vent systems or unlisted pipe or fittings. Plastic components, specified primers, and glues must be from a single system manufacturer and not intermixed with other system manufacturer's vent system parts. In addition, the first three feet of the vent pipe must be visible for inspection.*

Pipe Joints

All joints must be fastened and sealed per manufacturer instructions and local and national codes to prevent escape of combustion products into the building.

Manufactured Modular Venting Systems

⚠ WARNING

Carbon Monoxide Poisoning!

Failure to follow instructions below could result in death or serious injury, or property damage.
Refer to the Approved Vent Pipe Materials table for manufactured modular venting systems approved for use with this product. Follow the manufacturer's installation instructions when installing the venting system.

⚠ WARNING

Carbon Monoxide Poisoning!

Failure to follow instructions below could result in death or serious injury, or property damage.
Do not use cement on polypropylene venting systems. Follow the manufacturer's installation instructions when installing the venting system.

Important: *For manufactured modular venting systems that are approved with this product see PVC vent fitting material table. Do not drill into polypropelene venting pipes.*

Bonding of PVC

Note: *It is recommended that the first joints from the Furnace be connected and sealed with high temperature RTV. This will enable the pipes to be removed later without cutting.*

Be sure to properly support these joints.

Commercially available solvent cement for PVC must be used to join PVC pipe fittings. Follow instructions on container carefully.

Pipe and Fitting – ASTM D1785, D2466, D2661, and D2665

PVC Primer and Solvent Cement – ASTM D2564

Procedure for Cementing Joints – Ref ASTM D2855

1. Cut pipe square, remove ragged edges and burrs. Chamfer end of pipe, then clean fitting socket and pipe joint area of all dirt, grease, moisture or chips.
2. After checking pipe and socket for proper fit, wipe socket and pipe with cleaner-primer. Apply a liberal coat of primer to inside surface of socket and outside of pipe.
   DO NOT ALLOW PRIMER TO DRY BEFORE APPLYING CEMENT.
3. Apply a thin coat of cement evenly in the socket. Quickly apply a heavy coat of cement to the pipe end and insert pipe into fitting with a slight twisting movement until it bottoms out.
4. Hold the pipe in the fitting for 30 seconds to prevent tapered socket from pushing the pipe out of the fitting.
5. Wipe all excess cement from the joint with a rag. Allow 15 minutes before handling. Cure time varies according to fit, temperature and humidity.

Connection of the pipe and collar of the combustion air inlet should just be a friction fit. It is recommended that the inlet air joint be sealed with RTV type sealant to allow the joint to be separated for possible future service. The inlet and vent pipes must be properly supported throughout the entire length.

Note: *Follow venting instructions carefully when using PVC cement.*

Important: *All joints must be water tight. Flue condensate is somewhat acidic, and leaks can cause equipment damage.*

Figure 27. Sealing inlet air pipe

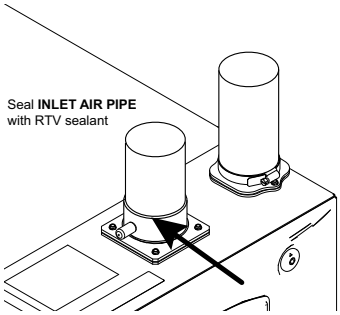


Table 33. Approved non-metallic vent pipe and fitting materials

ANSI/UL 1738 Approved Vent Pipe Material			
ASTM Standard	Pipe Type	Allowable Temperature °F	Marking
N/A	N/A	158	UL-1738
PVC			
ASTM Standard	Pipe Type	Allowable Temperature °F	Marking
D2665	DWV Pipe	158	ASTM D2665
D1785	SCH 40	158	ASTM 1785 - Type I
D2241	SDR 17, 21, 26, 32.5 SERIES	158	ASTM D2241
CPVC			
ASTM Standard	Pipe Type	Allowable Temperature °F	Marking
F441	SCH 40	212	ASTM F441
F442	SDR 17, 21, 26, 32.5 SERIES	212	ASTM F442
ABS			
ASTM Standard	Pipe Type	Allowable Temperature °F	Marking
D2661	SCH 40 DWV	180	ASTM D2661
Polypropylene			
PolyPro® by DuraVent, Z-Dens by Novaflex Group, Innoflue® by Centrotherm, System 1738 by IPEX, ECCO™ polypropylene venting system, and PolyFlue™ polypropylene venting systems.			
ASTM Standard	Pipe Type	Allowable Temperature °F	Marking
N/A	N/A	230	ULC-S636

Maximum Vent Length

Table 34. Maximum vent length — S9*1/S9X2

Model	1.5-in. Pipe	2-in. Pipe	2.5-in. Pipe	3-in. Pipe	4-in. Pipe
Altitude 0-2,000 ft.					
S9*1B040U3, S9*1B040D3, S9*1B060D3, S9*1B060U4, S9X2B040U3, S9X2B040D3, S9X2B060U4, S9X2B060D3	50	200	200	200	250
S9*1B080U4, S9*1B080D4, S9*1C080U5, S9X2B080U4, S9X2B080D4, S9X2C080U5	30	100	200	200	250
S9*1C100U5, S9*1C100D5, S9X2C100U5, S9X2C100D5	(a)	50	100	200	250
S9*1D120U5, S9*1D120D5, S9X2D120U5, S9X2D120D5	(a)	(a)	(a)	200	250
Altitude 2,001- 5,400 ft.					
S9*1B040U3, S9*1B040D3, S9*1B060D3, S9*1B060U4, S9X2B040U3, S9X2B040D3, S9X2B060U4, S9X2B060D3	50	200	200	200	250
S9*1B080U4, S9*1B080D4, S9*1C080U5, S9X2B080U4, S9X2B080D4, S9X2C080U5	20	80	120	120	200
S9*1C100U5, S9*1C100D5, S9X2C100U5, S9X2C100D5	(a)	50	100	150	200
S9*1D120U5, S9*1D120D5, S9X2D120U5, S9X2D120D5	(a)	(a)	(a)	200	250

Table 34. Maximum vent length — S9*1/S9X2 (continued)

Model	1.5-in. Pipe	2-in. Pipe	2.5-in. Pipe	3-in. Pipe	4-in. Pipe
Altitude 5,401-7,800 ft.					
S9*1B040U3, S9*1B040D3, S9*1B060D3, S9*1B060U4, S9X2B040U3, S9X2B040D3, S9X2B060U4, S9X2B060D3	25	100	150	150	200
S9*1B080U4, S9*1B080D4, S9*1C080U5, S9X2B080U4, S9X2B080D4, S9X2C080U5	(a)	50	70	70	140
S9*1C100U5, S9*1C100D5, S9X2C100U5, S9X2C100D5	(a)	(a)	(a)	100	200
S9*1D120U5, S9*1D120D5, S9X2D120U5, S9X2D120D5	(a)	(a)	(a)	100	200
Altitude 7,801-10,100 ft.					
S9*1B040U3, S9*1B040D3, S9*1B060D3, S9*1B060U4, S9X2B040U3, S9X2B040D3, S9X2B060U4, S9X2B060D3	(a)	50	90	90	180
S9*1B080U4, S9*1B080D4, S9*1C080U5, S9X2B080U4, S9X2B080D4, S9X2C080U5	(a)	(a)	(a)	50	100
S9*1C100U5, S9*1C100D5, S9X2C100U5, S9X2C100D5	(a)	(a)	(a)	50	100
S9*1D120U5, S9*1D120D5, S9X2D120U5, S9X2D120D5	(a)	(a)	(a)	50	100

Notes:

1. * represents X or B
2. Installation instructions must be followed for installation of the venting system.
3. Maximum total equivalent length in feet for vent or inlet air, not combined total.
4. For PolyPro® by Duravent, Z-DENS by Novaflex Group, InnoFlue® by Centrotherm, ECCO™ polypropylene venting system, and Polyflue™ manufactured modular venting systems that are in the approved vent pipe material table, fitting equivalent vent lengths may be different from what is shown in Note 8. See the venting system manufacturer's installation instruction for appropriate venting diameters and equivalent lengths.
5. Minimum vent length for all models: 15 ft. equivalent.
6. Do not mix pipe diameters in the same length of pipe outside the furnace cabinet (Except adapters at the top of the furnace). If different inlet and vent pipe sizes are used, the vent pipe must adhere to the maximum length limit shown in the table above (See Note 9 below for exception). The inlet pipe can be of a larger diameter, but never smaller than the vent pipe.
7. Maximum pipe lengths must not be exceeded! The length shown is not a combined total, it is the maximum length of each (Vent or inlet air pipes).
8. One short radius 90° elbow is equivalent to 10 ft. of 4-inch pipe, 10 ft. of 3-inch pipe, or 8 ft. of 2-inch pipe. One long radius elbow is equivalent to 6 ft. of 4-inch pipe, 7 ft. of 3-inch pipe, or 5 ft. of 2-inch pipe. Two 45° elbows equal one 90° long elbow. One mitered elbow is equivalent to 12 ft. of 3-inch pipe or 12 ft. of 2-inch pipe.
9. The termination tee or bend must be included in the total number of elbows. If the BAYAIR30AVENTA or BAYAIR30CNVENT termination kit is used, the equivalent length of pipe is 5 feet. For BAYVENT200B and BAYVENTCN200B the equivalent length is 0 feet.
10. For Canadian applications, venting systems must meet ULC-S636 requirements.
11. The inlet air of one pipe systems require the installation of a minimum of one 90° elbow (to prevent dust and debris from falling straight into the furnace).

(a) Not allowed

Horizontal Venting

Note: *Confirm the vent piping is sloped 1/4-inch per foot and that piping is supported properly to prevent sags and condensate pooling.*

3-inch Venting requirements

Important:

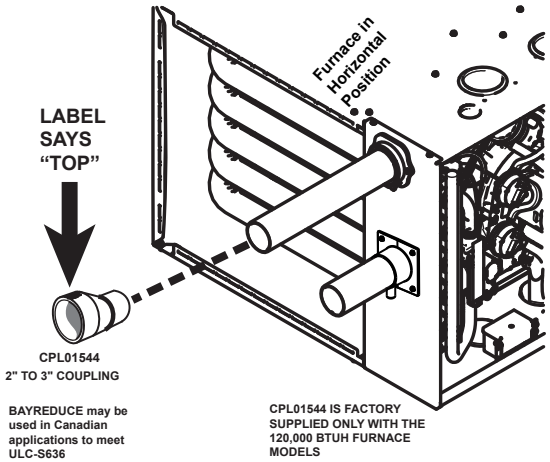
- *To determine if your application requires 3-inch venting, see the ",".*
- *Horizontal venting application must use the 2-inch x 3-inch offset reducing coupling. Vertical venting applications do not require the reducing coupling to be offset.*

When the vent pipe is exposed to temperatures below freezing, (for example when it passes through unheated spaces), the pipe must be insulated with 1/2-inch (12.7 mm) thick Armaflex-type insulation or equal.

If the space is heated sufficiently to prevent freezing, then the insulation will not be required. If domestic water pipes are not protected from freezing then the space meets the condition of a heated space.

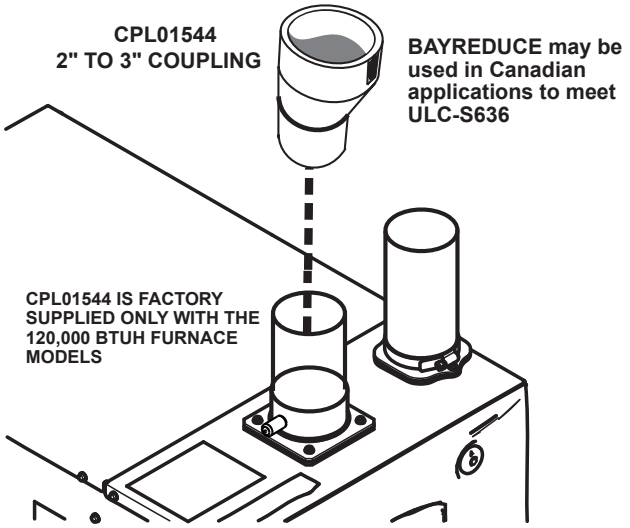
Note: *If your furnace comes with a factory supplied 2-inch x 3-inch offset reducing coupling it is used for 3-inch vent pipe installation. Make sure the marking "TOP" is located on the top side of the pipe in horizontal venting applications. The straight side of the coupling must be on bottom for proper drainage of condensate.*

Figure 28. Horizontal venting



Note: *For Canadian applications, BAYREDUCE 2-inch x 3-inch offset reducing coupling meets ULC-S636 requirements. Make sure the marking "TOP" is located on the top side of the pipe. The straight side of the coupling must be on bottom for proper drainage of condensate in horizontal venting.*

Figure 29. Vertical venting

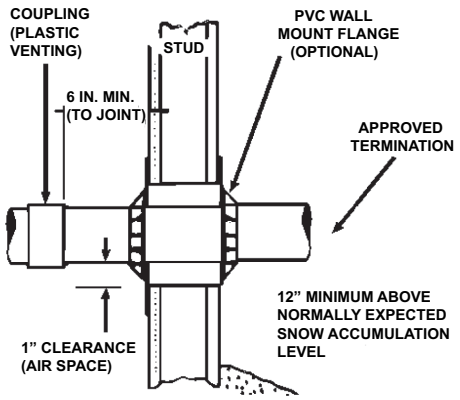


Combustible Material Wall

A minimum clearance of 1-inch to combustible materials must be maintained when using single wall stainless steel venting.

Shield material to be a minimum of 24 gauge stainless or aluminized sheet metal. Minimum dimensions are 12-inch x 12-inch. Shield must be fastened to both inside and outside of wall. Use screws or anchor type fasteners suited to the outside or inside wall surfaces.

Figure 30. Combustible material wall



VENTING THROUGH COMBUSTIBLE WALLS
Pitch - 1/4 Inch Per Foot

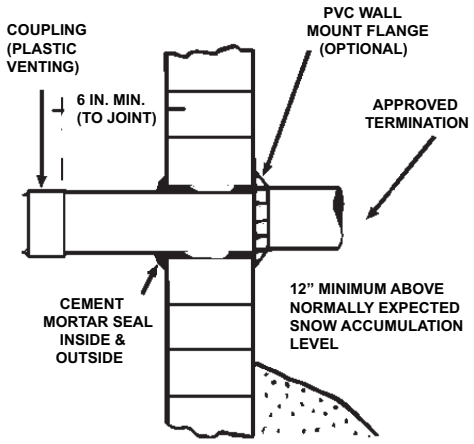
CLEARANCE (0" ACCEPTABLE FOR PVC VENT PIPE)
(1" ACCEPTABLE FOR TYPE 29-4C STAINLESS STEEL VENT PIPE)

Non-combustible Material Wall

The hole through the wall must be large enough to maintain pitch of vent and properly seal.

Use cement mortar seal on inside and outside of wall.

Figure 31. Non-combustible material wall



VENTING THROUGH NON-COMBUSTIBLE WALLS
Pitch - 1/4 Inch Per Foot

Horizontal Venting Through Wall

The vent for this appliance shall not terminate:

- Over public walkways.
- Near soffit vents or crawl space vents or other areas where condensate or vapor could create a nuisance or hazard or cause property damage.
- Where condensate vapor could cause damage or could be detrimental to the operation of regulators, relief valves. or other equipment.

Possible configurations for two pipe venting systems are located in the same pressure zone.

Important: *Maintain 12-inch minimum clearance above highest anticipated snow level or grade, whichever is greater.*

Note: *All distances are center line to center line.*

Figure 32. Configurations two pipe venting systems — type 1

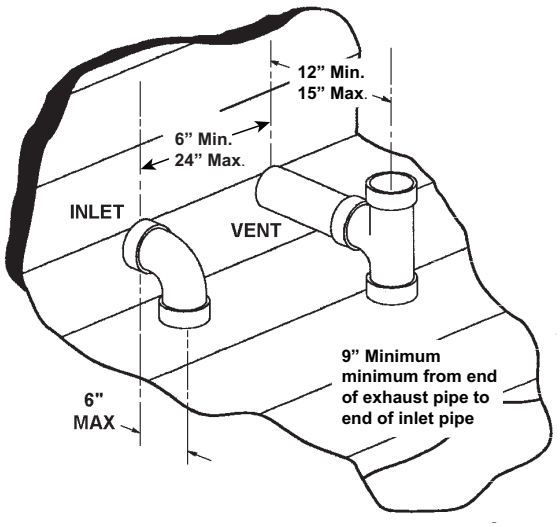


Figure 33. Configurations two pipe venting systems — type 2

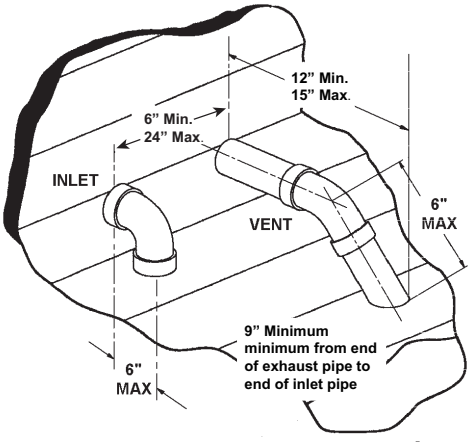


Figure 34. Configurations two pipe venting systems — type 3

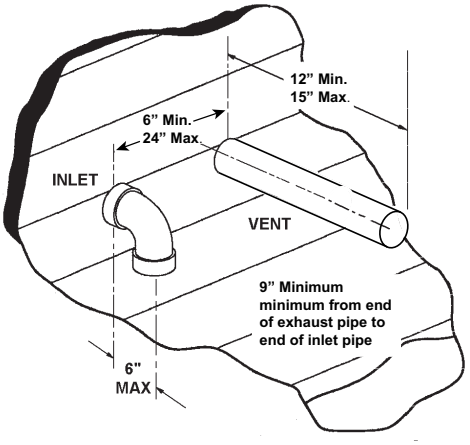


Figure 35. Configurations two pipe venting systems — type 4

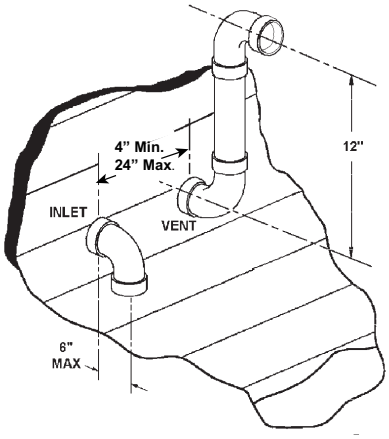


Figure 36. Configurations two pipe venting systems — type 5

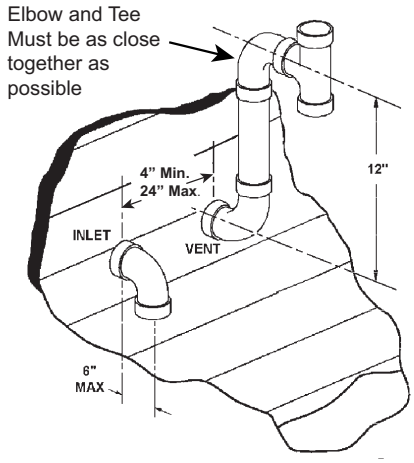
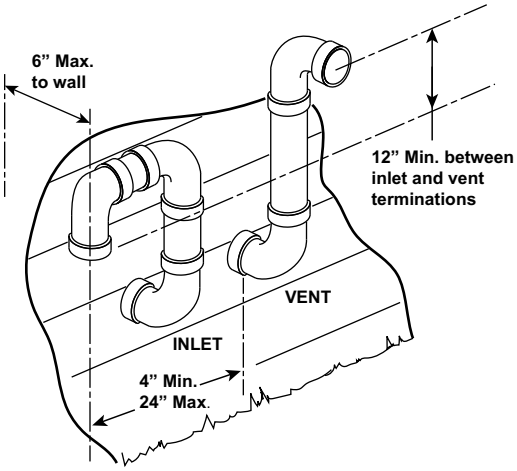


Figure 37. Configurations two pipe venting systems — type 6



Horizontal Venting Through Wall with Concentric Vent Kit

These Furnaces may be installed as direct vent (as shipped) or as nondirect vent. Installation must conform to national, state, and local codes.

The BAYVENT200B, BAYVENTCN200B, BAYAIR30AVENTA, and BAYAIR30CNVENT vent & inlet terminals kits must be located at least 12-inch minimum above normally expected snow accumulation level.

Avoid areas where staining or condensate drippage may be a problem.

Location of the vent/wind terminal should be chosen to meet the requirements for either direct or non-direct vent applications.

Pitch — Venting through the wall must maintain 1/4-inch per foot pitched upward to insure that condensate drains back to the Furnace.

Flue Gas Degradation — The moisture content of the flue gas may have a detrimental effect on some building materials.

This can be avoided by using the roof or chimney venting option. When wall venting is used on any surface that can be affected by moisture, it is recommended that a corrosion resistant shield (24 inches square) be used behind the vent terminal.

This shield can be wood, plastic, sheet metal, etc. Also, silicone caulk all cracks, seams and joints within 3 feet of the vent terminal.

The vent for this appliance shall not terminate

1. Over public walkways; or
2. Near soffit vents or crawl space vents or other areas where condensate or vapor could create a nuisance or hazard or cause property damage; or
3. Where condensate vapor could cause damage or could be detrimental to the operation of regulators, relief valves. or other equipment.

For Canadian installations, if you used a ULC-S636 approved manufactured modular venting system, a copy of the manufacturer's instructions should remain with the system.

The installation instruction can be obtained from the vent termination manufacturer. BAYVENTCN200B and BAYAIR30CNVENT meet ULC-S636 requirements.

Note: *For Canadian applications, horizontal vent termination kits must meet ULC-S636..*

Figure 38. BAYVENT200B / BAYVENTCN200B

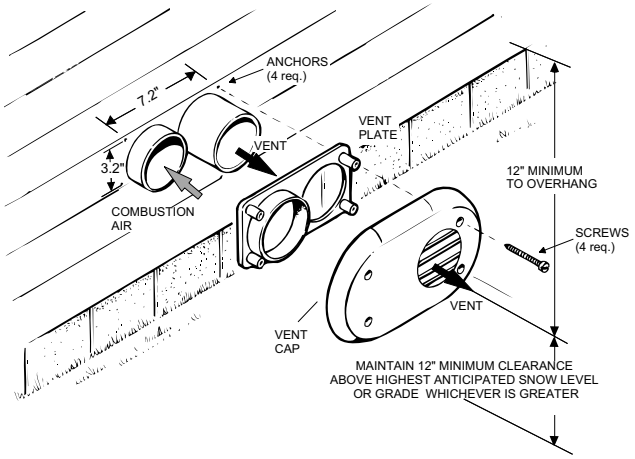
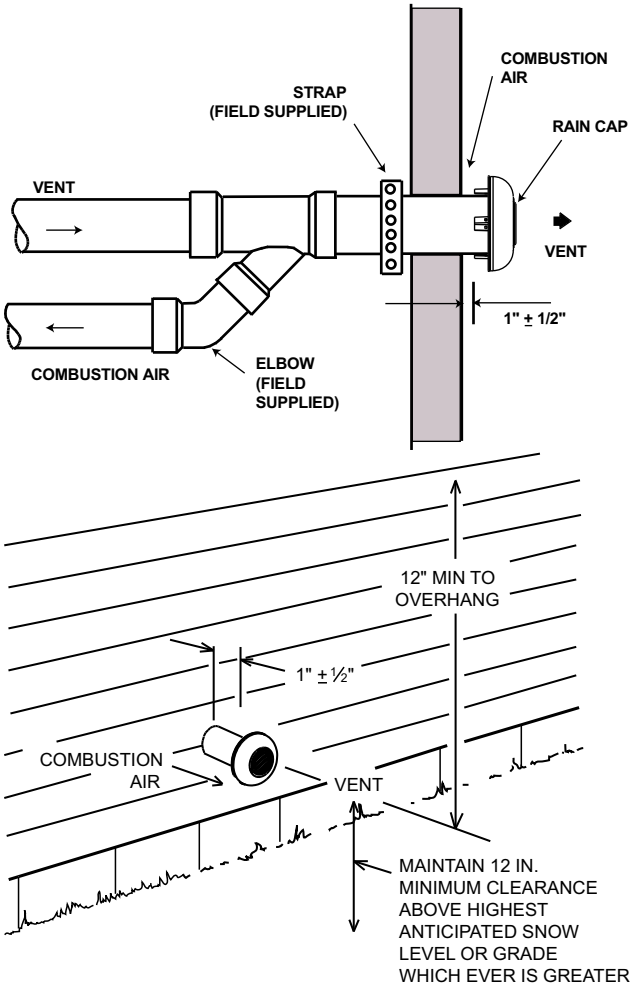


Figure 39. BAYAIR30AVENTA / BAYAIR30CNVENT (side wall)



Horizontal Vent Clearances

Figure 40. Horizontal vent clearances

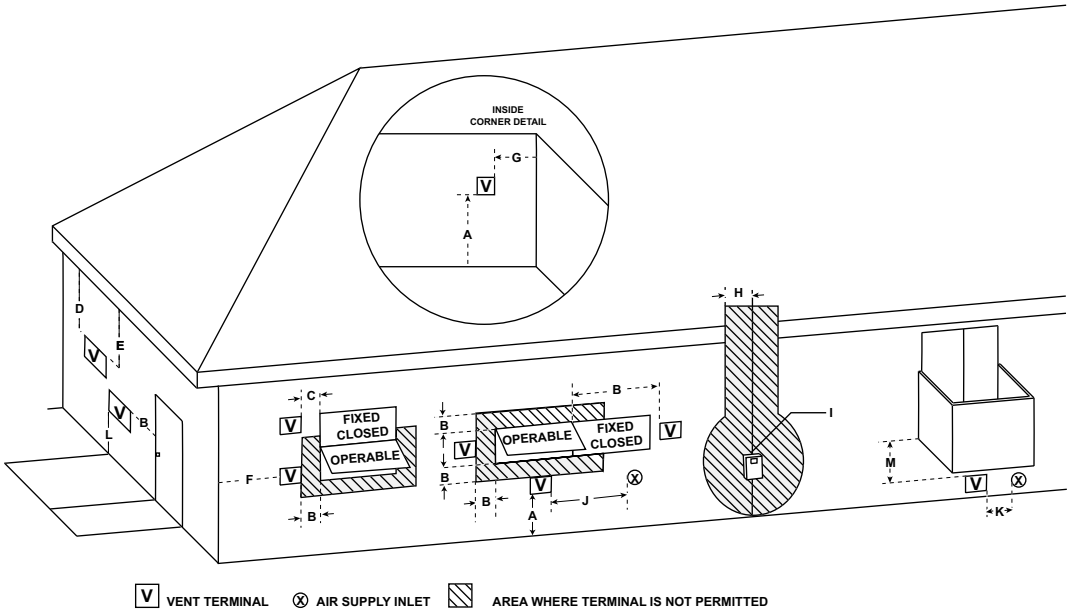


Table 35. Vent termination clearances - direct/non-direct

Vent Termination Clearances - Direct/Non-Direct				
		Canadian Installations	**US Installations Non-Direct**	**US Installations Direct**
A=	Clearance above grade, veranda, porch, deck, or balcony	12 inches (30 cm)		
B=	Clearance to window or door that may be opened	12 inches (30 cm) for appliances > 10,000 BTUH (3 kw) and ≤ 100,000 BTUH (30 kw), 36 inches (91 cm) for appliances > 100,000 BTUH (30 kw)	4 feet (1.2m) below or to the side of opening; 1 foot (0.3m) above opening	9 inches (23 cm) for appliances > 10,000 BTUH (3 kw) and ≤50,000 BTUH (15 kw), 12 inches (30 cm) for appliances > 50,000 BTUH (15 kw)
C=	Clearance to permanently closed window	(a)	(a)	(a)
D=	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet (61 cm) from the center line of the terminal	(a)	(a)	(a)
E=	Clearance to unventilated soffit	(a)	(a)	(a)
F=	Clearance to outside corner	(a)	(a)	(a)
G=	Clearance to inside corner	(a)	(a)	(a)
H=	Clearance to each side of center line extended above meter/ regulator assembly	3 feet (91 cm) with a height 15 feet (4.5 m) above the meter/ regulator assembly	(a)	(a)
I=	Clearance to service regulator vent outlet	3 feet (91 cm)	(a)	(a)
J=	Clearance to nonmechanical air supply inlet to building or the combustion air inlet to any other appliance	12 inches (30 cm) for appliances > 10,000 BTUH (3 kw) and ≤ 100,000 BTUH (30 kw), 36 inches (91 cm) for appliances > 100,000 BTUH (30 kw)	4 feet (1.2 m) below or to side of opening; 1 foot (300 m) above opening	9 inches (23 cm) for appliances > 10,000 BTUH (3 kw) and ≤ 50,000 BTUH (15 kw); 12 inches (30 cm) for appliances > 50,000 BTUH (15 kw)
K=	Clearance to a mechanical air supply inlet	6 feet (1.83m)	3 feet (91 cm) above if within 10 feet (3m) horizontally	3 feet (91 cm) above if within 10 feet (3m) horizontally

Table 35. Vent termination clearances - direct/non-direct (continued)

Vent Termination Clearances - Direct/Non-Direct				
		Canadian Installations	**US Installations Non-Direct**	**US Installations Direct**
L=	Clearance above a paved sidewalk or paved driveway located on public property	7 feet (2.13 m) and not located above public walkways or other areas where condensate or vapor can cause a nuisance or hazard		
M=	Clearance under veranda, porch, deck, or balcony	12 inches (30 cm) if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor	12 inches (30 cm) where the area beneath the veranda, porch, deck, or balcony is open on not less than two sides. The vent terminal is prohibited in this location where only one side is open	

Notes:

1. The Canadian venting installations must be in accordance with local codes or in the absence of local codes with the current CSA B149.1 Natural Gas and Propane Installation Code.
2. The US venting installations must be in accordance with local codes or in the absence of local codes with the current ANSI Z223.1/NFPA 54 National Fuel Gas Code.

(a) Clearance in accordance with local installation codes and the requirements of the gas supplier.

Venting through the Roof

Support Horizontal pipe every 3 feet with the first support as close to the furnace as possible. Induced draft blower, housing, and furnace must not support the weight of the flue pipe.

Figure 41. Supports

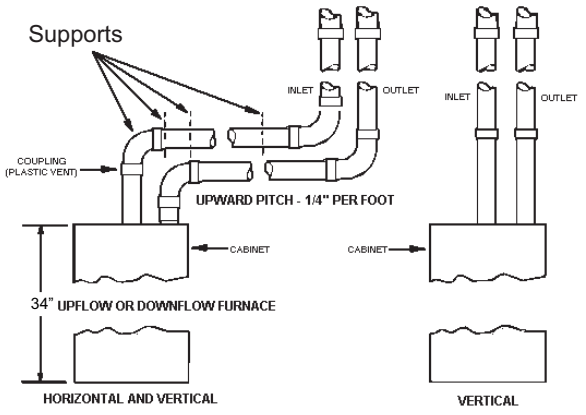
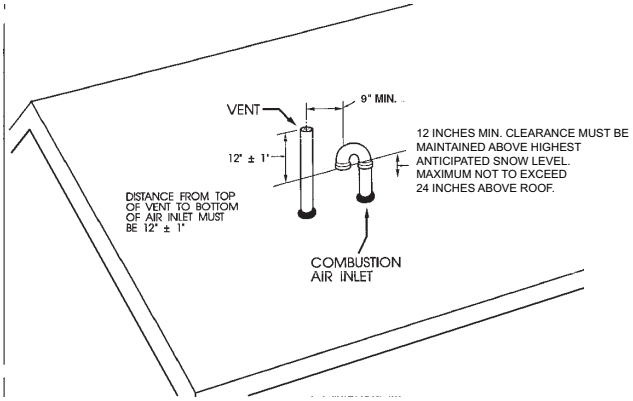


Figure 42. Pipe roof vents



Note: *All measurements are from center line to center line.*

Figure 43. BAYAIR30AVENTA / BAYAIR30CNVENT

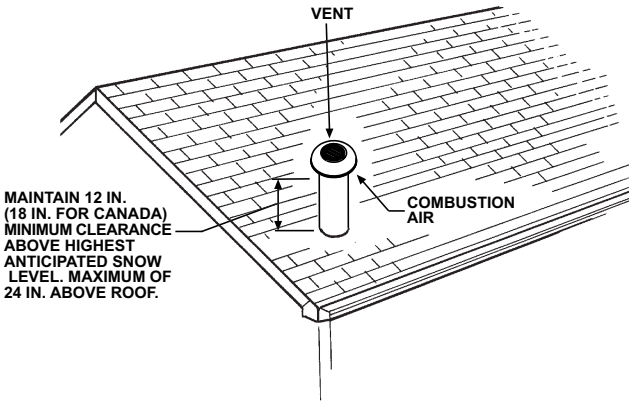
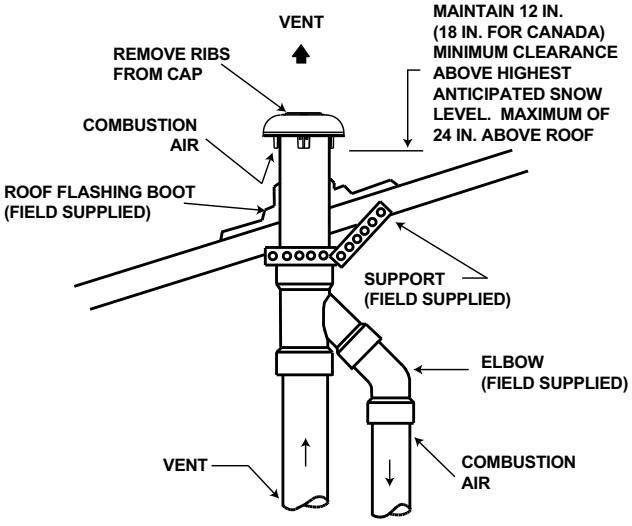


Figure 44. BAYAIR30AVENTA / BAYAIR30CNVENT



When penetrating roof with PVC vent pipe, a flexible flashing may be used for a weather tight seal. Lubricate flexible seal on flashing before PVC pipe is pushed through the seal. (Field Supplied)

Notes:

- *No vent cap is the preferred method for vertical vent termination in extremely cold climates.*
- *In extreme climate conditions, insulate the exposed pipe above the roof line with Armaflex type insulation.*

Figure 45. Venting through ceiling

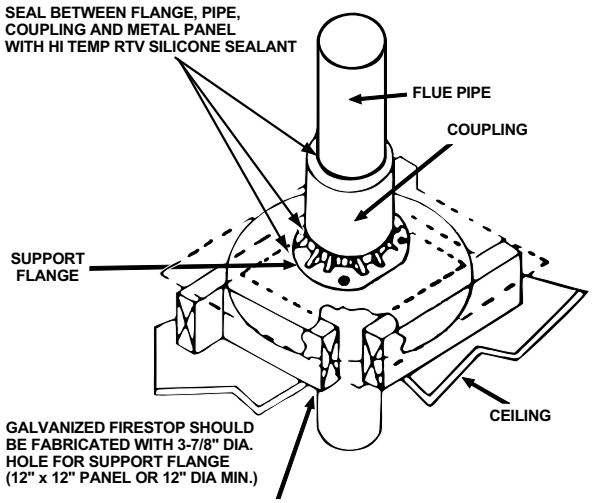
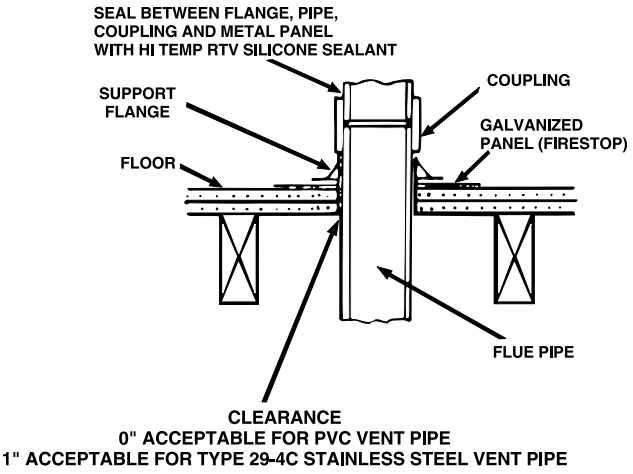


Figure 46. Venting through floor

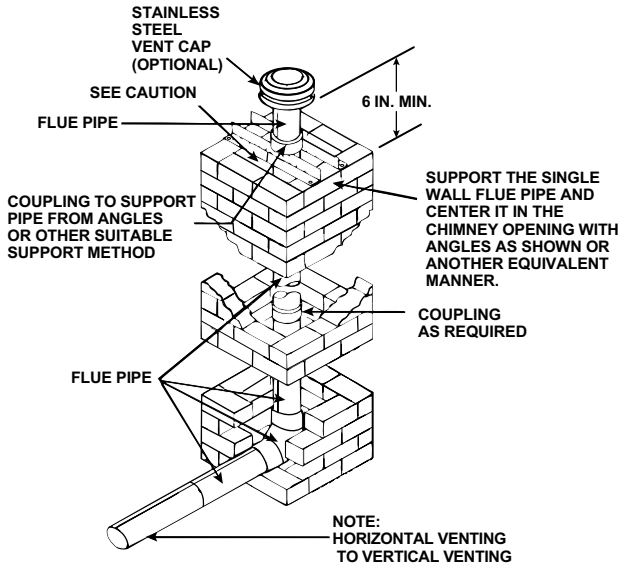


Venting Through an Unused Chimney / Venting Routed Through a Masonry Chimney

Important:

- *Refer to Section 12.6.8 of NFPA 54 / ANSI 223.1 when routing vent piping through a chimney.*
- *The single wall flue pipe joints must be sealed. The 90° elbow connection to vertical pipe must be sealed to prevent condensate leakage to base of masonry chimney.*

Figure 47. PVC plastic venting through unused chimney



Venting Through an Unused Chimney

Important:

- *Refer to Section 12.6.8 of NFPA 54 / ANSI 223.1 when routing vent piping through a chimney.*
- *The single wall flue pipe joints must be sealed. The 90° elbow connection to vertical pipe must be sealed to prevent condensate leakage to base of masonry chimney.*

Vent Fitting Material – Stainless Steel

Gas and liquid tight single wall metal vent fitting, designed for resistance to corrosive flue condensate such as Type 29-4C MUST be used throughout.

