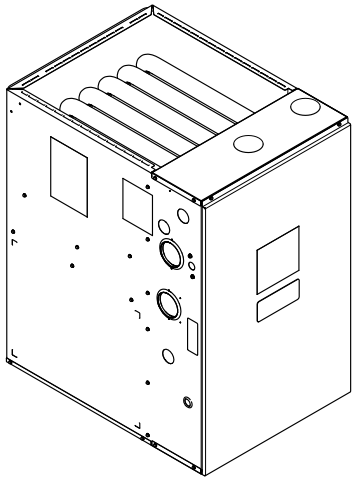
Installation, Operation, and Maintenance

Upflow/Horizontal and Dedicated Downflow Gas-Fired, Direct/Non-Direct Vent, 2-Stage Condensing Variable Speed Furnaces

Upflow, Convertible to Horizontal Right or Horizontal Left
A952V040BU3SB
A952V060BU4SB
A952V080BU4SB
A952V080CU5SB
A952V100CU5SB
A952V120DU5SB

Downflow Only
A952V040BD3SB
A952V060BD3SB
A952V080BD4SB
A952V100CD5SB
A952V120DD5SB



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

FNR-SVX005B-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.

September 2026 **FNR-SVX005B-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.**

⚠ 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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Revision History

- Updated Safety Practices and Precautions topic in Furnace Installation Guidelines chapter.
- Updated General Guidelines topic in Furnace Installation Guidelines chapter.
- Updated figure titles from the Gas Piping topic in Furnace General Installation chapter.
- Updated the table in the Supply Duct Connections topic in Furnace General Installation chapter
- Updated figure titles in the Furnace Combustion Air Exhaust Options chapter.
- Added QR for 6.2 and 6.3 Fault Codes in the Troubleshooting chapter.
- Added QR for Heat exchange inspection in the Periodic Servicing Requirements chapter.

Table of Contents

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 (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 when used in side return application. B-Cabinet Furnaces only when in bottom return application.
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

[a] Airflow greater than 1600 CFM, Furnace will require return air openings and filters on: (1) both sides, (2) one side and the bottom, or (3) just on the bottom.
[b] Latest revision.

Document Pack Contents

Figure 1. Document pack contents

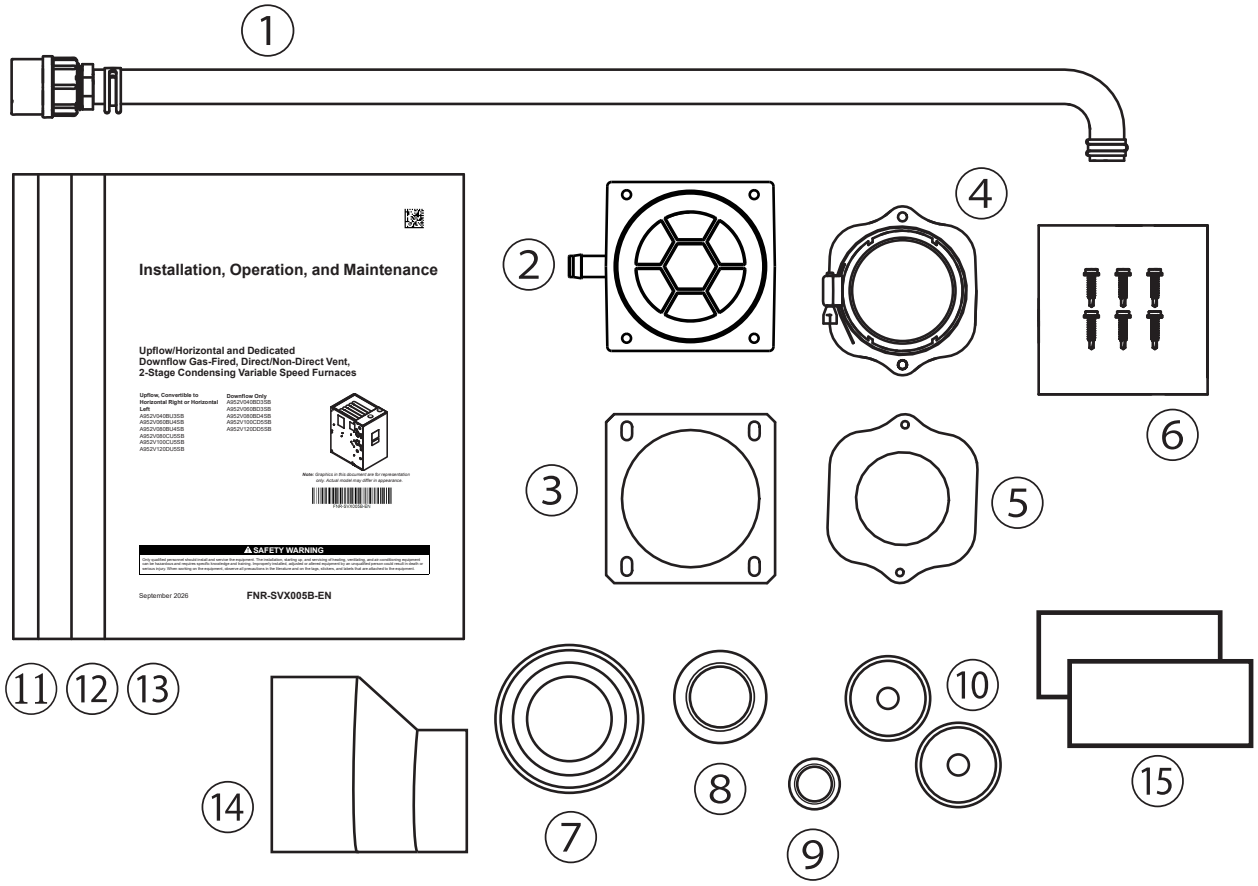


Table 2. Pack contents

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
	2	Tinnerman Clips (not pictured) ***Note:*** *Tinnerman Clips should be kept with unit and are used if the door panel flange hole(s) become stripped.*
7	1	Condensate Trap Grommet
8	1	Plug - Condensate/Gas

Table 2. Pack contents (continued)

Item	Qty.	Description
9	1	Plug - Electrical
10	2	Grommet - Condensate/Gas
11	1	Installation, Operation, and Maintenance Manual
12	1	Owner Guide
13	1	Limited Warranty
14	1	2 to 3-in. Coupling - CPL01544 [b]
15	2	Brand labels [c]

[a] 3-in. inlet vent supplied with A952V120DU and A952V120DD only. 2-in. inlet vent supplied with all other models.
[b] Supplied with A952V120DU and A952V120DD only.
[c] Place appropriate brand label below the warning label on the front panel using stencil marks as guides.

Product Specification

Table 3. Models – A952V040BU3SB, A952V060BU4SB, A952V080BU4SB, A952V080CU5SB, A952V100CU5SB, and A952V120DU5SB

Model	**A952V040BU 3SB** [a]	**A952V060BU 4SB** [a]	**A952V080BU 4SB** [a]	**A952V080CU 5SB** [a]	**A952V100CU 5SB** [a]	**A952V120DU 5SB** [a]
Type	Upflow / Horizontal					
Ratings [b]						
1st Stage Input BTUH	26,000	39,000	52,000	52,000	65,000	78,000
1st Stage Capacity BTUH (ICS)	25,300	38,100	50,500	50,600	63,400	75,500
2nd Stage Input BTUH	40,000	60,000	80,000	80,000	100,000	120,000
2nd Stage Capacity BTUH (ICS) [c]	38,950	58,400	77,700	77,750	97,650	115,700
1st Stage Temp. Rise (Min. - Max.) °F	25 - 55		30 - 60		25 - 55	35 - 65
2nd Stage Temp. Rise(Min. - Max.) °F	30 - 60	35 - 65			30 - 60	40 - 70
AFUE (%) [c]	96.0					
Return Air Temp. (Min. - Max.) °F	45°F - 80°F					
CEE Tier	Tier 2					
Energy Star Rating Before July 31, 2026	US - All/Canada					
Energy Star Rating On or After July 31, 2026	US - South					
Energy Star Orientation	Upflow / Horizontal					
Integrated Furnace Control						
Input-Communication Protocol	24 Volts					
Blower Drive	Direct					
Diameter - Width (in.)	11 × 8			11 × 10		
No. Used	1					
Speeds (No.)	Variable					
CFM vs. in. w.g.	See Fan Performance Table					
Motor HP	1/2	3/4		1		
R.P.M.	Variable					
Volts / Ph / Hz	120 / 1 / 60					
FLA	6.4	9.6		10.5		
Combustion Fan - Type	PSC					
Drive - No. Speeds	Direct - 2					
Motor RPM	3300/2600					
Volts/Ph/Hz	120 / 1 / 60					
FLA	0.66					
Inducer Orifice	0.61	0.79	0.96	0.88	1.05	1.19
Filter - Furnished?	No					
Type Recommended	High Velocity					
Hi Vel. (No.-Size-Thk.)	1 - 16 × 25 - 1-in.			1 - 20 × 25 - 1-in.		1 - 24 × 25 - 1-in.
Vent Outlet Dia - Min. (in.) [d]	2 Round					3 Round
Inlet Air Dia -Min. (in.)	2 Round					3 Round
Heat Exchanger – Type						
Fired	409 Stainless Steel					
Unfired	29-4C Stainless Steel					
Gauge (Fired)	20					
Orifices - Main						

Table 3. Models – A952V040BU3SB, A952V060BU4SB, A952V080BU4SB, A952V080CU5SB, A952V100CU5SB, and A952V120DU5SB (continued)

Model	A952V040BU 3SB [a]	A952V060BU 4SB [a]	A952V080BU 4SB [a]	A952V080CU 5SB [a]	A952V100CU 5SB [a]	A952V120DU 5SB [a]
Nat. Gas (Qty. - Drill Size)	2 - 45	3 - 45	4 - 45		5 - 45	6 - 45
Propane Gas (Qty. - Drill Size)	2 - 56	3 - 56	4 - 56		5 - 56	6 - 56
Gas Valve	Redundant - Two Stage					
Pilot Safety Device – Type	120 V SiNi Igniter					
Burners - Type - Qty	Inshot - 2	Inshot - 3	Inshot - 4		Inshot - 5	Inshot - 6
Power Conn. - V/Ph/Hz [e]	120 / 1 / 60					
Ampacity (Amps)	8.8	12.8		13.9		
Max. Overcurrent Protection (Amps)	15					
Pipe Conn. Size (in.)	1/2					

[a] Central Furnace heating designs are certified to ANSI Z21.47 / CSA 2.3 - latest edition.
[b] 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.
[c] Based on U.S. government standard tests.
[d] See the Maximum Vent Length Table, p. 44 in this document.
[e] The above wiring specifications are in accordance with National Electrical Code; however, installations must comply with local codes.

Table 4. Models – A952V040BD3SB, A952V060BD3SB, A952V080BD4SB, A952V100CD5SB, and A952V120DD5SB

Model	A952V040BD 3SB [a]	A952V060BD 3SB [a]	A952V080BD 4SB [a]	A952V100CD 5SB [a]	A952V120DD 5SB [a]
Type	Downflow				
Ratings [b]					
1st Stage Input BTUH	26,000	39,000	52,000	65,000	78,000
1st Stage Capacity BTUH (ICS)	25,300	37,700	50,300	63,300	75,800
2nd Stage Input BTUH	40,000	60,000	80,000	100,000	120,000
2nd Stage Capacity BTUH (ICS) [c]	38,850	57,850	77,350	97,150	116,100
1st Stage Temp. Rise(Min. - Max.) °F	25 - 55		30 - 60		
2nd Stage Temp. Rise(Min. - Max.) °F	30 - 60	35 - 65			
AFUE (%) [c]	96.0				
Return Air Temp. (Min. - Max.) °F	45°F - 80°F				
CEE Tier	Tier 2				
Energy Star Rating Before July 31, 2026	US - All/Canada				
Energy Star Rating On or After July 31, 2026	US - South				
Energy Star Orientation	Downflow				
Integrated Furnace Control					
Input-Communication Protocol	24 Volts				
Blower Drive	Direct				
Diameter - Width (in.)	11 × 8			11 × 10	
No. Used	1				
Speeds (No.)	Variable				
CFM vs. in. w.g.	See Fan Performance Table				
Motor HP	1/2		3/4	1	
R.P.M.	Variable				
Volts / Ph / Hz	120 / 1 / 60				
FLA	6.4		9.6	10.5	
Combustion Fan - Type	PSC				
Drive - No. Speeds	Direct - 2				
Motor RPM	3300/2600				
Volts/Ph/Hz	120 / 1 / 60				

Table 4. Models – A952V040BD3SB, A952V060BD3SB, A952V080BD4SB, A952V100CD5SB, and A952V120DD5SB (continued)

Model	A952V040BD 3SB [a]	A952V060BD 3SB [a]	A952V080BD 4SB [a]	A952V100CD 5SB [a]	A952V120DD 5SB [a]
FLA	0.66				
Inducer Orifice	0.61	0.79	0.96	1.05	1.19
Filter - Furnished?	No				
Type Recommended	High Velocity				
Hi Vel. (No.-Size-Thk.)	1 - 16 × 25 - 1-in.			1 - 20 × 25 - 1-in.	1 - 24 × 25 - 1-in.
Vent Outlet Dia - Min. (in.) [d]	2 Round				3 Round
Inlet Air Dia -Min. (in.)	2 Round				3 Round
Heat Exchanger – Type					
Fired	409 Stainless Steel				
Unfired	29-4C Stainless Steel				
Gauge (Fired)	20				
Orifices - Main					
Nat. Gas (Qty. - Drill Size)	2 - 45	3 - 45	4 - 45	5 - 45	6 - 45
Propane Gas (Qty. - Drill Size)	2 - 56	3 - 56	4 - 56	5 - 56	6 - 56
Gas Valve	Redundant - Two Stage				
Pilot Safety Device – Type	120 V SiNi Igniter				
Burners - Type - QTY	Inshot - 2	Inshot - 3	Inshot - 4	Inshot - 5	Inshot - 6
Power Conn. - V/Ph/Hz [e]	120 / 1 / 60				
Ampacity (Amps)	8.8		12.8	13.9	
Max. Overcurrent Protection (Amps)	15				
Pipe Conn. Size (in.)	1/2				

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

[b] 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.

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

[d] See the Maximum Vent Length Table, p. 44 in this document.

[e] 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. Refer to the furnace rating plate.
2. Install the furnace only in a location and position as specified in "Locations and Clearances," p. 15 of these instructions.
3. Provide adequate combustion and ventilation air to the furnace space as specified in "Air for Combustion and Ventilation," p. 52 of these instructions.
4. Combustion products must be discharged outdoors. Connect this furnace to an approved vent system only, as specified in the "General Venting," p. 38 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 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 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. 15 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 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 45 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 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 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 5. Location and clearances

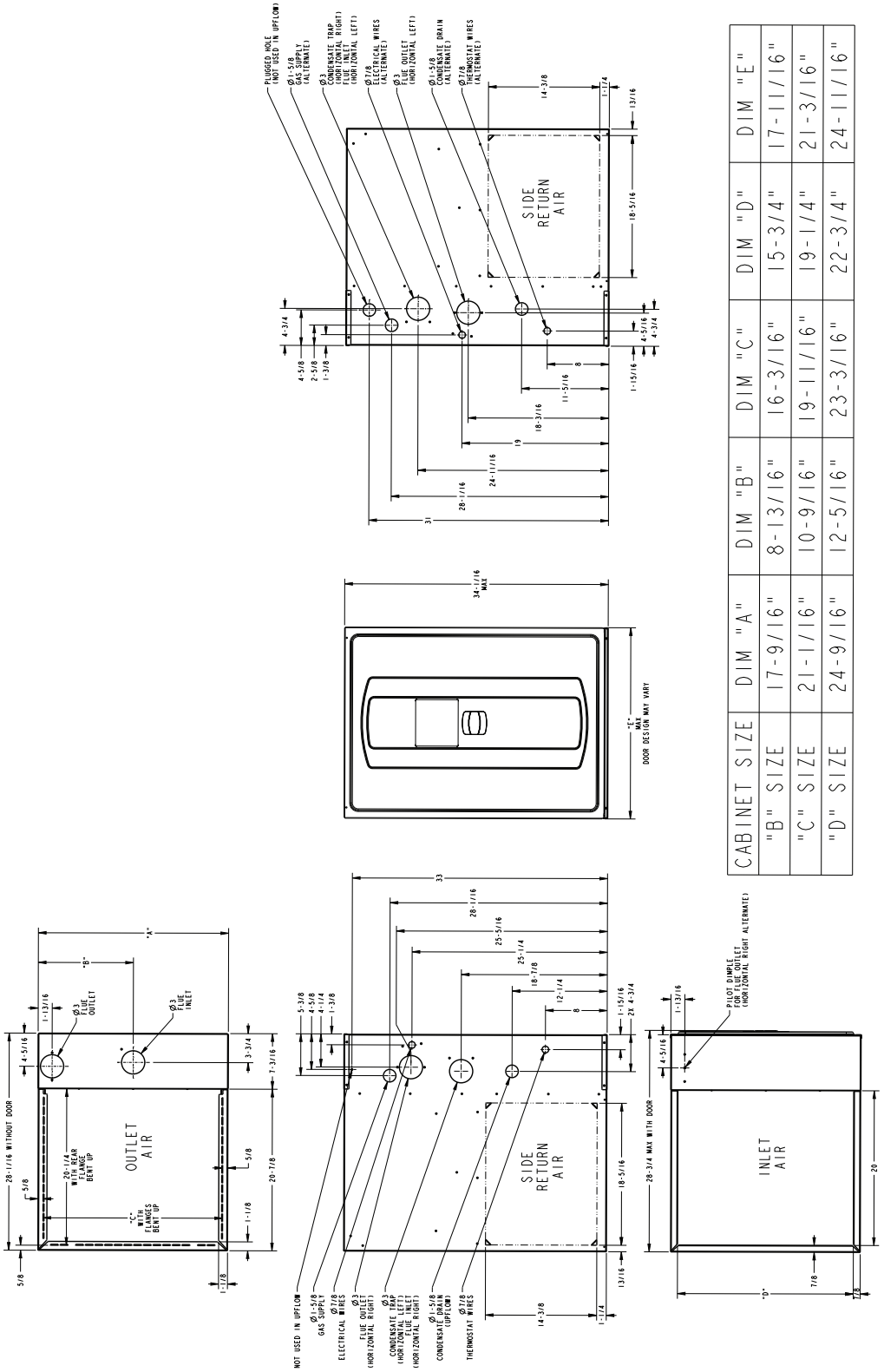
Minimum clearance to combustible materials (in.)	
Closet	
Sides	0
Back	1
Top	1
Front	0
Bottom	0
Flue	0
24-in. minimum front clearance recommended for service	
Horizontal Closet and Alcove	
Right Side	0
Left Side	0
Back	1
Top	1
Bottom	0
Flue	0
Horizontal Flue (discharge on left)	
Closet	
Right Side	0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

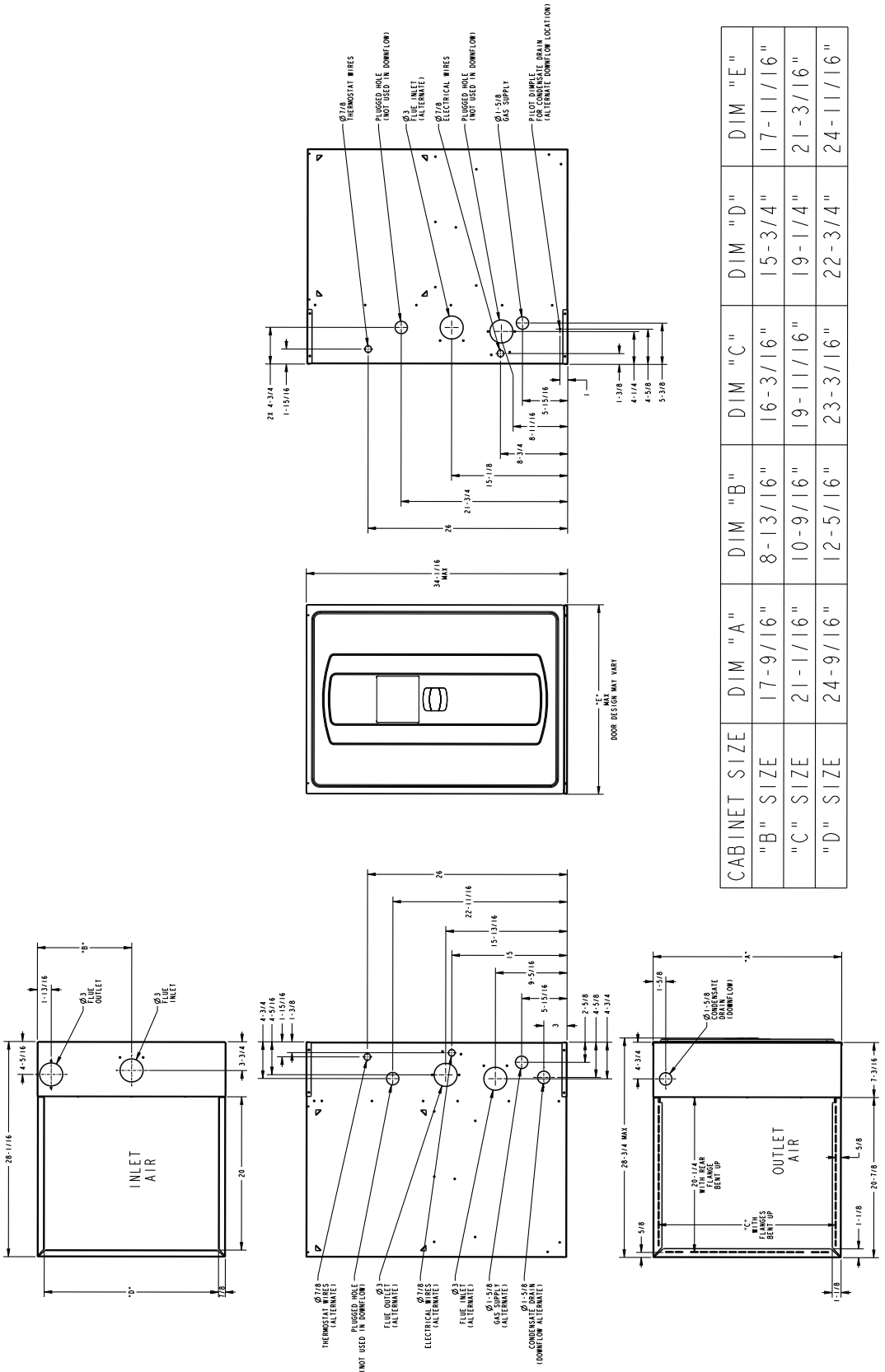
Dimensional Data

Figure 2. 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"

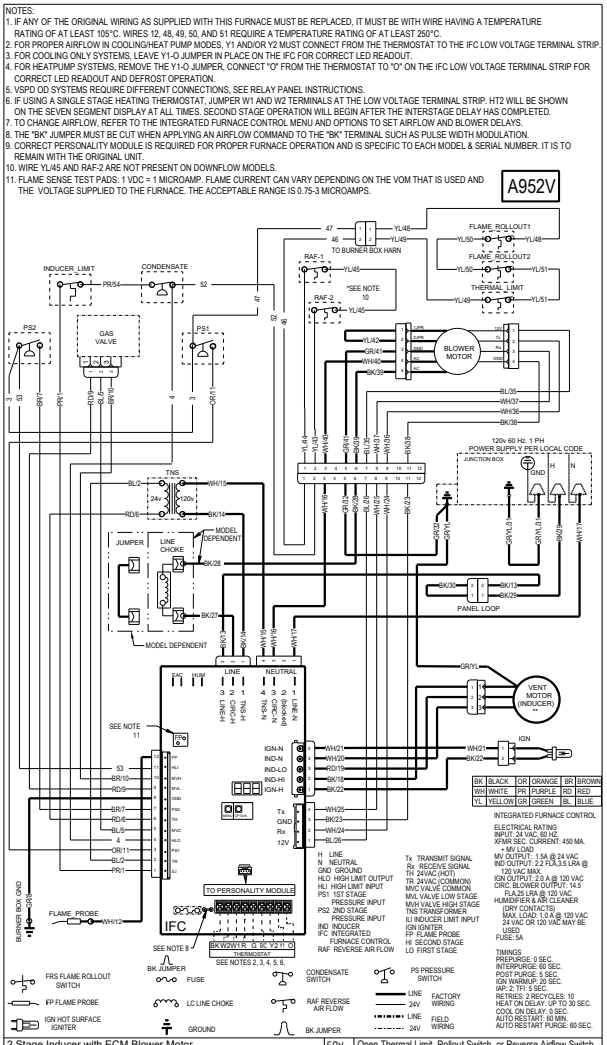
Figure 3. Downflow cabinets — 17.5-inch, 21-inch, and 24.5-inch



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 4. Wiring diagram – A952V



2 Stage Inducer with ECM Blower Motor					
	Status Codes	0dU	Outdoor Unit	E04	Open Thermal Limit, Rollout Switch, or Reverse Airflow Switch
IdL	Idle	CDF	Blower Constant Fan Airflow Multiplier %	E05	Flame detected, should not be present
HE 1	1st Stage Heating	CPC	Cooling (CFM/Ton)	E6 1	Voltage reversed polarity
HE2	2nd Stage Heating	CPH	Heat Pump Heating (CFM/Ton)	E6 2	Bad Grounding
A-F	Airflow (followed by Airflow x 10)	Hod	Heat Off Delay (sec)	E6 3	(1) Igniter relay fails, (2) Igniter open
		I Sd	Inter-Stage Delay (sec)	E 1 1	1st stage gas valve (MVL) is energized when it should be off
CDF	Continuous Fan	9HC	Gas Heating CFM (Airflow x10)	E08	Flame current is low, but still strong enough to allow operation.
CL 1	1st Stage Cooling	rUn	Run Test Mode	E09	Open Inducer Limit Switch or Condensate Switch
CL2	2nd Stage Cooling		Error Codes	E 11	(1) 1st stage gas valve not energized when it should be
HP 1	1st Stage Heat Pump	E0 1	Loss of the IRQ/other internal failures		(2) 1st stage gas valve relay stuck closed
HP2	2nd Stage Heat Pump	E2 1	Retry exceeded (Failed to est flame)		(3) 2nd stage gas valve relay stuck closed
dFt	Defrost Mode	E2 2	Recycles exceeded (loss of established flame) or 10X PS1 open		(4) 2nd stage gas valve energized when it should not be
	Menu Options				(5) 2nd stage gas valve not energized when it should be
Err	Active Alarm Menu	E2 3	1st Stage Gas Valve not energized when it should be exceeded after 10 times	E 12	Open fuse
LSF	Last 6 Faults (To Clear, Hold Option Button 5 sec)	E3 1	Shorted Pressure Switch, 1st Stage	E 13	Blower HP/OEM ID
				E 14	No PM and local copy bad
Er	Code Release Number	E3 2	Open Pressure Switch, 1st Stage	E 15	Both Unit Data File in PM and local Unit Data File are Corrupt
CDd	Cooling Off Delay (sec)	E3 3	Shorted Pressure Switch, 2nd Stage	E 17	Blower motor no communication response
Ode	Outdoor Tonnage	E3 4	Open Pressure Switch, 2nd Stage	E 18	Blower communication failure on the control

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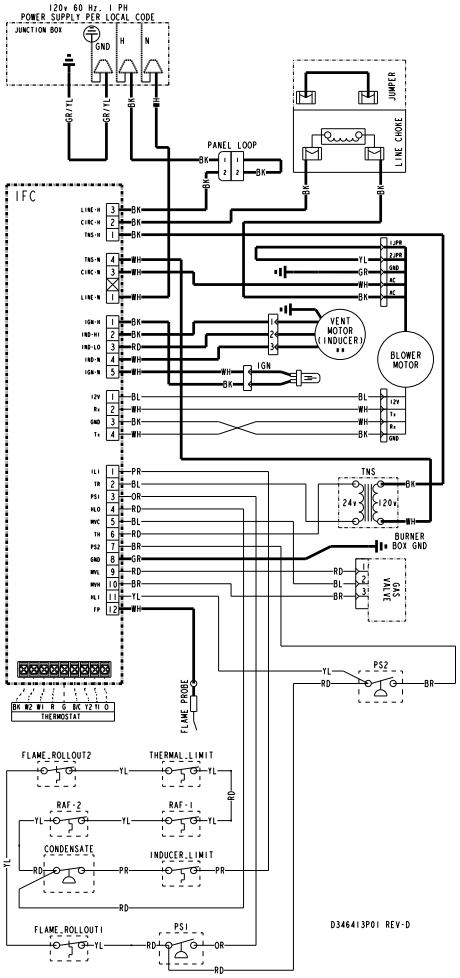
Figure 5. Ladder diagram – A952V



Heating and Cooling Airflow Tables

Table 6. A952V040BU3S heating airflow

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
				External Static Pressure (in. W. C.)				
Airflow Setting	**Heating Stage**	**Target Airflow**		**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
650	1st Stage	468	CFM / Watts	468/27	452/58	437/90	421/121	406/152
			Temp. Rise	49	51	54	56	58
	2nd Stage	650	CFM / Watts	633/48	636/92	639/135	643/179	646/223
			Temp. Rise	57	57	57	56	56
830	1st Stage	598	CFM / Watts	552/41	600/76	647/112	694/147	741/183
			Temp. Rise	43	39	36	32	28
	2nd Stage	830	CFM / Watts	760/82	786/132	813/182	840/232	866/282
			Temp. Rise	48	46	45	43	41
880 [a]	1st Stage	634	CFM / Watts	583/48	635/83	687/118	739/153	791/189
			Temp. Rise	39	36	33	30	27
	2nd Stage	880	CFM / Watts	792/94	817/142	842/189	867/237	892/284
			Temp. Rise	44	44	43	43	42
1200	1st Stage	864	CFM / Watts	753/86	785/129	818/171	850/213	882/256
			Temp. Rise	30	29	28	27	26
	2nd Stage	1200	CFM / Watts	1022/191	1044/250	1065/309	1087/368	1109/427
			Temp. Rise	34	33	33	32	32

[a] Factory Setting

Table 7. A952V040BD3S heating airflow

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
Airflow Setting	**Heating Stage**	**Target Airflow**		External Static Pressure (in. W. C.)				
				0.1	**0.3**	**0.5**	**0.7**	**0.9**
650	1st Stage	468	CFM / Watts	464/26	453/55	442/84	431/113	420/142
			Temp. Rise	51	52	53	54	55
	2nd Stage	650	CFM / Watts	662/37	655/79	649/120	642/162	635/203
			Temp. Rise	54	55	55	56	56
880 [a]	1st Stage	634	CFM / Watts	616/40	607/78	599/115	591/152	583/190
			Temp. Rise	38	38	39	40	40
	2nd Stage	880	CFM / Watts	811/67	818/121	826/176	834/230	841/284
			Temp. Rise	45	44	44	43	42
950	1st Stage	684	CFM / Watts	635 / 47	643 / 106	650 / 165	658 / 224	666 / 283
			Temp. Rise	37	37	36	36	35
	2nd Stage	950	CFM / Watts	859 / 88	865 / 144	871 / 200	877 / 256	884 / 312
			Temp. Rise	42	41	41	41	41
1250	1st Stage	900	CFM / Watts	824 / 82	843 / 130	861 / 178	880 / 226	898 / 274
			Temp. Rise	28	28	27	26	26
	2nd Stage	1200	CFM / Watts	1082 / 192	1092 / 253	1102 / 314	1111 / 375	1121 / 436
			Temp. Rise	33	33	33	33	33

[a] Factory Setting

Table 8. A952V040BU3S / A952V040BD3S cooling airflow

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (in. W. C.) VS. CFM/WATTS				
		0.1	0.3	0.5	0.7	0.9
1.5	450	675/47	675/81	675/121	675/166	675/215
	420	630/40	630/72	630/111	630/154	630/202
	400	600/36	600/67	600/105	600/147	600/193
	370	555/30	555/60	555/96	555/136	555/181
	350	525/27	525/56	525/90	525/130	525/174
	330	495/24	495/51	495/85	495/124	495/167
	310	465/21	465/48	465/80	465/118	465/161
	290	435/19	435/44	435/76	435/113	435/155
2.0	450	900/94	900/137	900/186	900/240	900/298
	420	840/79	840/120	840/166	840/218	840/273
	400	800/70	800/109	800/154	800/204	800/258
	370	740/58	740/95	740/138	740/185	740/236
	350	700/51	700/86	700/127	700/173	700/223
	330	660/44	660/78	660/118	660/162	660/211
	310	620/38	620/71	620/109	620/152	620/199
	290	580/33	580/64	580/101	580/142	580/188
2.5	450	1125/167	1125/219	1125/278	1125/341	1125/408
	420	1050/139	1050/188	1050/244	1050/304	1050/368
	400	1000/123	1000/170	1000/223	1000/281	1000/343
	370	925/100	925/145	925/195	925/250	925/308
	350	875/87	875/129	875/178	875/230	875/287
	330	825/121	825/160	825/205	825/254	825/308
	310	775/101	775/139	775/182	775/229	775/281
	290	725/88	725/123	725/164	725/210	725/260
3.0 [a]	450	1350/272	1350/334	1350/402	1298/440	1198/450
	420	1260/226	1260/284	1260/348	1260/417	1198/450
	400	1200/198	1200/254	1200/315	1200/381	1198/450
	370	1110/161	1110/213	1110/271	1110/333	1110/399
	350[a]	1050/139	1050/188	1050/244	1050/304	1050/368
	330	990/119	990/166	990/219	990/277	990/338
	310	930/102	930/146	930/197	930/252	930/311
	290	870/86	870/128	870/176	870/229	870/285

[a] Factory Setting.

Table 9. A952V060BD3S heating airflow

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
Airflow Setting	**Heating Stage**	**Target Airflow**		**External Static Pressure (in. W. C.)**				
				0.1	**0.3**	**0.5**	**0.7**	**0.9**
900	1st Stage	711	CFM / Watts	677 / 48	677 / 93	677 / 138	677 / 183	677 / 228
			Temp. Rise	52	52	52	52	51
	2nd Stage	900	CFM / Watts	859 / 89	856 / 138	853 / 188	849 / 237	846 / 286
			Temp. Rise	62	62	63	63	63
1030 [a]	1st Stage	814	CFM / Watts	787 / 71	775 / 115	763 / 160	751 / 204	739 / 249
			Temp. Rise	44	45	46	47	49
	2nd Stage	1030	CFM / Watts	976 / 126	967 / 179	957 / 232	947 / 285	938 / 338
			Temp. Rise	55	55	56	57	58
1130	1st Stage	893	CFM / Watts	864 / 85	855 / 133	846 / 181	836 / 229	827 / 277
			Temp. Rise	40	41	41	42	43
	2nd Stage	1130	CFM / Watts	1066 / 162	1053 / 218	1040 / 275	1026 / 331	1013 / 388
			Temp. Rise	50	51	52	53	53
1350	1st Stage	1067	CFM / Watts	1032 / 140	1013 / 193	993 / 245	974 / 297	955 / 349
			Temp. Rise	34	35	35	36	36
	2nd Stage	1350	CFM / Watts	1245 / 279	1233 / 332	1221 / 386	1209 / 440	1197 / 494
			Temp. Rise	43	44	44	44	45

[a] Factory Setting

Table 10. A952V060BD3S cooling airflow

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (in. W. C.) VS. CFM/WATTS				
		0.1	**0.3**	**0.5**	**0.7**	**0.9**
1.5	450	671 / 47	673 / 84	671 / 121	665 / 161	656 / 202
	420	625 / 41	628 / 75	626 / 111	621 / 149	611 / 190
	400	595 / 37	598 / 70	597 / 105	591 / 142	582 / 182
	370	548 / 32	552 / 63	552 / 96	547 / 132	538 / 171
	350	518 / 28	522 / 58	522 / 91	517 / 126	508 / 164
	330	487 / 25	491 / 54	491 / 86	487 / 120	479 / 158
	310	456 / 23	461 / 50	461 / 81	457 / 115	449 / 152
	290	424 / 20	430 / 47	431 / 77	427 / 110	419 / 147
2.0	450	894 / 91	890 / 136	881 / 181	871 / 228	873 / 282
	420	838 / 78	838 / 121	834 / 166	827 / 212	816 / 258
	400	797 / 69	798 / 111	795 / 154	788 / 198	777 / 244
	370	737 / 58	738 / 97	736 / 138	729 / 179	719 / 223
	350	696 / 51	698 / 89	696 / 127	690 / 168	680 / 210
	330	656 / 45	658 / 81	656 / 118	651 / 157	641 / 198
	310	615 / 39	618 / 73	616 / 109	611 / 147	602 / 187
	290	574 / 34	577 / 67	577 / 101	572 / 138	562 / 177

Table 10. A952V060BD3S cooling airflow (continued)

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (in. W. C.) VS. CFM/WATTS				
		0.1	0.3	0.5	0.7	0.9
2.5	450	1119 / 161	1117 / 218	1111 / 274	1101 / 332	1088 / 390
	420	1036 / 131	1034 / 184	1029 / 237	1020 / 291	1008 / 346
	400	997 / 119	996 / 170	990 / 221	982 / 273	970 / 326
	370	922 / 98	922 / 146	917 / 194	909 / 243	898 / 293
	350	873 / 86	873 / 131	869 / 177	861 / 224	850 / 272
	330	823 / 74	823 / 118	819 / 161	812 / 206	801 / 253
	310	772 / 64	773 / 105	770 / 147	764 / 190	753 / 235
	290	722 / 55	723 / 94	721 / 134	715 / 175	704 / 218
3.0 [a]	450	1336 / 262	1331 / 328	1323 / 395	1312 / 462	1299 / 529
	420	1250 / 217	1246 / 280	1239 / 342	1228 / 405	1215 / 469
	400	1192 / 191	1189 / 251	1182 / 311	1172 / 371	1159 / 432
	370	1105 / 156	1102 / 212	1096 / 268	1087 / 324	1074 / 382
	350[a]	1046 / 135	1044 / 188	1039 / 241	1030 / 296	1017 / 351
	330	987 / 116	986 / 167	981 / 217	972 / 269	960 / 322
	310	927 / 99	927 / 147	922 / 195	914 / 245	903 / 295
	290	868 / 85	868 / 130	864 / 175	856 / 222	845 / 270

[a] Factory Setting.

