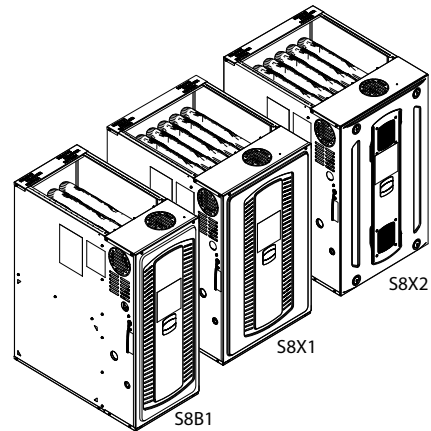


# Service Facts

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

### Upflow, Downflow, Horizontal Right/Left

Single Stage		Two Stage
S8B1A026M2PSC	S8X1A026M2PSC	S8X2A040M3PSC
S8B1A040M3PSC	S8X1A040M3PSC	S8X2B060M4PSC
S8B1B040M2PSC	S8X1B040M2PSC	S8X2B080M4PSC
S8B1B060M4PSC	S8X1B060M4PSC	S8X2C080M5PSC
S8B1B080M4PSC	S8X1B080M4PSC	S8X2C100M5PSC
S8B1C080M5PSC	S8X1C080M5PSC	S8X2D120M5PSC
S8B1C100M5PSC	S8X1C100M5PSC	
S8B1D120M5PSC	S8X1D120M5PSC	



*Note: Models may have a "T" in the 12th digit designating they meet California less than 40 ng/J (NOx) emissions requirements.*

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



S8XB-SF-2E-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.

# SAFETY SECTION NON-CONDENSING FURNACES

**Important:** — This document pack contains a wiring diagram and service information. This is customer property and is to remain with this unit. Please return to service information pack upon completion of work.

## ⚠ 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 this Warning could result in property damage, personal injury or death. Install a gas detecting warning device in case of a gas leak. **NOTE: The manufacturer of your furnace does not test any detectors and makes no representations regarding any brand or type of detector.**

## ⚠ WARNING

### FIRE OR EXPLOSION HAZARD!

Failure to follow the safety warnings exactly could result in serious injury, death, 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 may result causing property damage, personal injury, or loss of life.

## ⚠ WARNING

### ELECTRICAL SHOCK, FIRE, OR EXPLOSION HAZARD!

Failure to follow this Warning could result in dangerous operation, property damage, severe personal injury, or death.

Improper servicing could result in dangerous operation, property damage, severe personal injury, or death.

- Before servicing, disconnect all electrical power to furnace.
- When servicing controls, label all wires prior to disconnection. Reconnect wires correctly.
- Verify proper operation after servicing.

## ⚠ WARNING

### CARBON MONOXIDE POISONING HAZARD!

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

To ensure 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.

## ⚠ WARNING

### CARBON MONOXIDE HAZARD!

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

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

## ⚠ WARNING

### FIRE HAZARD!

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

Do not install the furnace directly on carpeting, tile or other combustible material other than wood flooring. For vertical downflow applications, subbase (BAYBASE205) must be used between the furnace and combustible flooring. When the downflow furnace is installed vertically with a cased coil, a subbase is not required.

**⚠ WARNING**

**WARNING!**

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](http://www.P65Warnings.ca.gov).

**⚠ WARNING**

**EXPLOSION HAZARD!**

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

Propane gas is heavier than air and may collect in any low areas or confined spaces. In addition, odorant fade may make the gas undetectable except with a warning device. If the gas furnace is installed in a basement, an excavated areas or a confined space, it is strongly recommended to contact a gas supplier to install a gas detecting warning device in case of leak. The manufacturer of your furnace does not test any detectors and makes no representations regarding any brand or type of detector.

**⚠ WARNING**

**ELECTRICAL SHOCK HAZARD!**

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

Do not bypass the door switch or panel loop by any permanent means.

**⚠ WARNING**

**ELECTRICAL SHOCK HAZARD!**

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

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

**⚠ WARNING**

**FIRE OR EXPLOSION HAZARD!**

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

Do **NOT** attempt to manually light the furnace.

**⚠ WARNING**

**CARBON MONOXIDE POISONING HAZARD!**

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

Follow the service and/or periodic maintenance instructions for the Furnace and venting system.

**⚠ WARNING**

**CARBON MONOXIDE POISONING HAZARD!**

Failure to follow this Warning could result in serious personal injury or death.

Make sure that the blower door is in place and not ajar. Dangerous fumes could escape an improperly secured door.

