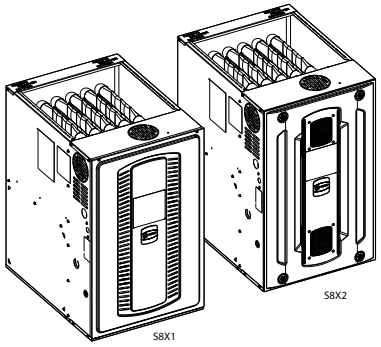
Installation, Operation, and Maintenance

Upflow/Downflow/Horizontal
Gas-Fired, 1-Stage and 2-Stage Induced Draft Furnaces with High Efficiency Motor

Single Stage
S8X1A040M3PSCA/C
S8X1B040M2PSCA/C
S8X1B060M4PSCB/C
S8X1B080M4PSCB/C
S8X1C080M5PSCA/C
S8X1C100M5PSCB/C
S8X1D120M5PSCA/C

Two Stage
S8X2A040M3PSC
S8X2B060M4PSC
S8X2B080M4PSC
S8X2C080M5PSC
S8X2C100M5PSC
S8X2D120M5PSC



Notes:

- *Graphics in this document are for representation only. Actual model may differ in appearance.*
- *Models that have a "D" in the 12th digit designate they meet California less than 40 ng/J (NOx) emissions requirements.*

FNR-SVX008A-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.

October 2026

FNR-SVX008A-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.**

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⚠ 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

Fire or Explosion Hazard!

Failure to follow safety warnings exactly could result in a fire or explosion causing property damage, personal injury or loss of life.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. WHAT TO DO IF YOU SMELL GAS:

- **Do not try to light any appliance.**
- **Do not touch any electrical switch; do not use any phone in your building.**
- **Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you cannot reach your gas supplier, call the fire department.**
- **Installation and service must be performed by a qualified installer, service agency, or the gas supplier.**

⚠ 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 result in death or serious injury, and property damage.

When replacing a furnace, confirm the venting system is adequate for the new furnace.

⚠ 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.

Do not install these furnaces in manufactured housing (mobile), trailers, or recreational vehicles.

⚠ 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

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

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

Hot Surface!

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

Do not touch igniter. It is extremely hot.

⚠ 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.**

⚠ 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.

During complete furnace shutdown during cold weather, take measures to prevent water pipes and receptacles from freezing.

⚠ CAUTION

Freeze Damage!

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

Schedule a qualified personnel to inspect the temperature if a house is vacant during freezing weather. If your furnace fails to operate, it could lead to frozen water pipes.

⚠ 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.

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

- FNR-SVX008A-EN replaces S8XB-SVX001-1D-EN to align with standard literature naming convention.
- Updated the document to remove S8B1.

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Accessories

Table 1. Accessories

Model Number	Description	Use with
BAYHANG	Horizontal Hanging Kit	All Furnaces
BAYLIFTB[a]	Dual Return Kit (B size extension)	All B Cabinet Furnaces
BAYLIFTC[a]	Dual Return Kit (C size extension)	All C Cabinet Furnaces
BAYLIFTD[a]	Dual Return Kit (D size extension)	All D Cabinet Furnaces
BAYBASE205	Downflow Subbase	All Furnaces in Downflow Orientation
BAYFLTR203	Horizontal Filter Kit	B Cabinet Furnace in Downflow/Horizontal
BAYFLTR204	Horizontal Filter Kit	C Cabinet Furnace in Downflow/Horizontal
BAYFLTR205	Horizontal Filter Kit	D Cabinet Furnace in Downflow Horizontal
BAYFLTR206	Filter Access Door Kit (Downflow only)	All Furnaces in Downflow Orientation
BAYSF1165[b] [a]	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]
BAYVENT600A	Internal Venting Kit	B, C, and D Furnaces in Downflow orientation
BAYVENT800B	Masonry Chimney Vent Kit	All Furnaces in Upflow Orientation only
BAYSWT14AHALTAB	High Altitude Pressure Switch Kit	S8X1C080M5P*, S8X1C100M5P*, S8X1D120M5P*
BAYSWT15AHALTAA	High Altitude Pressure Switch Kit	S8X1B060M4P*, S8X1B080M4P*
BAYSWT16AHALTAB	High Altitude Pressure Switch Kit	S8X2C080M5P*
BAYSWT17AHALTAA	High Altitude Pressure Switch Kit	S8X2B060M4PSAAA
BAYSWT18AHALTAA	High Altitude Pressure Switch Kit	S8X2B080M4P*
BAYSWT19AHALTAA	High Altitude Pressure Switch Kit	S8X100M5P*
BAYSWT21AHALTAA	High Altitude Pressure Switch Kit	S8X1A040M3P*, S8X1B040M2P*
BAYSWT22AHALTAA	High Altitude Pressure Switch Kit	S8X2B040M3P*
BAYSWT23AHALTAA	High Altitude Pressure Switch Kit	S8X2B060M4PSAAB & later, S8X2B060M4PTAAA and later
BAYSWT24AHALTAA	High Altitude Pressure Switch Kit	S8X2D120M5P*
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
PIP02095	U fitting for gas piping	All Furnaces for right hand gas entry

[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.

Product Specification

Table 2. Models S8X1A040M3PSCA/C, S8X1B040M2PSCA/C, S8X1B060M4PSCB/C, and S8X1B080M4PSCB/C

Model Number	**S8X1A040M3PSCA/C[a]**	**S8X1B040M2PSCA/C[a]**	**S8X1B060M4PSCB/C[a]**	**S8X1B080M4PSCB/C[a]**
Type	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow
Ratings [b]	—	—	—	—
Input BTUH	40,000	40,000	60,000	80,000
Capacity BTUH (ICS) [c]	32,300	32,500	48,700	65,100
Temp. Rise (Min. - Max.) °F	30 - 60	30 - 60	30 - 60	30 - 60
AFUE - Rating[c]	80	80	80	80
Return Air Temp. (Min.-Max.) °F	55°F - 80°F	55°F - 80°F	55°F - 80°F	55°F - 80°F
CEE Tier	None	None	None	None
Energy Star Rated Region	None	None	None	None
Energy Star Orientation	None	None	None	None
Integrated Furnace Control	—	—	—	—
Input-Communication Protocol	24 Volts	24 Volts	24 Volts	24 Volts
Blower Drive	Direct	Direct	Direct	Direct
Diameter - Width (in.)	11 X 8	11 X 8	11 X 8	11 X 8
No. Used	1	1	1	1
Speeds (No.) [d]	CTM - 9	CTM - 9	CTM - 9	CTM - 9
CFM vs in. w.g.	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table
Motor HP	1/2	1/3	3/4	3/4
R.P.M.	1050	1050	1050	1050
Volts / Ph / Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	6.4	4.1	9.2	9.2
Inducer Orifice	PSC	PSC	SP	SP
Combustion Fan - Type	Direct - 1	Direct - 1	Direct - 1	Direct - 1
Drive - No. Speeds	3300	3300	3300	3300
Motor RPM	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
Volts/Ph/Hz	0.31	0.30	1.40	1.40
FLA	1.20	1.15	1.40	2.15
Filter - Furnished?	No	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 14 X 25 - 1 in.	1 - 16 X 25 - 1 in.	1 - 16 X 25 - 1 in.	1 - 16 X 25 - 1 in.
Vent Pipe Diameter - Min. (in.) [e]	4 Round	4 Round	4 Round	4 Round
Heat Exchanger - Type	Aluminized Steel	Aluminized Steel	Aluminized Steel	Aluminized Steel
Gauge (Fired)	20 - 19	20 - 19	20 - 19	20 - 19
Orifices - Main	—	—	—	—
Nat. Gas Qty. - Drill Size	2 - 45	2 - 45	3 - 45	4 - 45

Table 2. Models S8X1A040M3PSCA/C, S8X1B040M2PSCA/C, S8X1B060M4PSCB/C, and S8X1B080M4PSCB/C (continued)

Model Number	S8X1A040M3PSCA/C[a]	S8X1B040M2PSCA/C[a]	S8X1B060M4PSCB/C[a]	S8X1B080M4PSCB/C[a]
Propane Gas Qty. - Drill Size	2 - 56	2 - 56	3 - 56	4 - 56
Gas Valve	Redundant - Single Stage	Redundant - Single Stage	Redundant - Single Stage	Redundant - Single Stage
Pilot Safety Device - Type	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter
Burners - Qty	2	2	3	4
Power Conn. - V/Ph/HZ [f]	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
Ampacity (Amps)	8.5	5.6	13.1	13.1
Max. Overcurrent Protection (Amps)	15	15	15	15
Pipe Conn. Size (in.)	1/2	1/2	1/2	1/2
Dimensions	H x W x D	H x W x D	H x W x D	H x W x D
Uncrated (in.)	34 x 14.5 x 28.75	34 x 17.5 x 28.75	34 x 17.5 x 28.75	34 x 17.5 x 28.75
Crated (in.)	35.5 x 16.5 x 30.87	35.5 x 19.5 x 30.87	35.5 x 19.5 x 30.87	35.5 x 19.5 x 30.87
Weight	—	—	—	—
Shipping (Lbs.)/Net (Lbs.)	102 / 94	128 / 120	132 / 124	137 / 129

[a] A Central Furnace heating designs are certified to ANSI Z21.47 - 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.
[c] Based on U.S. government standard tests.
[d] 9 Speed constant torque ECM Blower Motor.
[e] See the Installation, Operation, and Maintenance Manual
[f] The above wiring specifications are in accordance with National Electric Code, however, installations must comply with local codes.

Table 3. Models S8X1B080M4PSCB/C, S8X1C080M5PSCA/C, S8X1C100M5PSCB/C, and S8X1D120M5PSCA/C

Model Number	S8X1C080M5PSCA/C[a]	S8X1C100M5PSCB/C[a]	S8X1D120M5PSCA/C[a]
Type	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow
Ratings [b]	—	—	—
Input BTUH	80,000	1,00,000	1,20,000
Capacity BTUH (ICS) [c]	64,700	80,700	98,000
Temp. Rise (Min. - Max.) °F	30 - 60	30 - 60	35 - 65
AFUE - Rating[c]	80	80	80
Return Air Temp. (Min.-Max.) °F	55°F - 80°F	55°F - 80°F	55°F - 80°F
CEE Tier	None	None	None
Energy Star Rated Region	None	None	None
Energy Star Orientation	None	None	None
Integrated Furnace Control	—	—	—
Input-Communication Protocol	24 Volts	24 Volts	24 Volts
Blower Drive	Direct	Direct	Direct
Diameter - Width (in.)	11 X 11	11 X 11	11 X 11
No. Used	1	1	1
Speeds (No.) [d]	CTM - 9	CTM - 9	CTM - 9
CFM vs in. w.g.	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table

Table 3. Models S8X1B080M4PSCB/C, S8X1C080M5PSCA/C, S8X1C100M5PSCB/C, and S8X1D120M5PSCA/C (continued)

Model Number	S8X1C080M5PSCA/C[a]	S8X1C100M5PSCB/C[a]	S8X1D120M5PSCA/C[a]
Motor HP	1	1	1
R.P.M.	1050	1050	1050
Volts / Ph / Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	10.9	10.9	10.9
Inducer Orifice	PSC	PSC	PSC
Combustion Fan - Type	Direct - 1	Direct - 1	Direct - 1
Drive - No. Speeds	3300	3300	3300
Motor RPM	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
Volts/Ph/Hz	0.43	0.58	0.57
FLA	1.80	2.50	2.15
Filter - Furnished?	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 20 X 25 - 1 in.	1 - 20 X 25 - 1 in.	1 - 24 X 25 - 1 in.
Vent Pipe Diameter - Min. (in.) [e]	4 Round	4 Round	4 Round
Heat Exchanger - Type	Aluminized Steel	Aluminized Steel	Aluminized Steel
Gauge (Fired)	20 - 19	20 - 19	20 - 19
Orifices - Main	—	—	—
Nat. Gas Qty. - Drill Size	4 - 45	5 - 45	6 - 45
Propane Gas Qty. - Drill Size	4 - 56	5 - 56	6 - 56
Gas Valve	Redundant - Single Stage	Redundant - Single Stage	Redundant - Single Stage
Pilot Safety Device - Type	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter
Burners - Qty	4	5	6
Power Conn. - V/Ph/HZ [f]	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
Ampacity (Amps)	14.2	14.4	14.4
Max. Overcurrent Protection (Amps)	15	15	15
Pipe Conn. Size (in.)	1/2	1/2	1/2
Dimensions	H x W x D	H x W x D	H x W x D
Uncrated (in.)	34 x 21 x 28.75	34 x 21 x 28.75	34 x 24.5 x 28.75
Crated (in.)	35.5 x 23 x 30.87	35.5 x 23 x 30.87	35.5 x 26.5 x 30.87
Weight	—	—	—
Shipping (Lbs.)/Net (Lbs.)	142 / 134	144 / 136	160 / 152

[a] A Central Furnace heating designs are certified to ANSI Z21.47 - 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.
[c] Based on U.S. government standard tests.
[d] 9 Speed constant torque ECM Blower Motor.
[e] See the Installation, Operation, and Maintenance Manual
[f] The above wiring specifications are in accordance with National Electric Code, however, installations must comply with local codes.

Table 4. Models S8X2A040M3PSCA/B, S8X2B060M4PSCA/B, and S8X2B080M4PSCA/B

Model Number	**S8X2A040M3PSCA/B[a]**	**S8X2B060M4PSCA/B[a]**	**S8X2B080M4PSCA/B[a]**
Type	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow
Ratings [b]	—	—	—
1st Stage Input BTUH	26,000	39,000	52,000
1st Stage Capacity BTUH (ICS)	20,900	31,500	42,500
2nd Stage Input BTUH	40,000	60,000	80,000
2nd Stage Capacity BTUH (ICS) [c]	32,200	48,700	65,000
1st Stage Temp. Rise (Min. - Max.) °F	20 - 50	20 - 50	30 - 60
2nd Stage Temp. Rise (Min. - Max.) °F	30 - 60	30 - 60	30 - 60
AFUE - (%) [c]	80	80	80
Return Air Temp. (Min.-Max.) °F	55°F - 80°F	55°F - 80°F	55°F - 80°F
CEE Tier	None	None	None
Energy Star Rated Region	None	None	None
Energy Star Orientation	None	None	None
Integrated Furnace Control	—	—	—
Input-Communication Protocol	24 Volts	24 Volts	24 Volts
Blower Drive	Direct	Direct	Direct
Diameter - Width (in.)	11 X 8	11 X 8	11 X 8
No. Used	1	1	1
Speeds (No.) [d]	CTM - 9	CTM - 9	CTM - 9
CFM vs in. w.g.	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table
Motor HP	1/2	3/4	3/4
R.P.M.	1050	1050	1050
Volts / Ph / Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	6.4	9.2	9.2
Combustion Fan - Type	PSC	PSC	PSC
Drive - No. Speeds	Direct - 2	Direct - 2	Direct - 2
Motor RPM	3300/2600	3300/2600	3300/2600
Volts/Ph/Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	0.30	0.30	0.29
Inducer Orifice	1.20	1.40	1.75
Filter - Furnished?	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 14 X 25 - 1 in.	1 - 16 X 25 - 1 in.	1 - 16 X 25 - 1 in.
Vent Pipe Diameter - Min. (in.) [e]	4 Round	4 Round	4 Round
Heat Exchanger - Type	Aluminized Steel	Aluminized Steel	Aluminized Steel
Gauge (Fired)	20 - 19	20 - 19	20 - 19
Orifices - Main	—	—	—
Nat. Gas Qty. - Drill Size	2 - 45	3 - 45	4 - 45

Table 4. Models S8X2A040M3PSCA/B, S8X2B060M4PSCA/B, and S8X2B080M4PSCA/B (continued)

Model Number	S8X2A040M3PSCA/B[a]	S8X2B060M4PSCA/B[a]	S8X2B080M4PSCA/B[a]
Propane Gas Qty. - Drill Size	2 - 56	3 - 56	4 - 56
Gas Valve	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
Pilot Safety Device - Type	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter
Burners - Qty	2	3	4
Power Conn. - V/Ph/HZ [f]	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
Ampacity (Amps)	8.5	12.0	12.0
Max. Overcurrent Protection (Amps)	15	15	15
Pipe Conn. Size (in.)	1/2	1/2	1/2
Dimensions	H x W x D	H x W x D	H x W x D
Uncrated (in.)	34 x 14.5 x 28.75	34 x 17.5 x 28.75	34 x 17.5 x 28.75
Crated (in.)	35.5 x 16.5 x 30.87	35.5 x 19.5 x 30.87	35.5 x 19.5 x 30.87
Weight	—	—	—
Shipping (Lbs.)/Net (Lbs.)	102 / 94	132 / 124	137 / 129

[a] Central Furnace heating designs are certified to ANSI Z21.47 - 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.
[c] Based on U.S. government standard tests.
[d] 9 Speed constant torque ECM Blower Motor.
[e] See the Installation, Operation, and Maintenance Manual
[f] The above wiring specifications are in accordance with National Electric Code, however, installations must comply with local codes.

Table 5. Models S8X2C080M5PSCA/B, S8X2C100M5PSCA/B, and S8X2D120M5PSCA/B

Model Number	S8X2C080M5PSCA/B[a]	S8X2C100M5PSCA/B[a]	S8X2D120M5PSCA/B[a]
Type	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow
Ratings [b]	—	—	—
1st Stage Input BTUH	52,000	65,000	84,000
1st Stage Capacity BTUH (ICS)	41,800	52,300	67,800
2nd Stage Input BTUH	80,000	1,00,000	1,20,000
2nd Stage Capacity BTUH (ICS) [c]	64,900	80,600	98,000
1st Stage Temp. Rise (Min. - Max.) °F	30 - 60	25 - 55	30 - 60
2nd Stage Temp. Rise (Min. - Max.) °F	30 - 60	30 - 60	35 - 65
AFUE - (%) [c]	80	80	80
Return Air Temp. (Min.-Max.) °F	55°F - 80°F	55°F - 80°F	55°F - 80°F
CEE Tier	None	None	None
Energy Star Rated Region	None	None	None
Energy Star Orientation	None	None	None
Integrated Furnace Control	—	—	—
Input-Communication Protocol	24 Volts	24 Volts	24 Volts
Blower Drive	Direct	Direct	Direct
Diameter - Width (in.)	11 X 11	11 X 11	11 X 11
No. Used	1	1	1
Speeds (No.) [d]	CTM - 9	CTM - 9	CTM - 9

Table 5. Models S8X2C080M5PSCA/B, S8X2C100M5PSCA/B, and S8X2D120M5PSCA/B (continued)

Model Number	**S8X2C080M5PSCA/B[a]**	**S8X2C100M5PSCA/B[a]**	**S8X2D120M5PSCA/B[a]**
CFM vs in. w.g.	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table
Motor HP	1	1	1
R.P.M.	1050	1050	1050
Volts / Ph / Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	10.9	10.9	10.9
Combustion Fan - Type	PSC	PSC	PSC
Drive - No. Speeds	Direct - 2	Direct - 2	Direct - 2
Motor RPM	3300/2600	3300/2600	3300/2600
Volts/Ph/Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	0.30	0.33	0.33
Inducer Orifice	1.80	2.50	2.15
Filter - Furnished?	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 20 X 25 - 1 in.	1 - 20 X 25 - 1 in.	1 - 24 X 25 - 1 in.
Vent Pipe Diameter - Min. (in.) [e]	4 Round	4 Round	4 Round
Heat Exchanger - Type	Aluminized Steel	Aluminized Steel	Aluminized Steel
Gauge (Fired)	20 - 19	20 - 19	20 - 19
Orifices - Main	—	—	—
Nat. Gas Qty. - Drill Size	4 - 45	5 - 45	6 - 45
Propane Gas Qty. - Drill Size	4 - 56	5 - 56	6 - 56
Gas Valve	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
Pilot Safety Device - Type	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter
Burners - Qty	4	5	6
Power Conn. - V/Ph/HZ [f]	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
Ampacity (Amps)	14.1	14.1	14.1
Max. Overcurrent Protection (Amps)	15	15	15
Pipe Conn. Size (in.)	1/2	1/2	1/2
Dimensions	H x W x D	H x W x D	H x W x D
Uncrated (in.)	34 x 21 x 28.75	34 x 21 x 28.75	34 x 24.5 x 28.75
Crated (in.)	35.5 x 23 x 30.87	35.5 x 23 x 30.87	35.5 x 26.5 x 30.87
Weight	—	—	—
Shipping (Lbs.)/Net (Lbs.)	142 / 134	144 / 136	160 / 152

[a] Central Furnace heating designs are certified to ANSI Z21.47 - 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.
[c] Based on U.S. government standard tests.
[d] 9 Speed constant torque ECM Blower Motor.
[e] See the Installation, Operation, and Maintenance Manual
[f] The above wiring specifications are in accordance with National Electric Code, however, installations must comply with local codes.

Furnace Installation Guidelines

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

Safety Practices and Precautions

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

1. Use only with the type gas approved for this Furnace. See the Furnace rating plate.
2. Install the Furnace only in a location and position as specified in "," of these instructions.
3. Provide adequate combustion and ventilation air to the Furnace space as specified in "Air for Combustion and Ventilation," p. 35 of these instructions.
4. Combustion products must be discharged outdoors. Connect this Furnace to an approved vent system only, as specified in the "," 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 "," of these instructions.
6. Always install the Furnace to operate within the Furnace's intended temperature-rise range with a duct system which has an external static pressure within the allowable range, as specified on the unit rating plate. Airflow within temperature rise for cfm versus static is shown in the cfm Versus Temperature Rise section in this document accompanying this Furnace.
7. When a Furnace is installed so that the supply ducts carry air circulated by the Furnace to areas outside the space containing the Furnace, the return air shall also be handled by a duct(s) sealed to the Furnace casing and terminating outside the space containing the Furnace.
8. A gas-fired Furnace for installation in a residential garage must be installed as specified in "," of these instructions.
9. The furnace may be used for temporary heating of buildings or structures under construction only when the following conditions have been met:
   a. The Furnace venting system must be complete and installed per manufacturer's instructions.
   b. The Furnace is controlled only by a room Comfort Control (no field jumpers).
   c. The Furnace return air duct must be complete and sealed to the Furnace.
   d. The Furnace input rate and temperature rise must be verified to be within the nameplate marking.
   e. A minimum 4-inch MERV 11 air filter must be in place.
   f. 100% of the Furnace combustion air requirement must come from outside the structure.
   g. The Furnace return air temperature range is between 55 and 80 Fahrenheit.

      80% models = 55°F

      90%+ models = 45°F
   h. Clean the Furnace, duct work, and components upon substantial completion of the construction process, and verify Furnace operating conditions including ignition, input rate, temperature rise, and venting, according to the manufacturer's instructions.
10. In the Commonwealth of Massachusetts, this product must be gas piped by a Licensed Plumber or Gas Fitter.

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 ",".

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. The latest code may be obtained from the National Fire Protection Association, 1 Battery march Park, Quincy, Massachusetts, 02169-7471, 1-800-344-3555, or www.nfpa.org.

These furnaces have been classified as Fan Assisted Combustion system CATEGORY I furnaces as required by ANSI Z21.47 latest edition. Therefore they do not require any special provisions for venting other than what is indicated in these instructions.

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 Clearance Table below?

   Installation Clearance to Combustible Construction

   This furnace is approved for upflow, downflow and horizontal applications.

Table 6. Locations and clearances

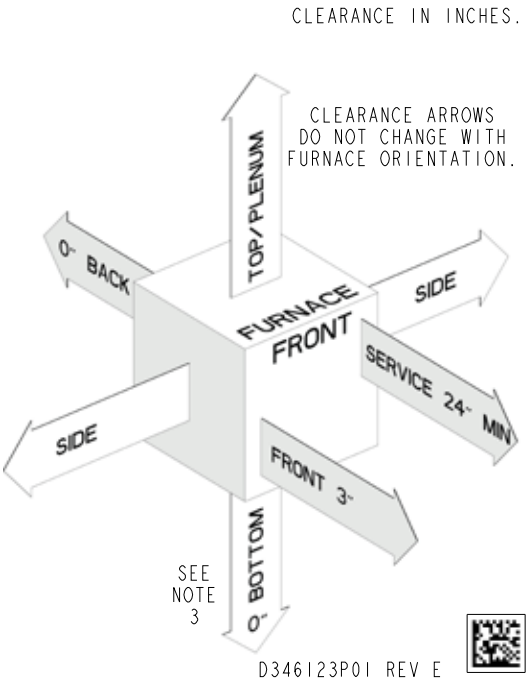
Minimum clearance to combustible materials		
Vertical Applications		
Furnace Cabinet Size (in.)	**Clearance Sides (in.)**	**Clearance Top (in.)**
14.5 cabinets, all BTU	0	1
17.5 cabinets, all BTU	0	1
21.0 cabinets, all BTU	0	1
24.5 cabinets, all BTU	0	1
Horizontal Applications		
14.5 cabinets, all BTU	1	2
17.5 cabinets, all BTU	1	2
21.0 cabinets, all BTU	1	3
24.5 cabinets, all BTU	1	5

Notes:

- *Must follow national fuel and gas codes for installs.*
- *Type B vent clearance is 1-inch.*
- *Must use special base (BAYBASE205) when installing in downflow orientation on combustible floor.*

Line contact only permissiable between lines formed by intersections of the top and two sides of the furnace jacket, and building joists, studs or framing.

Figure 1. Minimum clearance to combustible materials

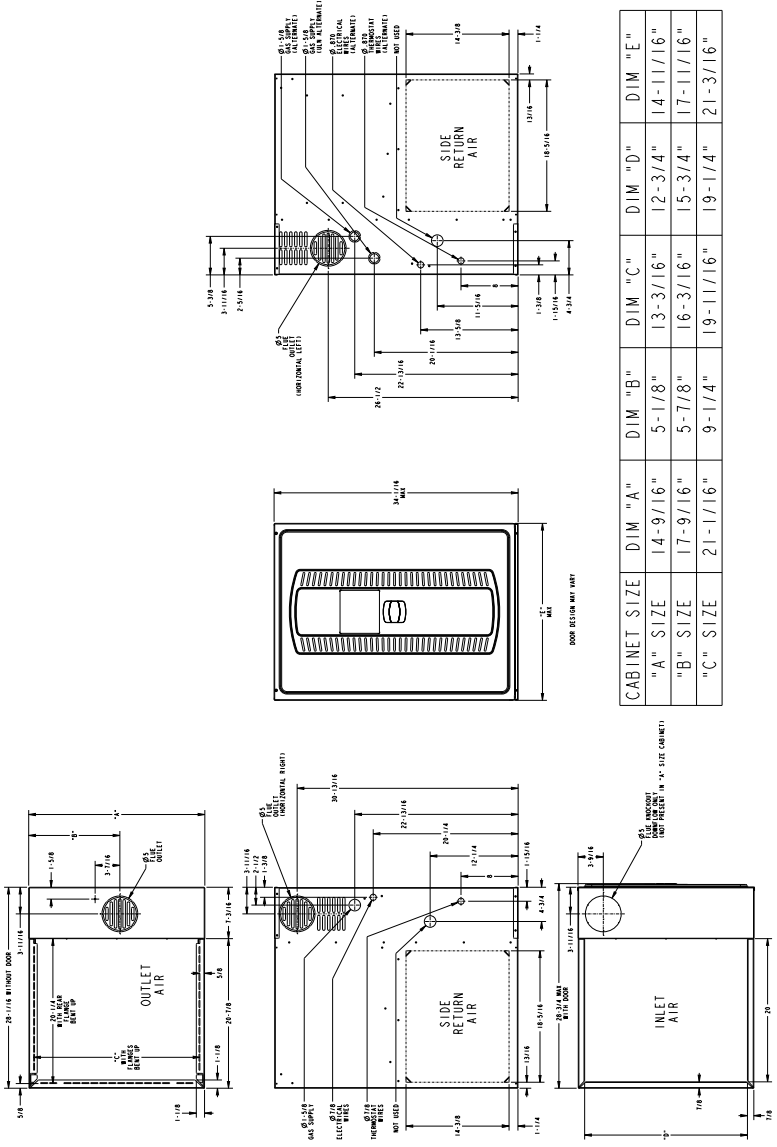


3. Is there sufficient space for servicing the Furnace and other equipment? A minimum of 24 inches front accessibility to the Furnace must be provided. Any access door or panel must permit removal of the largest component.
4. Are there at least 3 inches of clearance between the Furnace combustion air 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 known 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

Dimensional Data

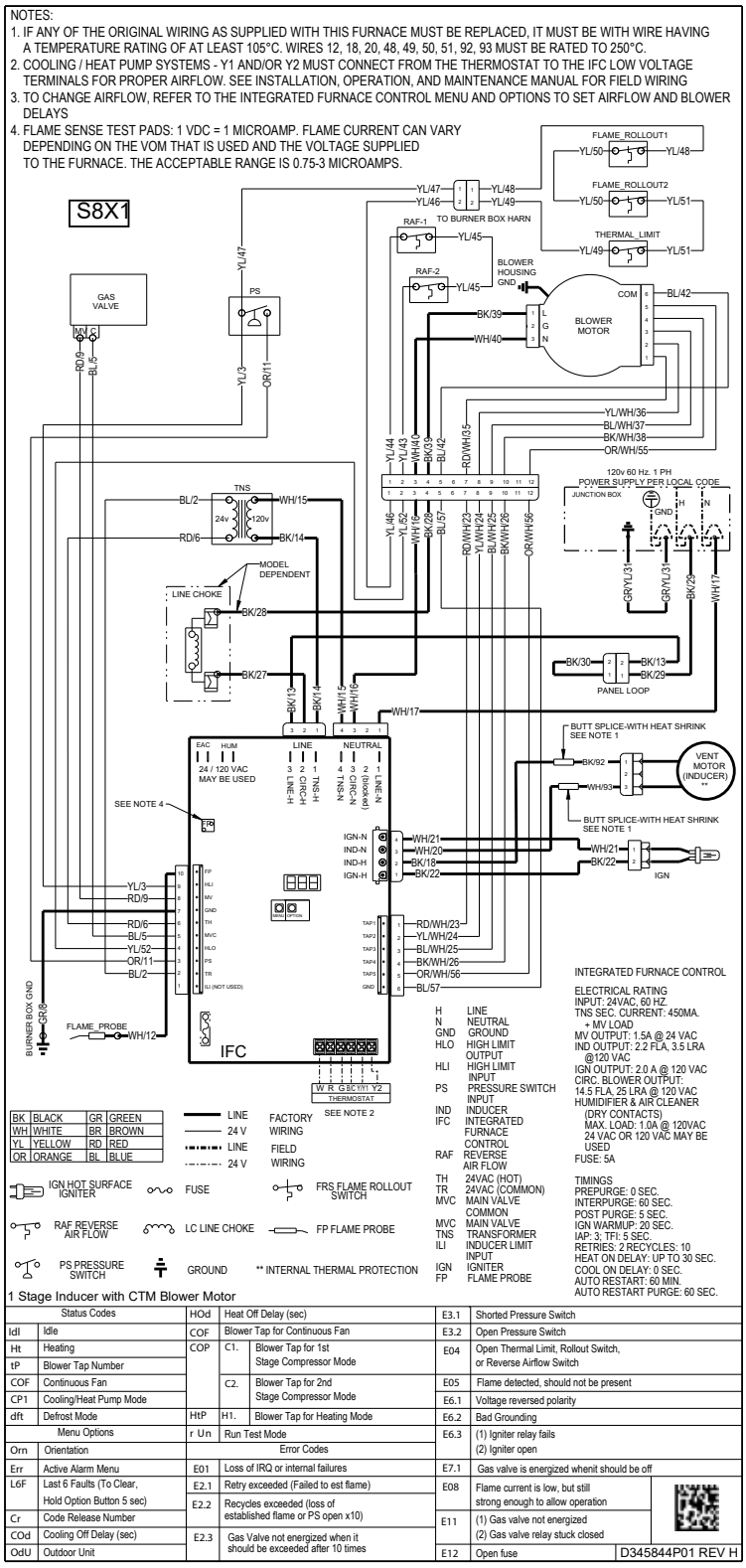
Figure 2. Dimensional data



CABINET SIZE	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"
"A" SIZE	14-9/16"	5-1/8"	13-3/16"	12-3/4"	14-11/16"
"B" SIZE	17-9/16"	5-7/8"	16-3/16"	15-3/4"	17-11/16"
"C" SIZE	21-1/16"	9-1/4"	19-11/16"	19-1/4"	21-3/16"