These fittings and fitting accessories are to be field supplied.

Direction of Stainless Steel Fitting

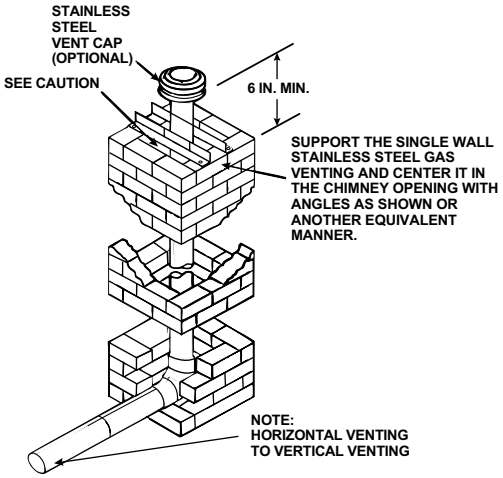
All stainless steel fitting must be installed with male end towards the Furnace.

All horizontal stainless steel sections must be positioned with the seam on top.

All long horizontal sections must be supported to prevent sagging.

All pipe joints must be fastened and sealed to prevent escape of combustion products into the building.

Figure 48. Type 29–4C stainless steel venting through unused chimney



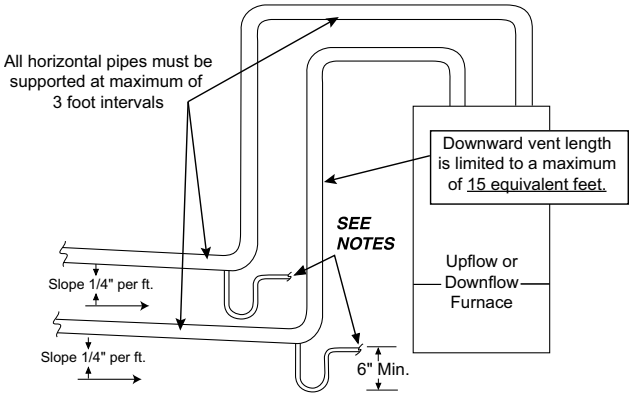
Downward Venting

Furnace may be in vertical or horizontal configuration.

Notes:

1. *Condensate trap for vent pipe must be a minimum of 6 inches in height.*
2. *Condensate trap for vent and inlet pipe must be connected into a condensate drain pump; an open or vented drain; or it can be connected to the outlet hose of the Furnace condensate trap. Outdoor draining of the Furnace and coil condensate is permissible if allowed by local codes.*
3. *The condensate trap should be primed at initial start up prior to heating season operation.*

Figure 49. Downward venting



Important: *Caution should be taken to prevent drains from freezing or causing slippery conditions that could lead to personal injury. Excessive draining of condensate may cause saturated ground conditions that may result in damage to plants.*

Air for Combustion and Ventilation

Adequate flow of combustion and ventilating air must not be obstructed from reaching the Furnace. Air openings provided in the Furnace casing must be kept free of obstructions which restrict the flow of air. Airflow restrictions affect the efficiency and safe operation of the Furnace. Keep this in mind should you choose to remodel or change the area which contains your Furnace. Furnaces must have a free flow of air for proper performance.

Provisions for combustion and ventilation air shall be made in accordance with "latest edition" of Section 9.3, Air for Combustion and Ventilation, of the National Fuel Gas Code, ANSI Z223.1 / NFPA 54, or Sections 8.2, 8.3 or 8.4 of CSA B149.1 Installation Codes, and applicable provisions of the local building codes. Special conditions created by mechanical exhausting of air and fireplaces must be considered to avoid unsatisfactory Furnace operation.

Furnace location may be in an unconfined space or a confined space.

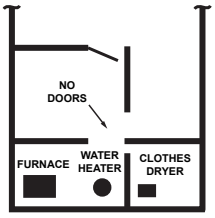
Unconfined space are installations with 50 cu. ft. or more per 1000 BTU/hr input from all equipment installed. Unconfined spaces are defined in the table and illustration for various furnace sizes. These spaces may have adequate air by infiltration to provide air for combustion, ventilation, and dilution of flue gases. Buildings with tight construction (for example, weather stripping, heavily insulated, caulked, vapor barrier, etc.), may need additional air provided as described for confined space.

Table 36. Minimum area in square feet for unconfined space installations

Furnace Maximum BTUH Input Rating	With 8 Ft. Ceiling; Minimum Area in Square Feet of Unconfined Space
40,000	250
60,000	375
80,000	500
100,000	625
120,000	750

Figure 50. Unconfined space

50 CU. FT. OR MORE PER 1000 BTU/HR INPUT ALL EQUIP. INSTALLED



Confined spaces are installations with less than 50 cu. ft. of space per 1000 BTU/ hr input from all equipment installed. Confined spaces are defined in the table and illustration for various furnace sizes. Air for combustion and ventilation requirements can be supplied from inside the building.

The following types of installations might require use of outdoor air for combustion, due to chemical exposures:

- Commercial buildings
- Buildings with indoor pools
- Furnaces installed in commercial laundry rooms
- Furnaces installed near chemical storage areas

Exposure to the following substances in the combustion air supply might require outdoor air for combustion:

- Permanent wave solutions
- Chlorinated waxes and cleaners
- Chlorine based swimming pool chemicals
- Water softening chemicals
- Deicing salts or chemicals
- Carbon Tetrachloride
- Halogen type refrigerants
- Cleaning solvents (such as perchloroethylene)
- Printing inks, paint removers, varnish, etc.
- Hydrochloric acid
- Cements and glues
- Antistatic fabric softeners for clothes dryers
- Masonry acid washing material

Note: *Extended warranties are not available in some instances. Extended warranty does not cover repairs to equipment installed in establishments with corrosive atmospheres, including but not limited to, dry cleaners, beauty shops, and printing facilities.*

Table 37. Minimum free area in square inches each opening (furnace only) in a confined space

Furnace Max BTUH.Input Rtg.	Air From Inside	Air From Outside	
		Vertical Duct [a]	Horizontal Duct[b]
40,000	100	10	20
60,000	100	15	30
80,000	100	20	40

Table 37. Minimum free area in square inches each opening (furnace only) in a confined space (continued)

Furnace Max BTUH.Input Rtg.	Air From Inside	Air From Outside	
		Vertical Duct [a]	Horizontal Duct[b]
100,000	100	25	50
120,000	120	30	50

[a] 1 Square inch per 4000 BTU/hr Vertical Duct.
[b] 1 Square inch per 2000 BTU/hr Horizontal Duct.

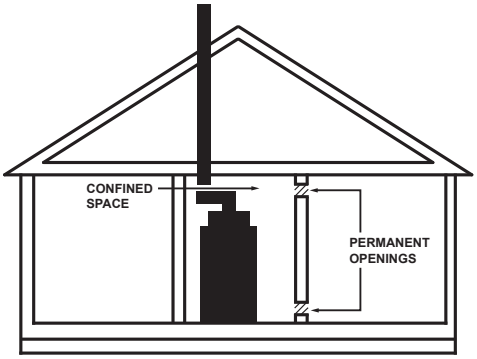
Figure 51. Confined space

LESS THAN 50 CU. FT. PER 1000 BTU/HR INPUT ALL EQUIP. INSTALLED



All air from inside the building — The confined space shall be provided with two permanent openings communicating directly with an additional room(s) of sufficient volume so that the combined volume of all spaces meets the criteria for an unconfined space. The total input of all gas utilization equipment installed in the combined space shall be considered in making this determination. Refer to the Minimum Free Area in square inches for confined spaces table, for minimum open areas required.

Figure 52. Air from inside building



All air from outdoors — The confined space shall be provided with two permanent openings, one commencing within 12 inches of the top and one commencing within 12 inches of the bottom of the enclosure.

The openings shall communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors. Refer to the Minimum Free Area in square inches for confined spaces table, for minimum open areas required.

Figure 53. Air from outdoors

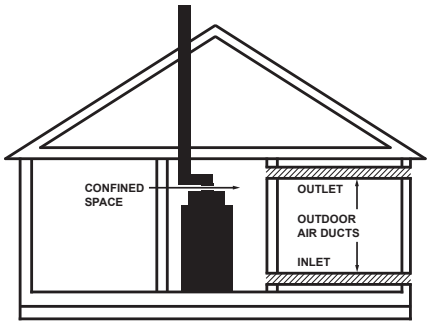


Figure 54. Air from ventilated attic/crawl space

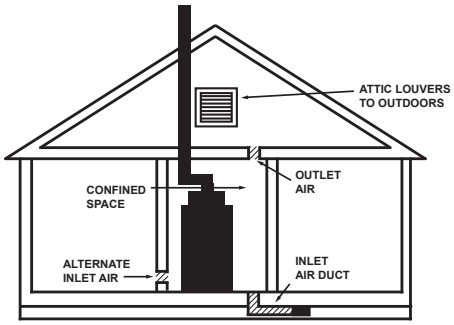
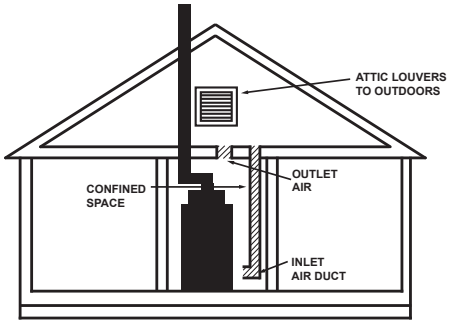


Figure 55. Air from ventilated attic



Duct Connections

Air duct systems should be installed in accordance with standards for air conditioning systems, National Fire Protection Association Pamphlet No. 90. They should be sized in accordance with ACCA Manual D or whichever is applicable. Check on controls to make certain they are correct for the electrical supply.

Central furnaces, when used in connection with cooling units, shall be installed in parallel or on the upstream side of the cooling units to avoid condensation in the heating element, unless the furnace has been specifically approved for downstream installation. With a parallel flow arrangement, the dampers or other means used to control flow of air shall be adequate to prevent chilled air from entering the furnace, and if manually operated, must be equipped with means to prevent operation of either unit unless the damper is in full heat or cool position.

Flexible connections of nonflammable material may be used for return air and discharge connections to reduce the transmission of vibration. Though these units have been specifically designed for quiet, vibration free operation, air ducts can act as sounding boards and could, if poorly installed, amplify the slightest vibration to the annoyance level.

When the furnace is located in a utility room adjacent to the living area, the system should be carefully designed with returns which minimize noise transmission through the return air grille. Although these winter air conditioners are designed with large blowers operating at moderate speeds, any blower moving a high volume of air will produce audible noise which could be objectionable when the unit is located very close to a living area. It is often advisable to route the return air ducts under the floor or through the attic. Such design permits the installation of air return remote from the living area (i.e. central hall).

When the furnace is installed so that the supply ducts carry air circulated by the furnace to areas outside the space containing the furnace, the return air shall also be handled by a duct(s) sealed to the furnace and terminating outside the space containing the furnace.

For furnaces not equipped with a cooling coil, it is recommended that the outlet duct be provided with a removable access panel. The opening shall be accessible when the furnace is installed and shall be of such a size that the heat exchanger can be viewed for possible openings using light assistance or a probe can be inserted for sampling the air stream. The removable cover must be sealed to prevent air leaks.

Where there is no complete return duct system, the return connection must be run full size from the Furnace to a location outside the utility room, basement, attic, or crawl space.

Important: *Do not install return air through the back of the Furnace cabinet. Do Not install return air through the side of the furnace cabinet on horizontal applications without following the guidelines in "Return Air Filters," p. 59 section of this document.*

Carbon monoxide, fire or smoke can cause serious bodily injury, death, and/or property damage.

A variety of potential sources of carbon monoxide can be found in a building or dwelling such as gas-fired clothes dryers, gas cooking stoves, water heaters, furnaces and fireplaces. The U.S. Consumer Product Safety Commission recommends that users of gas-burning appliances install carbon monoxide detectors as well as fire and smoke detectors per the manufactures installation instructions to help alert dwelling occupants of the presence of fire, smoke or unsafe levels of carbon monoxide. These devices should be listed by Underwriters Laboratories, Inc. *Standards for Single and Multiple Station Carbon Monoxide Alarms, UL 2034* or CSA International Standard, *Residential Carbon Monoxide Alarming Devices*, CSA 6.19.

Notes:

- *The manufacturer of your Furnace does not test any detectors and makes no representations regarding any brand or type of detector.*
- *Seal per local codes.*

Supply Duct Connections

Table 38. Supply duct connections

Furnace Orientation	Steps to be followed	Images for Reference
Upflow and Horizontal Furnace without Coil	Step 1., Step 12., Step 4., Step 5.	Figure 56, p. 54, Figure 57, p. 54
Upflow Furnace with Coil	Step 1., Step 2., Step 10., Step 3., Step 4.	Figure 56, p. 54, Figure 57, p. 54, Figure 59, p. 54
Furnace in Horizontal Left with Coil	Step 1., Step 6., Step 10., Step 3., Step 4.	Figure 56, p. 54, Figure 57, p. 54, Figure 60, p. 54
Furnace in Horizontal Right with "A" Coil	Step 6., Step 7., Step 8., Step 9., Step 10., Step 4.	Figure 56, p. 54, Figure 58, p. 54, Figure 61, p. 54
Downflow Furnace with Coil	Step 7., Step 8., Step 9., Step 11.,Step 4.	Figure 56, p. 54, Figure 58, p. 54, Figure 62, p. 55
Downflow Furnace without Coil with or without BAYBASE	Step 1., Step 12., Step 4., Step 5.	Figure 56, p. 54, Figure 57, p. 54

Figure 56. Initial position

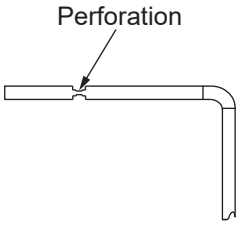


Figure 57. Flange orientation for upflow and horizontal left with and without coil and downflow and horizontal right without coil

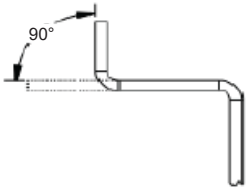


Figure 58. Flange orientation for downflow and horizontal right with coil

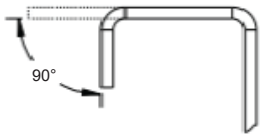


Figure 59. Upflow furnace with coil

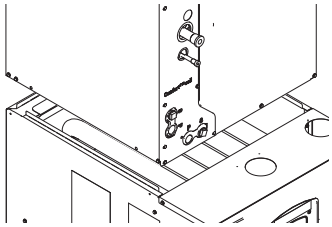


Figure 60. Horizontal left with or without coil

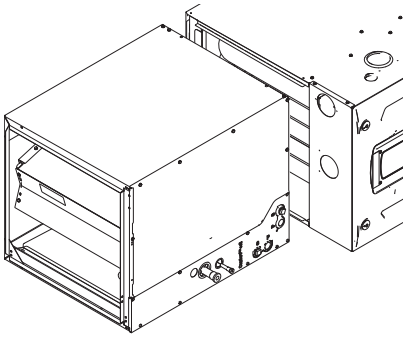


Figure 61. Horizontal right furnace with or without coil

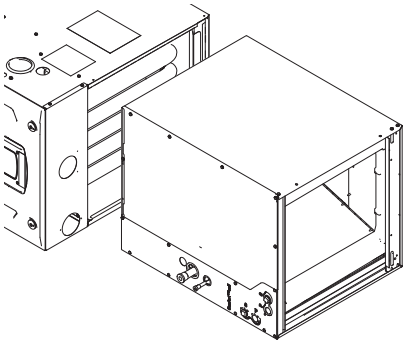
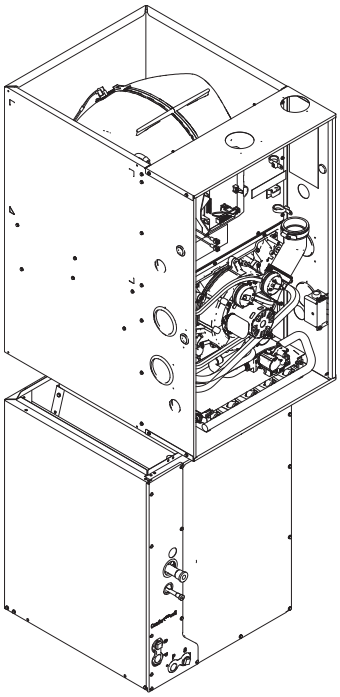


Figure 62. Downflow furnace with coil



Installation Instructions

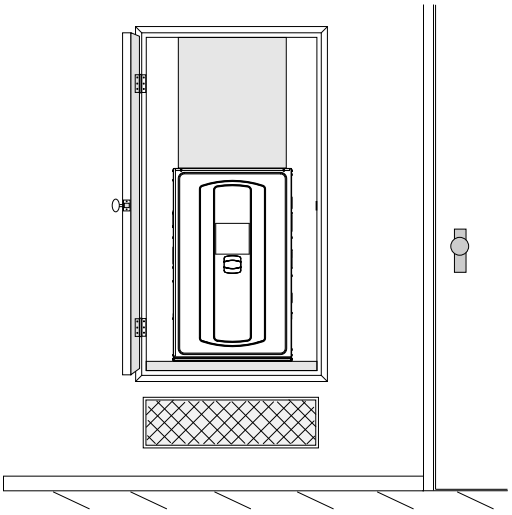
1. Bend furnace flanges up.
2. Set the coil on top of the furnace.
3. Screw through the coil cabinet into the furnace flange. Guide holes are located on the coil.
4. Seal per local codes and requirements.
5. Insulate the first 6 to12 inches of the supply duct.
6. Support the furnace and coil independently.
7. Cut the back flange along perforation.
8. Starting at the back of the furnace, cut the side flanges along perforations until past the end of the heat shield to avoid interference when bending.
9. Bend furnace side flanges down.
10. Match the coil up flush to the back of the furnace.
11. Set the furnace on top of the coil so that it is flush with the back of the furnace.
12. Attach ducting.

Return Duct Connections

Return Ducting General Guidelines

- Back returns are not allowed on any S-Series Furnaces
- Side returns are not allowed on downflow or horizontal S-Series Furnaces
- Mounting flanges must be located on ducting
- Shoot screws through the mount flanges into the furnace cabinet
- Always seal per local codes and requirements
- Furnace, coil, and ducting must be supported separately
- An external overflow drain pan must be installed in all applications over a finished ceiling to prevent property damage

Figure 63. Upflow furnace with bottom return in closet with remote filter



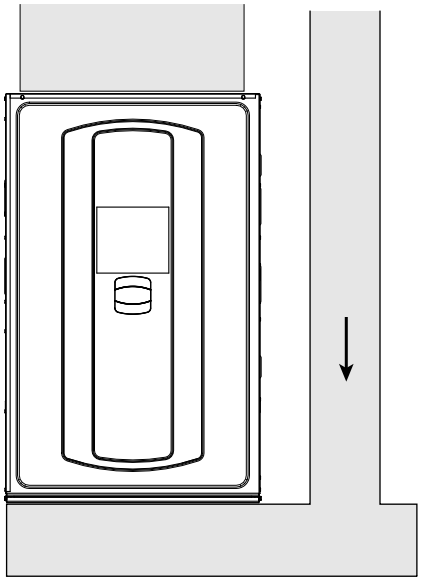
See Step 1., Step 2., Step 3., Step 4.

Figure 64. Upflow furnace with bottom return in closet with filter box



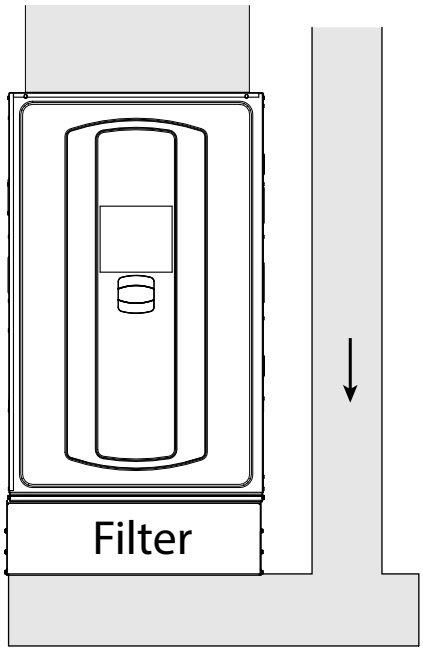
See Step 1., Step 5., Step 6., Step 4.

Figure 65. Upflow furnace with bottom return mounted on a ducted pedestal



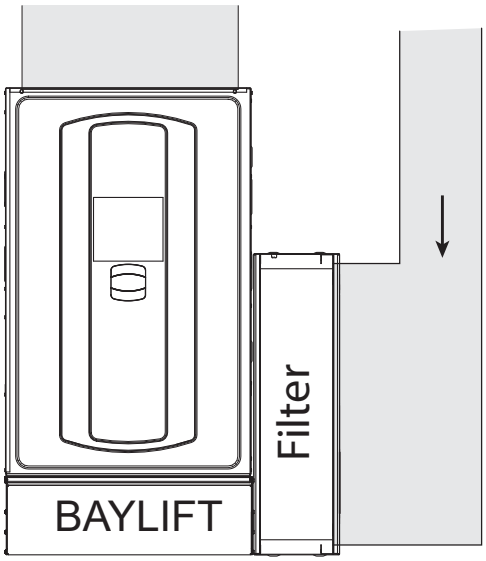
See Step 1., Step 7., Step 8., Step 4.

Figure 66. Upflow furnace with bottom return mounted on a ducted pedestal with filter box



See Step 1., Step 9., Step 4.

Figure 67. Upflow furnace with bottom and side returns mounted on a ducted pedestal with side return and filter box



Important:

- *Confirm the condensate and thermostat wiring holes are sealed on the cabinet side with the side return. The plugs and grommets may need to be changed with those on the opposite side of the cabinet..*
- *Make sure not to cut the cabinet in the "No Cut" area.*

Notes:

- *Use Optional BAYLIFT kit to lift furnace. Follow kit instructions.*
- *furnace bottom pedestal must be a minimum of 6-inch in height.*

See Step 1., Step 10., Step 11., Step 12., Step 13., Step 14., Step 15., Step 4.

Figure 68. 17.5–inch filter cabinet with BAYLIFT kit

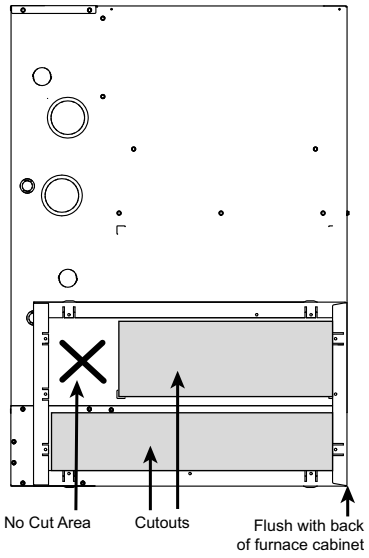


Figure 69. 21–inch filter cabinet with BAYLIFT kit

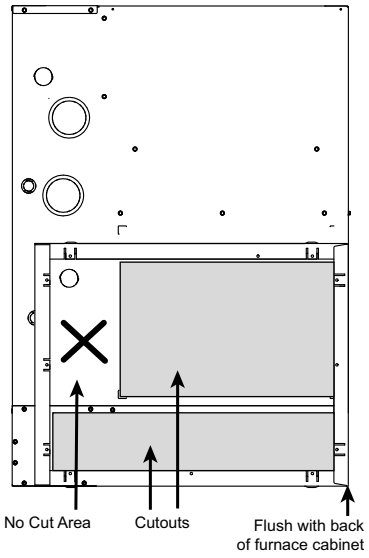
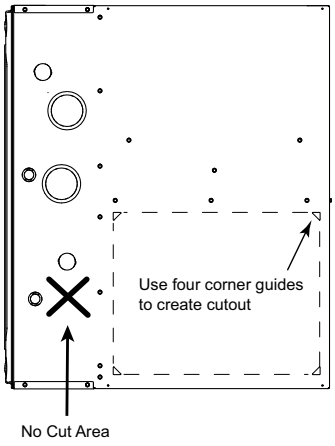


Figure 70. Upflow furnace with side return



Important:

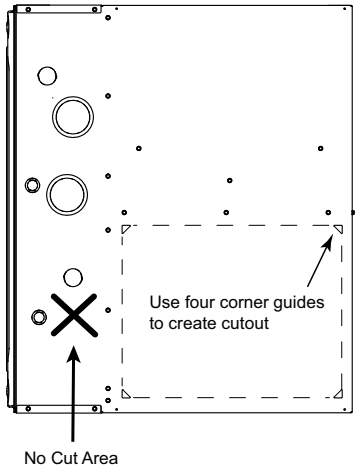
- *Make sure the condensate and thermostat wiring holes are sealed on the cabinet side with the side return. The plugs and grommets may need to be changes with those on the opposite side of the cabinet.*
- *Make sure not to cut the cabinet in the "No Cut" area.*

Notes:

- *Return air on right side with the condensate on the left or return air on left with the condensate on the right do not require a transition.*
- *If using a filter box, use a transition, if possible, to attach the filter box to the furnace cabinet.*

See Step 16., Step 17., Step 18., Step 19.

Figure 71. Upflow furnace with two side returns



Important:

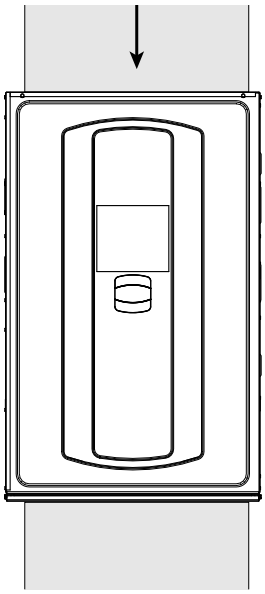
- *One of the sides must have a transition to allow the condensate and thermostat wiring to exit the cabinet.*
- *If a transition is not a viable option, a hole may be drilled in the bottom of the cabinet to allow the condensate to exit. Also, a hole will need to be drilled in the side of the cabinet for the thermostat wiring to exit.*
- *Make sure not to cut the cabinet in the "No Cut" area.*

Notes:

- *If using one transition, the condensate and thermostat wiring will exit on the transition side.*
- *If using a filter boxes, use transitions, if possible, to attach the filter boxes to the furnace cabinet. If transitions are not used, condensate may exit through the bottom of the furnace.*

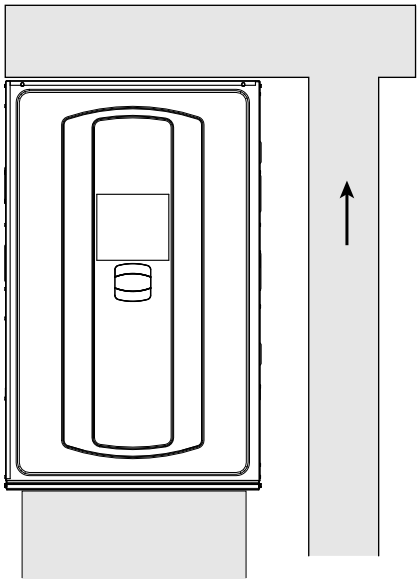
See Step 16., Step 17., Step 18., Step 19.

Figure 72. Downflow furnace with top return



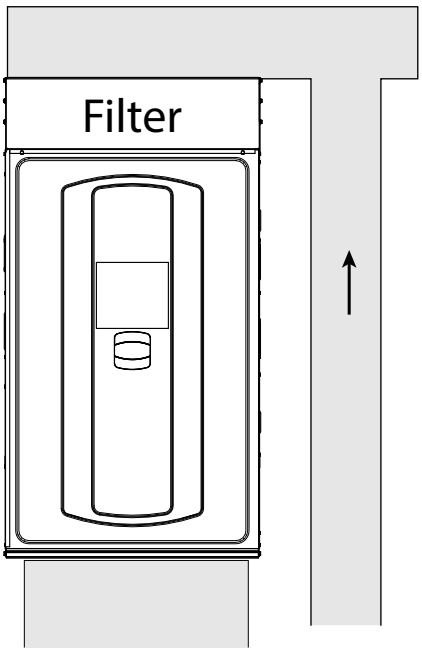
See Step 20., Step 21., Step 3., Step 4.

Figure 73. Downflow furnace with top return and plenum



See Step 20., Step 22., Step 3., Step 4.

Figure 74. Downflow furnace with top return and plenum with filter box



See Step 20., Step 23., Step 24., Step 4.

Installation Steps

1. Remove the bottom plate.
2. Set the furnace on the base inside closet.
3. Install remote filter.
4. Seal per local codes and requirements.
5. Set the furnace on the filter box inside closet.
6. Must have grill present for air.
7. Set the furnace on the ducted pedestal. The ducted pedestal will use ducted air from a remote location.
8. Install filter at a remote location.
9. Set the furnace on the filter box. The ducted pedestal will use ducted air from a remote location.
10. Create ducting and set the furnace in place.
11. Match the filter cabinet flush to the back and bottom sides of the furnace cabinet and secure in place with screws.
12. Mark the two areas to be cut out for the return air.
13. Cut out the two sections of the cabinet and BAYLIFT kit to be removed.
14. Attach ducting to the filter box.
15. The ducted pedestal will use ducted air from a remote location.
16. Using guides, remove the cutout for the side return.
17. Create ducting and set the furnace in place. Use screws to attach ducting to the furnace cabinet.
18. Seal bottom panel per local codes and requirements.

19. Seal all other panels per local codes and requirements.
20. Remove the top plate.
21. Attach the ducting to the top of the furnace.
22. Attach the plenum ducting to the top of the furnace.
23. Attach the filter box to the top of the furnace.
24. Attach ducting.

Return Air Filters

Typical Upflow Return Air Filter Installations

Filters are not factory supplied for upflow furnaces. Filter size needed will be dependent on type of filter and CFM requirement. Filters must be installed externally to the unit.

Important: *It is recommended to transition return ducting to the same size as the opening. It is acceptable for return duct or filter frame to extend forward of the opening but plastic plugs MUST be installed in any opening that the duct or filter frame may cover.*

Table 39. Upflow return air filters

Furnace Width (in.)	Filter Qty and Size(in.)
17–1/2	1 – 16 x 25 x 1
21	1 – 20 x 25 x 1
24–1/2	1 – 24 x 25 x 1

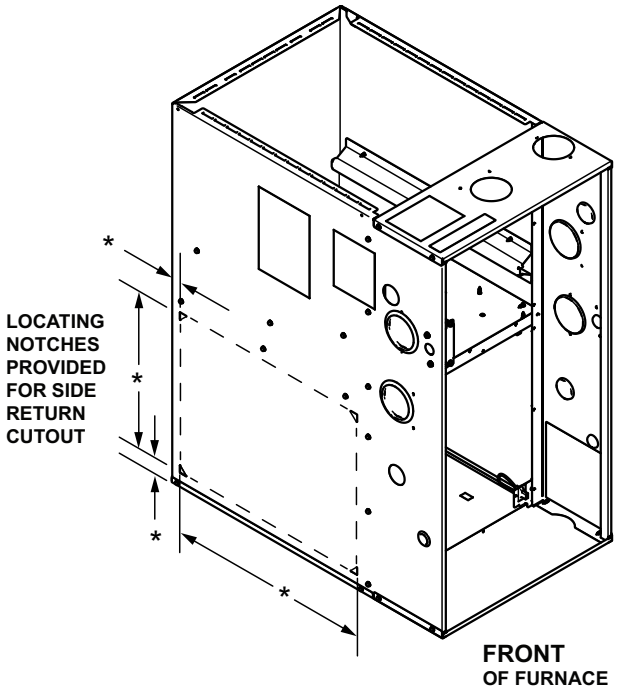
Note: *For upflow furnace models in any configuration, where the airflow requirement exceeds 1600 CFM - Furnaces will require return air openings and filters on: (1) both sides, or (2) one side and the bottom, or (3) just on the bottom.*

Preparation for Upflow Bottom and Side Return Air Filter Installations

All return air duct systems should provide for installation of return air filters.

1. Determine the appropriate position to set the furnace in order to connect to existing supply and return ductwork.
2. For upflow side return installations, remove the insulation around the opening in the blower compartment
3. The side panels of the upflow furnace include locating notches that are used as guides for cutting an opening for return air, refer to the figure and the upflow furnace outline drawing for duct connection dimensions for various furnaces.
4. If a 3/4-inch flange is to be used for attaching the air inlet duct, add to cut where indicated by dotted lines. Cut corners diagonally and bend outward to form flange.
5. If flanges are not required, and a filter frame is installed, cut between locating notches as in illustration.
6. The bottom panel of the upflow furnace must be removed for bottom return air.

Figure 75. Upflow furnaces only



Note: *See dimensional data drawing.*

Return Air Filters for Furnace in Horizontal Configuration

When the furnace is installed in the horizontal configuration, the return air filters must be installed exterior to the furnace cabinet. Remote filter grilles may be used for homeowner convenience, see Figure 76, p. 59 or the filters may be installed in the duct work upstream of the furnace, see Figure 77, p. 60.

Filter kits are available for horizontal applications.

Note: *Direct coupled side returns are not allowed to the furnace cabinet.*

Figure 76. Remote filter installation

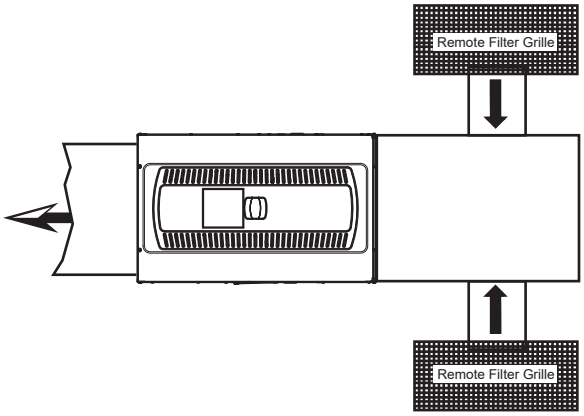
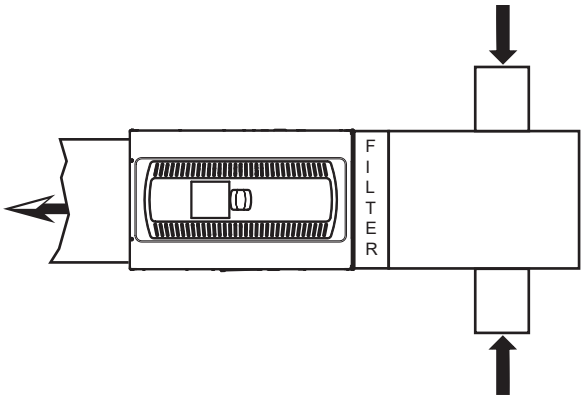


Figure 77. Duct filter installation



Typical Downflow Furnace Return Air Filter Installations

Filters are not factory supplied for downflow furnaces. Filter size needed will be dependent on type of filter and CFM requirement. Filters must be installed externally to the unit.