**⚠ WARNING**

**ELECTRICAL SHOCK HAZARD!**

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

Disconnect power to the unit before removing the blower door. Allow a minimum of 10 seconds for IFC power supply to discharge to 0 volts.

**⚠ WARNING**

**SAFETY HAZARD!**

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

These furnaces are not approved or intended for installation in manufactured (mobile) housing, trailers, or recreational vehicles.

**⚠ WARNING**

**EXPLOSION HAZARD!**

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

In the event that electrical, fuel, or mechanical failures occur, shut gas supply off at the manual gas valve located on the supply gas piping coming into the furnace before turning off the electrical power to the furnace. Contact the service agency designated by your dealer.

**⚠ WARNING**

**EXPLOSION HAZARD!**

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

Do not store combustible materials, gasoline, or other flammable vapors or liquids near the unit.

**⚠ WARNING**

**SAFETY HAZARD!**

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

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

**⚠ WARNING**

**INSTALLATION WARNING — HIGH VOLTAGE MOVING PARTS!**

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

Bodily injury can result from high voltage electrical components, fast moving fans, and combustible gas. For protection from these inherent hazards during installation and servicing, the main gas valve must be turned off and the electrical supply must be disconnected. If operating checks must be performed with the unit operating, it is the technician's responsibility to recognize these hazards and proceed safely.

**⚠ WARNING**

**SAFETY HAZARD!**

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

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 this Warning could result in property damage, severe personal injury, or death.

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

**⚠ WARNING**

**CARBON MONOXIDE HAZARD!**

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

Furnace venting into an unlined masonry chimney or concrete chimney is prohibited.

**⚠ WARNING**

**CARBON MONOXIDE HAZARD!**

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

The chimney liner must be thoroughly inspected to insure no cracks or other potential areas for flue gas leaks are present in the liner. Liner leaks will result in early deterioration of the chimney.

**⚠ WARNING**

**SHOCK HAZARD!**

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

If a disconnect switch is present, it must always be locked 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 overheating occur, or the gas supply fail to shut off, shut off the gas valve to the unit before shutting off the electrical supply.

**⚠ CAUTION**

**IMPROPER VOLTAGE CONNECTION!**

Failure to follow this Caution could result in property damage.

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

**⚠ CAUTION**

**CORROSION WARNING!**

Failure to follow this Caution could result in property damage or personal injury.

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

**⚠ CAUTION****SHARP EDGE HAZARD!**

Failure to follow this Caution could result in property damage or personal injury. Be careful of sharp edges on equipment or any cuts made on sheet metal while installing or servicing.

**⚠ CAUTION****BACKUP WRENCH REQUIRED!**

Failure to follow this Caution could result in property damage or personal injury. Use a backup wrench on the gas valve when installing gas piping to prevent damage to the gas valve and manifold assembly.

**⚠ CAUTION****FREEZE CAUTION!**

Failure to follow this Caution could result in property damage or personal injury. If complete furnace shutdown is done during the cold weather months, provisions must be taken to prevent freeze-up of all water pipes and water receptacles.

**⚠ CAUTION****FREEZE CAUTION!**

Failure to follow this Caution could result in property damage or personal injury. 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****IGNITION FUNCTION!**

Failure to follow this Caution may result in poor ignition characteristics. Maintain manifold pressure in high altitude installations.

**⚠ CAUTION****WATER DAMAGE!**

Failure to follow this Caution could result in property damage or personal injury. It is recommended that an external overflow drain pan be installed in all applications over a finished ceiling to prevent property damage or personal injury from leaking condensate.

**⚠ CAUTION****HOT SURFACE!**

Failure to follow this Caution could result in personal injury. Do NOT touch igniter. It is extremely hot.

**⚠ CAUTION****FURNACE SERVICE CAUTION!**

Failure to follow this Caution 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 this Caution could result in property damage or personal injury. In order to prevent shortening its service life, the Furnace should NOT be used as a "Construction Heater" during the finishing phases of construction until the requirements listed in the furnace installation guidelines of the Installer's Guide have been 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 INFORMATION!**

Failure to follow this Caution could result in property damage or personal injury. The integrated furnace control is polarity sensitive. The hot leg of the 120 VAC power must be connected to the BLACK field lead.

**⚠ CAUTION**

**EQUIPMENT DAMAGE!**

UV light exposure can cause the plastic blower material to deteriorate which could lead to Blower Housing Damage.

For units containing a plastic Blower Housing, Do NOT install third party Ultra-Violet Air Cleaners where the Blower Housing can be exposed to UV light.