Wiring Diagrams

Figure 3. Wiring diagram - S8X1



1 Stage Inducer with CTM Blower Motor

Status Codes		HOd	Heat Off Delay (sec)		E3.1	Shorted Pressure Switch
Idl	Idle	COF	Blower Tap for Continuous Fan		E3.2	Open Pressure Switch
Ht	Heating	COP	C1. Blower Tap for 1st Stage Compressor Mode		E04	Open Thermal Limit, Rollout Switch, or Reverse Airflow Switch
tP	Blower Tap Number					
COF	Continuous Fan		C2. Blower Tap for 2nd Stage Compressor Mode		E05	Flame detected, should not be present
CP1	Cooling/Heat Pump Mode				E6.1	Voltage reversed polarity
dft	Defrost Mode	HtP	H1. Blower Tap for Heating Mode		E6.2	Bad Grounding
Menu Options		r Un	Run Test Mode		E6.3	(1) Igniter relay fails (2) Igniter open
Orn	Orientation	Error Codes				
Err	Active Alarm Menu	E01	Loss of IRQ or internal failures		E7.1	Gas valve is energized whenit should be off
L6F	Last 6 Faults (To Clear, Hold Option Button 5 sec)	E2.1	Retry exceeded (Failed to est flame)		E08	Flame current is low, but still strong enough to allow operation
		E2.2	Recycles exceeded (loss of established flame or PS open x10)		E11	(1) Gas valve not energized (2) Gas valve relay stuck closed
Cr	Code Release Number					
COd	Cooling Off Delay (sec)	E2.3	Gas Valve not energized when it should be exceeded after 10 times		E12	Open fuse
OdU	Outdoor Unit					

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Figure 4. Ladder diagram - S8X1

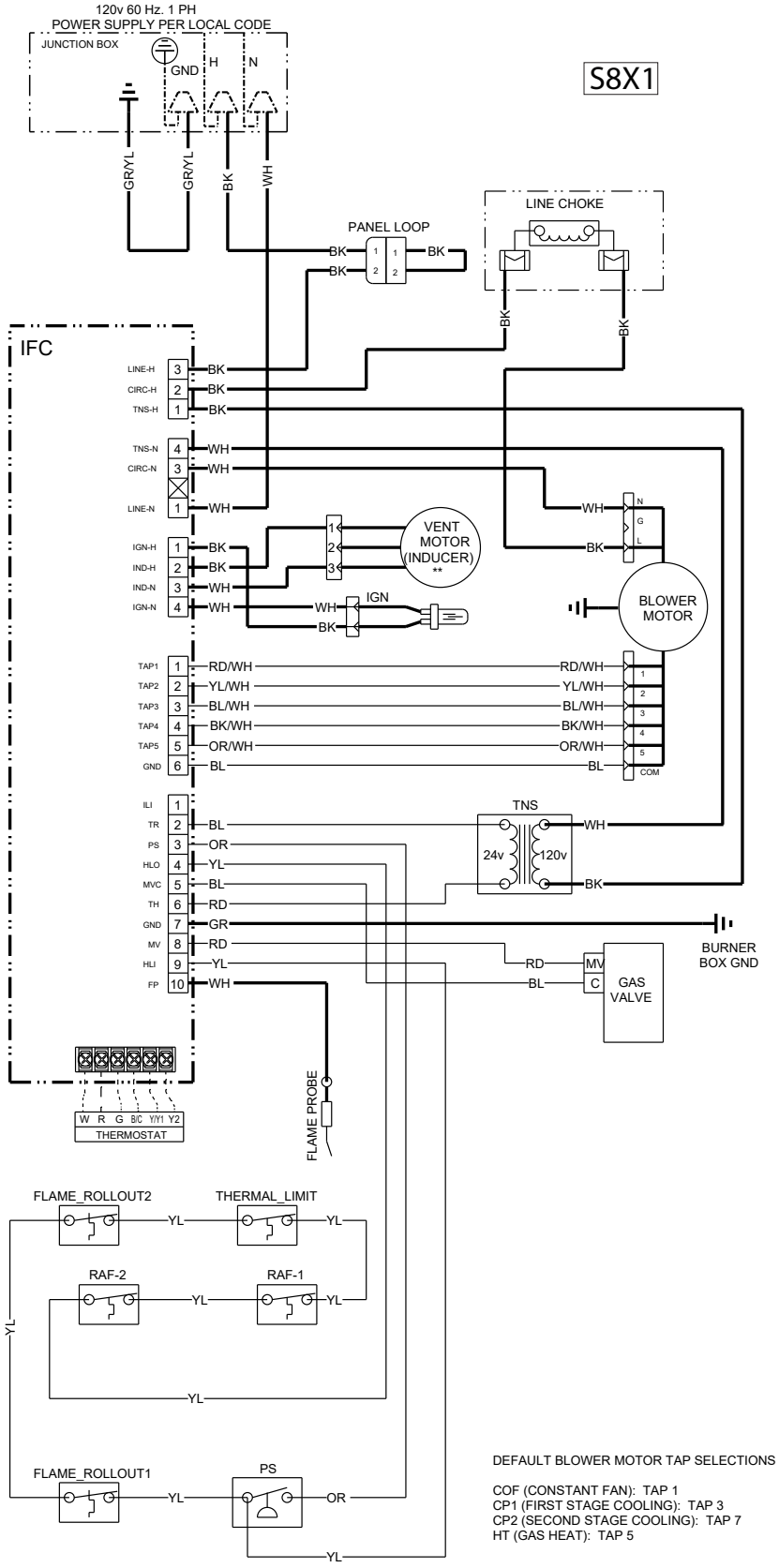
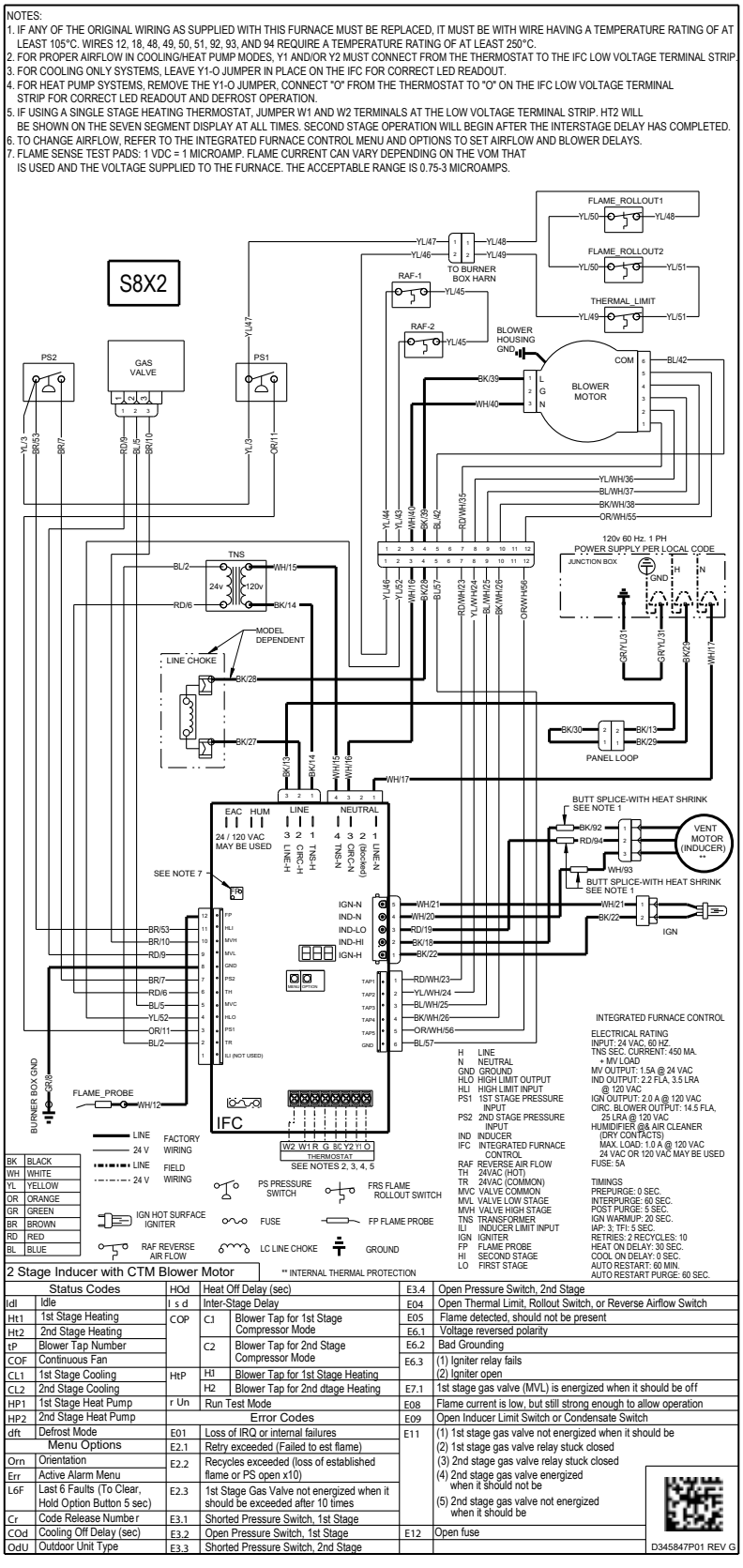
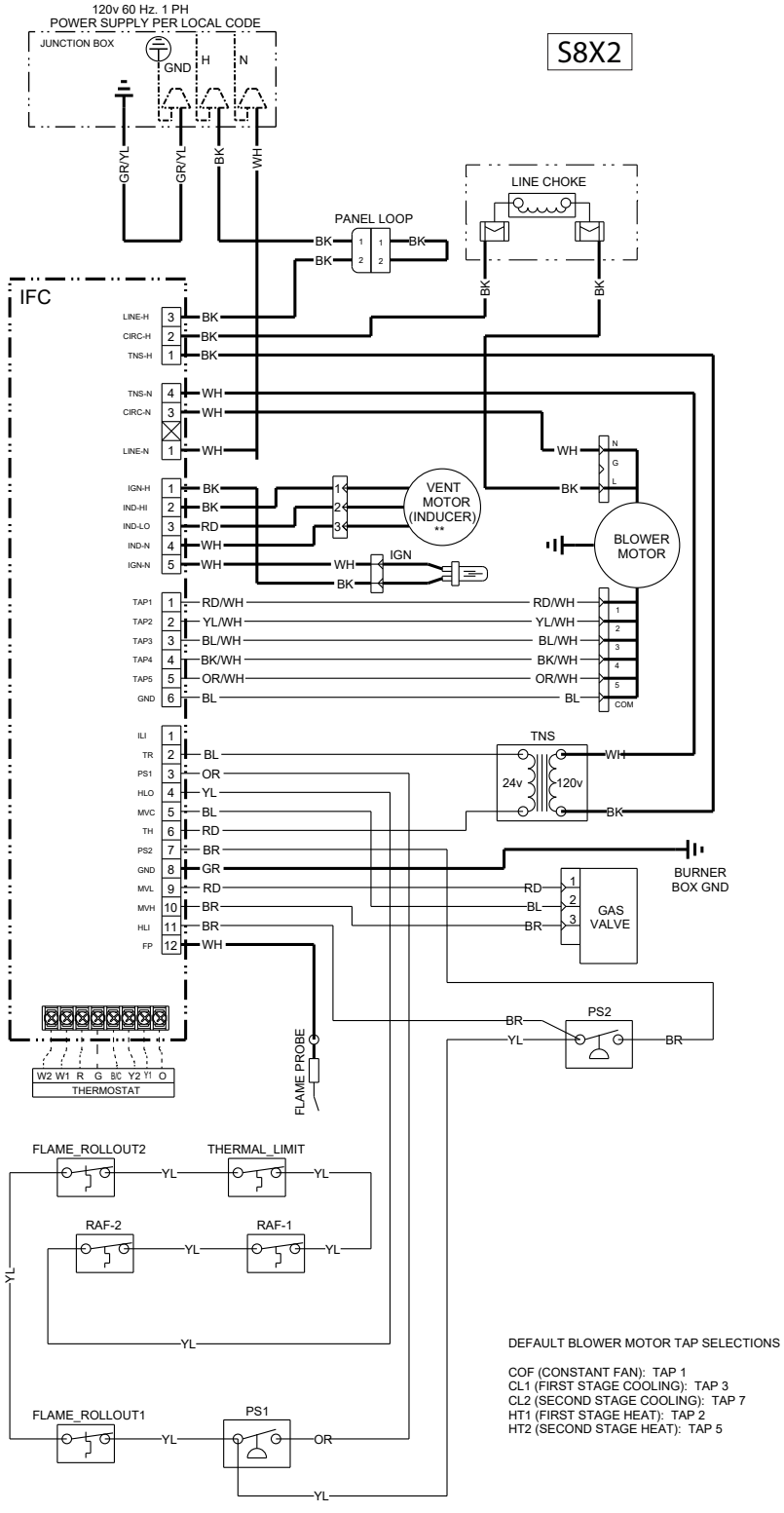


Figure 5. Wiring diagram - S8X2



Status Codes		HOd	Heat Off Delay (sec)		E3.4	Open Pressure Switch, 2nd Stage
Idl	Idle	I s d	Inter-Stage Delay		E04	Open Thermal Limit, Rollout Switch, or Reverse Airflow Switch
Ht1	1st Stage Heating	COP	C1	Blower Tap for 1st Stage Compressor Mode	E05	Flame detected, should not be present
Ht2	2nd Stage Heating				E6.1	Voltage reversed polarity
tP	Blower Tap Number		C2	Blower Tap for 2nd Stage Compressor Mode	E6.2	Bad Grounding
COF	Continuous Fan				E6.3	(1) Igniter relay fails (2) Igniter open
CL1	1st Stage Cooling	HtP	H1	Blower Tap for 1st Stage Heating		
CL2	2nd Stage Cooling		H2	Blower Tap for 2nd dtage Heating	E7.1	1st stage gas valve (MVL) is energized when it should be off
HP1	1st Stage Heat Pump	r Un	Run Test Mode		E08	Flame current is low, but still strong enough to allow operation
HP2	2nd Stage Heat Pump	Error Codes			E09	Open Inducer Limit Switch or Condensate Switch
dft	Defrost Mode	E01	Loss of IRQ or internal failures		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
Menu Options		E2.1	Retry exceeded (Failed to est flame)			
Orn	Orientation	E2.2	Recycles exceeded (loss of established flame or PS open x10)			
Err	Active Alarm Menu					
L6F	Last 6 Faults (To Clear, Hold Option Button 5 sec)	E2.3	1st Stage Gas Valve not energized when it should be exceeded after 10 times			
Cr	Code Release Number	E3.1	Shorted Pressure Switch, 1st Stage			
COd	Cooling Off Delay (sec)	E3.2	Open Pressure Switch, 1st Stage		E12	Open fuse
OdU	Outdoor Unit Type	E3.3	Shorted Pressure Switch, 2nd Stage			

Figure 6. Ladder diagram - S8X2



Airflow Tables

Table 7. Airflow performance — models S8X1A040M3PSC and S8X2A040M3PSC

Furnace Airflow (SCFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**	**Static**	**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S8X1A040M3PSC S8X2A040M3PSC	1	SCFM / Watts	592 / 40	342 / 43	93 / 46	—	—
	2	SCFM / Watts	666 / 48	467 / 56	268 / 65	70 / 74	—
	3	SCFM / Watts	687 / 49	493 / 59	299 / 69	105 / 78	—
	4	SCFM / Watts	938 / 100	788 / 111	638 / 123	488 / 134	338 / 146
	5	SCFM / Watts	1006 / 119	870 / 131	733 / 144	597 / 156	461 / 169
	6	SCFM / Watts	1068 / 140	944 / 154	820 / 167	696 / 181	573 / 194
	7	SCFM / Watts	1174 / 181	1066 / 196	957 / 211	848 / 226	740 / 241
	8	SCFM / Watts	1167 / 194	1098 / 219	1029 / 244	960 / 269	891 / 294
	9	SCFM / Watts	1556 / 398	1474 / 416	1392 / 435	1310 / 453	1228 / 471

Table 8. Airflow performance — model S8X1B040M2PSC

Furnace Airflow (SCFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**	**Static**	**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S8X1B040M2PSC	1	SCFM / Watts	526 / 34	-	-	-	-
	2	SCFM / Watts	744 / 54	533 / 63	322 / 72	110 / 81	-
	3	SCFM / Watts	820 / 68	662 / 81	504 / 94	346 / 106	188 / 119
	4	SCFM / Watts	967 / 97	811 / 110	654 / 122	498 / 135	341 / 148
	5	SCFM / Watts	997 / 104	840 / 116	687 / 129	533 / 142	380 / 154
	6	SCFM / Watts	1052 / 119	911 / 133	771 / 148	630 / 162	490 / 176
	7	SCFM / Watts	1099 / 134	968 / 150	837 / 165	706 / 180	575 / 196
	8	SCFM / Watts	1168 / 157	1047 / 174	926 / 191	805 / 208	684 / 225
	9	SCFM / Watts	1303 / 214	1196 / 233	1088 / 252	981 / 271	874 / 290

Table 9. Airflow performance — models S8X1B060M4PSC and S8X2B060M4PSC

Furnace Airflow (SCFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**	**Static**	**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S8X1B060M4PSC S8X2B060M4PSC	1	SCFM / Watts	596 / 38	287 / 42	—	—	—
	2	SCFM / Watts	851 / 70	667 / 81	483 / 92	299 / 102	115 / 113
	3	SCFM / Watts	1142 / 141	1018 / 156	893 / 172	769 / 187	644 / 203
	4	SCFM / Watts	1196 / 160	1079 / 176	961 / 192	844 / 208	726 / 224
	5	SCFM / Watts	1362 / 220	1258 / 239	1154 / 257	1050 / 276	946 / 294
	6	SCFM / Watts	1416 / 250	1319 / 269	1221 / 288	1124 / 307	1026 / 327
	7	SCFM / Watts	1495 / 287	1402 / 307	1309 / 327	1216 / 347	1123 / 367
	8	SCFM / Watts	1574 / 337	1487 / 357	1401 / 378	1314 / 399	1228 / 420
	9	SCFM / Watts	1983 / 659	1899 / 670	1815 / 680	1730 / 691	1646 / 701

Table 10. Airflow performance — models S8X1B080M4PSC and S8X2B080M4PSC

Furnace Airflow (SCFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**	**Static**	**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S8X1B080M4PSC S8X2B080M4PSC	1	SCFM / Watts	552 / 34	160 / 34	—	—	—
	2	SCFM / Watts	891 / 82	720 / 93	549 / 105	378 / 117	207 / 129
	3	SCFM / Watts	1123 / 141	996 / 157	869 / 173	742 / 189	615 / 205
	4	SCFM / Watts	1344 / 224	1240 / 224	1136 / 263	1033 / 283	929 / 302
	5	SCFM / Watts	1479 / 290	1384 / 312	1290 / 333	1196 / 354	1102 / 375
	6	SCFM / Watts	1583 / 354	1496 / 376	1408 / 398	1321 / 420	1234 / 442
	7	SCFM / Watts	1654 / 405	1572 / 428	1491 / 451	1409 / 474	1327 / 496
	8	SCFM / Watts	1818 / 542	1739 / 561	1661 / 581	1582 / 600	1503 / 619
	9	SCFM / Watts	1926 / 645	1841 / 656	1756 / 667	1670 / 679	1585 / 690

Table 11. Airflow performance — models S8X1C080M5PSC and S8X2C080M5PSC

Furnace Airflow (SCFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**	**Static**	**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S8X1C080M5PSC S8X2C080M5PSC	1	SCFM / Watts	728 / 44	358 / 49	—	—	—
	2	SCFM / Watts	809 / 53	540 / 63	271 / 74	—	—
	3	SCFM / Watts	1440 / 185	1273 / 201	1105 / 218	938 / 234	770 / 250
	4	SCFM / Watts	1536 / 220	1385 / 238	1233 / 257	1081 / 275	929 / 293
	5	SCFM / Watts	1689 / 278	1552 / 299	1414 / 320	1277 / 342	1140 / 363
	6	SCFM / Watts	1792 / 326	1661 / 348	1530 / 371	1400 / 394	1269 / 417
	7	SCFM / Watts	1899 / 373	1771 / 397	1643 / 422	1515 / 446	1387 / 471
	8	SCFM / Watts	2094 / 500	1985 / 527	1875 / 554	1766 / 582	1656 / 609
	9	SCFM / Watts	2533 / 931	2414 / 932	2295 / 933	2176 / 933	2058 / 934

Table 12. Airflow performance — models S8X1C100M5PSC and S8X2C100M5PSC

Furnace Airflow (SCFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**	**Static**	**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S8X1C100M5PSC S8X2C100M5PSC	1	SCFM / Watts	821 / 55	442 / 55	64 / 54	—	—
	2	SCFM / Watts	1359 / 163	1195 / 180	1031 / 198	868 / 215	704 / 233
	3	SCFM / Watts	1602 / 246	1461 / 268	1321 / 290	1180 / 312	1040 / 334
	4	SCFM / Watts	1807 / 336	1678 / 362	1550 / 388	1421 / 414	1292 / 440
	5	SCFM / Watts	1827 / 345	1700 / 371	1572 / 398	1444 / 425	1317 / 451
	6	SCFM / Watts	1925 / 395	1800 / 423	1675 / 451	1550 / 479	1425 / 508
	7	SCFM / Watts	2102 / 503	1985 / 534	1869 / 566	1752 / 597	1635 / 628
	8	SCFM / Watts	2222 / 602	2115 / 635	2008 / 667	1901 / 700	1794 / 732
	9	SCFM / Watts	2458 / 896	2351 / 913	2245 / 930	2138 / 947	2032 / 964

Table 13. Airflow performance — models S8X1D120M5PSC and S8X2D120M5PSC

Furnace Airflow (SCFM) Vs. External Static Pressure (in. W.C.)							
Model	**Tap**	**Static**	**0.1**	**0.3**	**0.5**	**0.7**	**0.9**
S8X1D120M5PSC S8X2D120M5PSC	1	SCFM / Watts	1469 / 184	912 / 126	355 / 68	—	—
	2	SCFM / Watts	1429 / 175	1165 / 171	900 / 168	636 / 164	371 / 160
	3	SCFM / Watts	1567 / 215	1401 / 232	1235 / 248	1069 / 264	903 / 280
	4	SCFM / Watts	1858 / 334	1731 / 361	1605 / 388	1478 / 415	1351 / 441
	5	SCFM / Watts	2004 / 418	1890 / 447	1776 / 476	1662 / 505	1548 / 534
	6	SCFM / Watts	2110 / 488	2004 / 518	1898 / 549	1792 / 580	1686 / 611
	7	SCFM / Watts	2245 / 596	2148 / 629	2052 / 662	1956 / 695	1860 / 729
	8	SCFM / Watts	2440 / 765	2345 / 794	2250 / 824	2155 / 854	2060 / 884
	9	SCFM / Watts	2536 / 882	2431 / 904	2325 / 927	2220 / 949	2114 / 972

CFM Versus Temperature Rise

S8X1 furnaces have one stage heating

S8X2 furnaces have two - stage heating. First stage is low heating and second stage is high heating.

Table 14. S8X1

Model	CFM VS. Temperature Rise																			
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
S8X1A040M3PSC	59	49	42	37	33	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S8X1B040M2PSC	59	49	42	37	33	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S8X1B060M4PSC	—	—	—	56	49	44	40	37	34	32	—	—	—	—	—	—	—	—	—	—
S8X1B080M4PSC	—	—	—	—	—	59	54	49	46	42	40	37	35	33	—	—	—	—	—	—
S8X1C080M5PSC	—	—	—	—	—	59	54	49	46	42	40	37	35	33	—	—	—	—	—	—
S8X1C100M5PSC	—	—	—	—	—	—	—	—	57	53	49	46	44	41	39	37	35	34	32	31
S8X1D120M5PSC	—	—	—	—	—	—	—	—	—	—	59	56	52	49	47	44	42	40	39	37

Table 15. S8X2 - Low heat

Model	CFM Versus Temperature Rise																
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
S8X2A040M3PSC	48	39	32	28	—	—	—	—	—	—	—	—	—	—	—	—	—
S8X2B060M4PSC	—	56	47	40	35	31	28	—	—	—	—	—	—	—	—	—	—
S8X2B080M4PSC	—	—	—	55	48	43	39	35	32	30	28	—	—	—	—	—	—
S8X2C080M5PSC	—	—	—	55	48	43	39	35	32	30	28	—	—	—	—	—	—
S8X2C100M5PSC	—	—	—	—	60	53	48	44	40	37	34	32	30	—	—	—	—
S8X2D120M5PSC	—	—	—	—	—	—	—	57	52	48	44	41	39	37	35	33	31

Table 16. S8X2 - High heat

Model	CFM Versus Temperature Rise																				
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
S8X2A040M3PSC	—	59	49	42	37	33	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S8X2B060M4PSC	—	—	—	—	56	49	44	40	37	34	32	—	—	—	—	—	—	—	—	—	—
S8X2B080M4PSC	—	—	—	—	—	—	59	54	49	46	42	40	37	35	33	—	—	—	—	—	—
S8X2C080M5PSC	—	—	—	—	—	—	59	54	49	46	42	40	37	35	33	—	—	—	—	—	—
S8X2C100M5PSC	—	—	—	—	—	—	—	—	—	57	53	49	46	44	41	39	37	35	34	32	31
S8X2D120M5PSC	—	—	—	—	—	—	—	—	—	—	—	59	56	52	49	47	44	42	40	39	37

Furnace General Installation

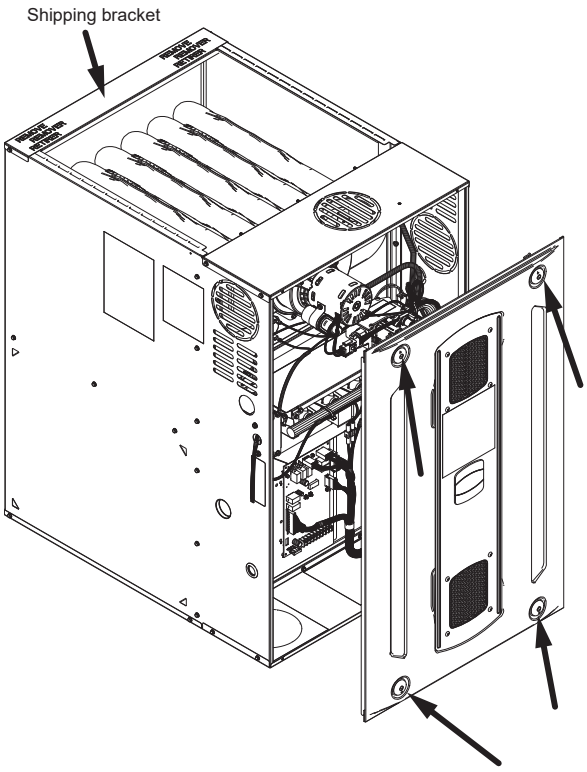
The following sections give general instructions for the installation of the gas furnaces.

S-Series Furnace Panel Removal

Notes:

- *For the S8X2 furnace, a 5/16-inch Allen wrench is required to remove the four latches on the front panel.*
- *Remove the shipping bracket before installation.*

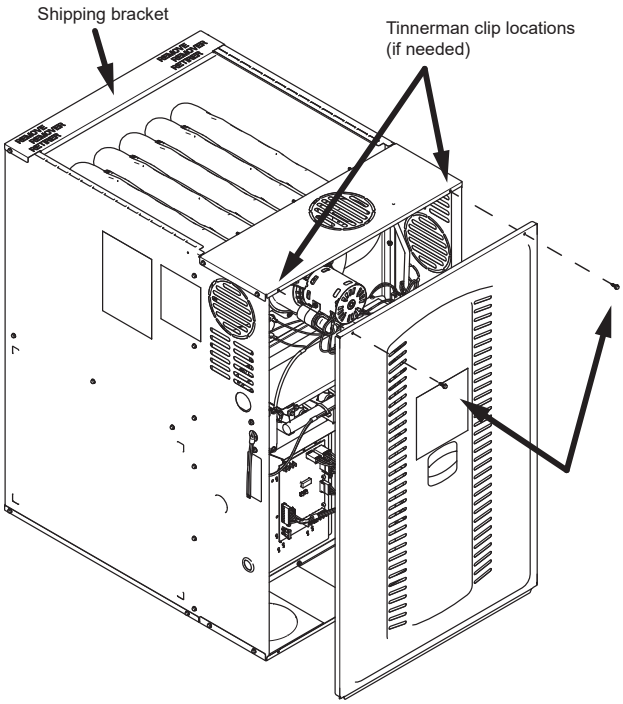
Figure 7. Furnace panel removal



Notes:

- *For the S8X1 furnace, a 1/4-inch nut driver is required to remove the two screws at the top of the front panel. The front panel can then be removed by lifting upwards.*
- *Tinnerman clips are provided in the doc pack if the door panel flange hole(s) becomes stripped.*
- *Remove the shipping bracket before installation.*

Figure 8. Tinnerman clip locations removal



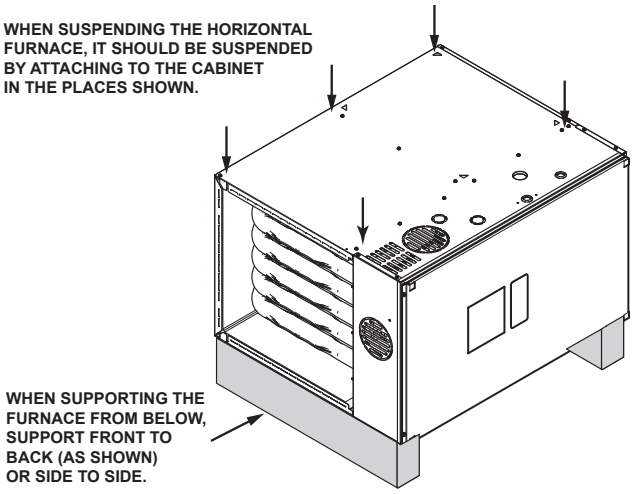
Horizontal Installation in an Attic or Crawlspace

The non-condensing furnace may be installed in an attic or crawl space in the horizontal position by placing the furnace on its left or right side (as viewed from the front in the vertical position). 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 the “Locations and Clearances,” p. 16. 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. Place blocks underneath to support the furnace and raise the unit for sufficient protection from moisture.