Table 40. Downflow return air filters

Furnace Width (in.)	Filter Qty and Size (in.)
17–1/2	1– 16 x 25 x 1
21	1 – 20 x 25 x 1
24–1/2	1 – 24 x 25 x 1

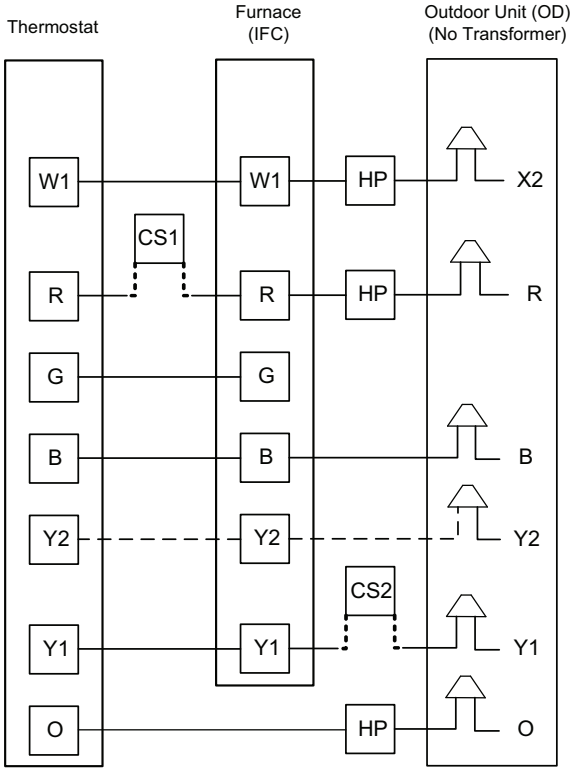
Electrical Connections

Make wiring connections to the unit as indicated on enclosed wiring diagram. As with all gas appliances using electrical power, this furnace shall be connected into a permanently live electric circuit. It is recommended that furnace be provided with a separate "circuit protection device" electric circuit. The furnace must be electrically grounded in accordance with local codes or in the absence of local codes with the National Electrical Code, ANSI/ NFPA 70, if an external electrical source is utilized. *The integrated furnace control is polarity sensitive.* The hot leg of the 120V power supply must be connected to the black power lead as indicated on the wiring diagram.

See the "Wiring Diagrams," p. 23 in this document and unit wiring diagram attached to furnace.

Field Wiring

Figure 78. S9B1/S9X1 with one or two stage AC or HP



Notes:
1) HP = Wiring used for Heat Pump System.
2) CS = wiring used for Condensate Switch (2 Options).
3) Y1 and/or Y2 must be connected from the thermostat to the IFC for proper airflow.
4) A/TCONT824 thermostats do not require the use of X2.
5) Recommended 1st stage airflow is 75% of total airflow.
6) Y2 and EAC/HUM terminals not available on S9B1.

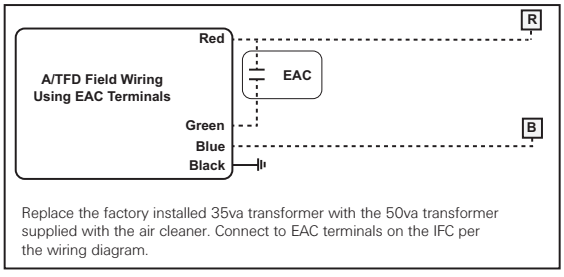
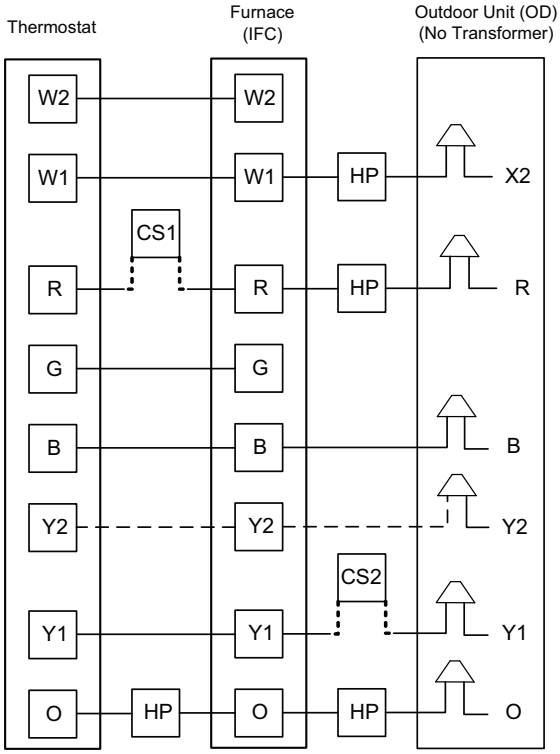


Figure 79. S9X2 with one or two stage AC or HP



Notes:
1) HP = Wiring used for Heat Pump System.
2) CS = wiring used for Condensate Switch (2 Options).
3) Y1 and/or Y2 must be connected from the thermostat to the IFC for proper airflow.
4) Remove Y1-O jumper for HP systems. O terminal must be connected as shown for gas heating operation during defrost.
5) If the thermostat does not have a W2, or there are not enough conductors, jumper W1 to W2 at the IFC.
6) A/TCONT824 thermostats do not require the use of X2.
7) Recommended 1st stage airflow is 75% of total airflow.

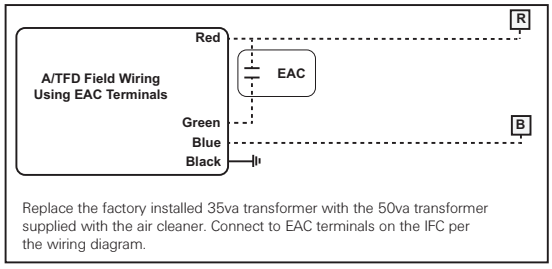
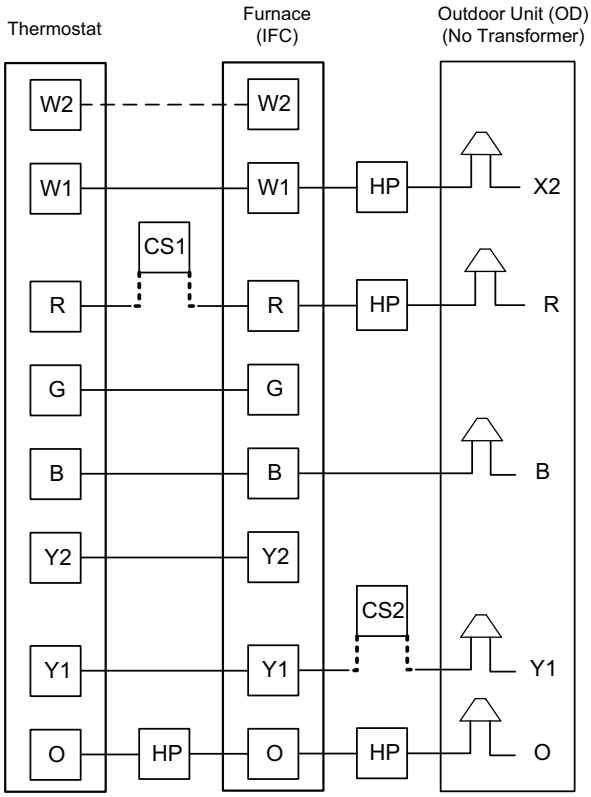
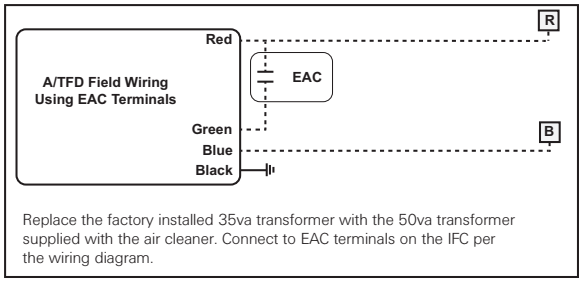


Figure 80. S9B1, S9X1/S9X2 with single stage AC or HP with two stage airflow



Notes:
1) HP = Wiring used for Heat Pump System.
2) CS = wiring used for Condensate Switch (2 Options).
3) Y1 and Y2 must be connected from the thermostat to the IFC for proper airflow.
4) Thermostat must be setup for 2 stage OD.
5) IFC Must be setup for 2 stage OD using the Menu/Option Buttons.
6) For S9X2, remove Y1-O jumper for HP systems. O terminal must be connected as shown for gas heating operation during defrost.
7) Recommended 1st stage airflow is 75% of total airflow.
8) A/TCONT824 thermostats do not require the use of X2.
9) W2 and O not available for S9B1 or S9X1.
10) EAC/HUM terminals not available on S9B1.



Twinning

Figure 81. Twinning connection diagram for twinning s-series furnaces 2 stage heat or 1 stage cooling thermostat for non-A2L systems

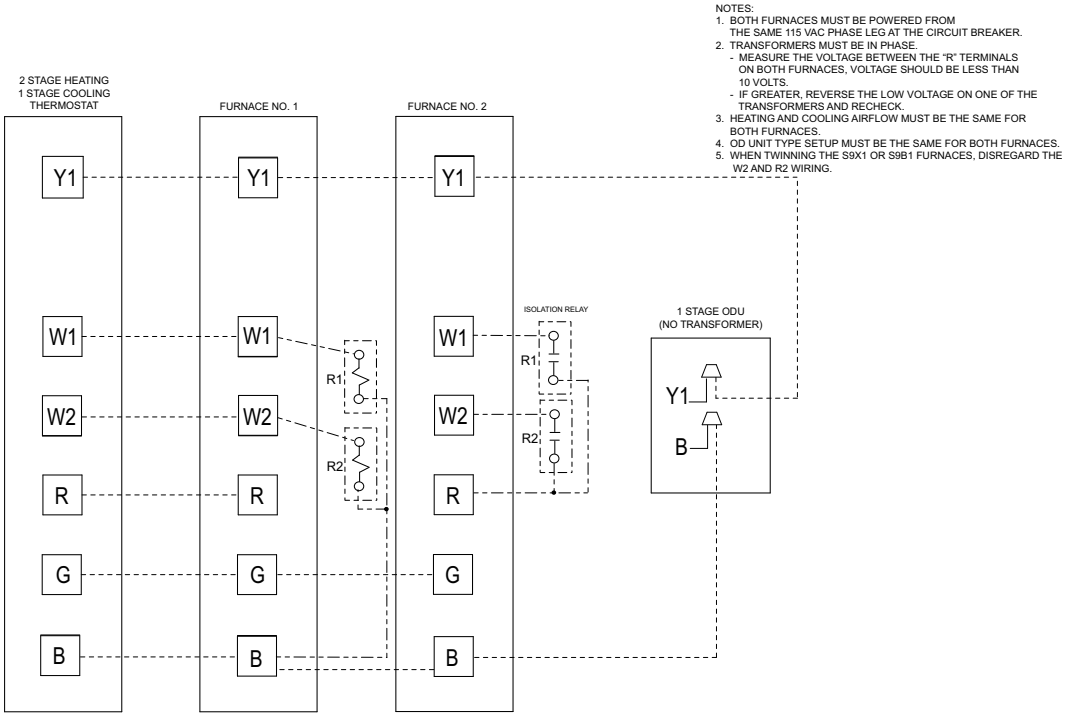


Figure 82. Twinning connection diagram for twinning s-series furnaces 2 stage heat or 2 stage cooling thermostat for non-A2L systems

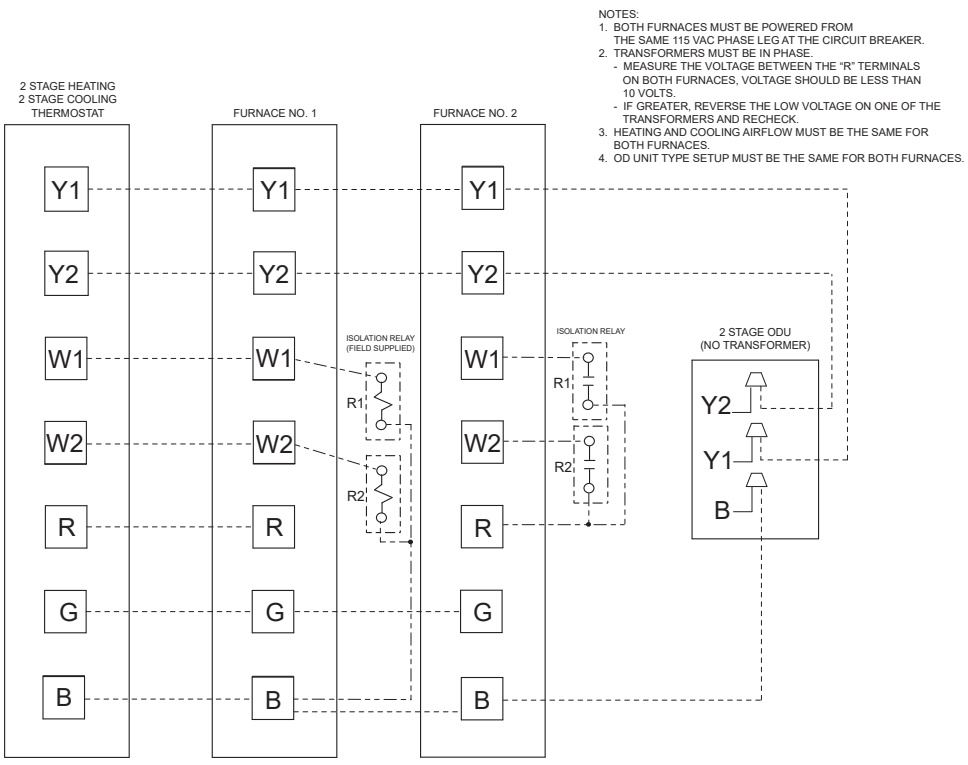
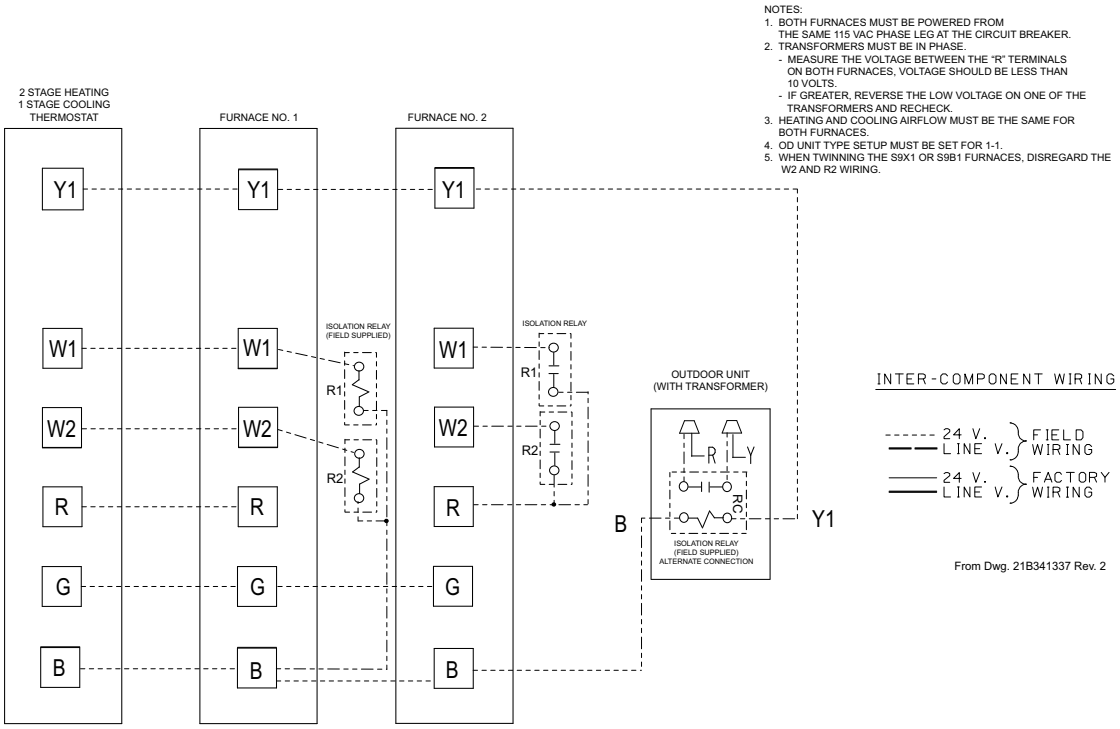


Figure 83. Twinning connection diagram for twinning s-series furnaces 2 stage heat or 1 stage cooling (with transformer) thermostat for non-A2L systems



Condensate Drain Instructions

The following sections give general instructions for the installation of the gas furnace condensate drains. Repositioning of the condensate trap is covered in the exhaust air options section.

Cutouts with plugs and grommets are provided on the left and right hand side of the furnace cabinets for drain connections in vertical applications. The standard arrangement is for the drain connection on the left side. The tubing may have to be trimmed in this application to avoid kinking.

The upflow (vertical application) also has provisions for right side drain connections. Exchange the grommet and plugs from the left and right side. Trim all excess tubing to avoid kinking.

It is always recommended that an auxiliary drain pan be installed under a horizontally installed evaporator or 90% Gas Furnace. Connect the auxiliary drain line to a separate drain line (no trap is needed in this line).

Horizontal applications require repositioning the condensate canister trap. Additionally the drain tubing connected to the inducer housing may need to be repositioned for removing the plug and reconnecting the tubing to the lower connection on the inducer housing.

Connections must be made to an open/vented drain.

Notes:

- *All condensate drain piping supplies included with the furnace are intended for internal piping only and should not be applied external to the furnace. All external piping must use 1/2-inch minimum size PVC pipe and fittings throughout for drain connections (fittings, pipe and PVC solvent cement not provided with furnace, must be field supplied). A 3/4-inch coupling is supplied to connect to systems that are using 3/4-inch piping with an air conditioner coil.*
- *A corrosion resistant condensate pump must be used if a pump is required for a specific drain system.*

⚠ CAUTION

Water Damage!

Failure to follow instructions below could result in minor to moderate injury or equipment damage
Install a drain pan under the furnace to prevent leaking condensate.

Figure 84. Condensate management



Important: *The condensate drain should be installed with provisions to prevent winter freeze-up of the condensate drain line. Frozen condensate will block drains, resulting in furnace shutdown. If the drain line cannot be installed in a conditioned space and/ or its surrounding ambient temperature is expected to fall below freezing, then heat tape should be applied as required to prevent freezing (per manufacturer's instructions). The heat tape should be rated at 5 or 6 watts per foot at 120 Volts. Self-regulating (preferred) or thermostatically controlled heat tape is required.*

Typical sources of UL listed heat tapes are W.W. Granger, Inc. (Wintergard PlusTM Series), McMaster Carr Supply Co. (3554 Series), or your equipment supplier.

The condensate drain may be cleaned or inspected by removal of the drain tube at the header.

Evaporator and Furnace condensate drain piping may be manifolded together. A primary drain vent stack must be installed and terminated below the outlet of the secondary heat exchanger drain connection to prevent water from damaging Furnace controls if the primary drain outlet plugs up.

Where the Furnace is installed above a finished ceiling, the primary drain vent stack must be installed such that overflow from the vent stack opening will flow into an auxiliary drain pan in order to prevent water damage to the finished ceiling below.

Vertical Applications

Upflow Furnace

1. Remove the plug from the side panel where the condensate will exit.
2. Install the condensate grommet into the side panel.
3. Install the connection tubing from the trap to the side of the unit and trim all excess tubing to avoid kinks.

Note: *For easiest installation, remove the spring clip from the end of the condensate line and feed through the grommet.*

Important: *Condensate grommet must be installed for proper operation.*

Figure 85. Left side drain

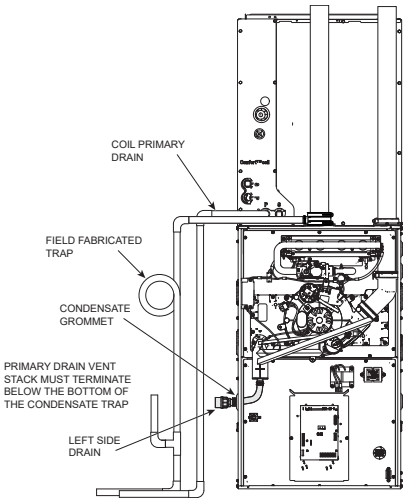


Figure 86. Right side drain

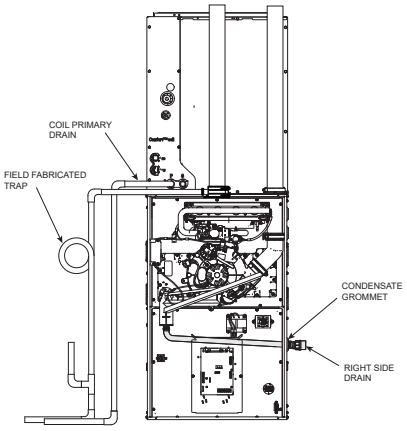


Figure 87. Right side drain

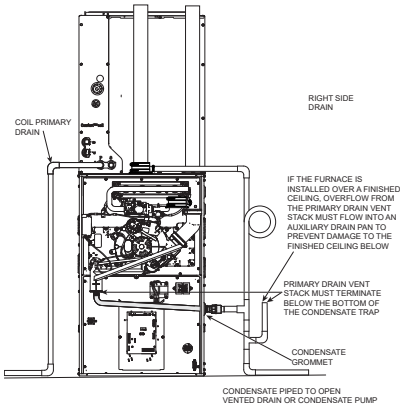


Figure 88. Left side drain

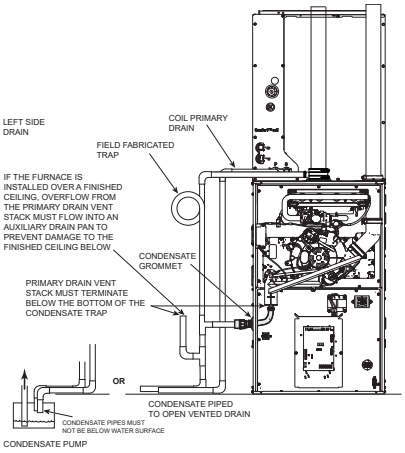
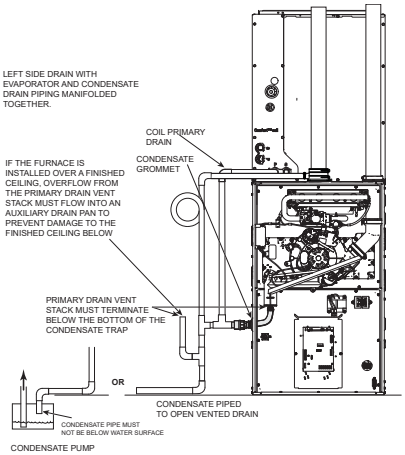


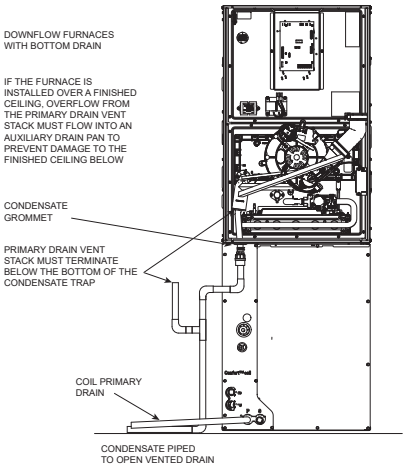
Figure 89. Left side drain with evaporator and condensate drain piping manifolded together



Downflow Furnace

1. Cut the 90 degree section of the condensate tubing off and connect the tubing to the condensate trap.
2. Install the condensate grommet into the bottom panel.
3. Cut to length as needed.

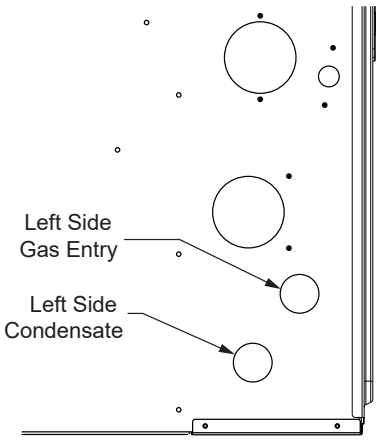
Figure 90. Downflow furnaces with bottom drain



Downflow Furnace with Left Side Condensate

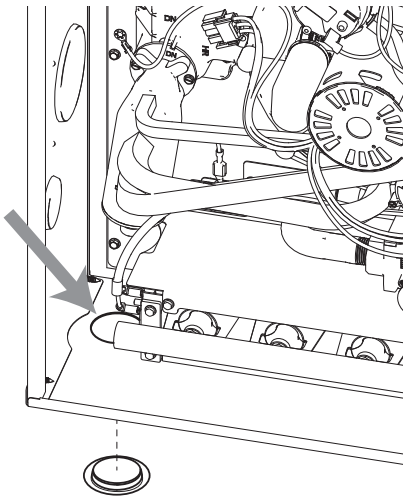
1. Remove left hand condensate plug.
2. Install into bottom cross member.

Figure 91. Downflow furnace with left side condensate



3. Plug the bottom hole with plug provided in document pack.

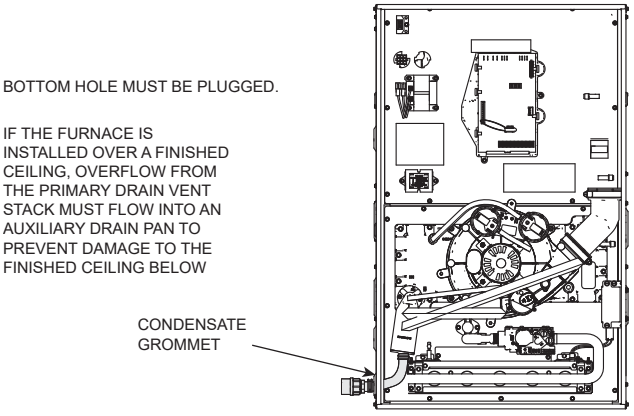
Figure 92. Plug the bottom hole with plug provided in document pack



Attaching the condensate drain line

1. Locate the condensate grommet and the condensate drain line assembly in the doc pack.
2. Insert the condensate grommet in the 1–5/8-inch hole in the side of the cabinet.
3. Remove the fitting at the end of the drain line assembly and insert it through the cabinet from the inside out. Attach the 90 degree section of the hose to the condensate drain trap.
4. Cut off the excess tube and reinstall the end fitting to the drain hose.

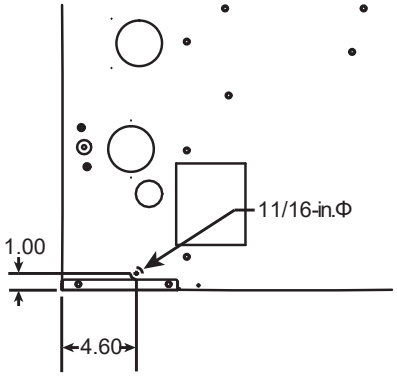
Figure 93. Downflow furnaces with left side drain



Downflow Furnace with Right Side Condensate

1. Drill an 11/16-inch diameter hole in the right side of the case at the dimensions shown.
2. Plug the bottom hole with plug provided in the bottom pack. See Figure 92, p. 66.

Figure 94. Downflow furnace with right side condensate



Attaching the condensate drain line

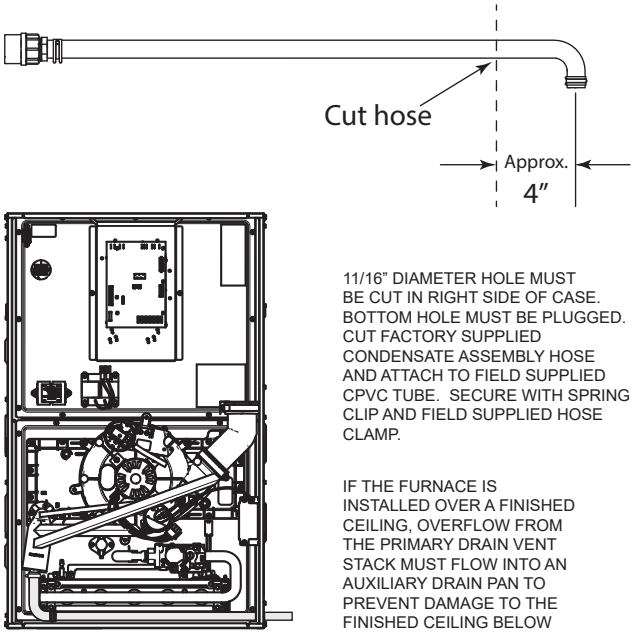
1. Locate the condensate drain line assembly in the doc pack.

Important: *It is best to cut the condensate drain hose assembly longer than 4 inches and then fit in place. It can then be trimmed to needed length. The 4-inch measurement is an approximation.*

2. Cut the condensate drain line assembly as shown.
3. Use a field supplied hose clamp to secure the condensate drain line to the condensate trap.
4. Insert a field supplied piece of 1/2-inch CPVC pipe though the 11/16-inch hole drilled through the cabinet and insert into drain line hose. Secure with the spring clip.

Note: *Seal around the condensate drain tubing where it exits the cabinet.*

Figure 95. Downflow furnaces with right side drain



Horizontal Applications

Upflow Models in Horizontal

It is always recommended that the auxiliary drain pan be installed under a horizontally installed evaporator and/or 90% gas furnace. Connect the auxiliary drain pan to a separate drain line (no trap is needed in this line).

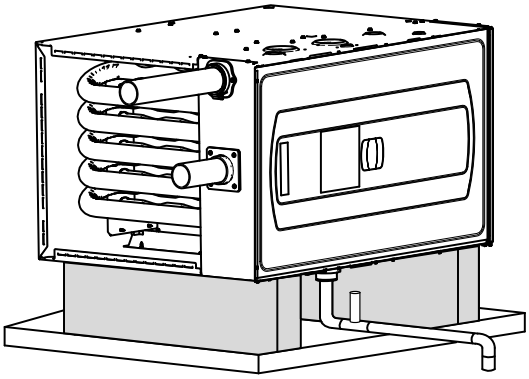
Connections must be made to an open/vented drain. Outdoor draining of the furnace and coil condensate is permissible if allowed by local codes. Caution should be taken to prevent drains from freezing or causing slippery conditions that could lead to personal injury. Excessive draining of condensate may cause saturated ground conditions that may result in damage to plants.

Notes:

- *Use 1/2-inch or larger PVC or CPVC pipe and fittings as required for drain connections (fittings, pipe and solvent cement not provided).*
- *A corrosion resistant condensate pump must be used if a pump is required for a specific drain system.*

Important: *The condensate drain should be installed with provisions to prevent winter freeze-up of the condensate drain line. Frozen condensate will block drains, resulting in furnace shutdown. If the drain line cannot be installed in a conditioned space, then UL listed heat tape should be applied as required to prevent freezing (per manufacturer’s instructions). The heat tape should be rated at 5 or 6 watts per foot at 120 volts. Self-regulating (preferred) or thermostatically controlled heat tape is required.*

Figure 96. Horizontal applications



To prevent AC condensate from backing up into the furnaces, follow these instructions for condensate drainage.

1. The overflow stand pipe termination must be even with or slightly below than the bottom of the condensate trap.
2. Water from the overflow pipe must drain into the emergency drain pan.
3. It is recommended to use the secondary drain. The secondary drain pipe must terminate over the emergency drain pan.
4. Emergency drain pan.

NOTICE

Equipment Damage!

Failure to follow instructions below could result in intermittent or improper operation, or equipment damage.

A blocked main drain with an overflow standpipe that is higher than the bottom of the condensate trap can result in an E09 Condensate Pressure Switch Trip error. Additionally, a condensate pressure switch hose that is not trimmed to fit can also cause this error. In extreme cases, these issues can lead to an E04 Rollout Thermal Limit Trip error.

An overflow standpipe with an opening even with or slightly below the bottom of the condensate trap must be installed. The condensate pressure switch hose must be trimmed to fit.

Figure 97. Horizontal right

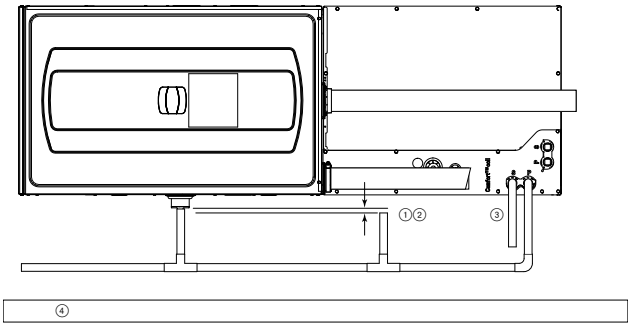
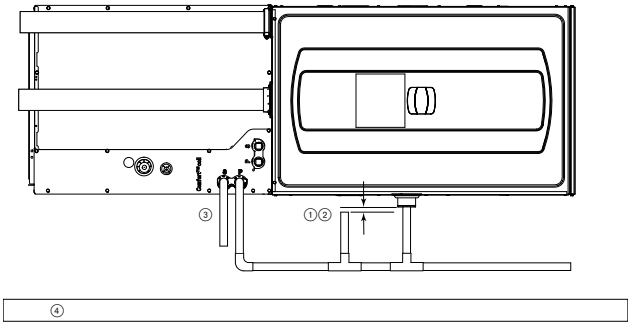


Figure 98. Horizontal left



General Start-Up and Adjustment

The following sections provide instructions for the general start-up and adjustment of the gas furnaces.

Preliminary Inspections

With gas and electrical power OFF, confirm:

1. Duct connections are properly sealed.
2. Filters are in place.
3. Venting is properly assembled.
4. Blower vestibule panel and all screws are in place.

Slide the control switch on main gas valve within the unit OFF. Turn the external gas valve ON. Purge the air from the gas lines. After purging, check all gas connections for leaks with a soapy solution.

Do not check with an open flame allow 5 minutes for any gas that might have escaped to dissipate. Slide the control switch on the gas valve in the unit to the ON position.

Propane gas being heavier than air may require forced ventilation. Slide the control switch on the gas valve in the unit to the ON position.

Lighting Instructions

Lighting instructions appear on each unit. Each installation must be checked out at the time of initial start up to confirm proper operation of all components. Check out should include putting the unit through one complete cycle as outlined below.

Turn on the main electrical supply and set the comfort control above the indicated temperature. The igniter will automatically heat and the gas valve is energized to permit the flow of gas to the burners. After ignition and flame is established, the flame control module monitors the flame and supplies power to the gas valve until the comfort control is satisfied.

⚠ WARNING

Risk of Fire or Explosion!

Failure to follow instruction below could result in death or serious injury or property damage.
Do NOT attempt to manually light the furnace.

For complete shutdown, slide the control switch located on the main gas valve inside the unit to OFF and the external main gas shutoff valve to OFF. Disconnect the electrical supply to the unit.

Inspect temperature in a vacant house especially during freezing weather. If for any reason your furnace should fail to operate damage could result, such as frozen water pipes.

⚠ CAUTION

Freeze Damage!

Failure to follow instructions below could result in minor to moderate injury or property damage.
Insulate vent pipes with 1/2 inch (12.7 mm) Armaflex-type insulation or equivalent when passing through unheated spaces exposed to freezing temperatures. Insulation is not needed if the space is heated enough to prevent freezing. If domestic water pipes are not protected from freezing, the space is considered heated. Schedule qualified personnel to inspect the temperature if the house is vacant during freezing weather. A furnace failure could lead to frozen water pipes.