Table 11. A952V060BU4S heating airflow

Furnace Heating Airflow (CFM), Temp. Rise (°F), and Power (Watts) vs. External Static Pressure with Filter (iwc)								
Heating	Airflow Setting	Target Airflow		External Static Pressure (in. W. C.)				
				0.1	0.3	0.5	0.7	0.9
990	1st Stage	782	CFM / Watts	776 / 70	769 / 109	762 / 149	756 / 188	749 / 227
			Temp. Rise	45	45	45	45	46
	2nd Stage	990	CFM / Watts	1002 / 126	996 / 172	990 / 219	984 / 266	979 / 313
			Temp. Rise	55	55	55	55	55
1090	1st Stage	861	CFM / Watts	842 / 88	823 / 126	805 / 164	786 / 202	768 / 240
			Temp. Rise	42	43	43	44	44
	2nd Stage	1090	CFM / Watts	1130 / 160	1117 / 206	1105 / 253	1092 / 300	1079 / 347
			Temp. Rise	49	49	49	50	50
1160 [a]	1st Stage	916	CFM / Watts	863 / 105	860 / 143	858 / 181	855 / 219	853 / 257
			Temp. Rise	41	41	41	41	41
	2nd Stage	1160	CFM / Watts	1139 / 181	1133 / 231	1128 / 281	1122 / 331	1116 / 381
			Temp. Rise	48	48	49	49	49
1300	1st Stage	1027	CFM / Watts	1105 / 135	1084 / 173	1063 / 210	1042 / 248	1021 / 285
			Temp. Rise	32	32	33	34	34
	2nd Stage	1300	CFM / Watts	1319 / 246	1307 / 300	1295 / 353	1283 / 407	1272 / 461
			Temp. Rise	41	42	42	42	43

[a] Factory Setting

Table 12. A952V060BU4S cooling airflow

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (in. W. C.) VS. CFM/WATTS				
		0.1	0.3	0.5	0.7	0.9
1.5	450	663 / 46	673 / 82	666 / 118	640 / 154	596 / 191
	420	620 / 40	629 / 74	621 / 109	594 / 143	548 / 179
	400	581 / 35	580 / 66	566 / 98	528 / 130	507 / 170
	370	549 / 31	556 / 63	546 / 94	517 / 127	469 / 162
	350	520 / 28	526 / 58	515 / 89	486 / 122	437 / 155
	330	492 / 25	497 / 54	485 / 84	454 / 116	404 / 150
	310	463 / 23	467 / 51	454 / 80	423 / 111	372 / 145
	290	434 / 20	437 / 47	424 / 76	391 / 107	339 / 140
2.0	450	878 / 90	892 / 135	889 / 179	868 / 222	829 / 266
	420	820 / 76	834 / 119	830 / 160	808 / 202	767 / 244
	400	769 / 65	777 / 105	770 / 144	742 / 182	724 / 229
	370	725 / 57	736 / 95	730 / 133	706 / 172	663 / 210
	350	687 / 50	697 / 87	691 / 124	666 / 161	622 / 198
	330	649 / 44	658 / 80	651 / 115	625 / 151	580 / 187
	310	611 / 39	619 / 73	611 / 107	584 / 141	538 / 177
	290	573 / 34	580 / 66	571 / 99	543 / 132	495 / 167
2.5	450	1096 / 159	1114 / 212	1114 / 264	1096 / 316	1061 / 367
	420	1023 / 132	1040 / 183	1039 / 233	1020 / 282	983 / 330
	400	975 / 117	989 / 165	989 / 214	969 / 261	932 / 308
	370	902 / 96	917 / 142	914 / 187	893 / 231	854 / 276
	350	854 / 84	868 / 128	864 / 171	843 / 214	803 / 256
	330	806 / 73	819 / 115	815 / 156	792 / 197	751 / 238
	310	758 / 63	770 / 103	765 / 142	742 / 182	700 / 221
	290	710 / 54	722 / 92	716 / 130	691 / 167	648 / 206
3.0	450	1318 / 259	1339 / 321	1342 / 381	1327 / 441	1295 / 500
	420	1229 / 215	1249 / 273	1250 / 330	1234 / 387	1201 / 443
	400	1170 / 188	1189 / 244	1190 / 299	1173 / 354	1138 / 408
	370	1081 / 153	1099 / 206	1099 / 258	1081 / 309	1045 / 360
	350	1023 / 132	1040 / 183	1039 / 233	1020 / 282	983 / 330
	330	965 / 114	981 / 162	979 / 210	959 / 257	921 / 303
	310	907 / 97	922 / 143	919 / 189	898 / 233	860 / 278
	290	849 / 83	863 / 126	859 / 169	838 / 212	798 / 255

Table 12. A952V060BU4S cooling airflow (continued)

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (in. W. C.) VS. CFM/WATTS				
		0.1	0.3	0.5	0.7	0.9
3.5	450	1546 / 399	1570 / 468	1575 / 536	1563 / 604	1534 / 670
	420	1439 / 329	1462 / 394	1466 / 459	1453 / 523	1422 / 586
	400	1369 / 287	1390 / 350	1394 / 412	1379 / 474	1347 / 534
	370	1264 / 231	1284 / 291	1286 / 349	1270 / 407	1237 / 464
	350	1194 / 199	1214 / 256	1215 / 312	1198 / 367	1164 / 422
	330	1125 / 170	1144 / 224	1144 / 278	1127 / 331	1092 / 383
	310	1058 / 144	1074 / 196	1074 / 247	1055 / 297	1019 / 347
	290	991 / 122	1005 / 171	1004 / 219	984 / 267	947 / 314
4.0[a]	450	1779 / 584	1805 / 661	1814 / 736	1805 / 811	1778 / 885
	420	1654 / 479	1679 / 552	1686 / 623	1675 / 694	1647 / 765
	400	1571 / 417	1596 / 487	1602 / 556	1590 / 624	1560 / 692
	370	1449 / 335	1472 / 401	1476 / 466	1463 / 530	1432 / 593
	350[a]	1369 / 287	1390 / 350	1394 / 412	1379 / 474	1347 / 534
	330	1289 / 244	1309 / 304	1312 / 364	1296 / 422	1263 / 480
	310	1209 / 206	1229 / 263	1230 / 320	1214 / 376	1180 / 431
	290	1130 / 172	1149 / 227	1149 / 280	1132 / 333	1097 / 386

[a] Factory Setting

Table 13. A952V080BU4S heating airflow

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
Airflow Setting	Heating Stage	Target Airflow		External Static Pressure (in. W. C.)				
				0.1	0.3	0.5	0.7	0.9
1200	1st Stage	864	CFM / Watts	914 / 90	882 / 131	849 / 172	816 / 213	783 / 255
	2nd Stage		Temp. Rise	51	53	55	57	59
	1st Stage	907	CFM / Watts	1207 / 206	1206 / 258	1205 / 309	1204 / 361	1203 / 412
	2nd Stage		Temp. Rise	60	60	60	60	60
1260[a]	1st Stage	958	CFM / Watts	940 / 104	912 / 141	885 / 178	858 / 215	831 / 253
	2nd Stage		Temp. Rise	50	51	53	54	56
	1st Stage	1051	CFM / Watts	1260 / 232	1261 / 287	1262 / 342	1263 / 397	1264 / 452
	2nd Stage		Temp. Rise	57	57	57	57	57
1330	1st Stage	1200	CFM / Watts	983 / 118	932 / 151	881 / 184	830 / 218	779 / 251
	2nd Stage		Temp. Rise	47	50	53	55	58
	1st Stage	1260	CFM / Watts	1360 / 263	1347 / 322	1333 / 380	1320 / 439	1306 / 497
	2nd Stage		Temp. Rise	53	53	54	54	55
1460	1st Stage	1330	CFM / Watts	1029 / 155	1068 / 195	1107 / 235	1146 / 275	1185 / 314
	2nd Stage		Temp. Rise	45	44	42	40	39
	1st Stage	1460	CFM / Watts	1420 / 377	1439 / 433	1458 / 489	1477 / 546	1496 / 602
	2nd Stage		Temp. Rise	51	50	49	49	48

[a] Factory Setting

Table 14. A952V080BD4S heating airflow

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
Airflow Setting	**Heating Stage**	**Target Airflow**		**External Static Pressure (in. W. C.)**				
				0.1	**0.3**	**0.5**	**0.7**	**0.9**
1200	1st Stage	864	CFM / Watts	807 / 81	795 / 126	782 / 171	769 / 216	757 / 261
			Temp. Rise	57	58	59	60	61
	2nd Stage	1200	CFM / Watts	1125 / 191	1103 / 241	1082 / 291	1060 / 341	1039 / 391
			Temp. Rise	64	65	66	67	69
1260	1st Stage	907	CFM / Watts	835 / 94	822 / 137	809 / 180	796 / 222	783 / 265
			Temp. Rise	55	56	57	58	59
	2nd Stage	1260	CFM / Watts	1188 / 219	1161 / 272	1135 / 326	1108 / 380	1082 / 433
			Temp. Rise	60	62	63	64	66
1330[a]	1st Stage	958	CFM / Watts	895 / 109	880 / 152	865 / 195	850 / 238	835 / 281
			Temp. Rise	51	52	54	55	57
	2nd Stage	1330	CFM / Watts	1242 / 258	1219 / 309	1196 / 359	1173 / 410	1150 / 461
			Temp. Rise	57	59	60	61	62
1480	1st Stage	1066	CFM / Watts	977 / 127	962 / 178	948 / 230	934 / 281	920 / 332
			Temp. Rise	47	48	49	50	51
	2nd Stage	1480	CFM / Watts	1342 / 329	1327 / 388	1313 / 448	1298 / 507	1284 / 567
			Temp. Rise	53	54	54	55	56

[a] Factory Setting

Table 15. A952V080BU4S / A952V080BD4S cooling airflow

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (IN. W. C.) VS. CFM/WATTS				
		0.1	**0.3**	**0.5**	**0.7**	**0.9**
2.0	450	891 / 91	899 / 136	892 / 179	872 / 222	837 / 264
	420	834 / 77	840 / 120	833 / 161	812 / 201	777 / 242
	400	785 / 67	785 / 106	780 / 146	753 / 183	737 / 228
	370	738 / 58	743 / 96	735 / 134	713 / 171	677 / 209
	350	700 / 51	704 / 88	696 / 124	674 / 160	637 / 197
	330	661 / 45	665 / 80	657 / 115	635 / 150	597 / 186
	310	623 / 40	627 / 73	618 / 107	595 / 141	558 / 176
	290	585 / 35	588 / 67	579 / 99	556 / 132	518 / 167
2.5	450	1108 / 158	1119 / 212	1115 / 264	1097 / 315	1065 / 365
	420	1035 / 132	1045 / 184	1040 / 233	1021 / 281	988 / 328
	400	987 / 117	997 / 166	991 / 214	972 / 260	938 / 305
	370	915 / 97	923 / 143	917 / 187	897 / 231	862 / 274
	350	867 / 85	874 / 129	868 / 171	847 / 213	812 / 255
	330	819 / 74	826 / 116	819 / 156	798 / 196	762 / 237
	310	771 / 64	777 / 104	770 / 143	748 / 181	712 / 220
	290	724 / 55	729 / 93	721 / 130	699 / 167	662 / 205

Table 15. A952V080BU4S / A952V080BD4S cooling airflow (continued)

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (IN. W. C.) VS. CFM/WATTS				
		0.1	0.3	0.5	0.7	0.9
3.0	450	1326 / 256	1341 / 319	1340 / 379	1325 / 438	1295 / 496
	420	1238 / 213	1252 / 272	1250 / 329	1233 / 385	1203 / 440
	400	1180 / 187	1193 / 244	1190 / 299	1173 / 352	1141 / 405
	370	1093 / 153	1104 / 206	1100 / 258	1082 / 308	1049 / 357
	350	1035 / 133	1046 / 184	1041 / 233	1022 / 281	988 / 328
	330	978 / 114	987 / 163	981 / 210	962 / 256	928 / 301
	310	920 / 98	928 / 144	922 / 189	902 / 233	867 / 276
	290	862 / 84	870 / 127	863 / 170	842 / 211	807 / 253
3.5	450	1546 / 392	1565 / 462	1567 / 531	1555 / 597	1529 / 663
	420	1443 / 323	1460 / 390	1461 / 455	1447 / 518	1419 / 580
	400	1374 / 283	1390 / 347	1391 / 410	1376 / 470	1347 / 530
	370	1272 / 229	1287 / 290	1285 / 348	1269 / 405	1239 / 461
	350	1204 / 198	1217 / 256	1215 / 311	1198 / 366	1167 / 419
	330	1137 / 169	1149 / 225	1145 / 278	1127 / 329	1095 / 380
	310	1069 / 144	1080 / 197	1075 / 247	1057 / 296	1024 / 345
	290	1002 / 122	1011 / 172	1006 / 219	987 / 266	953 / 312
4.0[a]	450	1769 / 570	1791 / 648	1797 / 724	1788 / 799	1765 / 872
	420	1650 / 469	1670 / 543	1674 / 615	1664 / 686	1639 / 755
	400	1571 / 409	1590 / 481	1593 / 550	1581 / 618	1555 / 684
	370	1453 / 330	1470 / 397	1471 / 462	1458 / 525	1430 / 588
	350[a]	1374 / 283	1390 / 347	1391 / 410	1376 / 470	1347 / 530
	330	1296 / 241	1311 / 303	1310 / 362	1294 / 420	1264 / 477
	310	1219 / 204	1232 / 263	1230 / 319	1213 / 374	1182 / 428
	290	1141 / 171	1153 / 227	1150 / 280	1132 / 332	1100 / 383

[a] Factory Setting

Table 16. A952V080CU5S heating airflow

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
Airflow Setting	Heating Stage	Target Airflow		External Static Pressure (in. W. C.)				
				0.1	0.3	0.5	0.7	0.9
1190	1st Stage	857	CFM / Watts	837 / 67	821 / 109	804 / 150	787 / 192	771 / 233
			Temp. Rise	55	56	57	58	59
	2nd Stage	1190	CFM / Watts	1114 / 126	1127 / 188	1140 / 250	1153 / 311	1167 / 373
			Temp. Rise	64	63	62	61	60
1450[a]	1st Stage	1044	CFM / Watts	967 / 90	993 / 144	1018 / 198	1044 / 252	1070 / 305
			Temp. Rise	47	46	45	44	43
	2nd Stage	1450	CFM / Watts	1359 / 216	1377 / 290	1395 / 364	1413 / 439	1431 / 513
			Temp. Rise	52	51	50	50	49

Table 16. A952V080CU5S heating airflow (continued)

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
Airflow Setting	**Heating Stage**	**Target Airflow**		**External Static Pressure (in. W. C.)**				
				0.1	**0.3**	**0.5**	**0.7**	**0.9**
1560	1st Stage	1123	CFM / Watts	1059 / 108	1057 / 164	1055 / 221	1053 / 278	1051 / 335
			Temp. Rise	43	43	43	43	43
	2nd Stage	1560	CFM / Watts	1466 / 263	1473 / 344	1481 / 425	1489 / 506	1497 / 587
			Temp. Rise	47	47	47	47	47
1700	1st Stage	1224	CFM / Watts	1266 / 133	1170 / 193	1075 / 253	979 / 313	884 / 372
			Temp. Rise	36	39	42	46	49
	2nd Stage	1700	CFM / Watts	1773 / 355	1731 / 436	1689 / 518	1646 / 599	1604 / 681
			Temp. Rise	40	41	42	43	44

(a) Factory Setting

Table 17. A952V080CU5S cooling airflow

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (IN. W. C.) VS. CFM/WATTS				
		0.1	**0.3**	**0.5**	**0.7**	**0.9**
3.0	450	1334 / 181	1346 / 241	1356 / 303	1362 / 366	1366 / 431
	420	1246 / 152	1258 / 207	1267 / 265	1273 / 325	1277 / 387
	400	1187 / 134	1199 / 187	1208 / 243	1213 / 300	1216 / 359
	370	1099 / 110	1111 / 160	1118 / 212	1122 / 266	1124 / 322
	350	1041 / 96	1051 / 143	1058 / 193	1061 / 244	1062 / 298
	330	983 / 83	992 / 128	997 / 175	999 / 225	999 / 277
	310	925 / 71	932 / 114	936 / 159	936 / 207	935 / 257
	290	867 / 61	873 / 101	874 / 144	872 / 190	870 / 238
3.5	450	1557 / 273	1567 / 342	1575 / 413	1581 / 485	1584 / 559
	420	1453 / 227	1464 / 292	1473 / 358	1479 / 426	1483 / 496
	400	1384 / 200	1395 / 261	1405 / 325	1411 / 390	1415 / 457
	370	1280 / 163	1292 / 220	1301 / 279	1308 / 341	1311 / 403
	350	1212 / 141	1224 / 195	1232 / 252	1238 / 310	1241 / 371
	330	1143 / 121	1155 / 173	1163 / 227	1168 / 282	1171 / 340
	310	1075 / 104	1086 / 152	1093 / 204	1097 / 257	1099 / 312
	290	1007 / 88	1017 / 134	1022 / 182	1025 / 233	1026 / 286
4.0	450	1781 / 392	1788 / 470	1794 / 550	1797 / 632	1798 / 715
	420	1661 / 325	1670 / 398	1677 / 473	1682 / 550	1684 / 628
	400	1582 / 285	1592 / 355	1600 / 427	1605 / 500	1608 / 575
	370	1463 / 231	1474 / 296	1483 / 363	1489 / 432	1493 / 502
	350	1384 / 200	1395 / 261	1405 / 325	1411 / 390	1415 / 457
	330	1305 / 171	1317 / 229	1326 / 290	1332 / 352	1336 / 416
	310	1226 / 146	1238 / 201	1247 / 258	1253 / 317	1256 / 377
	290	1148 / 123	1160 / 174	1168 / 228	1173 / 284	1176 / 342

Table 17. A952V080CU5S cooling airflow (continued)

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (IN. W. C.) VS. CFM/WATTS				
		0.1	0.3	0.5	0.7	0.9
4.5	450	2008 / 542	2010 / 629	2011 / 719	2011 / 810	2008 / 902
	420	1872 / 448	1877 / 530	1881 / 614	1883 / 699	1882 / 786
	400	1781 / 392	1788 / 470	1794 / 550	1797 / 632	1798 / 715
	370	1647 / 317	1656 / 390	1663 / 464	1668 / 540	1670 / 618
	350	1557 / 273	1567 / 342	1575 / 413	1581 / 485	1584 / 559
	330	1468 / 233	1479 / 298	1488 / 366	1494 / 434	1498 / 504
	310	1379 / 198	1391 / 259	1400 / 323	1406 / 388	1410 / 454
	290	1290 / 166	1302 / 224	1311 / 284	1318 / 345	1321 / 408
5.0[a]	450	2235 / 726	2233 / 823	2229 / 922	2224 / 1023	2216 / 1124
	420	2083 / 599	2084 / 690	2084 / 783	2082 / 877	2077 / 972
	400	1982 / 523	1986 / 610	1987 / 699	1987 / 789	1985 / 880
	370	1832 / 422	1838 / 503	1842 / 585	1844 / 669	1844 / 754
	350[a]	1731 / 363	1739 / 439	1745 / 517	1749 / 597	1750 / 678
	330	1632 / 309	1641 / 381	1648 / 455	1653 / 531	1656 / 608
	310	1532 / 261	1543 / 329	1551 / 399	1557 / 471	1560 / 543
	290	1433 / 219	1445 / 283	1453 / 348	1460 / 416	1464 / 484

[a] Factory Setting

Table 18. A952V100CU5S heating airflow

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
Airflow Setting	Heating Stage	Target Airflow		External Static Pressure (in. W. C.)				
				0.1	0.3	0.5	0.7	0.9
1590	1st Stage	1145	CFM / Watts	1111 / 135	1097 / 184	1083 / 234	1068 / 283	1054 / 333
			Temp. Rise	52	52	52	52	53
	2nd Stage	1590	CFM / Watts	1564 / 323	1550 / 397	1536 / 470	1522 / 544	1508 / 618
			Temp. Rise	58	58	58	58	59
1980	1st Stage	1426	CFM / Watts	1393 / 232	1383 / 286	1372 / 340	1362 / 394	1352 / 447
			Temp. Rise	41	41	42	42	42
	2nd Stage	1980	CFM / Watts	1959 / 597	1936 / 681	1913 / 764	1891 / 847	1868 / 930
			Temp. Rise	46	46	47	47	47
2060[a]	1st Stage	1483	CFM / Watts	1451 / 260	1447 / 310	1443 / 360	1438 / 410	1434 / 460
			Temp. Rise	39	40	40	40	40
	2nd Stage	2060	CFM / Watts	2047 / 655	2034 / 737	2021 / 818	2008 / 900	1995 / 982
			Temp. Rise	44	44	44	45	45
2150	1st Stage	1548	CFM / Watts	1495 / 285	1477 / 352	1458 / 419	1439 / 486	1421 / 553
			Temp. Rise	38	39	39	40	40
	2nd Stage	2150	CFM / Watts	2102 / 745	2087 / 801	2073 / 857	2058 / 913	2044 / 969
			Temp. Rise	43	43	43	44	44

[a] Factory Setting

Table 19. A952V100CD5S heating airflow

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
Airflow Setting	Heating Stage	Target Airflow		External Static Pressure (in. W. C.)				
				0.1	0.3	0.5	0.7	0.9
1520	1st Stage	1094	CFM / Watts	1093 / 126	1092 / 183	1090 / 240	1089 / 296	1088 / 353
			Temp. Rise	53	53	53	52	52
	2nd Stage	1520	CFM / Watts	1484 / 296	1477 / 370	1469 / 444	1461 / 518	1453 / 592
			Temp. Rise	60	60	61	61	61
1880	1st Stage	1296	CFM / Watts	1234 / 186	1238 / 243	1242 / 299	1247 / 356	1251 / 413
			Temp. Rise	47	47	47	47	47
	2nd Stage	1800	CFM / Watts	1693 / 449	1688 / 533	1684 / 618	1679 / 702	1674 / 786
			Temp. Rise	53	53	53	53	53
1870[a]	1st Stage	1346	CFM / Watts	1279 / 214	1268 / 268	1256 / 321	1245 / 375	1234 / 428
			Temp. Rise	45	45	46	46	47
	2nd Stage	1870	CFM / Watts	1768 / 505	1772 / 591	1775 / 678	1778 / 765	1781 / 852
			Temp. Rise	51	50	50	50	50
2100	1st Stage	1512	CFM / Watts	1453 / 277	1429 / 344	1405 / 411	1381 / 478	1358 / 545
			Temp. Rise	40	40	41	41	42
	2nd Stage	2100	CFM / Watts	1969 / 723	1956 / 789	1944 / 854	1931 / 920	1918 / 986
			Temp. Rise	45	45	46	46	46

[a] Factory Setting

Table 20. A952V100CU5S / A952V100CD5S cooling airflow

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (IN. W. C.) VS. CFM/WATTS				
		0.1	0.3	0.5	0.7	0.9
2.5	450	1152 / 111	1149 / 158	1147 / 208	1144 / 260	1140 / 314
	420	1076 / 93	1072 / 138	1070 / 185	1068 / 234	1063 / 286
	400	1060 / 89	1056 / 133	1053 / 180	1044 / 227	1021 / 272
	370	949 / 68	944 / 108	941 / 151	939 / 197	934 / 246
	350	898 / 60	892 / 98	890 / 139	886 / 184	882 / 232
	330	847 / 52	841 / 88	837 / 128	834 / 172	829 / 219
	310	796 / 45	788 / 80	785 / 118	782 / 161	777 / 207
	290	744 / 39	736 / 72	732 / 109	729 / 151	723 / 197
3.0	450	1378 / 178	1376 / 234	1374 / 292	1371 / 352	1367 / 413
	420	1288 / 148	1285 / 201	1284 / 256	1281 / 312	1277 / 370
	400	1228 / 131	1225 / 181	1223 / 233	1220 / 288	1216 / 344
	370	1137 / 107	1134 / 154	1132 / 203	1129 / 254	1125 / 308
	350	1076 / 93	1072 / 138	1070 / 185	1068 / 234	1063 / 286
	330	1016 / 80	1011 / 123	1009 / 168	1006 / 215	1002 / 266
	310	954 / 69	949 / 109	947 / 152	944 / 198	939 / 247
	290	893 / 59	887 / 97	884 / 138	881 / 183	877 / 230

Table 20. A952V100CU5S / A952V100CD5S cooling airflow (continued)

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (IN. W. C.) VS. CFM/WATTS				
		0.1	0.3	0.5	0.7	0.9
3.5	450	1601 / 269	1599 / 334	1597 / 401	1594 / 469	1589 / 538
	420	1497 / 223	1495 / 284	1493 / 347	1490 / 411	1486 / 476
	400	1428 / 196	1425 / 254	1424 / 314	1421 / 375	1417 / 438
	370	1323 / 159	1320 / 213	1319 / 269	1316 / 327	1312 / 386
	350	1253 / 138	1250 / 189	1248 / 242	1246 / 298	1242 / 355
	330	1183 / 118	1179 / 167	1177 / 218	1175 / 271	1171 / 326
	310	1112 / 101	1108 / 147	1106 / 195	1103 / 246	1099 / 299
	290	1041 / 86	1037 / 129	1034 / 175	1032 / 223	1027 / 274
4.0	450	1820 / 387	1818 / 461	1816 / 537	1812 / 614	1807 / 692
	420	1703 / 320	1701 / 390	1699 / 461	1696 / 533	1691 / 606
	400	1625 / 280	1623 / 347	1621 / 414	1618 / 483	1614 / 554
	370	1507 / 227	1505 / 288	1503 / 352	1500 / 416	1496 / 482
	350	1428 / 196	1425 / 254	1424 / 314	1421 / 375	1417 / 438
	330	1348 / 168	1346 / 222	1344 / 279	1341 / 338	1337 / 398
	310	1268 / 142	1265 / 194	1263 / 248	1261 / 304	1257 / 361
	290	1188 / 120	1184 / 168	1182 / 219	1180 / 272	1176 / 328
4.5	450	2036 / 537	2034 / 620	2030 / 705	2026 / 791	2020 / 879
	420	1907 / 443	1905 / 521	1902 / 600	1898 / 681	1892 / 763
	400	1820 / 387	1818 / 461	1816 / 537	1812 / 614	1807 / 692
	370	1689 / 313	1687 / 381	1685 / 452	1682 / 523	1677 / 596
	350	1601 / 269	1599 / 334	1597 / 401	1594 / 469	1589 / 538
	330	1512 / 229	1510 / 291	1508 / 354	1505 / 419	1501 / 485
	310	1423 / 194	1420 / 252	1419 / 312	1416 / 373	1412 / 436
	290	1333 / 163	1331 / 217	1329 / 273	1326 / 331	1322 / 391
5.0[a]	450	2248 / 721	2245 / 814	2241 / 909	2235 / 1004	2228 / 1100
	420	2107 / 594	2105 / 681	2101 / 769	2096 / 858	2089 / 948
	400	2012 / 519	2010 / 601	2007 / 685	2002 / 770	1996 / 856
	370	1868 / 418	1866 / 494	1864 / 572	1860 / 651	1854 / 731
	350[a]	1771 / 358	1770 / 430	1767 / 504	1764 / 579	1759 / 655
	330	1674 / 305	1672 / 373	1670 / 443	1667 / 514	1662 / 586
	310	1576 / 257	1574 / 321	1572 / 387	1569 / 454	1565 / 523
	290	1477 / 215	1475 / 275	1473 / 337	1471 / 400	1466 / 465

[a] Factory Setting

Table 21. A952V120DU5S heating airflow

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
Airflow Setting	**Heating Stage**	**Target Airflow**		**External Static Pressure (in. W. C.)**				
				0.1	**0.3**	**0.5**	**0.7**	**0.9**
1560	1st Stage	1123	CFM / Watts	1138 / 115	1158 / 176	1178 / 236	1198 / 297	1218 / 358
			Temp. Rise	61	60	59	58	57
	2nd Stage	1560	CFM / Watts	1654 / 291	1637 / 360	1621 / 430	1604 / 499	1587 / 568
			Temp. Rise	65	66	67	67	68
1850	1st Stage	1332	CFM / Watts	1371 / 182	1383 / 251	1394 / 320	1406 / 389	1417 / 457
			Temp. Rise	51	50	50	49	49
	2nd Stage	1850	CFM / Watts	1980 / 456	1951 / 539	1922 / 621	1893 / 704	1864 / 787
			Temp. Rise	55	56	57	58	58
1950[(a)]	1st Stage	1404	CFM / Watts	1440 / 208	1450 / 283	1461 / 357	1471 / 431	1482 / 505
			Temp. Rise	48	48	48	47	47
	2nd Stage	1950	CFM / Watts	2075 / 527	2037 / 611	1999 / 696	1961 / 781	1923 / 865
			Temp. Rise	52	53	54	55	56
2250	1st Stage	1620	CFM / Watts	1669 / 315	1674 / 388	1680 / 460	1685 / 533	1691 / 605
			Temp. Rise	42	42	41	41	41
	2nd Stage	2250	CFM / Watts	2280 / 795	2197 / 819	2114 / 842	2032 / 865	1949 / 888
			Temp. Rise	48	50	52	54	56

[(a)] Factory Setting

Table 22. A952V120DD5S heating airflow

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
Airflow Setting	**Heating Stage**	**Target Airflow**		**External Static Pressure (in. W. C.)**				
				0.1	**0.3**	**0.5**	**0.7**	**0.9**
1750	1st Stage	1160	CFM / Watts	1234 / 137	1240 / 198	1246 / 258	1252 / 319	1258 / 380
			Temp. Rise	56	56	56	55	55
	2nd Stage	1750	CFM / Watts	1687 / 327	1673 / 407	1659 / 487	1645 / 568	1631 / 648
			Temp. Rise	63	64	64	65	65
1850	1st Stage	1332	CFM / Watts	1305 / 158	1311 / 221	1318 / 284	1325 / 347	1332 / 410
			Temp. Rise	53	53	53	52	52
	2nd Stage	1850	CFM / Watts	1788 / 380	1771 / 464	1754 / 549	1738 / 633	1721 / 718
			Temp. Rise	60	60	61	61	62
1950	1st Stage	1404	CFM / Watts	1324 / 179	1510 / 246	1697 / 313	1884 / 380	2070 / 447
			Temp. Rise	53	46	39	32	25
	2nd Stage	1950	CFM / Watts	1891 / 424	1862 / 524	1833 / 624	1803 / 724	1774 / 824
			Temp. Rise	56	57	58	60	61

Table 22. A952V120DD5S heating airflow (continued)

Furnace Heating Airflow (CFM), Power (Watts), and Temp. Rise (°F) vs. External Static Pressure with Filter (iwc)								
Airflow Setting	Heating Stage	Target Airflow		External Static Pressure (in. W. C.)				
				0.1	0.3	0.5	0.7	0.9
2250[a]	1st Stage	1620	CFM / Watts	1598 / 266	1484 / 316	1371 / 366	1257 / 416	1144 / 466
			Temp. Rise	44	47	49	52	54
	2nd Stage	2250	CFM / Watts	2080 / 708	2100 / 768	2120 / 828	2140 / 888	2160 / 948
			Temp. Rise	51	51	51	51	51

[a] Factory Setting

Table 23. A952V120DU5S / A952V120DD5S cooling airflow

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (IN. W. C.) VS. CFM/WATTS				
		0.1	0.3	0.5	0.7	0.9
3.0	450	1336 / 163	1346 / 221	1353 / 280	1359 / 341	1363 / 401
	420	1247 / 136	1257 / 191	1265 / 247	1270 / 303	1274 / 360
	400	1189 / 120	1198 / 173	1205 / 226	1211 / 280	1214 / 335
	370	1101 / 99	1109 / 148	1116 / 198	1120 / 249	1123 / 300
	350	1043 / 86	1050 / 133	1056 / 180	1060 / 229	1062 / 279
	330	985 / 75	991 / 119	996 / 164	999 / 211	1000 / 259
	310	926 / 65	931 / 106	935 / 149	937 / 194	937 / 240
	290	869 / 56	872 / 95	874 / 136	875 / 178	874 / 223
3.5	450	1558 / 244	1567 / 312	1574 / 380	1579 / 449	1582 / 519
	420	1454 / 203	1464 / 266	1471 / 331	1477 / 396	1480 / 461
	400	1385 / 179	1395 / 239	1403 / 301	1408 / 363	1412 / 425
	370	1282 / 146	1292 / 202	1299 / 259	1305 / 317	1309 / 376
	350	1213 / 127	1223 / 180	1230 / 235	1235 / 290	1239 / 346
	330	1145 / 109	1154 / 160	1161 / 211	1166 / 264	1169 / 317
	310	1077 / 94	1085 / 141	1091 / 190	1095 / 240	1098 / 291
	290	1009 / 80	1016 / 125	1021 / 171	1024 / 218	1026 / 267
4.0	450	1783 / 349	1789 / 426	1793 / 505	1796 / 583	1797 / 662
	420	1663 / 290	1670 / 362	1676 / 435	1680 / 509	1683 / 582
	400	1583 / 254	1591 / 323	1598 / 393	1603 / 463	1606 / 534
	370	1464 / 207	1473 / 270	1481 / 335	1486 / 401	1490 / 466
	350	1385 / 179	1395 / 239	1403 / 301	1408 / 363	1412 / 425
	330	1306 / 153	1316 / 211	1324 / 269	1330 / 328	1333 / 387
	310	1228 / 131	1237 / 185	1245 / 240	1250 / 295	1254 / 352
	290	1150 / 111	1159 / 161	1166 / 213	1171 / 266	1174 / 319

Table 23. A952V120DU5S / A952V120DD5S cooling airflow (continued)

Outdoor Tonnage (tons)	Airflow Setting (CFM/ton)	External Static Pressure (IN. W. C.) VS. CFM/WATTS				
		0.1	0.3	0.5	0.7	0.9
4.5	450	2009 / 482	2011 / 569	2011 / 657	2011 / 745	2009 / 833
	420	1873 / 399	1877 / 480	1880 / 562	1882 / 644	1882 / 727
	400	1783 / 349	1789 / 426	1793 / 505	1796 / 583	1797 / 662
	370	1648 / 283	1655 / 354	1661 / 427	1666 / 500	1668 / 573
	350	1558 / 244	1567 / 312	1574 / 380	1579 / 449	1582 / 519
	330	1469 / 209	1478 / 273	1486 / 338	1491 / 403	1495 / 469
	310	1380 / 177	1390 / 237	1398 / 299	1403 / 361	1407 / 423
	290	1292 / 149	1301 / 206	1309 / 263	1315 / 322	1318 / 380
5.0[a]	450	2238 / 645	2234 / 742	2230 / 839	2225 / 937	2220 / 1035
	420	2085 / 533	2085 / 623	2084 / 714	2082 / 805	2080 / 897
	400	1984 / 466	1986 / 551	1987 / 638	1987 / 725	1986 / 813
	370	1833 / 376	1838 / 456	1841 / 536	1844 / 617	1844 / 698
	350[a]	1733 / 323	1739 / 399	1744 / 475	1748 / 551	1750 / 628
	330	1633 / 276	1641 / 347	1647 / 419	1651 / 491	1654 / 564
	310	1533 / 234	1542 / 300	1549 / 368	1554 / 436	1558 / 505
	290	1434 / 196	1444 / 258	1452 / 322	1457 / 386	1461 / 451

[a] Factory Setting

Furnace General Installation

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

Furnace Panel Removal

Note: *Use a 1/4-inch nut driver to remove the two screws on the front panel.*

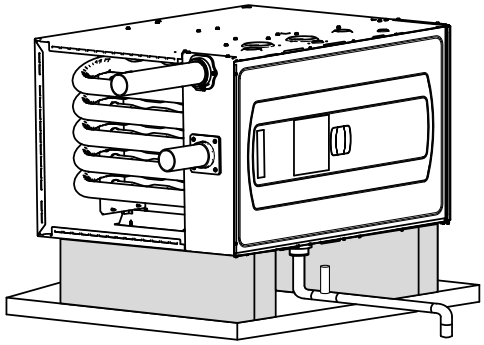
Horizontal Installation in an Attic or Crawlspace

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. 15. 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 6. 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

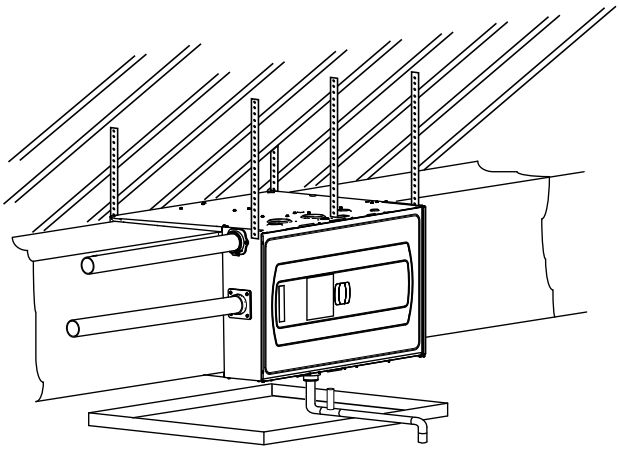
Note: The overflow stand pipe termination must be even with or slightly below the bottom of the condensate trap.