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

Figure 9. Horizontal installation

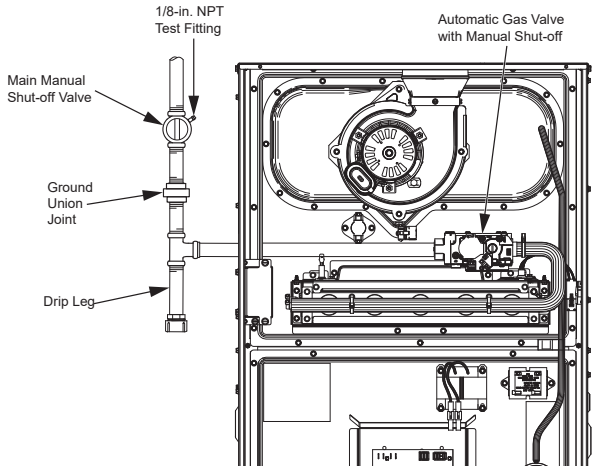


Gas Piping

Important: *The furnace default is left side gas piping.*

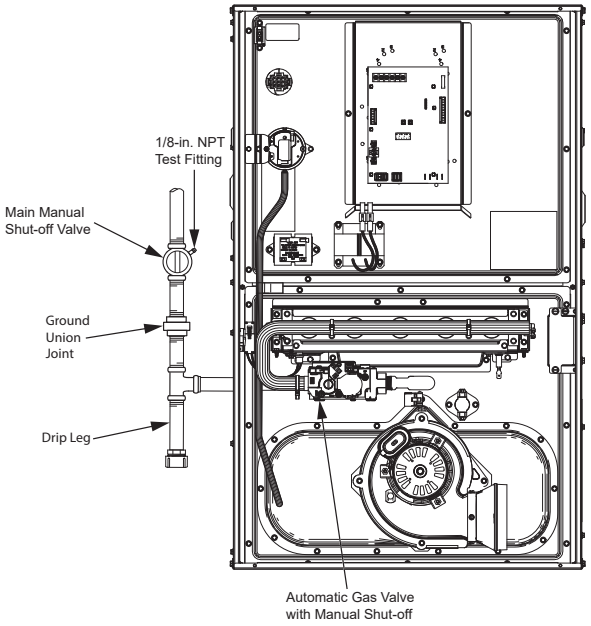
Note: *For ease of installation, optional accessory part PIP02095 is recommended for gas piping entering the right side of the furnace.*

Figure 10. Representative vertical furnace with gas piping on left side



Note: *For ease of installation, optional accessory part PIP02095 is recommended for gas piping entering the left side of the furnace in the downflow orientation.*

Figure 11. Furnace in downflow orientation with gas piping on left



Note: *For ease of installation, optional accessory part PIP02095 is recommended for gas piping entering the right side of the furnace in the upflow orientation.*

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

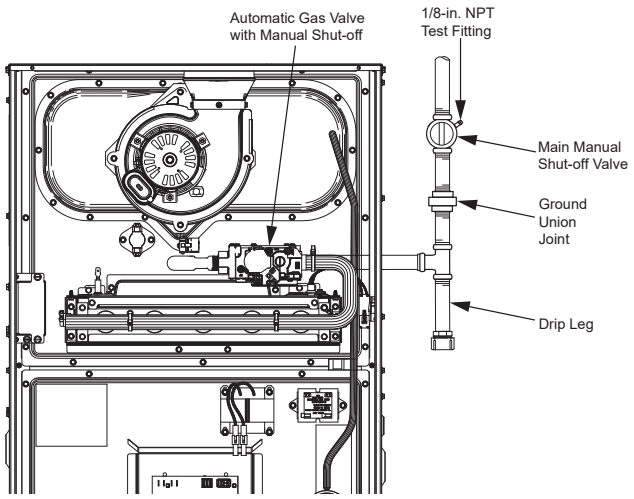
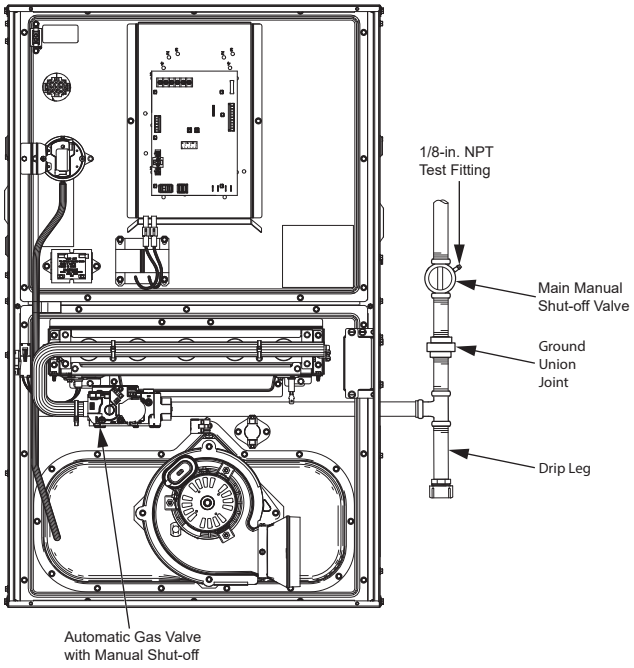


Figure 13. Furnace in downflow orientation with gas piping on right



Note: *For ease of installation, optional accessory part PIP02095 is recommended for gas piping entering the top of the furnace in the horizontal left position.*

Figure 14. Representative horizontal furnace with gas piping out right side

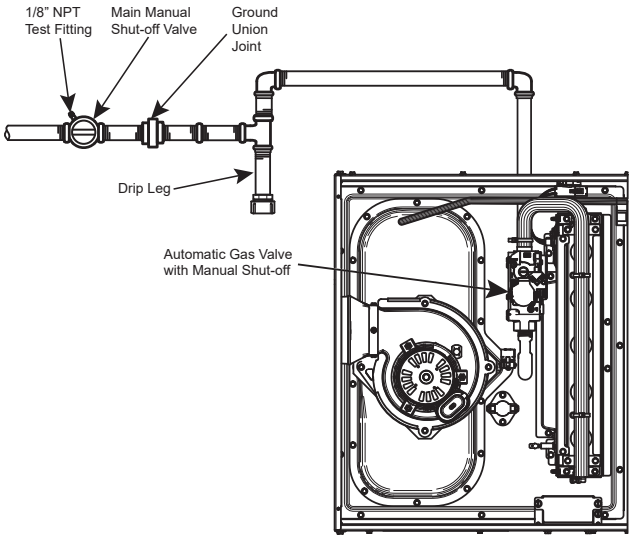


Figure 15. Furnace in horizontal right orientation with gas piping out top

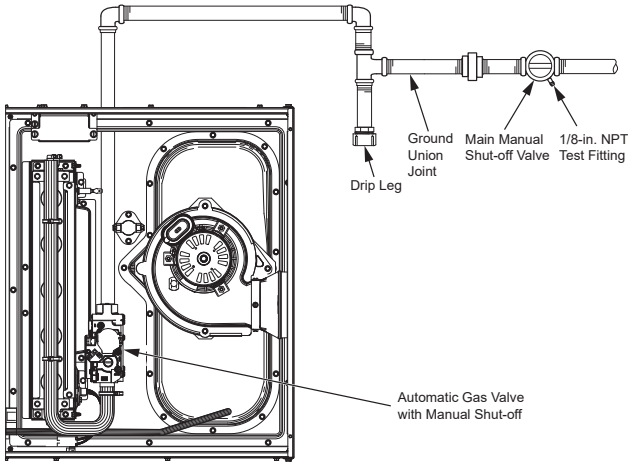
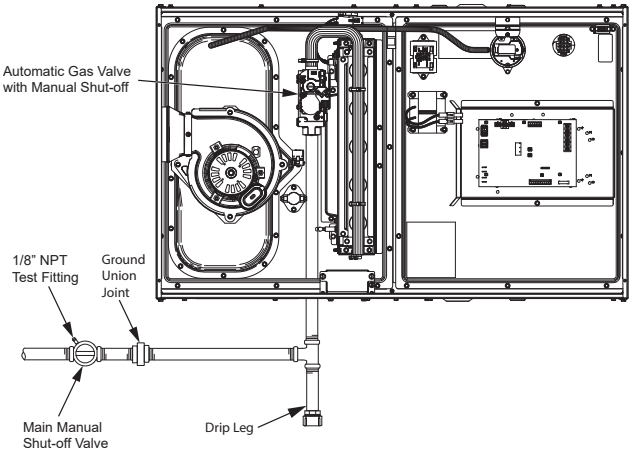
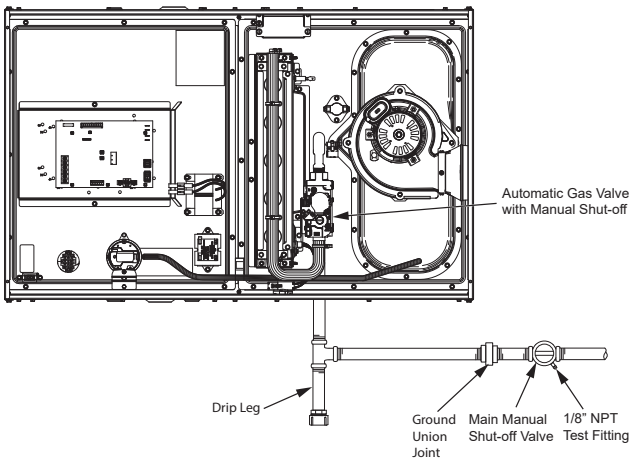


Figure 16. Furnace in horizontal left orientation with gas piping out bottom



Note: *For ease of installation, optional accessory part PIP02095 is recommended for gas piping entering the bottom of the furnace in the horizontal right position.*

Figure 17. Furnace in horizontal right orientation with gas piping out bottom



The furnace is shipped standard for left side installation of gas piping. A cutout with plug is provided on the right side for an alternate gas piping arrangement.

The installation of piping must 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.*

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

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

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

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

Table 17. 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 of S-Series Furnaces, use BAYLPSS400* conversion kit with stainless steel burners.

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 18. Gas flow in cubic feet per hour; 2 cubic foot dial

Sec.	Flow	Sec.	Flow	Sec.	Flow	Sec.	Flow
10	732	31	236	52	141	86	85
11	666	32	229	53	138	88	83
12	610	33	222	54	136	90	81
13	563	34	215	55	133	94	78
14	523	35	209	56	131	98	75
15	488	36	203	57	128	100	73
16	458	37	198	58	126	104	70
17	431	38	193	59	124	108	68
18	407	39	188	60	122	112	65
19	385	40	183	62	118	116	63
20	366	41	179	64	114	120	61
21	349	42	174	66	111	130	56
22	333	43	170	68	108	140	52
23	318	44	166	70	105	150	49
24	305	45	163	72	102	160	46
25	293	46	159	74	99	170	43

Table 18. Gas flow in cubic feet per hour; 2 cubic foot dial (continued)

Sec.	Flow	Sec.	Flow	Sec.	Flow	Sec.	Flow
26	282	47	156	76	96	180	41
27	271	48	153	78	94	190	39
28	262	49	149	80	92	200	37
29	253	50	146	82	89	—	—
30	244	51	144	84	87	—	—

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 the gas valve.
4. Turn on system power with NO call for heat.

   Note: *2nd stage manifold pressure should be adjusted first. To shorten the amount of time it takes for 2nd stage to be energized, set the ISD (Interstage Delay) to zero (000) using the Menu and Option buttons on the IFC. This will energize 2nd stage heating immediately after the blower on delay from 1st stage is complete. This is ~30 seconds after 1st stage flame has been sensed.*
5. Make a call for 2nd stage heating. Insure that the unit is in 2nd stage heating by verifying 24 Vac is measured between C and HI on the gas valve.

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

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

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

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

Figure 18. Gas valve adjustment

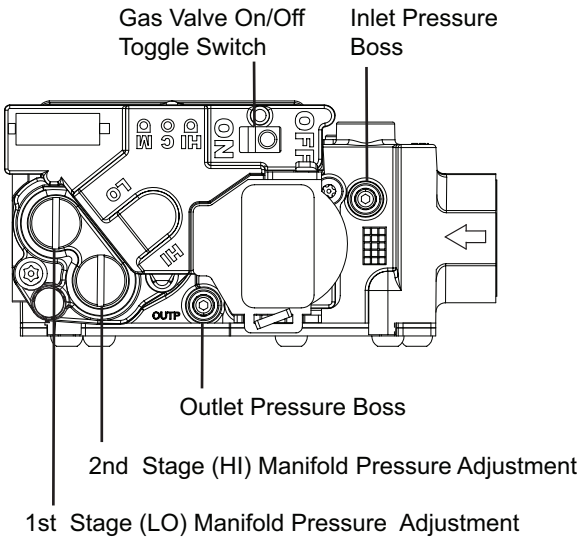


Figure 19. Gas valve adjustment

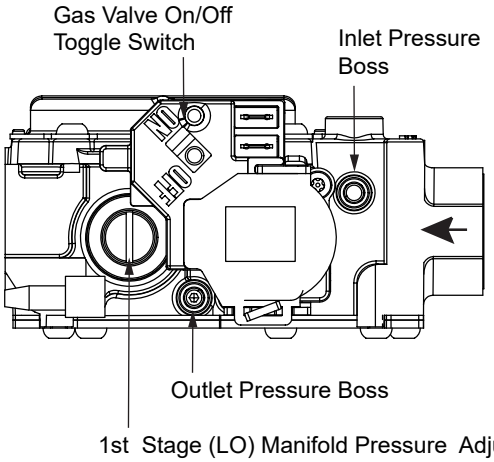


Table 19. Maximum and minimum inlet pressure (inches w.c.)

	Maximum	Minimum
Natural gas	13.8	5.0
Propane gas	13.8	11.0

Table 20. Maximum and minimum inlet pressure (inches w.c.)

	All models except S8X1D120, S8X2D120	S8X1D120, S8X2D120
Natural gas	3.5/1.6	3.5/1.8
Propane gas	10/6	10/7.5

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

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

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

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

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

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.

Table 21. Part numbers for replacement orifices

Drill size	Part number	Drill size	Part number
44	ORF00501	54	ORF00555
45	ORF00644	55	ORF00693
46	ORF00909	56	ORF00907
47	ORF00910	57	ORF00908
48	ORF01099	58	ORF01338
49	ORF00503	59	ORF01339
50	ORF00493	—	—

The table below lists the main burner orifices used with the furnace. If a change of orifices is required to correct the furnace input rating see Table 21, p. 32.

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.

Table 22. Main burner orifices

Orifice twist drill size if installed at sea level	Altitude above sea level and orifice required at other elevations								
	2000	3000	4000	5000	6000	7000	8000	9000	10000
42	42	43	43	43	44	44	45	46	47
43	44	44	44	45	45	46	47	47	48

Table 22. Main burner orifices (continued)

Orifice twist drill size if installed at sea level	Altitude above sea level and orifice required at other elevations								
	2000	3000	4000	5000	6000	7000	8000	9000	10000
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: Excerpted from NFPA 54 Table E.1.1(d).

Table 23. High altitude kit

Furnace Models	Kit Model No.	PS1-Low SET PT	PS2-High SET PT
S8X1A040M3P*	BAYSWT21AHALTAA	—	-0.47-in. +/- 0.05-in. WC
S8X1B040M2P*	BAYSWT21AHALTAA	—	-0.47-in. +/- 0.05-in. WC
S8X1B060M4P*	BAYSWT15AHALTAA	—	-0.60-in. +/- 0.05-in. WC
S8X1B080M4P*	BAYSWT15AHALTAA	—	-0.60-in. +/- 0.05-in. WC
S8X1C080M5P*	BAYSWT14AHALTAB	—	-0.50-in. +/- 0.05-in. WC
S8X1C100M5P*	BAYSWT14AHALTAB	—	-0.50-in. +/- 0.05-in. WC
S8X1D120M5P*	BAYSWT14AHALTAB	—	-0.50-in. +/- 0.05-in. WC
S8X2A040M3P*	BAYSWT22AHALTAA	-0.25-in. +/- 0.05-in. WC	-0.47-in. +/- 0.05-in. WC
S8X2B060M4PSAAA	BAYSWT17AHALTAA	-0.30-in. +/- 0.05-in. WC	-0.60-in. +/- 0.05-in. WC
S8X2B060M4PSAAB and later	BAYSWT23AHALTAA	-0.40-in. +/- 0.05-in. WC	-0.70-in. +/- 0.05-in. WC
S8X2B060M4PTAAA and later	BAYSWT23AHALTAA	-0.40-in. +/- 0.05-in. WC	-0.70-in. +/- 0.05-in. WC
S8X2B080M4P*	BAYSWT18AHALTAA	-0.37-in. +/- 0.05-in. WC	-0.60-in. +/- 0.05-in. WC
S8X2C080M5P*	BAYSWT16AHALTAB	-0.25-in. +/- 0.05-in. WC	-0.50-in. +/- 0.05-in. WC
S8X2C100M5P*	BAYSWT19AHALTAA	-0.37-in. +/- 0.05-in. WC	-0.50-in. +/- 0.05-in. WC
S8X2D120M5P*	BAYSWT24AHALTAA	0.45-in. +/ 0.05-in.WC	-0.50-in. +/- 0.05-in. WC

General Venting

Vent Piping

These furnaces are classified as Fan-Assisted Combustion System, Category I furnaces under the latest edition provisions of ANSI Z21.47 standards. Category I furnaces operate with a non-positive vent static pressure and with a flue loss of not less than 17 percent.

Multistory and common venting are permitted for these furnaces. Venting systems shall be in accordance with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, local codes, and this installation manual.

Note: *If desired, a side wall termination can be accomplished through the use of a listed "add-on" draft inducer. The inducer must be installed according to the inducer manufacturer's instructions. Set the barometric pressure relief to achieve –0.02-inch water column.*

Important: *The furnace shall be connected to a factory built chimney or vent complying with a recognized standard, or a masonry or concrete chimney lined with a lining material acceptable to the authority having jurisdiction.*

Venting into a Masonry Chimney

If the chimney is oversized, the liner is inadequate, or flue-gas condensation is a problem in your area, consider using the chimney as a pathway or chase for type "B" vent or flexible vent liner. If flexible liner material is used, size the vent using the "B" vent tables, then reduce the maximum capacity by 20% (multiply 0.80 times the maximum capacity). Masonry Chimney Kit BAYVENT800B may be used with these furnaces (Upflow model furnaces only) to allow venting into a masonry chimney. See the BAYVENT800B Installer's Guide for application requirements.

Internal Masonry Chimneys

Venting of fan assisted appliances into a lined, internal masonry chimney is allowed only if it is common vented with at least one natural draft appliance; or, if the chimney is lined with type "B", double wall vent or suitable flexible liner material

⚠ WARNING

Carbon Monoxide Poisoning!

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

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.

Note: *The following section does not apply if BAYVENT800B (Masonry Chimney Vent Kit) is used. All instructions with the kit must be followed.*

Table 24. Masonry chimney venting

Type Furnace	Tile Lined Chimney		Chimney Lining	
	Internal	External	"B" Vent	Flexible Metal Liner
Single Fan Assist	No	No	Yes	Yes [a]
Fan Assist + Fan Assist	No	No	Yes	Yes [a]
Fan Assist + Natural	Yes	No	Yes	Yes [a]

[a] Flexible chimney liner size is determined by using the type "B" vent size for the available BTUH input, then reducing the maximum capacity by 20% (multiply maximum capacity times 0.80). The minimum capacity is the same as shown in the "B" vent tables.

External Masonry Chimney

Venting of fan assisted appliances into external chimneys (one or more walls exposed to outdoor temperatures), requires the chimney be lined with type "B", double wall vent or suitable flexible chimney liner material. This applies in all combinations of common venting as well as for fan assisted appliances vented alone.

The following installation practices are recommended to minimize corrosion caused by condensation of flue products in the furnace and flue gas system.

1. Avoid an excessive number of bends.
2. Horizontal runs should pitch upward at least 1/4-inch per foot.
3. Horizontal runs should be as short as possible.
4. All vent pipe or connectors should be securely supported and must be inserted into, but not beyond the inside wall at the chimney vent.
5. When vent connections must pass through walls or partitions of combustible material, a thimble must be used and installed according to local codes.
6. Vent pipe through the roof should be extended to a height determined by National Fuel Gas Code or local codes. It should be capped properly to prevent rain water from entering the vent. Roof exit should be waterproofed.
7. Use type "B" double wall vent when vent pipe is routed through cool spaces (below 60° F.).
8. Where long periods of airflow are desired for comfort, use long fan cycles instead of continuous airflow.
9. Apply other good venting practices as stated in the venting section of the National Fuel Gas Code ANSI Z223.1 "latest edition".
10. Vent connectors serving appliance vented by natural draft or non positive pressure shall not be connected into any portion of a mechanized draft system operating under positive pressure.
11. Horizontal pipe runs must be supported by hangers, straps or other suitable material in intervals at a minimum of every 3 feet of pipe.
12. A furnace shall not be connected to a chimney or flue serving a separate appliance designed to burn solid fuel.
13. The flow area of the largest section of vertical vent or chimney shall not exceed 7 times the smallest listed appliance categorized vent area, flue collar area, or draft hood outlet area unless designed in accordance with approved engineering methods.

Maximum Vent or Tile Lined Chimney Flow Area = [π(D*)2]/4 X 7

* Drafthood outlet diameter, flue collar diameter, or listed appliance categorized vent diameter.

Table 25. Gas vent termination

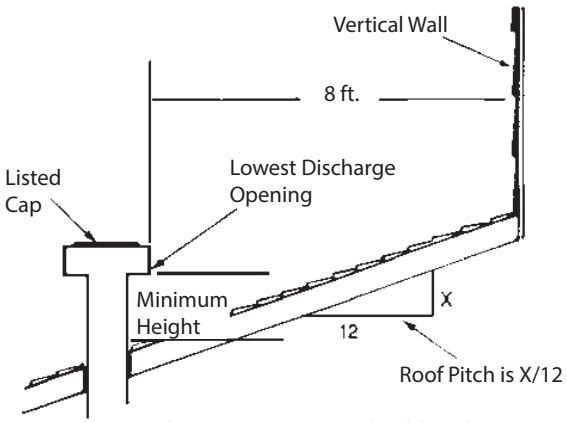
Roof Pitch	Minimum Height
Flat to 6/12	1.0 Feet [a]
Over 6/12 to 7/12	1.25 Feet
Over 7/12 to 8/12	1.5 Feet
Over 8/12 to 9/12	2.0 Feet
Over 9/12 to 10/12	2.5 Feet

Table 25. Gas vent termination (continued)

Roof Pitch	Minimum Height
Over 10/12 to 11/12	3.25 Feet
Over 11/12 to 12/12	4.0 Feet
Over 12/12 to 14/12	5.0 Feet
Over 14/12 to 16/12	6.0 Feet
Over 16/12 to 16/12	7.0 Feet
Over 18/12 to 20/12	7.5 Feet
Over 20/12 to 21/12	8.0 Feet

(a) This requirement covers most installations

Figure 20. Vent termination



The vent termination should not be less than 8 ft. from a vertical wall.

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 must 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. 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.

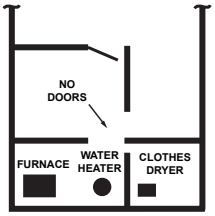
Unconfined space are installations with 50 cu. ft. or more per 1000 BTU/hr input from all equipment installed. Unconfined spaces are defined in the table and illustration for various furnace sizes. These spaces may have adequate air by infiltration to provide air for combustion, ventilation, and dilution 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 26. 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 21. 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 27. 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
100,000	100	25	50
120,000	120	30	60

(a) 1 Square inch per 4000 BTU/hr Vertical Duct.
(b) 1 Square inch per 2000 BTU/hr Horizontal Duct.

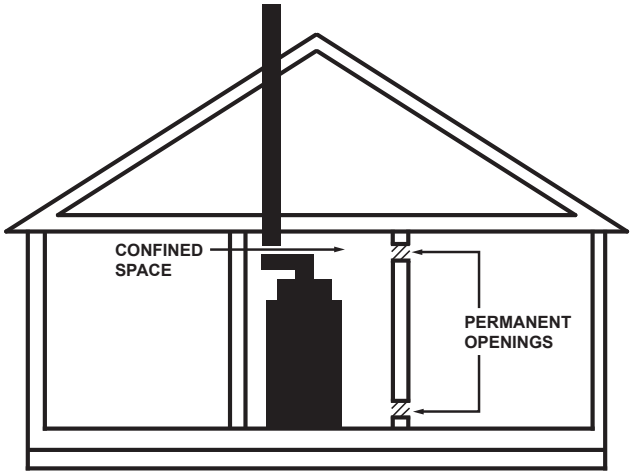
Figure 22. Confined space



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

All air from inside the building The confined space must 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 must be considered in making this determination. See the Table 27, p. 36, for minimum open areas required.

Figure 23. Air from inside building



All air from outdoors The confined space must 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 must communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors. See the Table 27, p. 36, for minimum open areas required.

Figure 24. Air from outdoors

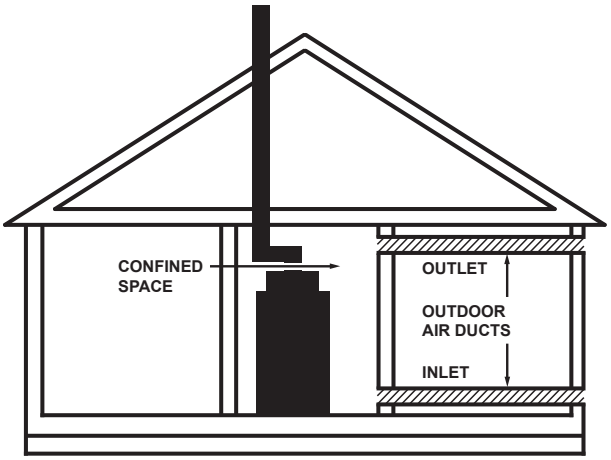


Figure 25. Air from ventilated attic/crawl space

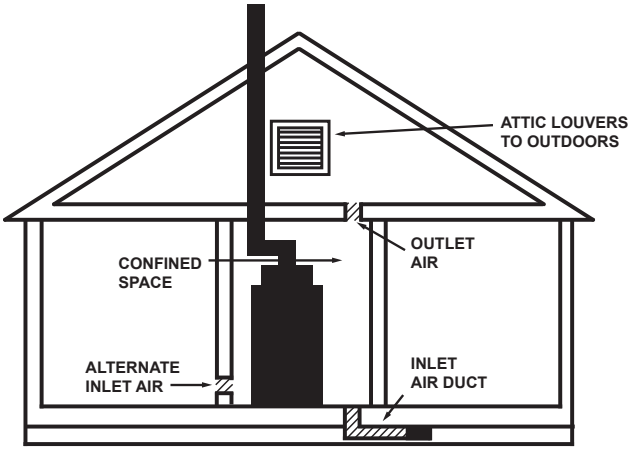
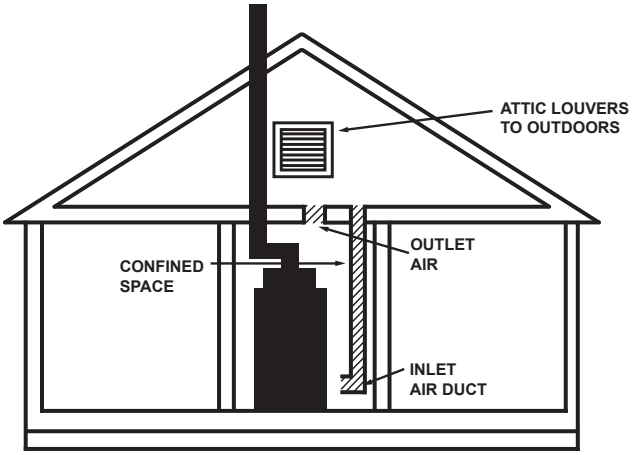


Figure 26. Air from ventilated attic



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.

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 and through the side of the furnace cabinet on horizontal applications without following the guidelines in the Return Air Filters section in the figure for Horizontal furnace with side return.*

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.

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.

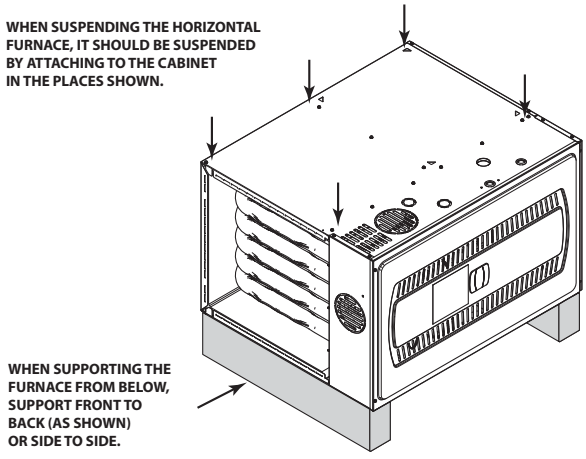
Notes:

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

In horizontal applications, the furnace must be supported with one of the following methods.