Furnace Combustion Air Exhaust Options

Important:

- *All plugs must be in place for sealed combustion.*
- *If the locations are changed from the defaults, the default holes not being used must be plugged.*
- *The combustion air exhaust must be vented to the outdoors.*

Notes:

- *Default is left side for electric and natural gas connections. Default for the combustion air inlet and exhaust is top of the furnace.*
- *If the electrical and natural gas connections are moved to the right side, remove the plugs and move them to the left side. The grommets will move from the left side to the right side.*
- *The grommets are different for the natural gas and condensate connections.*
- *The combustion air inlet does not have to be on the same side as the combustion air exhaust.*

Refer to the illustrations below to find the approved venting options for upflow and horizontal left furnace applications.

Note: *Choose any combination such that it must have one inlet and one outlet.*

Figure 99. Upflow application

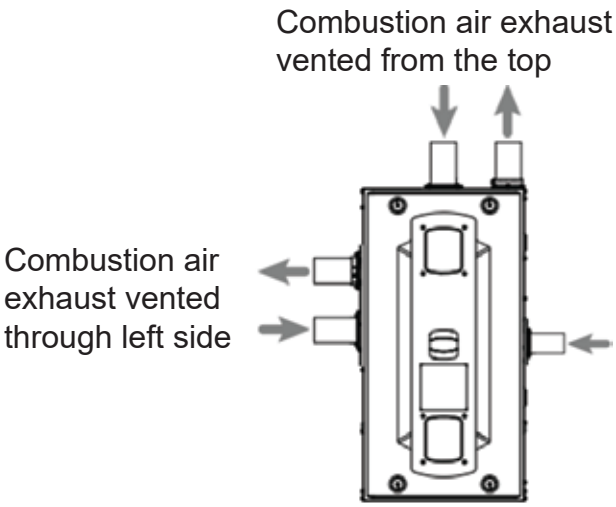


Figure 100. Horizontal left application

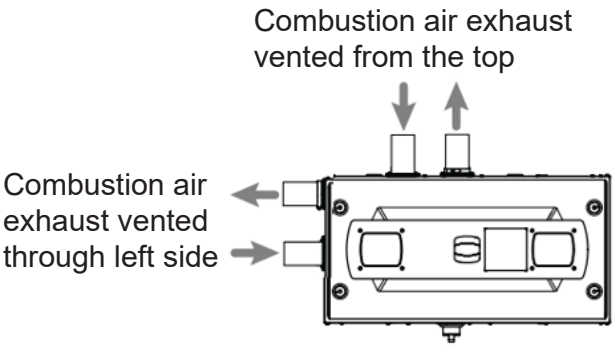


Figure 101. Horizontal right application

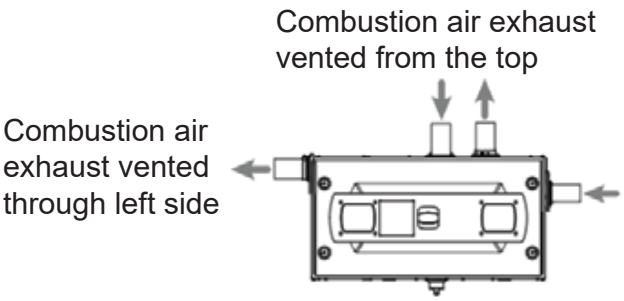
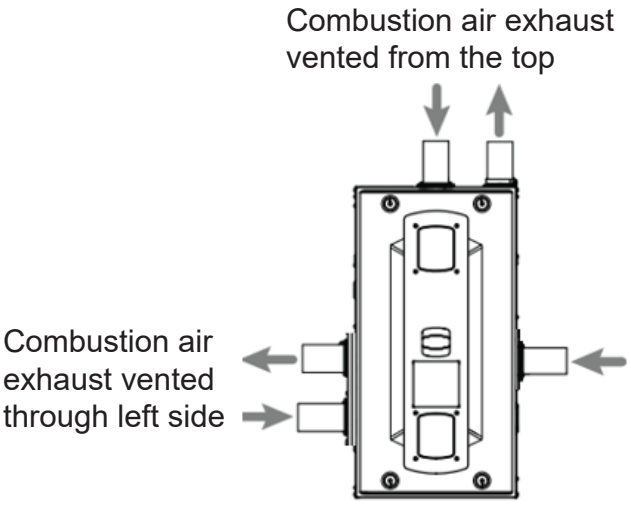


Figure 102. Downflow application



Factory Set Up - Upflow and Downflow Orientation

Figure 103. Upflow, horizontal left, and horizontal right orientations

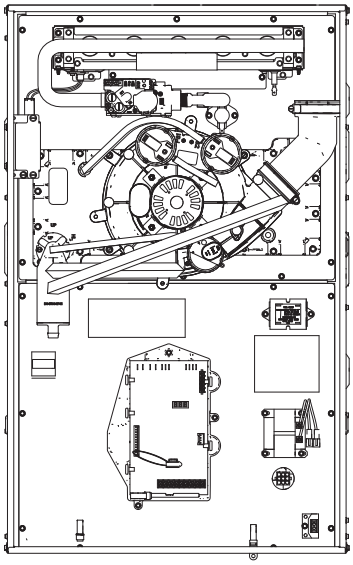


Figure 104. Downflow orientation

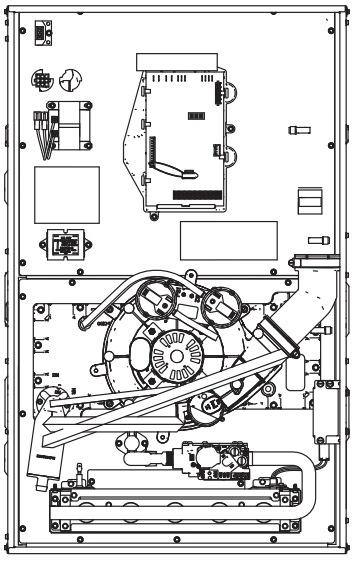


Figure 105. Grommet trap for horizontal left and right application

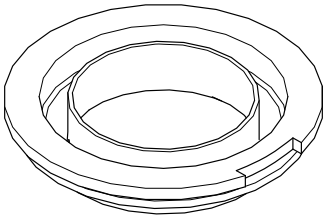


Figure 106. Conversion instructions

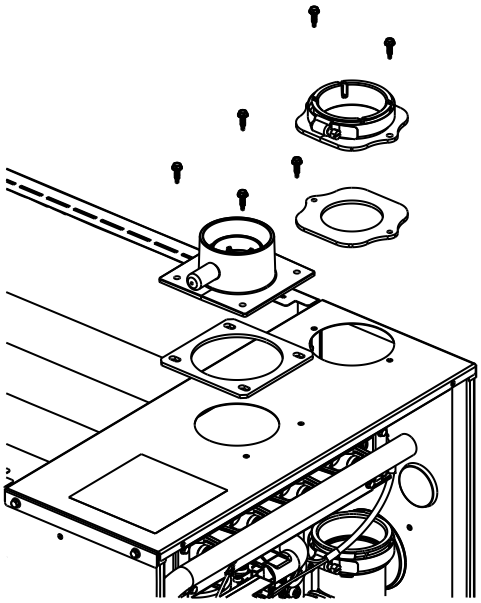
Upflow Furnace in Upflow Position - Top Vented Combustion Air

Important:

- *Trim the condensate pressure switch tubing to length to ensure there is no sag or trap created.*
- *See Figure 103, p. 71 for the factory view of the furnace.*

1. Attach the vent outlet gasket to the vent outlet.
2. Install vent outlet to top of cabinet using two screws supplied in the doc pack.
3. Install vent inlet gasket and vent inlet using four screws supplied in the doc pack.

Figure 107. Vent inlet/outlet



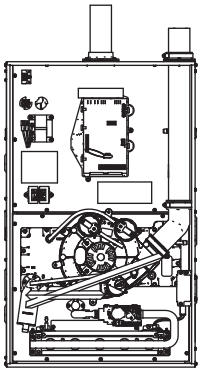
4. Slide PVC pipe through vent outlet adaptor and insert into inducer outlet.
5. Twist to ensure PVC is fully inserted.
6. Tighten the clamp on the end of the 45° elbow.
7. Tighten the clamp on the outlet vent adapter.

Note: *The vent outlet adapter is used for strain relief against the weight of the venting. The clamp should be tightened after the internal connection is made.*

8. Install the combustion air inlet PVC pipe.

Note: *If required, transition to larger venting within 2ft of the cabinet. CPL00938 – 2-inch x 3-inch offset coupling may be used and is factory supplied with 120 KBTUH furnaces. Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.*

Figure 108. Upflow furnace in upflow position



Upflow Position - Left Side Vented Combustion Air

Changes need to be made to the inducer orientation when installing the upflow furnace with the combustion air vented through the side. Additional changes are needed for hose routing and PS2 rotation.

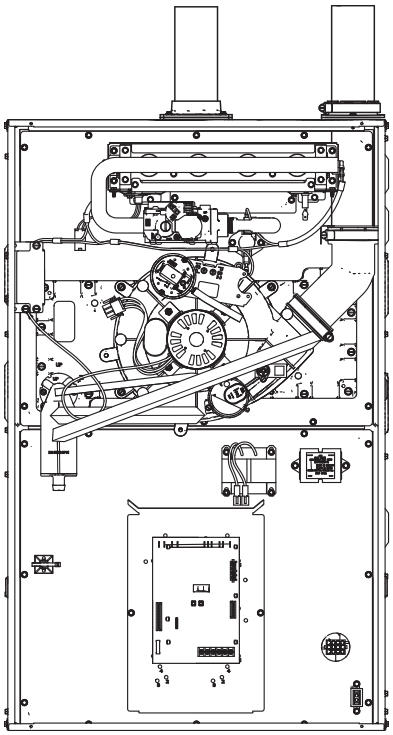
The figure to the top left in next page shows the furnace as it is sent from the factory.

Use the following steps to modify the furnace for upflow with side venting of combustion air.

Important:

- *Right side vent outlet is not allowed because condensate will not drain.*
- *PS2 conversion does not apply to the S9X1 or S9B1 models.*

Figure 109. Upflow furnace in upflow position



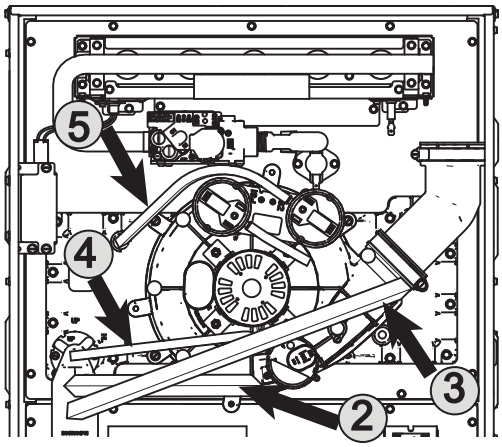
Before proceeding, lay unit on its back to make conversion easier.

1. Disconnect all drain tubes from condensate trap.

Note: *When removing condensate hoses from the condensate trap, hold the trap with your hand to prevent the trap from breaking. Removing the trap before the hoses is also an option.*

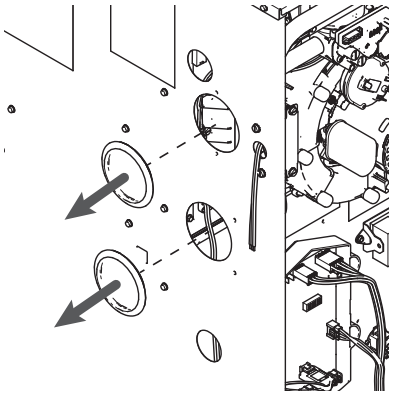
2. Remove drain tubing from bottom of inducer housing.
3. Remove rain gutter tubing from inducer outlet.
4. Remove tubing from condensate pressure switch.
5. Remove tubing from PS2 to cold header.

Figure 110. Removing tubing



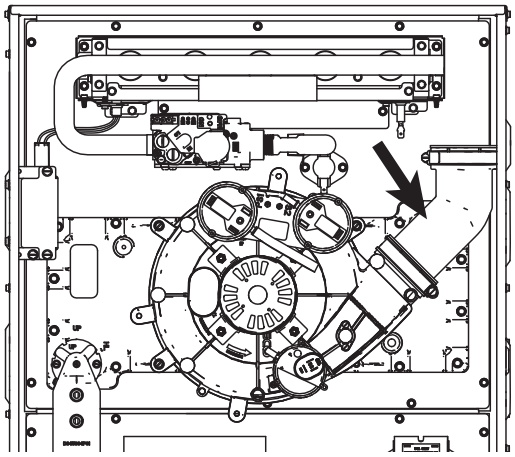
6. Remove two 3-inch plugs on left side of cabinet. To be used for combustion air and vent exhaust.
7. Install the two 3-inch plugs into the two 3-inch default openings on the top of the cabinet.

Figure 111. Plug installation



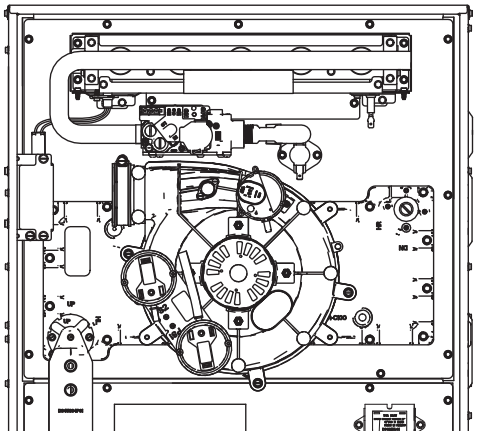
8. Loosen hose clamp and remove 45 degree adapter. If the rubber boot pulls out of the inducer opening, remove from the adapter and reinstall onto the inducer. Remove the elbow and discard.

Figure 112. Removing the elbow



9. Remove the three inducer mounting screws.
10. Rotate inducer counter-clockwise so that the inducer outlet aligns with the exhaust vent outlet.
11. Insert and re-tighten screws to 30 in.-lbs. Do not overtighten.

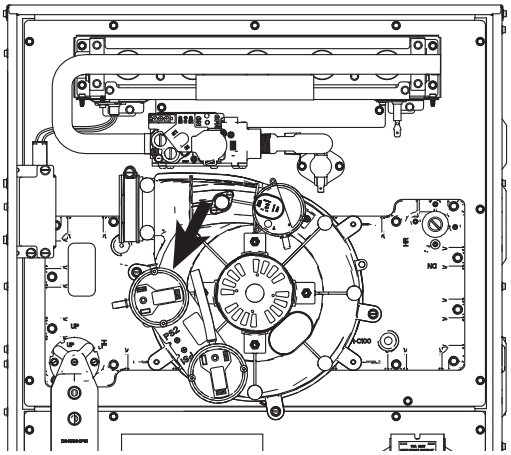
Figure 113. Inducer rotated



12. Remove the pressure switch bracket assembly.
13. Remove the screw that holds PS2, rotate 90 degrees clockwise, and reattach.
14. Reattach the pressure switch bracket assembly.

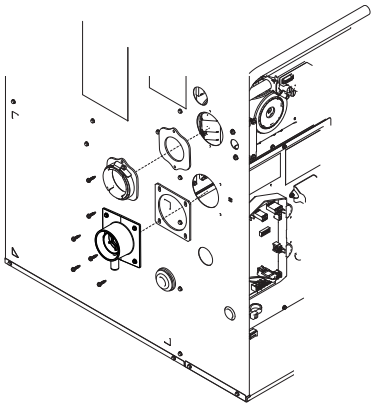
Note: *Figure 114, p. 73 shows the PS2 pressure switch in the final rotated position.*

Figure 114. PS2 pressure switch in the final rotated position



15. Attach the vent outlet gasket to the vent outlet.
16. Install vent outlet to top of cabinet using 2 screws supplied in the dock pack.
17. Install vent inlet gasket and vent inlet using 4 screws supplied in the dock pack.
18. Install the grommet for the condensate drain tube. The drain may be located on either side of the cabinet.

Figure 115. Install the vent inlet/outlet and grommet

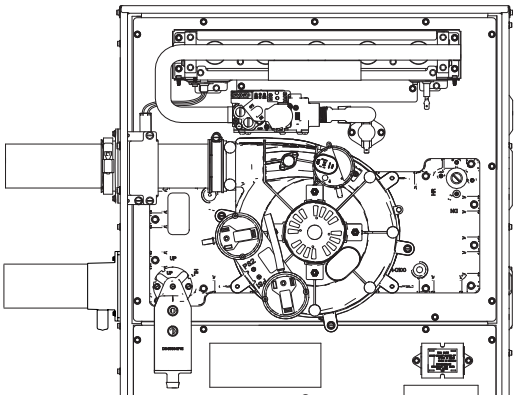


19. Slide PVC through vent outlet adaptor and insert into inducer outlet.
20. Twist to insure PVC is fully inserted.
21. Tighten the two clamps.
22. Install the combustion air inlet pipe.

Notes:

- *The vent outlet adapter is used for strain relief against the weight of the venting. The clamp should be tightened after the internal connection is made.*
- *If required, transition to larger venting within 2ft of the cabinet. An 2-inchx 3-inch offset coupling is required if the transition is made in a horizontal plane. Use coupling CPL01544 (Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.) See Horizontal Venting section for proper orientation of 2-inchx 3-inch offset coupling.*

Figure 116. Installing the combustion air inlet pipe



23. Connect PS2 tubing to switch and sensing location.

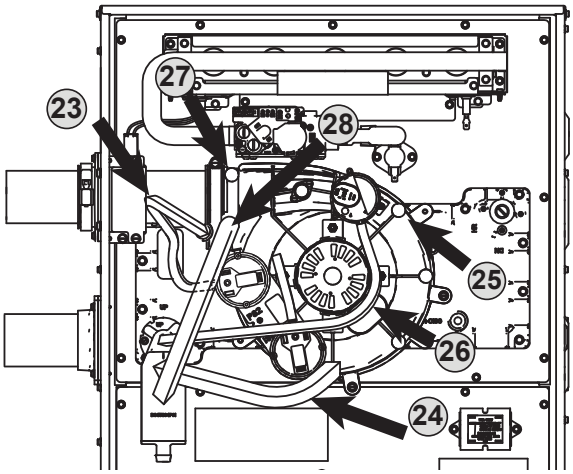
Important: *Trim the PS2 pressure switch tubing to length to ensure there is no sag or trap created.*

24. Remove port cap at bottom of inducer and connect inducer condensate tubing. Connect other end of inducer condensate tubing to top port on the condensate trap. Cut tubing to length, if necessary.
25. Install previously removed port cap onto bottom port of the inducer. (As viewed in upflow)
26. Connect condensate pressure switch tubing to pressure port on the condensate trap.

Important: *Trim the condensate pressure switch tubing to length to ensure there is no sag or trap created.*

27. Remove port plug from rain gutter and install in new position on opposite side of the rain gutter.
28. Connect rain gutter condensate hose to the rain gutter and the lower port of the condensate trap. Cut to length, if necessary.

Figure 117. Condensate tubing



Horizontal Left Position - Side Vented Combustion Air

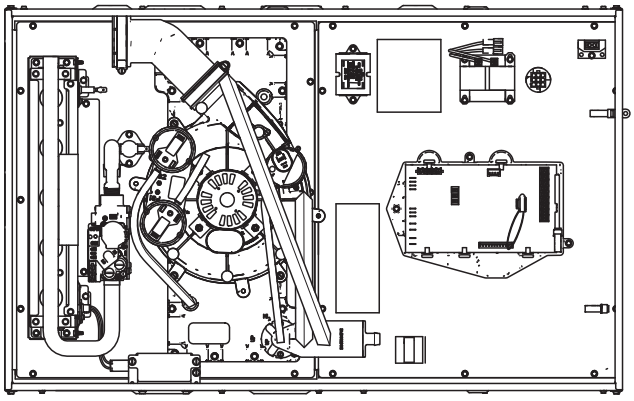
Changes need to be made to the inducer orientation when installing the upflow furnace in the horizontal left position with the combustion air vented through the side. Additional changes are needed for hose routing, condensate trap orientation, and inducer hoses.

The figure to the top right shows the furnace as it is sent from the factory.

Use the following steps to modify the furnace for horizontal left with side venting of combustion air.

Important: *PS2 conversion does not apply to the S9X1 or S9B1 models.*

Figure 118. Horizontal left position - side vented combustion air



Before proceeding, lay unit on its back to make the conversion easier.

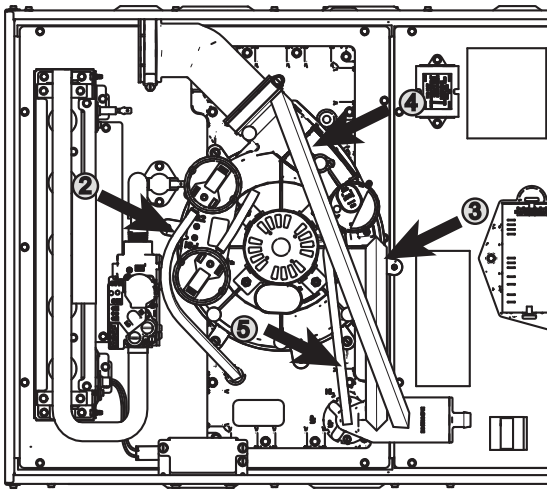
1. Remove all drain hoses from condensate trap.

Note: *When removing condensate hoses from the condensate trap, hold the trap with your hand to prevent the trap from breaking. Removing the trap before the hoses is also an option.*

2. Remove tubing from PS2 to cold header.
3. Remove drain tubing from bottom of inducer housing.
4. Remove rain gutter tubing from inducer outlet.
5. Remove tubing from condensate pressure switch.
6. Remove the screws that hold the condensate trap bracket. The condensate trap should not be removed from the condensate trap bracket. Remove assembly and retain for later installation.

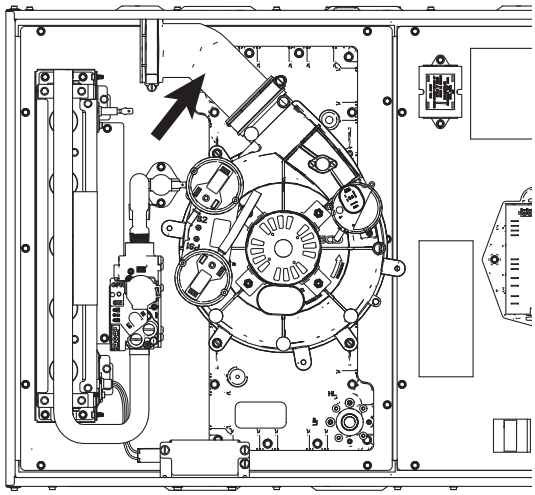
Note: *There is a plastic adapter with O-rings located inside the cold header that is held in place by the condensate trap bracket. Do not lose this adapter. This adapter needs to be in place when the condensate trap bracket is reattached.*

Figure 119. Removing tubing



7. Loosen hose clamp and remove 45 degree adapter. If the rubber boot pulls out of the inducer opening, remove from the adapter and reinstall onto the inducer. Remove the elbow and discard.

Figure 120. - Replacing adapter and reinstalling the rubber boot



8. Remove three inducer screws.
9. Rotate the inducer so that the outlet is pointing vertically.
10. Use the three screws to reattach the inducer to the cold header to 30 in. -lbs. Do not overtighten.

Figure 121. Inducer and PS2 pressure switch rotation before and after

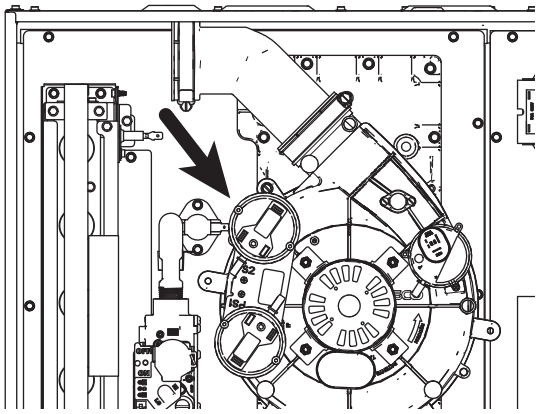
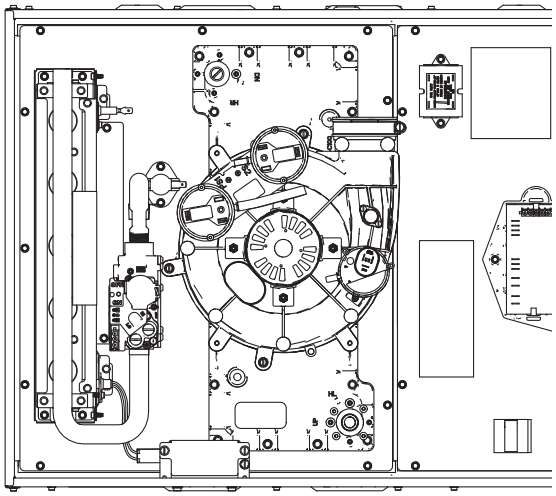
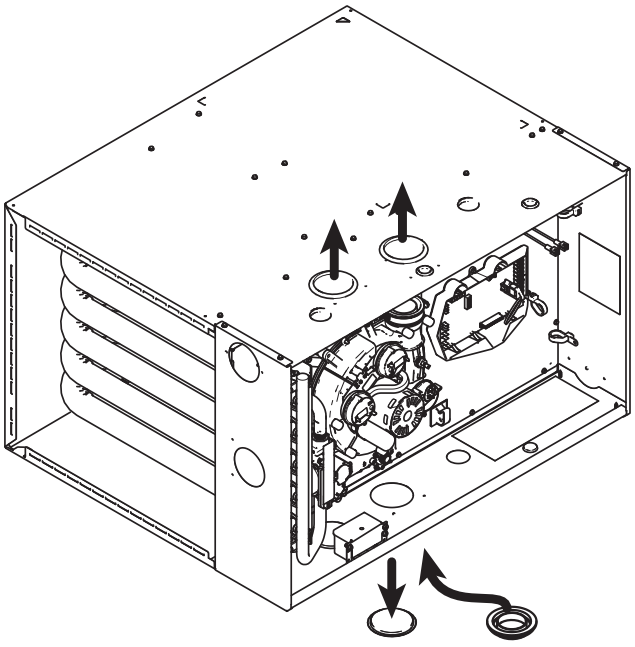


Figure 122. Reattaching the inducer



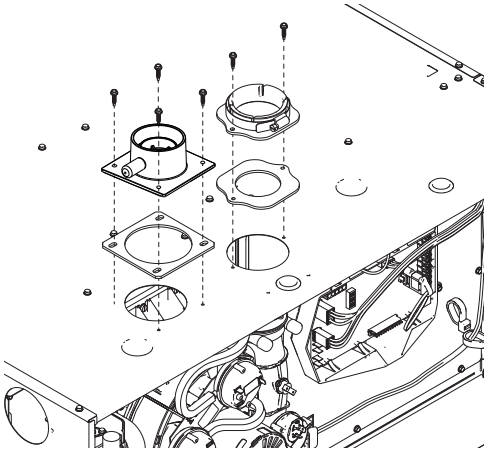
11. Remove 3-inch plug on left side of unit. To be used for condensate trap.
12. Install condensate trap grommet.
13. Remove two 3-inch plugs on right side of cabinet. To be used for combustion air exhaust and inlet.
14. Reuse the two 3-inch plugs to seal the two 3-inch default openings on the top of the furnace.

Figure 123. Sealing the default openings



15. Attach the vent outlet gasket to the vent outlet.
16. Install vent outlet to top of cabinet using 2 screws supplied in the dock pack.
17. Install vent inlet gasket and vent inlet using 4 screws supplied in the dock pack.

Figure 124. Install the vent inlet/outlet

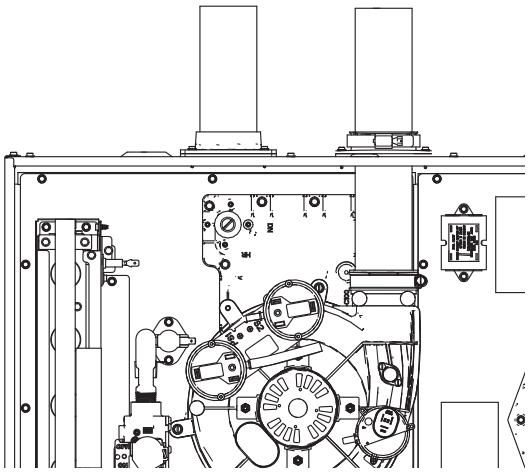


18. Slide PVC through vent outlet adaptor and insert into inducer outlet.
19. Twist to insure PVC is fully inserted.
20. Tighten the two clamps.
21. Install the combustion air inlet PVC pipe.

Notes:

- *The vent outlet adapter is used for strain relief against the weight of the venting. The clamp should be tightened after the internal connection is made.*
- *If required, transition to larger venting within 2ft of the cabinet. CPL01544 – 2-inch x 3-inch offset coupling may be used and is factory supplied with 120 MBTUH furnaces. Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.*

Figure 125. Installing the combustion air inlet PVC pipe



22. Reinstall the condensate adapter if it was earlier removed or ensure adapter is still in place.

    Important: *The condensate adapter must be present for proper condensate drain operation.*

23. Install condensate trap into new location by fitting into grommet and aligning the hole on the condensate trap with the hole labeled “HL”.

    Important: *When installing a 21.0-inch wide S-Series furnace, the condenser trap grommet must be rotated so that the notch in the grommet faces the outer edge of the furnace cabinet as shown in the illustrations below and to the top left in next page. This allows the rain gutter tubing to fully seat onto the lower condensate port trap.*

24. Hand tighten screw with a 1/4-inch nut driver. Do not over torque or use a drill gun.

Figure 126. Tightening screw

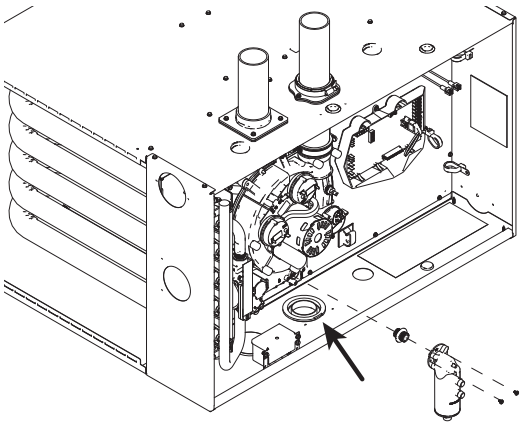
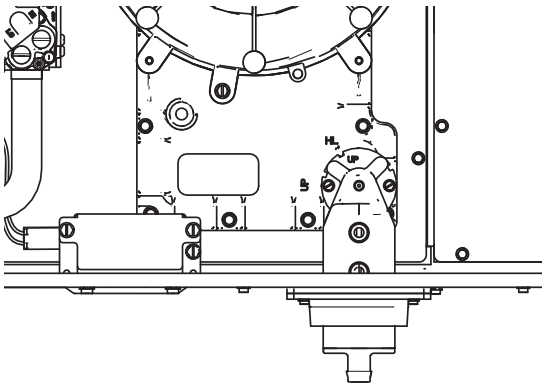


Figure 127. Tightening screw



25. Connect PS2 tubing to switch and new sensing location.

    Important: *Trim the PS2 pressure switch tubing to length to ensure there is no sag or trap created.*

26. Remove port cap on left of inducer and connect inducer condensate tubing. Connect other end of inducer condensate tubing to top port on the condensate trap. Cut tubing to length, if necessary.

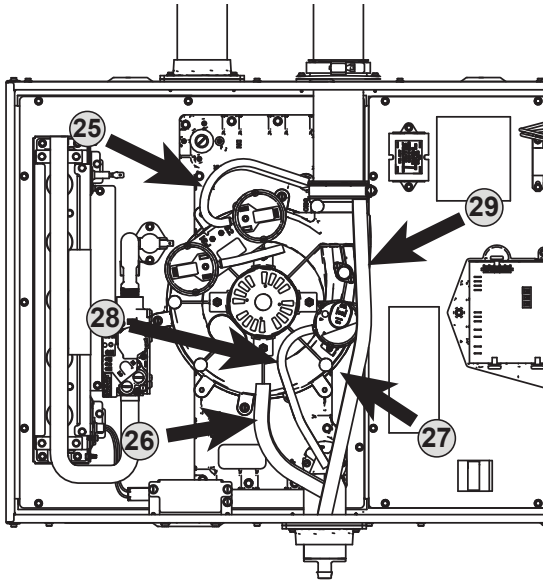
27. Install previously removed port cap onto bottom port of the inducer.

28. Connect condensate pressure switch tubing to pressure port on the condensate trap.

    Important: *Trim the condensate pressure switch tubing to length to ensure there is no sag or trap created.*

29. Connect rain gutter condensate hose to the rain gutter and the lower port of the condensate trap.

Figure 128. Condensate tubing



Furnace in Horizontal Left Position - Top Vented Combustion Air

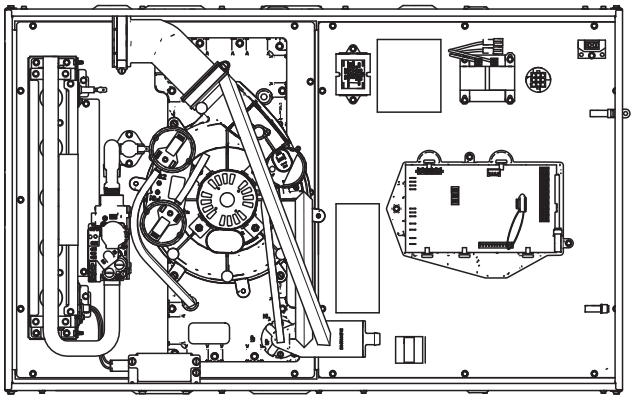
Changes do not need to be made to the inducer orientation when installing the upflow furnace in the horizontal left position with the combustion air vented through the top. Changes are needed for hose routing, condensate trap orientation, and inducer port caps.

The figure below shows the furnace as it is sent from the factory.

Use the following steps to modify the furnace for horizontal left with top venting of combustion air.

Important: *PS2 conversion does not apply to the S9X1 or S9B1 models.*

Figure 129. Horizontal left position - top vented combustion air



Before proceeding, lay unit on its back to make the conversion easier.

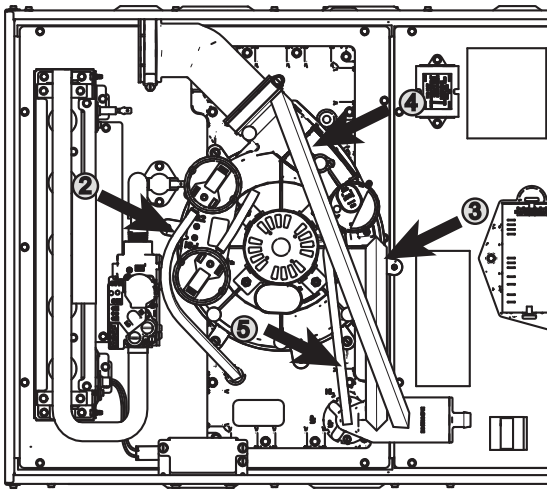
1. Remove all drain hoses from condensate trap.

Note: *When removing condensate hoses from the condensate trap, hold the trap with your hand to prevent the trap from breaking. Removing the trap before the hoses is also an option.*

2. Remove tubing from PS2 to cold header.
3. Remove drain tubing from bottom of inducer housing.
4. Remove rain gutter tubing from inducer outlet.
5. Remove tubing from condensate pressure switch.
6. Remove the screws that hold the condensate trap bracket. The condensate trap should not be removed from the condensate trap bracket. Remove assembly and retain for later installation.