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 7. 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 8. Representative vertical furnace with gas piping on left side

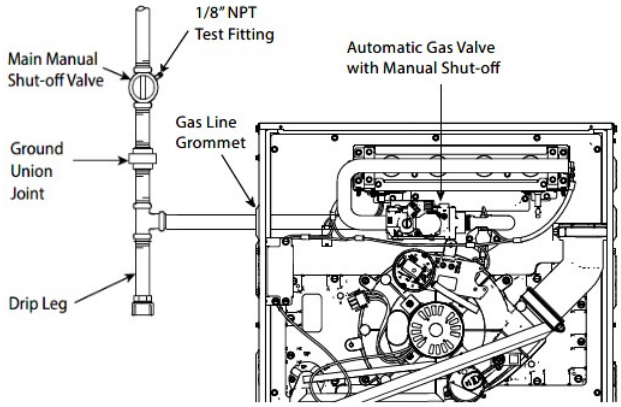


Figure 9. Representative vertical furnace with gas piping on right side

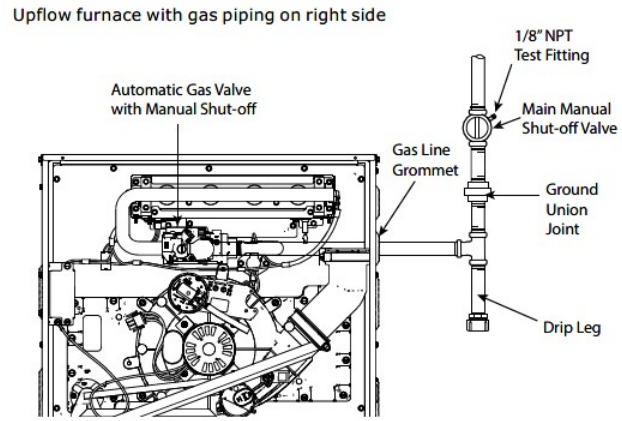
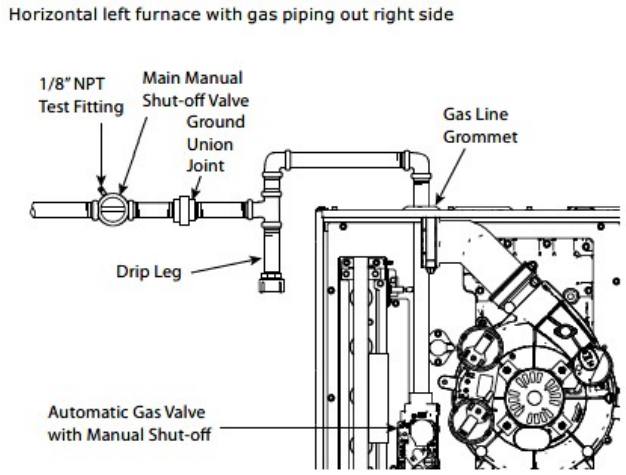


Figure 10. Representative horizontal left furnace with gas piping out top



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-in. W.C. Minimum pressure is 5.0-in. W.C. Maximum pressure to the gas valve for propane is 13.8-in. W.C. Minimum pressure is 10.0-in. W.C.*

Table 24. Table of 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.

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 25. 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
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" on White-Rodgers gas valve model 36J.
4. Turn on system power and energize valve.

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

5. 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.
6. Adjust 1st stage gas heat by removing the low (LO) 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.
7. Cycle the valve several times to verify regulator setting.
   a. Repeat Step 5 to Step 7 if needed.
8. Turn off all electrical power to the system.
9. Remove the manometer and flexible tubing and tighten the pressure tap screw.
10. Using a leak detection solution or soap suds, check for leaks at the pressure outlet boss and pressure tap test screw.
11. Turn on system power and check operation of the unit.

Figure 11. Gas valve adjustment

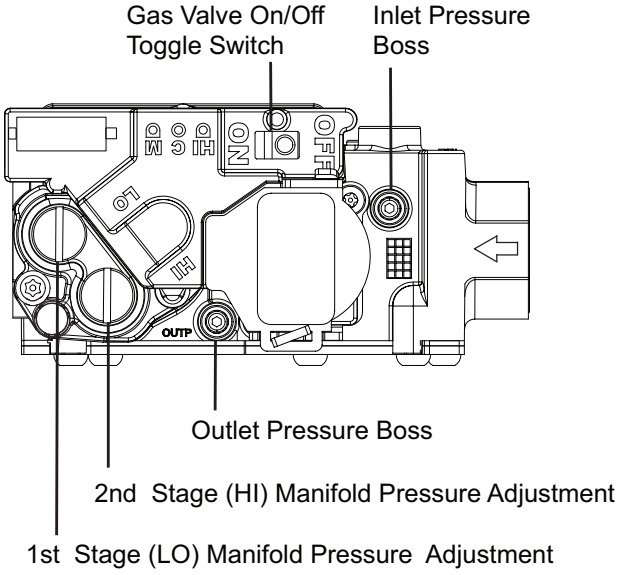


Table 26. Fuel manifold pressure settings (in. w.c.)

Fuel	2nd Stage Max.	1st Stage Max.
Natural Gas	3.5	1.7
Propane Gas	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. Installations above 12,000 feet are not allowed.

Table 27. Part numbers for replacement orifices

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

Turn the main Gas Valve toggle switch within the unit to the **OFF** position. 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. Turn the toggle switch on the Gas Valve in the unit to the **ON** position.

The table in next page 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.*

Table 28. Altitude above sea level and orifice required at other elevations

Orifice Twist Drill Size If Installed at Sea Level	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 for maximum condensing furnace efficiency. Proper installation of the vent system is necessary for condensate drainage and to 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 Approved Vent Pipe Materials Table. 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 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, e.g., when it passes through unheated spaces, etc., 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.

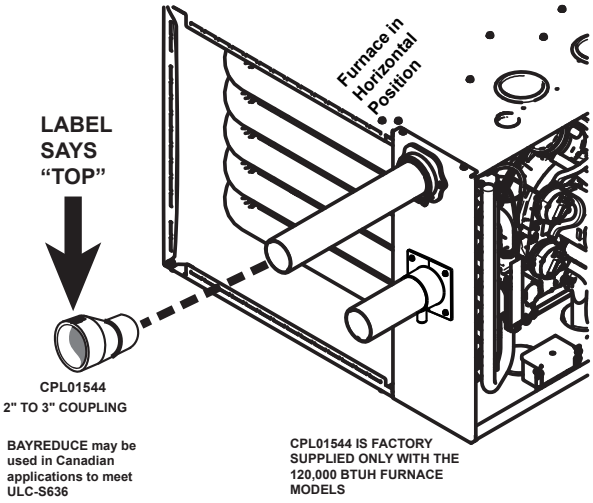
3-Inch Venting Requirements

Important:

- *To determine if your application requires 3-inch venting, see “Maximum Vent Length Table,” p. 44.*
- *Horizontal venting application must use the 2-inch × 3-inch offset reducing coupling. Vertical venting applications do not require the reducing coupling to be offset.*

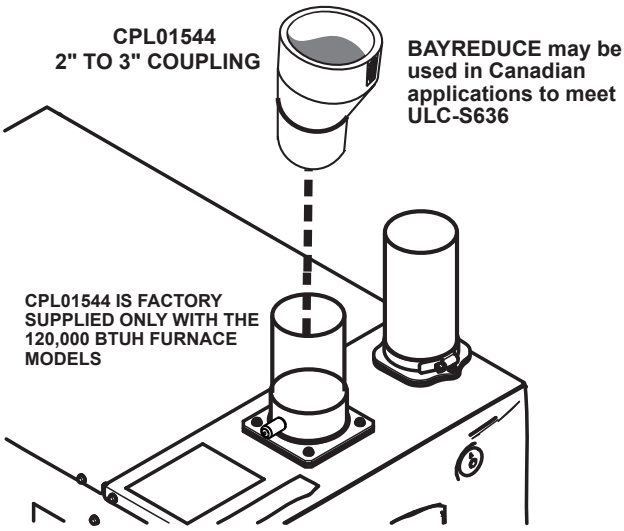
Note: *If the furnace comes with a factory supplied 2-inch × 3-inch offset reducing coupling use it for 3-inch vent pipe installation. Confirm TOP is on the top side of the pipe in horizontal venting applications. The straight side of the coupling must be on bottom for proper drainage of condensate.*

Figure 12. Horizontal coupling



Note: *For Canadian applications, BAYREDUCE 2-inch × 3-inch offset reducing coupling meets ULC-S636 requirements. Confirm TOP is 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 13. 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 15, p. 39, Figure 16, p. 39, and Figure 17, 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, confirm that the drain is oriented downward.

Figure 14. Condensing furnace vent

Figure 15. Upflow top entry

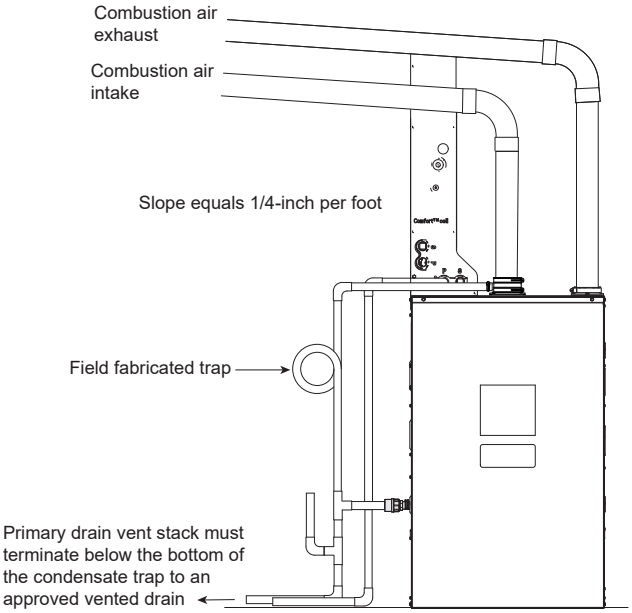


Figure 16. Horizontal top entry

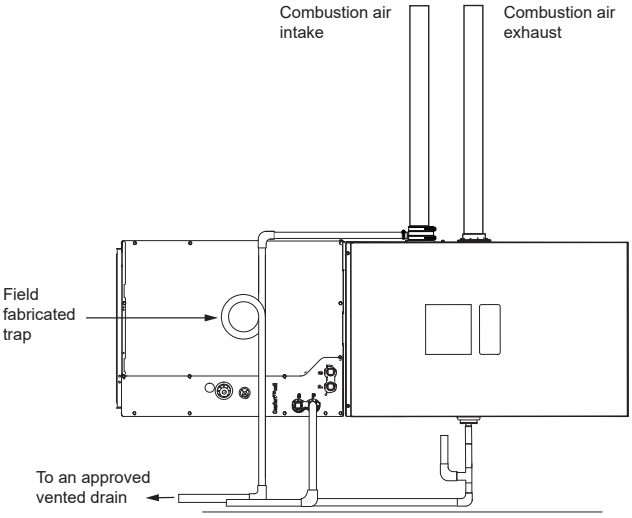
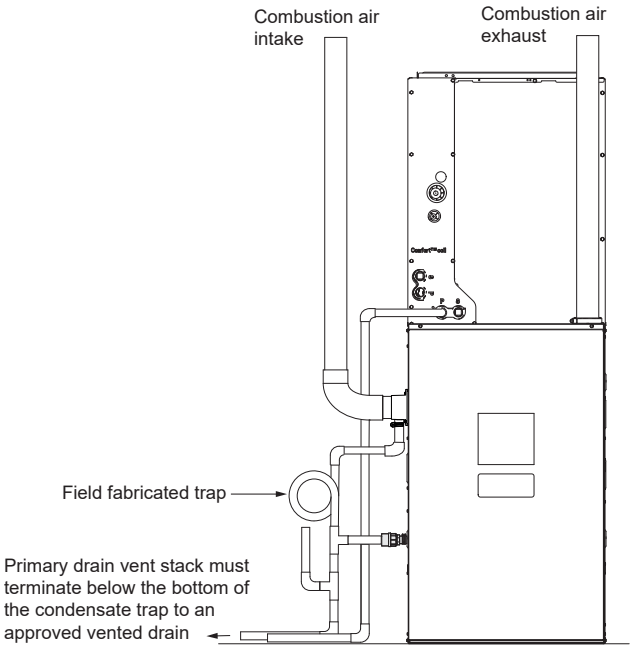


Figure 17. Upflow side entry



Direct Vent Furnace Air Intake

Special 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.

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

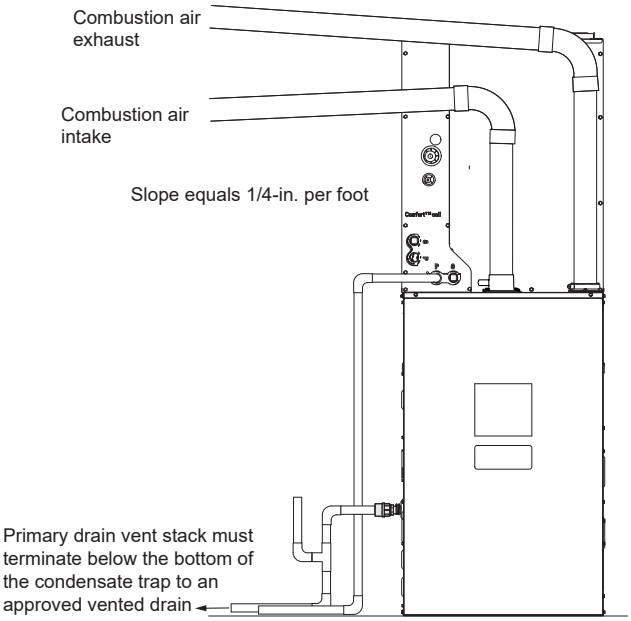
Note: *Inlet air piping is not considered to be part of the venting system. The inlet air piping may be made from PVC.*

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. 63.*

Figure 18. Option 1

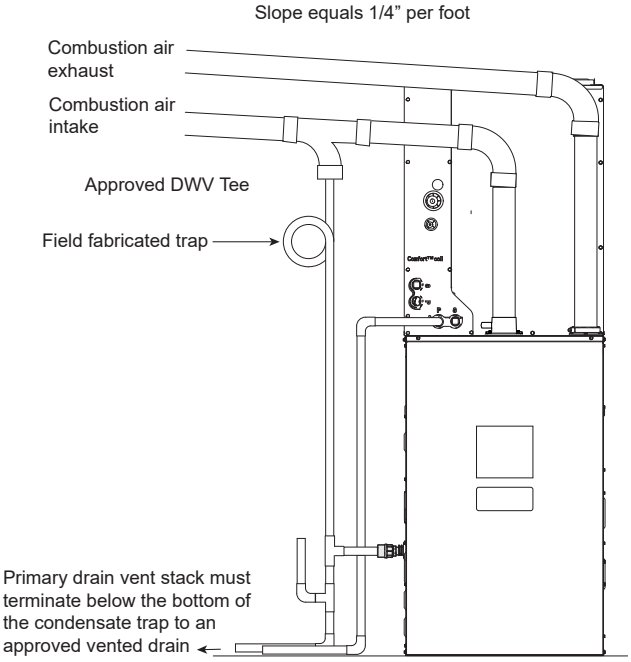


Option 2 – Top combustion air intake

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. 63.*

Figure 19. Option 2

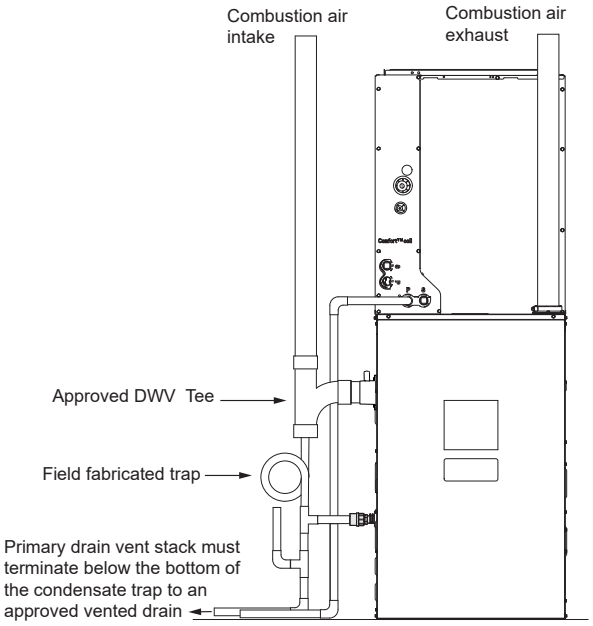


Option 3 – Side combustion air intake

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. 63.*

Figure 20. 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. 52)

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 "Horizontal Venting," p. 44 section.*

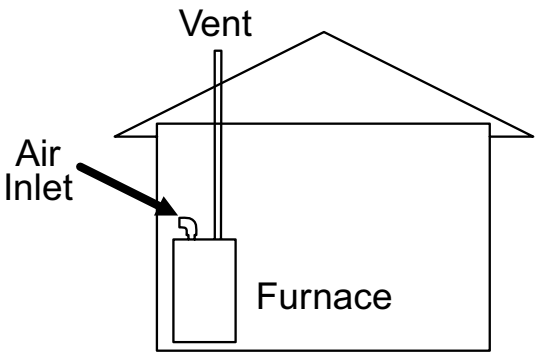
The following are Examples Only.

Example 1

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, etc., as shown in the section "Air for Combustion and Ventilation," p. 52.

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.*

Figure 21. Example 1

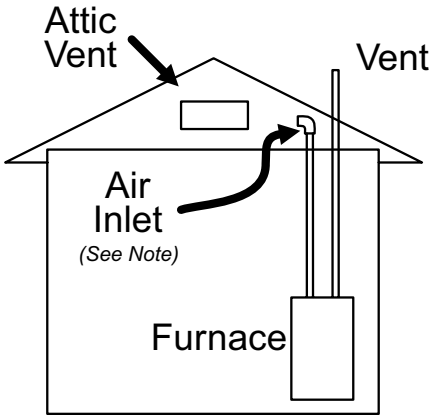


Example 2

The inlet air does not have to come from outside the structure. Example 2 shows the inlet air, may come from the attic if the requirements for combustion air are met as shown in the section "Air for Combustion and Ventilation," p. 52.

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.*

Figure 22. Example 2



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.

Note: *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

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. Check the fit, then wipe socket and pipe with cleaner primer and apply a liberal coat to the socket interior and pipe exterior. Do not let the primer dry before cementing.
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 23. Sealing inlet air pipe

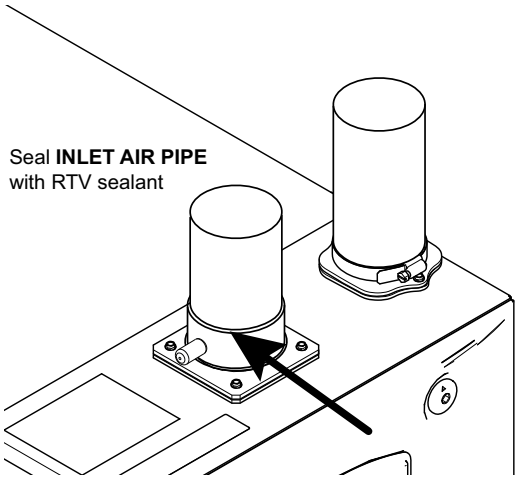


Table 29. Approved vent pipe materials

PVC Vent Fitting Material These fittings are available from your Gas Furnace Distributors.			
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
F891	CELLULAR CORE[(a)]	158	ASTM F891
D2665	DWV PIPE	158	ASTM D2665
D1785	SCH 40, 80, 120	158	ASTM 1785
D2241	SDR SERIES	158	ASTM D2241
CPVC			
ASTM STANDARD	PIPE TYPE	ALLOWABLE TEMPERATURE °F	MARKING
D2846	CPVC 41	212	ASTM D2846
F441	SCH 40, 80	212	ASTM F441
F442	SDR SERIES	212	ASTM F442
ABS			
ASTM STANDARD	PIPE TYPE	ALLOWABLE TEMPERATURE °F	MARKING
D2661	SCH 40 DWV	180	ASTM D2661
F628	SCH 40 DWV CELLULAR CORE[(a)]	180	ASTM F628
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

[(a)] Beginning March 1, 2024, PVC Cellular Core and ABS Cellular Core vent materials are not approved.

Maximum Vent Length Table

Table 30. Maximum vent length

Model	1.5-inch Pipe	2-inch Pipe	2.5-inch Pipe	3-inch Pipe	4-inch Pipe
Altitude 0-2,000 FT.					
A952V040B, A952V060B	50	200	200	200	250
A952V080B, A952V080C	30	100	200	200	250
A952V100C	(a)	50	100	200	250
A952V120D	(a)	(a)	(a)	200	250
Altitude 2,001- 5400 FT					
A952V040B, A952V060B	50	200	200	200	250
A952V080B, A952V080C	20	80	120	120	200
A952V100C	(a)	50	100	150	200
A952V120D	(a)	(a)	(a)	200	250
Altitude 5,401-7,800 FT					
A952V040B, A952V060B	25	100	150	150	200
A952V080B, A952V080C	(a)	50	70	70	140
A952V100C	(a)	(a)	(a)	100	200
A952V120D	(a)	(a)	(a)	100	200
Altitude 7,801-10,100 FT					
A952V040B, A952V060B	(a)	50	90	90	180
A952V080B, A952V080C	(a)	(a)	(a)	50	100
A952V100C	(a)	(a)	(a)	50	100
A952V120D	(a)	(a)	(a)	50	100

Notes:

1. *Installation Instructions must be followed for installation of the venting system.*
2. *Maximum Total Equivalent Length In Feet for Vent or Inlet Air, not combined total.*
3. *For PolyPro® by Duravent, Z-DENS by Novaflex Group, InnoFlue® by Centrotherm, 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 7. See the venting system manufacturer's installation instruction for appropriate venting diameters and equivalent lengths.*
4. *Minimum vent length for all models: 15ft equivalent.*
5. *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 8 below for exception). The inlet pipe can be of a larger diameter, but never smaller than the vent pipe.*
6. *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).*
7. *One short radius 90° elbow is equivalent to 10ft of 4-inch pipe, 10ft of 3-inch pipe, or 8ft of 2-inch pipe. One long radius elbow is equivalent to 6ft of 4-inch pipe, 7ft of 3-inch pipe, or 5ft of 2-inch pipe. Two 45° elbows equal one 90° LONG elbow. One mitered elbow is equivalent to 12ft of 3-inch pipe or 12ft of 2-inch pipe.*
8. *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 5ft. For BAYVENT200B and BAYVENTCN200B the equivalent length is 0ft.*
9. *For Canadian applications, venting systems must meet ULC-S636 requirements.*
10. *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 that 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:

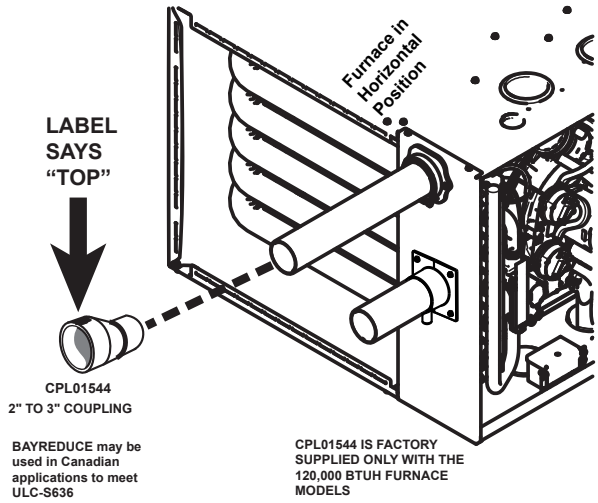
- *To determine if your application requires 3-inch venting, see "Maximum Vent Length Table," p. 44.*
- *Horizontal venting application must use the 2-inch × 3-inch offset reducing coupling. Vertical venting applications do not require the reducing coupling to be offset.*

When the vent pipe is exposed to temperatures below freezing, e.g., when it passes through unheated spaces, etc., 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.

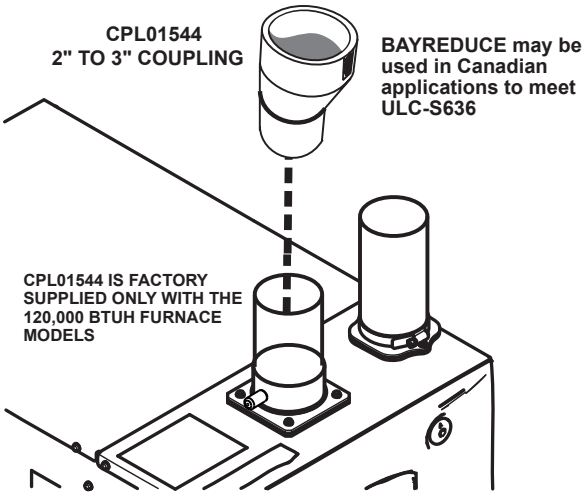
Note: *If your furnace comes with a factory supplied 2-inch × 3-inch offset reducing coupling it is used for 3-inch vent pipe installation. Make sure the marking TOP is located on the top side of the pipe in horizontal venting applications. The straight side of the coupling must be on bottom for proper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

Figure 24. Horizontal venting



Note: *For Canadian applications, BAYREDUCE 2-inch × 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 25. Vertical venting

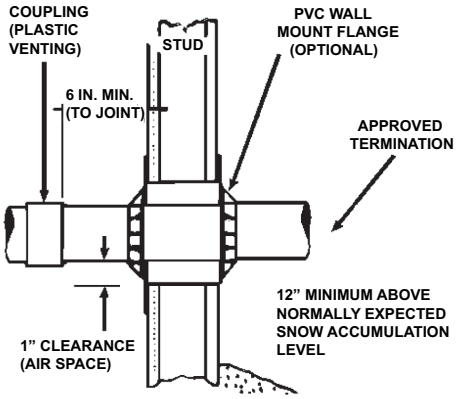


Combustible Material Wall

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 × 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 26. Combustible material wall



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

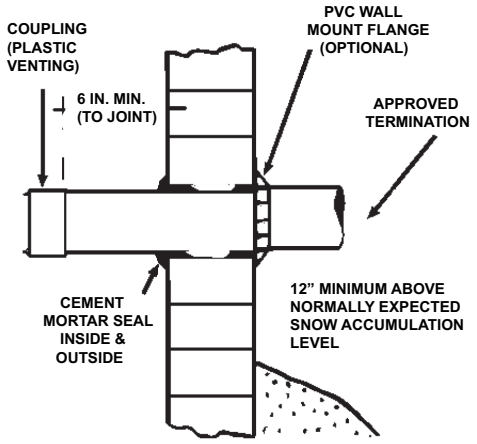
CLEARANCE (0" ACCEPTABLE FOR PVC VENT PIPE)
(1" ACCEPTABLE FOR TYPE 29-4C STAINLESS STEEL VENT PIPE)

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 27. Non-combustible material wall



Horizontal Venting Through Wall

The vent for this appliance shall not terminate:

1. Over public walkways.
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.

Possible configurations for two pipe venting systems 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 centerline to centerline.*

Figure 28. Configurations two pipe venting systems — type 1

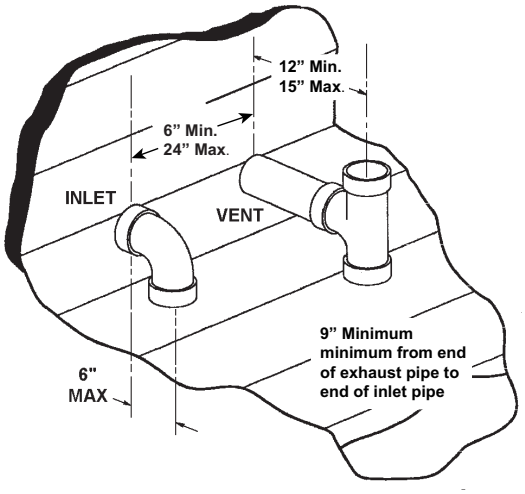


Figure 29. Configurations two pipe venting systems — type 2

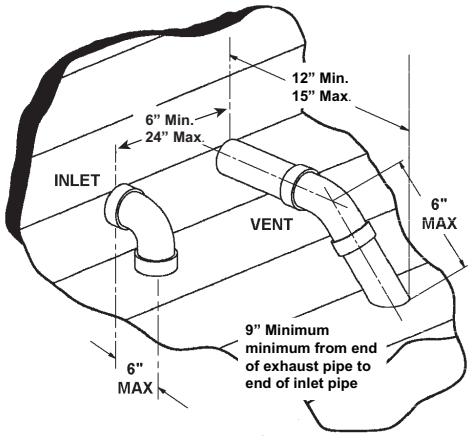


Figure 30. Configurations two pipe venting systems — type 3

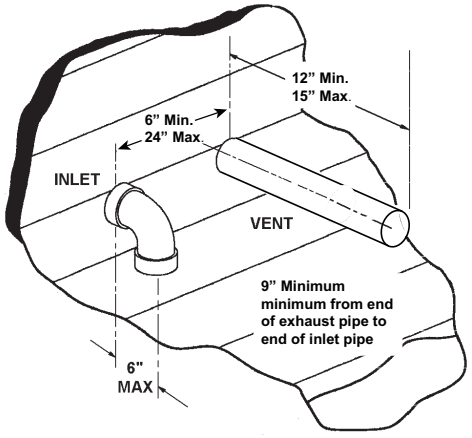


Figure 31. Configurations two pipe venting systems — type 4

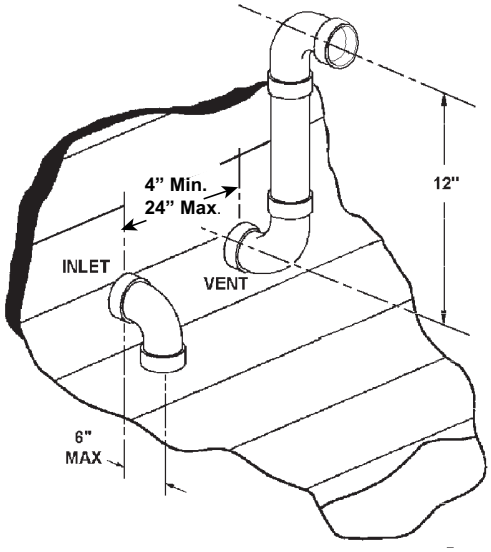


Figure 32. Configurations two pipe venting systems — type 5

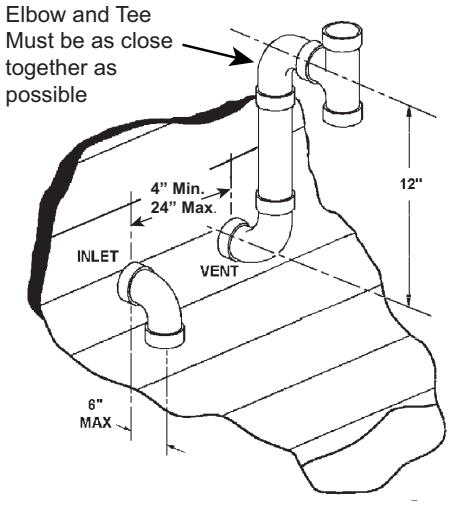
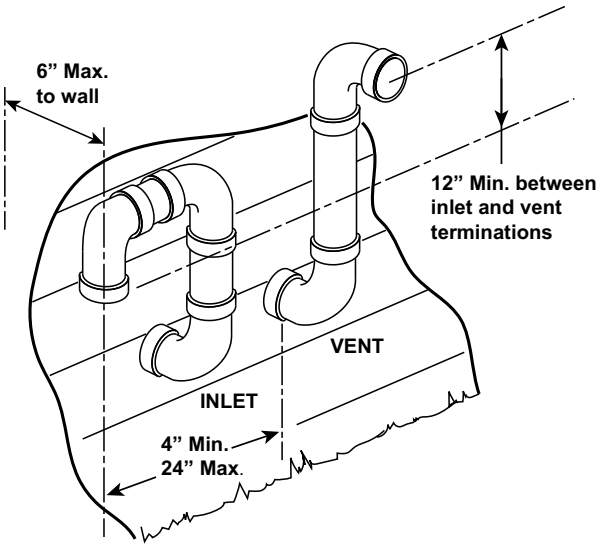


Figure 33. Configurations two pipe venting systems — type 6



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 and 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 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 34. BAYVENT200B / BAYVENTCN200B