1. Support below with non-combustible material as shown in the illustration.
2. Use BAYHANG kit. See kit instructions.
3. Use unistrut with cabling to provide support from under the unit.
4. Use strapping material in locations shown in illustration.

Figure 27. Horizontal installation with supports



Supply Duct Connections

Table 28. Supply duct connections

Furnace Orientation	Steps to be followed	Images for Reference
Upflow Furnace with Coil	Step 1., Step 3., Step 5., Step 7.	Figure 28, p. 38
Furnace in Horizontal Left with Coil	Step 1., Step 4., Step 5., Step 7.	Figure 30, p. 38
Furnace in Horizontal Right with A Coil	Step 2., Step 4.	Figure 29, p. 38
Downflow Furnace with Coil	Step 2., Step 4.	Figure 31, p. 38
Horizontal Right and Downflow Furnace — no Coil	Step 1., Step 6., Step 7.	Figure 32, p. 39

Figure 28. Upflow furnace with Coil

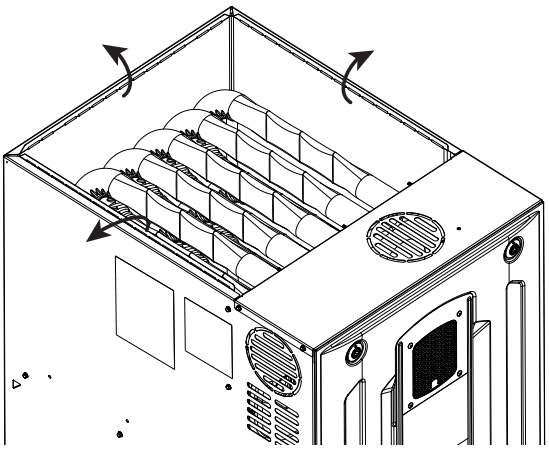


Figure 29. Furnace in horizontal right with A coil

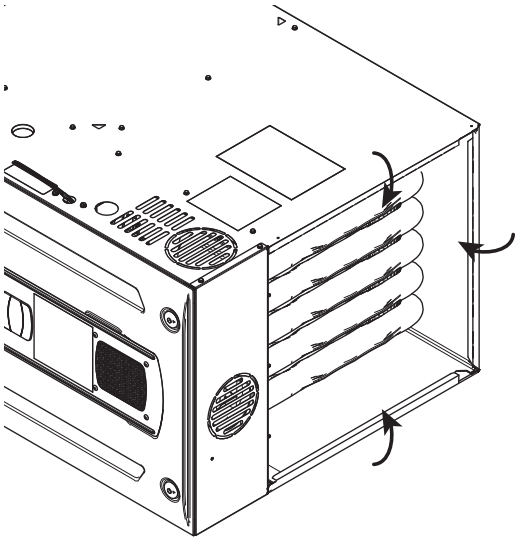


Figure 30. Furnace in horizontal left with coil

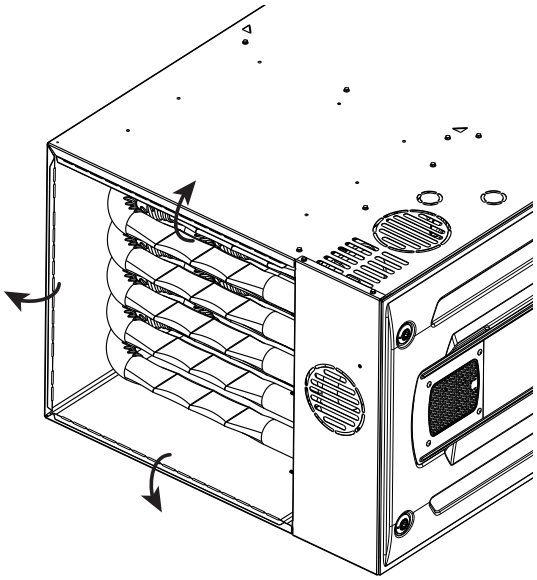


Figure 31. Downflow furnace with coil

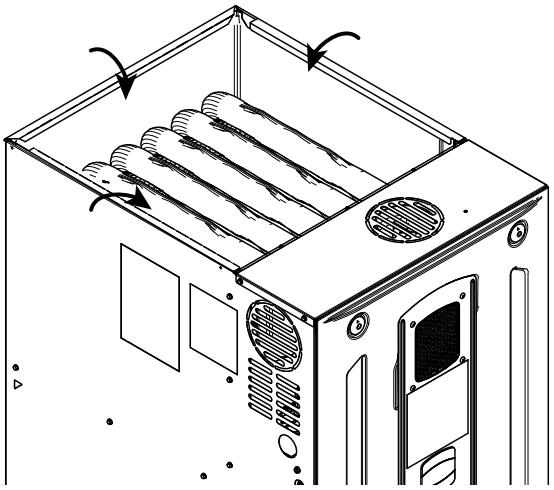
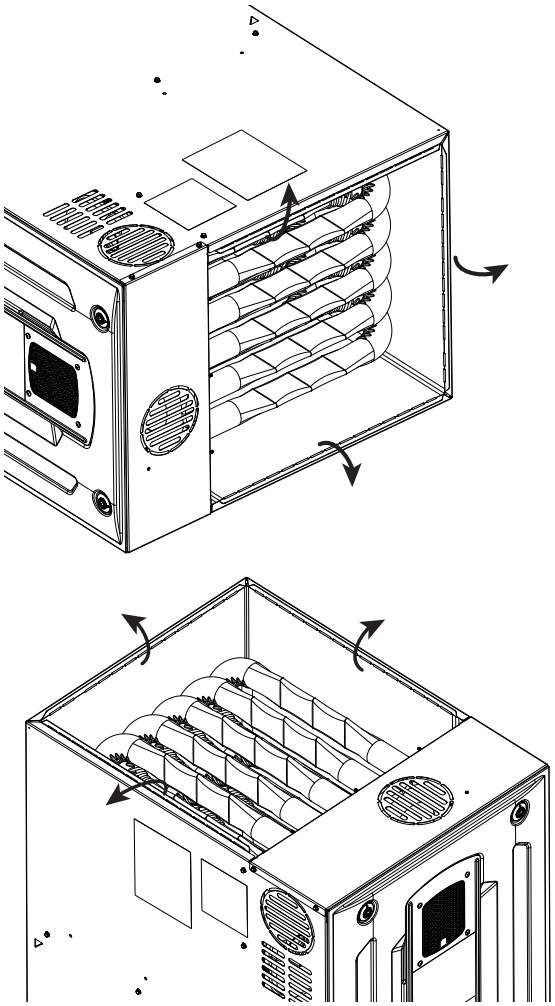


Figure 32. Horizontal right and downflow furnace — no coil



Notes:

- *There are no longer guide holes located on the furnace flange.*
- *Flat or dedicated horizontal coils may require flanges to be bent upward.*
- *There are no longer guide holes located on the furnace flange.*

Important: *BAYBASE is required when installing the furnace on a combustible floor.*

Installation Instructions

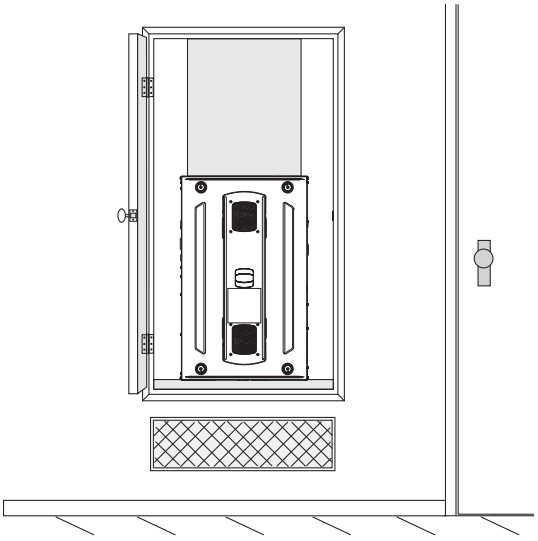
1. Bend furnace flanges up.
2. Bend furnace side flanges down.
3. Set the coil on top of the furnace.
4. Support the furnace and coil independently.
5. Screw through the coil cabinet into the furnace flange. Guide holes are located on the coil.
6. Attach ducting.
7. Seal per local codes and requirements.

Return Duct Connections

Return Ducting General Guidelines

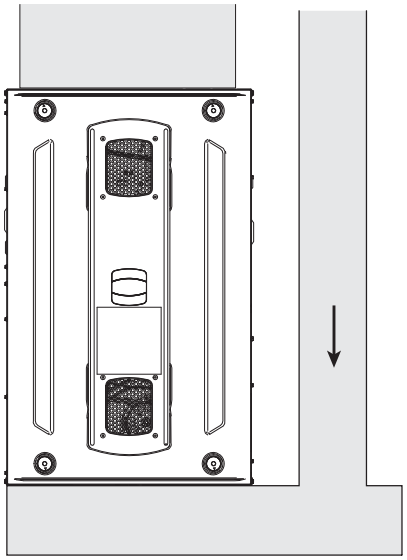
- Back returns are not allowed on any S-Series Furnaces.
- Side returns are not allowed on downflow or horizontal S-Series Furnaces.
- Mounting flanges must be located on ducting.
- Shoot screws through the mount flanges into the furnace cabinet.
- Always seal per local codes and requirements.
- Furnace,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

Figure 33. Upflow furnace with bottom return in closet with remote filter



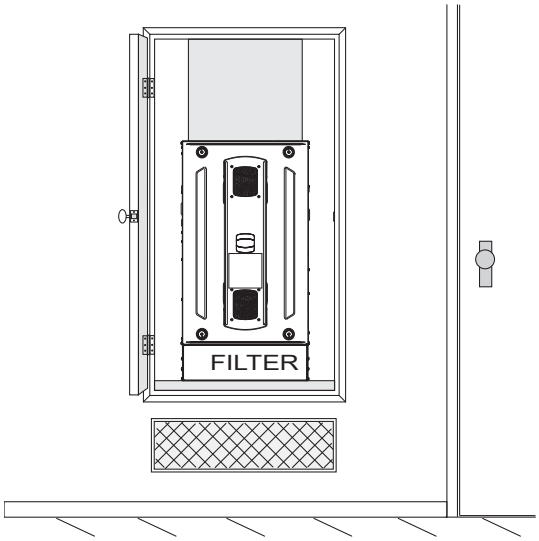
See Step 1., Step 2., Step 3., and Step 8.

Figure 34. Upflow furnace with bottom return mounted on a ducted pedestal



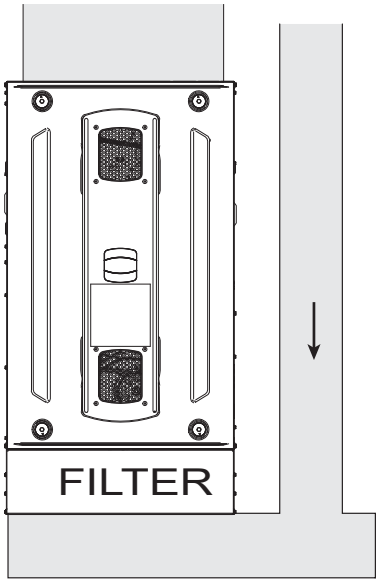
See Step 1., Step 6., Step 3., and Step 8.

Figure 35. Upflow furnace with bottom return in closet with filter box



See Step 1., Step 4., Step 5., and Step 8.

Figure 36. Upflow furnace with bottom return mounted on a ducted pedestal with filter box



See Step 1., Step 7., and Step 8.

Installation Instructions

1. Remove the bottom plate.
2. Set the furnace on the base inside closet.
3. Install remote filter.
4. Set the furnace on the filter box inside closet.
5. Must have grille present for air.
6. Set the furnace on the ducted pedestal. The ducted pedestal will use ducted air from a remote location.
7. Set the furnace on the filter box. The ducted pedestal will use ducted air from a remote location.
8. Seal per local codes and requirements.

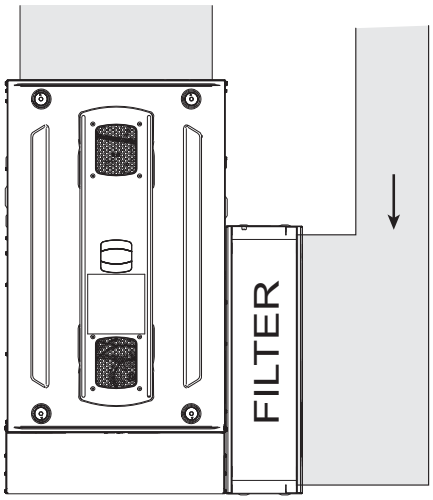
Important:

1. *Make sure the thermostat wiring hole is sealed on the cabinet side with the side return.*
2. *Make sure not to cut the cabinet in the "No Cut" area.*

Notes:

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

Figure 37. Upflow furnace with bottom and side returns mounted on a ducted pedestal with side return and filter box



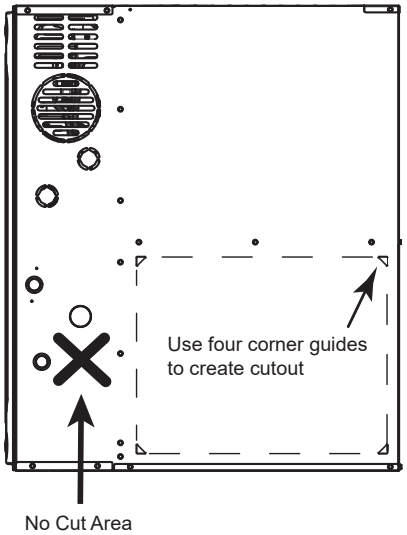
See Step 1. to Step 8.

Important:

1. *Make sure the thermostat wiring hole is sealed on the cabinet side with the side return.*
2. *Make sure not to cut the cabinet in the "No Cut" area.*

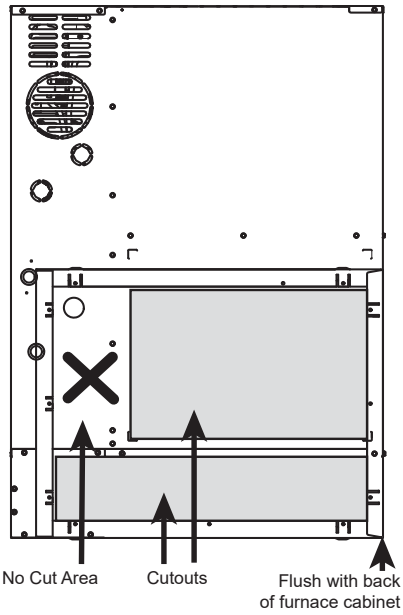
Note: *If using a filter box, use a transition, if possible, to attach the filter box to the furnace cabinet.*

Figure 38. Upflow Furnace with side return



See Step 9. to Step 12.

Figure 39. Cabinet cutout when used with BAYLIFT



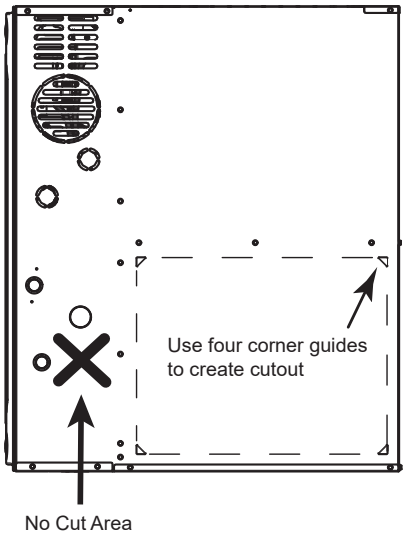
Important:

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

Notes:

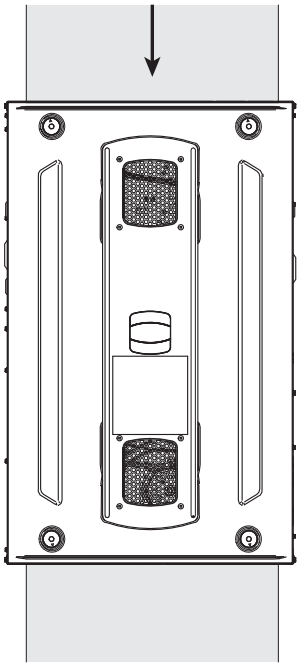
1. *If using one transition, the thermostat wiring will exit on the transition side.*
2. *If using a filter boxes, use transitions, if possible, to attach the filter boxes to the furnace cabinet.*

Figure 40. Upflow furnace with two side returns



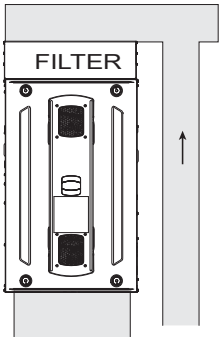
See Step 9. to Step 12.

Figure 41. Downflow furnace with top return



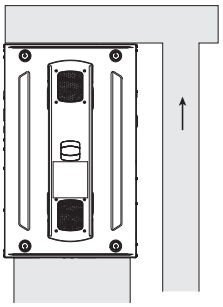
See Step 13., Step 14., Step 17., and Step 8.

Figure 42. Downflow furnace with top return and plenum with filter box



See Step 13., Step 16., Step 14., and Step 8.

Figure 43. Downflow furnace with top return and plenum



See Step 13., Step 15., Step 17., and Step 8.

Installation Steps

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

17. Install remote filter.

Return Air Filters

Typical Air Filter Installations

Filters are not factory supplied for 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 29. Return air filters

Furnace Width (in.)	Filter Qty and Size (in.)
14 – 1/2	1 – 14 x 25 x 1
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

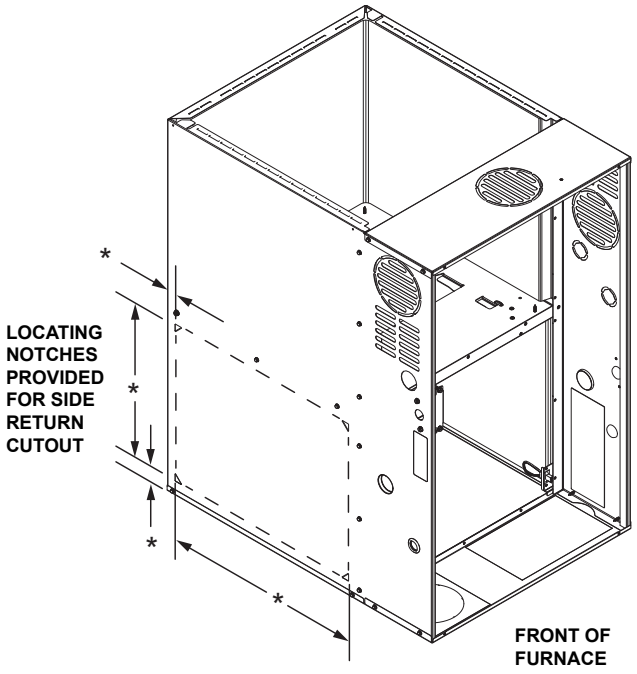
Note: For upflow airflow furnaces where the airflow requirement exceeds 1600 CFM - Furnaces will require return air openings and filters on: (1) both sides, or (2) one side and the bottom, or (3) just on the bottom.

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, see 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 44. Upflow furnaces only



* See Outline Drawing

Note: *See dimensional data drawing.*

Return air filters for furnace in horizontal configuration

When the furnace is installed in the horizontal configuration, the return air filters must be installed exterior to the furnace cabinet. Remote filter grilles may be used for homeowner convenience, see Figure 45, p. 43 or the filters may be installed in the duct work upstream of the furnace, see Figure 46, p. 44.

Filter kits are available for horizontal applications.

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

Figure 45. Remote filter installation

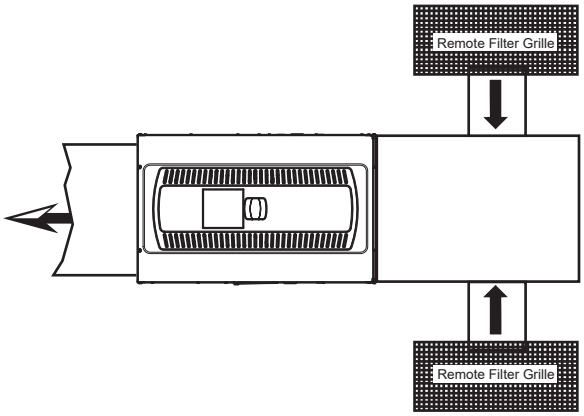
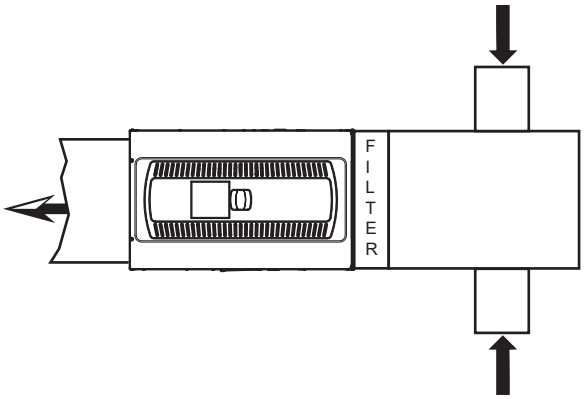


Figure 46. Duct filter installation



Electrical Connections

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

See the "Wiring Diagrams," p. 20 in this document and unit wiring diagram attached to furnace.

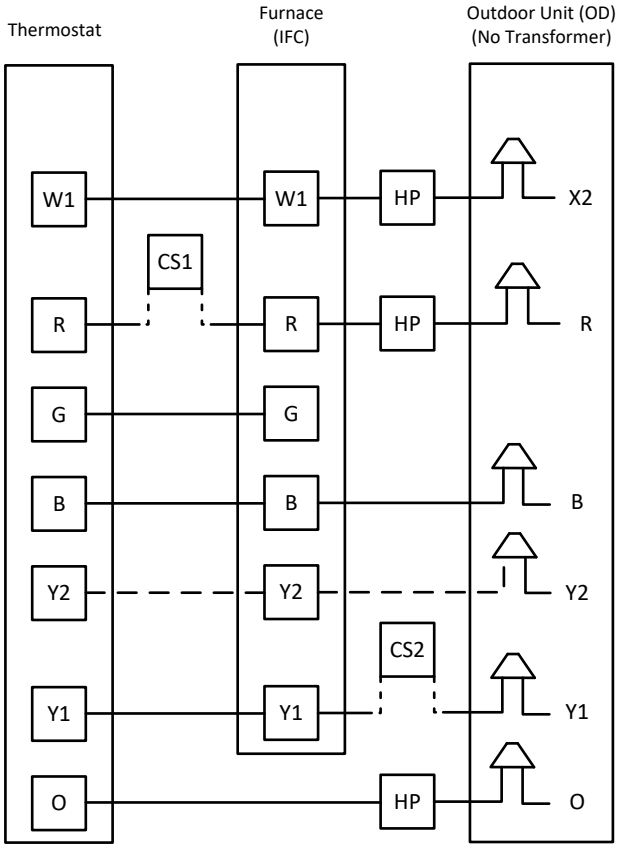
⚠ WARNING

Fire Hazard!

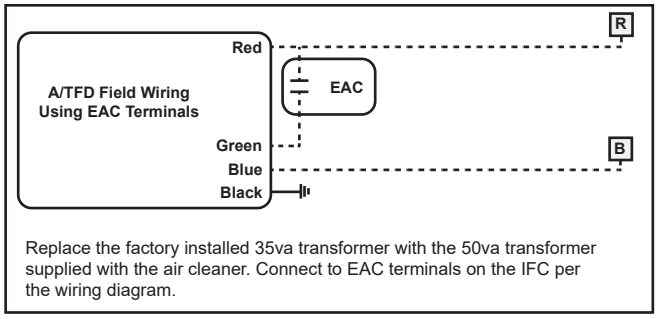
Failure to follow instructions below could result in death or serious injury or property damage.
For installations with flammable refrigeration system, the furnace must be powered at all times except during servicing. The furnace must be installed and connected according to installation instructions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

Field Wiring

Figure 47. Field wiring diagram for S8X1 with one / two stage AC or heat pump

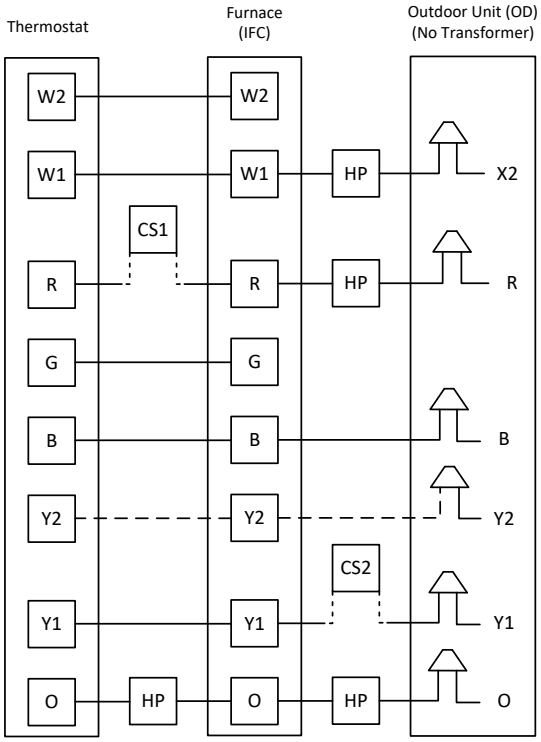


Notes:
1) HP = Wiring used for Heat Pump system.
2) CS = Wiringused for Condensate Switch (2 Options).
3) Y1 and/or Y2 must be connected from the thermostat to the IFC for proper airflow.
4) A/TCONT824 thermostats do not require the use of X2.
5) Recommended 1st stage airflow is 75% of total airflow.

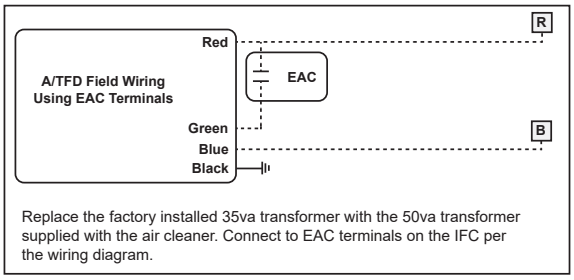


Replace the factory installed 35va transformer with the 50va transformer supplied with the air cleaner. Connect to EAC terminals on the IFC per the wiring diagram.

Figure 48. Field wiring diagram for S8X2 with one / two stage AC or heat pump

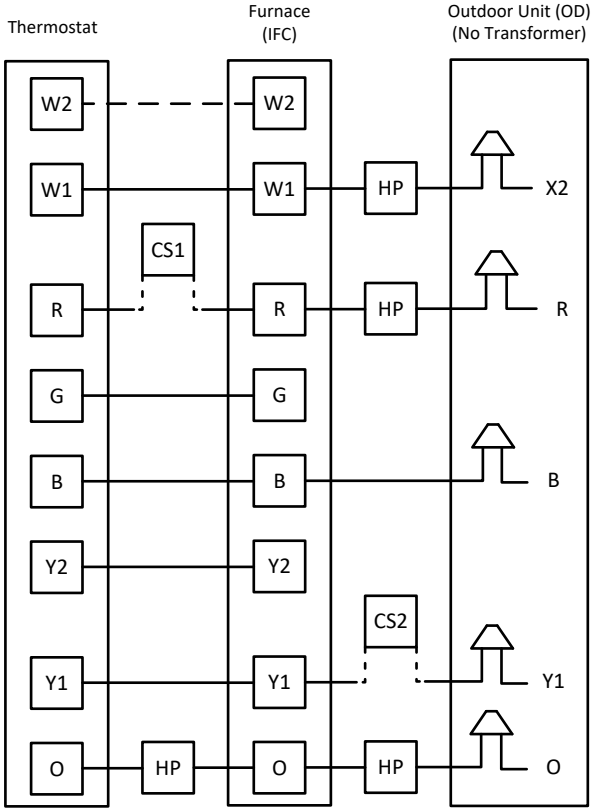


NOTES:
1) HP = Wiring used for Heat Pump system.
2) CS = Wiringused for Condensate Switch (2 Options).
3) Y1 and/or Y2 must be connected from the thermostat to the IFC for proper airflow.
4) Remove Y1-O jumper for HP systems. O terminal must be connected as shown for gas heating operation during defrost.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

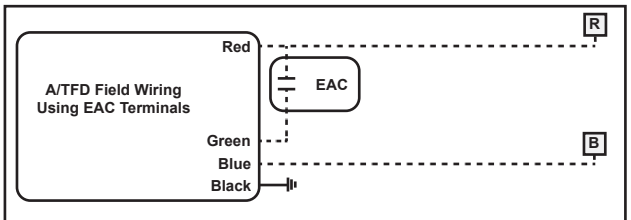


Replace the factory installed 35va transformer with the 50va transformer supplied with the air cleaner. Connect to EAC terminals on the IFC per the wiring diagram.

Figure 49. Field wiring diagram for S8X1 / S8X2 with single stage AC or heat pump with 2 stage airflow



Notes:
1) HP = Wiring used for Heat Pump system.
2) CS = Wiringused for Condensate Switch (2 Options).
3) Y1 and Y2 must be connected from the thermostat to the IFC for proper airflow.
4) Thermostat must be setup for 2 stage OD.
5) IFC Must be setup for 2 stage OD using the Menu/Option buttons.
6) For S8X2, remove Y1-O jumper for HP systems. O terminal must be connected as shown for gas heating operation during defrost.
7) Recommended 1st stage airflow is 75% of total airflow.
8) A/TCONT824 thermostats do not require the use of X2.
9) W2 and O not available for S8X1.



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.