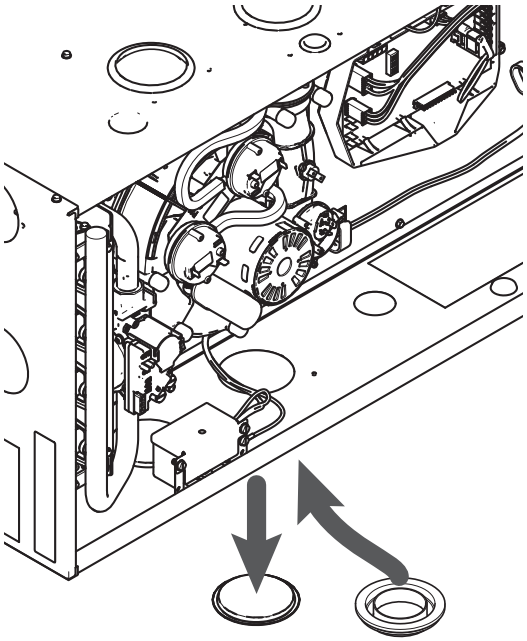
   Note: *There is a plastic adapter with O-rings located inside the cold header that is held in place by the condensate trap bracket. Do not lose this adapter. This adapter needs to be in place when the condensate trap bracket is reattached.*

Figure 130. Removing tubing



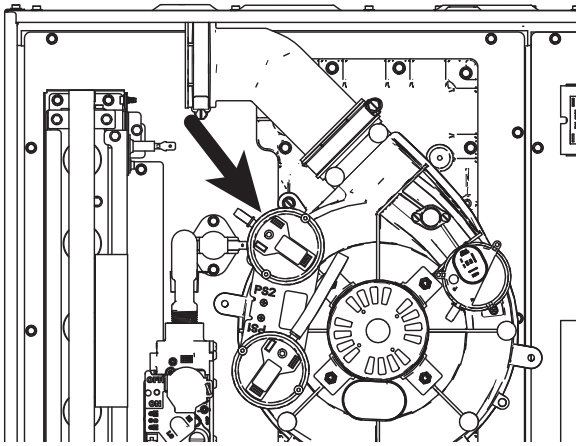
7. Remove plug from 3-inch hole.
8. Install condensate trap grommet.

Figure 131. Installing condensate trap grommet



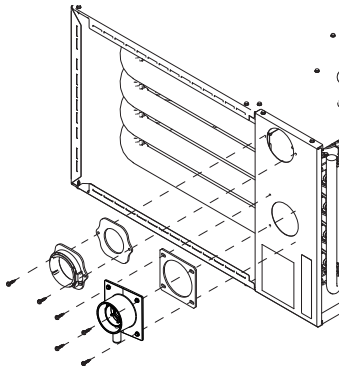
9. Remove the pressure switch bracket assembly.
10. Remove the screw that holds PS2, rotate 90 degrees clockwise, and reattach.
11. Reattach the pressure switch bracket assembly.

Figure 132. Pressure switch bracket assembly



12. Attach the vent outlet gasket to the vent outlet.
13. Install vent outlet to top of cabinet using 2 screws supplied in the doc pack.
14. Install vent inlet gasket and vent inlet using 4 screws supplied in the doc pack.

Figure 133. Install the vent inlet/outlet

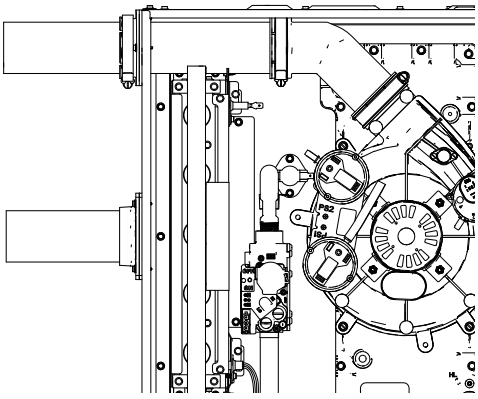


15. Remove the cap on the cap on the top side of the cold header and move it to the bottom position on the cold header.
16. Slide PVC through vent outlet adaptor and insert into inducer outlet.
17. Twist to insure PVC is fully inserted.
18. Tighten the two clamps.
19. Install the combustion air inlet PVC pipe.

Notes:

- *The vent outlet adapter is used for strain relief against the weight of the venting. The clamp should be tightened after the internal connection is made.*
- *f required, transition to larger venting within 2ft of the cabinet. An 2-inch x 3-inch offset coupling is required if the transition is made in a horizontal plane. Use coupling CPL01544 (Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.) See Horizontal Venting section for proper orientation of 2-inch x 3-inch offset coupling.*

Figure 134. Install the combustion air inlet PVC pipe



20. Reinstall the condensate adapter if it was earlier removed or ensure adapter is still in place.

Important: *The condensate adapter must be present for proper condensate drain operation.*

21. Install condensate trap into new location by fitting into grommet and aligning the hole on the condensate trap with the hole labeled “HL”.

When installing a 21.0-inch wide S-Series furnace, the condenser trap grommet must be rotated so that the notch in the grommet faces the outer edge of the furnace cabinet as shown in the illustrations below and to the top left in next page. This allows the rain gutter tubing to fully seat onto the lower condensate port trap.

22. Hand tighten screw with a 1/4-inch nut driver. Do not over torque or use a drill gun.

Figure 135. Tightening screws

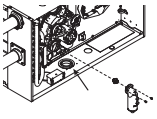
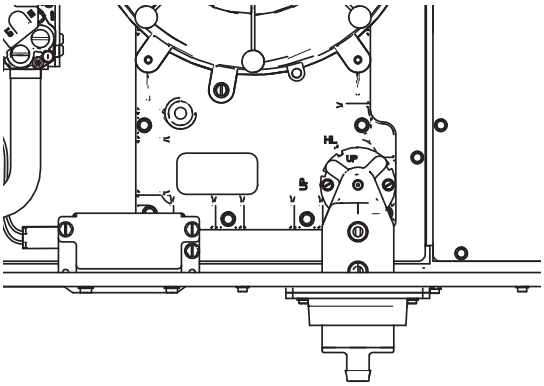


Figure 136. Tightening screws



23. Connect PS2 tubing to switch and new sensing location.

Important: *Cut to length but insure there is a rise in the tubing to avoid condensed flue gases from entering pressure switch.*

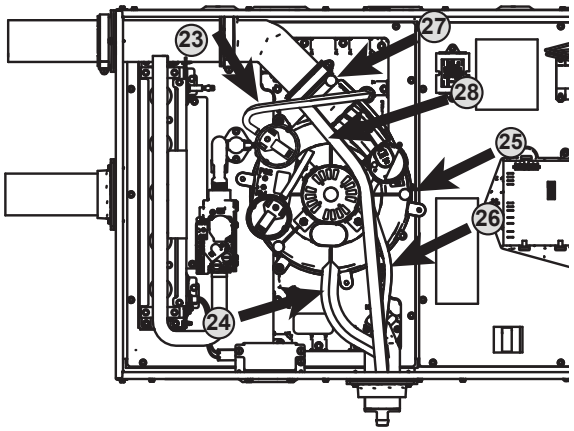
24. Remove port cap on left side of inducer and connect inducer condensate tubing. Connect other end of inducer condensate tubing to top port on the condensate trap. Cut tubing to length, if necessary.
25. Install previously removed port cap onto bottom port of the inducer. (As viewed in upflow)
26. Connect condensate pressure switch tubing to pressure port on the condensate trap.

Important: *Trim the PS2 pressure switch tubing to length to ensure there is no sag or trap created.*

27. Remove port plug from rain gutter and install in new position on opposite side of the rain gutter.

28. Connect rain gutter condensate hose to the rain gutter and the lower port of the condensate trap. Route rain gutter condensate hose to the right of the inducer motor.

Figure 137. Condensate tubing



Furnace in Horizontal Right Position - Top Vented Combustion Air

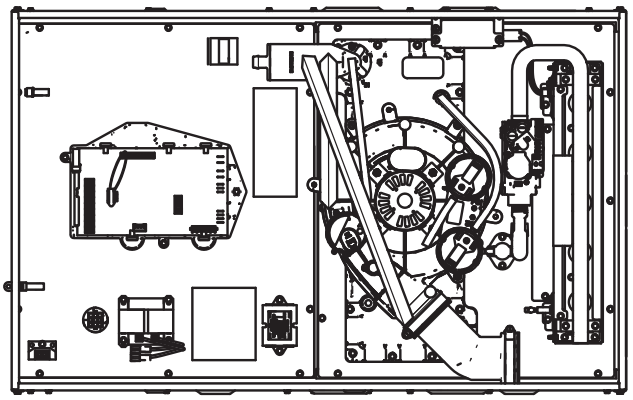
Changes need to be made to the inducer orientation when installing the upflow furnace in the horizontal right position with the combustion air vented through the left side. Additional changes are needed for hose routing, condensate trap location, and inducer port caps, and the condensate plug.

The figure below shows the furnace as it is sent from the factory.

Use the following steps to modify the furnace for horizontal right with left side venting of combustion air.

Important: *PS2 conversion does not apply to the S9X1 or S9B1 models.*

Figure 138. Horizontal right position - top vented combustion air



Before proceeding, lay unit on its back to make the conversion easier.

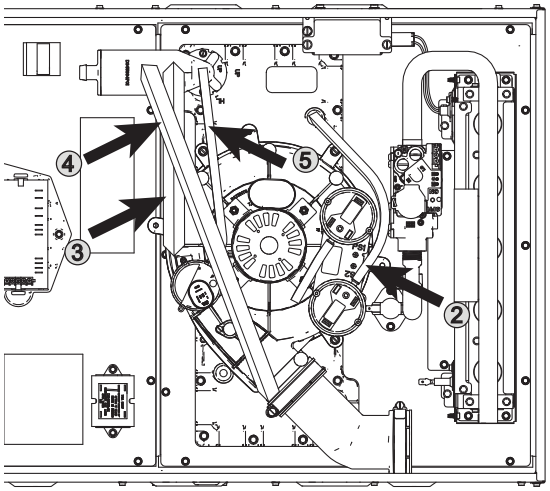
1. Remove all drain hoses from condensate trap.

   Note: *When removing condensate hoses from the condensate trap, hold the trap with your hand to prevent the trap from breaking. Removing the trap before the hoses is also an option.*

2. Remove tubing from PS2 to cold header.
3. Remove drain tubing from bottom of inducer housing.
4. Remove rain gutter tubing from inducer outlet.
5. Remove tubing from condensate pressure switch.
6. Remove the screws that hold the condensate trap bracket. The condensate trap should not be removed from the condensate trap bracket. Remove assembly and retain for later installation.
7. Remove the adapter located inside the condensate trap connection on the cold header and retain for later installation.

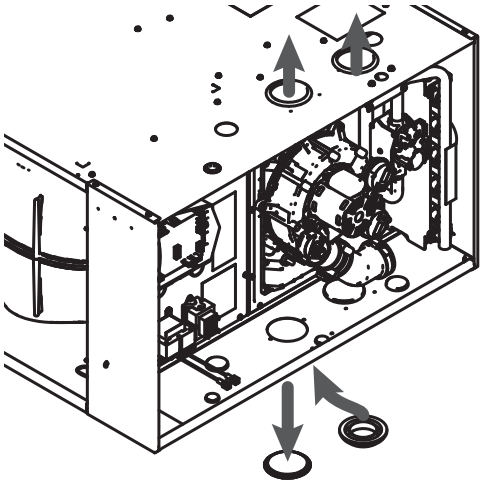
   Note: *The plastic adapter with O-rings located inside the cold header that is held in place by the condensate trap bracket. Do not lose this adapter. This adapter needs to be in place when the condensate trap bracket is reattached.*

Figure 139. Removing tubing



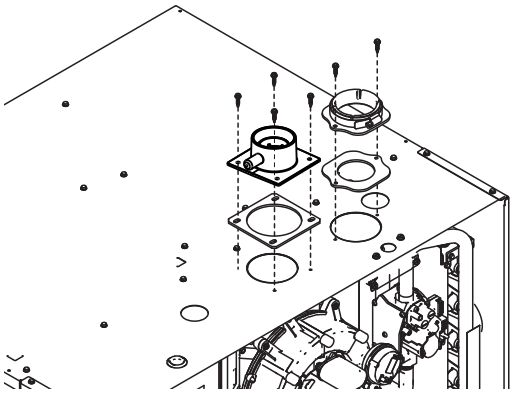
8. Remove 3-inch plug on right side of unit. To be used for condensate trap.
9. Install condensate trap grommet.
10. Remove two 3-inch plugs on left side of cabinet.
11. Reuse the two 3-inch plugs to seal the two 3-inch default openings on the top of the cabinet.

Figure 140. Sealing default openings



12. Attach the vent outlet gasket to the vent outlet.
13. Install vent outlet to top of cabinet using 2 screws supplied in the doc pack.
14. Install vent inlet gasket and vent inlet using 4 screws supplied in the doc pack.

Figure 141. Install the vent inlet/outlet



15. Remove three inducer screws.
16. Loosen hose clamp and remove 45 degree adapter. If the rubber boot pulls out of the inducer opening, remove from the adapter and reinstall onto the inducer.
17. Rotate the inducer so that the outlet is pointing vertically.
18. Use the three inducer screws to reattach the inducer to the cold header. Torque to 30 in.-lbs. Do not overtighten.

Figure 142. Reattaching the inducer

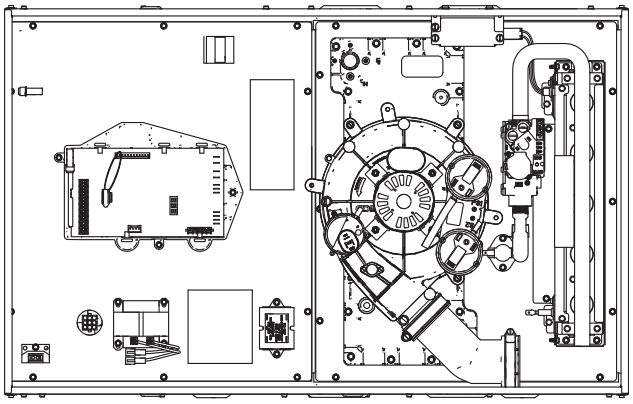
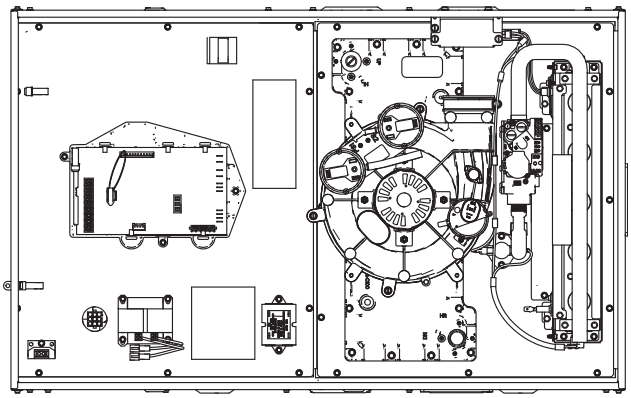
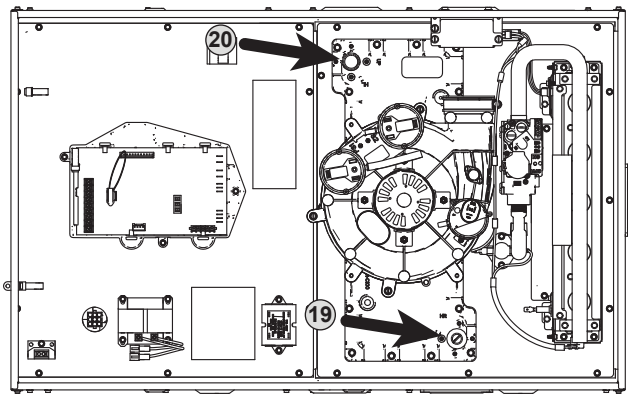


Figure 143. Reattaching the inducer



19. Remove condensate drain plug from top right location on cold header.
20. Place condensate drain plug onto the cold header outlet located on the bottom left of the cold header.

Figure 144. Condensate drain plug

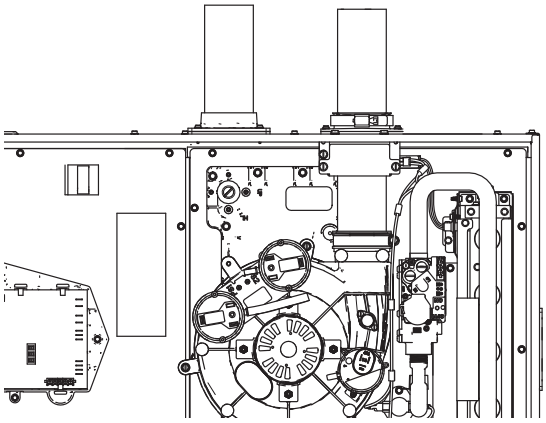


21. Slide PVC through vent outlet adaptor and insert into inducer outlet.
22. Twist to insure PVC is fully inserted.
23. Tighten the two clamps.
24. Install the combustion air inlet PVC pipe.

Notes:

- *The vent outlet adapter is used for strain relief against the weight of the venting. The clamp should be tightened after the internal connection is made.*
- *If required, transition to larger venting within 2ft of the cabinet. CPL01544 – 2-inch x 3-inch offset coupling may be used and is factory supplied with 120 MBTUH furnaces. Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.*

Figure 145. Install the combustion air inlet PVC pipe



Condensate Trap Installation

25. Reinstall the condensate adapter if it was earlier removed or ensure adapter is still in place.

    Important: *The condensate adapter must be present for proper condensate drain operation.*

26. Install condensate trap into new location by fitting into grommet and aligning the hole on the condensate trap with the hole labeled “HR”.

    Important: *When installing a 21.0-inch wide S-Series furnace, the condenser trap grommet must be rotated so that the notch in the grommet faces the outer edge of the furnace cabinet as shown in the illustrations below and to the top left in next page. This allows the rain gutter tubing to fully seat onto the lower condensate port trap.*

27. Hand tighten screw with a 1/4-inch nut driver. Do not over torque or use a drill gun.

Figure 146. Tightening screws

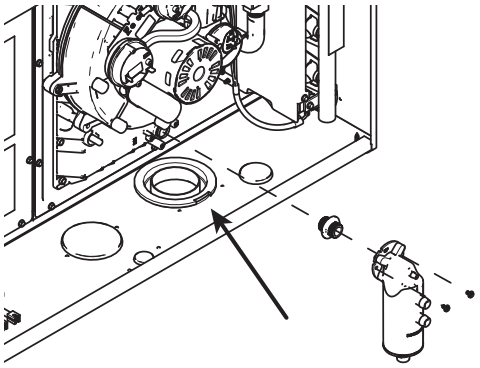
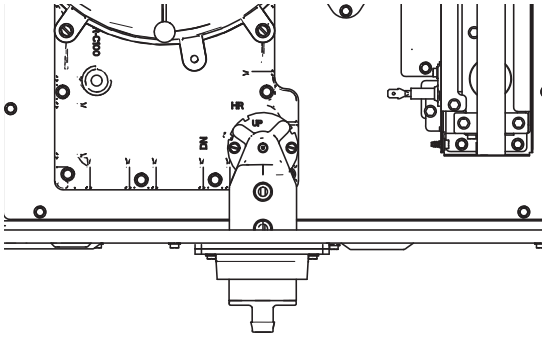


Figure 147. Tightening screws



28. Connect PS2 tubing to switch and new sensing location.

    Important: *Trim the PS2 pressure switch tubing to length to ensure there is no sag or trap created.*

29. Remove port cap on the right side of the inducer and connect inducer condensate tubing. Connect other end of inducer condensate tubing to top port on the condensate trap. Cut tubing to length, if necessary.

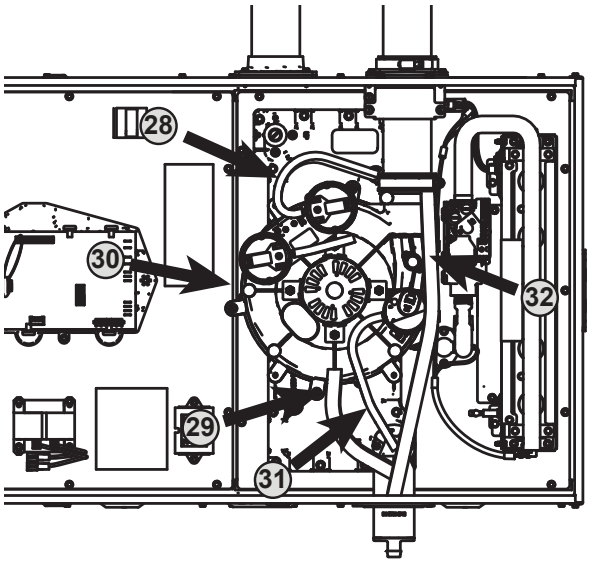
30. Install previously removed port cap onto bottom port of the inducer.

31. Connect condensate pressure switch tubing to pressure port on the condensate trap.

    Important: *Cut to length to ensure there is no sag or trap created.*

32. Connect rain gutter condensate hose to the rain gutter and the lower port of the condensate trap.

Figure 148. Condensate tubing



Furnace in Horizontal Right Position - Left Vented Combustion Air

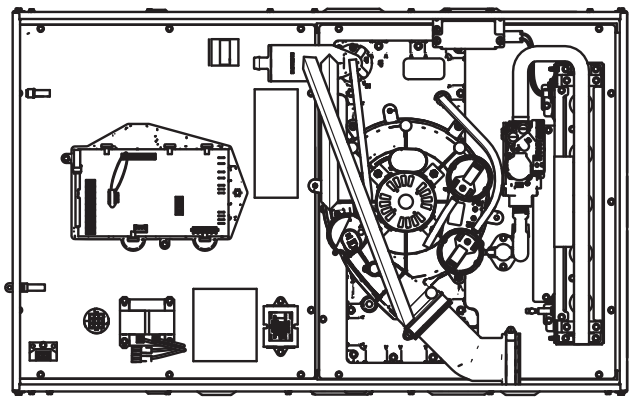
Changes need to be made to the inducer orientation when installing the upflow furnace in the horizontal right position with the combustion air vented through the bottom. Additional changes are needed for hose routing, condensate trap location, and inducer port caps, and the condensate plug.

The figure below shows the furnace as it is sent from the factory.

Use the following steps to modify the furnace for horizontal right with bottom venting of combustion air.

Important: *PS2 conversion does not apply to the S9X1 or S9B1 models.*

Figure 149. Horizontal right position - left vented combustion air



Before proceeding, lay unit on its back to make the conversion easier.

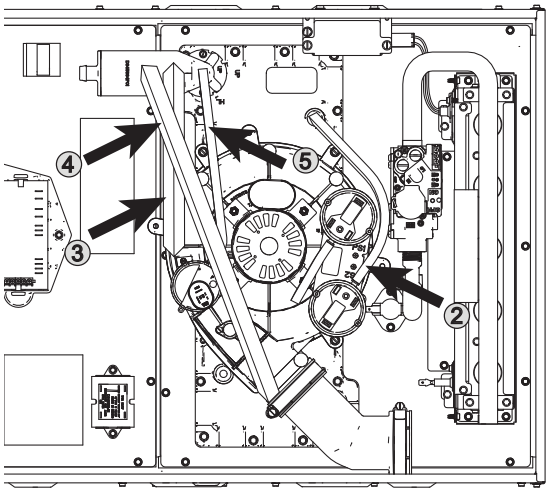
1. Remove all drain hoses from condensate trap.

Note: *When removing condensate hoses from the condensate trap, hold the trap with your hand to prevent the trap from breaking. Removing the trap before the hoses is also an option.*

2. Remove tubing from PS2 pressure switch.
3. Remove drain tubing from bottom of inducer housing.
4. Remove rain gutter tubing from inducer outlet.
5. Remove tubing from condensate pressure switch.
6. Remove the screws that hold the condensate trap bracket. The condensate trap should not be removed from the condensate trap bracket. Remove assembly and retain for later installation.
7. Remove the condensate adapter located inside the condensate trap connection on the cold header and retain for later installation.

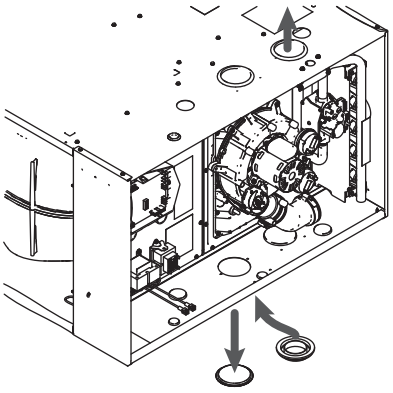
Note: *The plastic condensate adapter with O-rings located inside the cold header that is held in place by the condensate trap bracket. Do not lose this adapter. The condensate adapter needs to be in place when the condensate trap bracket is reattached.*

Figure 150. Condensate tubing



8. Remove 3-inch plug on right side of unit. To be used for condensate trap.
9. Install condensate trap grommet.
10. Remove 3-inch plugs on the left side of the cabinet. To be used for combustion air inlet.
11. Reuse the two 3-inch plugs to seal the two 3-inch default openings on the top of the furnace.

Figure 151. Sealing default openings



12. Remove three inducer screws.
13. While the inducer is loose, remove condensate drain plug from top right location on cold header.
14. Place condensate drain plug onto the cold header outlet located on the bottom left of the cold header.
15. Rotate the inducer 180 degrees so that the elbow is pointing towards the left.
16. Use the three inducer screws to reattach the inducer to the cold header. Torque to 30 in.-lbs. Do not overtighten.

Figure 152. Reattaching the inducer

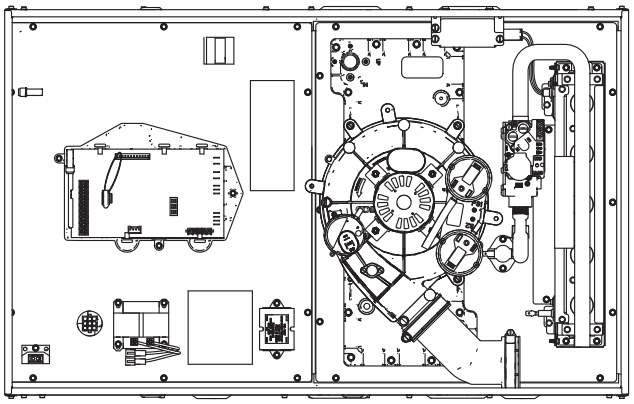


Figure 153. Reattaching the inducer

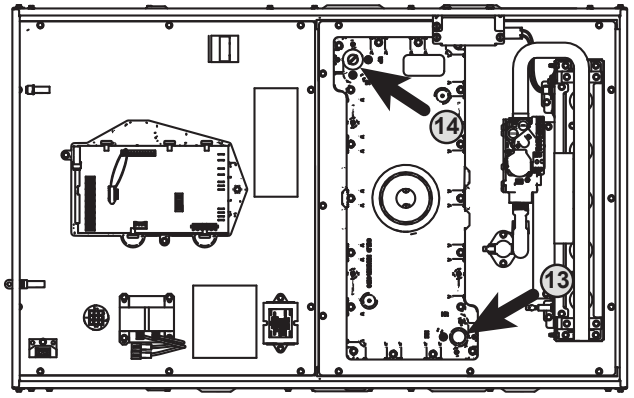
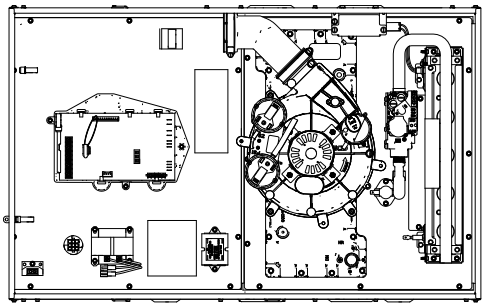


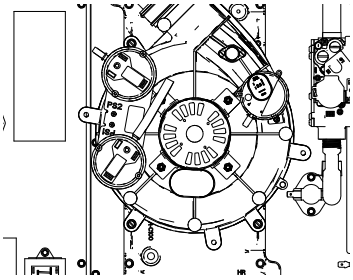
Figure 154. Reattaching the inducer



17. Remove the pressure switch bracket assembly.
18. Remove the screw that holds PS2, rotate 90 degrees clockwise, and reattach.
19. Reattach the pressure switch bracket assembly.

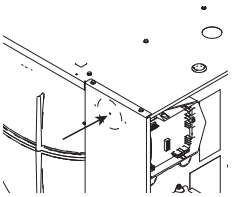
Note: *The inducer is shown rotated into its final position in the illustration below.*

Figure 155. Pressure switch bracket assembly



20. Cut 3-inch hole in bottom panel using large dimple as guide.

Figure 156. Cut hole

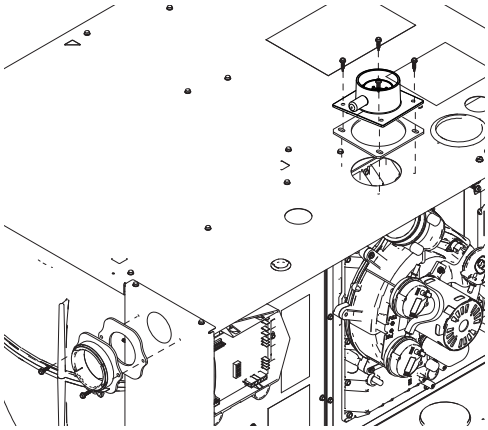


21. Attach the vent outlet gasket to the vent outlet.
22. Install vent outlet to top of cabinet using 2 screws supplied in the doc pack.
23. Install vent inlet gasket and vent inlet using 4 screws supplied in the doc pack.

Notes:

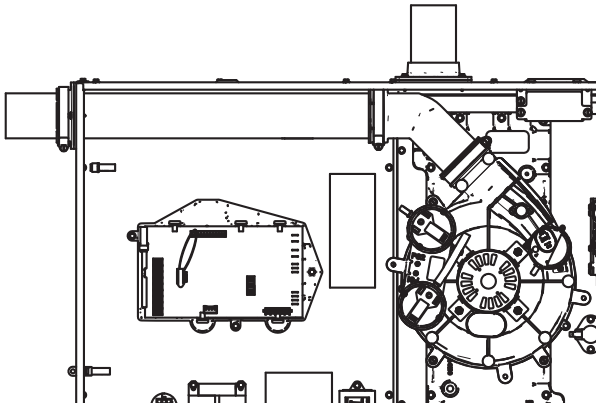
- *The vent outlet adapter is used for strain relief against the weight of the venting. The clamp should be tightened after the internal connection is made.*
- *If required, transition to larger venting within 2ft of the cabinet. An 2-inch X 3-inch offset coupling is required if the transition is made in a horizontal plane. Use coupling CPL01544 (Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.) See Horizontal Venting section for proper orientation of 2-inch X 3-inch offset coupling*

Figure 157. Install the vent inlet/outlet



24. Slide PVC through vent outlet adaptor and insert into inducer outlet.
25. Twist to insure PVC is fully inserted.
26. Tighten the two clamps.
27. Install the combustion air inlet PVC pipe.

Figure 158. Install the combustion air inlet PVC pipe



28. Reinstall the condensate adapter if it was earlier removed or ensure adapter is still in place.

Important: *The condensate adapter must be present for proper condensate drain operation.*

29. Install condensate trap into new location by fitting into grommet and aligning the hole on the condensate trap with the hole labeled “HR”.

Important: *When installing a 21.0-inchwide S-Series furnace, the condenser trap grommet must be rotated so that the notch in the grommet faces the outer edge of the furnace cabinet as shown in the illustrations below and to the top right. This allows the rain gutter tubing to fully seat onto the lower condensate port trap.*

30. Hand tighten screw with a 1/4-inch nut driver. Do not over torque or use a drill gun.

Figure 159. Tightening screws

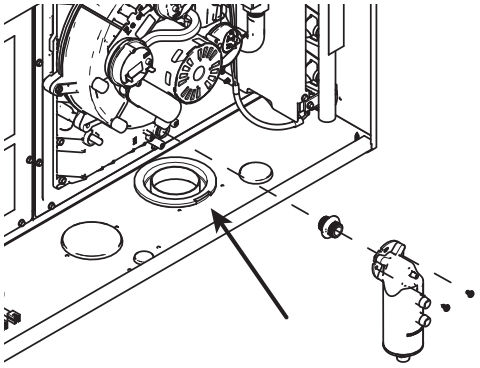
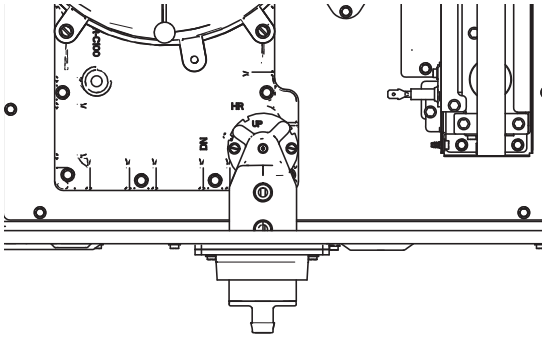


Figure 160. Tightening screws



31. Connect PS2 tubing to the PS2 switch and to the original sensing location on the cold header.

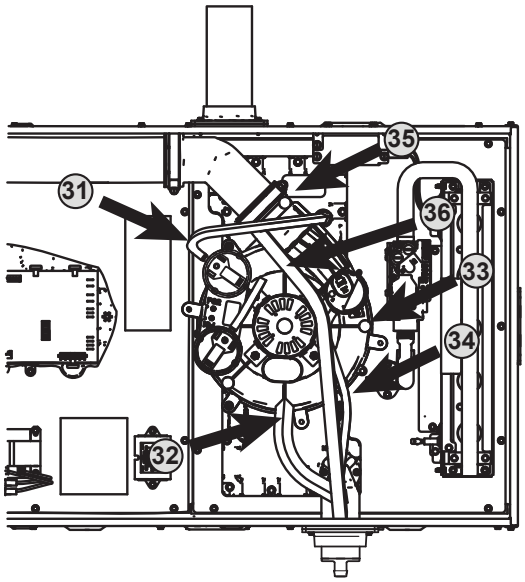
Important: *Trim the PS2 pressure switch tubing to length to ensure there is no sag or trap created.*

32. Remove port cap on the right side of inducer and connect inducer condensate tubing. Connect other end of inducer condensate tubing to top port on the condensate trap. Cut tubing to length, if necessary.

33. Install previously removed port cap onto bottom port of the inducer. (As viewed in upflow)
34. Connect condensate pressure switch tubing to pressure port on the condensate trap.

    Important: *Cut to length to ensure there is no sag or trap created.*
35. Remove port plug from rain gutter and install in new position on opposite side of the rain gutter.
36. Connect rain gutter condensate hose to the rain gutter and the lower port of the condensate trap. Route rain gutter condensate hose to the right of the inducer motor.

Figure 161. Condensate tubing



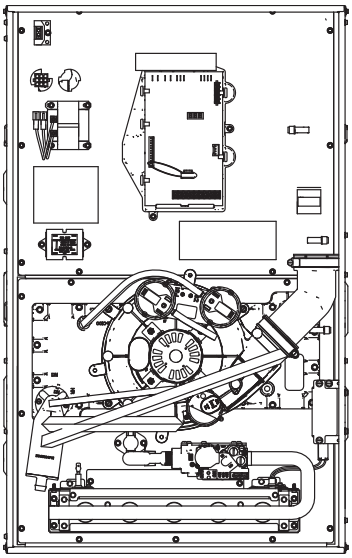
Downflow Furnace - Top Vented Combustion Air

No changes need to be made to the inducer when installing the downflow furnace with the combustion air vented through the top.

Important:

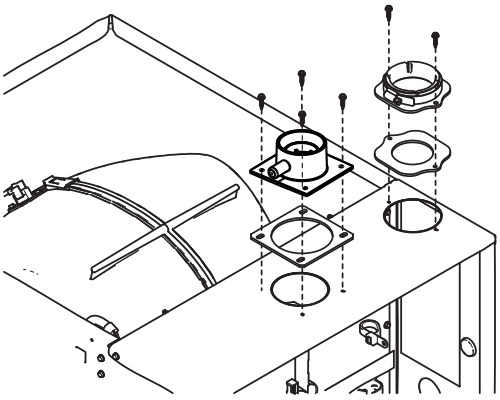
- *Trim the PS2 pressure switch tubing to length to ensure there is no sag or trap created.*
- *PS2 conversion does not apply to the S9X1 or S9B1 models.*

Figure 162. Downflow - top vented combustion air



1. Attach the vent outlet gasket to the vent outlet.
2. Install vent outlet to top of cabinet using 2 screws supplied in the doc pack.
3. Install vent inlet gasket and vent inlet using 4 screws supplied in the doc pack.