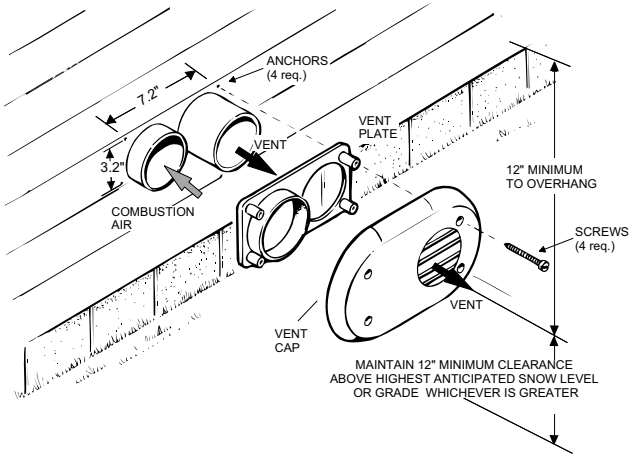
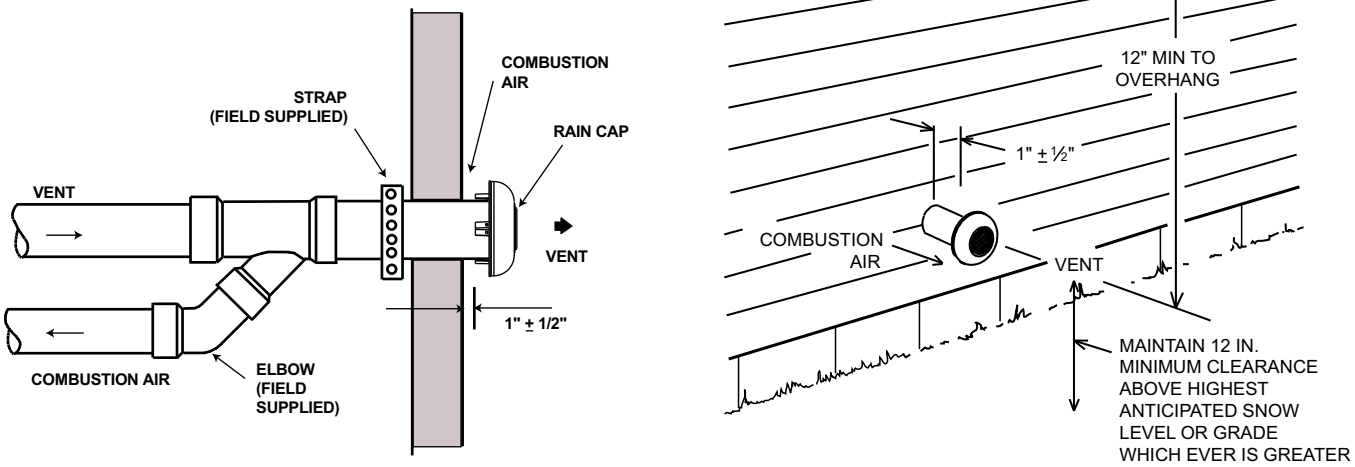


Figure 35. BAYAIR30AVENTA / BAYAIR30CNVENT (Sidewall)



Horizontal Vent Clearances

Figure 36. Horizontal vent clearances

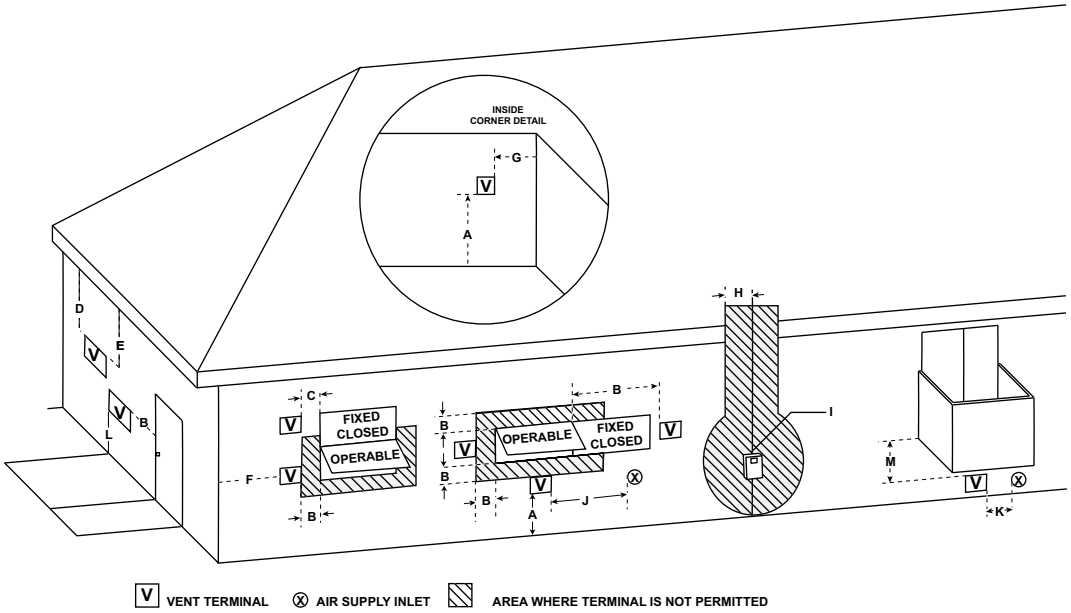


Table 31. Vent termination clearances - direct/non-direct

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)

Table 31. Vent termination clearances - direct/non-direct (continued)

Vent Termination Clearances- Direct/Non-Direct				
		Canadian Installations	**US Installations Non-Direct**	**US Installations Direct**
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
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 37. Vent support example

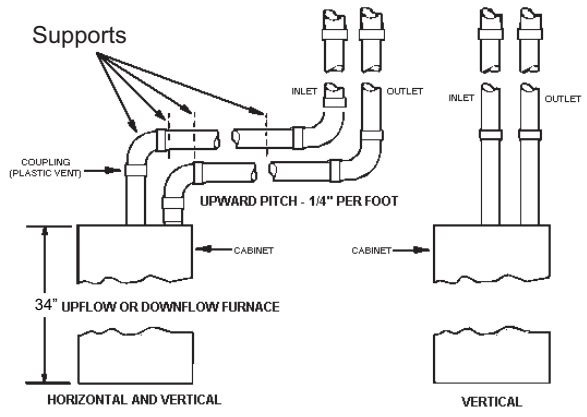
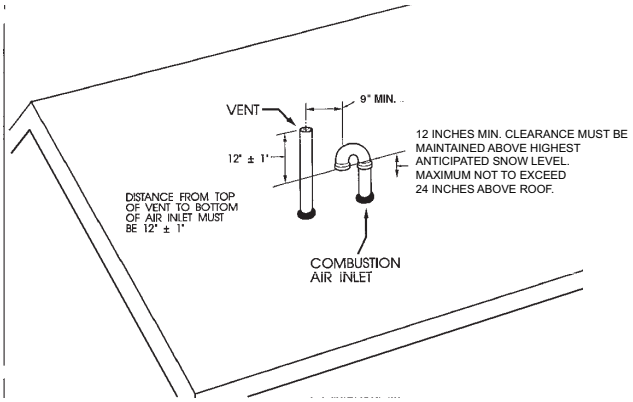


Figure 38. Venting through roof



Note: *All measurements are from centerline to centerline.*

Figure 39. BAYAIR30AVENTA / BAYAIR30CNVENT

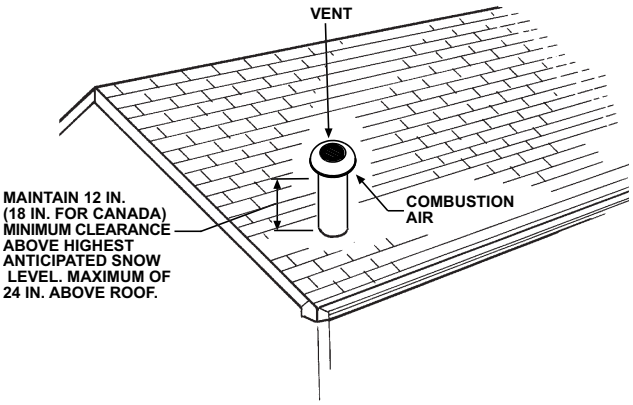


Figure 40. BAYAIR30AVENTA / BAYAIR30CNVENT

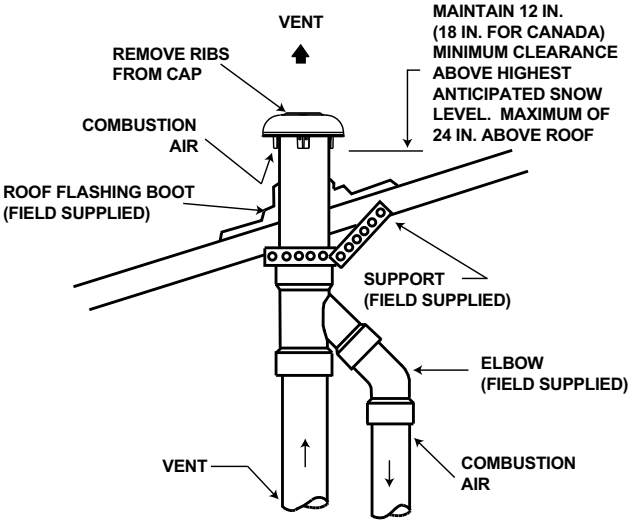
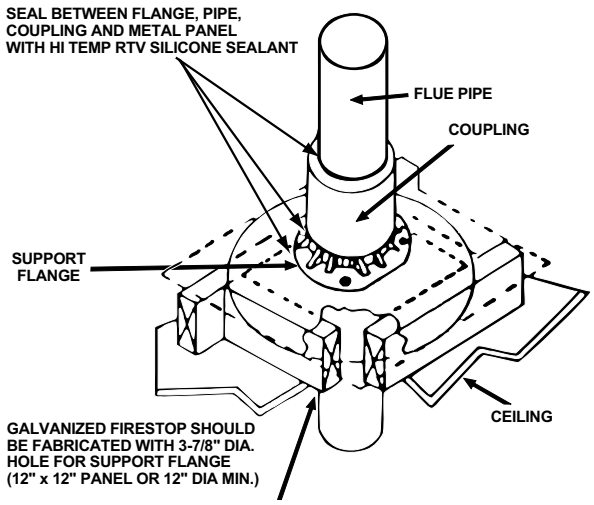


Figure 41. Manufactured home ceiling vent installation example

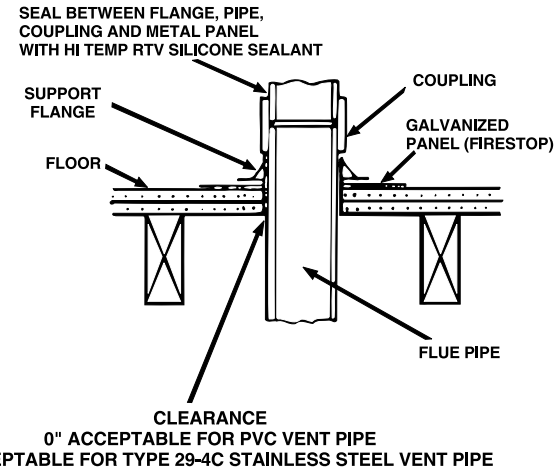


When penetrating roof with PVC vent pipe, a flexible flashing may be used for a weather tight seal. Lubricate flexible seal on flashing before PVC pipe is pushed through the seal. (Field Supplied)

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 42. Manufactured home floor vent installation example



Venting Through an UNUSED Chimney

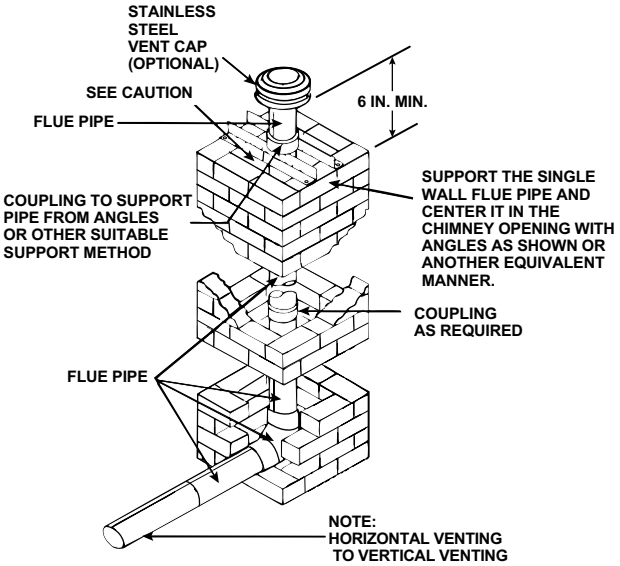
Venting Routed Through a Masonry Chimney

Important:

- *Refer to Section 12.6.8 of NFPA 54 / ANSI 223.1 2012 when routing vent piping through a chimney.*
- *The single wall flue pipe joints must be sealed.*

  The 90 degree elbow connection to vertical pipe must be sealed to prevent condensate leakage to base of masonry chimney.

Figure 43. PVC plastic venting through unused 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

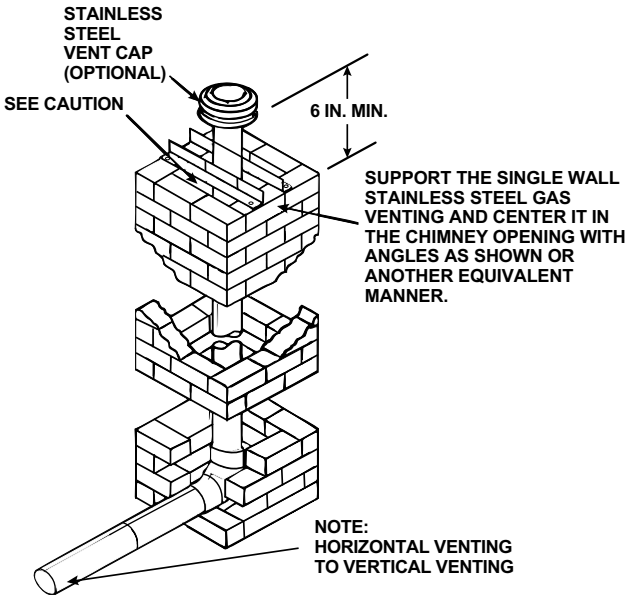
All stainless steel fitting must be installed with male end towards the Furnace.

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



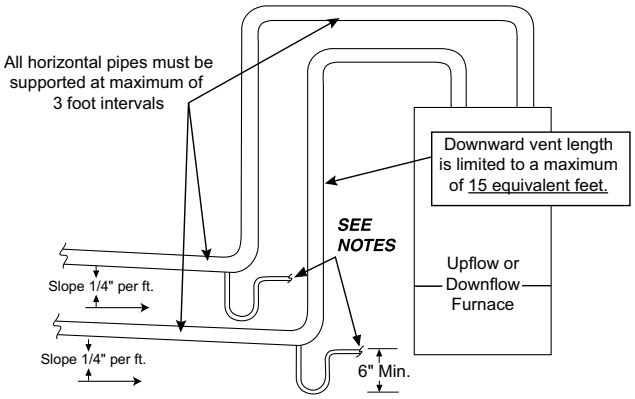
Downward Venting

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 45. 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.

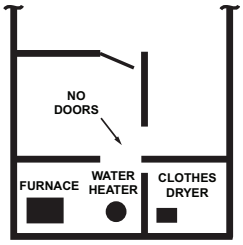
Furnace location may be in an unconfined space or a confined space.

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 32. 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 46. 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 will 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 will also 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 33. 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 33. Minimum free area in square inches each opening (furnace only) in a confined space (continued)

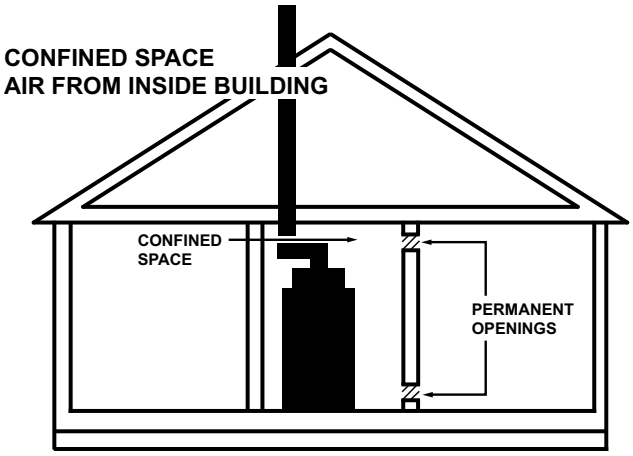
Furnace Max BTUH.Input Rtg.	Air From Inside	Air From Outside	
		Vertical Duct [a]	Horizontal Duct [b]
100,000	100	25	50
120,000	120	30	60
140,000	140	35	70

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

Figure 47. Confined space

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 48. 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 49. Air from outdoors

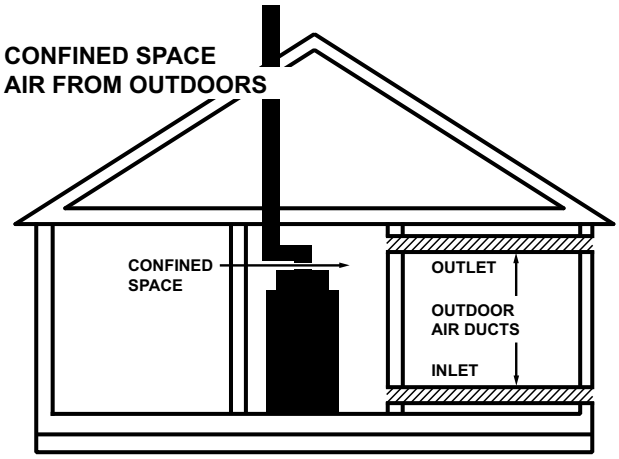


Figure 50. Air from ventilated attic/crawl space

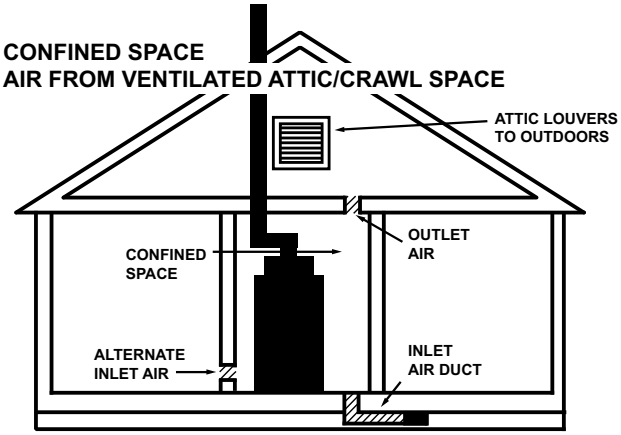
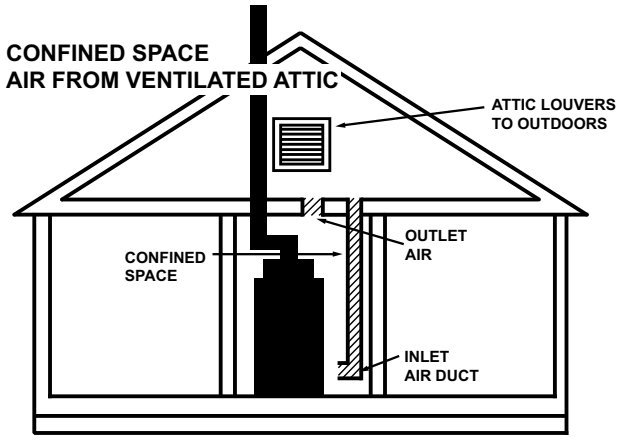


Figure 51. Air from ventilated attic



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

⚠ 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.

Notes: *The "Coil Requirement" caution is applicable to:*

- *Upflow furnace with coil*
- *Furnace in horizontal left with coil*
- *Furnace in horizontal right with "A" coil*

Installation Instructions:

Table 34. Supply duct connections

Furnace Orientation	Steps to be followed	Images for Reference
Upflow and Horizontal Furnace - no Coil	Step 1., Step 12., Step 4., Step 5.	Figure 52, p. 55, Figure 53, p. 55
Upflow Furnace with Coil	Step 1., Step 2., Step 10., Step 3., Step 4.	Figure 52, p. 55, Figure 53, p. 55, Figure 55, p. 55

Table 34. Supply duct connections (continued)

Furnace Orientation	Steps to be followed	Images for Reference
Furnace in Horizontal Left with Coil	Step 1., Step 6., Step 10., Step 3., Step 4.	Figure 52, p. 55, Figure 53, p. 55, Figure 56, p. 55
Furnace in Horizontal Right with "A" Coil	Step 6., Step 7., Step 8., Step 9., Step 10., Step 4.	Figure 52, p. 55, Figure 54, p. 55, Figure 57, p. 55
Downflow Furnace with Coil	Step 7., Step 8., Step 9., Step 11., Step 4.	Figure 52, p. 55, Figure 54, p. 55, Figure 58, p. 56
Downflow Furnace — no Coil with or without BAYBASE	Step 1., Step 12., Step 4., Step 5.	Figure 52, p. 55, Figure 53, p. 55

Figure 52. Initial position

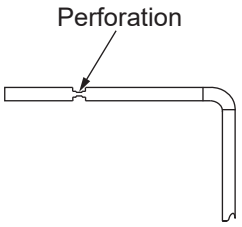


Figure 53. Flange orientation for upflow and horizontal left with and without coil and downflow and horizontal right without coil

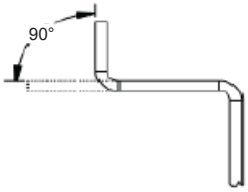


Figure 54. Flange orientation for downflow and horizontal right with coil

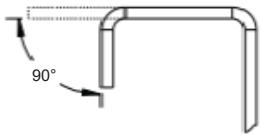


Figure 55. Upflow furnace with coil

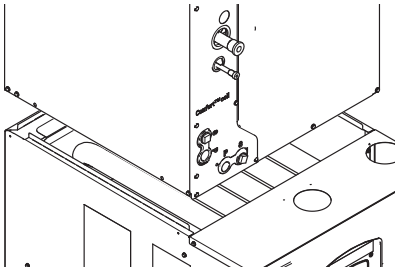


Figure 56. Horizontal left with or without coil

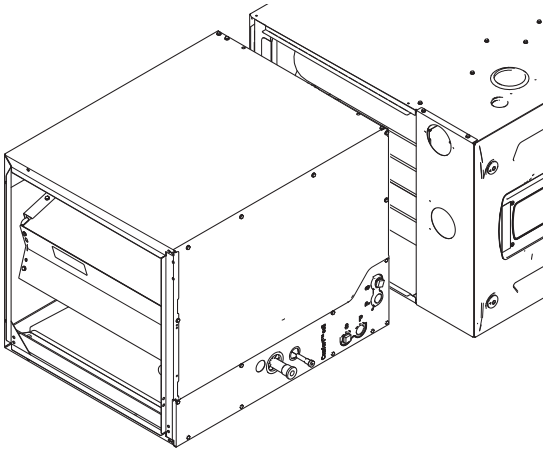


Figure 57. Horizontal right furnace with or without coil

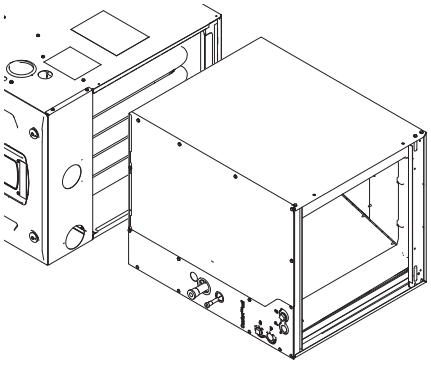
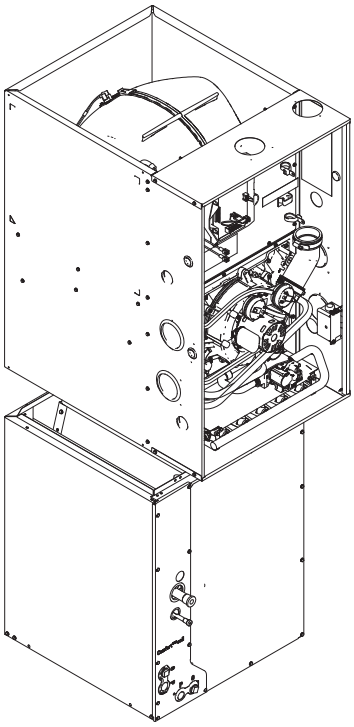


Figure 58. Downflow furnace with coil



Installation Steps

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 6–12 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

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

Installation Instructions:

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.

Table 35. Return duct connections

Image Reference	Steps to follow
Figure 59, p. 57	See Step 1, Step 2, Step3 , and Step 4
Figure 60, p. 57	See Step 1, Step 5, Step 6, and Step 4
Figure 61, p. 57	See Step 1, Step 7, Step 8, and Step 4
Figure 62, p. 57	See Step 1, Step 9, and Step 4
Figure 63, p. 57	See Step 1, Step 10, Step 11, Step 12, Step 13, Step 14, Step 15, and Step 4

Table 35. Return duct connections (continued)

Image Reference	Steps to follow
Figure 66, p. 58	See Step 16, Step 17, Step 18, and Step 19
Figure 67, p. 58	See Step 16, Step 17, Step 18, and Step 19
Figure 68, p. 59	See Step 20, Step 21, Step 3, and Step 4
Figure 69, p. 59	See Step 20, Step 22, Step 3,and Step 4
Figure 70, p. 59	See Step 20, Step 23, Step 24, and Step 4

Figure 59. Upflow furnace with bottom return in closet with remote filter

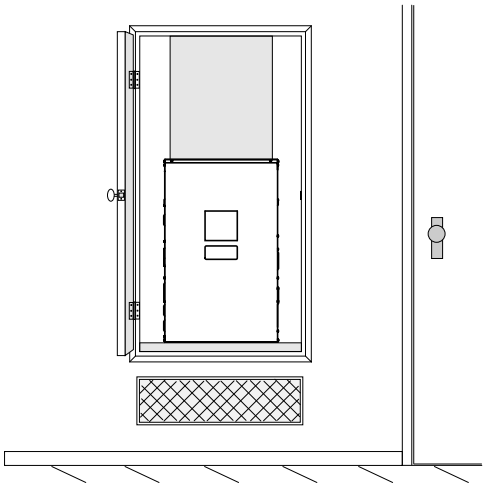


Figure 60. Upflow furnace with bottom return in closet with filter box

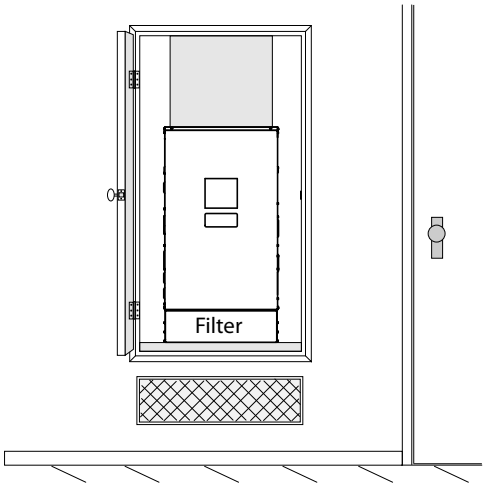


Figure 61. Upflow furnace with bottom return mounted on a ducted pedestal

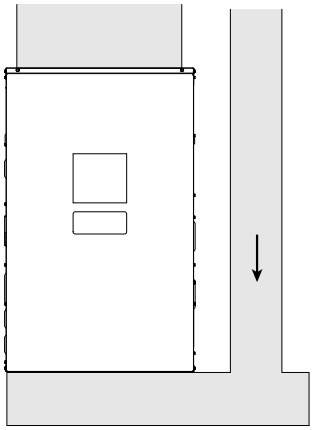


Figure 62. Upflow furnace with bottom return mounted on a ducted pedestal with filter box

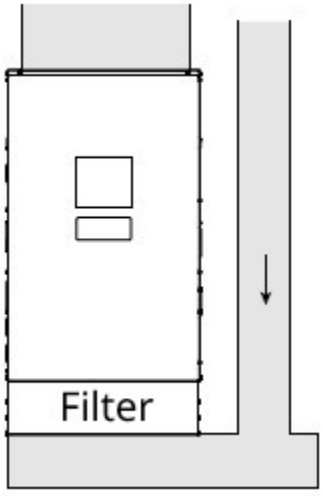
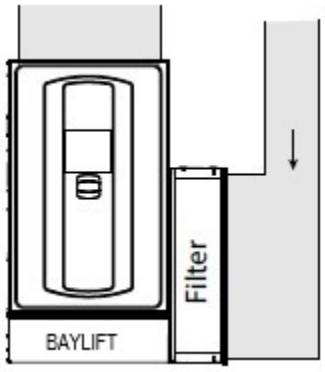


Figure 63. Upflow furnace with bottom and side returns mounted on a ducted pedestal with side return and filter box



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.*
- *The furnace bottom pedestal must be a minimum of 6-inch height.*

Figure 64. 17.5-inch filter cabinet with BAYLIFT kit

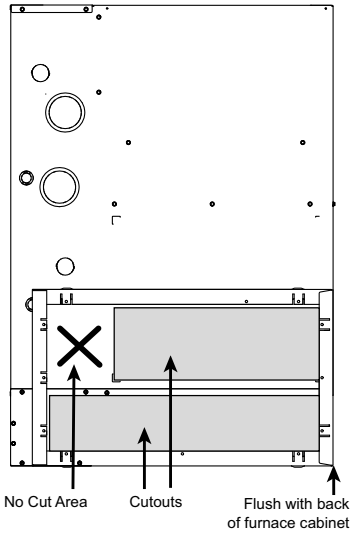


Figure 65. 21-inch filter cabinet with BAYLIFT kit

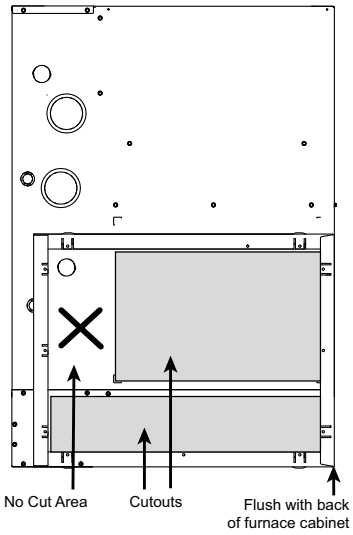
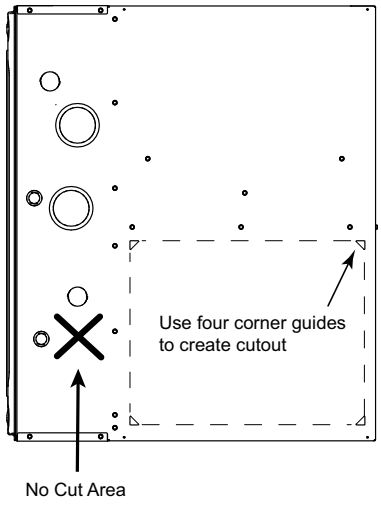


Figure 66. Upflow furnace with side return



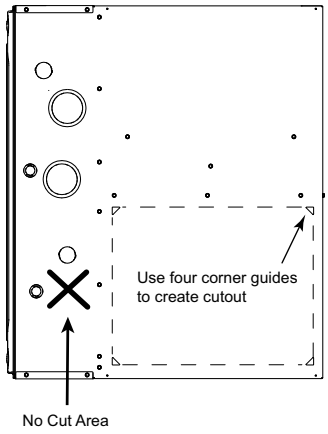
Important:

- *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 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.*

Figure 67. 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.*

Figure 68. Downflow furnace with top return

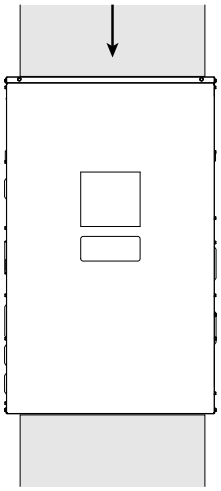


Figure 69. Downflow furnace with top return and plenum

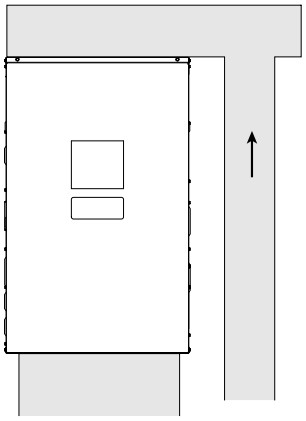
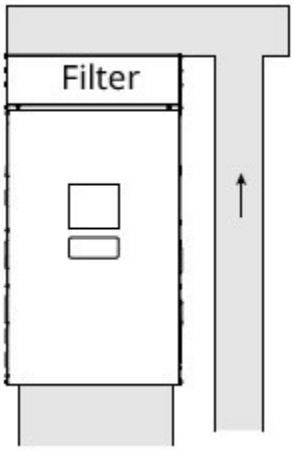


Figure 70. Downflow furnace with top return and plenum with filter box



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 36. 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.

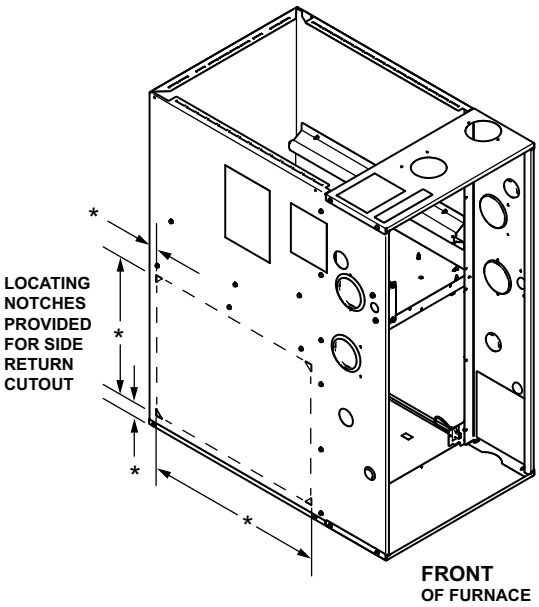
Preparation for Upflow Bottom and Side Return Air Filter Installations

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 71. Upflow furnaces



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, refer to Figure 72, p. 60 or the filters may be installed in the duct work upstream of the furnace, refer to Figure 73, p. 60.

Filter kits are available for horizontal applications.

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

Figure 72. Remote filter installation

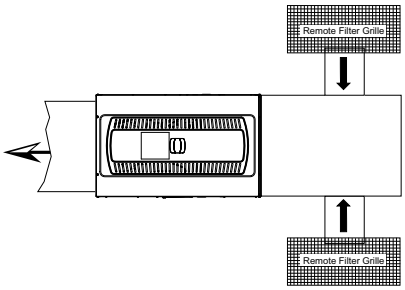
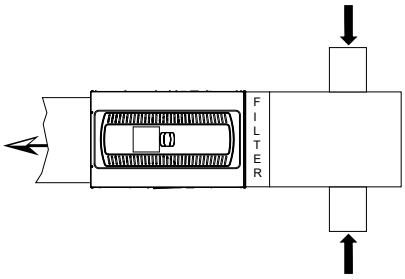


Figure 73. Duct filter installation



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 37. 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 or CSA C22.1 Electrical Code, 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.

Refer to the Wiring Diagram section in this document and Unit Wiring Diagram attached to the furnace.

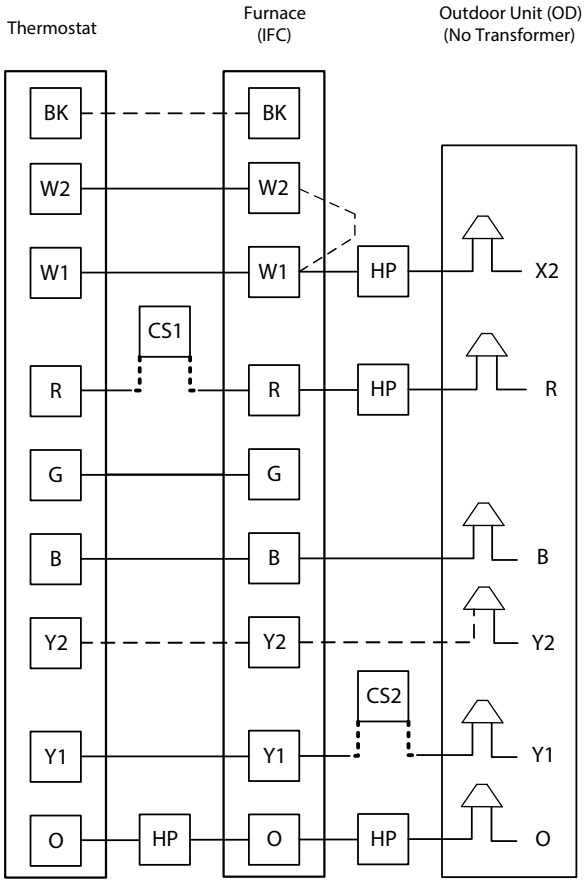
⚠ WARNING

Fire Hazard!

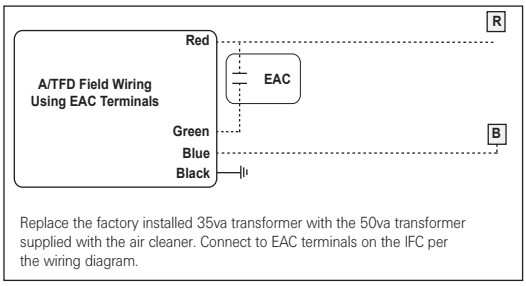
Failure to follow instructions below could result in death or serious injury or property damage.
For installations with flammable refrigeration system, the furnace must be powered at all times except during servicing. The furnace must be installed and connected according to installation instructions and wiring diagrams provided with the evaporator coil.