Twinning

Figure 50. Twinning connection diagram for twinning s-series furnaces 2 stage heat / 1 stage cooling thermostat

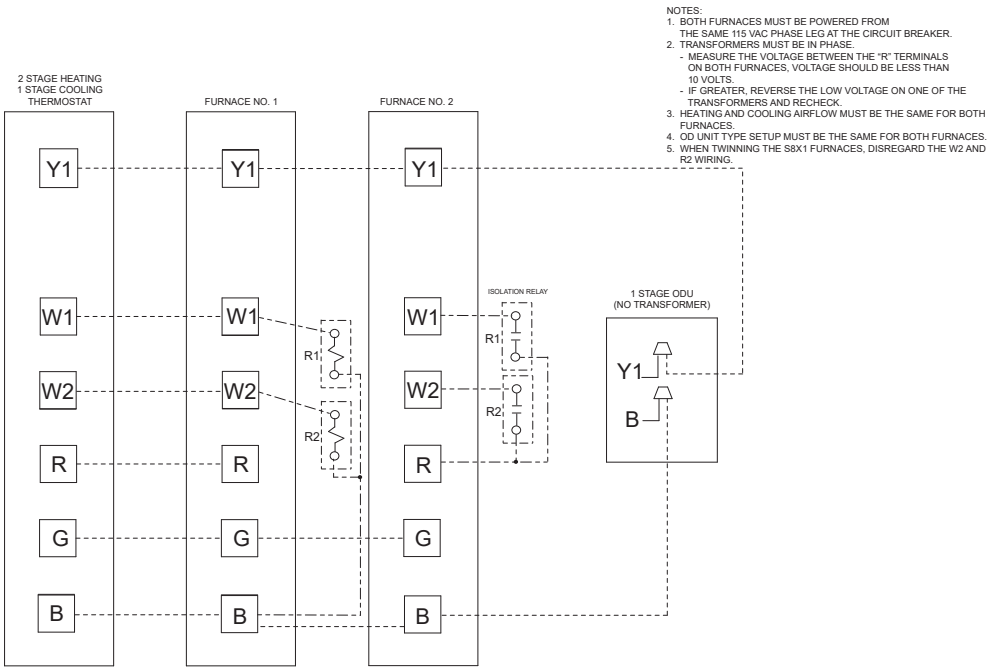


Figure 51. Twinning connection diagram for twinning s-series furnaces 2 stage heat / 2 stage cooling thermostat

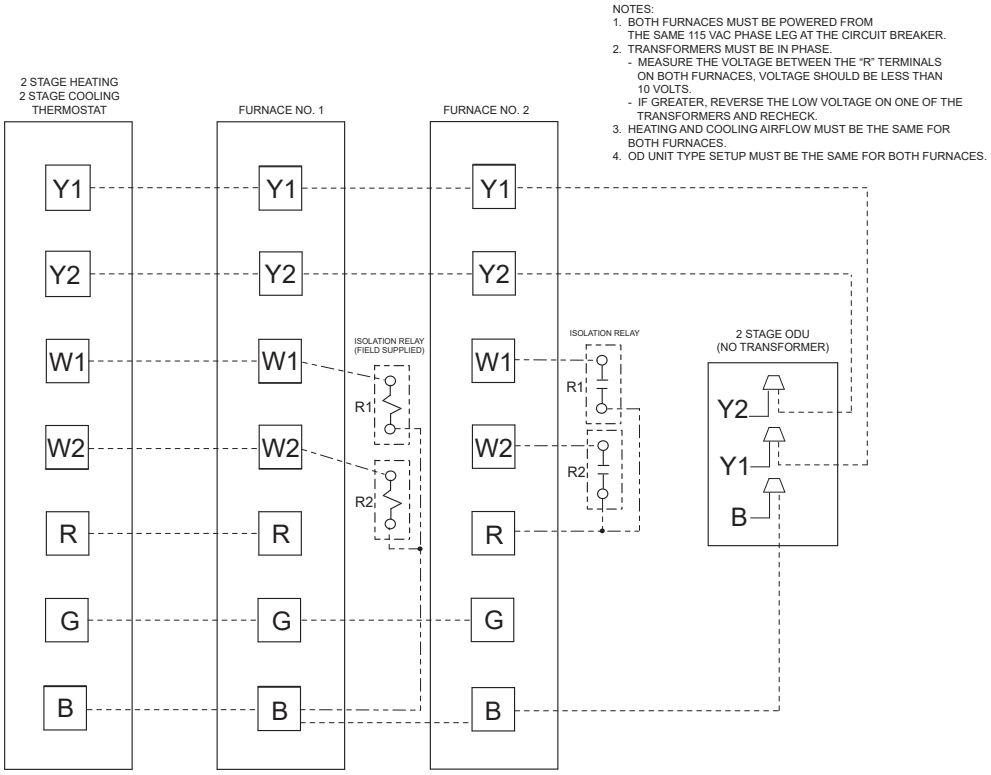


Figure 52. Twinning connection diagram for twinning s-series furnaces 2 stage heat / 1 stage cooling (with transformer) thermostat

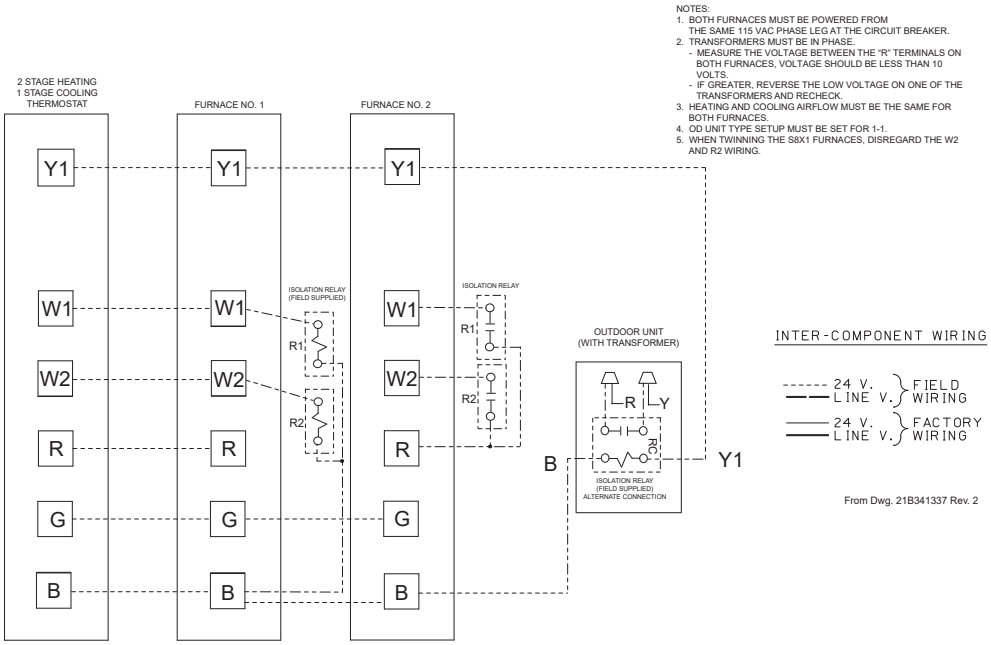
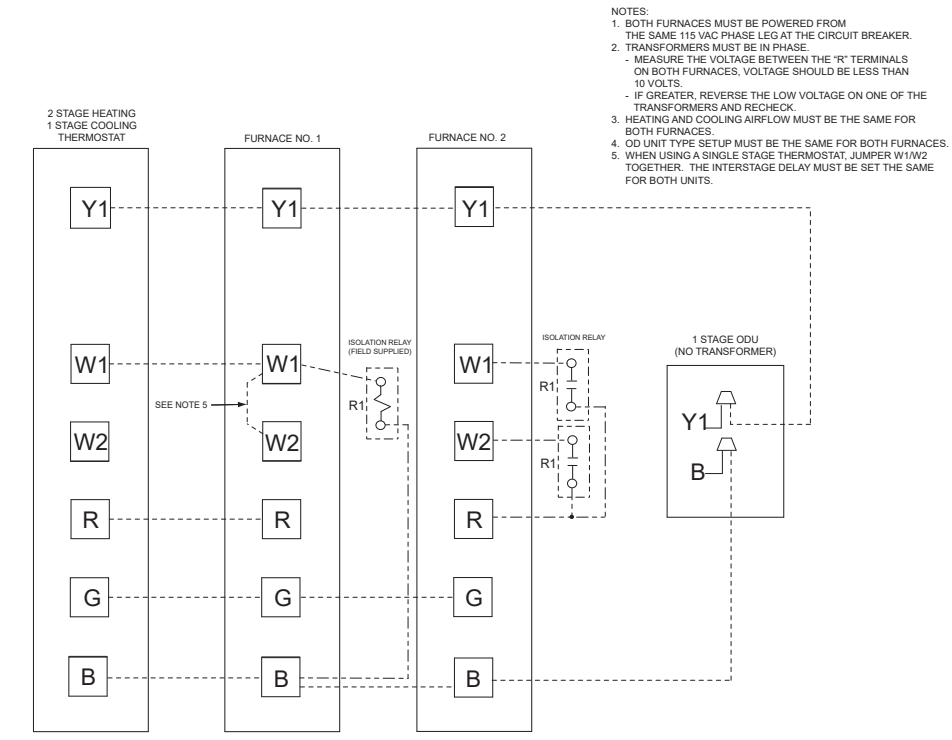


Figure 53. Twinning connection diagram for twinning s-series furnaces 2 stage heat / 1 stage cooling thermostat with single stage thermostat



General Start-Up and Adjustment

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

Preliminary Inspections

With gas and electrical power OFF, confirm:

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

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

Do not check with an open flame allow 5 minutes for any gas that might have escaped to dissipate. 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 ensure 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, then 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.

To shut off

For complete shutdown: Turn the toggle or control switch located on the main gas valve inside the unit to the OFF position and the external main gas shutoff valve to the OFF position. Disconnect the electrical supply to the unit.

Whenever your house is to be vacant, arrange to have someone inspect your house for proper temperature. This is very important 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.
During complete furnace shutdown during cold weather, take measures to prevent water pipes and receptacles from freezing.

Control and Safety Switch Adjustment

Control and Safety Switch Adjustment

Limit Switch Check Out

The limit switch is a safety device designed to close the gas valve should the furnace become overheated. Since proper operation of this switch is important to the safety of the unit, it must be checked out on initial start up by the installer.

To check for proper operation of the limit switches, set the thermostat to a temperature higher than the indicated temperature to bring on the gas valve. Restrict the airflow by blocking the return air to the blower. When the furnace reaches the maximum outlet temperature as shown on the rating plate, the burners must shut off. If they do not shut off after a reasonable time and overheating is evident, a faulty limit switch is probable and the limit switch must be replaced. After checking the operation of the limit control, be sure to remove the paper or cardboard from the return air inlet, or reconnect the blower.

Furnace Combustion Air Exhaust Options

Note: *Default is left side for electric and gas connections.*

The following sections give instructions for the different furnace orientations and the options for venting the exhaust combustion air.

Important: *When looking at the different orientations, the direction of the combustion air exhaust in the illustration's description is after the furnace has been rotated, if needed.*

Venting Options for Upflow Applications

See the illustrations below to find the approved venting options for upflow furnace.

Important: *The exhaust must be vented to the outdoors.*

Figure 54. Upflow orientation or installation

Combustion air exhaust vented out at the top.

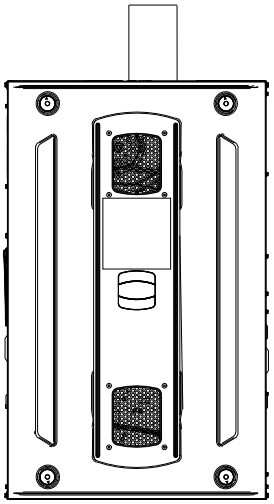


Figure 55. Upflow orientation or installation

Combustion air exhaust vented through left side.

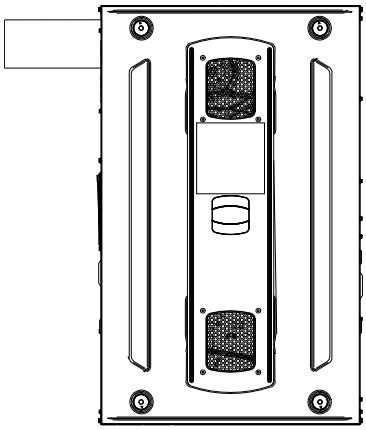
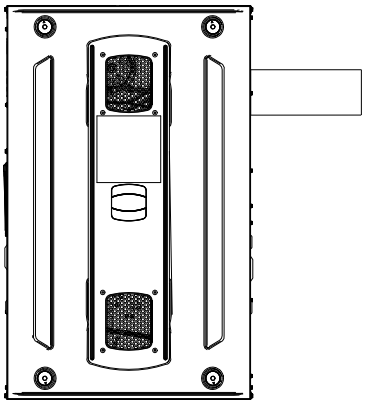


Figure 56. Upflow orientation or installation

Combustion air exhaust vented through right side.



Venting Options for Horizontal Left Applications

See the illustrations below to find the approved venting options for horizontal left furnace.

Important: *The exhaust must be vented to the outdoors.*

Note: *4-inch Type B double wall vent pipe must be used inside of the furnace cabinet.*

Vented out top.

Figure 57. Horizontal left orientation or installation

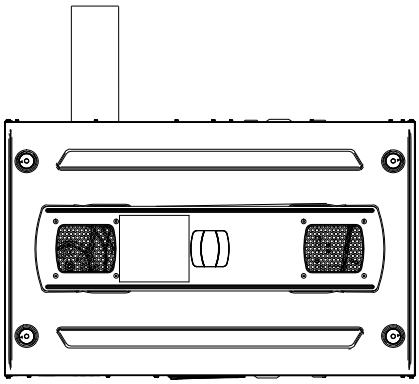
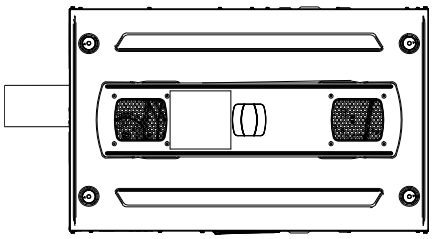


Figure 58. Horizontal left orientation or installation



Venting Options for Horizontal Right Applications

See the illustrations below to find the approved venting options for horizontal right furnace.

Important: *The exhaust must be vented to the outdoors.*

Note: *4-inch Type B double wall vent pipe must be used inside of the furnace cabinet.*

Figure 59. Horizontal right orientation or installation

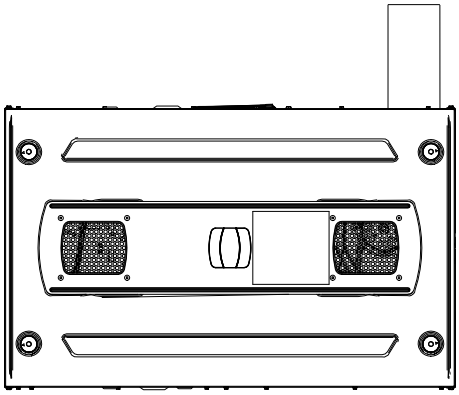
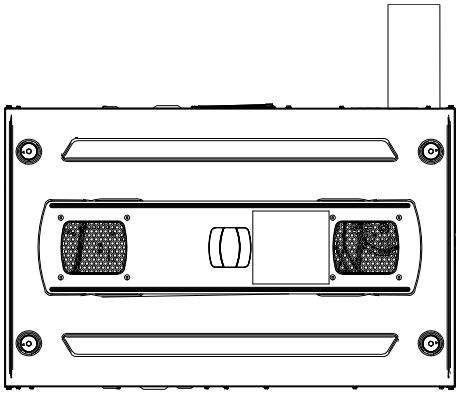


Figure 60. Horizontal right orientation or installation



Venting Options for Downflow Applications

See the illustrations below to find the approved venting options for downflow furnace models.

Important: *The combustion air exhaust must be vented to the outdoors.*

Notes:

1. *4-inch Type B double wall vent pipe must be used inside of the furnace cabinet.*
2. *Requires kit BAYVENT600. Kit used with B, C, and D cabinets only.*
3. *“A” cabinet furnaces must be vented through the left of right side openings.*

Figure 61. Downflow orientation or installation

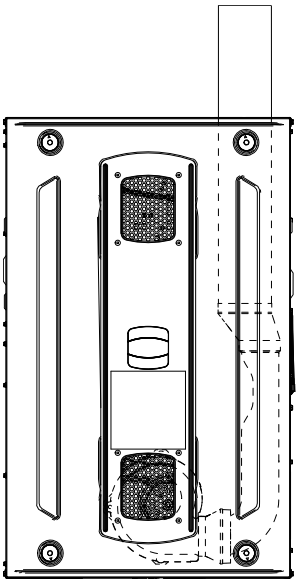


Figure 62. Downflow orientation or installation

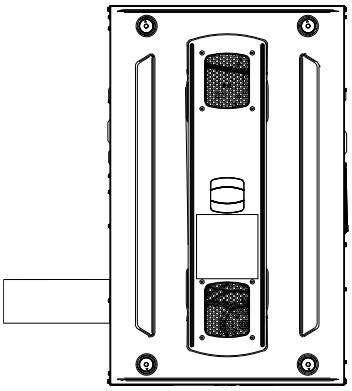
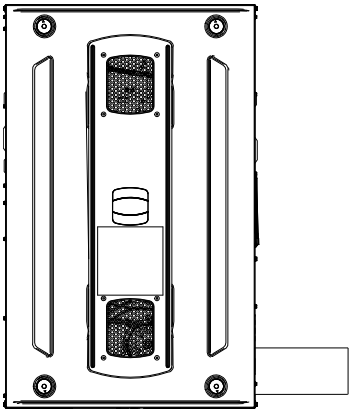


Figure 63. Downflow orientation or installation



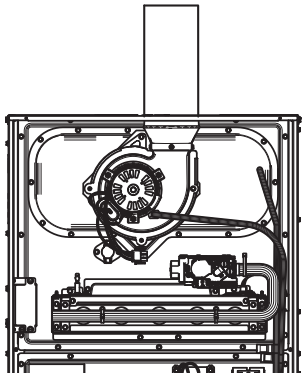
Combustion Air Conversions

Important: *After deciding the orientation of the flue outlet, cut the metal tabs around the appropriate 5-inch metal cutout on the furnace cabinet and remove the cutout, if necessary.*

Notes:

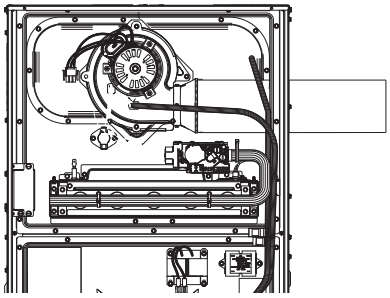
1. *When rotating the inducer it may be necessary to cut the wire tie. A new wire tie must be installed once the inducer is rotated.*
2. *Self-tapping screws are recommended for attaching the vent pipe to the inducer outlet.*

Figure 64. Upflow orientation with top venting



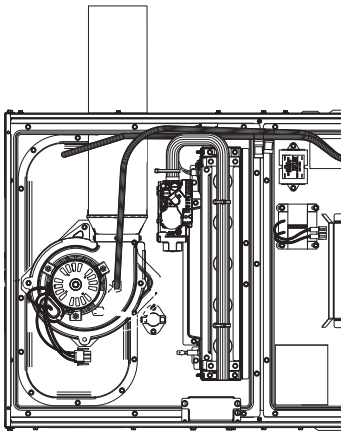
See Step 1.

Figure 65. Upflow orientation with right side venting



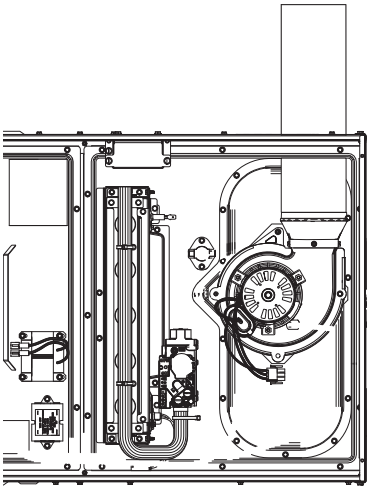
See Step 2. to Step 6.

Figure 66. Horizontal left orientation with top venting



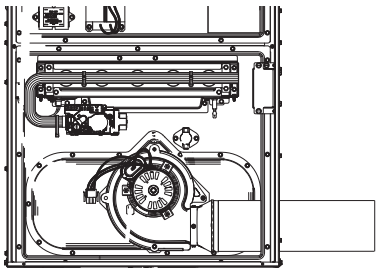
See Step 2. to Step 6.

Figure 67. Horizontal right orientation with top venting



See Step 2. to Step 5. and Step 7.

Figure 68. Downflow orientation with right side venting



See Step 2. to Step 6.

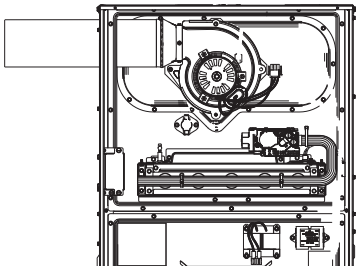
Pressure Switch locations

S8X1: PS is connected to the hot header.

S8X2: PS1 is connected to the inducer. PS2 is connected to the hot header.

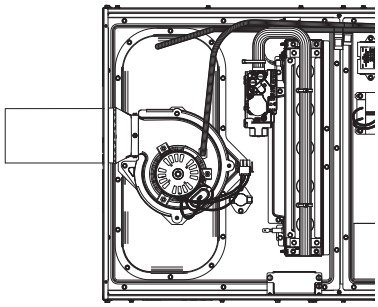
Note: *When rotating the inducer it may be necessary to cut the wire tie. A new wire tie must be installed once the inducer is rotated.*

Figure 69. Upflow orientation with left side venting



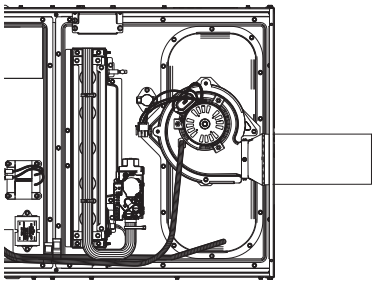
See Step 2. to Step 6.

Figure 70. Horizontal left orientation with left side venting



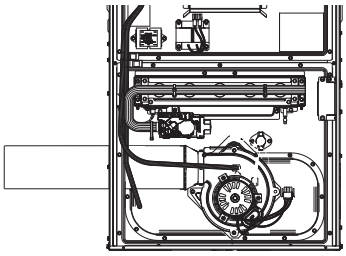
See Step 1.

Figure 71. Horizontal right orientation with right side venting



See Step 1.

Figure 72. Downflow orientation with left side venting

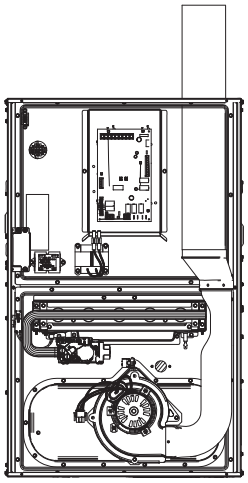


See Step 2. to Step 6.

Notes:

1. *Requires kit BAYVENT600. Kit used with B, C, and D cabinets only. Follow kit instructions for installation.*
2. *4-inch Type B double wall vent pipe must be used inside of the furnace cabinet.*

Figure 73. Downflow orientation with top venting



See Step 2., Step 3., Step 4., Step 8. and Step 6.

Installation Instructions

1. No changes need to be made to the inducer when installing the furnace in upflow position when vented through the top.
2. Before proceeding, lay unit on its back to make the conversion easier.
3. Remove the four screws holding the inducer in place.
4. Rotate the inducer so the inducer outlet is pointing towards the 5-inch cutout.
5. Secure the inducer in place using the screws removed in Step 3.
6. Attach the vent to the inducer outlet.
7. Attach the vent outlet gasket to the vent outlet.
8. Install BAYVENT600 kit per the kit instructions.