Figure 163. Install the vent inlet/outlet



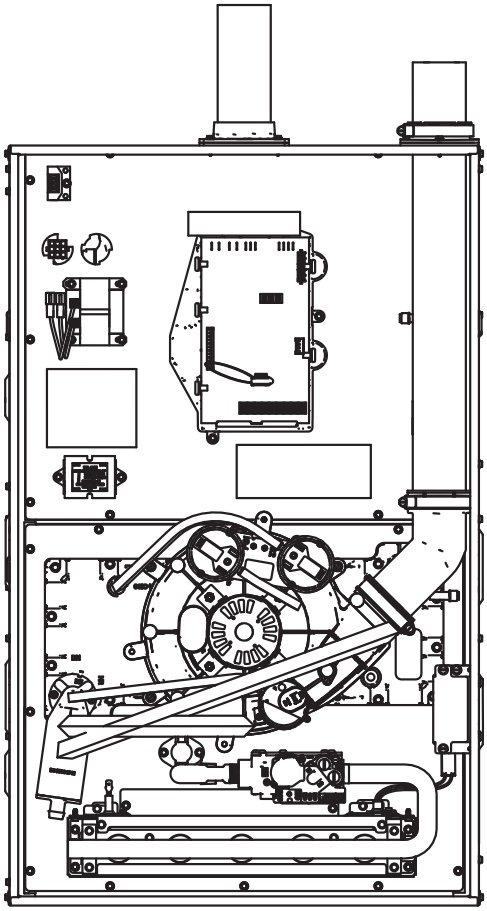
4. Slide PVC pipe through vent outlet adaptor and insert into inducer outlet.
5. Twist to insure PVC is fully inserted.
6. Tighten the two clamps.
7. Install the combustion air inlet PVC pipe.

Notes:

- *The vent outlet adapter is used for strain relief against the weight of the venting. The clamp should be tightened after the internal connection is made.*
- *If required, transition to larger venting within 2ft of the cabinet. CPL01544 – 2-inch X 3-inch offset coupling may be used and is factory supplied with 120 MBTUH furnaces. Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.*

Important: *Trim the pressure switch tubing to length to ensure there is no sag or trap created.*

Figure 164. Install the combustion air inlet PVC pipe



Downflow Furnace - Left Side Vented Combustion Air

Changes need to be made to the inducer orientation when installing the downflow furnace with the combustion air vented through the side. Additional changes are needed for hose routing and PS2 rotation.

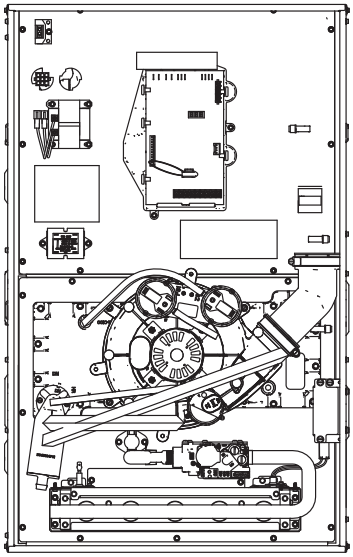
The figure below shows the furnace as it is sent from the factory.

Use the following steps to modify the furnace for downflow with side venting of combustion air.

Important:

- *Right side vent outlet is not allowed because condensate will not drain.*
- *PS2 conversion does not apply to the S9X1 or S9B1 models.*

Figure 165. Downflow - left side vented combustion air



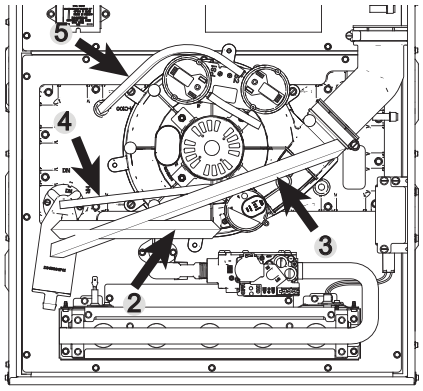
Before proceeding, lay unit on its back to make conversion easier.

1. Disconnect all drain tubes from condensate trap.

   Notes:

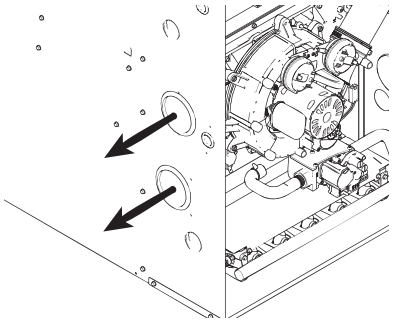
   - *When removing condensate hoses from the condensate trap, hold the trap with your hand to prevent the trap from breaking.*
   - *If preferred, the trap may be removed before the hoses.*
2. Remove drain tubing from bottom of inducer housing.
3. Remove rain gutter tubing from inducer outlet.
4. Remove tubing from condensate pressure switch.
5. Remove tubing from PS2 to cold header.

Figure 166. Removing tubing



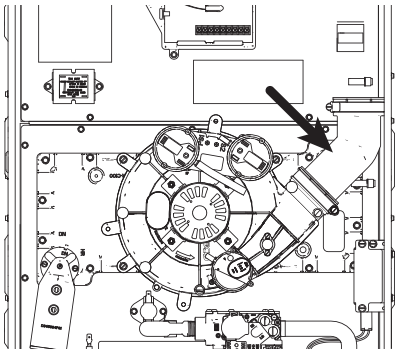
6. Remove two 3-inch plugs on left side of cabinet. To be used for combustion air exhaust and inlet.
7. Reuse the two 3-inch plugs to seal the two 3-inch default openings on the top of the cabinet.

Figure 167. Sealing default openings



8. Loosen hose clamp and remove 45 degree adapter. If the rubber boot pulls out of the inducer opening, remove from the adapter and reinstall onto the inducer. Remove the elbow and discard.

Figure 168. Replacing adapter and reinstalling the rubber boot



9. Remove the three inducer mounting screws.
10. Rotate inducer counterclockwise so that the inducer outlet aligns with the exhaust vent outlet.
11. Reinsert and tighten screws to 30 in.-lbs. Do not overtighten.

Figure 169. Reattach the inducer

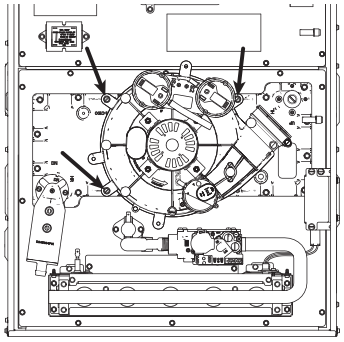
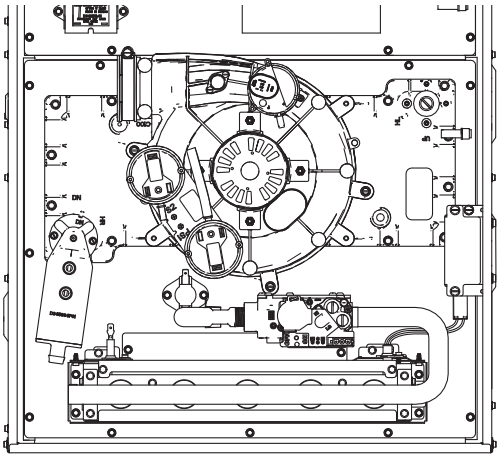


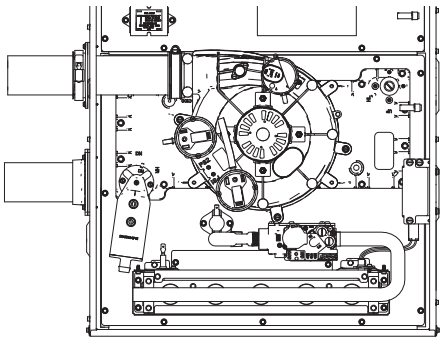
Figure 170. Reattach the inducer



12. Remove the pressure switch bracket assembly.
13. Remove the screw that holds PS2, rotate 90 degrees counterclockwise, and reattach.
14. Reattach the pressure switch bracket assembly.

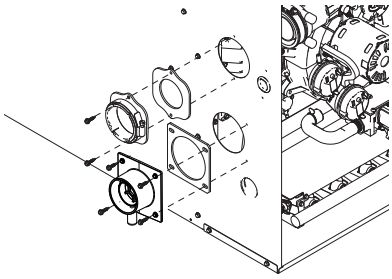
Note: *The illustration below shows PS2 in its final position after being rotated.*

Figure 171. Reattach the pressure switch bracket assembly



15. Attach the vent outlet gasket to the vent outlet.
16. Install vent outlet to cabinet using 2 screws supplied in the doc pack.
17. Install vent inlet gasket and vent inlet using 4 screws supplied in the doc pack.
18. Install the grommet for the condensate drain tube. The drain may be located on either side of the cabinet.

Figure 172. Install the vent inlet/outlet

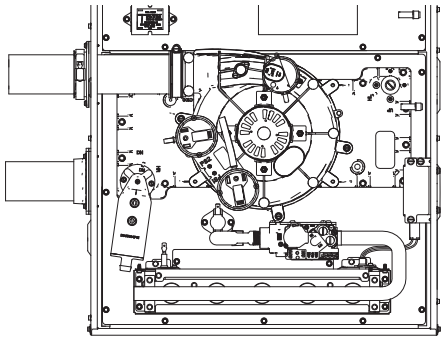


19. Slide PVC through vent outlet adaptor and insert into inducer outlet.
20. Twist to insure PVC is fully inserted.
21. Tighten the two clamps.
22. Install the combustion air inlet PVC pipe.

Notes:

- *The vent outlet adapter is used for strain relief against the weight of the venting. The clamp should be tightened after the internal connection is made.*
- *f required, transition to larger venting within 2ft of the cabinet. An 2-inch X 3-inch offset coupling is required if the transition is made in a horizontal plane. Use coupling CPL01544 (Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.) See Horizontal Venting section for proper orientation of 2-inch X 3-inch offset coupling.*

Figure 173. Install the combustion air inlet PVC pipe



23. Connect PS2 tubing to switch and original sensing location.

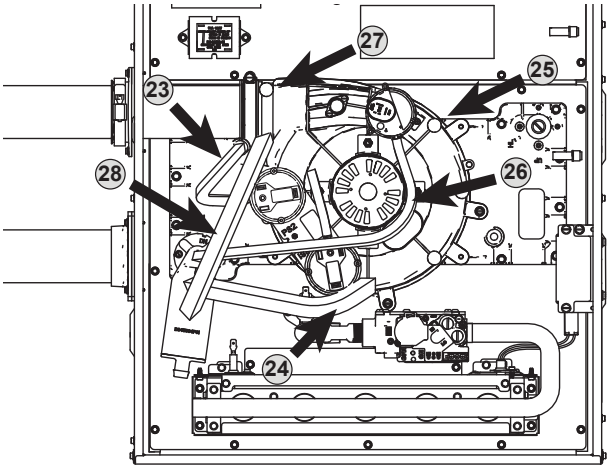
Important: *Trim the PS2 pressure switch tubing to length to ensure there is no sag or trap created.*

24. Remove port cap at bottom of inducer and connect inducer condensate tubing. Connect other end of inducer condensate tubing to top port on the condensate trap. Cut tubing to length, if necessary.
25. Install previously removed port cap onto bottom port of the inducer.
26. Connect condensate pressure switch tubing to pressure port on the condensate trap.

Important: *Trim the condensate pressure switch tubing to length to ensure there is no sag or trap created.*

27. Remove port plug from rain gutter and install in new position on opposite side of the rain gutter.
28. Connect rain gutter condensate hose to the rain gutter and the lower port of the condensate trap. Cut to length, as required.

Figure 174. Condensate tubing



Integrated Furnace Control Menu

Figure 175. Control system menu single stage OD — S9X1/S9B1

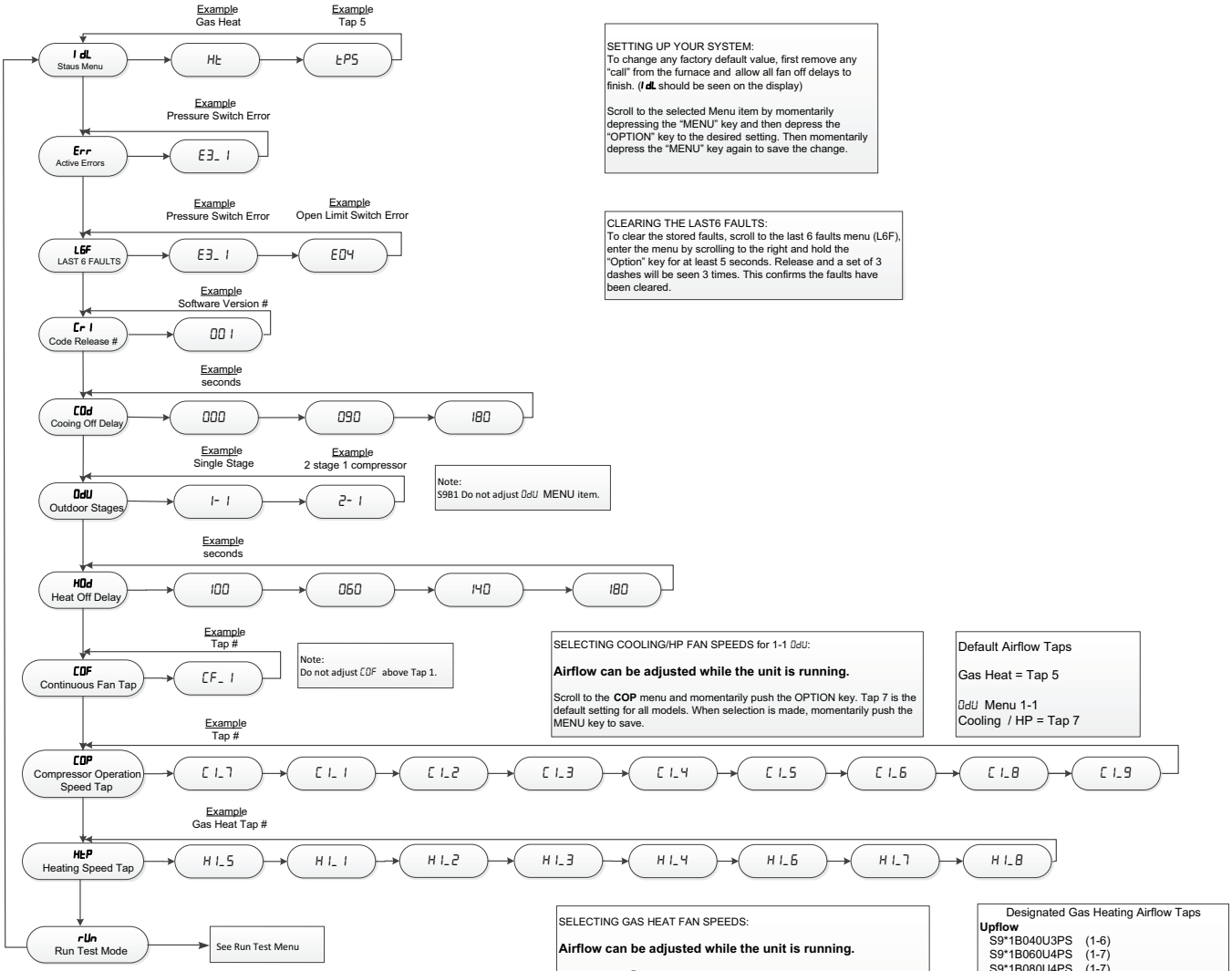


Figure 176. Control system menu two stage OD — S9X1

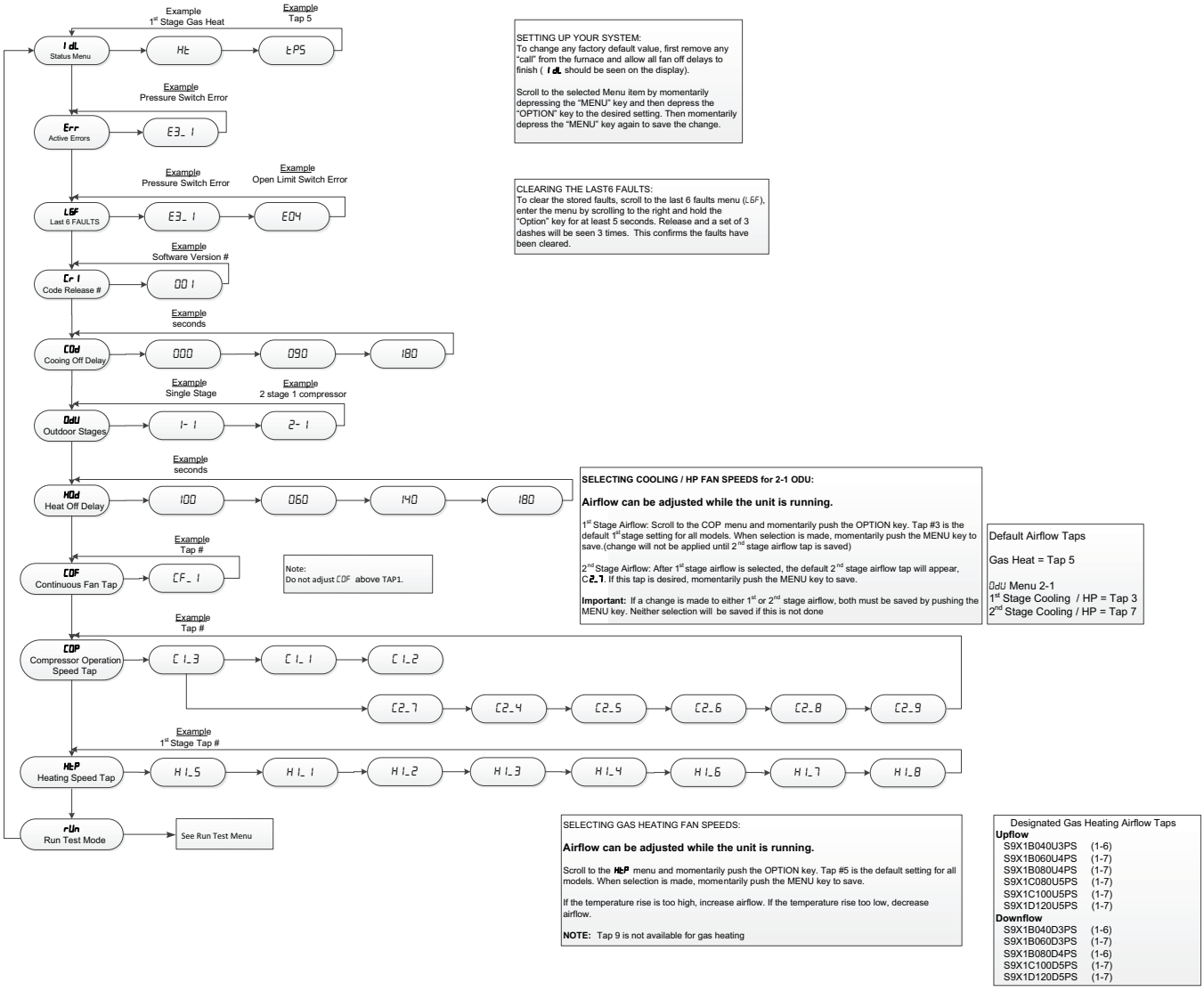


Figure 177. Control system single stage OD — S9X2

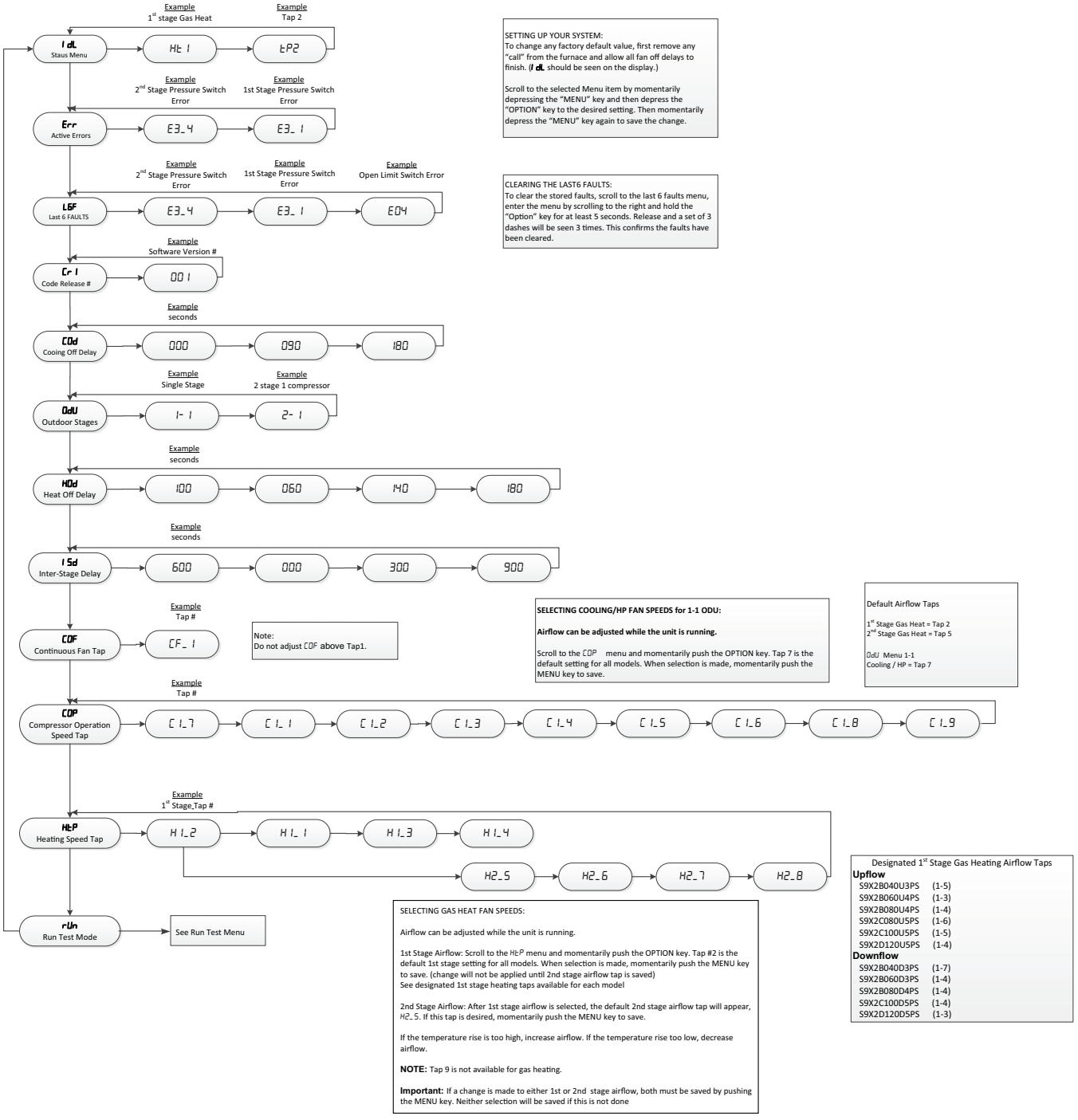


Figure 178. Control system menu two stage OD — S9X2

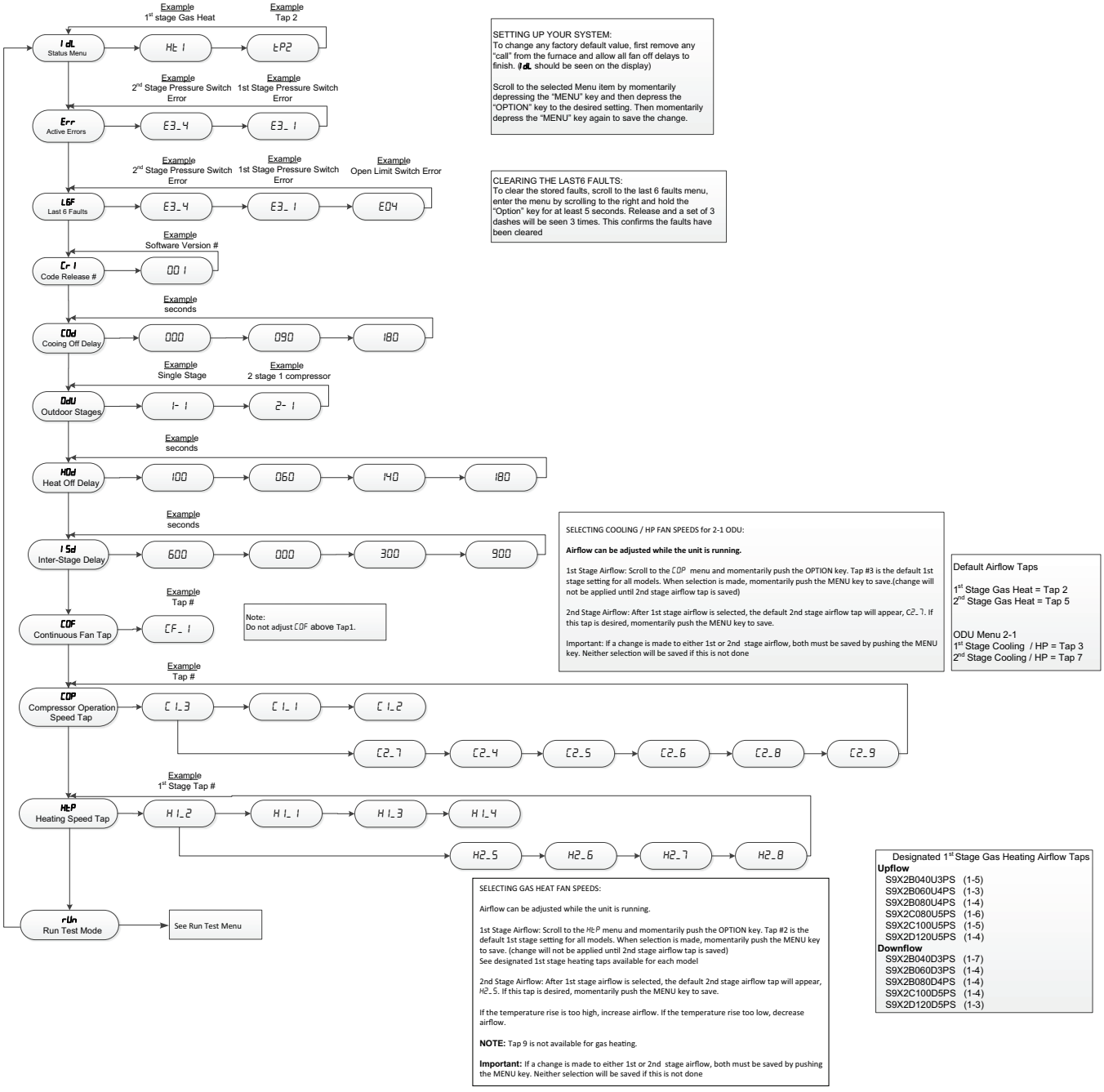


Figure 179. Run test mode and system status menu

S9X1 – S9X2 – S9B1

Run Test Mode

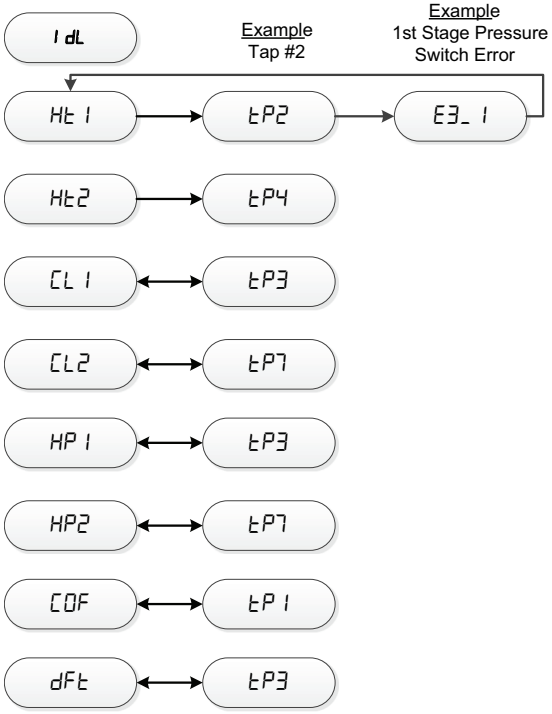
Run Test Mode:
To enter Run Test Mode, scroll to rUn using the Menu key, then push the option key. The LED will flash rUn three times, then begin the test.
To exit the test mode, momentarily push the Menu key, cycle power to the furnace, or make a valid thermostat call for capacity or fan.

Sequence of Run Test Mode
rU1 -Turns the inducer on in 1st stage for 30 seconds
rU2 – Turns on the inducer on 2nd stage for 30 seconds (N/A for S9B1/S9X1)
rU3 – Turns the igniter on for 10 seconds
rU4 – Turns the circulating blower on 1st stage compressor speed for 10 seconds
rU5 – Turns the circulating blower on 2nd stage compressor speed for 10 seconds (N/A for S9B1)
rU6 – Turns the circulating blower on 1st stage gas heat speed for 10 seconds
rU7 – Turns on the circulating blower on 2nd stage gas heat speed for 10 seconds (N/A for S9B1, S9X1)
The above sequence will repeat two more times unless the Run Test Mode is exited, see above

Important: The Run Test Mode does not test fire the furnace or bring the outdoor unit on. It is designed to allow the technician to observe each mode to ensure the IFC, inducer, and circulating blower are performing as intended.

S9X1 – S9X2 – S9B1

System Status Menu



IdL = Idle, no demand for cooling, heating, or fan
Ht1 = Demand for 1st stage gas heat (Ht = S9X1 & S9B1)
Ht2 = Demand for 2nd gas heat
CL1 = Demand for 1st stage cooling (CP1 = S9X1 & S9B1)
CL2 = Demand for 2nd stage cooling (CP2 = S9X1)
HP1 = Demand for 1st stage heat pump (CP1 = S9X1 & S9B1)
HP2 = Demand for 2nd stage heat pump (CP2 = S9X1)
COF = Demand for continuous fan
dFt = Demand for outdoor unit defrost, furnace running in gas heat mode
tP1-9 = Tap selected for airflow

NOTE:
(1) The menu status displayed is solely dependent on the input of 24VAC that is applied to the low voltage terminal strip.
(2) The status will alternate between the system mode and the airflow request every 2 seconds.
(3) If an error occurs, an E*.* will alternately flash with the system mode and airflow request. See first example.

Setting Airflow

With all ductwork connected and a clean filter in place, measure the External Static Pressure (ESP) of the unit in locations below. Use the appropriate airflow table in the Airflow Tables section for the furnace and outdoor unit installed.

Measurements must be made prior to the evaporator coil, if equipped, and after the filter.

Notes:

- *See Airflow Tables section in this document.*
- *Check out fieldtechhelp.com to watch a short video.*

Figure 180. Setting airflow on the 9–tap motor

Figure 181. Setting airflow

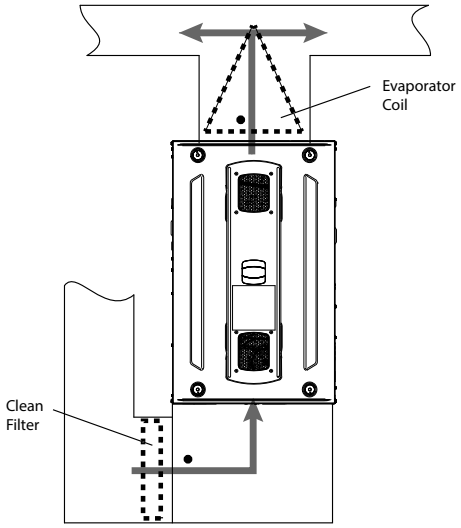


Table 41. Setting airflow table

S9X1/S9B1/S9X2 B080U4 Furnace Airflow (CFM) at. External Static Pressure (in. W.C.) versus Tap							
			Static				
			0.1	0.3	0.5	0.7	0.9
Tap	Torque (%)						
1	20	SCFM / Watts	911 / 94	766 / 104	622 / 115	477 / 125	332 / 136
2	31	SCFM / Watts	1075 / 139	963 / 153	851 / 168	740 / 182	628 / 197
3	40	SCFM / Watts	1215 / 185	1121 / 202	1028 / 219	934 / 236	840 / 253
4	43	SCFM / Watts	1250 / 203	1164 / 221	1077 [a] / 239	990 / 257	903 / 274
5	51	SCFM / Watts	1349 / 251	1272 / 271	1194 / 291	1116 [b] / 310	1039 / 330
6	61	SCFM / Watts	1453 / 313	1387 / 335	1321 / 356	1254 / 378	1188 / 400
7	64	SCFM / Watts	1505 / 340	1438 / 362	1372 / 384	1305 / 406	1239 / 427
8	78	SCFM / Watts	1657 / 453	1597 / 477	1538 / 500	1479 / 524	1419 [a] / 547
9	100	SCFM / Watts	1878 / 669	1815 / 686	1752 / 702	1690 / 718	1627 / 735

This is an example Airflow Table only. See "Airflow Tables," p. 29 for complete airflow data.

[a] Example 2
[b] Example 1

Example 1: S9X2B080U4PS (Default Tap 7)

Cooling / HP

- 3 Ton Single Stage Outdoor
- Total ESP = 0.7" W.C.
- Required Airflow = 1050 cfm (3T x 350 cfm/ton)
- New Tap Number = Tap 5 (Re-check static pressure and adjust airflow as necessary)

Example 2: S9X2B080U4PS (Default Tap 3 & 7)

- 4 Ton Two Stage Outdoor
- Total 2nd Stage ESP = 0.9" W.C.
- Total 1st Stage ESP = 0.6" W.C.
- Required 2nd Stage Airflow = 1400 cfm (4T x 350 cfm/ton)
- Required 1st Stage Airflow = 1050 cfm (2nd stage airflow x .75)
- New 2nd Stage Tap Number = Tap 8 (Re-check static pressure and adjust as necessary)

- New 1st Stage Tap Number = Tap 4 (Re-check static pressure and adjust as necessary)

Integrated Furnace Control Display Codes

Table 42. Menu options

Menu Options	
IdL	Idle
Err	Active Alarm Errors
L6F	Last 6 Faults (To clear — Hold Option button down for 5 seconds after entering the L6F menu)
Cr	Code Release Number
COd	Cooling Off Delay (Seconds)
OdU	Outdoor Unit Type
COF	Blower Constant Fan Airflow
HOd	Heat Off Delay (Seconds)
ISd	Inter-Stage Delay (Seconds)
9HC	Gas Heating CFM (1st and 2nd stage airflow are selectable)
rUn	Test Mode

Table 43. Error codes

Alarm Error Code	Alarm Explanation
E01	Loss of the IRQ or other internal failures (Internal IFC error)
E2_1	Retry Exceeded (Flame never sensed, one hour lockout after 3 times)
E2_2	Recycles Exceeded (Flame sensed then lost, one hour lockout after 10 times)
E2_3	1st Stage Gas Valve Not Energized When It Should Be exceeded after 10 times
E3_1	Shorted Pressure Switch, 1st Stage
E3_2	Open Pressure Switch, 1st Stage
E3_3	Shorted Pressure Switch, 2nd Stage (Not applicable for S9X1/S9B1)
E3_4	Open Pressure Switch, 2nd Stage (Not applicable for S9X1/S9B1)
E04	Open Limit (Main Thermal, Rollout Switch, or Reverse Airflow Switch)
E05	Flame detected, should not be present
E6_1	Voltage reversed polarity
E6_2	Bad grounding
E6_3	(1) Igniter relay fails
	(2) Igniter open
E7_1	1st Gas valve (MVL) is energized when it should be off
E08	Flame current is low, but still strong enough to allow operation
E09	Open Inducer Limit Switch or Condensate Pressure Switch
E11	(1) 1st stage gas valve not energized when it should be
	(2) 1st stage gas valve relay stuck closed
	(3) 2nd stage gas valve relay stuck closed (Not applicable for S9X1/S9B1)
	(4) 2nd stage gas valve energized when it should not be (Not applicable for S9X1/S9B1)
	(5) 2nd stage gas valve not energized when it should be (Not applicable for S9X1/S9B1)

Table 43. Error codes (continued)

Alarm Error Code	Alarm Explanation
E 12	Open fuse
E 14 r E 18	Refer troubleshooting flow chart

Fault Code Recovery

Fault Code Recovery

1. To view the last 6 faults, press the “Menu” key until the “Last 6 Faults” (L6F) menu appears.
2. Enter the menu by pressing the “Option” key.
3. The last 6 faults can be viewed.