For more information, visit [www.trane.com](http://www.trane.com) and [www.americanstandardair.com](http://www.americanstandardair.com) or contact your installing dealer.  
6200 Troup Highway  
Tyler, TX 75707

**⚠ 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:**

- Inspect the venting system for proper size and horizontal pitch as required in the National Fuel Gas Code, ANSI Z223.1/NFPA 54 and these instructions. Determine there is no blockage or restriction, leakage, corrosion or other deficiencies which could cause an unsafe condition.
- Close all doors and windows between the space in which the appliance(s) connected to the venting system are located. Also 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 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, the venting system must be corrected in accordance with the National Fuel Gas Code, ANSI Z221.1/NFPA 54.
- After it has been determined that each appliance connected to the venting system properly vents when tested, return all doors, windows, exhaust fans, etc. to their previous condition of use.

# Product Specifications

MODEL	S8*1A026M2PSC (a)	S8*1A040M3PSC (a)	S8*1B040M2PSC (a)
<b>Type</b>	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow
<b>RATINGS (b)</b>			
Input BTUH	26,000	40,000	40,000
Capacity BTUH (ICS) (c)	21,000	32,300	32,500
Temp. Rise (Min. - Max.) °F	25 - 55	30 - 60	30 - 60
AFUE - Rating (c)	80	80	80
Return Air Temp. (Min. - Max.) °F	55°F - 80°F	55°F - 80°F	55°F - 80°F
<b>BLOWER DRIVE</b>	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	1/3	1/2	1/3
R.P.M.	1050	1050	1050
Volts / Ph / Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	4.1	6.4	4.1
<b>COMBUSTION FAN - Type</b>	SP	PSC	PSC
Drive - No. Speeds	Direct - 1	Direct - 1	Direct - 1
Motor RPM	3300	3300	3300
Volts/Ph/Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	1.39	0.30	0.30
Inducer Orifice	0.90	1.20	1.15
<b>FILTER - Furnished?</b>	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 14 X 25 - 1 in.	1 - 14 X 25 - 1 in.	1 - 16 X 25 - 1 in.
<b>VENT PIPE DIAMETER - Min. (in.) (e)</b>	4 Round	4 Round	4 Round
<b>HEAT EXCHANGER - Type</b>	Aluminized Steel	Aluminized Steel	Aluminized Steel
Gauge (Fired)	20 - 19	20 - 19	20 - 19
<b>ORIFICES - Main</b>			
Nat. Gas Qty. - Drill Size	2 - 51	2 - 45	2 - 45
L.P. Gas Qty. - Drill Size	2 - 59	2 - 56	2 - 56
<b>GAS VALVE</b>	Redundant - Single Stage	Redundant - Single Stage	Redundant - Single Stage
<b>PILOT SAFETY DEVICE - Type</b>	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter
<b>BURNERS - QTY</b>	2	2	2
<b>POWER CONN. - V/Ph/HZ (f)</b>	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
Ampacity (Amps)	6.7	8.5	5.6
Max. Overcurrent Protection (Amps)	15	15	15
<b>PIPE CONN. SIZE (IN.)</b>	1/2	1/2	1/2

(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) Refer to the Installer's Guide.

(f) The above wiring specifications are in accordance with National Electric Code, however, installations must comply with local codes.