Integrated Furnace Control Menu

Figure 74. S8X1 control system menu - single stage OD

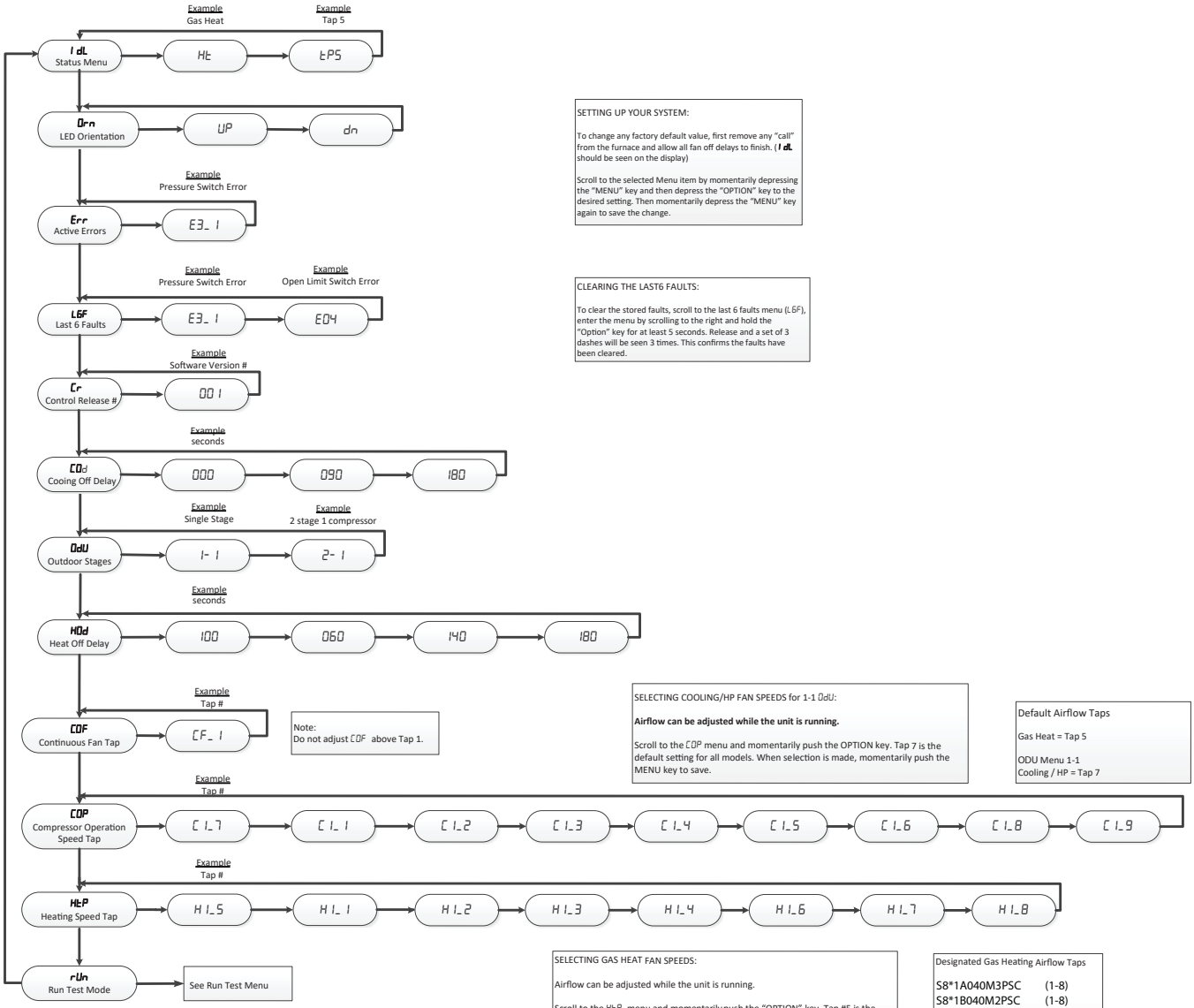


Figure 75. S8X1 control system menu two stage OD

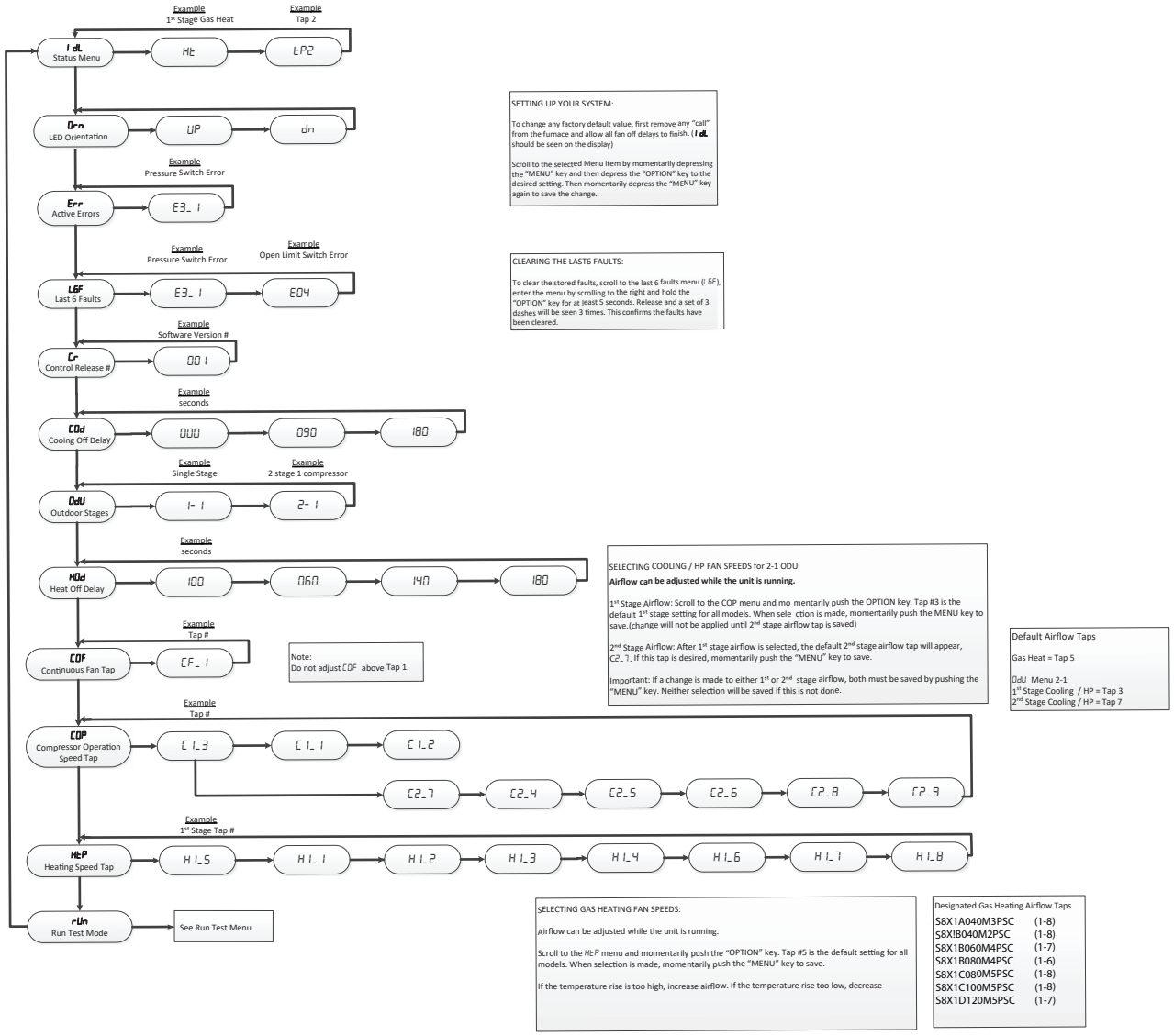


Figure 76. S8X2 control system menu single stage OD

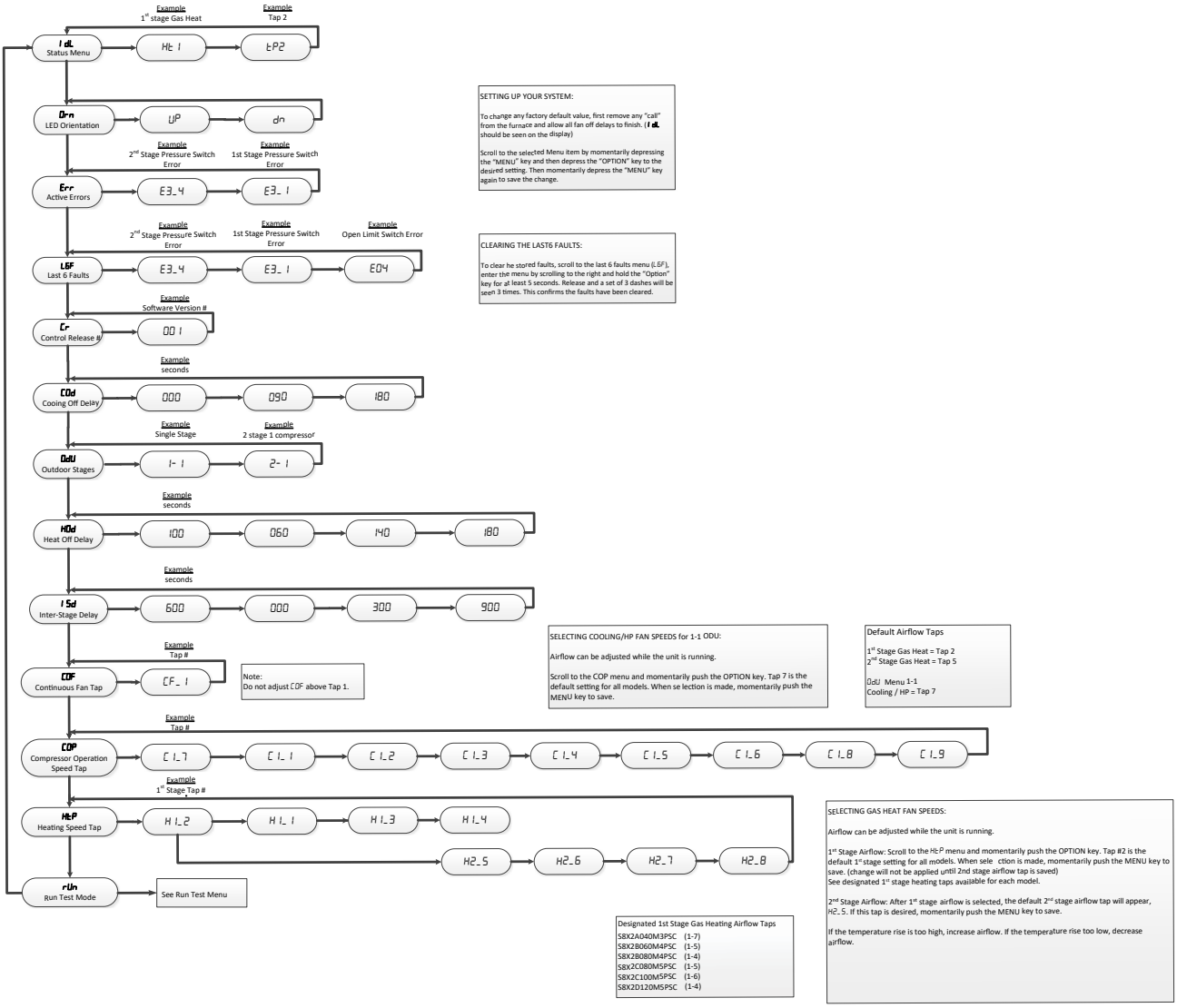


Figure 77. S8X2 control system menu two stage OD

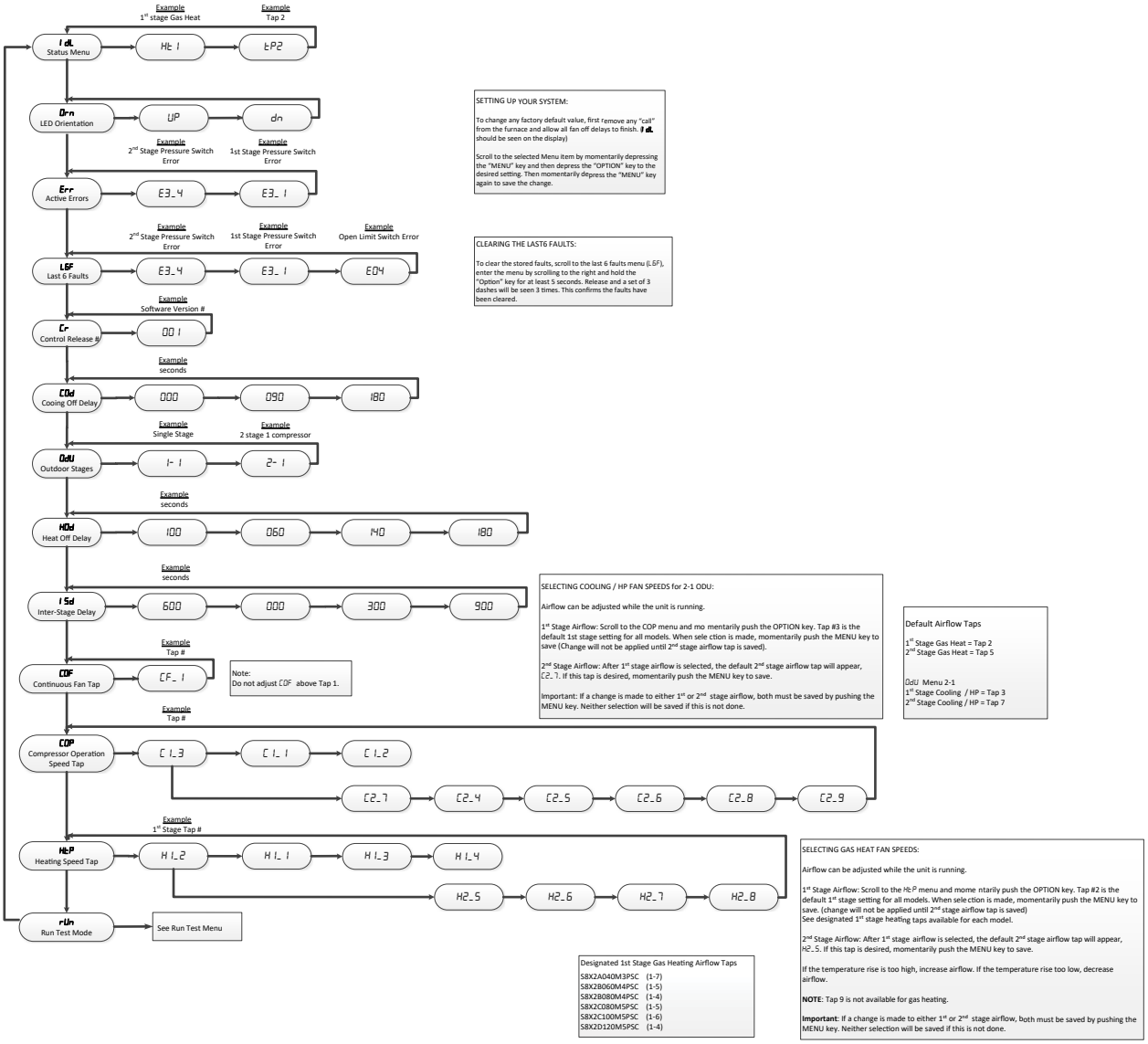


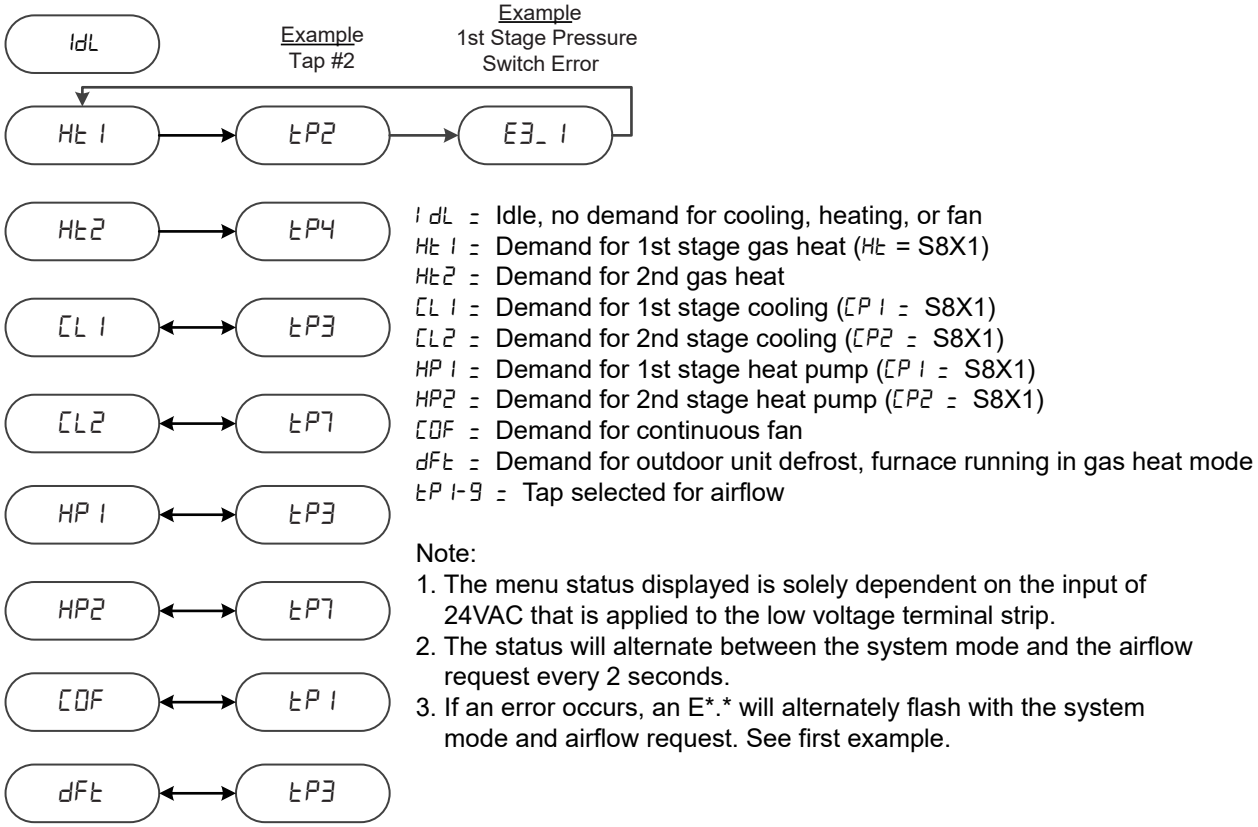
Figure 78. S8X1/S8X2 run test mode

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

Sequence of Run Test Mode
rU1-Turns the inducer on in 1st stage for 30 seconds
rU2 – Turns on the inducer on 2nd stage for 30 seconds (S8X1)
rU3 – Turns the igniter on for 10 seconds
rU4 – Turns the circulating blower on 1st stage compressor speed for 10 seconds
rU5 – Turns the circulating blower on 2nd stage compressor speed for 10 seconds
rU6 – Turns the circulating blower on 1st stage gas heat speed for 10 seconds
rU7 – Turns on the circulating blower on 2nd stage gas heat speed for 10 seconds (N/A for S8X1)
The above sequence will repeat two more times unless the Run Test Mode is exited, see above.

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

Figure 79. S8X1/S8X2 system status menu

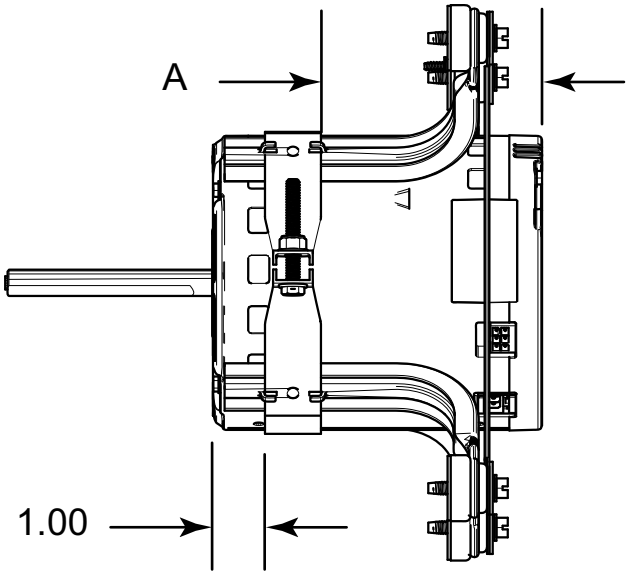


IdL = Idle, no demand for cooling, heating, or fan
Ht1 = Demand for 1st stage gas heat (Ht = S8X1)
Ht2 = Demand for 2nd gas heat
CL1 = Demand for 1st stage cooling (CP1 = S8X1)
CL2 = Demand for 2nd stage cooling (CP2 = S8X1)
HP1 = Demand for 1st stage heat pump (CP1 = S8X1)
HP2 = Demand for 2nd stage heat pump (CP2 = S8X1)
COF = Demand for continuous fan
dFt = Demand for outdoor unit defrost, furnace running in gas heat mode
tP1-9 = Tap selected for airflow

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

Belly Band Location

Figure 80. Distance from belly band to the front face of motor for minimum vibration

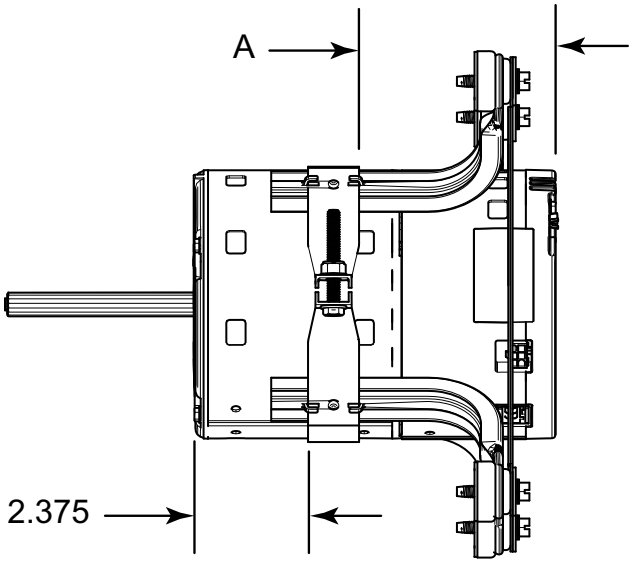


Note: *Blower housings and wheel removed from view for clarity.*

Table 30. Belly band dimensions

Furnace Model	Dimension "A" (inches)
A040	3.75 (3–3/4)
B040	3.5 (3–1/2)
B060 4 ton	4.25 (4–1/4)
B080	4.25 (4–1/4)

Figure 81. Distance from belly band to the front face of motor for minimum vibration



Note: *Blower housings and wheel removed from view for clarity.*

Table 31. Belly band dimensions

Furnace Model	Dimension "A" (inches)
C080	4.125 (4–1/8)
C100	4.125 (4–1/8)
D120	4.125 (4–1/8)

Setting Airflow

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

Note: *See "Airflow Tables," p. 24 section in this document.*

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

Note: *Check out fieldtechhelp.com and search for "Setting Air Flow on the 9-Tap Motor" to watch a short video.*

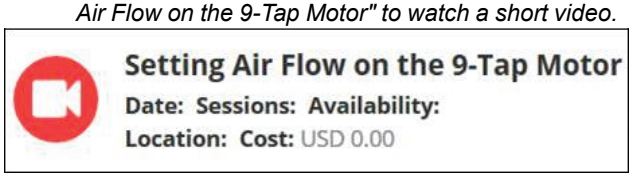


Figure 82. Setting airflow

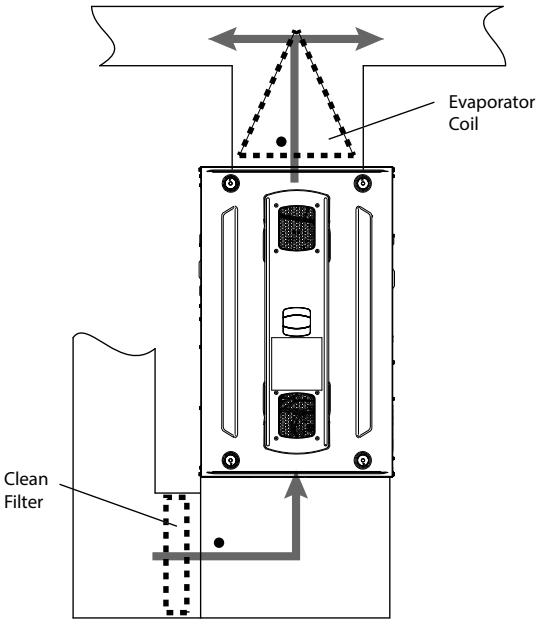


Table 32. Furnace airflow (cfm) vs. external static pressure (in. W.C.)

Model	Tap	0.1	0.3	0.5	0.7	0.9
S8X1B080M4PS S8X2B080M4PS	1	633	297	—	—	—
	2	957	800	719	428	213
	3	1220	1080	940	800	660
	4	1403	1298	1192	1087 (a)	981
	5	1524	1428	1336	1248	1164
	6	1684	1574	1544	1401	1337
	7	1700	1625	1551	1476 (b)	1401 (c)
	8	1858	1790	1723	1656	1589
	9	1967	1898	1829	1760	1691

This is an Example Airflow Table only. See "Airflow Tables," p. 24 for complete Airflow data.

(a) Exapmple 1, 2
(b) Example 1
(c) Example 2

Example 1: S8X2B080M4PS (Default Tap 7)

Cooling / HP

- 3 Ton Single Stage Outdoor
- Total ESP = 0.7-inch W.C.
- Required Airflow = 1050 cfm (3T x 350 cfm/ton)
- New Tap Number = Tap 4

Example 2: S8X2B080M4PS (Default Tap 3 and 7)

- 4 Ton Two Stage Outdoor
- Total 2nd Stage ESP = 0.9-inch W.C.
- Total 1st Stage ESP = 0.6-inch W.C.
- Required 2nd Stage Airflow = 1400 cfm (4T x 350 cfm/ton)
- Required 1st Stage Airflow = 1050 cfm (2nd stage airflow x .75)
- New 2nd Stage Tap Number = Tap 7 (no change)
- New 1st Stage Tap Number = Tap 4

Integrated Furnace Control Display Codes

Table 33. Menu options

IdL	Idle
Ht	Heating
Ht1	1st Stage Heating (Not Applicable for S8X1)
Ht2	2nd Stage Heating (Not Applicable for S8X1)
tP	Blower Tap Number
CL1	1st Stage Cooling (Not Applicable for S8X1)
CL2	2nd Stage Cooling (Not Applicable for S8X1)
HP1	1st Stage Heat Pump (Not Applicable for S8X1)
HP2	2nd Stage Heat Pump (Not Applicable for S8X1)
Orn	LED Orientation Adjustment
Err	Active Alarm Menu
LGF	Last 6 Faults (To clear — Hold Option button down for 5 seconds after entering the LGF menu)
Cr	Code Release Number
COd	Cooling Off Delay (Seconds)
OdU	Outdoor Unit Type (Single / Two Stage)
COF	Blower Constant Fan Airflow
CP1	Cooling/Heat Pump Mode
HOd	Heat Off Delay (Seconds)
1Sd	Inter-Stage Delay (Seconds) (Not Applicable for S8X1)
COP	Compressor Operation Speed Tap
HtP	Gas Heating Speed Tap
rUn	Test Mode

Table 34. Error codes

Alarm Error Code	Alarm Explanation
E01	Loss of the IRQ or other internal failures (Internal IFC error)
E2_1	Retry Exceeded (Flame never sensed, one hour lockout after 3 times)
E2_2	Recycles Exceeded (Flame sensed then lost, one hour lockout after 10 times)
E2_3	1st Stage Gas Valve Not Energized When It Should Be exceeded after 10 times
E3_1	Shorted Pressure Switch, 1st Stage
E3_2	Open Pressure Switch, 1st Stage
E3_3	Shorted Pressure Switch, 2nd Stage (Not Applicable for S8X1)
E3_4	Open Pressure Switch, 2nd Stage (Not Applicable for S8X1)
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

Table 34. Error codes (continued)

Alarm Error Code	Alarm Explanation
E6_3	(1) Igniter relay fails
	(2) Igniter open
E7_1	1st stage gas valve (MVL) is energized when it should be off
E08	Flame current is low, but still strong enough to allow operation
E 11	(1) 1st stage gas valve not energized when it should be
	(2) 1st stage gas valve relay stuck closed
	(3) 2nd stage gas valve relay stuck closed (Not Applicable for S8X1)
	(4) 2nd stage gas valve energized when it should not be (Not Applicable for S8X1)
	(5) 2nd stage gas valve not energized when it should be (Not Applicable for S8X1)
E 12	Open fuse

Fault Code Recovery

Fault Code Recovery

1. To view 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. 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 83. S8X1 IFC component layout

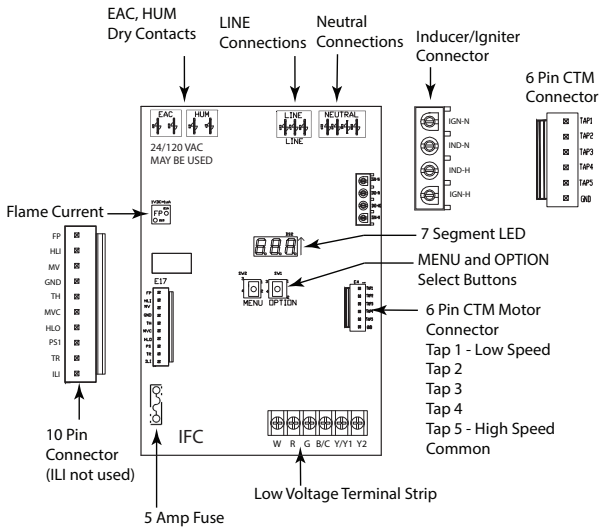
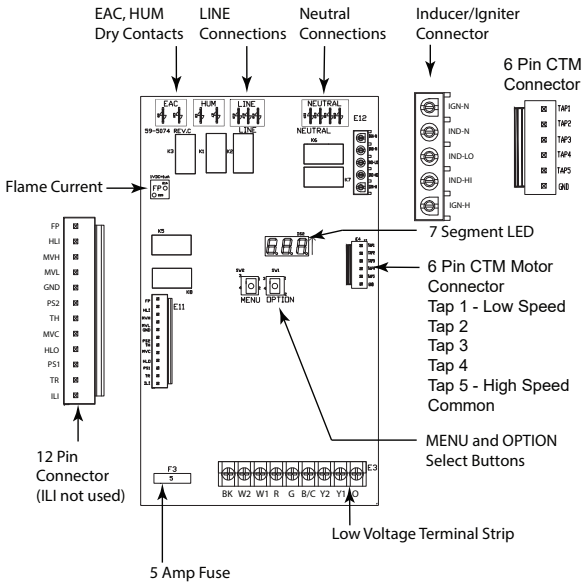


Figure 84. S8X2 IFC component layout



Troubleshooting

The following pages include troubleshooting flowcharts in reference for the 1 Stage S8X1 and 2 Stage S8X2 families 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.

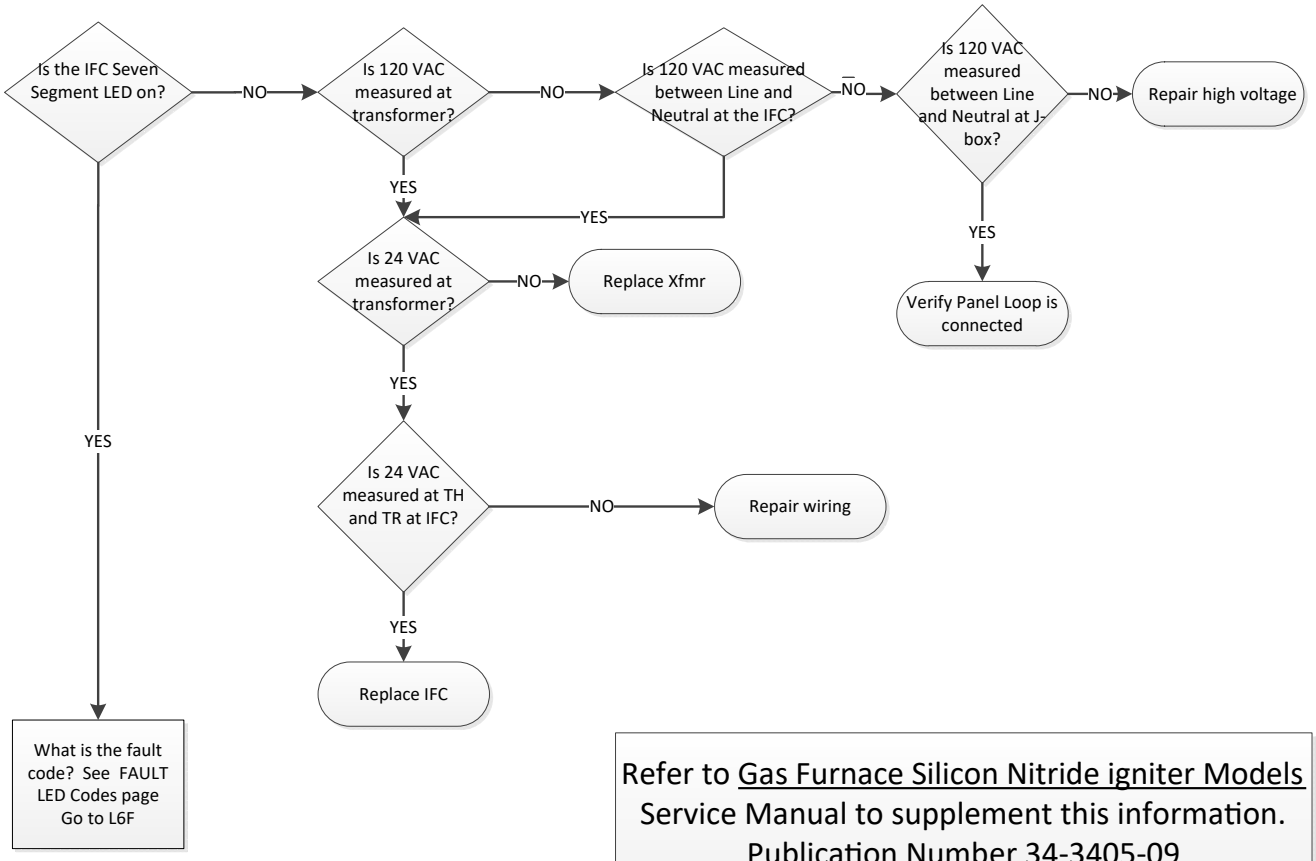
Failure to follow all cautions and /or warnings could result in personal or property damage, including death.