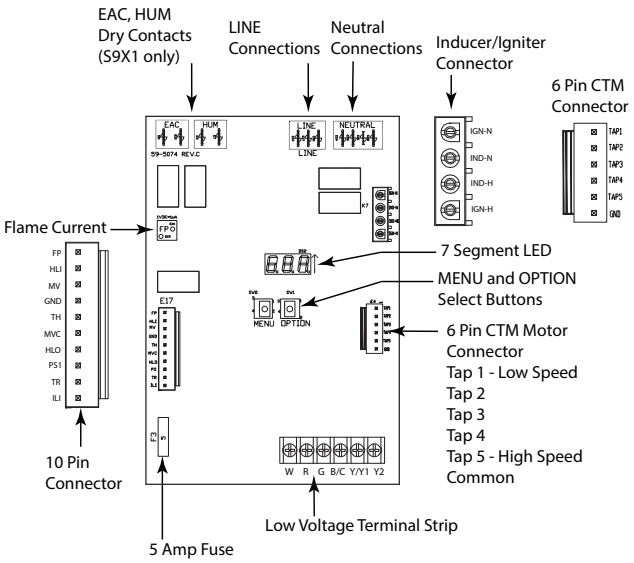
Clearing the Last 6 Faults

1. To clear the last 6 faults, press the “Menu” key until the “Last 6 Faults” (L6F) menu appears.
2. Enter the menu by pressing the “Option” key.
3. Hold the “Option” key for at least 5 seconds.
4. Release and a set of 3 dashes with be seen 3 times. This confirms the faults have been cleared.

Resetting Factory Defaults

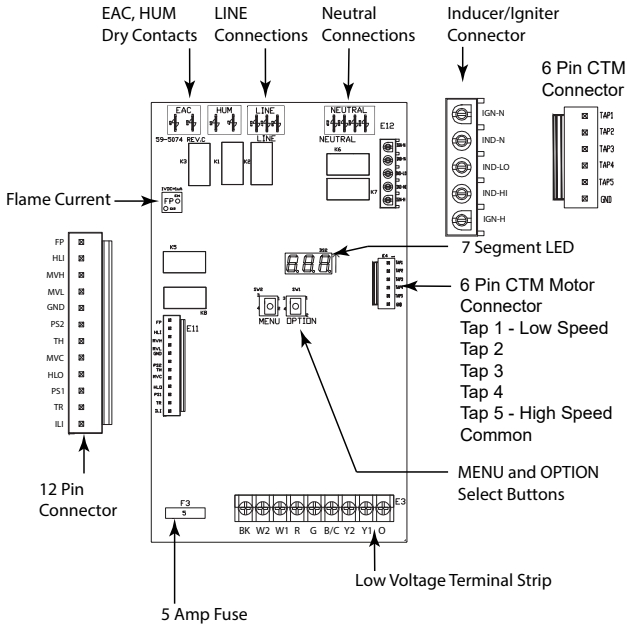
1. Display must be in Idle Mode.
2. Push the “Menu” and “Option” buttons at the same time for 15 seconds then release.
3. The 7 segment will flash “Fd” 3 times. This confirms the unit has been reset to the factory defaults.

Figure 182. S9X1 and S9B1 IFC component layout



Note: *The S9B1 does not have EAC or HUM connections.*

Figure 183. S9X2 IFC component layout



Troubleshooting

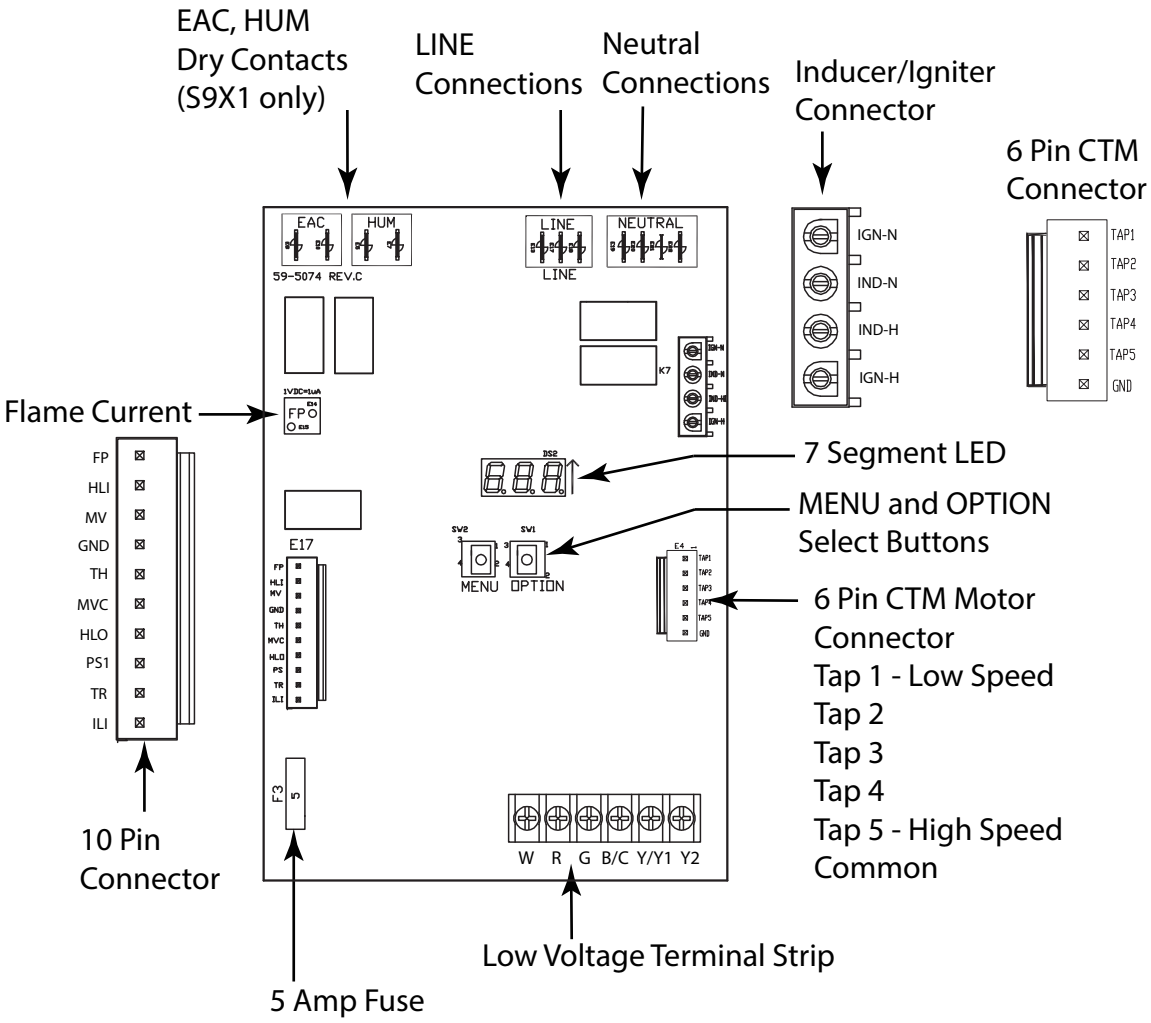
The following pages include troubleshooting flowcharts in reference to the S9X1 and S9B1 single stage furnaces and the S9X2 two stage furnace only.

The information contained is for reference only and does not cover all scenarios or problems that may be encountered.

Only qualified technicians should attempt to install, troubleshoot, or repair this appliance.

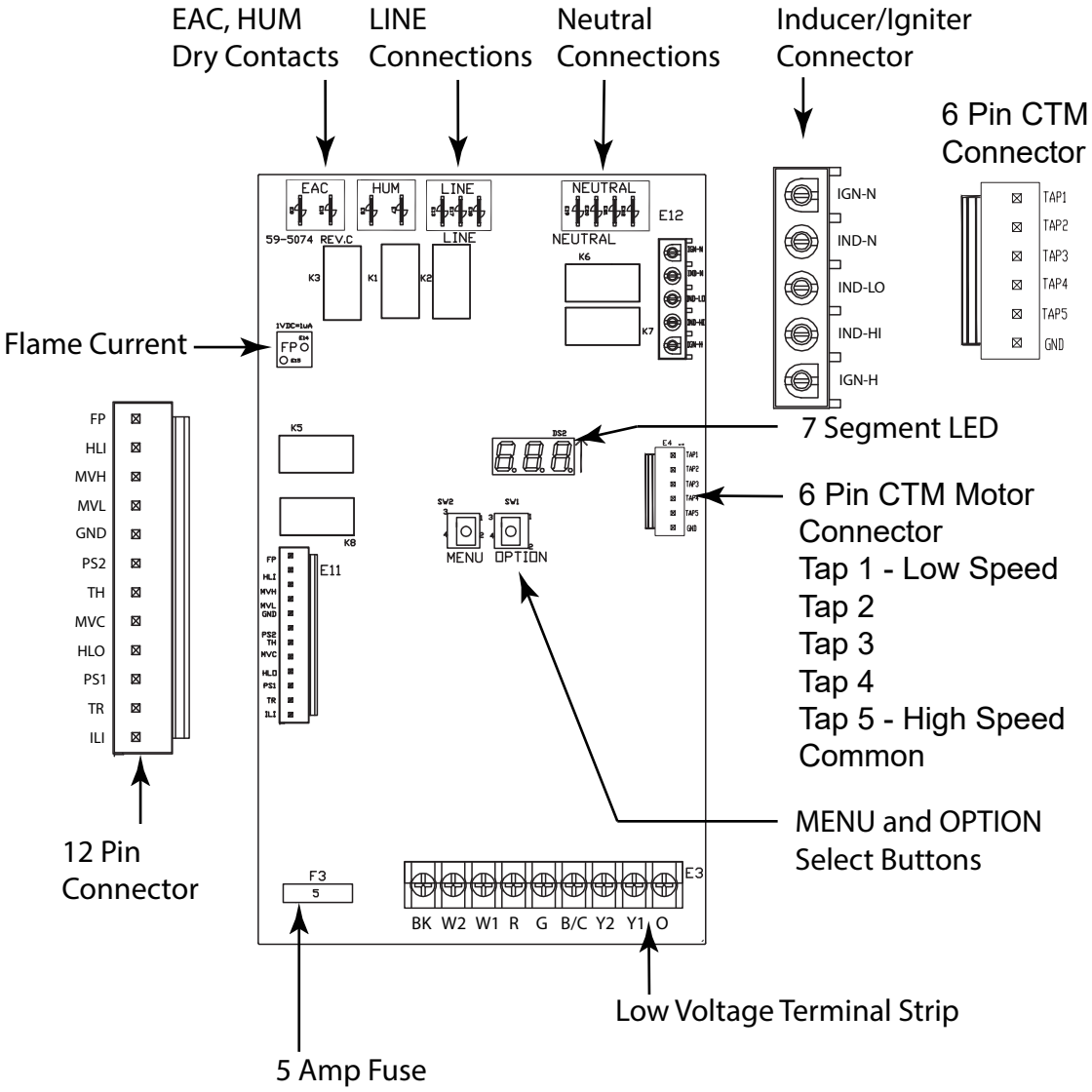
Failure to follow all cautions and/or warnings could result in personal or property damage, including death.

Figure 184. S9X1 and S9B1 IFC component layout

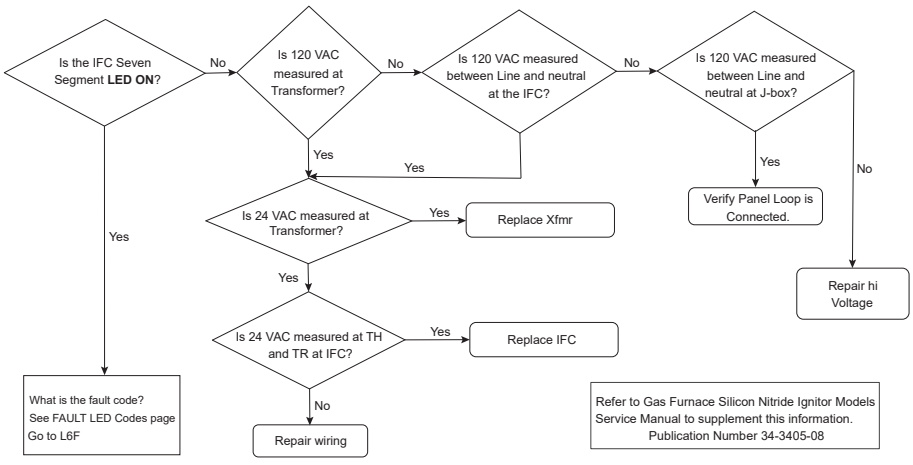


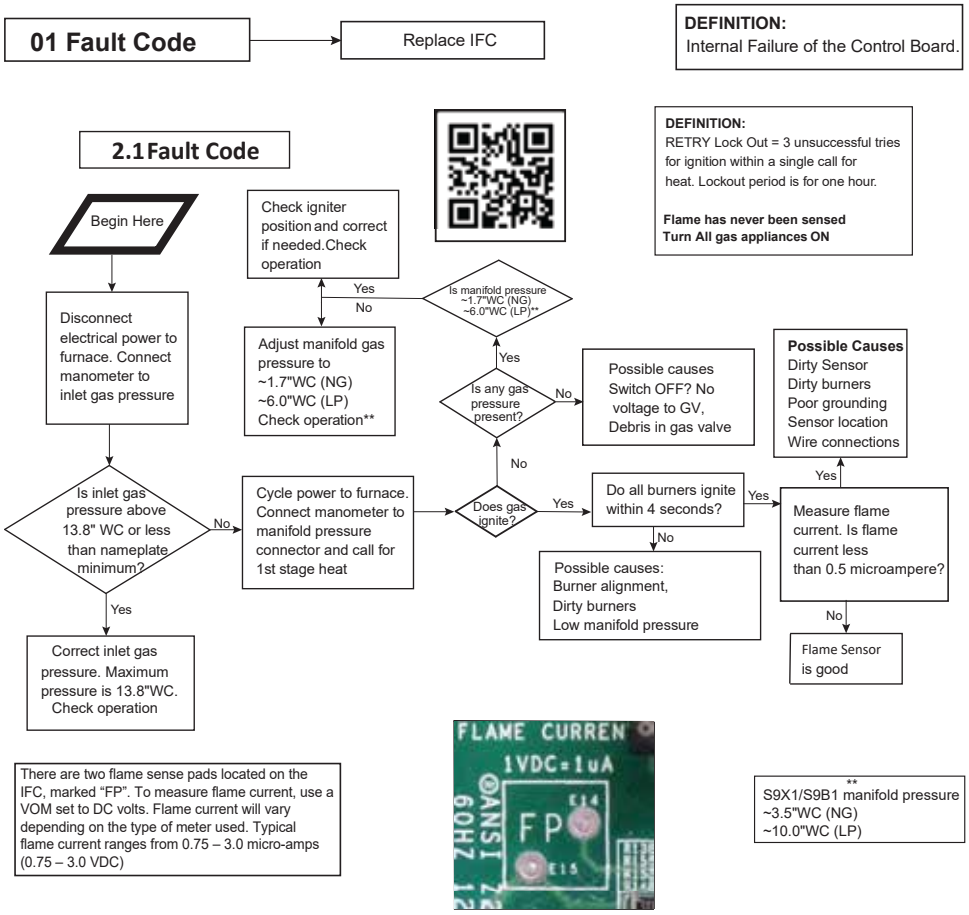
Note: *The S9B1 does not have EAC or HUM connections.*

Figure 185. S9X2 IFC component layout



GETTING STARTED

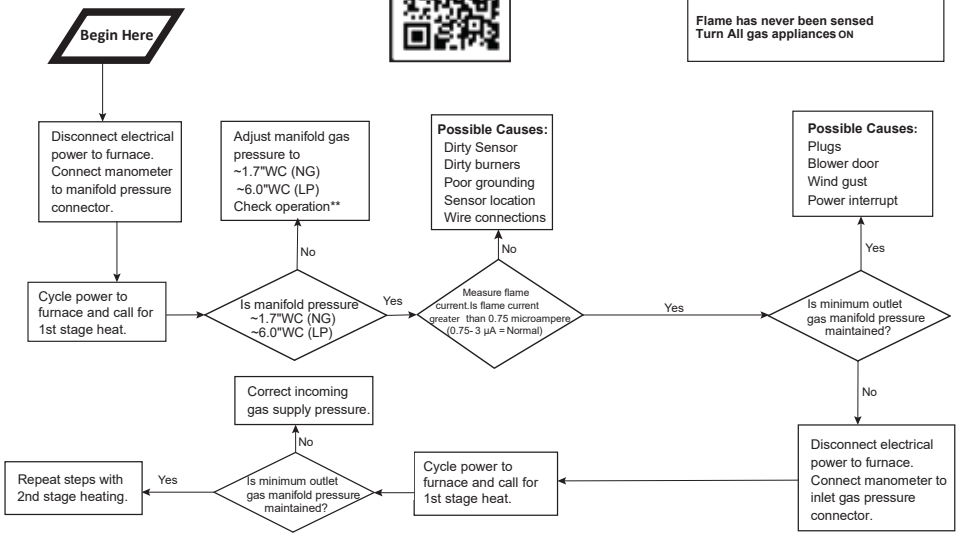



01 Fault Code
Replace IFC
DEFINITION:
Internal Failure of the Control Board.
2.1 Fault Code
DEFINITION:
RETRY Lock Out = 3 unsuccessful tries for ignition within a single call for heat. Lockout period is for one hour.
Flame has never been sensed
Turn All gas appliances ON
Begin Here
Check igniter position and correct if needed.Check operation
Yes
No
Is manifold pressure ~1.7"WC (NG) ~6.0"WC (LP)**
Disconnect electrical power to furnace. Connect manometer to inlet gas pressure
Adjust manifold gas pressure to ~1.7"WC (NG) ~6.0"WC (LP) Check operation**
Yes
Is any gas pressure present?
No
Possible causes Switch OFF? No voltage to GV, Debris in gas valve
Possible Causes
Dirty Sensor
Dirty burners
Poor grounding
Sensor location
Wire connections
Is inlet gas pressure above 13.8" WC or less than nameplate minimum?
No
Cycle power to furnace. Connect manometer to manifold pressure connector and call for 1st stage heat
No
Does gas ignite?
Yes
Do all burners ignite within 4 seconds?
Yes
Measure flame current. Is flame current less than 0.5 microampere?
Yes
No
Flame Sensor is good
Yes
Correct inlet gas pressure. Maximum pressure is 13.8"WC. Check operation
No
Possible causes:
Burner alignment,
Dirty burners
Low manifold pressure
There are two flame sense pads located on the IFC, marked “FP”. To measure flame current, use a VOM set to DC volts. Flame current will vary depending on the type of meter used. Typical flame current ranges from 0.75 – 3.0 micro-amps (0.75 – 3.0 VDC)
FLAME CURREN
1VDC=1uA
FP
E14
E15
60HZ
** S9X1/S9B1 manifold pressure ~3.5"WC (NG) ~10.0"WC (LP)

2.2 Fault Code

DEFINITION
RECYCLE Lock Out = 10 recycles within a single call for heat. Lockout period is for one hour.

Flame has never been sensed
Turn All gas appliances ON



There are two flame sense pads located on the IFC, marked "FP". To measure flame current, use a VOM set to DC volts. Flame current will vary depending on the type of meter used. Typical flame current ranges from 0.75 – 3.0 micro-amps (0.75 – 3.0 VDC).



** S9X1/S9B1 manifold pressure ~3.5"WC (NG) ~10.0"WC (LP)

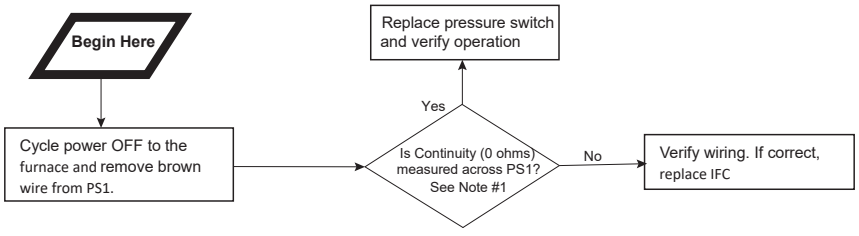
2.3 Fault Code → Replace IFC

DEFINITION:
1st Stage Gas Valve not energized when it should be 10 times within the same call for heat.
24VAC not sensed on MVL 10 TIMES

3.1 Fault Code

DEFINITION:
An error has occurred with the PS1, indicating that the pressure switch is closed when it should be open.
In most cases, thepressure switch is not the problem.
NOTE: Verify pressure switch wiring and tube routing are correct.

Note #1
OL = Open Switch
0 ohms = Closed Switch



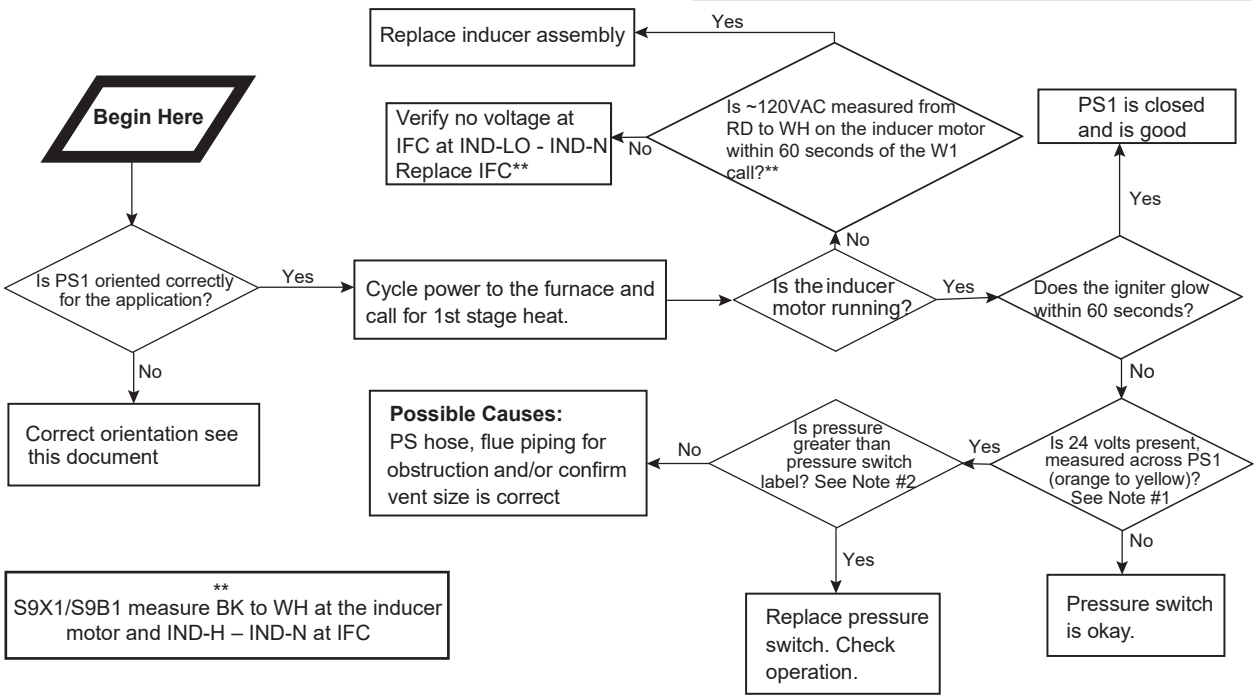
3.2 Fault Code

Note #1
24 volts = Open Switch
0 volts = Closed Switch

Note #2
Measured pressure is negative, greater than refers to magnitude only.

DEFINITION:
An error has occurred with the PS1 indicating that the pressure switch is open when it should be closed.
In most cases, thepressure switch is not the problem.
NOTE: Verify pressure switch wiring and tube routing are correct.
PS1 Open errors can occasionally happen when wind gusts occur.

S9X2 Only
The IFC will attempt to close both PS1 and PS2 and operate on 2nd stage during such an event.



** S9X1/S9B1 measure BK to WH at the inducer motor and IND-H – IND-N at IFC

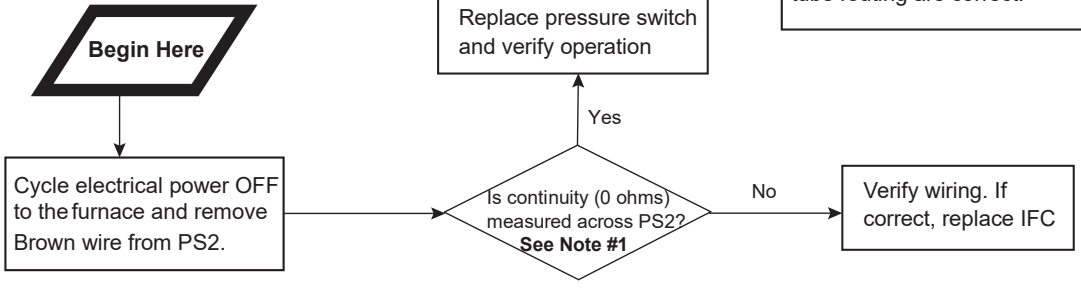
3.3 Fault Code

Note #1
OL = Open Switch
0 ohms = Closed

DEFINITION:
An error has occurred with the PS2, indicating that the pressure switch is closed when it should be open.

In most cases, the pressure switch is not the problem.

NOTE: Verify pressure switch wiring and tube routing are correct.



3.4 Fault Code

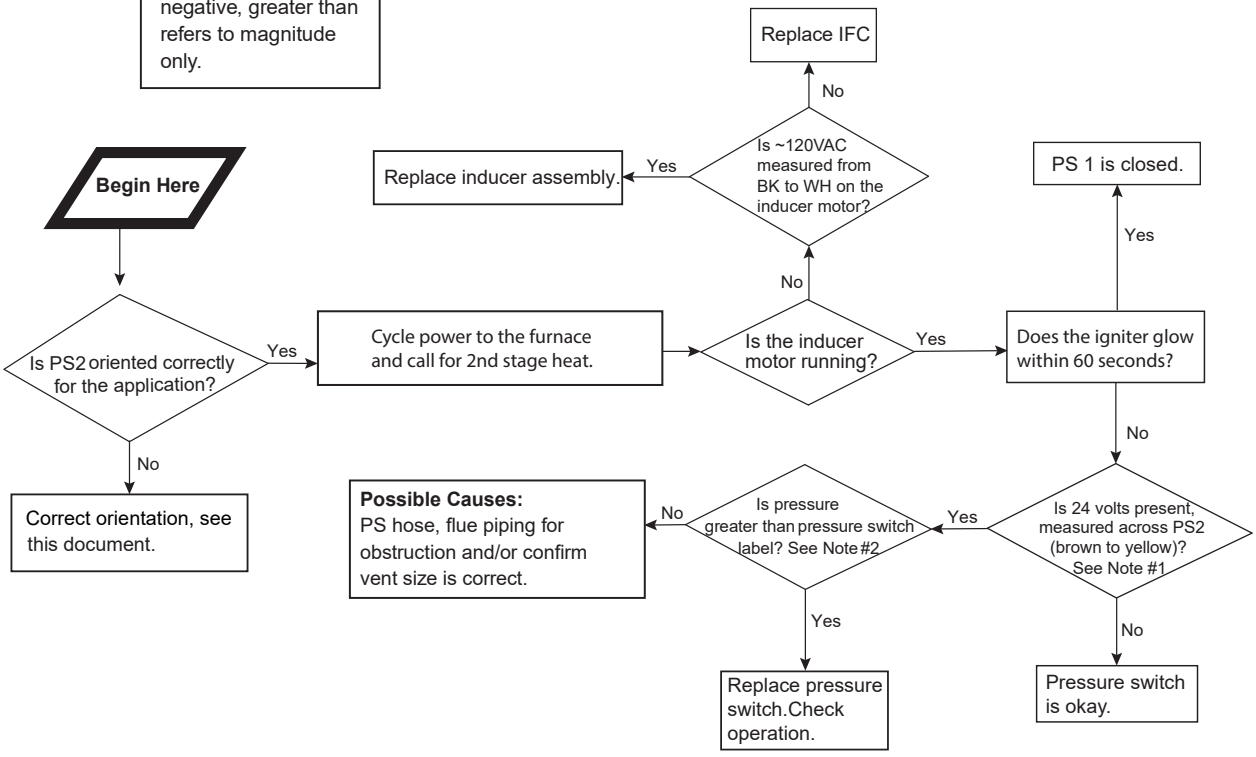
DEFINITION:
An error has occurred with the PS2 indicating that the pressure switch is open when it should be closed.

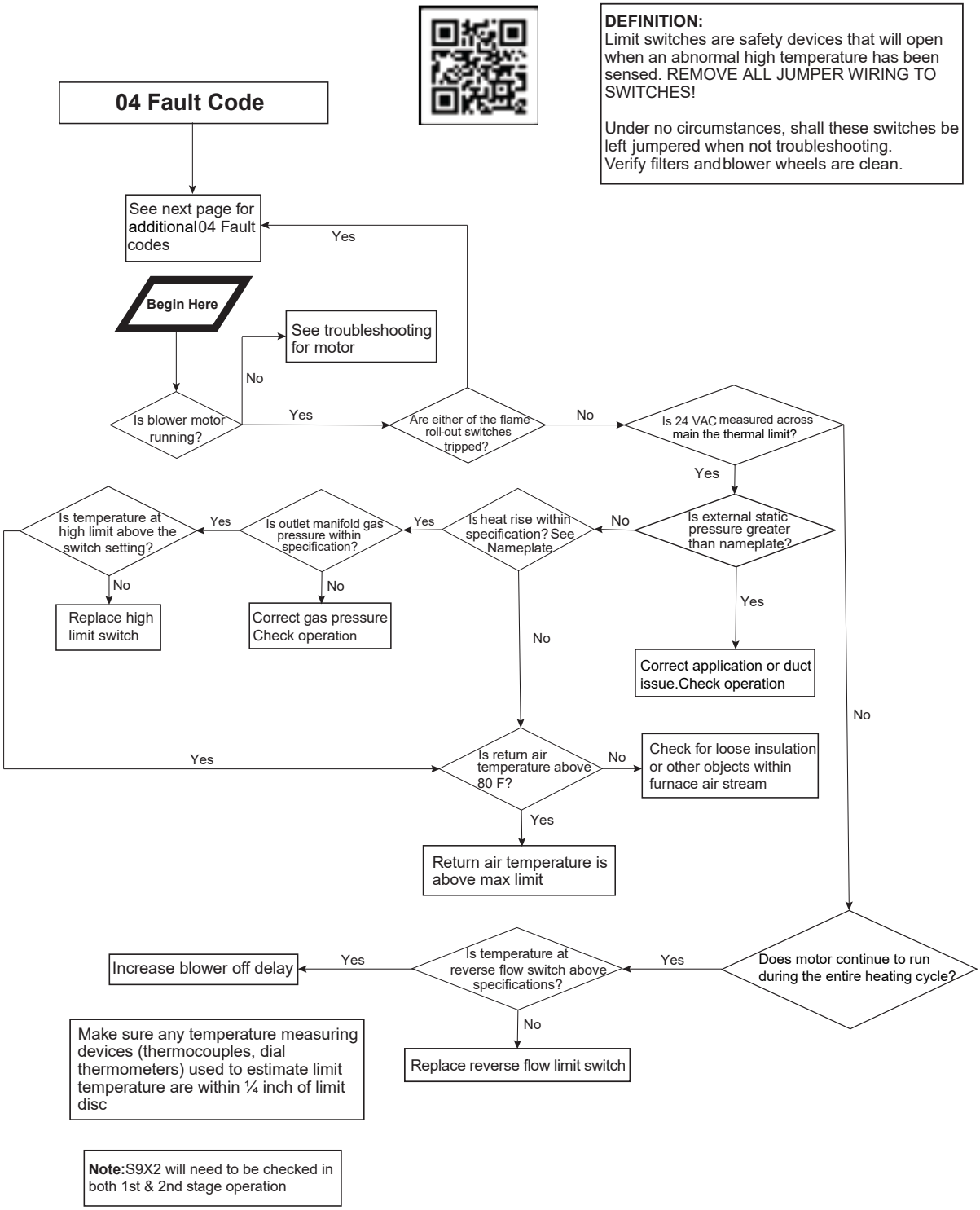
In most cases, the pressure switch is not the problem.

Note: Verify pressure switch wiring and tube routing are correct.

Note #1
24 volts = Open Switch
0 volts = Closed Switch

Note #2
Measured pressure is negative, greater than refers to magnitude only.




04 Fault Code
DEFINITION:
Limit switches are safety devices that will open when an abnormal high temperature has been sensed. REMOVE ALL JUMPER WIRING TO SWITCHES!
Under no circumstances, shall these switches be left jumpered when not troubleshooting.
Verify filters and blower wheels are clean.
See next page for additional 04 Fault codes
Yes
Begin Here
See troubleshooting for motor
No
Is blower motor running?
Yes
Are either of the flame roll-out switches tripped?
No
Is 24 VAC measured across main the thermal limit?
Yes
Is external static pressure greater than nameplate?
No
Yes
Correct application or duct issue.Check operation
Is heat rise within specification? See Nameplate
No
Yes
Is outlet manifold gas pressure within specification?
Yes
No
Correct gas pressure Check operation
Is temperature at high limit above the switch setting?
Yes
No
Replace high limit switch
No
Is return air temperature above 80 F?
No
Check for loose insulation or other objects within furnace air stream
Yes
Yes
Return air temperature is above max limit
Yes
Does motor continue to run during the entire heating cycle?
Yes
Is temperature at reverse flow switch above specifications?
Yes
Increase blower off delay
No
Replace reverse flow limit switch
Make sure any temperature measuring devices (thermocouples, dial thermometers) used to estimate limit temperature are within ¼ inch of limit disc
Note: S9X2 will need to be checked in both 1st & 2nd stage operation

04 Fault Code Flame Rollout

Begin Here

Is propane gas being used?

Yes

No

Is the burner orifice size 56? Or matched to this document for propane?

No

Install correct size orifices.Check operation.

Yes

Disconnect electrical power to furnace.

Is flue piping restricted?

Yes

Correct as needed. Check operation.

No

Check flue pipe for correct sizing and long horizontal runs or slope less than ¼" per linear foot. Correct as needed.

Remove, clean, and reassemble burners. Push RED reset on both rollout switches.

Cycle power to furnace and call for heat.

Ignition occurs Do all burners ignite within 5 seconds?

No

Check burner alignment Correct as needed. Check operation.

Yes

Yes

Are flames from burners impinging on sides of heat exchanger?

No

Are all burner flames directed into heat exchanger with a tight pattern (inadequately aired burners tend to roll back)?

No

When fan comes on, do flames stay consistent?

Yes

Replace Roll out switch. Check operation.

No

Replace heat exchanger. Check operation.

Yes

Check combustion air blower venting, heat exchanger for blockage (i.e. sooting).

DEFINITION:
Limit switches are safety devices that will open when an abnormal high temperature has been sensed.
REMOVE ALL JUMPER WIRING TO SWITCHES! Under no circumstances, shall these switches be left jumpered when not troubleshooting.

05 Fault Code

DEFINITION:
Flame is sensed when it should not be.

Begin Here

Is flame seen with no call for heat?

Yes

Disconnect power to unit Turn off gas supply! Remove gas valve

No

Is flame current measured across FS pads?

No

Replace IFC

Yes

Possible Causes:
Flame sense wire shorted to ground.
Flame sensor is grounded.

Are there signs of moisture or debris in the inlet gas screen?

Yes

Inspect gas supply for leaks and have gas supplier check gas quality.

No

Using a backup wrench, install new gas valve. Check operation.

Yes

Is there a drip leg installed on inlet gas piping per installation instructions?