## Product Specifications

MODEL	S8*1B060M4PSC (a)	S8*1B080M4PSC (a)	S8*1C080M5PSC (a)
<b>Type</b>	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow
<b>RATINGS (b)</b>			
Input BTUH	60,000	80,000	80,000
Capacity BTUH (ICS) (c)	48,700	65,100	64,700
Temp. Rise (Min. - Max.) °F	30 - 60	30 - 60	30 - 60
AFUE - Rating (c)	80	80	80
Return Air Temp. (Min. - Max.) °F	55°F - 80°F	55°F - 80°F	55°F - 80°F
<b>BLOWER DRIVE</b>	DIRECT	DIRECT	DIRECT
Diameter - Width (in.)	11 X 8	11 X 8	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
Motor HP	3/4	3/4	1
R.P.M.	1050	1050	1050
Volts / Ph / Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	9.2	9.2	10.9
<b>COMBUSTION FAN - Type</b>	PSC	PSC	PSC
Drive - No. Speeds	Direct - 1	Direct - 1	Direct - 1
Motor RPM	3300	3300	3300
Volts/Ph/Hz	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
FLA	0.30	0.29	0.30
Inducer Orifice	1.40	1.75	1.80
<b>FILTER - Furnished?</b>	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 16 X 25 - 1 in.	1 - 16 X 25 - 1 in.	1 - 20 X 25 - 1 in.
<b>VENT PIPE DIAMETER - Min. (in.) (e)</b>	4 Round	4 Round	4 Round
<b>HEAT EXCHANGER - Type</b>	Aluminized Steel	Aluminized Steel	Aluminized Steel
Gauge (Fired)	20 - 19	20 - 19	20 - 19
<b>ORIFICES - Main</b>			
Nat. Gas Qty. - Drill Size	3 - 45	4 - 45	4 - 45
L.P. Gas Qty. - Drill Size	3 - 56	4 - 56	4 - 56
<b>GAS VALVE</b>	Redundant - Single Stage	Redundant - Single Stage	Redundant - Single Stage
<b>PILOT SAFETY DEVICE - Type</b>	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter
<b>BURNERS - QTY</b>	3	4	4
<b>POWER CONN. - V/Ph/HZ (f)</b>	120 / 1 / 60	120 / 1 / 60	120 / 1 / 60
Ampacity (Amps)	12.0	12.0	14.1
Max. Overcurrent Protection (Amps)	15	15	15
<b>PIPE CONN. SIZE (IN.)</b>	1/2	1/2	1/2

(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) Refer to the Installer's Guide.

(f) The above wiring specifications are in accordance with National Electric Code, however, installations must comply with local codes.



MODEL	S8*1C100M5PSC (a)	S8*1D120M5PSC (a)
<b>Type</b>	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow
<b>RATINGS (b)</b>		
Input BTUH	100,000	120,000
Capacity BTUH (ICS) (c)	80,700	98,000
Temp. Rise (Min. - Max.) °F	30 - 60	35 - 65
AFUE - Rating (c)	80	80
Return Air Temp. (Min. - Max.) °F	55°F - 80°F	55°F - 80°F
<b>BLOWER DRIVE</b>	DIRECT	DIRECT
Diameter - Width (in.)	11 X 11	11 X 11
No. Used	1	1
Speeds (No.) (d)	CTM - 9	CTM - 9
CFM vs. in. w.g.	See Fan Performance Table	See Fan Performance Table
Motor HP	3/4	1
R.P.M.	1050	1050
Volts / Ph / Hz	120 / 1 / 60	120 / 1 / 60
FLA	10.9	10.9
<b>COMBUSTION FAN - Type</b>	PSC	PSC
Drive - No. Speeds	Direct - 1	Direct - 1
Motor RPM	3300	3300
Volts/Ph/Hz	120 / 1 / 60	120 / 1 / 60
FLA	0.33	0.33
Inducer Orifice	2.50	2.15
<b>FILTER - Furnished?</b>	No	No
Type Recommended	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 20 X 25 - 1 in.	1 - 24 X 25 - 1 in.
<b>VENT PIPE DIAMETER - Min. (in.) (e)</b>	4 Round	4 Round
<b>HEAT EXCHANGER - Type</b>	Aluminized Steel	Aluminized Steel
Gauge (Fired)	20 - 19	20 - 19
<b>ORIFICES - Main</b>		
Nat. Gas Qty. - Drill Size	5 - 45	6 - 45
L.P. Gas Qty. - Drill Size	5 - 56	6 - 56
<b>GAS VALVE</b>	Redundant - Single Stage	Redundant - Single Stage
<b>PILOT SAFETY DEVICE - Type</b>	120 V SiNi Igniter	120 V SiNi Igniter
<b>BURNERS - QTY</b>	5	6
<b>POWER CONN. - V/Ph/HZ (f)</b>	120 / 1 / 60	120 / 1 / 60
Ampacity (Amps)	14.1	14.1
Max. Overcurrent Protection (Amps)	15	15
<b>PIPE CONN. SIZE (IN.)</b>	1/2	1/2

(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) Refer to the Installer's Guide.

(f) The above wiring specifications are in accordance with National Electric Code, however, installations must comply with local codes.