Field Wiring

Figure 74. Field wiring diagram for A952V with one / two stage AC or heat pump

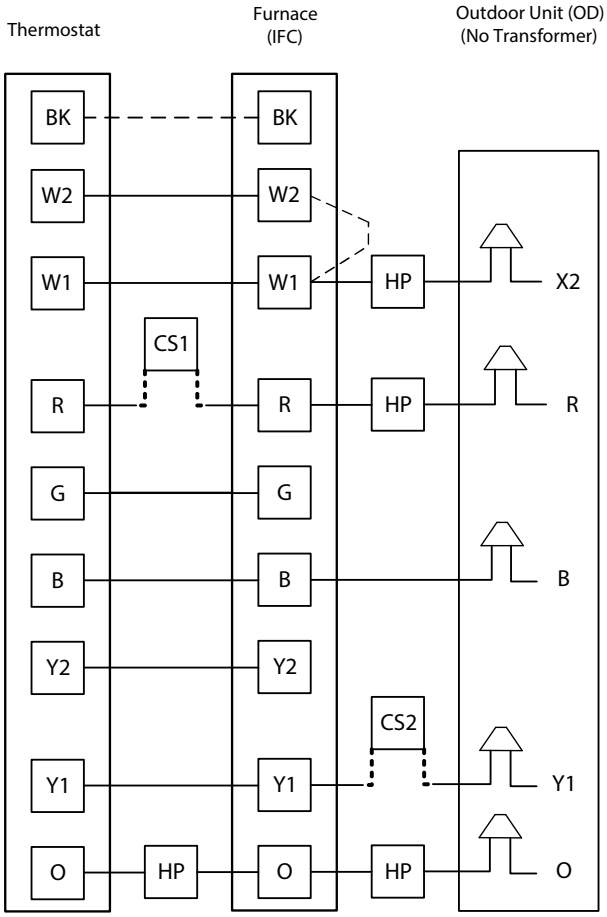


NOTES:
1) HP = Wiring used for Heat Pump System.
2) CS = wiring used for Condensate Switch (2 Options).
3) Y1 and/or Y2 must be connected from the thermostat to the IFC for proper airflow.
4) Remove Y1-O jumper for HP systems. O terminal must be connected as shown for gas heating operation during defrost.
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) For PWM (BK) enabled thermostats, cut the BK jumper on the IFC and connect wiring.



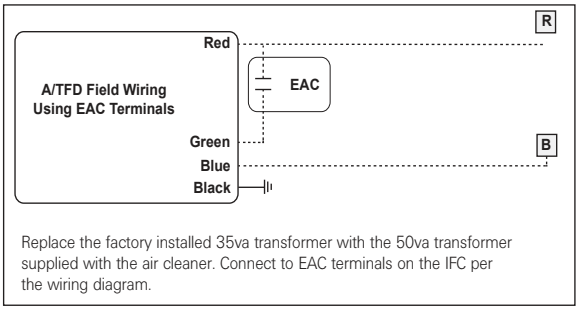
Replace the factory installed 35va transformer with the 50va transformer supplied with the air cleaner. Connect to EAC terminals on the IFC per the wiring diagram.

Figure 75. Field wiring diagram for A952V with single stage AC or heat pump 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) Remove Y1-O jumper for HP systems. O terminal must be connected as shown for gas heating operation during defrost.
7) If the thermostat does not have a W2, or there are not enough conductors, jumper W1 to W2 at the IFC.
8) A/TCONT824 thermostats do not require the use of X2.
9) For PWM (BK) enabled thermostats, cut the BK jumper on the IFC and connect wiring.



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 76. 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 Application

Upflow Furnace

Remove the plug from the side panel where the condensate will exit.

Install the condensate grommet into the side panel.

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 77. Upflow furnace with left side drain

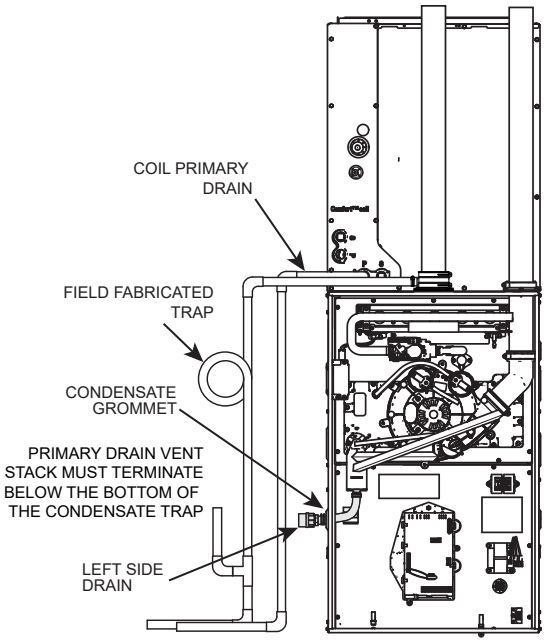


Figure 78. Upflow furnace with right side drain

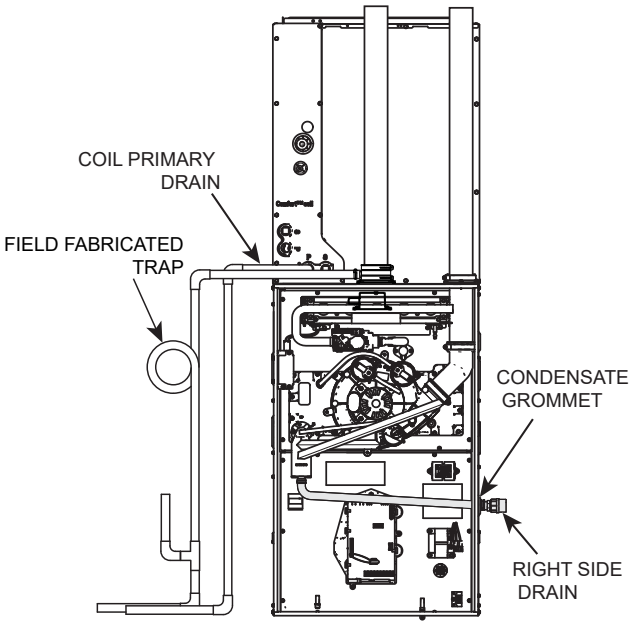


Figure 79. Upflow furnace with left side drain

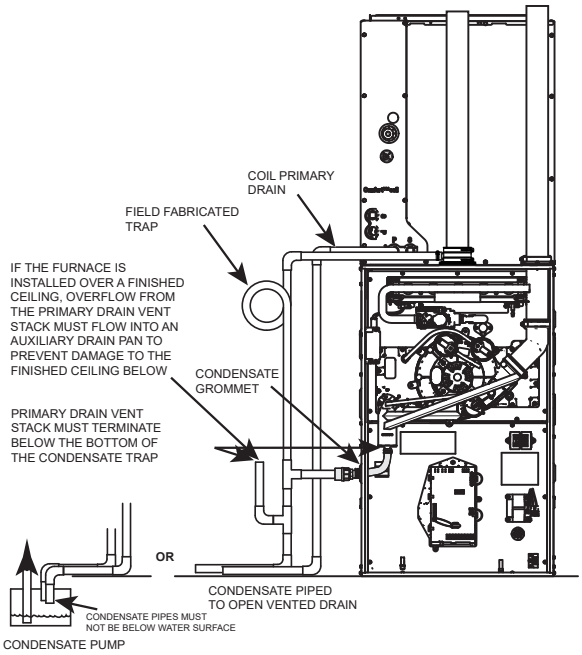


Figure 80. Upflow furnace with right side drain

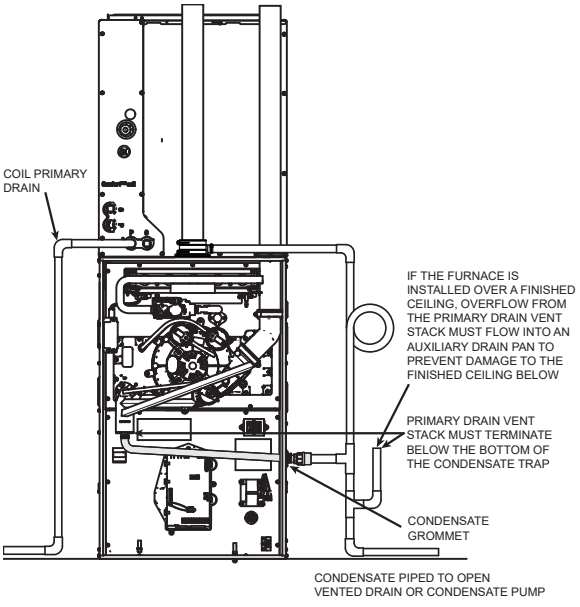
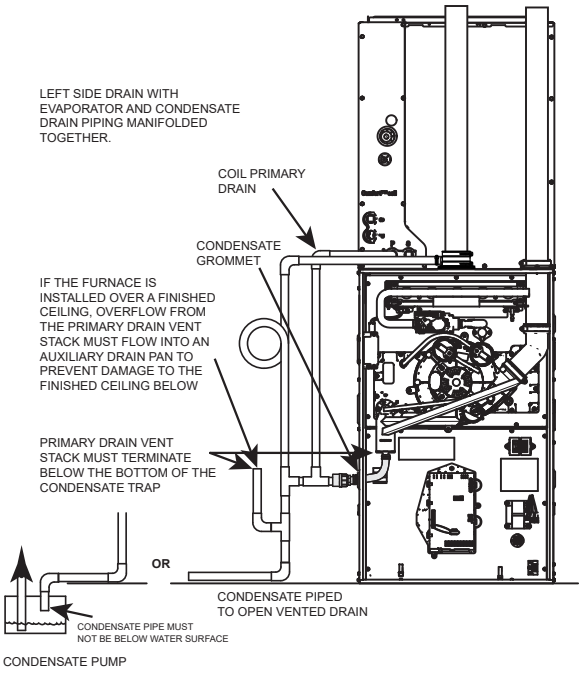


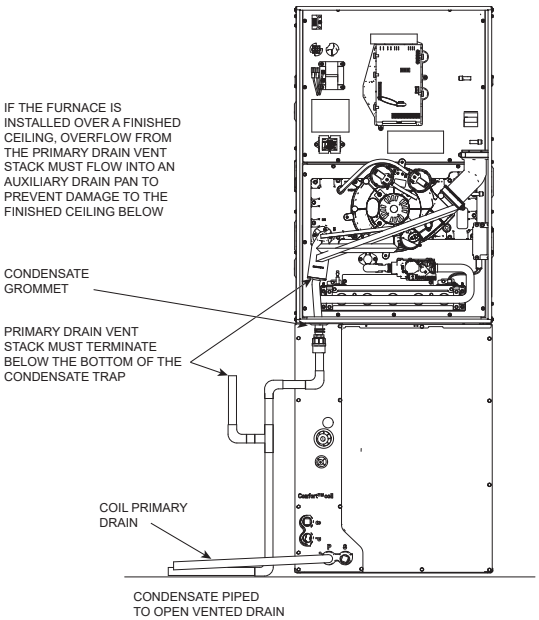
Figure 81. Upflow furnace with left side drain



Downflow Furnace

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

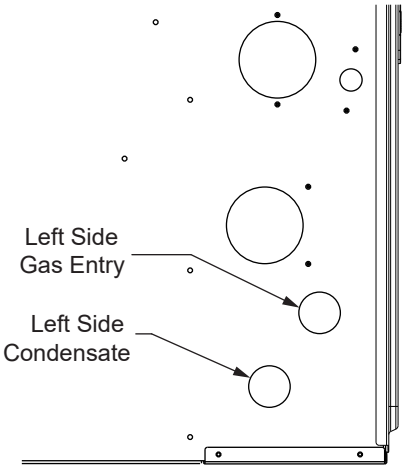
Figure 82. Downflow furnace with bottom drain



Downflow furnace with Left Side Condensate

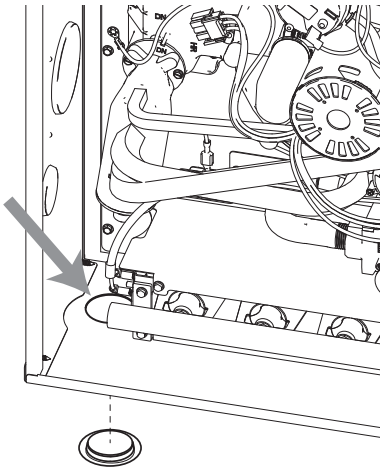
1. Remove left hand condensate plug.
2. Install into bottom cross member.

Figure 83. Downflow furnace with left side condensate



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

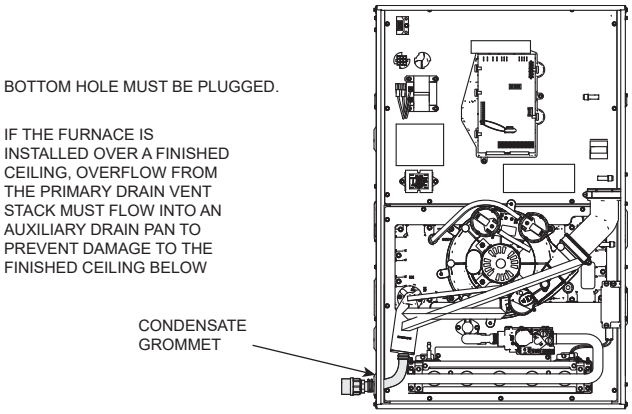
Figure 84. Downflow furnace with right side condensate — plug installation



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.

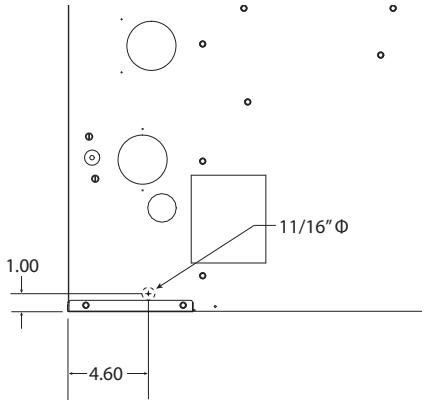
Figure 85. Condensate grommet



Downflow furnace with Right Side Condensate:

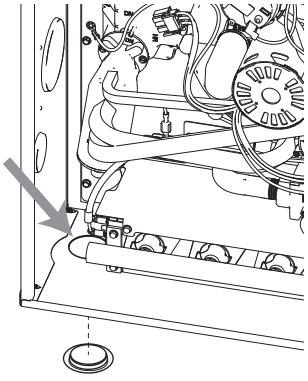
1. Drill an 11/16-inch diameter hole in the right side of the case at the dimensions shown.

Figure 86. Downflow furnace with right side condensate



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

Figure 87. Plug hole



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 in Figure 88, p. 66.
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 88. Condensate drain line

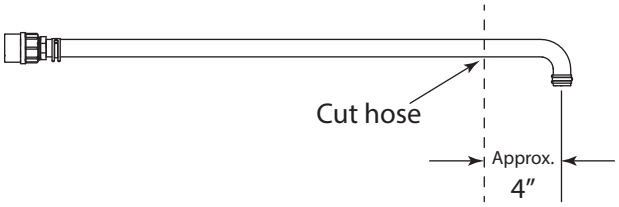
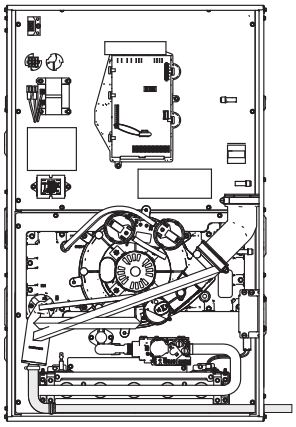


Figure 89. Downflow furnace with right side drain



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

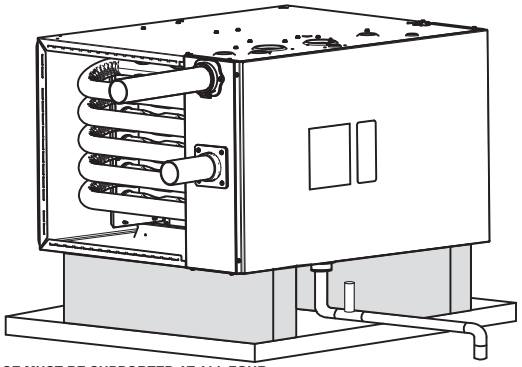
draining of condensate may cause saturated ground conditions that may result in damage to plants.

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 90. Horizontal applications



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

Notes: .

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.*

Figure 91. Horizontal right

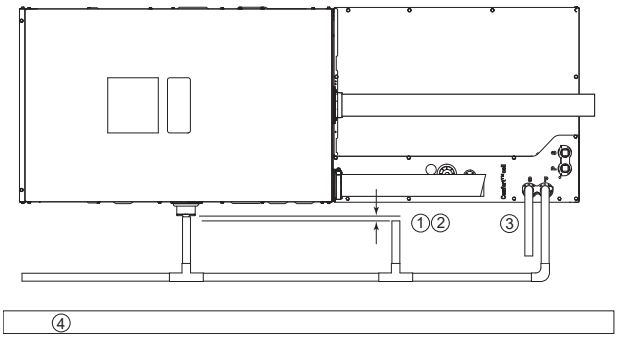
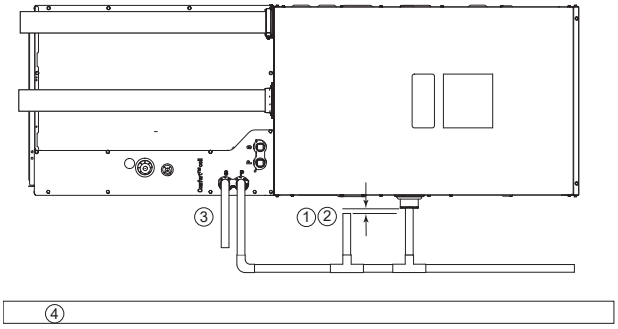


Figure 92. Horizontal left



General Start-up and Adjustment

The following sections give 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 is in place and all screws in place.

Turn knob on main gas valve within the unit to the **OFF** position. 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. Turn the gas valve in the unit to the **ON** position.

Propane Gas being heavier than air may require forced ventilation. Turn the toggle 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, turn the toggle or 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:

- *For electric and natural gas connections, default is left side . For the combustion air inlet and exhaust, default 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.*
- *Choose any combination such that it must have one inlet and one outlet.*

Figure 93. Upflow application

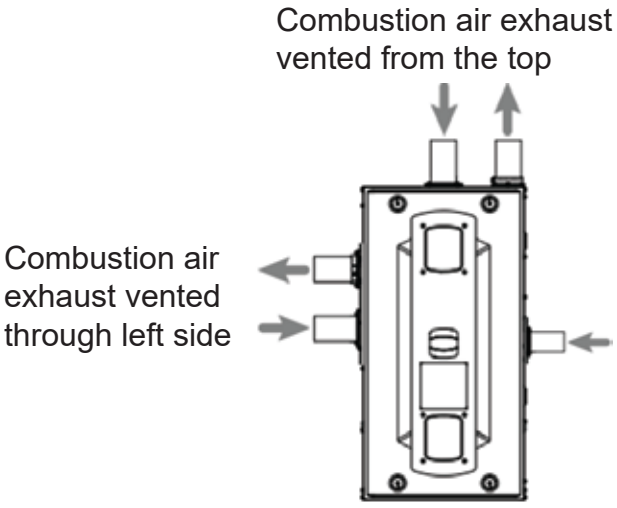


Figure 94. Horizontal left application

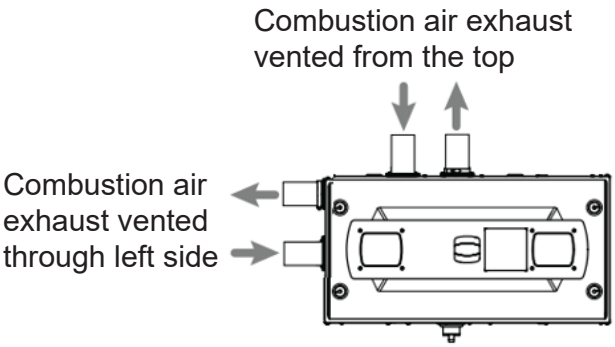


Figure 95. Horizontal right application

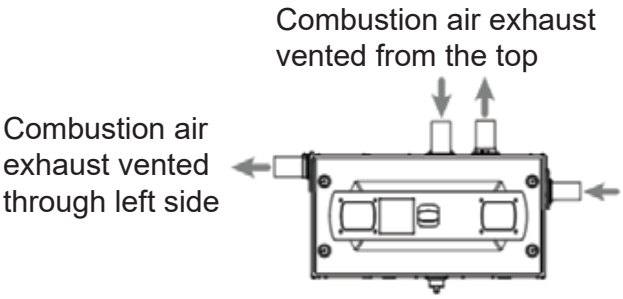
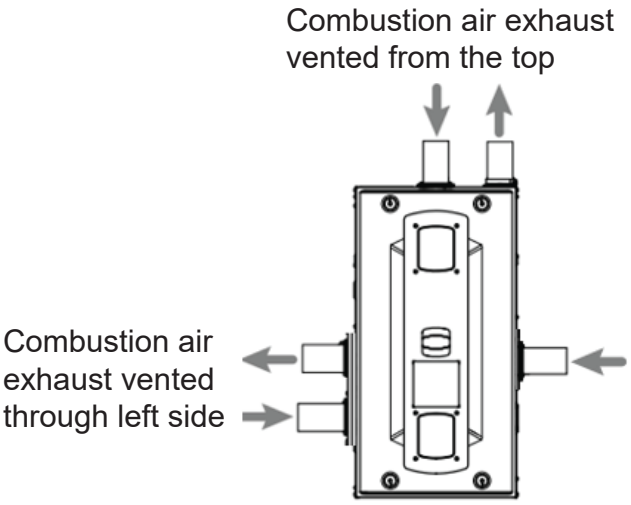


Figure 96. Downflow application



Upflow Furnace in Upflow Position - Top Vented Combustion Air

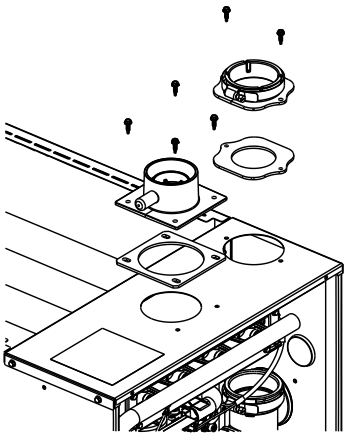
Figure 97. Conversion instructions

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

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

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 98. Vent inlet/outlet



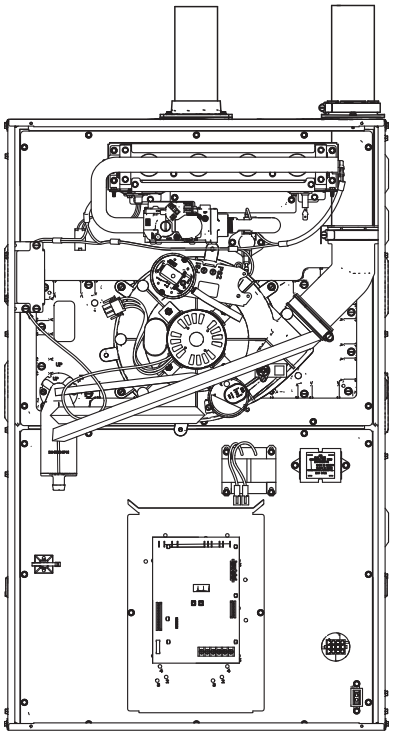
4. Slide PVC pipe through vent outlet adaptor and insert into inducer outlet.
5. Twist to confirm PVC is fully inserted.
6. Tighten the clamp on the end of the 45 degree elbow.
7. Tighten the clamp on the outlet vent adapter.

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 2 ft. of the cabinet. CPL01544 – 2-in. x 3-in. offset coupling may be used and is factory supplied with 120 KBTUH furnaces. Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.*

Figure 99. Upflow furnace in upflow position



Upflow Furnace in 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 below figure 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.*

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

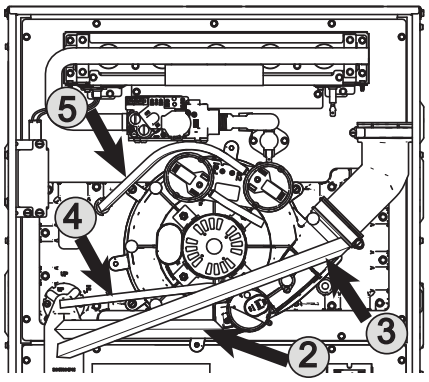
1. Disconnect all drain tubes from condensate trap.

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.

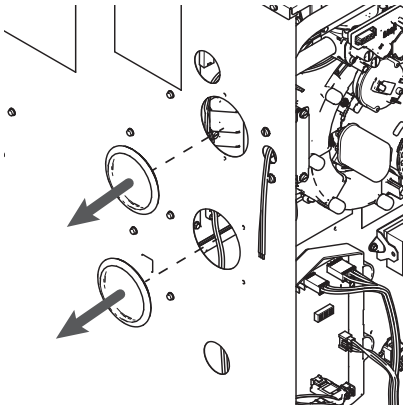
3. Remove rain gutter tubing from inducer outlet.
4. Remove tubing from condensate pressure switch.
5. Remove tubing from PS2 to cold header.

Figure 100. Removing tubing



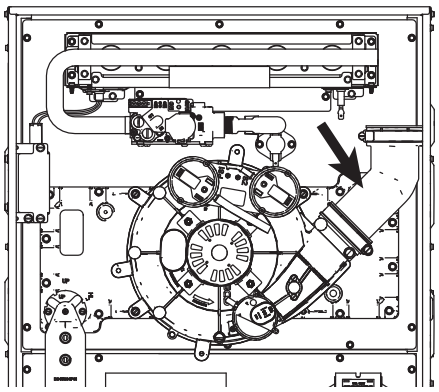
6. Remove two 3-inch plugs on left side of cabinet. To be used for combustion air and vent exhaust.
7. Install the two 3-inch plugs into the two 3-inch default openings on the top of the cabinet.

Figure 101. Plug installation



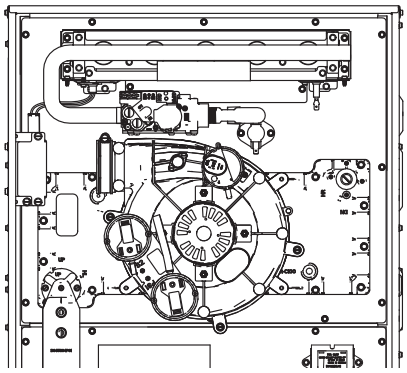
8. Loosen the clamp holding the 45 degrees elbow. Remove the elbow and discard.

Figure 102. Elbow removal



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.

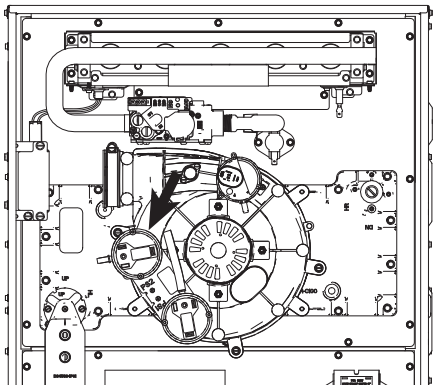
Figure 103. Tightening screws



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.

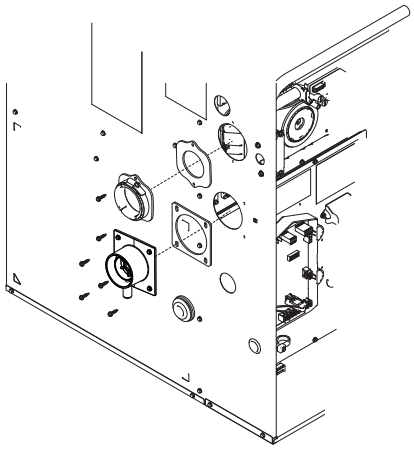
Note: *Illustration shows the PS2 pressure switch in the final rotated position.*

Figure 104. Inducer rotated



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 105. Install the vent inlet/outlet and grommet

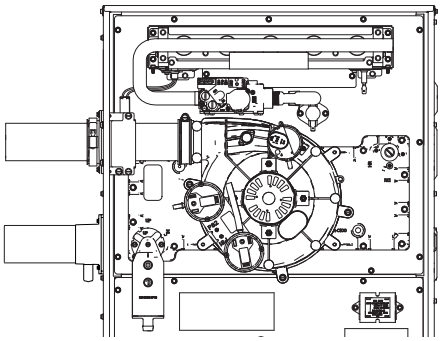


19. Slide PVC through vent outlet adaptor and insert into inducer outlet.
20. Twist to insure PVC is fully inserted.
21. Tighten the two clamps.
22. Install the combustion air inlet pipe.

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-in. x 3-in. 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," p. 44 for proper orientation of 2-in. x 3-in. offset coupling.*

Figure 106. Installing the vent and combustion air inlet pipes



23. Connect PS2 tubing to switch and sensing location.

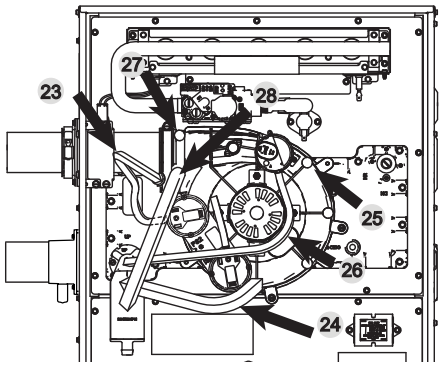
Important: *Trim the condensate pressure switch tubing to length to confirm there is no sag or trap created*

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 confirm 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 107. Condensate tubing



Upflow Furnace in Horizontal Left Position - Top 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.

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

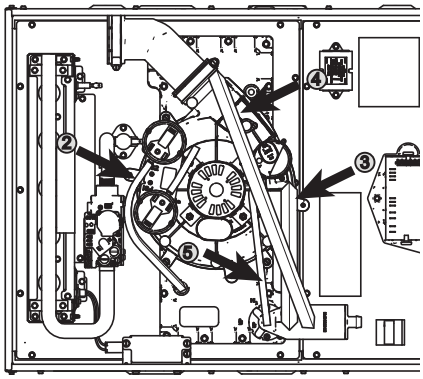
1. Remove all drain hoses from condensate trap.

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.

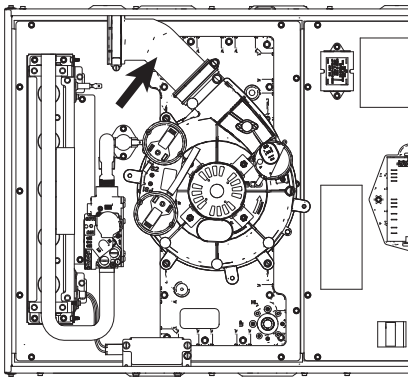
Note: *There is a condensate trap adapter located inside the cold header that is held in place by the condensate trap bracket. Do not lose this adapter. This adapter needs to be in place when the condensate trap bracket is reattached.*

Figure 108. Removing tubing



7. Loosen the clamp holding the 45 degree elbow. Remove the elbow and discard.

Figure 109. 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 110. Inducer and PS2 pressure switch rotation before and after

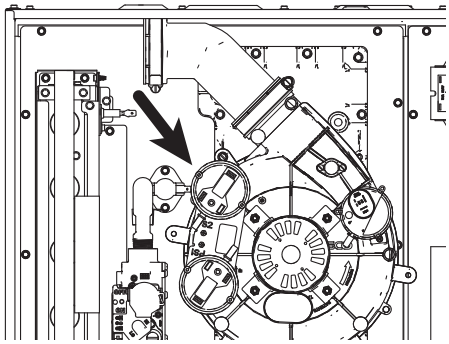
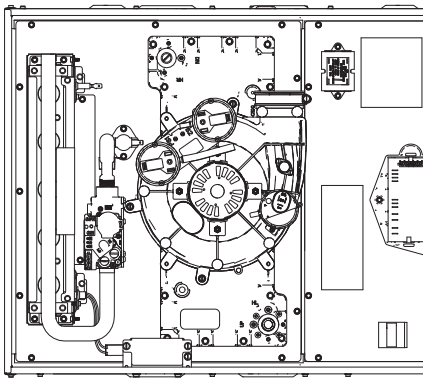
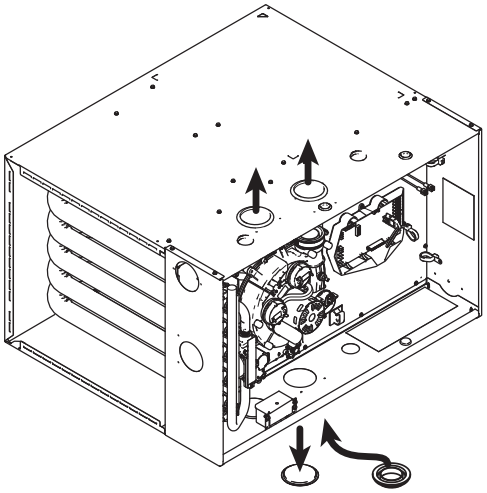


Figure 111. Reattaching the inducer



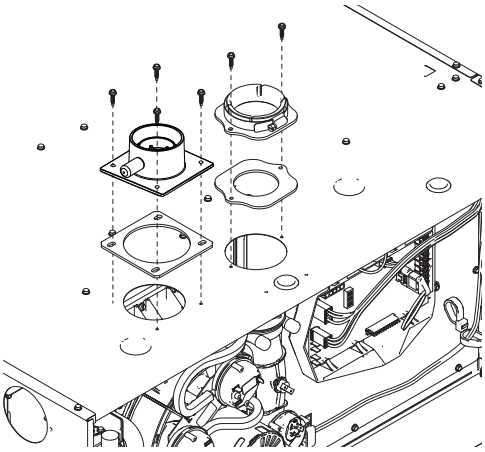
11. Remove 3-inch plug on left side of unit. To be used for condensate trap.
12. Install condensate trap grommet.
13. Remove two 3-inch plugs on right side of cabinet. To be used for combustion air exhaust and inlet.
14. Reuse the two 3-inch plugs to seal the two 3-inch default openings on the top of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

Figure 112. Sealing 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 113. Install the vent inlet/outlet

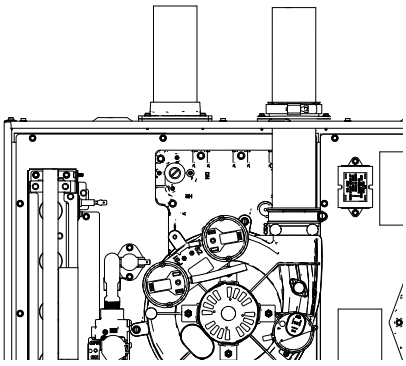


18. Slide PVC through vent outlet adaptor and insert into inducer outlet.
19. Twist to insure PVC is fully inserted.
20. Tighten the two clamps.
21. Install the combustion air inlet PVC pipe.

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 2 ft. of the cabinet. CPL01544 – 2-in.x 3-in. offset coupling may be used and is factory supplied with 120 MBTUH furnaces. Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.*

Figure 114. Installing the vent and combustion air inlet pipes



Condensate Trap Installation

22. Reinstall the condensate adapter if it was earlier removed or confirm 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 screws.

Figure 115. Tightening screws

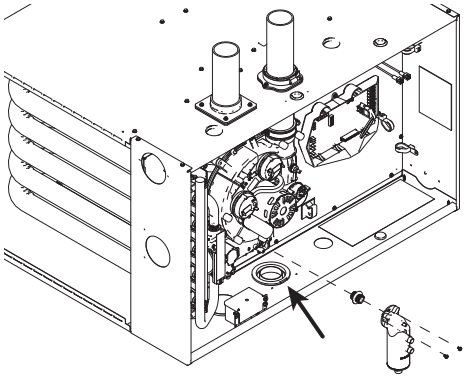
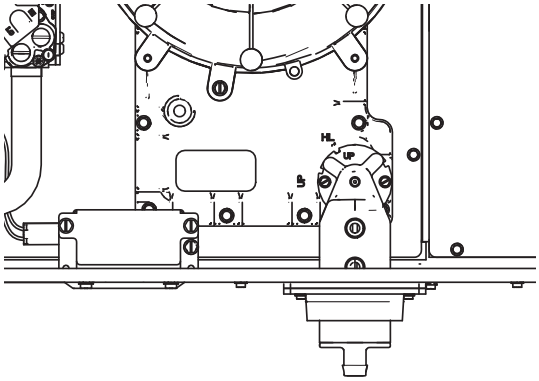


Figure 116. Condensate trap installed



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

Important: *Trim the condensate pressure switch tubing to length to confirm 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.