Figure 85. Troubleshooting flowchart index

IFC Component Layout
Status Codes
Menu Options

Error Codes
E01 – Internal failure
E2.1 – Retries Exceeded (flame never sensed)
E2.2 – Recycles Exceeded (loss of flame after being sensed)
E2.3 – 1st Stage Gas Valve energized when it should not be (10 times)
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 Thermal Limit
E05 – Flame Detected , should not be present
E6.1 – Reversed Polarity (High Voltage)
E6.2 – Faulty Ground
E6.3 – Igniter Circuit
E07 – 1st Stage Gas Valve (MVL) energized when it should not be
E08 – Flame Current Low, operation allowed
E11 – See troubleshooting Instructions
E12 – Open fuse

GETTING STARTED



Refer to Gas Furnace Silicon Nitride igniter Models Service Manual to supplement this information. Publication Number 34-3405-09

DEFINITION :

Internal Failure of the Control Board

E01 Fault Code

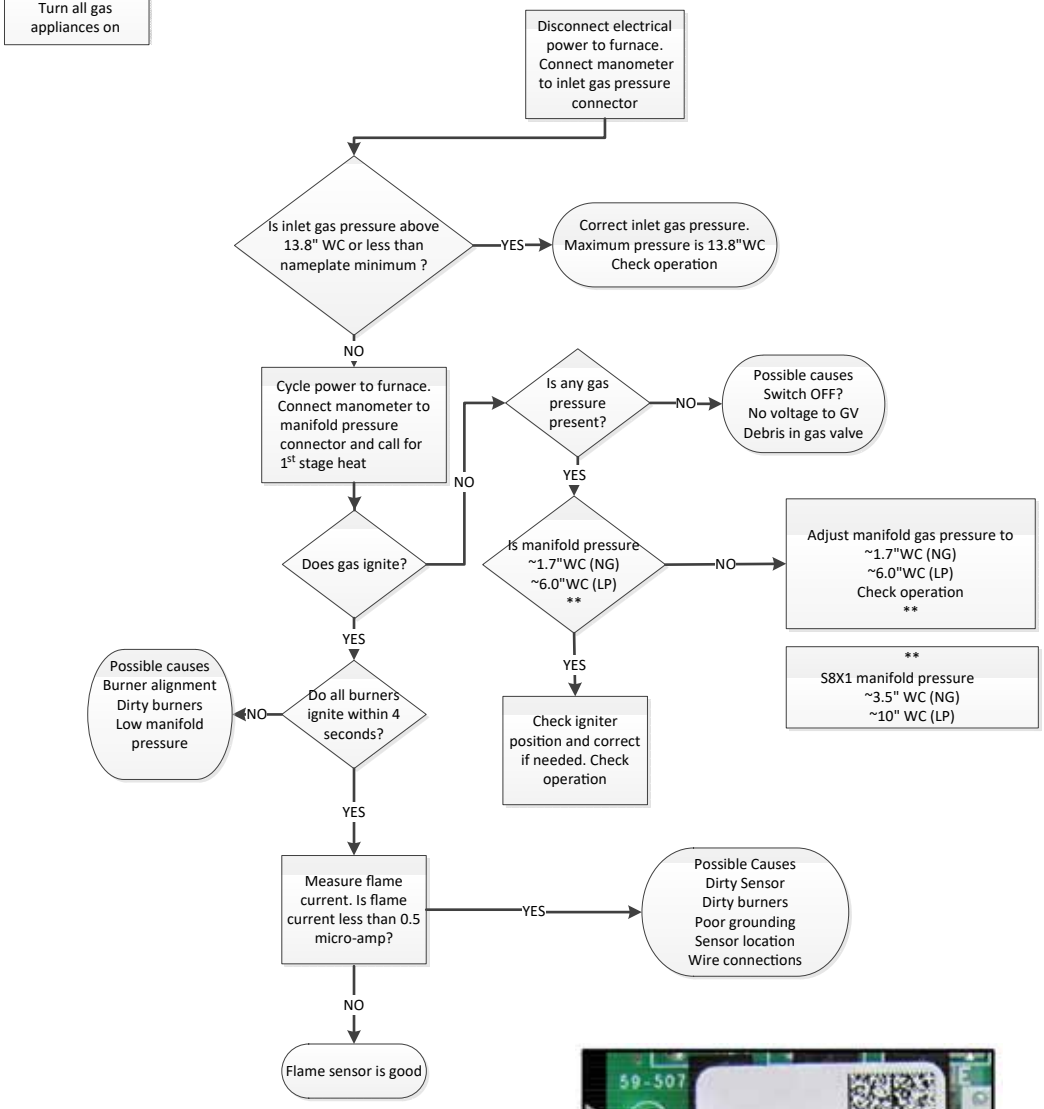
Replace IFC

DEFINITION

RETRY Lock Out = 3 unsuccessful tries for ignition within a single call for heat. Lockout period is for one hour

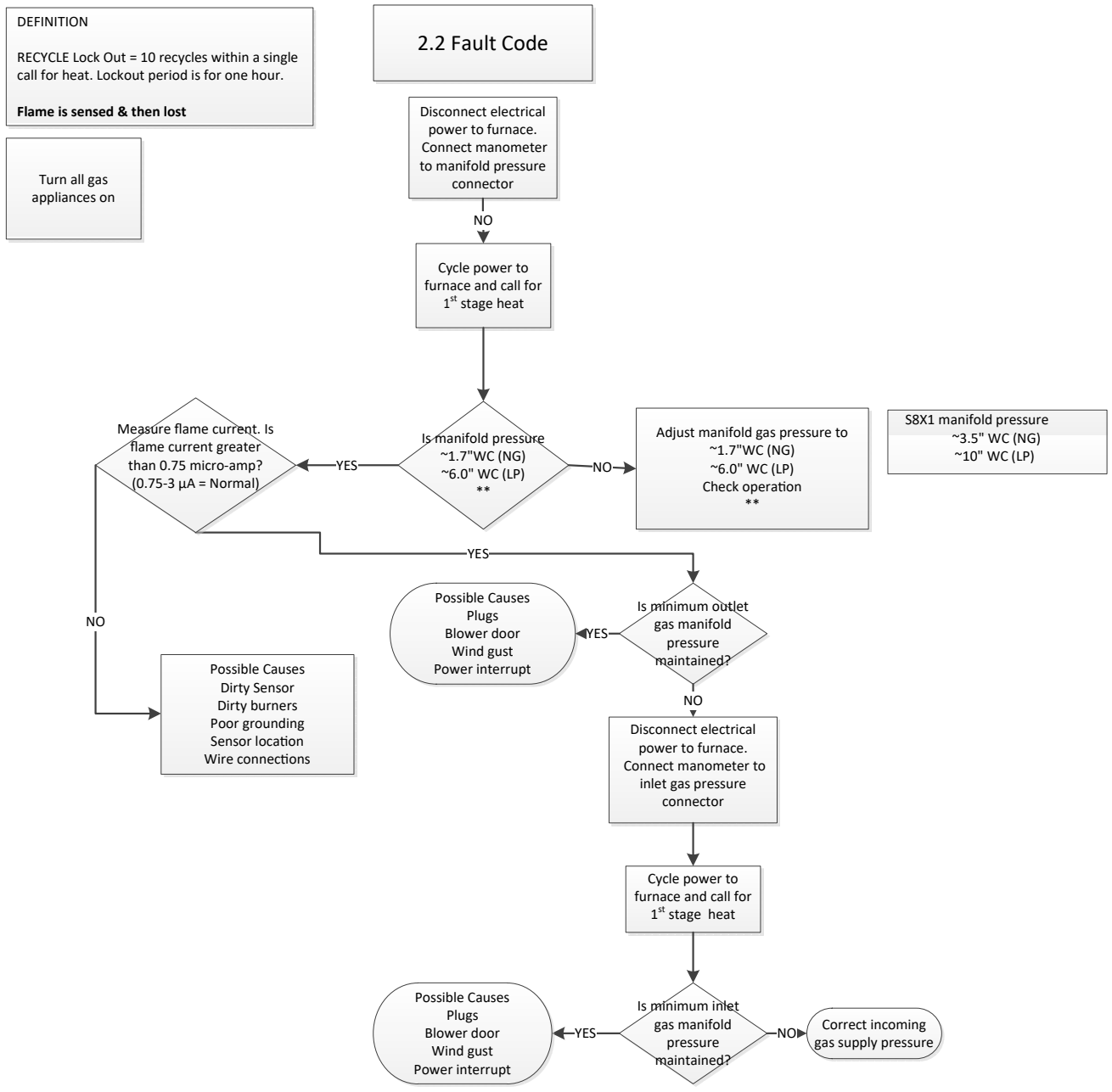
Flame has never been sensed

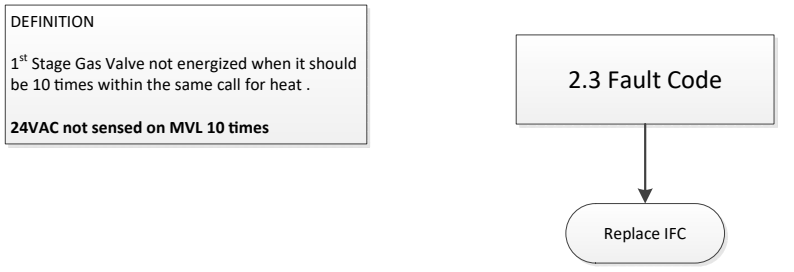
2.1 Fault Code



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




DEFINITION
RECYCLE Lock Out = 10 recycles within a single call for heat. Lockout period is for one hour.
Flame is sensed & then lost
Turn all gas appliances on
2.2 Fault Code
Disconnect electrical power to furnace. Connect manometer to manifold pressure connector
NO
Cycle power to furnace and call for 1st stage heat
Is manifold pressure ~1.7"WC (NG) ~6.0" WC (LP) **
YES
NO
Adjust manifold gas pressure to ~1.7"WC (NG) ~6.0" WC (LP) Check operation **
S8X1 manifold pressure ~3.5" WC (NG) ~10" WC (LP)
Measure flame current. Is flame current greater than 0.75 micro-amp? (0.75-3 µA = Normal)
YES
NO
Possible Causes Dirty Sensor Dirty burners Poor grounding Sensor location Wire connections
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 inlet gas manifold pressure maintained?
YES
Possible Causes Plugs Blower door Wind gust Power interrupt
NO
Correct incoming gas supply pressure


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
2.3 Fault Code
Replace IFC

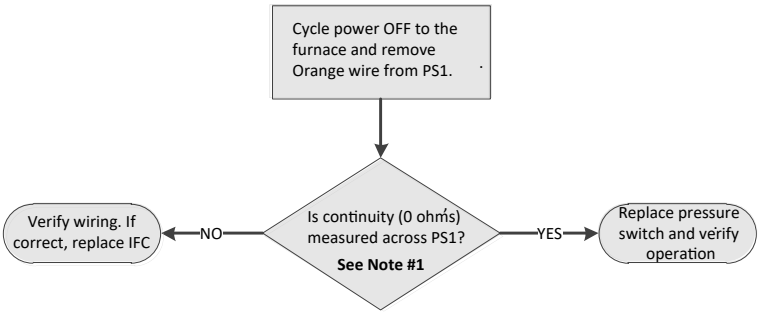
DEFINITION
An error has occurred with the PS1, indicating that the pressure switch is closed when it should be open.

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

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

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

3.1 Fault Code



DEFINITION
An error has occurred with the PS1 indicating that the pressure switch is either 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.

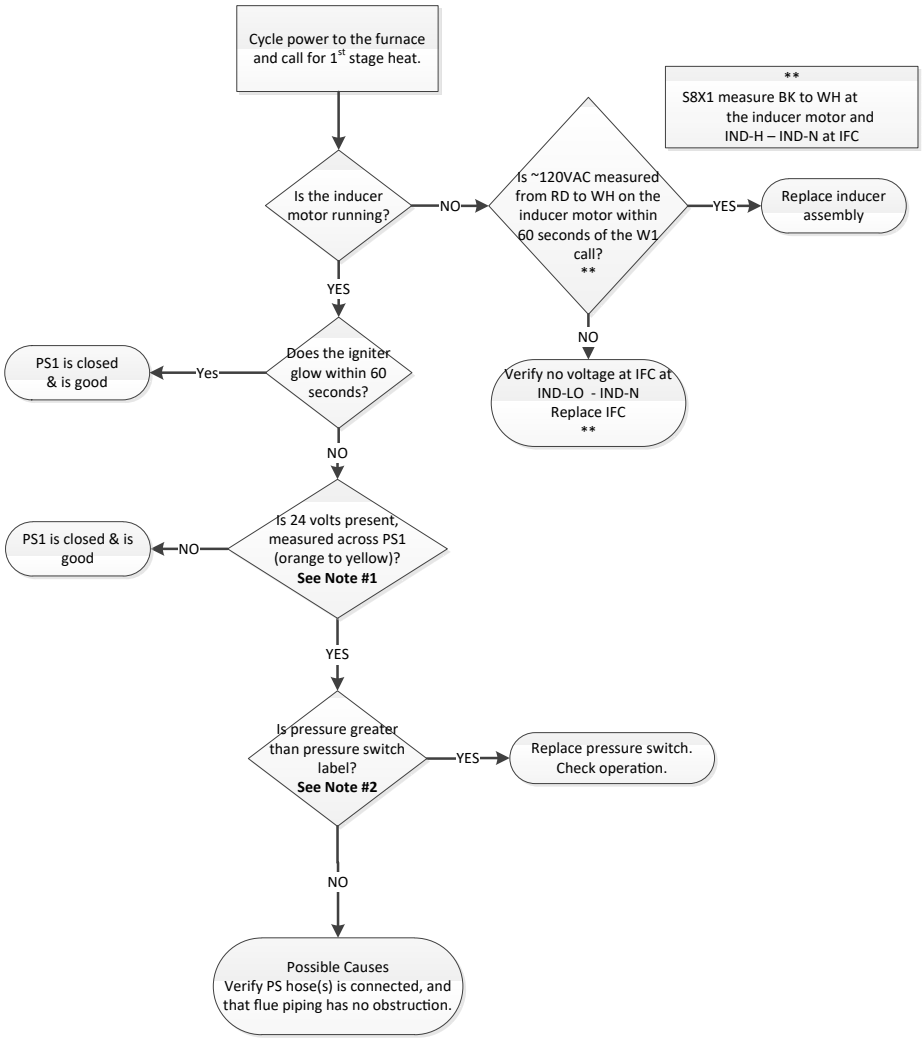
PS1 Open errors can occasionally happen when wind gusts occur.

S8X2 Only
The IFC will attempt to close both PS1 and PS2 and operate on 2nd stage during such an event.

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.



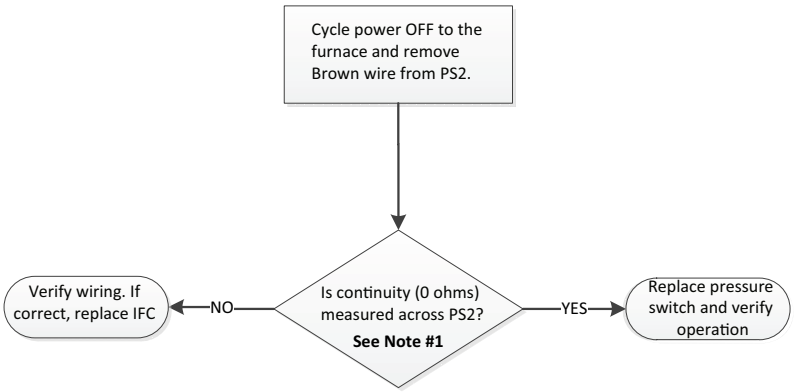
DEFINITION
An error has occurred with the PS2, indicating that the pressure switch is closed when it should be open.

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

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

3.3 Fault Code

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



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

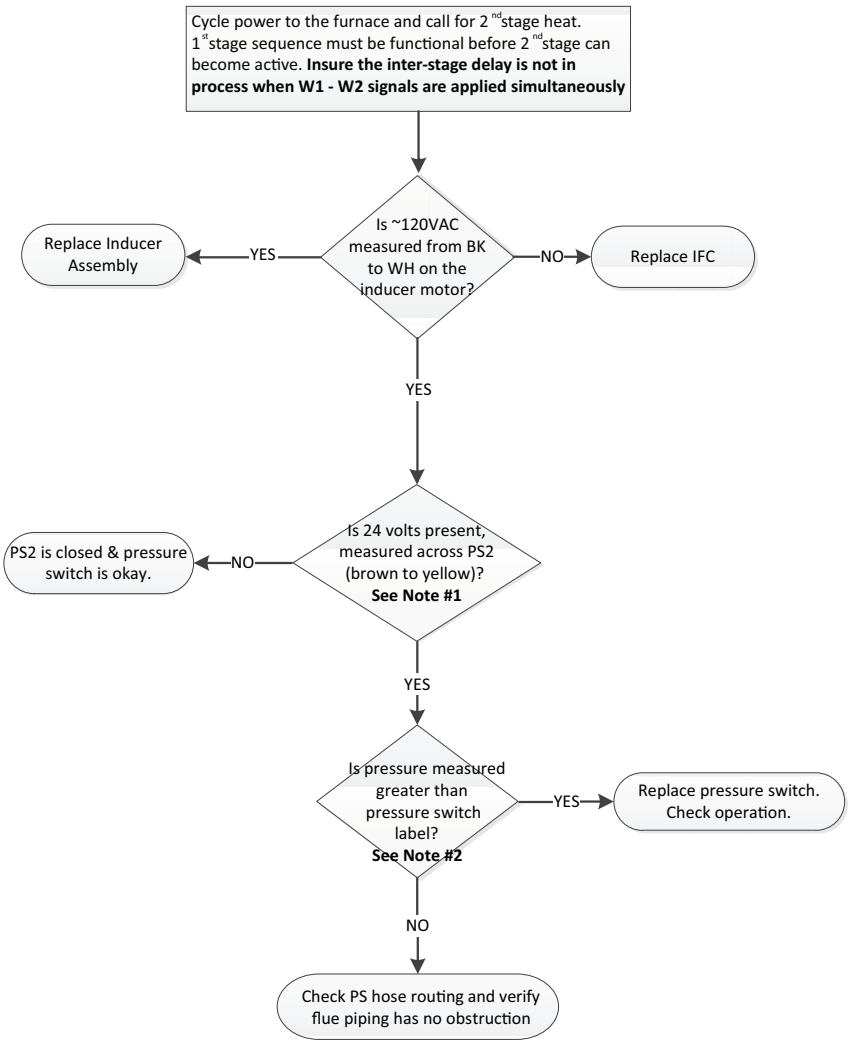
In most cases, the pressure switch is not the problem.

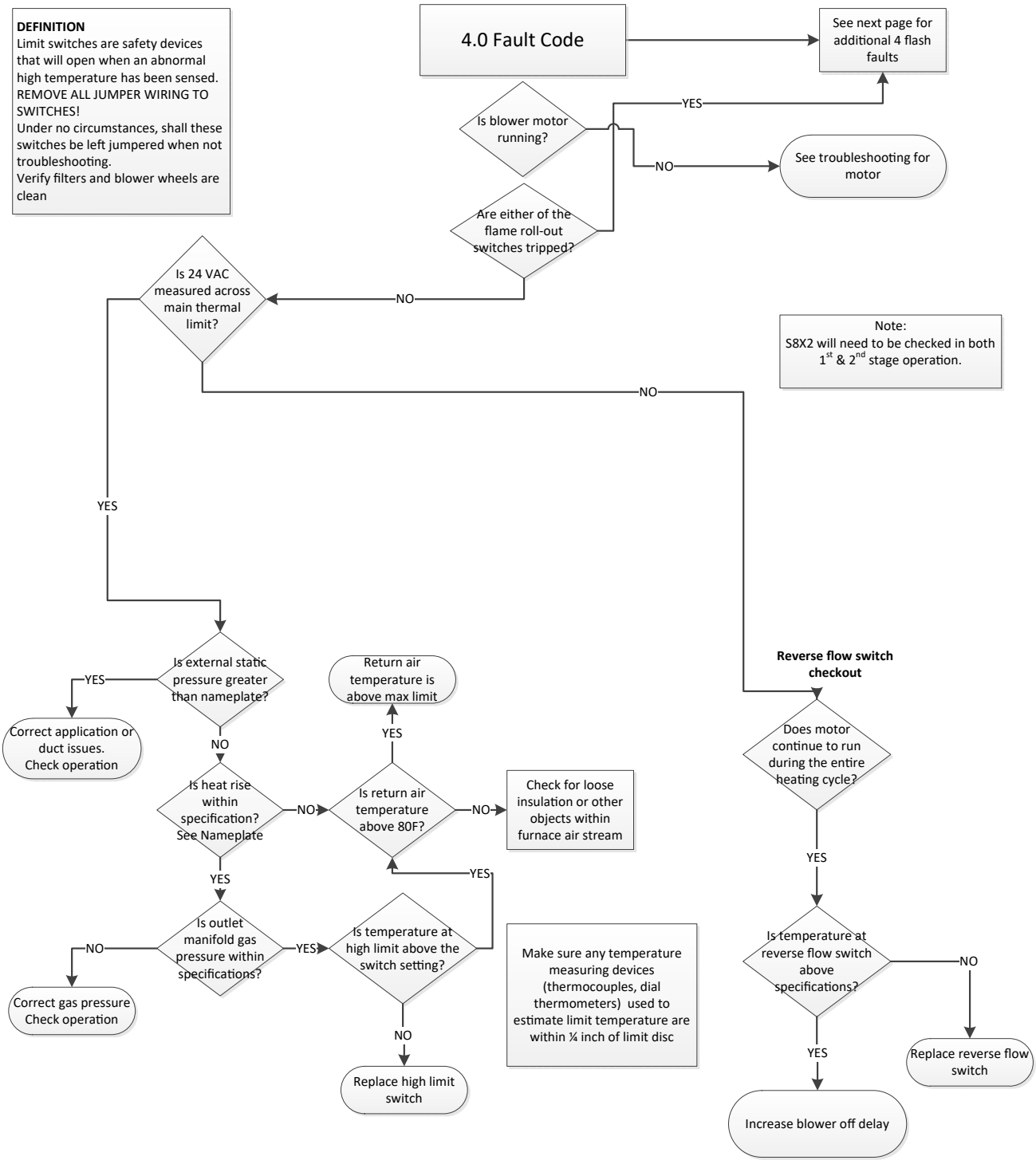
NOTE: Verify pressure switch wiring and tube routing are correct.

3.4 Fault Code

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

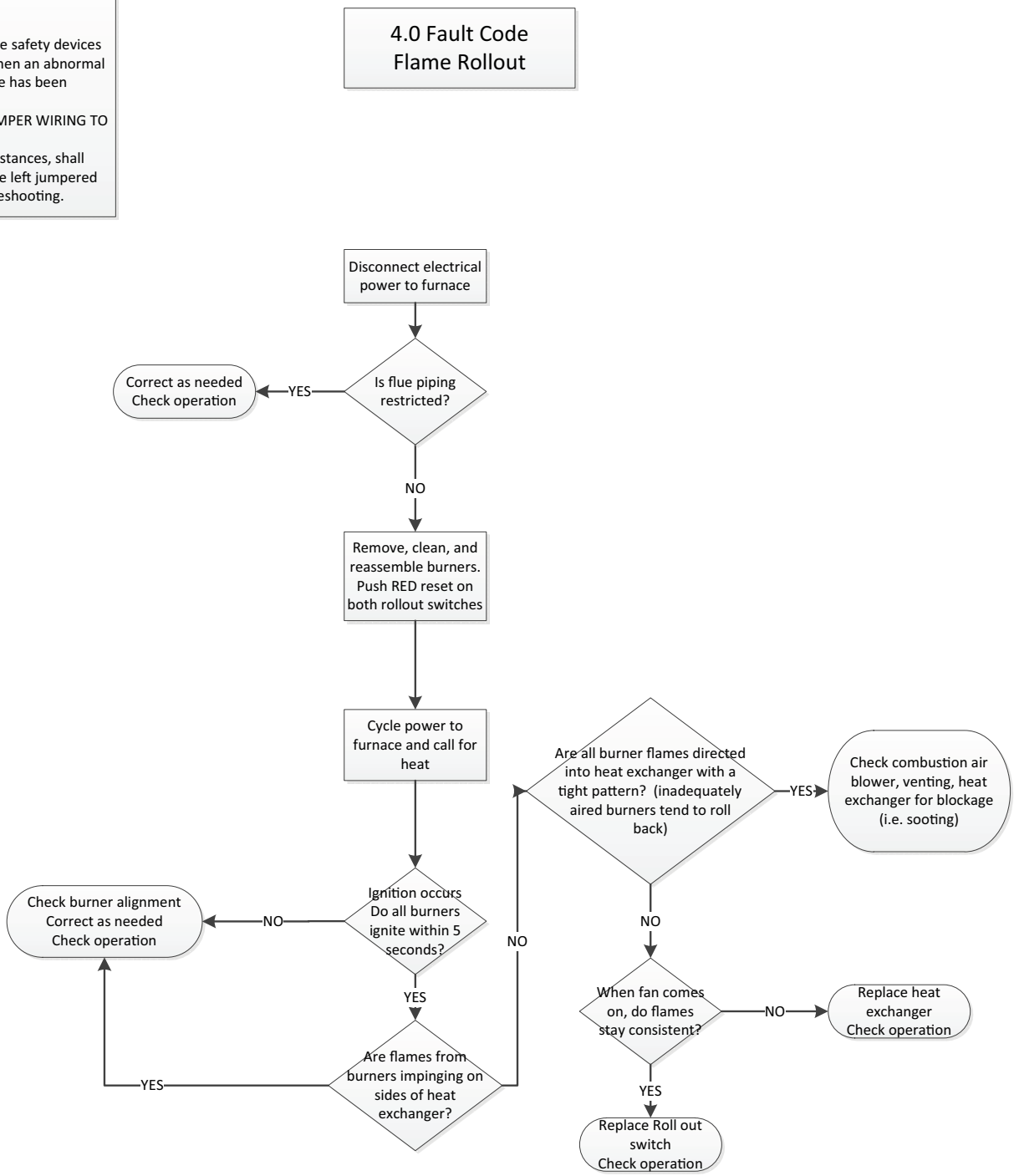
Note #2
Measured pressure is negative, greater than refers to magnitude only.




DEFINITION
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
4.0 Fault Code
See next page for additional 4 flash faults
Is blower motor running?
YES
NO
See troubleshooting for motor
Are either of the flame roll-out switches tripped?
Is 24 VAC measured across main thermal limit?
NO
Note:
S8X2 will need to be checked in both 1st & 2nd stage operation.
NO
YES
Is external static pressure greater than nameplate?
YES
Correct application or duct issues. Check operation
NO
Is heat rise within specification? See Nameplate
NO
Is return air temperature above 80F?
NO
Check for loose insulation or other objects within furnace air stream
YES
Return air temperature is above max limit
YES
YES
Is outlet manifold gas pressure within specifications?
NO
Correct gas pressure Check operation
YES
Is temperature at high limit above the switch setting?
NO
Replace high limit switch
Make sure any temperature measuring devices (thermocouples, dial thermometers) used to estimate limit temperature are within ¼ inch of limit disc
Reverse flow switch checkout
Does motor continue to run during the entire heating cycle?
YES
Is temperature at reverse flow switch above specifications?
NO
Replace reverse flow switch
YES
Increase blower off delay

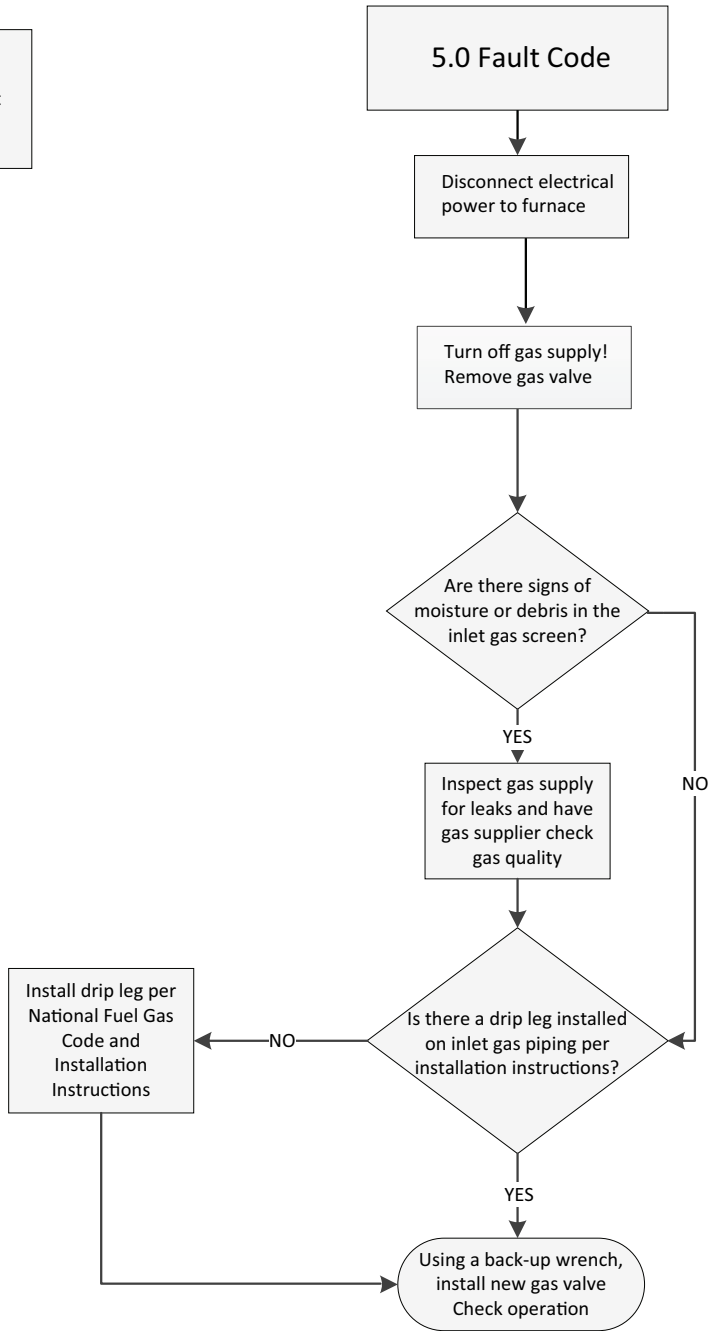
DEFINITION:

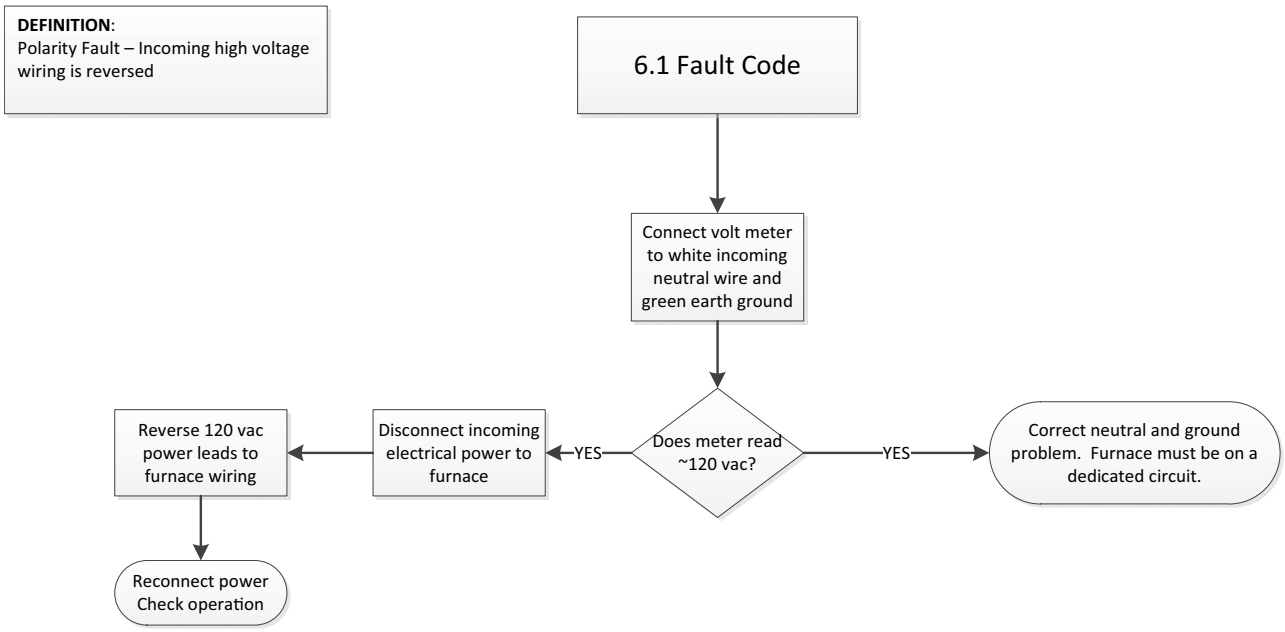
Limit switches are safety devices that will open when an abnormal high temperature has been sensed.
REMOVE ALL JUMPER WIRING TO SWITCHES!
Under no circumstances, shall these switches be left jumpered when not troubleshooting.