No

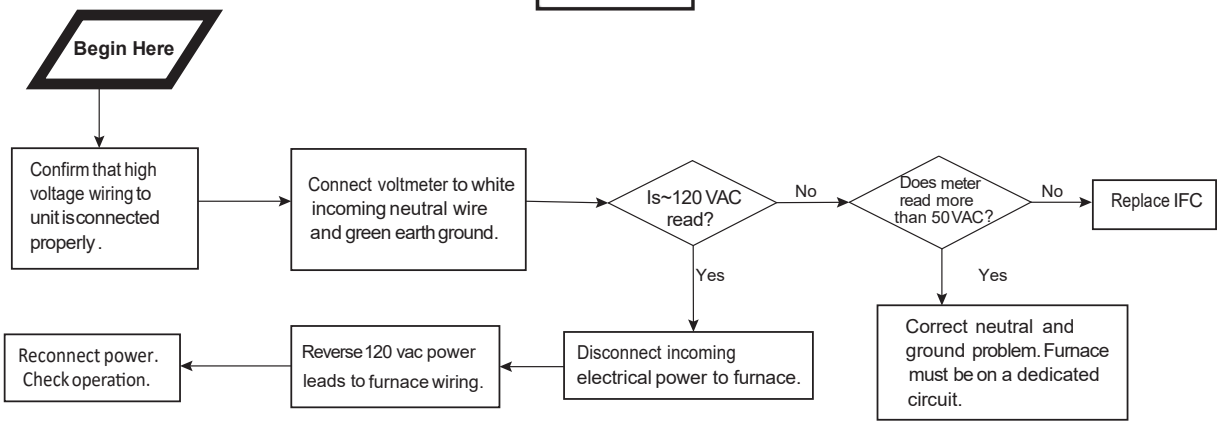
Install drip leg per National Fuel Gas Code and Installation instructions.

There are two flame sense pads located on the IFC, marked "FP". To measure flame current, use a VOM set to DC volts. Flame current will vary depending on the type of meter used. Typical flame current ranges from 0.75 – 3.0 micro-amps (0.75 – 3.0 VDC).



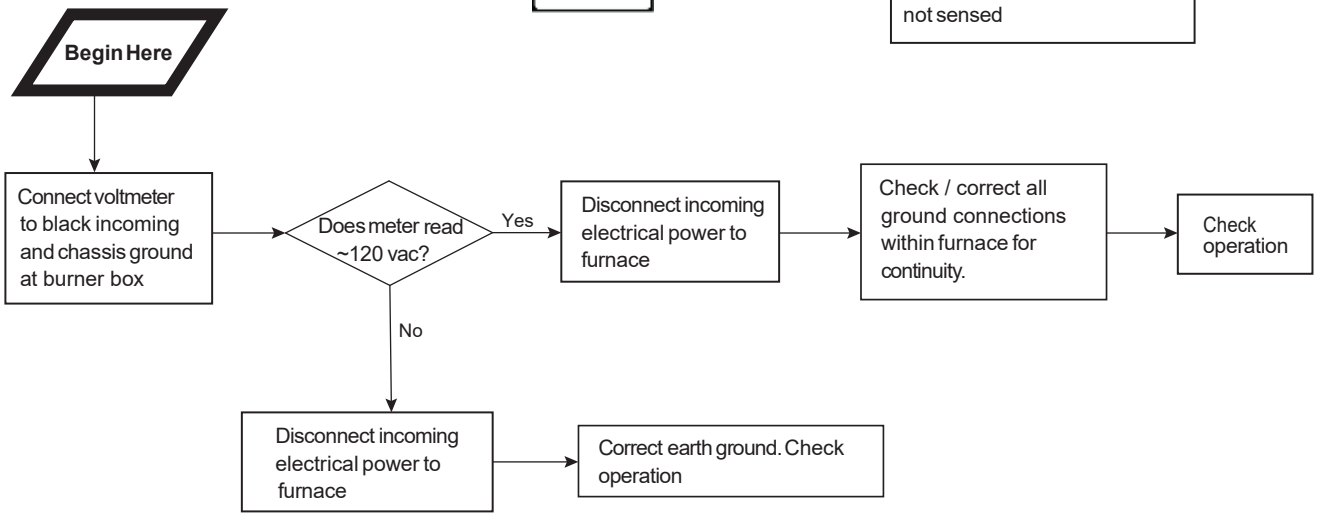
6.1 Fault Code

DEFINITION:
Polarity Fault– Incoming high voltage wiring is reversed.

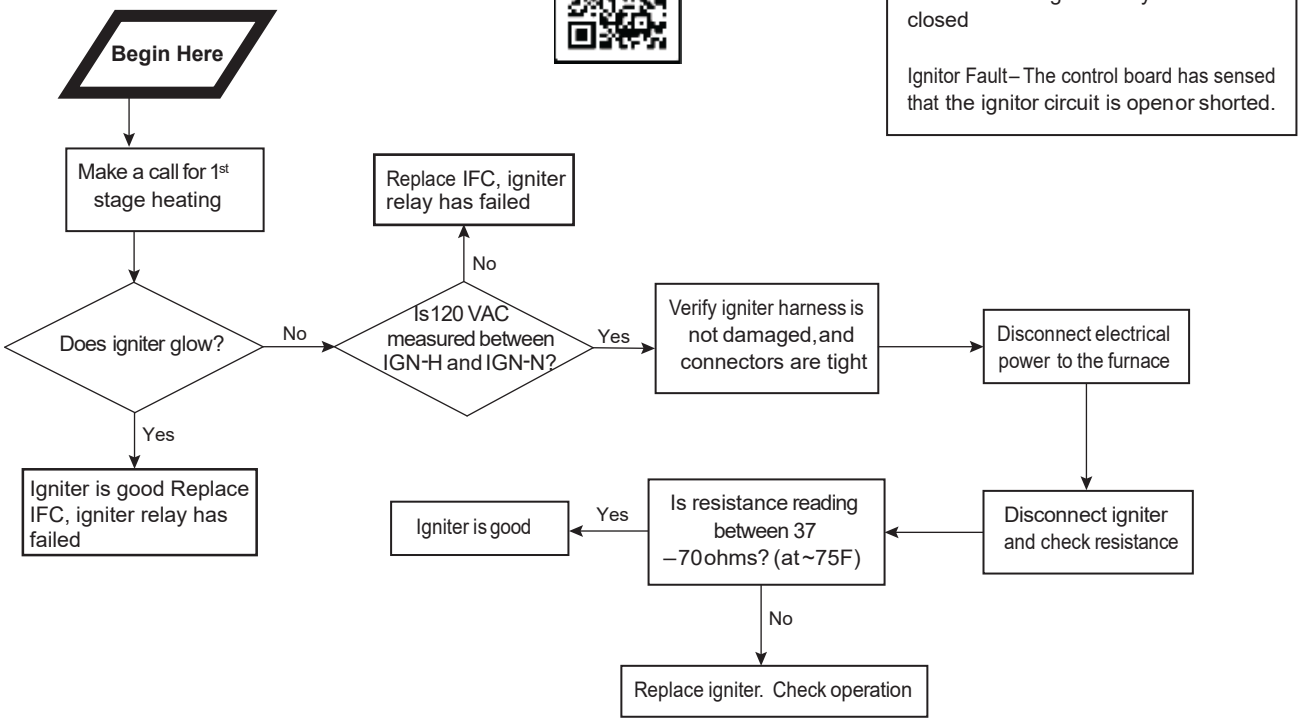


6.2 Fault Code

DEFINITION:
Ground Fault - Incoming or chassis ground connection is not sensed



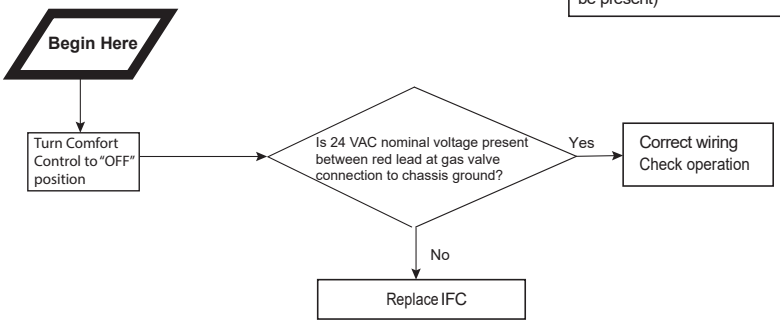
6.3 Fault Code



DEFINITION:
Igniter Relay Fault – The control board has sensed that the igniter relay has stuck closed

Ignitor Fault – The control board has sensed that the ignitor circuit is open or shorted.

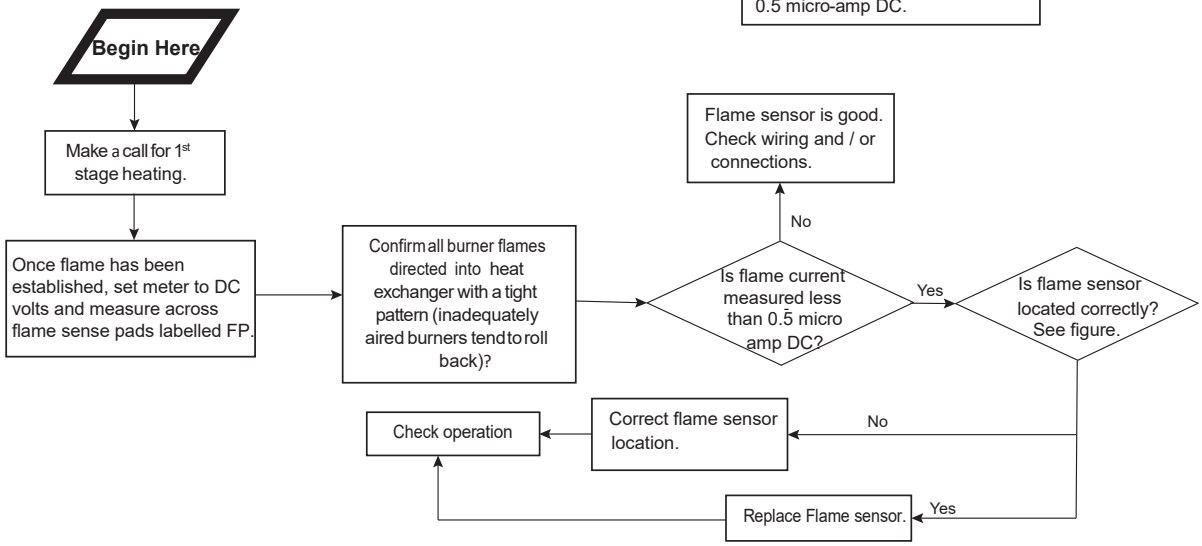
7.1 Fault Code

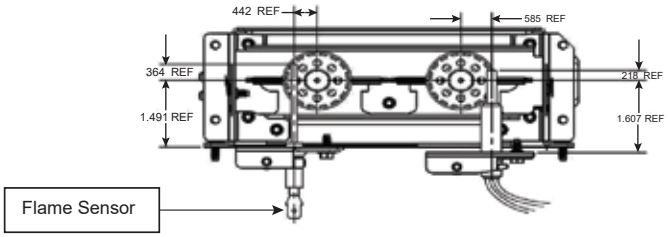


DEFINITION:
External Gas Valve Circuit Error (24 volts is present when it should not be present)

8 Fault Code

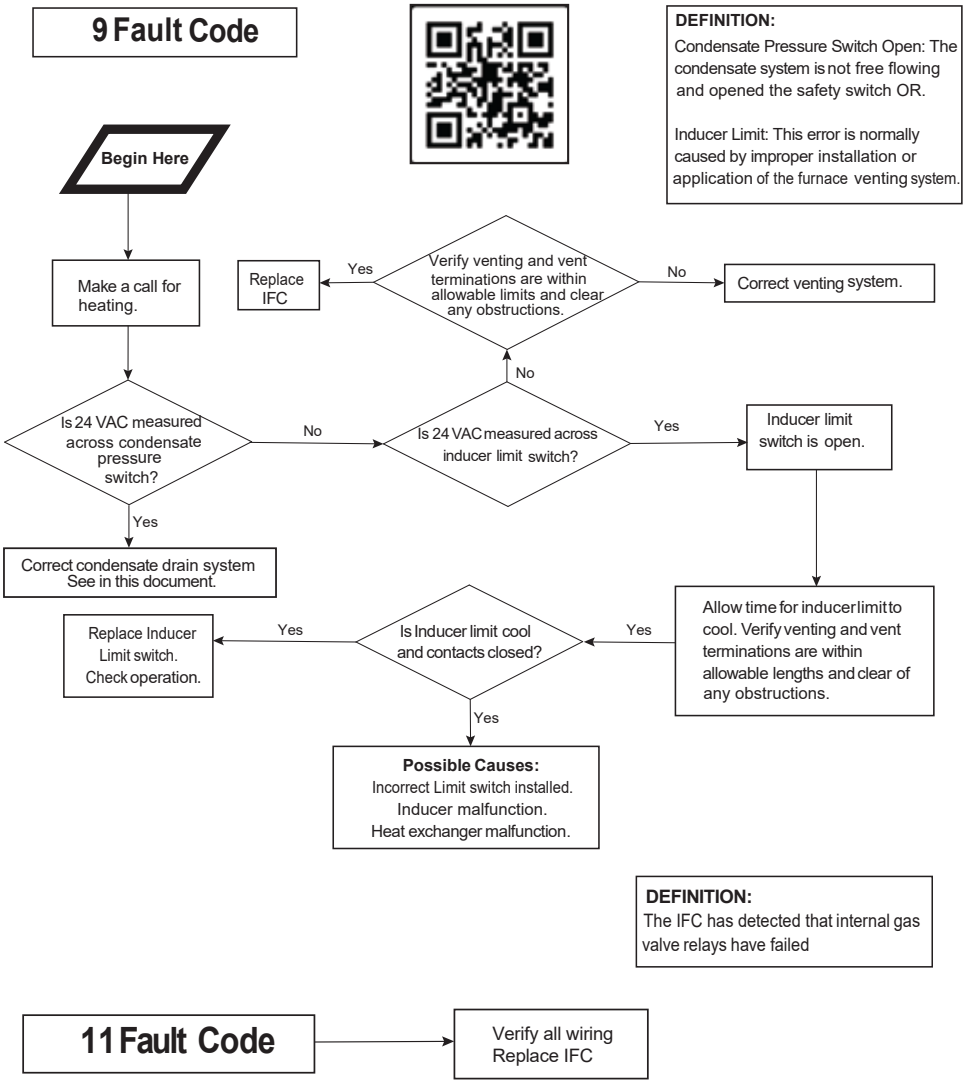
DEFINITION:
The flame sense current is less than 0.5 micro-amp DC.





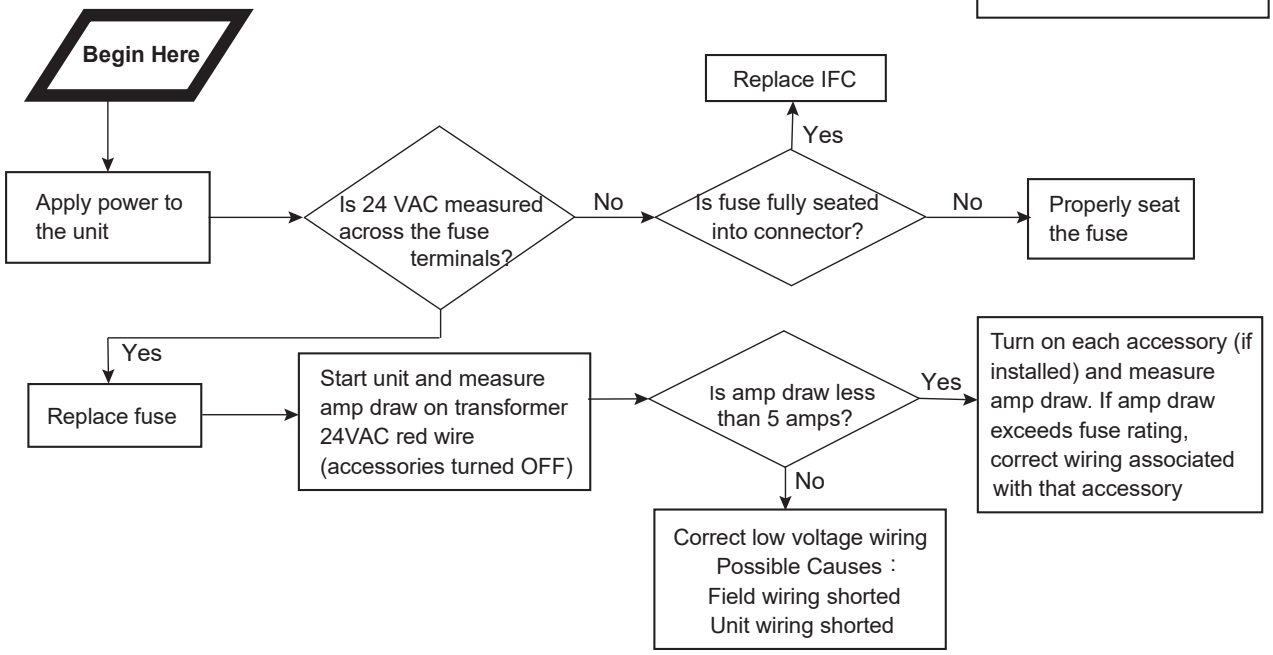
There are two flame sense pads located on the IFC, marked "FP".
To measure flame current, use a VOM set to DC volts.
Flame current will vary depending on the type of meter used.
Typical flame current ranges from 0.75 – 3.0 micro-amps (0.75 – 3.0 VDC).




9 Fault Code
DEFINITION:
Condensate Pressure Switch Open: The condensate system is not free flowing and opened the safety switch OR.
Inducer Limit: This error is normally caused by improper installation or application of the furnace venting system.
Begin Here
Make a call for heating.
Is 24 VAC measured across condensate pressure switch?
Yes
Correct condensate drain system See in this document.
No
Is 24 VAC measured across inducer limit switch?
Yes
Inducer limit switch is open.
No
Verify venting and vent terminations are within allowable limits and clear any obstructions.
Yes
Replace IFC
No
Correct venting system.
Allow time for inducer limit to cool. Verify venting and vent terminations are within allowable lengths and clear of any obstructions.
Yes
Is Inducer limit cool and contacts closed?
Yes
Replace Inducer Limit switch. Check operation.
Yes
Possible Causes:
Incorrect Limit switch installed.
Inducer malfunction.
Heat exchanger malfunction.
DEFINITION:
The IFC has detected that internal gas valve relays have failed
11 Fault Code
Verify all wiring
Replace IFC

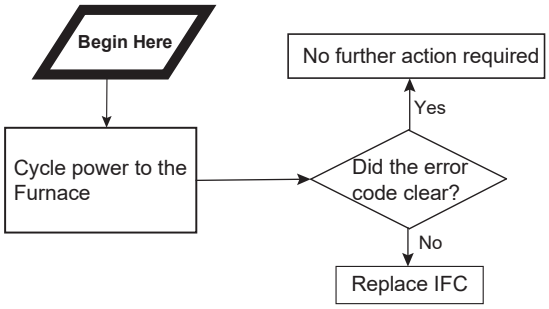
12 Fault Code

DEFINITION:
The onboard 5 amp fuse is open or missing.



E14/E18 Fault Code

DEFINITION:
These errors has been reported in association with the S9X2 model furnaces on initial start-up.
They are not valid errors but can typically be corrected by following the flow chart.



Constant Torque Motor Troubleshooting

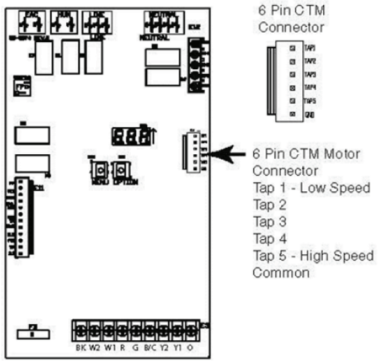
Continuous FAN on this unit is limited to TAP 1 only. No field adjustment can be made. If troubleshooting other speed taps, use the method as outlined below using the voltages listed for the tap number being used.

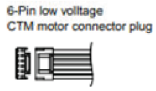
Begin Here

Ensure power is applied to the unit and Seven Segment LED's are ON with no active error codes → Turn fan to ON at thermostat and verify that COF and TP1 alternately appear on the seven segment display

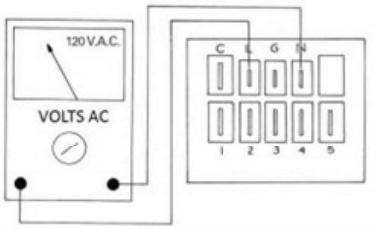
Motor and IFC are good → Yes → Does motor run? → No → Verify voltage(s) listed

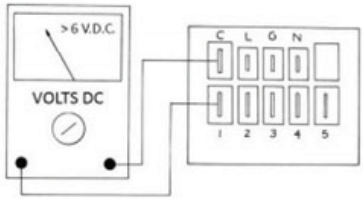
If voltage is not present, remove 6 pin connector from IFC and re-check. If voltage is present, verify voltage at panel connectors and at motor. If voltage is present at the motor, replace motor





1. Remove the 6-pin low voltage connector from the IFC
2. Apply 24 VAC to Common tap (Blue) and any speed tap on the CTM motor 6-pin plug. The motor should run.





S9X1 / S9B1 / S9X2 Output Voltage

RD/W	Tap 1
YL/W	Tap 2
BL/W	Tap 3
BK/W	Tap 4
OR/W	Tap 5
BLUE	24v C

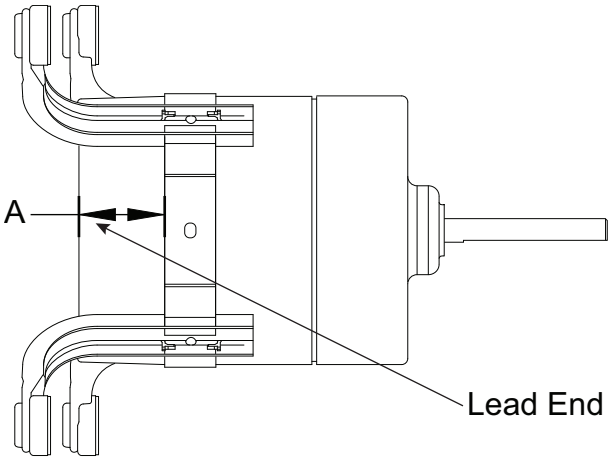
Tap 1	~ 8vdc	
Tap 2	~ 8vdc	
Tap 3	~ 18vdc	
Tap 4	~ 8vdc	
Tap 5	~ 18vdc	
Tap 6 (1+2)	~ 8vdc	~ 8vdc
Tap 7 (1+3)	~ 8vdc	~ 18vdc
Tap 8 (1+4)	~ 8vdc	~ 8vdc
Tap 9 (1+5)	~ 8vdc	~ 18vdc

All Voltages Reference Ground

Belly Band Location

Distance from belly band to the back side off motor for minimum vibration.

Figure 186. Belly band location



Blower housings and wheel removed from view for clarity.

Table 44. Belly band location

Furnace Model Number	Dimension “A” (inches)
S9B1B060U4PSAB S9X1B060U4PSBB S9X2B060U4PSBB S9B1B080U4PSAB S9X1B080U4PSBB S9X2B080U4PSBB	2.65
S9B1C080U5PSAB S9X1C080U5PSBB S9X2C080U5PSBB S9B1D120U5PSAB S9X1D120U5PSBB S9X2D120U5PSBB S9B1B080D4PSAB S9X1B080D4PSBB S9X2B080D4PSBB S9B1C100D5PSAB S9X1C100D5PSBB S9X2C100D5PSBB S9B1D120D5PSAB S9X1D120D5PSBB S9X2D120D5PSBB	3.54
S9B1C100U5PSAB S9X1C100U5PSBB S9X2C100U5PSBB	3.81
S9B1B040U3PSAB S9X1B040U3PSBB S9X2B040U3PSBB S9B1B040D3PSAB S9X1B040D3PSBB S9X2B040D3PSBB S9B1B060D3PSAB S9X1B060D3PSBB S9X2B060D3PSBB	3.91

Sequence of Operation

Note: *The seven segment LED readout is based solely on thermostat input.. During a simultaneous call for W1 and W2, the seven-segment will read HE2, although the IFC will process the call for 1st stage heat first.*

1st Stage Gas Heating

1. R – W contacts close on the thermostat sending 24Vac to the W1 low voltage terminal of the IFC. Technician should read 24Vac from W to B/C. The seven-segment LED will read:

   HE 1 = 1st Stage gas heat (S9X2)

   HE = Gas Heat (S9X1, S9B1)
2. The IFC performs a self-check routine and then confirms that the:
   a. Condensate pressure switch and Inducer limit switch are closed by sending 24Vac out the HLO terminal and monitoring the ILI input.
   b. Flame roll-out switches (FRS) 1 and 2, main thermal limit (TCO), and any reverse air flow (RAF) switches are closed by sending 24Vac out the HLO terminal and monitoring the HLI input.
   c. Pressure switch 1 (PS1) and pressure switch 2 (PS2 – S9X2 only) are open by sending 24Vac out the HLO terminal, through the limit switches, and monitoring the PS1 and PS2 inputs.

   Note: *If a thermal limit is open, 24Vac will not be present at the pressure switch.*
3. After steps a, b, and c are confirmed, the inducer relay is closed energizing the inducer motor.
4. As the inducer ramps up, PS1 will close.
5. When PS1 closes, the ignitor relay on the IFC will close. The ignitor is energized. The ignitor warm up is approximately 17 seconds.
6. After the ignitor warm up, the gas valve relay is closed on the IFC, which energizes the gas valve solenoid to allow ignition.
7. The first burner will ignite, and flame will crossover to the remaining burners, establishing current to the flame sensor. Proof of flame must be established within 4 seconds.

   Note: *There are two flame sense pads located on the IFC marked as "FP". To measure the flame current, use a VOM set to DC volts. 1Vdc = 1 micro-amp. Flame current will vary depending on the type of meter used. Typical flame current ranges from 0.75 – 3.0 micro-amps (0.75 – 3 Vdc).*
8. Once flame sense has been established, a timer on the IFC starts, and the indoor blower will energize at 1st stage speed after the blower "Heat On Delay" has completed.. The seven-segment LED for example will alternately read:

   HE = Gas heating = S9X1 / S9B1

   HE 1 = Gas heating, Stage 1 = S9X2

   tP2 = Speed Tap 2
9. When the temperature raises enough to satisfy the thermostat setting, contacts R-W will open.
10. The gas valve relay will open, closing the gas valve. The inducer will continue to run for approximately 5 seconds to remove any combustion by-products from inside the furnace.
11. The indoor blower continues to run to remove heat from the heat exchangers. The blower off time is field adjustable through the IFC menu setup option. The seven segment LED will read I dL = Idle, no thermostat demand.

2nd Stage Gas Heating (S9X2 Only)

1. See sequence of operation for 1st stage gas heating operation above (Step 1. to Step 8.) .

Note: *2nd stage heating cannot operate without 1st stage operating.*

2. R-W2 contacts close on the thermostat sending 24Vac to the W2 low voltage terminal of the IFC. Technician should read 24Vac from W2 to B/C. The seven-segment LED will read HE2
3. The IFC checks to ensure that PS2 is open, and then energizes the 2nd stage inducer relay. The inducer is energized on high speed, and the second stage gas valve relay on the IFC closes, energizing second stage gas valve. The indoor blower motor will ramp up to the 2nd stage gas heating speed. The seven-segment LED for example will alternately read:

HE2 = Gas heating, Stage 2

tP5 = Tap 5

4. The IFC monitors PS2 for closure and if PS2 does not close within 45 seconds, a PS2 open error will be declared and the furnace will operate in 1st stage. If PS2 closes, 2nd stage gas heating will continue until the thermostat R-W2 contacts open.

Note: *If PS2 does not close within the 45 second time, the IFC will wait 10 minutes and repeat steps 3 and 4. If on the third attempt during the same heating call, PS2 does not close within the 45 second proving time, the unit will run in 1st stage until the thermostat contacts R-W2 open.*

5. When the temperature raises enough to satisfy the thermostat setting, contacts R-W2 will open, the 2nd stage gas valve will close, the indoor blower motor will ramp down to 1st stage, and the unit will continue to run until R-W1 contacts open.
6. When the temperature raises enough to satisfy the thermostat setting, contacts R-W1 will open.
7. The gas valve relay will open, closing the gas valve. The inducer will continue to run for approximately 5

seconds to remove any combustion by products from inside the furnace.

8. The indoor blower continues to run to remove heat from the heat exchangers. This blower off time is field adjustable through the IFC menu setup option. The seven-segment LED will read I dL = Idle, no thermostat demand.

Single Stage Cooling

1. R-Y1-G contacts on the thermostat close sending 24Vac to the Y1 and G low voltage terminals on the IFC. Technician should read 24Vac between Y1-B/C and between G-B/C.

Note: *For S9X2 units, the factory supplied Y1-O jumper must remain in place for proper seven-segment LED readout. If removed, the seven-segment LED will read HP I*

2. 24Vac is sent to the OD unit via thermostat wiring.
3. The indoor blower ramps to the cooling airflow. The seven-segment LED, for example, will alternately read:

   CL I = Cooling, Stage 1 (S9X2)

   CP I = Cooling, Stage 1 (S9X1 / S9B1)

   EP7 = Speed Tap 7
4. When the temperature is lowered enough to satisfy the thermostat setting, contacts R-Y1-G will open.
5. The OD unit shuts off and the indoor blower shuts off, unless a blower “Cool Off Delay” has been enabled in the IFC setup menu options. The seven-segment LED will read I dL = Idle, no thermostat demand.

Two Stage Cooling

1. See sequence of operation for Single Stage Cooling above (Step 1. to Step 3.).
2. R-Y2 contact on the thermostat closes sending 24Vac to the Y2 low voltage terminal on the IFC. Technician should read 24Vac between Y2-B/C.
3. 24Vac is sent to the OD unit via thermostat wiring.
4. The indoor blower ramps to 2nd stage airflow. The seven-segment LED for example will alternately read:

   CL2 = Cooling, Stage 2 (S9X2)

   CP2 = Cooling, Stage 2 (S9X1)

   EP7 = Speed Tap 7
5. When the temperature is lowered enough to satisfy the thermostat setting, contacts R-Y1–Y2–G will open.
6. The OD unit shuts off and the indoor blower shuts off, unless a blower “Cool Off Delay” has been enabled in the IFC setup menu options. The seven segment LED will read I dL = Idle, no thermostat demand.

Single Stage Heat Pump

1. R-Y1-G contacts on the thermostat close sending 24Vac to the Y1 and G low voltage terminals on the IFC. Technician should read 24Vac between Y1-B/C and between G-B/C.

Note: *For S9X2 units, the factory supplied Y1-O jumper must be removed for proper seven-segment LED readout. If left in place, the seven-segment LED will read CL I*

2. 24Vac is sent to the OD unit via thermostat wiring.
3. The indoor blower ramps to the cooling airflow. The seven-segment LED, for example, will alternately read:

   HP I = Cooling, Stage 1 (S9X2)

   CP I = Cooling, Stage 1 (S9X1 / S9B1)

   EP7 = Speed Tap 7
4. When the temperature is lowered enough to satisfy the thermostat setting, contacts R-Y1-G will open.
5. The OD unit shuts off and the indoor blower shuts off, unless a blower “Cool Off Delay” has been enabled in the IFC setup menu options. The seven-segment LED will read I dL = Idle, no thermostat demand.

Two Stage Heat Pump

1. See sequence of operation for Single Stage heat pump above (Step 1. to Step 3.).
2. R-Y2 contact on the thermostat closes sending 24Vac to the Y2 low voltage terminal on the IFC. Technician should read 24Vac between Y2-B/C.
3. 24Vac is sent to the OD unit via thermostat wiring.
4. The indoor blower ramps to 2nd stage airflow. The seven-segment LED for example will alternately read:

   HP2 = Cooling, Stage 2 (S9X2)

   CP2 = Cooling, Stage 2 (S9X1)

   EP7 = Speed Tap 7
5. When the temperature is lowered enough to satisfy the thermostat setting, contacts R-Y1–Y2–G will open.
6. The OD unit shuts off and the indoor blower shuts off, unless a blower “Cool Off Delay” has been enabled in the IFC setup menu options. The seven segment LED will read I dL = Idle, no thermostat demand.

Periodic Servicing Requirements

1. General Inspection – *Examine the furnace installation annually for the following items:*
   a. All flue product carrying areas external to the Furnace (i.e. chimney, vent connector) are clear and free of obstruction. A vent screen in the end of the Vent (flue) Pipe must be inspected for blockage annually, if applicable.
   b. The vent connector is in place, slopes upward and is physically sound without holes or excessive corrosion.
   c. The return air duct connection(s) is physically sound, is sealed to the Furnace and terminates outside the space containing the Furnace.
   d. The physical support of the Furnace should be sound without sagging, cracks, gaps, etc., around the base so as to provide a seal between the support and the base.
2. Filters – Filters should be cleaned or replaced (with high velocity filters only), monthly and more frequently during high use times of the year such as midsummer or midwinter.
3. Blowers – The Blower size and speed determine the air volume delivered by the Furnace. The Blower motor bearings are factory lubricated and under normal operating conditions do not require servicing. Annual cleaning of the Blower wheel and housing is recommended for maximum air output, and this must be performed only by a qualified servicer or service agency.
4. Igniter – This unit has a special hot surface direct ignition device that automatically lights the burners. Please note that it is very fragile and should be handled with care.

⚠ CAUTION

Hot Surface!

Failure to follow instructions below could result in minor to moderate injuries.
Do not touch igniter. It is extremely hot.

5. Burner – Gas burners do not normally require scheduled servicing, however, accumulation of foreign material may cause a yellowing flame or delayed ignition. Either condition indicates that a service call is required. For best operation, burners must be cleaned annually using brushes and vacuum cleaner. Turn off gas and electric power supply. To clean burners, remove burner bottom plate (2 screws) and bottom burner bracket (2 screws). Twist burner towards slot, lift, and push forward away from orifice. Remove burners.

   Alternate method — Remove manifold assembly, bottom burner plate, and bottom burner bracket. Remove burners.

   Note: *Be careful NOT to break igniter when removing burners.*

   Clean burners with brush and/ or vacuum cleaner. Reassemble parts by reversal of the above procedure.

   Notes:

   - *Natural gas units should not have any yellow tipped flames. This condition indicates that a service call is required. For best operation, burners must be cleaned annually using brushes and vacuum cleaner.*
   - *On Propane units, due to variations in BTU content and altitude, servicing may be required at shorter intervals.*

6. Heat Exchanger/Flue Pipe – These items must be inspected for signs of corrosion, and/ or deterioration at the beginning of each heating season by a qualified service technician and cleaned annually for best operation. To clean flue gas passages, follow recommendations below:

Figure 187. Heat exchanger inspection



   a. Turn off gas and electric power supply.
   b. Inspect flue pipe exterior for cracks, leaks, holes or leaky joints. Some discoloration of PVC pipe is normal.
   c. Remove door from Furnace.
   d. Inspect around insulation covering flue collector box. Inspect induced draft Blower connections from recuperative cell and to the flue pipe connection.
   e. Remove burners. (See Step 5.)
   f. Use a mirror and flashlight to inspect interior of Heat Exchanger, be careful not to damage the Igniter, Flame Sensor or other components.
   g. If any corrosion is present, the Heat Exchanger should be cleaned by a qualified service technician.
   h. After inspection is complete replace burners and Furnace door.
   i. Restore gas supply. Check for leaks using a soap solution. Restore electrical supply. Check unit for normal operation.

7. Cooling Coil Condensate Drain - If a cooling coil is installed with the Furnace, condensate drains should be checked and cleaned periodically to assure that condensate can drain freely from coil to drain. If condensate cannot drain freely water damage could occur.

Notes

About Trane and American Standard Heating and Air Conditioning

Trane and American Standard create comfortable, energy efficient indoor environments for residential applications. For more information, please visit www.trane.com or www.americanstandardair.com.

The manufacturer has a policy of continuous data improvement and it reserves the right to change design and specifications without notice. We are committed to using environmentally conscious print practices.

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