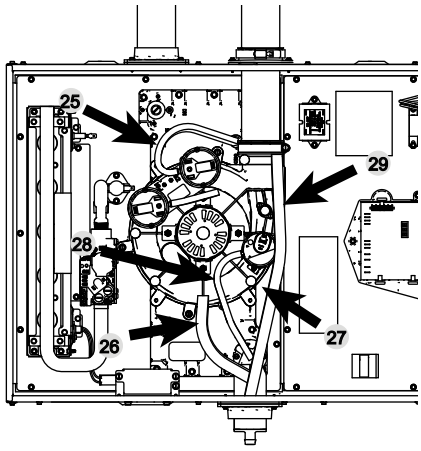
27. Install previously removed port cap onto bottom port of the inducer.

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

Important: *Trim the condensate pressure switch tubing to length to confirm 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 117. Condensate tubing



Upflow Furnace in Horizontal Left Position - Side 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 below figure 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.

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

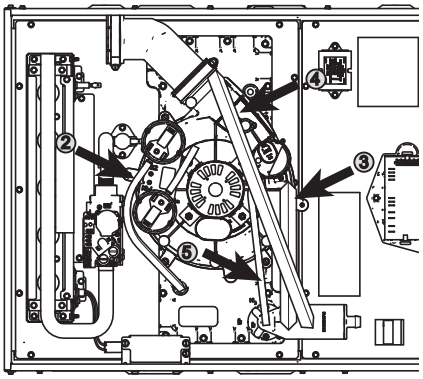
1. Remove all drain hoses from condensate trap.

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.

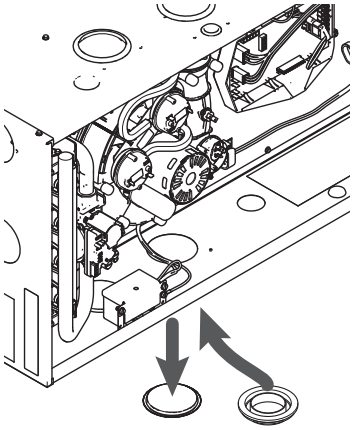
Note: *There is a condensate trap adapter located inside the cold header that is held in place by the condensate trap bracket. Do not lose this adapter. This adapter needs to be in place when the condensate trap bracket is reattached.*

Figure 118. Removing screws



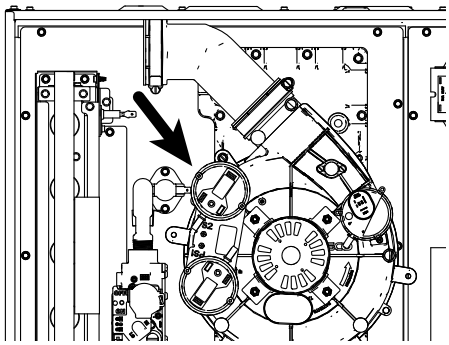
7. Remove plug from 3-inch hole.
8. Install condensate trap grommet.

Figure 119. Condensate trap grommet



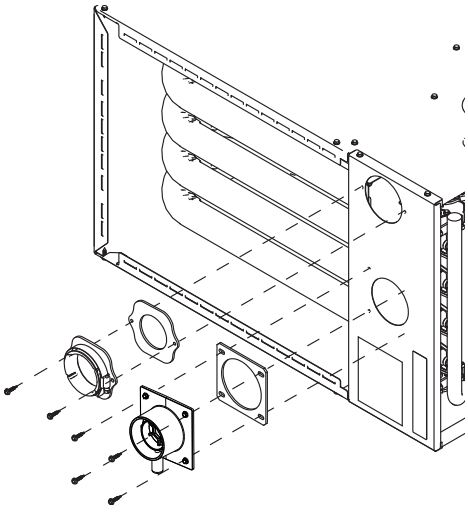
9. Remove the pressure switch bracket assembly.
10. Remove the screw that holds PS2, rotate 90 degrees clockwise, and reattach.
11. Reattach the pressure switch bracket assembly.

Figure 120. 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 121. Install the vent inlet/outlet

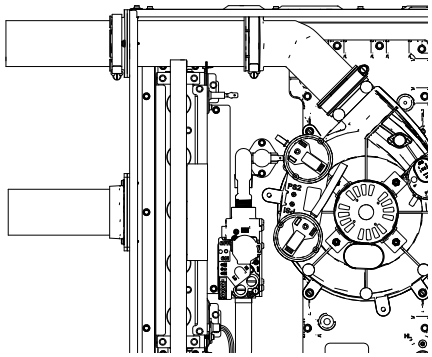


15. Slide PVC through vent outlet adaptor and insert into inducer outlet.
16. Twist to insure PVC is fully inserted.
17. Tighten the two clamps.
18. Install the combustion air inlet PVC pipe.

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 2 ft. of the cabinet. An 2-in. x 3-in.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," p. 44 for proper orientation of 2-in. x 3-in. offset coupling.*

Figure 122. Installing the vent and combustion air inlet pipes



Condensate Trap Installation

19. Reinstall the condensate adapter if it was earlier removed or confirm adapter is still in place.

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

20. Install condensate trap into new location by fitting into grommet and aligning the hole on the condensate trap with the hole labeled "HL".
21. 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 right. This allows the rain gutter tubing to fully seat onto the lower condensate port trap.
22. Hand tighten screws.

Figure 123. Install condensate trap adapter and condensate trap

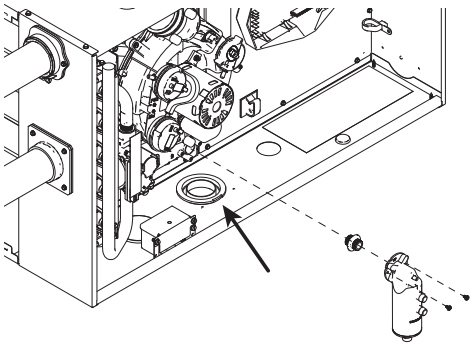
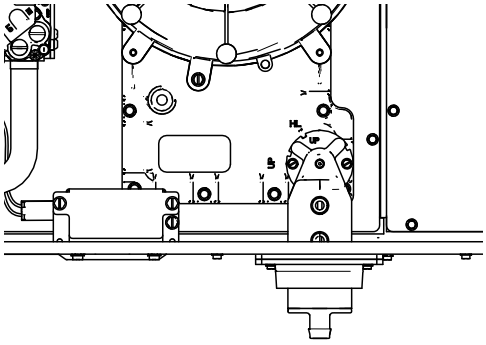


Figure 124. Condensate trap installed



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

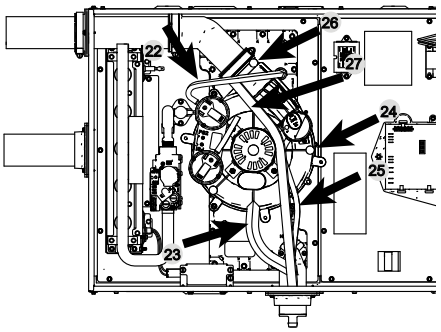
Important: *Cut to length but insure there is a rise in the tubing to avoid condensed flue gases from entering pressure switch.*

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 condensate pressure switch tubing to length to confirm 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 125. Condensate tubing



Upflow 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 below figure 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.

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

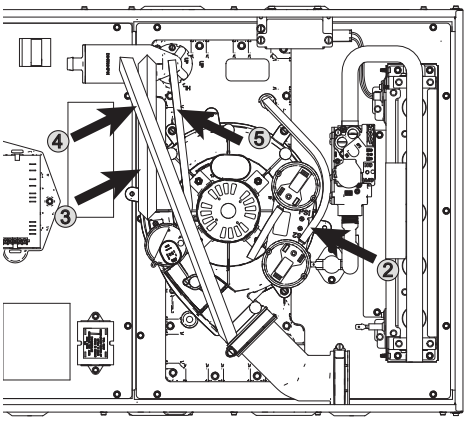
1. Remove all drain hoses from condensate trap.

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.

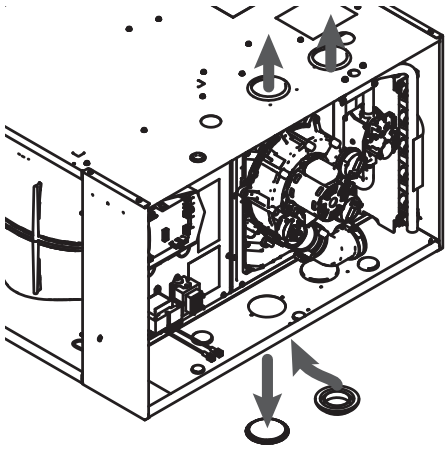
Note: *The condensate trap adapter located inside the cold header that is held in place by the condensate trap bracket. Do not lose this adapter. This adapter needs to be in place when the condensate trap bracket is reattached.*

Figure 126. Removing tubing



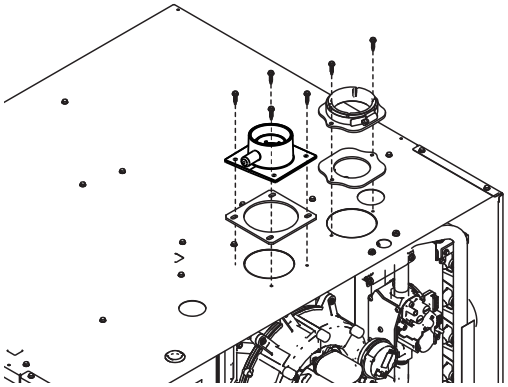
8. Remove 3-inch plug on right side of unit. To be used for condensate trap.
9. Install condensate trap grommet.
10. Remove two 3-inch plugs on left side of cabinet.
11. Reuse the two 3-inch plugs to seal the two 3-inch default openings on the top of the cabinet.

Figure 127. Sealing default openings



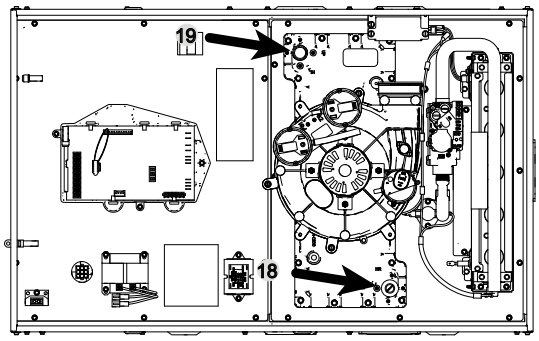
12. Attach the vent outlet gasket to the vent outlet.
13. Install vent outlet to top of cabinet using 2 screws supplied in the doc pack.
14. Install vent inlet gasket and vent inlet using 4 screws supplied in the doc pack.

Figure 128. Install the vent inlet/outlet



15. Remove three inducer screws.
16. Rotate the inducer so that the outlet is pointing vertically.
17. Use the three inducer screws to reattach the inducer to the cold header. Torque to 30 in.-lbs. Do not overtighten.
18. Remove condensate drain plug from top right location on cold header.
19. Place condensate drain plug onto the cold header outlet located on the bottom left of the cold header.

Figure 129. Elbow removal and reattaching the inducer

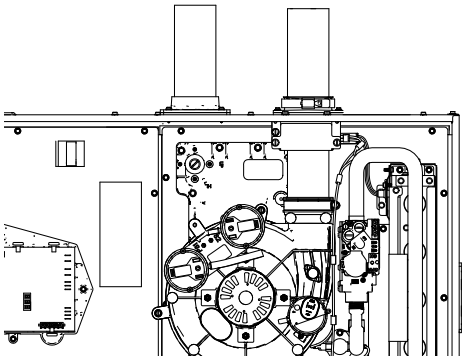


20. Slide PVC through vent outlet adaptor and insert into inducer outlet.
21. Twist to insure PVC is fully inserted.
22. Tighten the two clamps.
23. Install the combustion air inlet PVC pipe.

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 2 ft. of the cabinet. CPL01544 – 2-in. x 3-in. offset coupling may be used and is factory supplied with 120 MBTUH furnaces. Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.*

Figure 130. Installing the vent and combustion air inlet pipes



Condensate Trap Installation

24. Reinstall the condensate adapter if it was earlier removed or confirm adapter is still in place.

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

25. 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 right. This allows the rain gutter tubing to fully seat onto the lower condensate port trap.*

26. Hand tighten screw.

Figure 131. Install condensate trap adapter and condensate trap

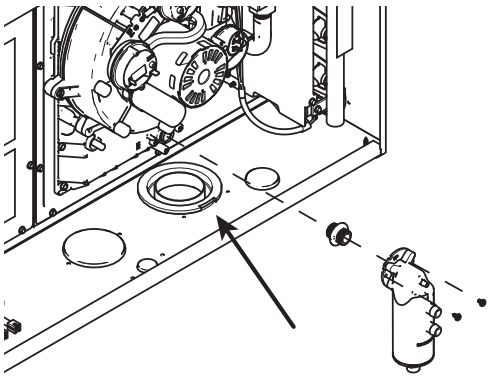
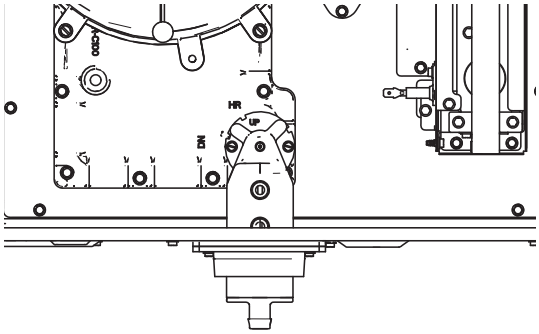


Figure 132. Condensate trap installed



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

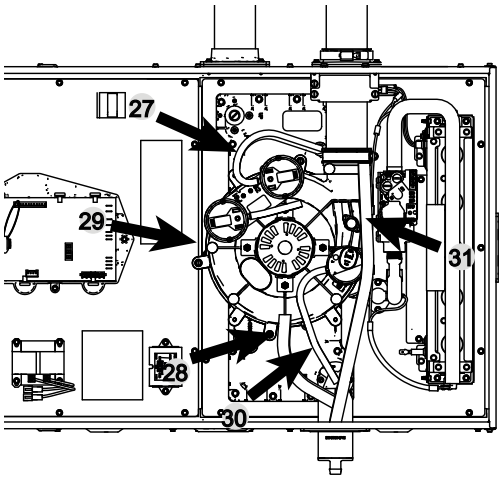
Important: *Trim the condensate pressure switch tubing to length to confirm there is no sag or trap created.*

28. 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.
29. Install previously removed port cap onto bottom port of the inducer.
30. Connect condensate pressure switch tubing to pressure port on the condensate trap.

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

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

Figure 133. Connecting condensate hose



Upflow Furnace in Horizontal Right Position - Left Side 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 below figure 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.

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

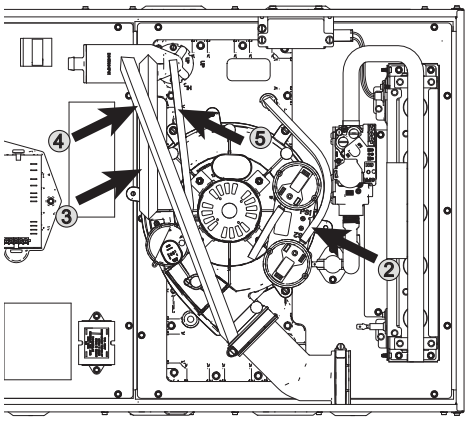
1. Remove all drain hoses from condensate trap.

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.

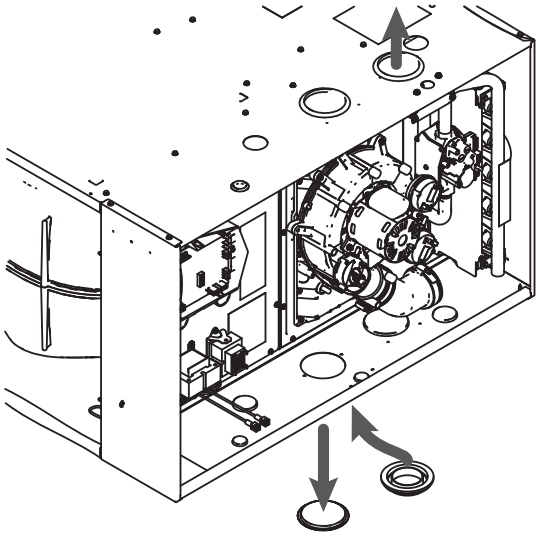
Note: *The plastic condensate adapter with O-rings located inside the cold header that is held in place by the condensate trap bracket. Do not lose this adapter. The condensate adapter needs to be in place when the condensate trap bracket is reattached.*

Figure 134. Remove condensate tubing



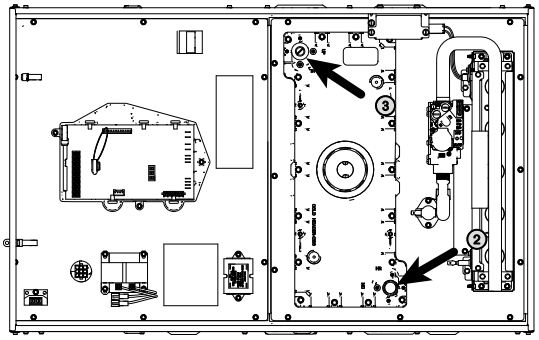
8. Remove 3-inch plug on right side of unit. To be used for condensate trap.
9. Install condensate trap grommet.
10. Remove 3-inch plugs on the left side of the cabinet. To be used for combustion air inlet.
11. Reuse the two 3-inch plugs to seal the two 3-inch default openings on the top of the furnace.

Figure 135. 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.

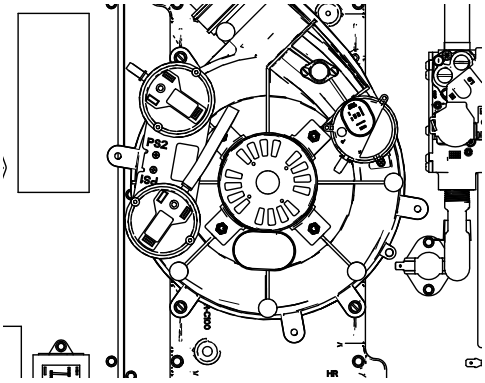
Figure 136. Relocation of condensate drain plug



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.

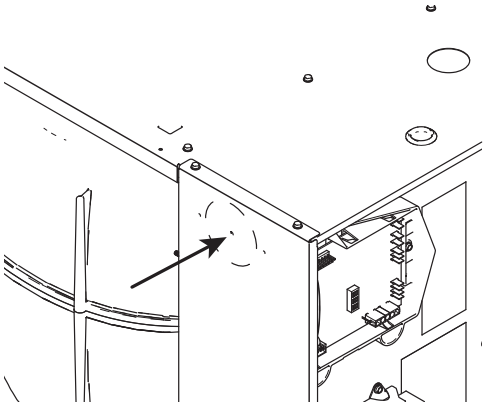
Note: *The inducer is shown rotated into its final position in the illustration in next page.*

Figure 137. Inducer rotated and pressure switch orientation



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

Figure 138. Cutting hole

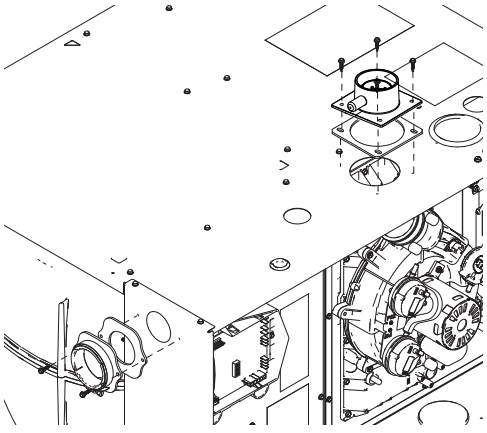


21. Attach the vent outlet gasket to the vent outlet.
22. Install vent outlet to top of cabinet using 2 screws supplied in the doc pack.
23. Install vent inlet gasket and vent inlet using 4 screws supplied in the doc pack.

Notes:

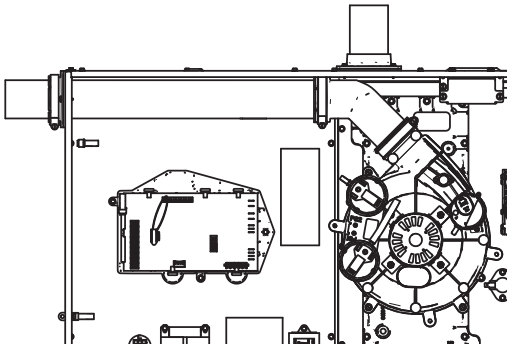
- *The vent outlet adapter is used for strain relief against the weight of the venting. The clamp should be tightened after the internal connection is made.*
- *If required, transition to larger venting within 2ft. of the cabinet. An 2-in. x 3-in. offset coupling is required if the transition is made in a horizontal plane. Use coupling CPL01544 (Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.) See "Horizontal Venting," p. 44 for proper orientation of 2-in. x 3-in. offset coupling.*

Figure 139. 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 140. Installing the vent and combustion air inlet pipes



Condensate Trap Installation

28. Reinstall the condensate adapter if it was earlier removed or confirm 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-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.*

30. Hand tighten screw.

Figure 141. Grommet

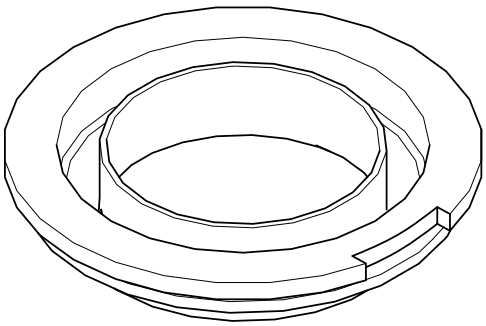


Figure 142. Install condensate trap adapter and condensate trap

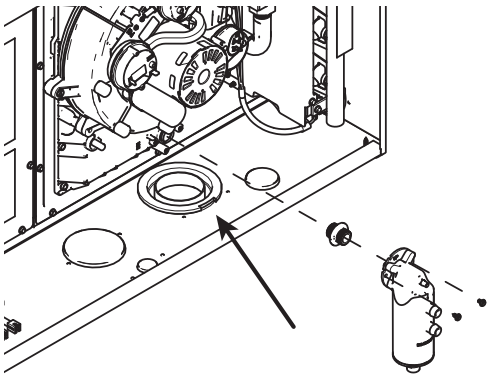
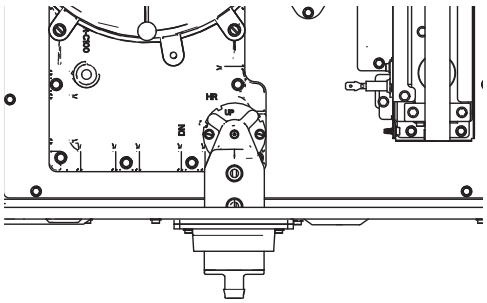


Figure 143. Condensate tubing



31. Connect PS2 tubing to switch and new sensing location. Use additional tubing in ship with bag, if necessary.

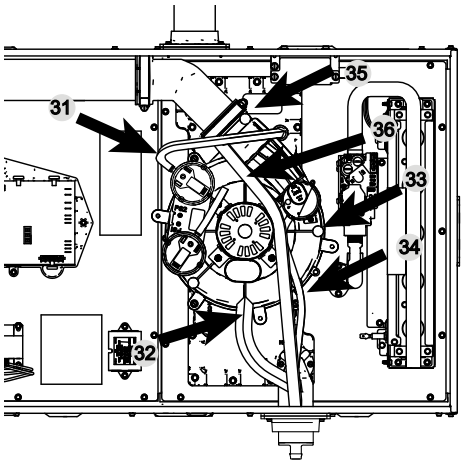
Important: *Trim the condensate pressure switch tubing to length to confirm there is no sag or trap created.*

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 confirm 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 144. Condensate tubing connection



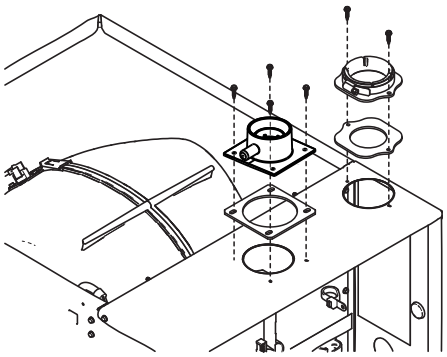
Downflow Furnace - Top Vented Combustion Air

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 condensate pressure switch tubing to length to confirm there is no sag or trap created.*

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 145. Vent inlet/outlet

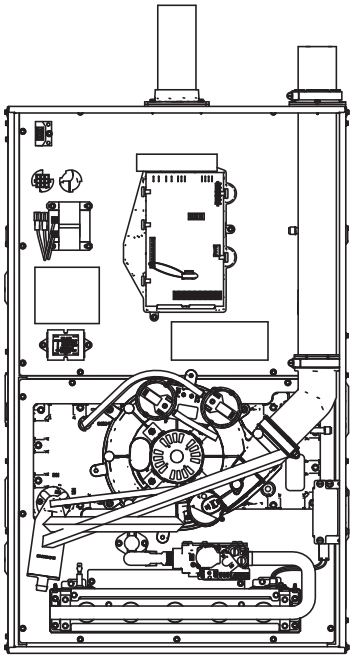


4. Slide PVC pipe through vent outlet adaptor and insert into inducer outlet.
5. Twist to insure PVC is fully inserted.
6. Tighten the two clamps.
7. Install the combustion air inlet PVC pipe.

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-in. x 3-in. offset coupling may be used and is factory supplied with 120 MBTUH furnaces. Canadian applications may use BAYREDUCE to meet ULC-S636 requirements.*

Figure 146. Installing the vent and combustion air inlet pipes



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 to the top right 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.*

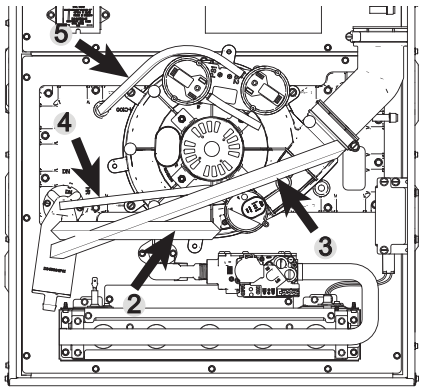
Before proceeding, lay unit on its back to make conversion easier.

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.*

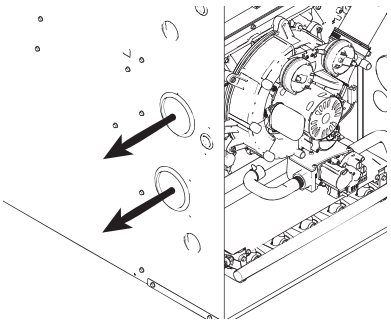
2. Remove drain tubing from bottom of inducer housing.
3. Remove rain gutter tubing from inducer outlet.
4. Remove tubing from condensate pressure switch.
5. Remove tubing from PS2 to cold header.

Figure 147. Removing tubing



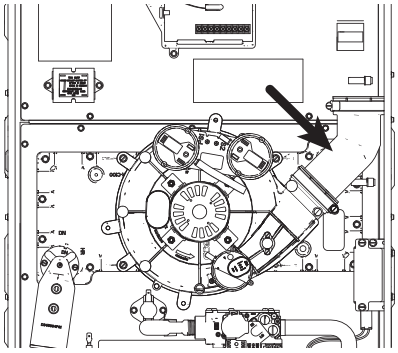
6. Remove two 3-inch plugs on left side of cabinet. To be used for combustion air exhaust and inlet.
7. Reuse the two 3-inch plugs to seal the two 3-inch default openings on the top of the cabinet.

Figure 148. Plug opening



8. Loosen the clamp holding the 45 degree elbow. Remove the elbow and discard.

Figure 149. Removing elbow



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 150. Tightening screws

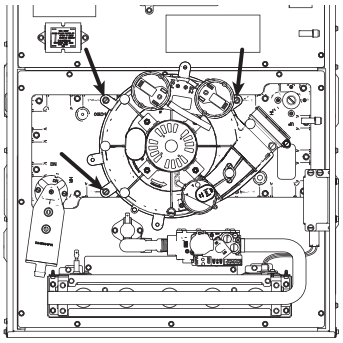
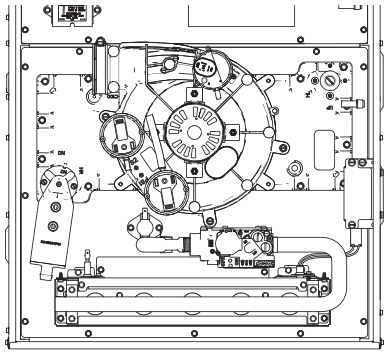


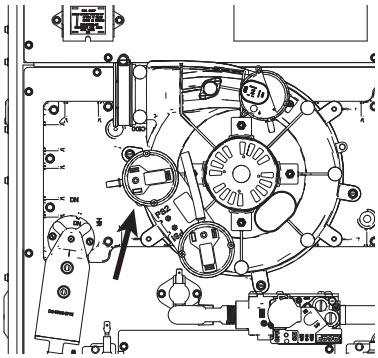
Figure 151. Tightening screws



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.

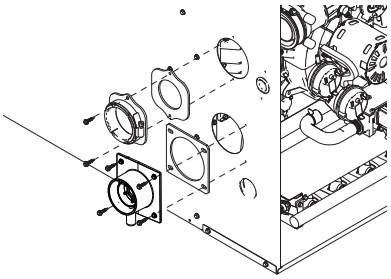
Note: *The illustration shows PS2 in its final position after being rotated.*

Figure 152. Reattaching pressure switch bracket



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 153. Install the vent inlet/outlet

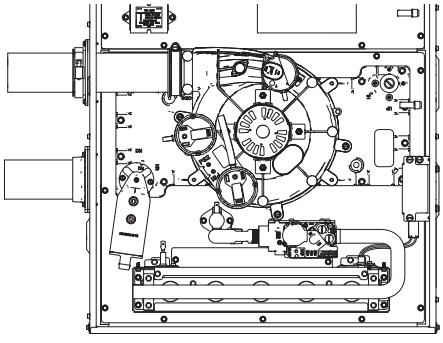


19. Slide PVC through vent outlet adaptor and insert into inducer outlet.
20. Twist to insure PVC is fully inserted.
21. Tighten the two clamps.
22. Install the combustion air inlet PVC pipe.

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.*
- *If required, transition to larger venting within 2ft of the cabinet. An 2-in. x 3-in. 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," p. 44 for proper orientation of 2-in. x 3-in. offset coupling.*

Figure 154. Installing the vent and combustion air inlet pipes



23. Connect PS2 tubing to switch and sensing location.

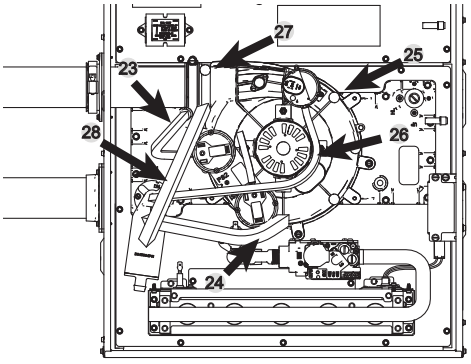
Important: *Trim the condensate pressure switch tubing to length to confirm there is no sag or trap created.*

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: *Cut to length to confirm 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 155. Condensate tubing



Integrated Furnace Control Menu

Figure 156. A952V control menu

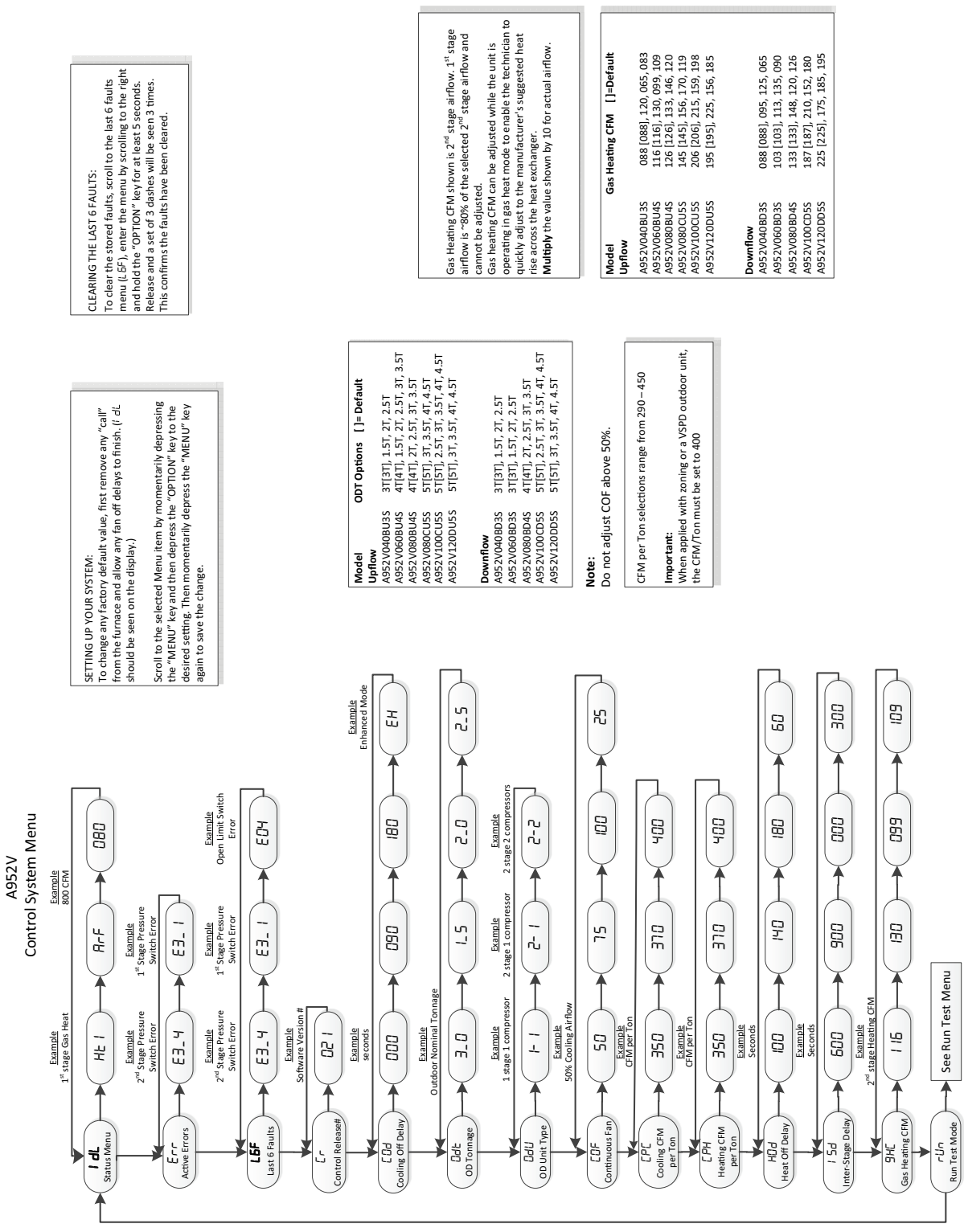
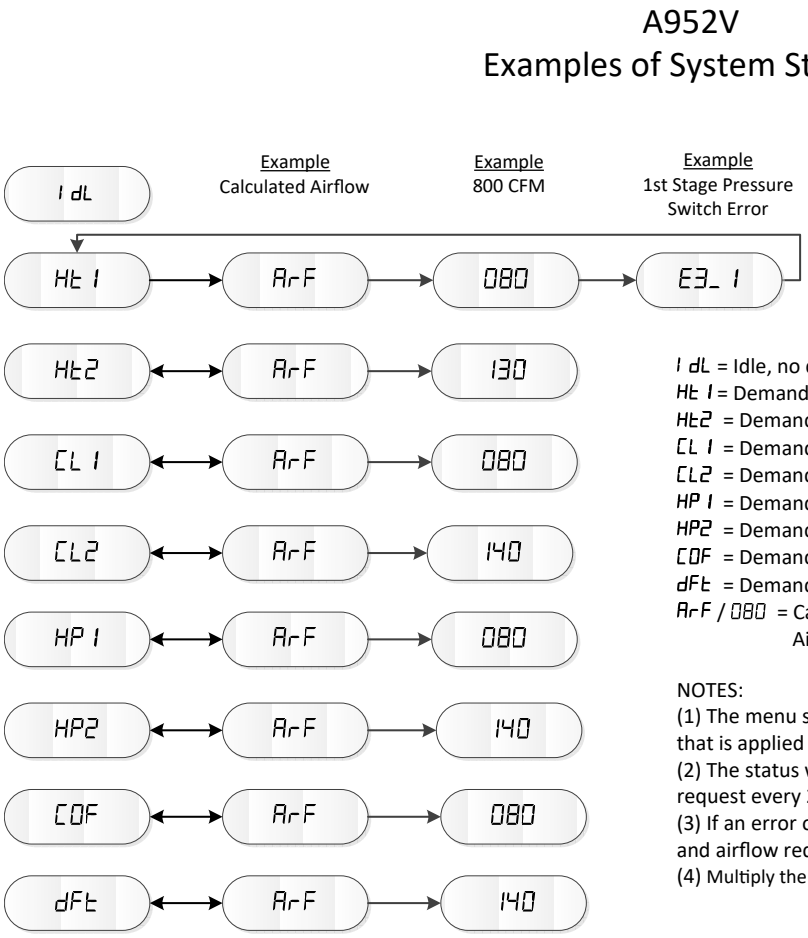