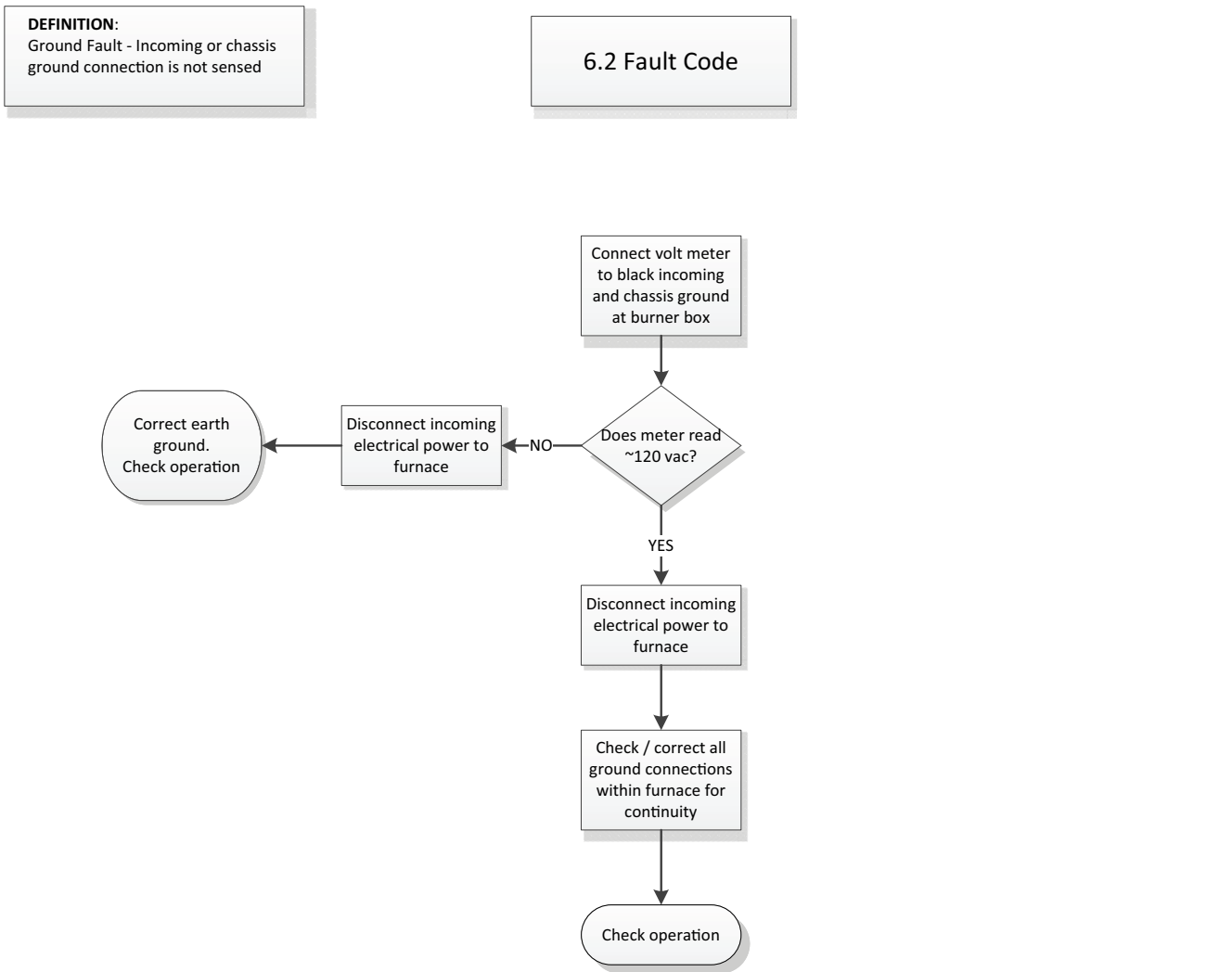


DEFINITION:

Flame is sensed when it should not be sensed.



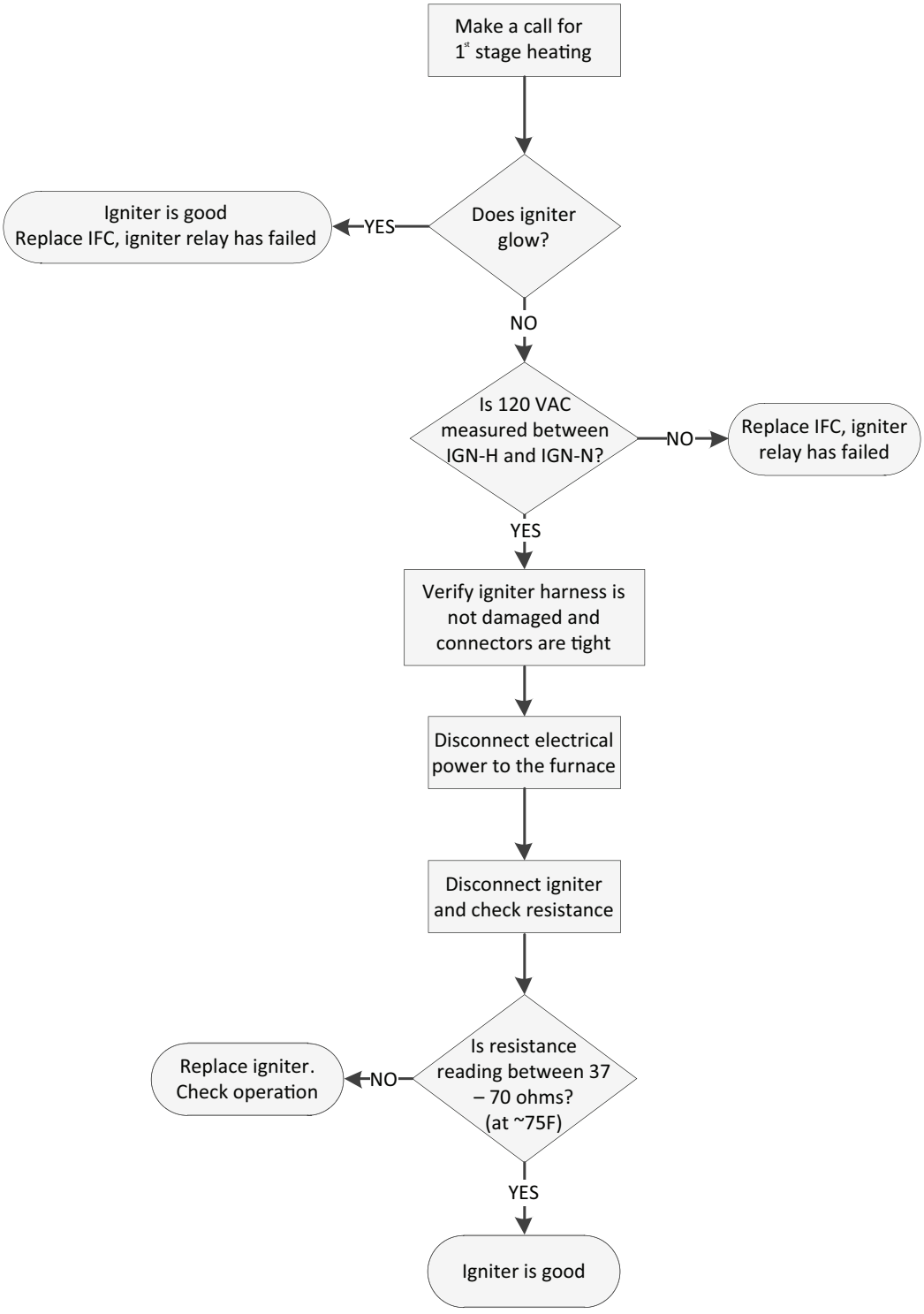

DEFINITION:
Polarity Fault – Incoming high voltage wiring is reversed
6.1 Fault Code
Connect volt meter to white incoming neutral wire and green earth ground
Does meter read ~120 vac?
YES
Correct neutral and ground problem. Furnace must be on a dedicated circuit.
YES
Disconnect incoming electrical power to furnace
Reverse 120 vac power leads to furnace wiring
Reconnect power Check operation


DEFINITION:
Ground Fault - Incoming or chassis ground connection is not sensed
6.2 Fault Code
Connect volt meter to black incoming and chassis ground at burner box
Does meter read ~120 vac?
NO
Disconnect incoming electrical power to furnace
Correct earth ground. Check operation
YES
Disconnect incoming electrical power to furnace
Check / correct all ground connections within furnace for continuity
Check operation

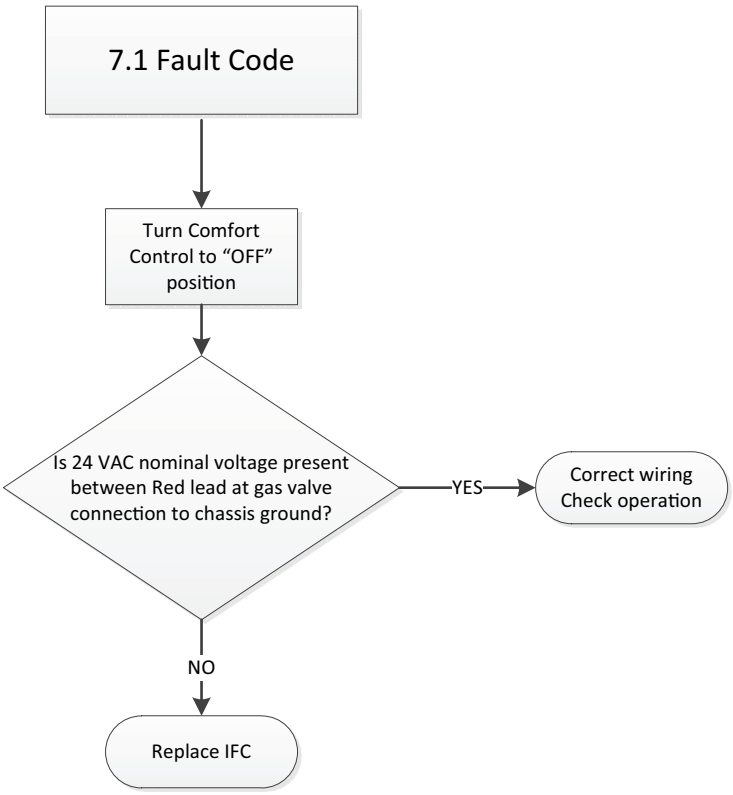
DEFINITION:
Igniter Relay Fault – The control board has sensed that the igniter relay has stuck closed

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

6.3 Fault Code

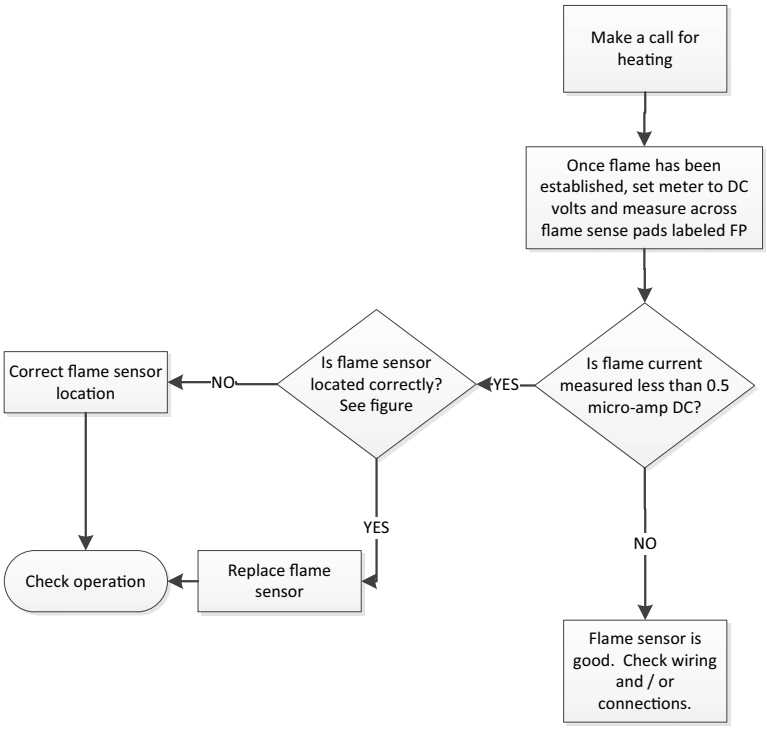


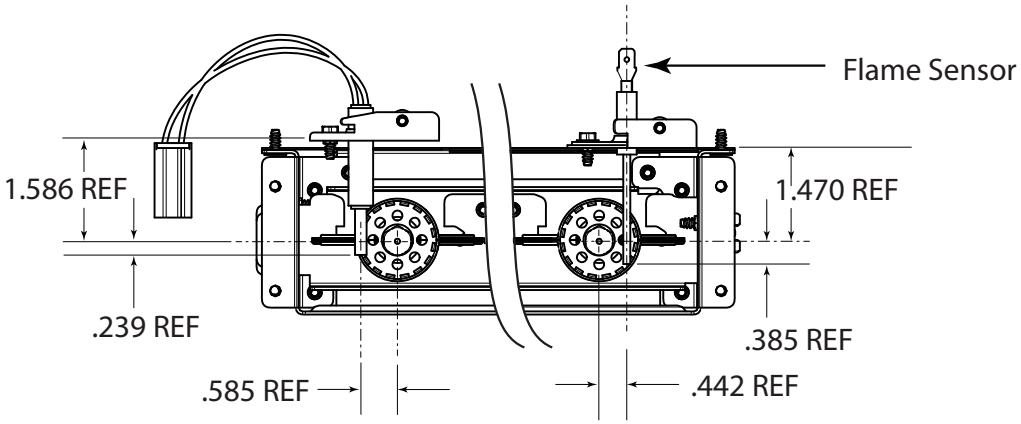
DEFINITION: External Gas Valve Circuit Error (24 volts is present when it should not be present)



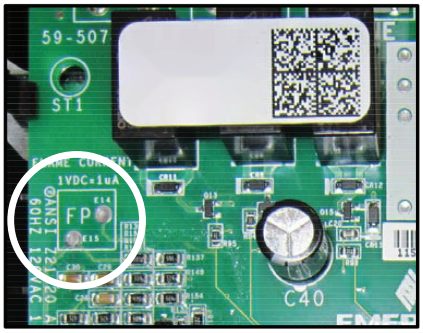
DEFINITION:
The flame sense current is less than 0.5 micro-amp DC

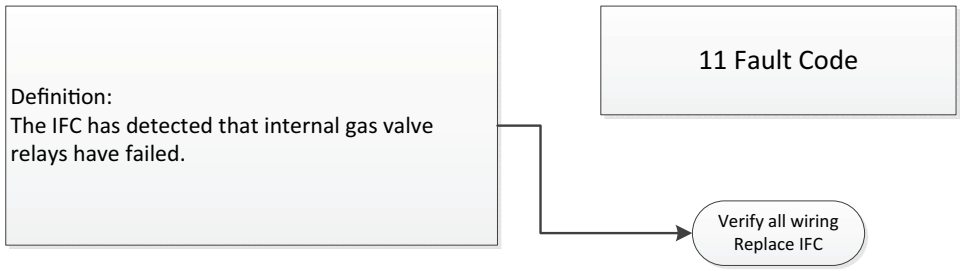
08 Fault Code

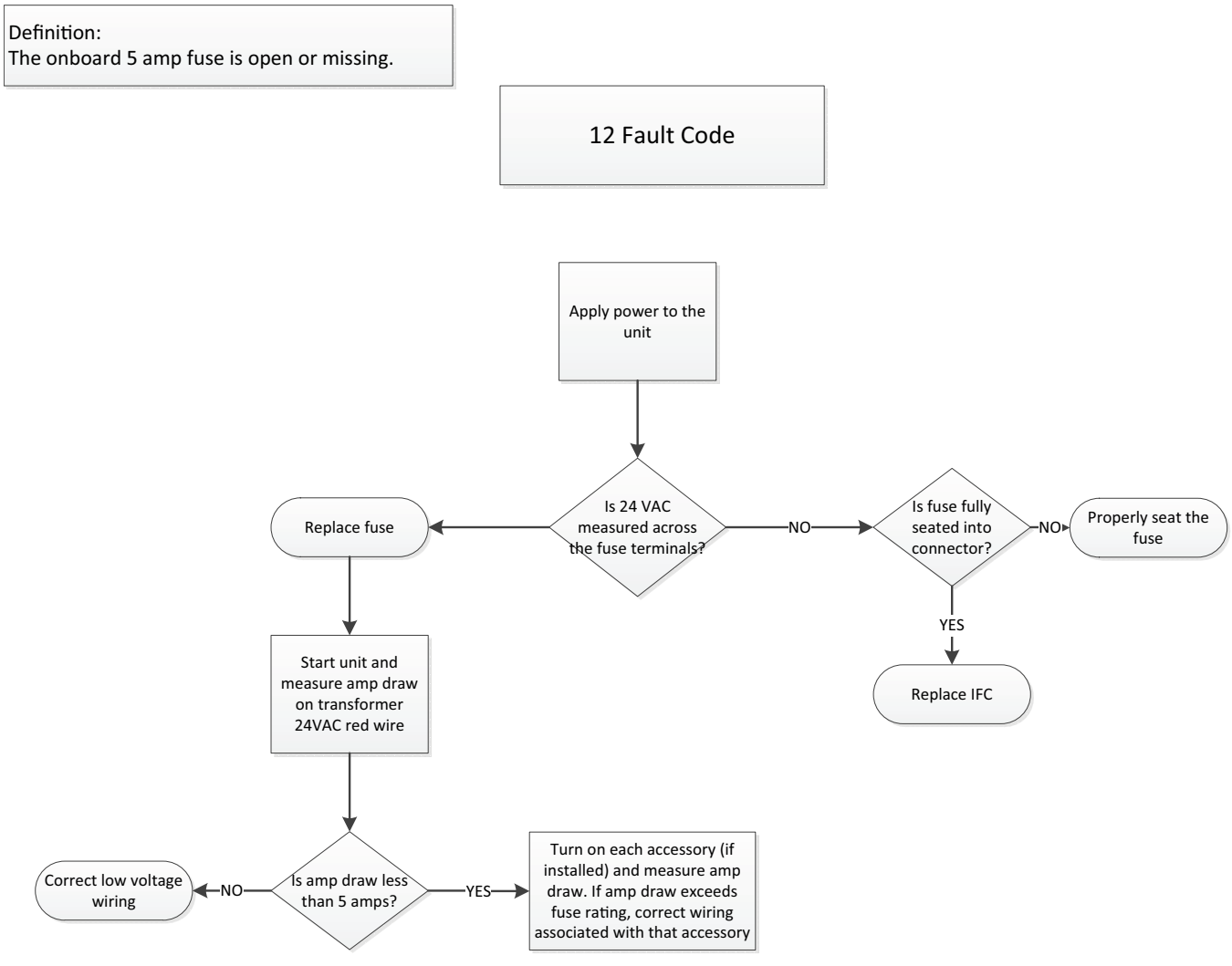




There are two flame sense pads located on the IFC, marked “FP”. To measure flame current, use a VOM set to DC volts. Flame current will vary depending on the type of meter used. Typical flame current ranges from 0.75 – 3.0 micro-amps (0.75 – 3.0 VDC)




Definition:
The IFC has detected that internal gas valve relays have failed.
11 Fault Code
Verify all wiring
Replace IFC


Definition:
The onboard 5 amp fuse is open or missing.
12 Fault Code
Apply power to the unit
Is 24 VAC measured across the fuse terminals?
NO
Is fuse fully seated into connector?
NO
Properly seat the fuse
YES
Replace IFC
Replace fuse
Start unit and measure amp draw on transformer 24VAC red wire
Is amp draw less than 5 amps?
NO
Correct low voltage wiring
YES
Turn on each accessory (if installed) and measure amp draw. If amp draw exceeds fuse rating, correct wiring associated with that accessory

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

Constant Torque Motor Troubleshooting

Ensure power is applied to the unit and Seven Segment LED's are ON with no active error codes

Turn fan to ON at thermostat and verify that COF and TP1 alternately appear on the seven segment display

Does motor run?

YES → Motor & IFC are good

NO → Verify voltage(s) listed

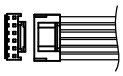
If voltage is not present, remove 6 pin connector from IFC and re-check. If voltage is present, verify voltage at panel connectors and at motor. If voltage is present at the motor, replace motor

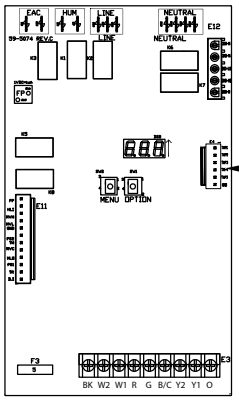
1. Remove the 6-pin low voltage connector from the IFC
2. Apply 24 VAC to Common tap (Blue) and any speed tap on the CTM motor 6-pin plug. The motor should run.

6 Pin CTM Connector

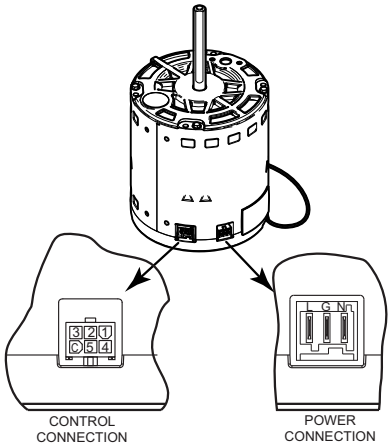


6-Pin low volltage CTM motor connector plug





6 Pin CTM Motor Connector
Tap 1 - Low Speed
Tap 2
Tap 3
Tap 4
Tap 5 - High Speed
Common



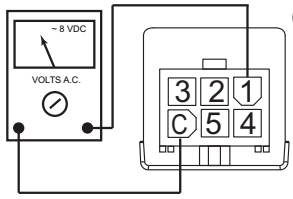
9 Tap CTM Voltages

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

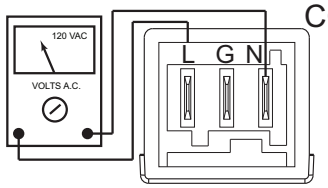
Tap 1	~ 8vdc	
Tap 2	~ 8vdc	
Tap 3	~ 18vdc	
Tap 4	~ 8vdc	
Tap 5	~ 18vdc	
Tap 6 (1+2)	~ 8vdc	~ 8vdc
Tap 7 (1+3)	~ 8vdc	~ 18vdc
Tap 8 (1+4)	~ 8vdc	~ 8vdc
Tap 9 (1+5)	~ 8vdc	~ 18vdc

All Voltages Reference Ground

CONTROL CONNECTION



POWER CONNECTION



Sequence of Operation S8X1/S8X2

Note: *The seven-segment LED readout is based on thermostat input. For the S8X2, during simultaneous call for W1 and W2, the seven-segment LED will read "Ht2", although the IFC will process the call for 1st stage heat first.*

EAC and HUM Timing

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

1st Stage Gas Heating

1. R – W1 contacts close on the thermostat sending 24 Vac to the W1 low voltage terminal of the IFC. Technician should read 24 Vac from W1 to B/C. The seven segment LED will read: .
   - Ht = S8X1
   - Ht 1 = S8X2
2. The IFC performs a self-check routine and then confirms:
   a. Flame roll-out switches (FRS) 1 and 2, main thermal limit (TCO), and any reverse air flow (RAF) switches are closed by sending 24 Vac out the HLO terminal and monitoring the HLI input.
   b. Pressure switch 1 (PS1) and pressure switch 2 (PS2–S8X2 only) are opened by sending 24 Vac out the HLO terminal, through the limit switches, and monitoring the PS1 (3) and PS2 (7) inputs.

   Note: *If a thermal limit is open, 24 Vac will not be present at either pressure switch.*
3. After Step a. and Step b. are confirmed, the inducer relay is closed, energizing the inducer motor.
4. As the inducer ramps up, PS1 will close.

Note: *S8X2 units will start the inducer motor on high speed for approximately 6 seconds, then switch to low speed. If PS1 does not close within 60 seconds, the control will report a E3. 1 error and increase the inducer to high speed in an attempt to close PS1.*

5. When PS1 closes, the igniter relay on the IFC will close. The igniter is energized. The igniter warm up is approximately 17 seconds.
6. After the igniter warm up, the 1 st stage gas valve relay is closed, which energizes the 1st stage gas valve solenoid to allow ignition.
7. The first burner will ignite, and flame will crossover to the remaining burners establishing current to the flame sensor. Flame sensing must be established within 4 seconds.

Note: *There are two flame sense pads located on the IFC marked as "FP". To measure the flame current, use a VOM set to DC volts. 1 Vdc = 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).*

8. Once the flame sense has been established, a timer on the IFC starts and the indoor blower will energize at 1st stage speed after the blower "Heat On Delay" has completed. The seven-segment LED for example will alternately read:
   - Ht = Gas heating = S8X1
   - Ht 1= Gas heating, stage 1 = S8X2
   - tP3= Tap 3
9. When the temperature raises enough to satisfy the thermostat setting, contacts R-W1 will open.
10. The gas valve relay will open, closing the gas valve. The inducer will continue to run for approximately 5 seconds to remove any combustion by products from inside the furnace.
11. The indoor blower continues to run to remove heat from the heat exchangers. The "blower off" time is field adjustable through the IFC menu setup option. The seven-segment LED will read "1 dL" = Idle, no thermostat demand.

2nd Stage Gas Heating (S8X2 Only)

1. See sequence of operation for 1st stage gas heating operation above (Step 1. to Step 7.).

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

2. R-W2 contacts close on the thermostat sending 24 Vac from to the W2 low voltage terminal of the IFC. Technician should read 24 Vac from W2 to B/C. The seven-segment LED will read Ht2.
3. The IFC checks to ensure that PS2 is open, and then energizes the 2nd stage inducer relay. The inducer is energized on high speed, and the second stage gas valve relay on the IFC closes, energizing second stage gas valve. The indoor blower motor will ramp up to the 2nd stage gas heating speed. The seven-segment LED for example will alternately read:
   - Ht2 = Gas heating = stage 2
   - tP5= Tap 5
4. The IFC monitors PS2 for closure and if PS2 does not close within 45 seconds, a PS2 open error will be declared and the furnace will operate in 1st stage. If PS2 closes, 2nd stage gas heating will continue until the thermostat R-W2 contacts open.

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

5. When the temperature raises enough to satisfy the thermostat setting, contacts R-W2 will open, the 2nd stage gas valve will close, the indoor blower motor will ramp down to 1st stage, and the unit will continue to run until R-W1 contacts open.
6. When the temperature raises enough to satisfy the thermostat setting, contacts R-W1 will open.
7. The gas valve relay will open, closing the gas valve. The inducer will continue to run for approximately 5 seconds to remove any combustion by products from inside the furnace.
8. The indoor blower continues to run to remove heat from the heat exchangers. This blower off time is field adjustable through the IFC menu setup option. The seven-segment LED will read IdL = Idle, no thermostat demand.

Single Stage Cooling

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

   Note: *For S8X2 units, the factory supplied Y1-O jumper must remain in place for proper seven-segment LED readout, and furnace operation. If removed, the seven-segment LED will read "HP I".*
2. 24 Vac is sent to the OD unit via thermostat wiring.
3. The indoor blower ramps to the cooling airflow. The seven-segment LED for example will alternately read:
   - CL I = Cooling, Stage 1 (S8X2)
   - CP I = Cooling, Stage 1 (S8X1)
   - tP3 = Tap 3
4. When the temperature is lowered enough to satisfy the thermostat setting, contacts R-Y-G will open.
5. The OD unit shuts off and the indoor blower shuts off, unless a blower "Cool Off Delay" has been enabled in the IFC setup menu options. The seven-segment LED will read "I dL" = Idle, no thermostat demand.

Two Stage Cooling

1. See sequence of operation for Single stage cooling operation above (Step 1. to Step 3.).
2. R-Y2 contact on the thermostat close sending 24 Vac to Y2 low voltage terminal on the IFC. Technician should read 24 Vac between Y2 and B/C.
3. 24 Vac is sent to the OD unit via thermostat wiring.
4. The indoor airflow ramps to 2nd stage airflow. The seven-segment LED for example will read:
   - CL2 = Cooling, Stage 2 (S8X2)
   - CP2 = Cooling, Stage 2 (S8X1)
   - tP7 = Tap 7
5. When the temperature is lowered enough to satisfy the thermostat setting, contacts R-Y1-Y2-G will open.
6. The OD unit shuts off and the indoor blower shuts off, unless a blower "Cool Off Delay" has been enabled in the IFC setup menu options. The seven-segment LED will read IdL = Idle, no thermostat demand.

Single Stage Heat Pump

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

   Note: *For S8X2 units, the factory supplied Y1-O jumper must be removed for proper seven-segment LED readout and furnace operation during defrost. If left in place, the seven-segment LED will read CL I*
2. 24 Vac is sent to the OD unit via thermostat wiring.
3. The indoor blower ramps to the cooling airflow. The seven-segment LED for example will alternately read:
   - HP I = Cooling, Stage 1 (S8X2)
   - CP I = Cooling, Stage 1 (S8X1)
   - tP3 = Tap 3
4. When the temperature is lowered enough to satisfy the thermostat setting, contacts R-Y-G will open.
5. The OD unit shuts off and the indoor blower shuts off, unless a "Cool Off Delay" has been enabled in the IFC setup menu options. The seven-segment LED will read IdL = Idle, no thermostat demand.

Two Stage Heat Pump

1. See sequence of operation for single stage cooling operations above (Step 1. to Step 3.).
2. R-Y2 contact on the thermostat close sending 24 Vac to Y2 low voltage terminal on the IFC. Technician should read 24 Vac between Y2 and B/C.
3. 24 Vac is sent to the OD unit via thermostat wiring.
4. The indoor airflow ramps to 2nd stage airflow. The seven-segment LED for example will read:
   - HP2 = Cooling, Stage 2 (S8X2)
   - CP2 = Cooling, Stage 2 (S8X1)
   - tP7 = Tap 7
5. When the temperature is raised enough to satisfy the thermostat setting, contacts R-Y1-Y2-G will open.
6. The OD unit shuts off and the indoor blower shuts off, unless a "Blower Off Delay" has been enabled in the IFC setup menu options. The seven-segment LED will read IdL = 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 mid summer or mid winter.
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 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.

Notes:

- *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.
- *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:
   a. Turn off gas and electric power supply.
   b. Inspect flue pipe exterior for cracks, leaks, holes or leaky joints. Some discoloration of PVC pipe is normal.
   c. Remove door from Furnace.
   d. Inspect around insulation covering flue collector box. Inspect induced draft Blower connections from recuperative cell and to the flue pipe connection.
   e. Remove burners. (See Step 5.)
   f. Use a mirror and flashlight to inspect interior of Heat Exchanger, be careful not to damage the Igniter, Flame Sensor or other components.
   g. If any corrosion is present, the Heat Exchanger should be cleaned by a qualified service technician.
   h. After inspection is complete replace burners and Furnace door.
   i. Restore gas supply. Check for leaks using a soap solution. Restore electrical supply. Check unit for normal operation.
7. Cooling Coil Condensate Drain - If a cooling coil is installed with the Furnace, condensate drains should be checked and cleaned periodically to assure that condensate can drain freely from coil to drain. If condensate cannot drain freely water damage could occur.

About Trane and American Standard Heating and Air Conditioning

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

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

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