Figure 157. A952X system status examples

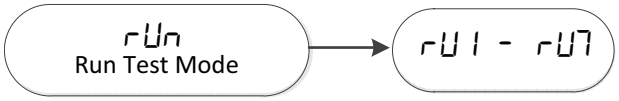


IdL = Idle, no demand for cooling, heating, or fan
Ht1 = Demand for 1st stage gas heat
Ht2 = Demand for 2nd stage gas heat
CL1 = Demand for 1st stage cooling
CL2 = Demand for 2nd stage cooling
HP1 = Demand for 1st stage heat pump
HP2 = Demand for 2nd stage heat pump
COF = Demand for continuous fan
dFt = Demand for outdoor unit defrost, furnace running in gas heat mode
ArF / 080 = Calculated airflow is 800 CFM.
Airflow display is rounded down to the nearest 10 cfm

NOTES:
(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
(4) Multiply the value shown by 10 for actual airflow

Run Test Mode

Figure 158. Segment menu



To enter Run Test Mode, scroll to using the Menu key, then push the op!on key. The LED will flash 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

rU3 – Turns the ignitor 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

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

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 confirm the IFC, inducer, and circulating blower are performing as intended.*

Integrated Furnace Control Display Codes

Table 38. 2 Stage Inducer with ECM Blower Motor Status Codes

IdL	Idle
Ht1	First Stage Heating
Ht2	Second Stage Heating
ArF	Calculated airflow times 10 (080=800 CFM)
COF	Continuous Fan
CL1	First Stage Cooling
CL2	Second Stage Cooling
HP1	First Stage Heat Pump
HP2	Second Stage Heat Pump
dFt	Defrost Mode

Table 39. Menu Options

Err	Active Alarm Menu
LGF	Last 6 Faults (To clear — Hold Option button down for 5 seconds)
Cr	Code Release Number
COd	Cooling Off Delay (Seconds)
Odt	Outdoor Tonnage
OdU	Outdoor Unit
COF	Blower Constant Fan Airflow Multiplier (Percentage)
CPC	Cooling (CFM/Ton)
CPH	Heat Pump Heating (CFM/Ton)
Hod	Heat Off Delay (Seconds)
ISd	Inter-Stage Delay (Seconds)
9HC	Gas Heating CFM 2nd Stage (1st Stage is not adjustable)
rUn	Run Test Mode

Table 40. 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
E2_4	Redundant Relay (HLO output) Not Energized when it should be exceeded after 10 times

Table 40. Error codes (continued)

Alarm Error Code	Alarm Explanation
E3_1	Shorted Pressure Switch, 1st Stage
E3_2	Open Pressure Switch, 1st Stage
E3_3	Shorted Pressure Switch, 2nd Stage
E3_4	Open Pressure Switch, 2nd Stage
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 stage gas valve (MVL) is energized when it should be off
E7_2	Redundant Relay (HLO output) Energized when it should Not be
E08	Flame current is low, but still strong enough to allow operation
E09	Open Inducer Limit Switch or Condensate Pressure Switch
E 10	Communication error between variable speed inducer and blower motor microprocessor
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 4. 2nd stage gas valve energized when it should not be 5. 2nd stage gas valve not energized when it should be
E12	Open fuse
E13	Blower HP/OEM ID
E14	No PM and local copy bad
E15	Both of unit Data File in PM and local Unit Data File are corrupt
E17	Blower motor no communication response
E18	Blower communication failure on the control

Fault Code Recovery

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

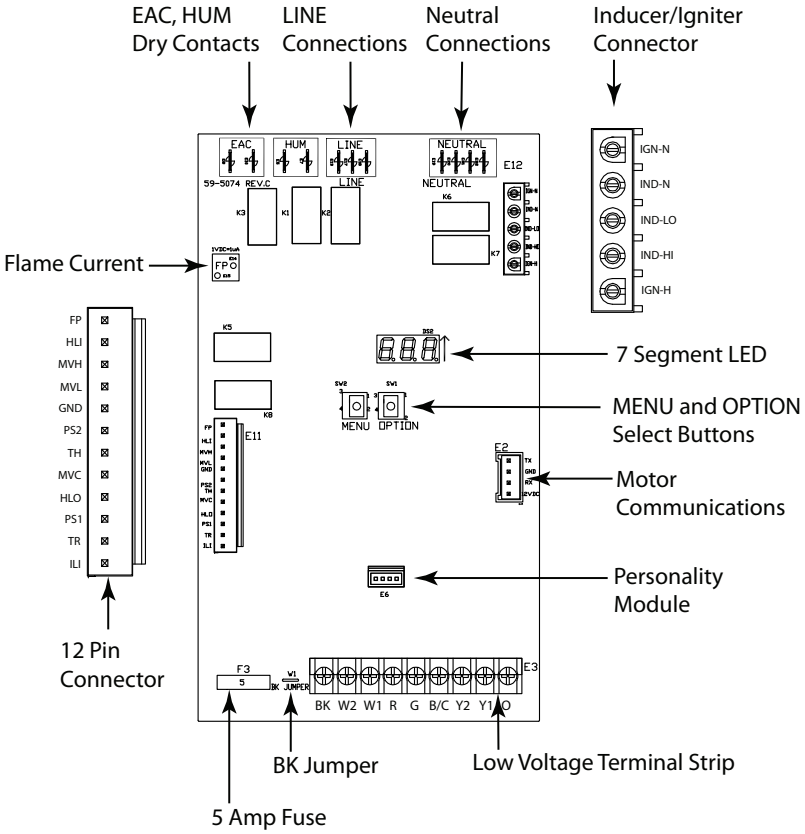
Clearing the Last 6 Faults

1. To clear the last 6 faults, press the **Menu** key until the **Last 6 Faults** (LSF) 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 159. Component layout



Troubleshooting

The following pages include troubleshooting flowcharts in reference for the 2 Stage A952V family of furnaces only.

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

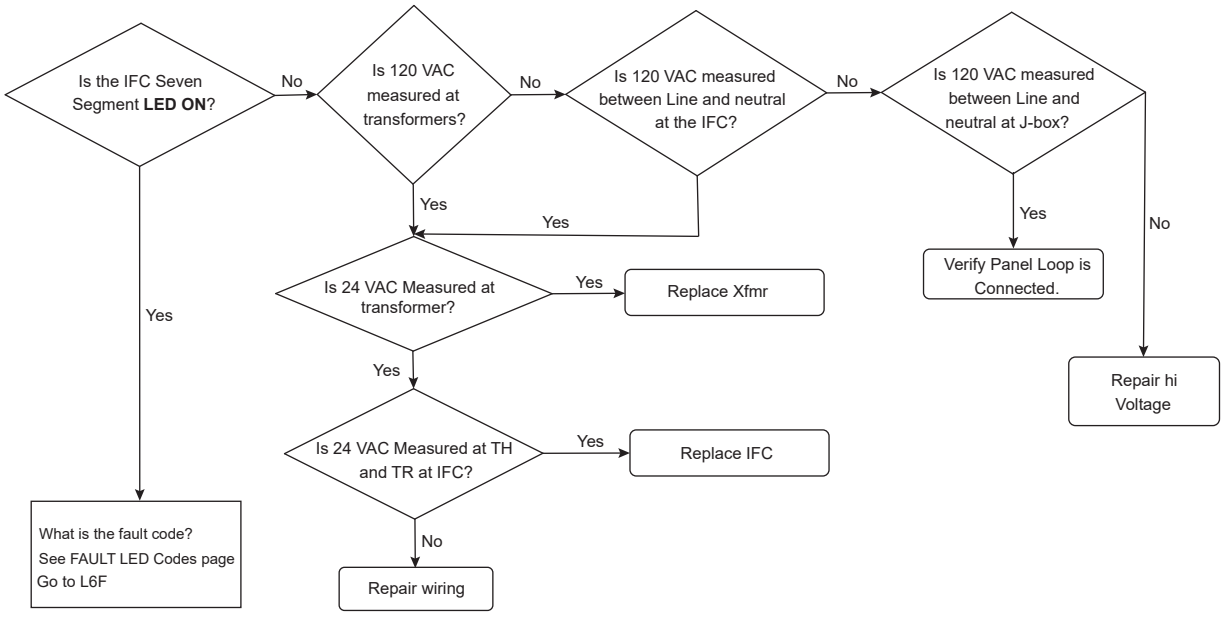
ONLY qualified technicians should attempt to install, troubleshoot, or repair this appliance.

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

See Table 40, p. 89 for possible error codes.

For questions regarding IFC component layouts, see Figure 159, p. 90.

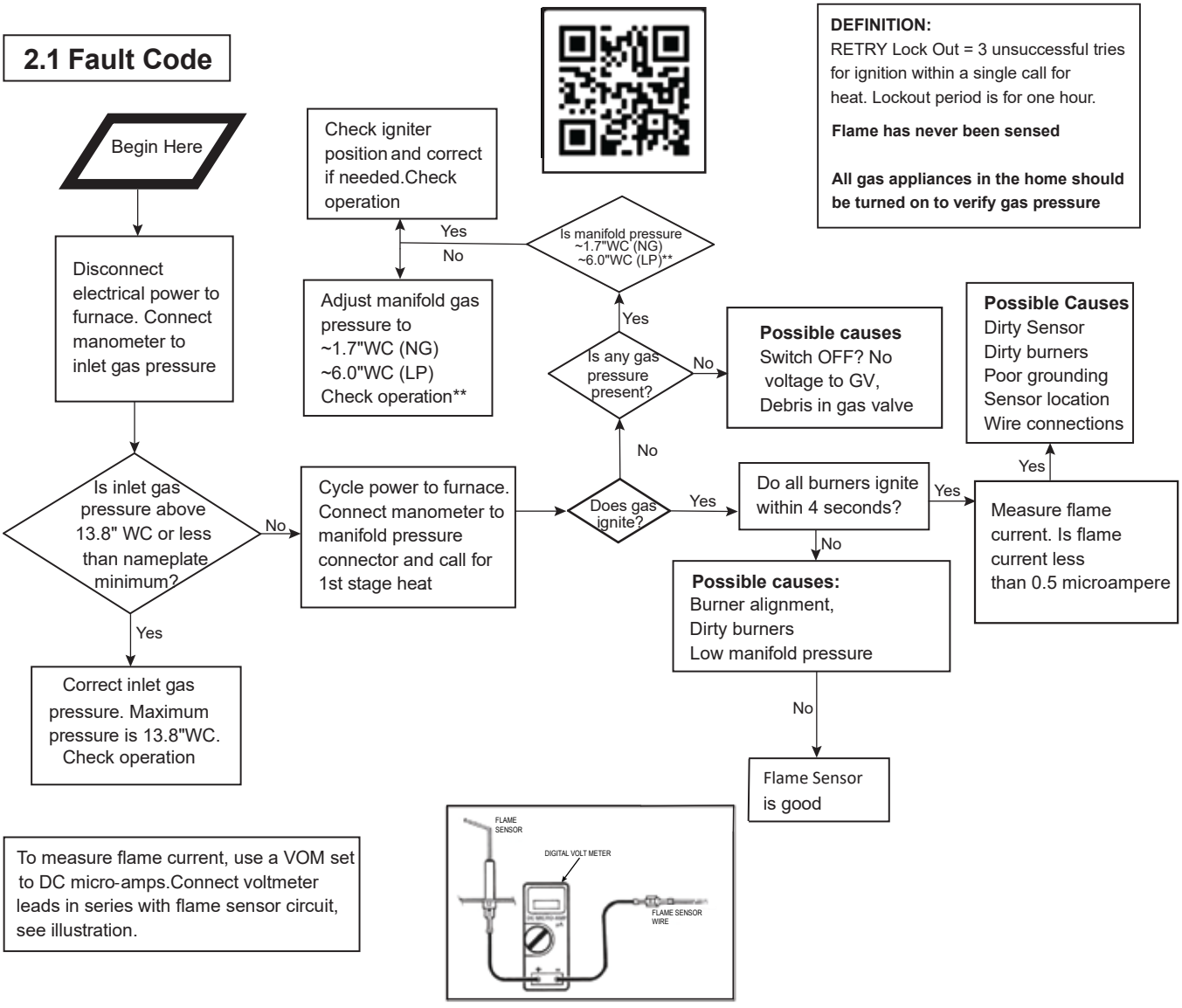
GETTING STARTED



01 Fault Code → Replace IFC

DEFINITION:
Internal Failure of the Control Board.

2.1 Fault Code



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

Begin Here

Disconnect electrical power to furnace. Connect manometer to manifold pressure connector

Cycle power to furnace and call for 1st stage heat

Is manifold pressure ~1.7"WC (NG) ~6.0"WC (LP)

No → Adjust manifold gas pressure to ~1.7"WC (NG) ~6.0"WC (LP) Check operation**

Yes → Measure flame current.Is flame current greater than 0.75 microampere (0.75- 3 µA = Normal)

No → **Possible Causes:**
Dirty Sensor
Dirty burners
Poor grounding
Sensor location
Wire connections

Yes → Is minimum outlet gas manifold pressure maintained?

Yes → **Possible Causes:**
Plugs
Blower door
Wind gust
Power interrupt

No → Disconnect electrical power to furnace. Connect manometer to inlet gas pressure connector

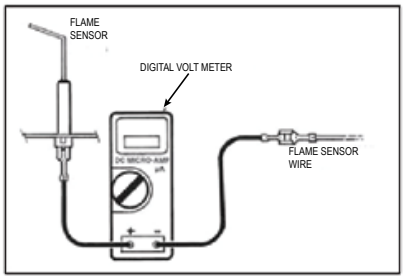
Cycle power to furnace and call for 1st stage heat

Is minimum outlet gas manifold pressure maintained?

No → Correct incoming gas supply pressure

Yes → Repeat steps with 2nd stage heating

To measure flame current, use a VOM set to DC microampere. Connect voltmeter leads in series with flame sensor circuit, see illustration.



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

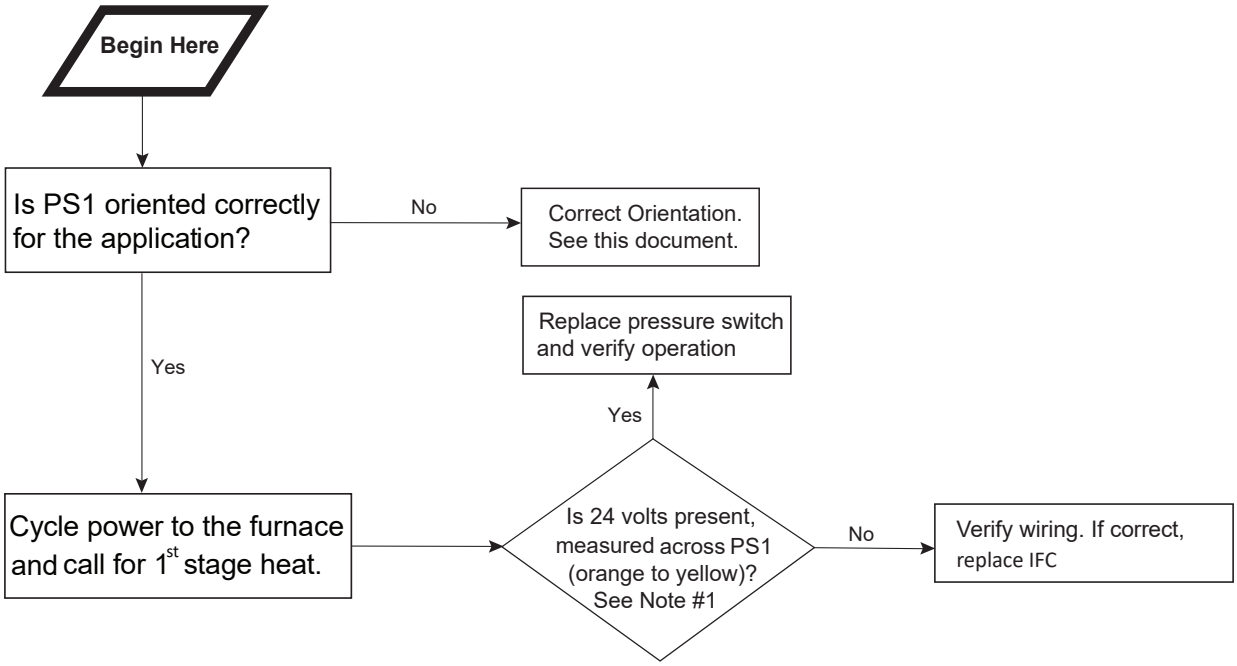
2.4 Fault Code → Replace IFC

DEFINITION
High limit output relay is not closed when it should be
24VAC not sensed on HLO 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
24 volts = Open Switch
0 volts = Closed Switch



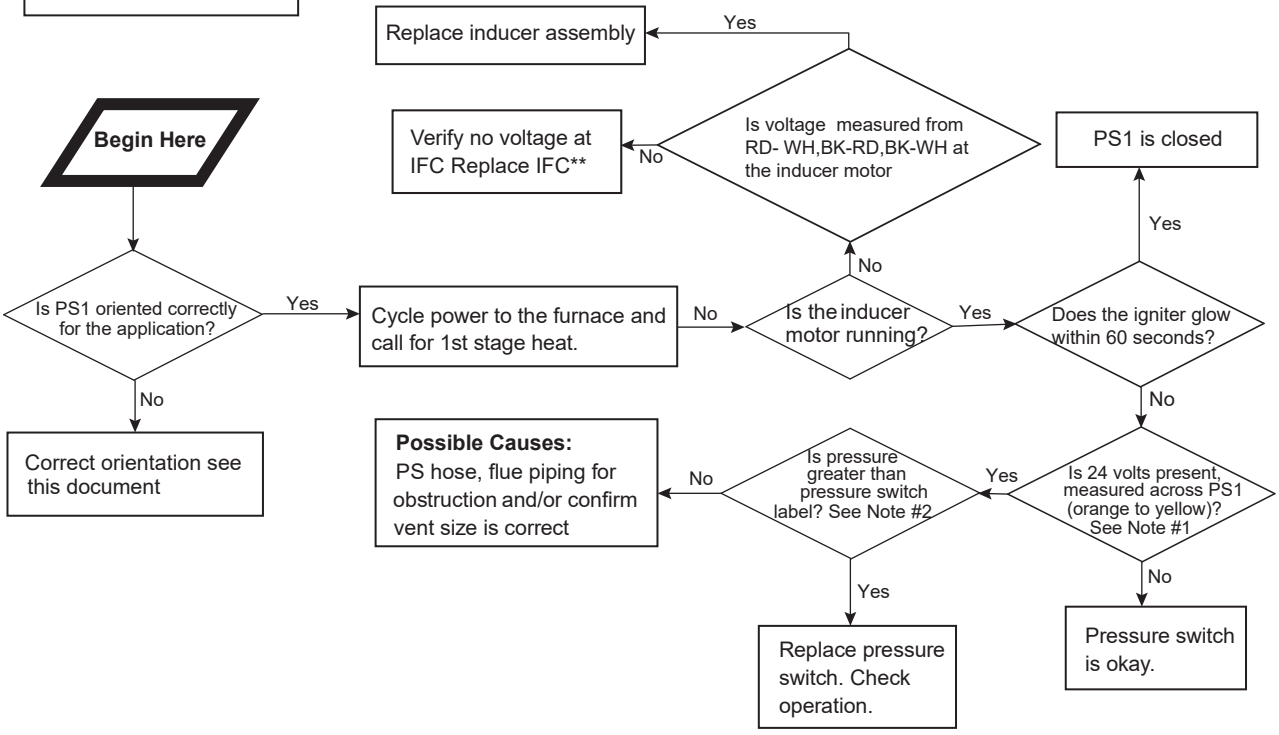
3.2 Fault Code

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 occur when wind gusts occur. The IFC will a close both PS1 by increasing the voltage to the inducer motor



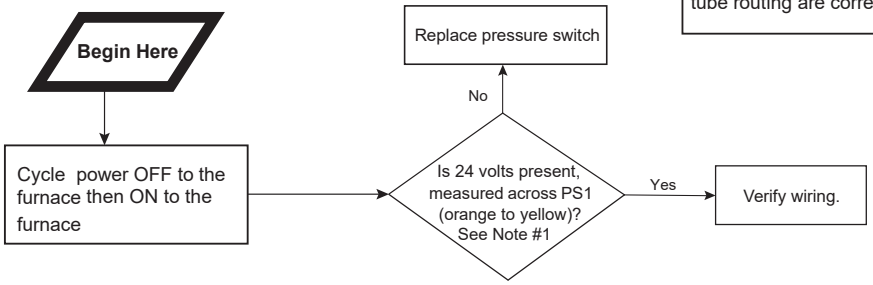
3.3 Fault Code

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

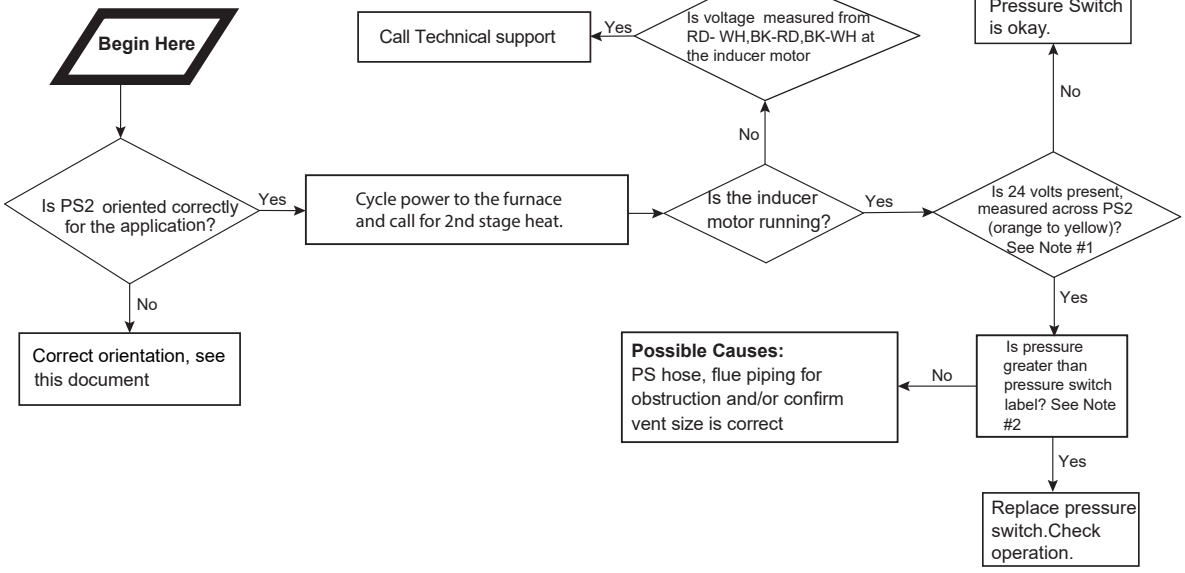
Note #1
24 volts = Open Switch
0 volts = Closed Switch

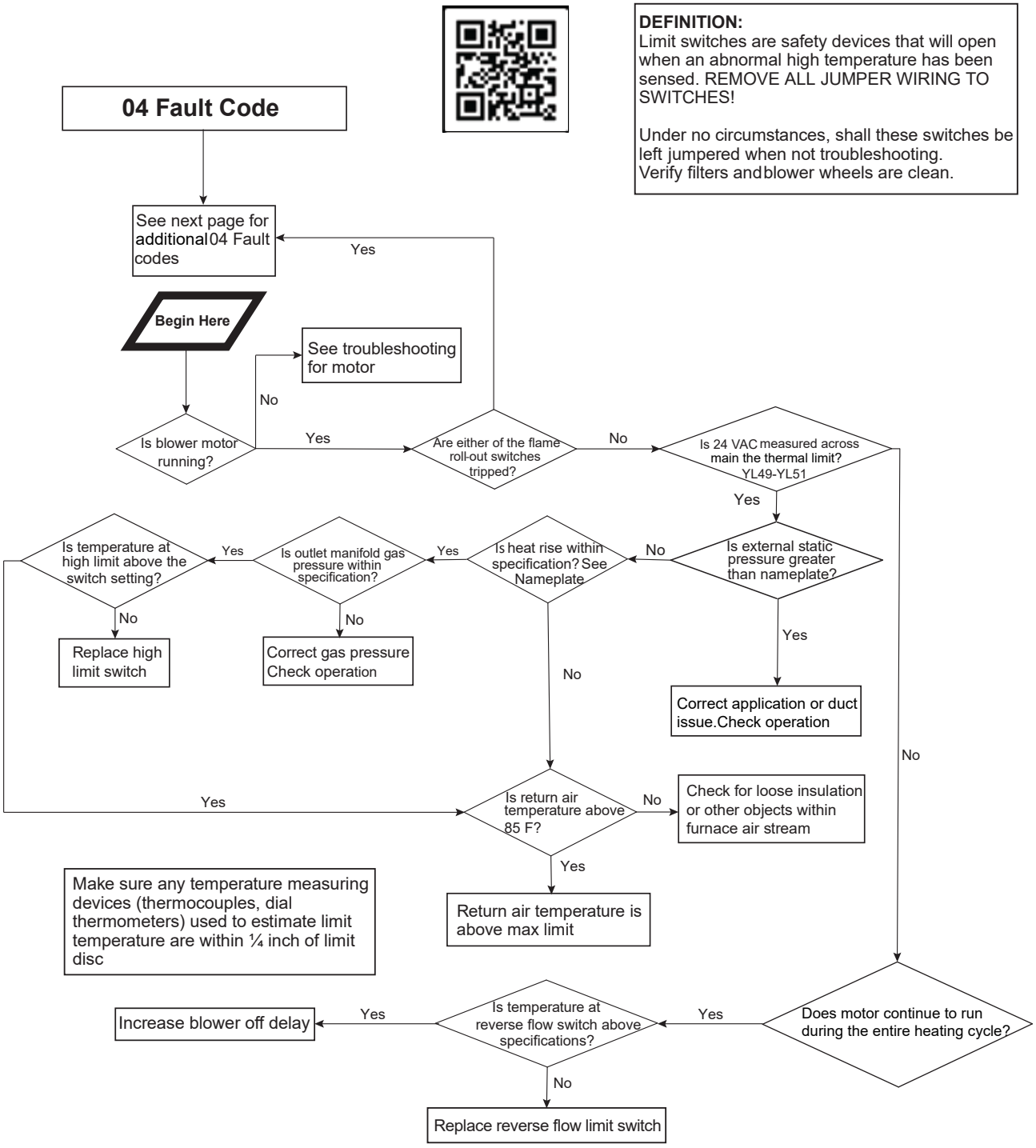
Note #2
Measured pressure is negative, greater than refers to magnitude only.

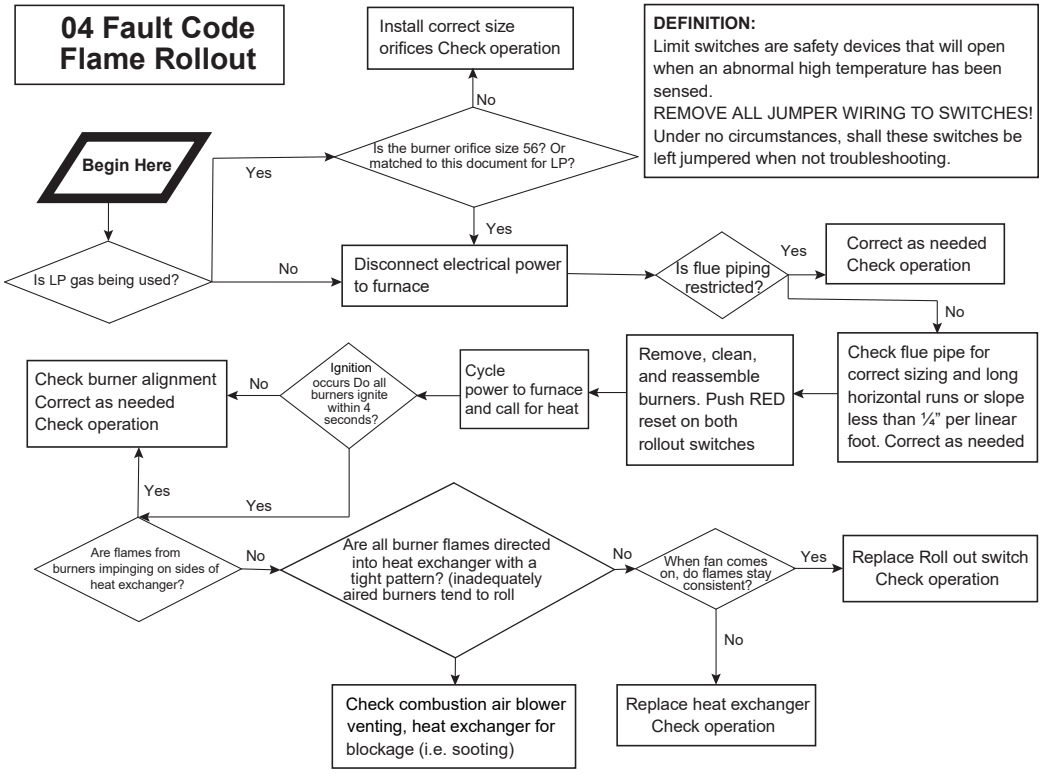
DEFINITION:
An error has occurred with the PS2 indicating that the pressure switch is open when it should be closed.

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

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




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? YL49-YL51
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
Yes
Is return air temperature above 85 F?
No
Check for loose insulation or other objects within furnace air stream
Yes
Return air temperature is above max limit
Make sure any temperature measuring devices (thermocouples, dial thermometers) used to estimate limit temperature are within ¼ inch of limit disc
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


04 Fault Code
Flame Rollout
Begin Here
Is LP gas being used?
Yes
No
Is the burner orifice size 56? Or matched to this document for LP?
No
Yes
Install correct size orifices Check operation
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.
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 4 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
No
When fan comes on, do flames stay consistent?
Yes
Replace Roll out switch
Check operation
No
Check combustion air blower venting, heat exchanger for blockage (i.e. sooting)
Replace heat exchanger
Check operation

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

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

Is flame current present? See illustration

No

Replace IFC

Yes

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

No

Using a back-up wrench, install new gas valve Check operation

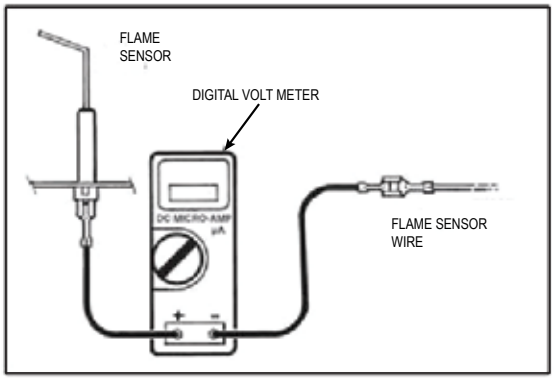
Yes

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

Install drip per National Fuel Gas Code and Installation instructions

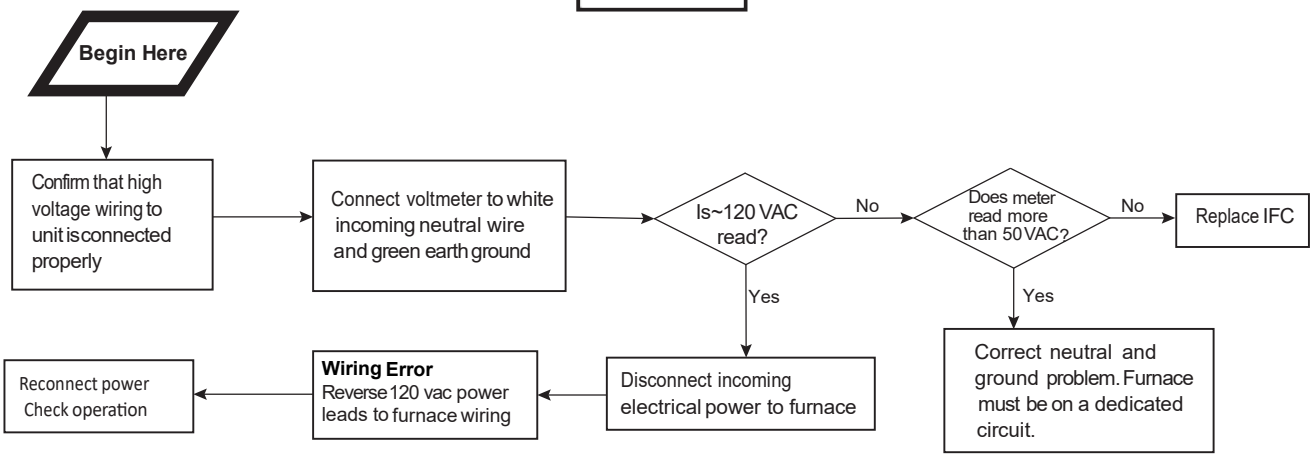
No

To measure flame current, use a VOM set to DC micro amps. Connect voltmeter leads in series with flame sensor circuit, see illustration,



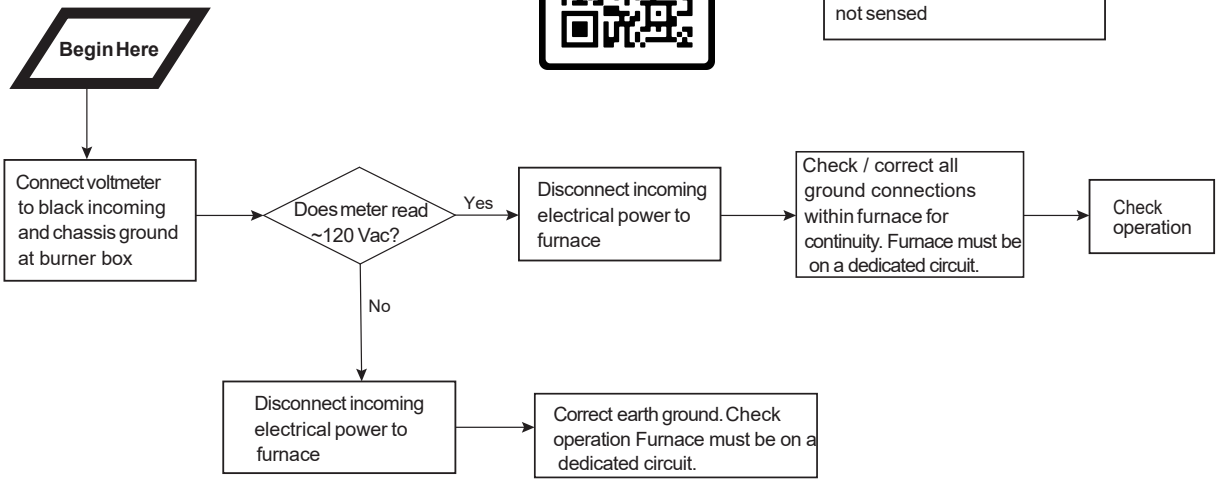
6.1 Fault Code Reversed Polarity

DEFINITION:
Polarity Fault– Incoming high voltage wiring is reversed

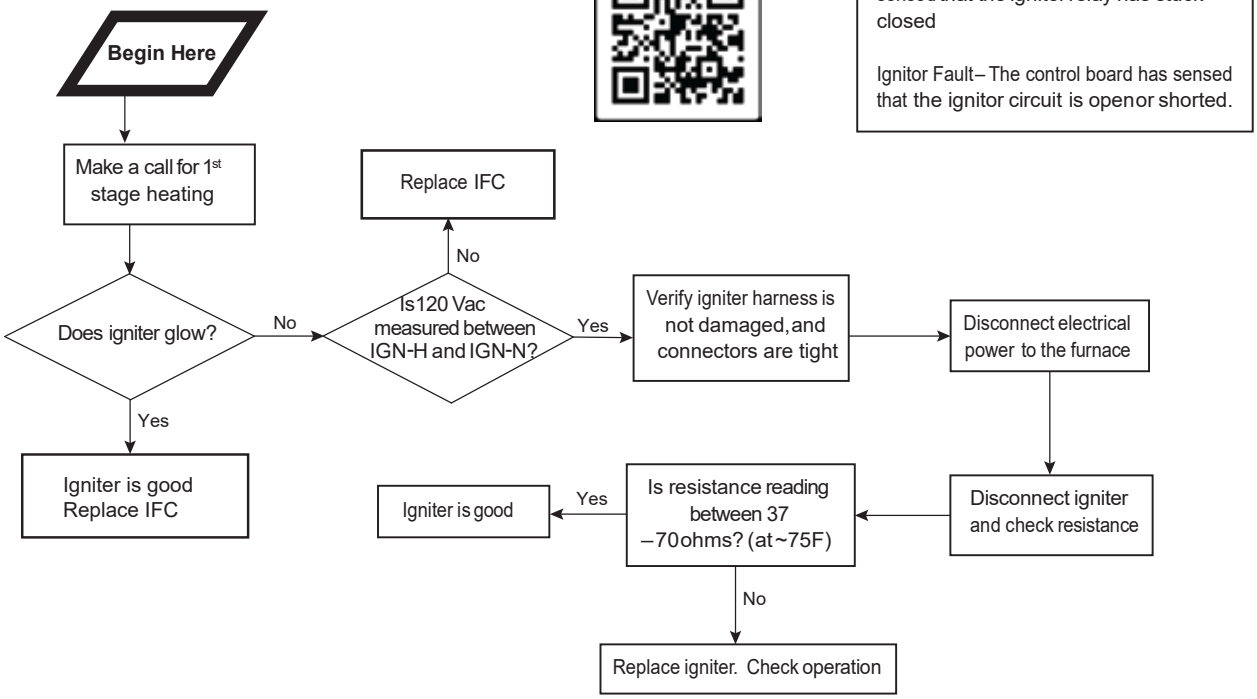


6.2 Fault Code Faulty Ground

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



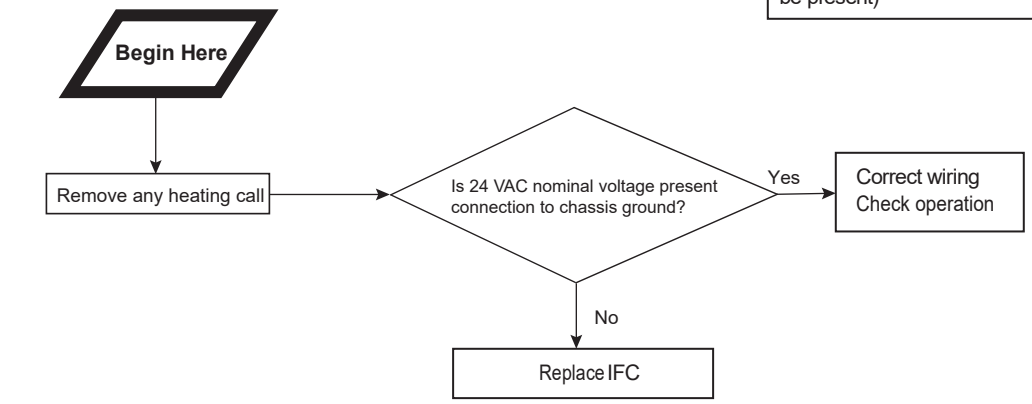
6.3 Fault Code



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)

7.2 Fault Code

Replace IFC

DEFINITION:
Internal control board error Redundant HLO relay closed when it should not be.

8 Fault Code

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

Begin Here

Connect a voltmeter with the ability to read micro-amperes per the illustration below.

Make a call for 1st stage heating

Confirm all burner flame s directed into heat exchanger with a tight pattern? (inadequately aired burners tendto roll back)

Is flame current measured less than 0.5 micro - amp DC?

No

Flame sensor is good. Check wiring and / or connections

Yes

Is flame sensor located correctly? See figure

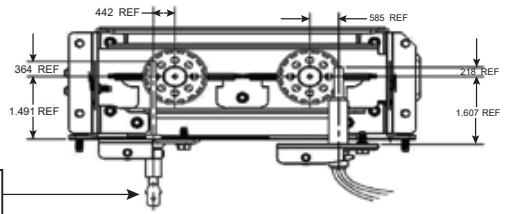
No

Correct flame sensor location

Check operation

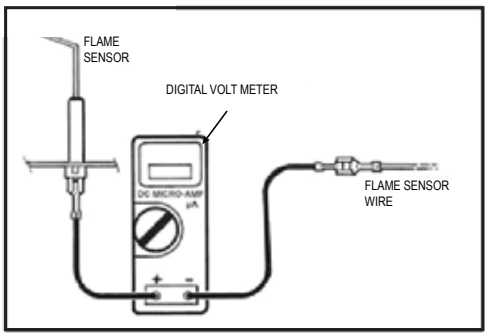
Yes

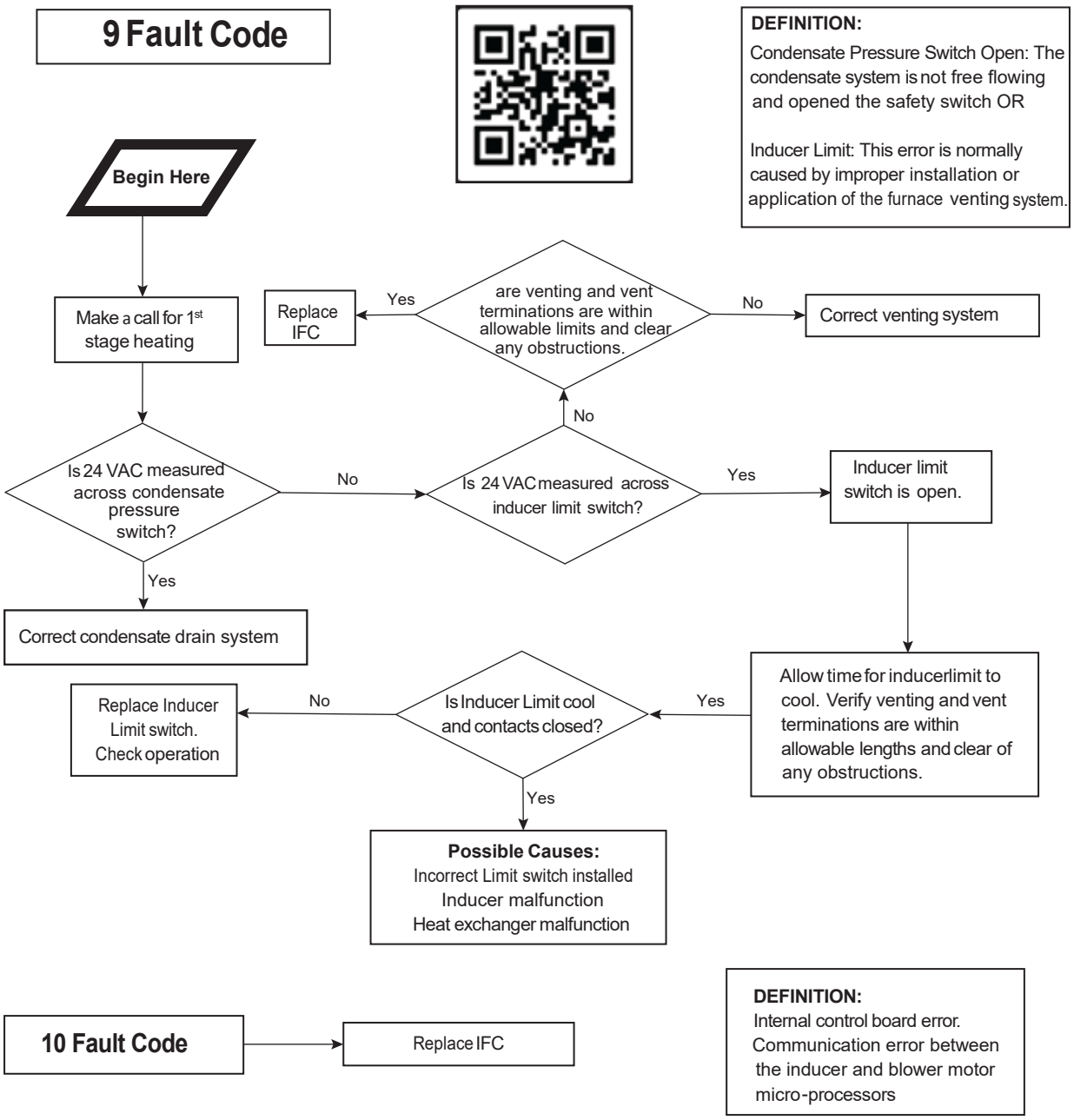
Replace Flame sensor



Flame Sensor

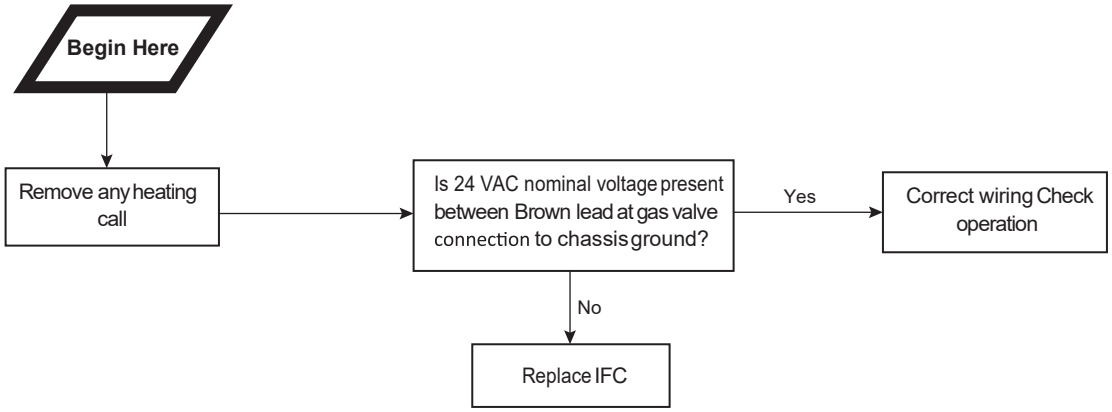
To measure flame current, use a VOM set to DC micro-amps. Connect voltmeter leads in series with flame sensor circuit, see illustration




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 1st stage heating
Is 24 VAC measured across condensate pressure switch?
No
Is 24 VAC measured across inducer limit switch?
Yes
Inducer limit switch is open.
No
are venting and vent terminations are within allowable limits and clear any obstructions.
Yes
Replace IFC
No
Correct venting system
Yes
Correct condensate drain system
Allow time for inducerlimit to cool. Verify venting and vent terminations are within allowable lengths and clear of any obstructions.
Yes
Is Inducer Limit cool and contacts closed?
No
Replace Inducer Limit switch. Check operation
Yes
Possible Causes:
Incorrect Limit switch installed
Inducer malfunction
Heat exchanger malfunction
10 Fault Code
Replace IFC
DEFINITION:
Internal control board error. Communication error between the inducer and blower motor micro-processors

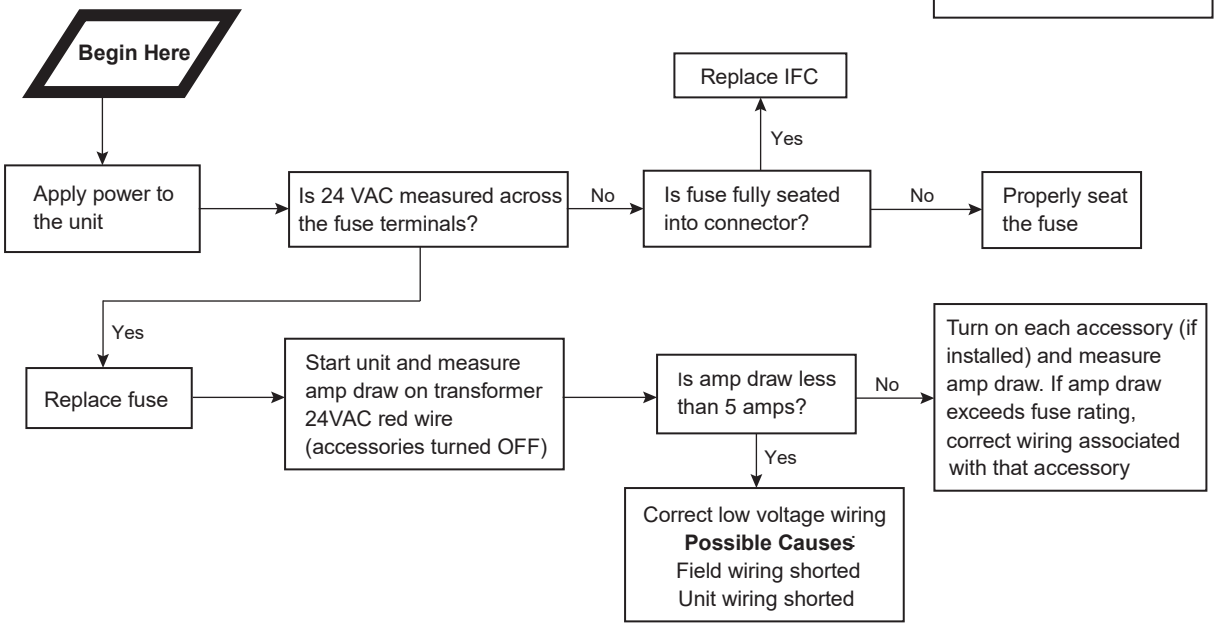
11 Fault Code

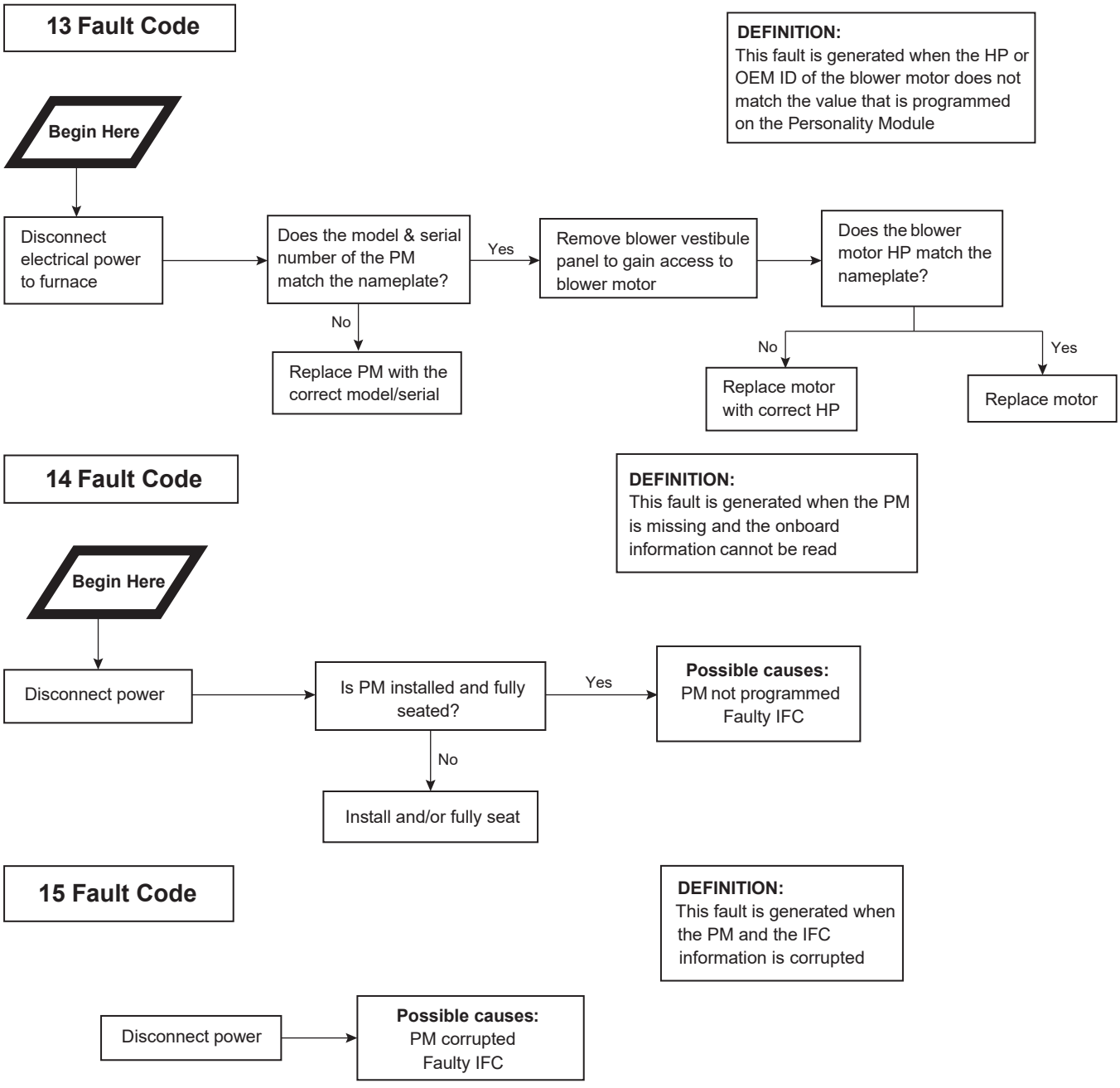
Definition
The IFC has detected that internal gas valve relays have failed OR 24 VAC is being sensed at 2nd stage gas valve

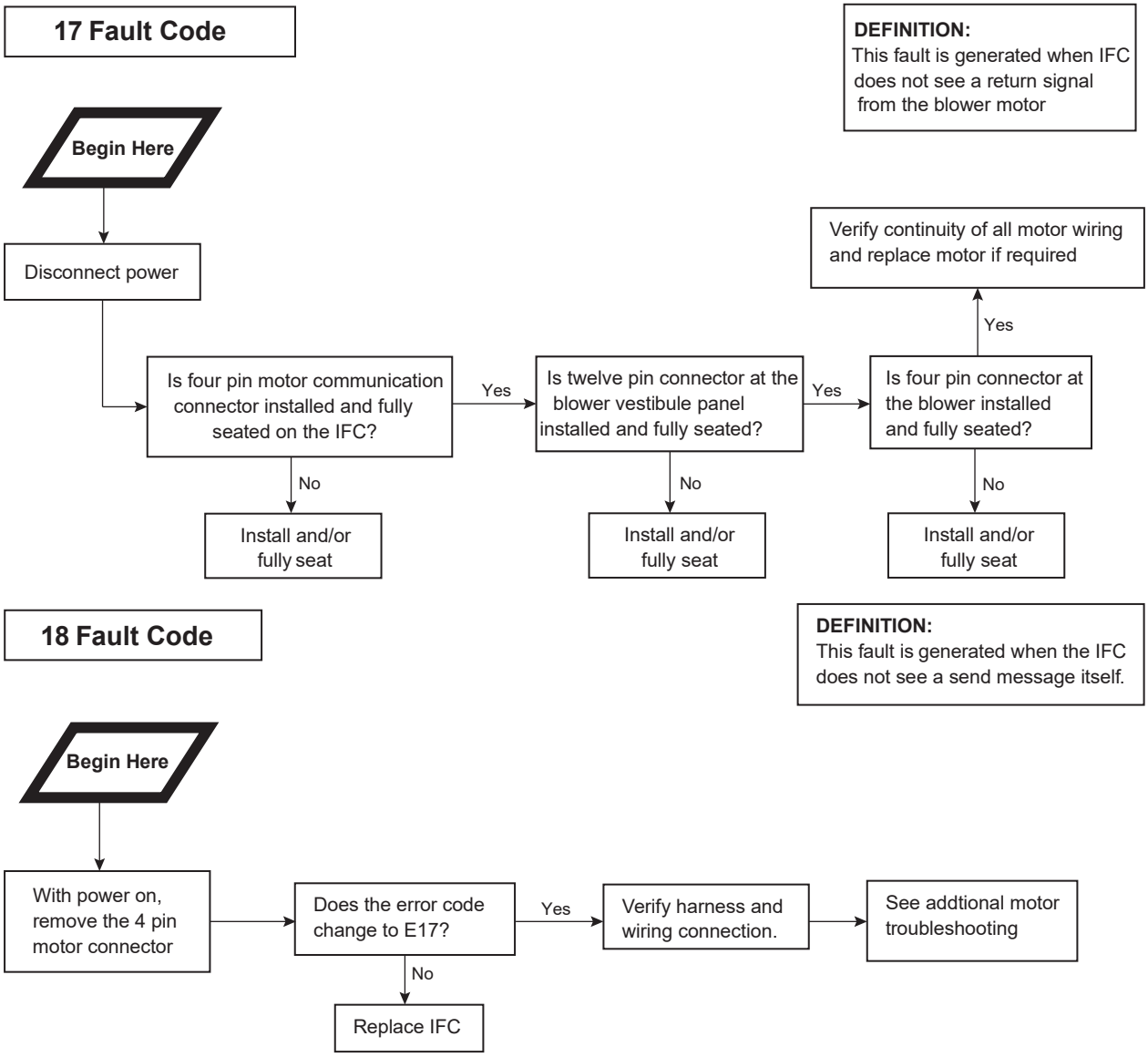


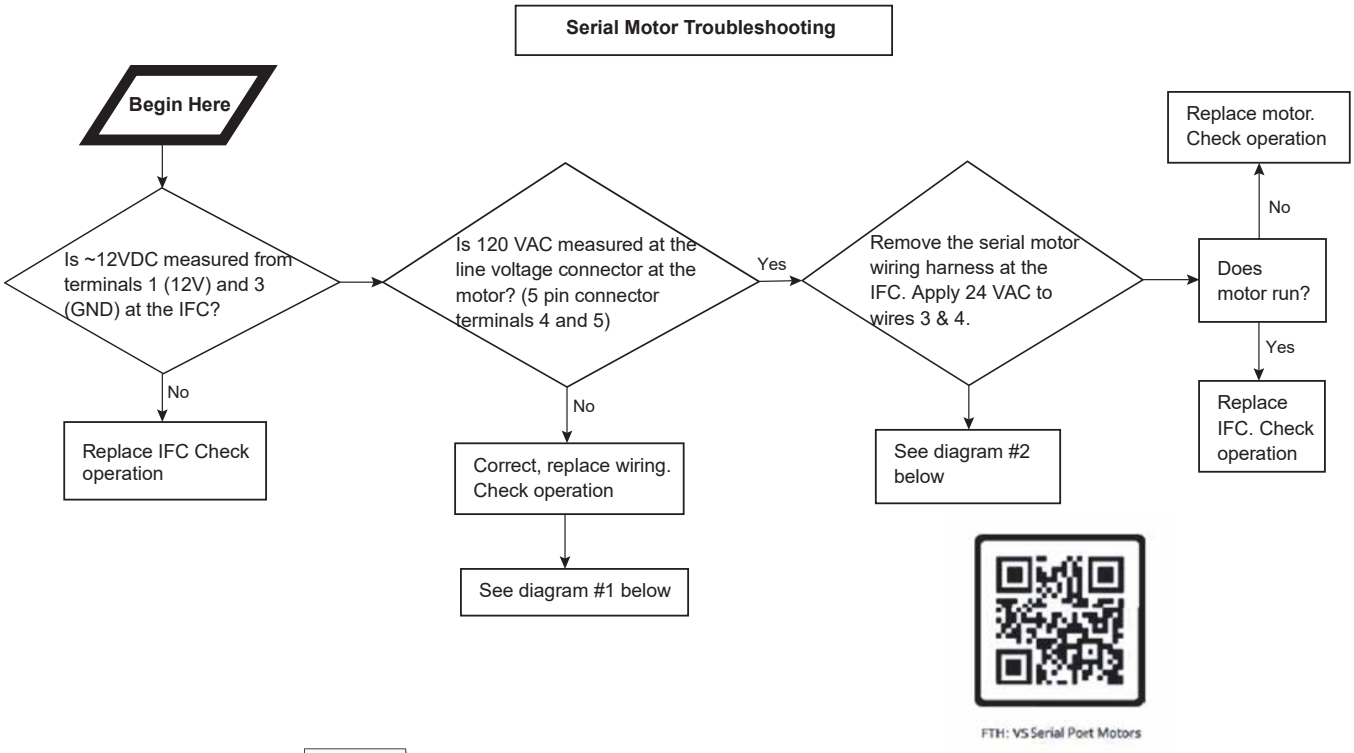
12 Fault Code

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




13 Fault Code
DEFINITION:
This fault is generated when the HP or OEM ID of the blower motor does not match the value that is programmed on the Personality Module
Begin Here
Disconnect electrical power to furnace
Does the model & serial number of the PM match the nameplate?
Yes
No
Replace PM with the correct model/serial
Remove blower vestibule panel to gain access to blower motor
Does the blower motor HP match the nameplate?
No
Yes
Replace motor with correct HP
Replace motor
14 Fault Code
DEFINITION:
This fault is generated when the PM is missing and the onboard information cannot be read
Begin Here
Disconnect power
Is PM installed and fully seated?
Yes
No
Possible causes:
PM not programmed
Faulty IFC
Install and/or fully seat
15 Fault Code
DEFINITION:
This fault is generated when the PM and the IFC information is corrupted
Disconnect power
Possible causes:
PM corrupted
Faulty IFC


17 Fault Code
DEFINITION:
This fault is generated when IFC does not see a return signal from the blower motor
Begin Here
Disconnect power
Is four pin motor communication connector installed and fully seated on the IFC?
Yes
Is twelve pin connector at the blower vestibule panel installed and fully seated?
Yes
Is four pin connector at the blower installed and fully seated?
Yes
Verify continuity of all motor wiring and replace motor if required
No
Install and/or fully seat
No
Install and/or fully seat
No
Install and/or fully seat
18 Fault Code
DEFINITION:
This fault is generated when the IFC does not see a send message itself.
Begin Here
With power on, remove the 4 pin motor connector
Does the error code change to E17?
Yes
Verify harness and wiring connection.
See addtional motor troubleshooting
No
Replace IFC


Serial Motor Troubleshooting
Begin Here
Is ~12VDC measured from terminals 1 (12V) and 3 (GND) at the IFC?
No
Replace IFC Check operation
Is 120 VAC measured at the line voltage connector at the motor? (5 pin connector terminals 4 and 5)
No
Correct, replace wiring. Check operation
See diagram #1 below
Yes
Remove the serial motor wiring harness at the IFC. Apply 24 VAC to wires 3 & 4.
See diagram #2 below
Does motor run?
No
Replace motor. Check operation
Yes
Replace IFC. Check operation
FTH: VS Serial Port Motors

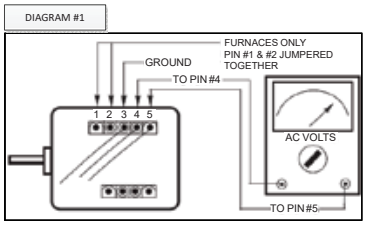


DIAGRAM #1
FURNACES ONLY
PIN #1 & #2 JUMPERED TOGETHER
GROUND
TO PIN #4
1 2 3 4 5
AC VOLTS
TO PIN #5

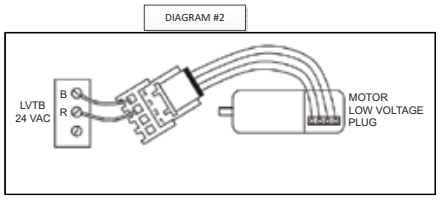
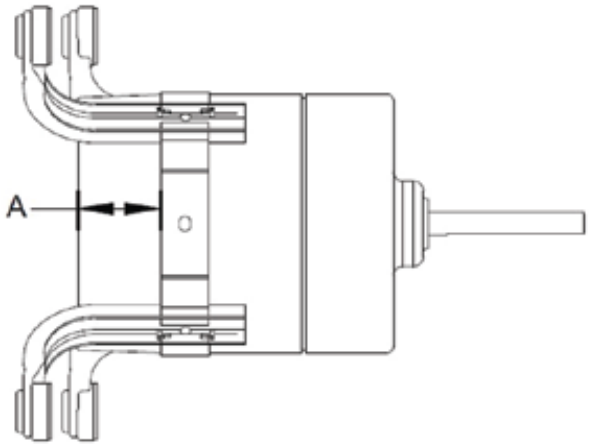


DIAGRAM #2
LVTB
24 VAC
B
R
MOTOR
LOW VOLTAGE
PLUG

Belly Band Location

Distance from belly band to the front face of motor for minimum vibration

Figure 160. Belly band



Blower housings and wheel removed from view for clarity.

Table 41. Regal Rexnord Eon+ Motor (D346803P02-P04)

Furnace Cabinet Size	Dimension "A" (inches)
040BU3, 040BD3, and 060BD3	2.75
060BU4, 080BU4, and 080BD4	3.54
All C and D	3.79

Table 42. Panasonic V2 Motor (D345263P01-P03)

Furnace Cabinet Size	Dimension "A" (inches)
040BU3, 040BD3, and 060BD3	2.71
060BU4, 080BU4, and 080BD4	3.42
All C and D	1.79

Sequence of Operation

Notes:

1. *The seven segment LED readout is based on thermostat input. During a simultaneous call for W1 and W2, the seven segment LED will read "HtC", although the IFC will process the call for 1st stage heat first.*
2. *Numbers in Parenthesis ( ) refer to the 12 pin terminal positions.*

EAC and HUM Timing

- EAC relay closes approximately 2 seconds after the blower starts and opens when the blower motor stops.
- HUM relay closes on any heating call (HP/Gas) approximately 1 second after the blower motor starts and opens when any heating call (HP/Gas) is removed.

1st Stage Gas Heating

1. R – W1 contacts close on the thermostat sending 24Vac to the W1 low voltage terminal of the IFC. Technician should read 24Vac from W1 to B/C. The seven segment LED will read "Ht 1".
2. The IFC performs a self-check routine and then confirms:
   a. Condensate pressure switch and Inducer limit switch are closed by sending 24Vac out the HLO terminal and monitoring the ILI (1) input.
   b. Flame roll-out switches (FRS) 1 and 2, main thermal limit (TCO), and any reverse air flow (RAF) switches are proved closed by sending 24Vac out the HLO (4) terminal and monitoring the HLI (11) input.
   c. Pressure switch 1 (PS1) and pressure switch 2 (PS2) are proved 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 either pressure switch.*
3. After steps a, b, and c are confirmed, the inducer relay is closed energizing 1st stage inducer. As the inducer ramps up, PS1 closes.
4. The ignitor relay on the IFC closes and the ignitor energizes and warms up is approximately 20 seconds.
5. The 1st stage gas valve relay closes, energizing the 1st stage gas valve solenoid to allow ignition.
6. The first burner will ignite and flame will crossover to the remaining burners, establishing current to the flame sensor. Flame sensing must take place within 4 seconds.

   Note: *There are two flame sense pads located on the IFC, marked "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 to 3.0 micro-amps (0.75 to 3 Vdc).*
7. Once flame sense has been achieved, a timer on the IFC starts and after the "Blower On" delay has completed, the indoor blower will energize and run at the 1st stage gas heating speed. The seven segment LED for example will alternately read:

   Ht1 = Gas heating, Stage 1

   AirF = Airflow

   060 = 600 calculated cfm (value shown x 10)
8. When the temperature raises enough to satisfy the thermostat setting, contacts R-W1 will open.
9. The gas valve relay will open, closing the gas valve. The inducer will continue to run for approximately 5 seconds to remove any combustion byproducts from inside the furnace.
10. 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 "Idl" = Idle, no thermostat demand.

2nd Stage Gas Heating

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

1. R – W1 contacts close on the thermostat sending 24Vac to the W1 low voltage terminal of the IFC. Technician should read 24Vac from W1 to B/C. The seven segment LED will read "Ht 1"
2. The IFC performs a self-check routine and then confirms:
   a. Condensate pressure switch and Inducer limit switch are proved closed by sending 24Vac out the HLO terminal and monitoring the ILI (1) 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 (4) terminal and monitoring the HLI (11) input.
   c. Pressure switch 1 (PS1) and pressure switch 2 (PS2) are proved open by sending 24Vac out the HLO terminal, through the limit switches, and monitoring the PS1 (3) and PS2 (7) inputs.

   Note: *If a thermal limit is open, 24Vac will not be present at either pressure switch.*
3. After steps a, b, and c are confirmed, the inducer relay is closed energizing 1st stage inducer. As the inducer ramps up, PS1 will close.
4. When PS1 closes, the ignitor relay on the IFC will close. The ignitor is energized and warm up is approximately 20 seconds.
5. After the ignitor warm up, the 1st stage gas valve relay is closed, energizing the 1st stage gas valve solenoid to allow ignition.
6. The first burner will ignite and flame will crossover to the remaining burners, establishing current to the flame

sensor. Flame sensing must take place within 4 seconds.

Note: *There are two flame sense pads located on the IFC, marked "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 to 3.0 micro-amps (0.75 to 3 Vdc).*

7. Once flame sense has been achieved, a timer on the IFC starts and after the "Blower On" delay has completed, the indoor blower will energize and run at the 1st stage gas heating speed. The seven segment LED for <u>example</u> will alternately read:

   HE 1 = Gas heating, Stage 1

   ArF = Airflow

   060 = 600 calculated cfm (value shown x 10)
8. 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".
9. The IFC then energizes the 2nd stage inducer relay. The inducer ramps to 2nd stage, 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

   ArF = Airflow

   123 = 1230 calculated cfm (value shown x 10)
10. 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 step 9. If on the third attempt during the same heating call, PS2 does not close within the 45 second proving time, the unit will lock out 2nd stage until the heating calls are removed or the power is cycled to the furnace.*

11. When the temperature raises enough to satisfy the thermostat setting, contacts R-W2 will open, 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.
12. When the temperature raises enough to satisfy the thermostat setting, contacts R-W1 will open.
13. The gas valve relay will open, closing the gas valve. The inducer will continue to run for approximately 5 seconds to remove any combustion byproducts from inside the furnace.
14. 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: *Factory supplied Y1-O jumper must remain in place for proper seven segment LED readout. If removed, 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 1 = Cooling, Stage 1

   ArF = Airflow

   080 = 800 calculated cfm (value shown x 10)
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 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. 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: *Factory supplied Y1-O jumper must remain in place for proper seven segment LED readout. If removed, seven segment LED will read "HP I".*

2. 24Vac is sent to the OD unit via thermostat wiring energizing 1st stage compressor operation.
3. The indoor blower ramps to the 1st stage cooling airflow. The seven segment LED for example will alternately read:

   CL 1 = Cooling, Stage 1

   ArF = Airflow

   080 = 800 calculated cfm (value shown x 10)
4. R-Y2 contact on the thermostat closes sending 24Vac to Y2 low voltage terminal on the IFC.

   Technician should read 24Vac between Y2 and B/C.
5. 24Vac is sent to the OD unit via thermostat wiring.
6. The indoor airflow ramps to 2nd stage cooling airflow. The seven segment LED for example will read:

   CL2 = Cooling, Stage 2

   ArF = Airflow

   160 = 1600 calculated cfm (value shown x 10)
7. When the temperature is lowered enough to satisfy the thermostat setting, contacts R-Y1-Y2-G will open.
8. The OD unit shuts off and the indoor blower shuts off, unless a blower 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 161. 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, check and clean the condensate drains periodically so condensate can drain freely from the coil to the drain. If it cannot drain freely, water damage could occur.

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