## Product Specifications

Model	S8X2A040M3PSC (a)	S8X2B060M4PSC (a)	S8X2B080M4PSC (a)
Type	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow
<b>RATINGS</b> (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	25 - 55
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
<b>BLOWER DRIVE</b>	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
<b>COMBUSTION FAN - Type</b>	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	0.33
Inducer Orifice	1.20	1.40	1.75
<b>FILTER - Furnished?</b>	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.
<b>VENT PIPE DIAMETER - Min. (in.)</b> (e)	4 Round	4 Round	4 Round
<b>HEAT EXCHANGER - Type</b>	Aluminized Steel	Aluminized Steel	Aluminized Steel
Gauge (Fired)	20 - 19	20 - 19	20 - 19
<b>ORIFICES - Main</b>			
Nat. Gas Qty. - Drill Size	2 - 45	3 - 45	4 - 45
L.P. Gas Qty. - Drill Size	2 - 56	3 - 56	4 - 56
<b>GAS VALVE</b>	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
<b>PILOT SAFETY DEVICE - Type</b>	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter
<b>BURNERS - QTY</b>	2	3	4
<b>POWER CONN. - V/Ph/HZ</b> (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
<b>PIPE CONN. SIZE (IN.)</b>	1/2	1/2	1/2

(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) Refer to the Installer's Guide.

(f) The above wiring specifications are in accordance with National Electric Code, however, installations must comply with local codes.

Model	S8X2C080M5PSC (a)	S8X2C100M5PSC (a)	S8X2D120M5PSC (a)
Type	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow	Upflow / Horizontal / Downflow
<b>RATINGS</b> (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	100,000	120,000
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
<b>BLOWER DRIVE</b>	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
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
<b>COMBUSTION FAN - Type</b>	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
<b>FILTER - Furnished?</b>	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.
<b>VENT PIPE DIAMETER - Min. (in.)</b> (e)	4 Round	4 Round	4 Round
<b>HEAT EXCHANGER - Type</b>	Aluminized Steel	Aluminized Steel	Aluminized Steel
Gauge (Fired)	20 - 19	20 - 19	20 - 19
<b>ORIFICES - Main</b>			
Nat. Gas Qty. - Drill Size	4 - 45	5 - 45	6 - 45
L.P. Gas Qty. - Drill Size	4 - 56	5 - 56	6 - 56
<b>GAS VALVE</b>	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
<b>PILOT SAFETY DEVICE - Type</b>	120 V SiNi Igniter	120 V SiNi Igniter	120 V SiNi Igniter
<b>BURNERS - QTY</b>	4	5	6
<b>POWER CONN. - V/Ph/HZ</b> (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
<b>PIPE CONN. SIZE (IN.)</b>	1/2	1/2	1/2

(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) Refer to the Installer's Guide.

(f) The above wiring specifications are in accordance with National Electric Code, however, installations must comply with local codes.

# Sequence of Operation S8B1/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 1<sup>st</sup> 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.

## 1<sup>st</sup> Stage Gas Heating

1. R – W1 contacts close on the thermostat sending 24VAC to the W1 low voltage terminal of the IFC. Technician should read 24VAC from W1 to B/C. The seven segment LED will read: .
  - Ht = S8B1/S8X1
  - Ht l = S8X2
2. The IFC performs a self-check routine and then confirms:
  - a. Flame roll-out switches (FRS) 1 & 2, main thermal limit (TCO), and any reverse air flow (RAF) switches are closed by sending 24VAC out the HLO terminal and monitoring the HLI input.
  - b. Pressure switch 1 (PS1) and pressure switch 2 (PS2–S8X2 only) are opened by sending 24VAC out the HLO terminal, through the limit switches, and monitoring the PS1 (3) and PS2 (7) inputs.

**Note:** If a thermal limit is open, 24VAC will not be present at either pressure switch.
3. After steps a & b 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. l 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<sup>st</sup> stage gas valve relay is closed, which energizes the 1<sup>st</sup> 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. 1VDC = 1 micro-amp. Flame current will vary depending on the type of meter used. Typical flame current ranges from 0.75 – 3.0 micro-amps (0.75 – 3 VDC).

8. Once the flame sense has been established, a timer on the IFC starts and the indoor blower will energize at 1<sup>st</sup> stage speed after the blower "Heat On Delay" has completed. The seven-segment LED for example will alternately read:
  - Ht = Gas heating = S8B1/S8X1
  - Ht l = 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 byproducts from inside the furnace.
11. The indoor blower continues to run to remove heat from the heat exchangers. The "blower off" time is field adjustable through the IFC menu setup option. The seven-segment LED will read "i dL" = Idle, no thermostat demand.

## 2<sup>nd</sup> Stage Gas Heating (S8X2 Only)

1. See sequence of operation for 1<sup>st</sup> stage gas heating operation above (steps 1–7)

**Note:** 2<sup>nd</sup> stage heating cannot operate without 1<sup>st</sup> stage operation.

2. R-W2 contacts close on the thermostat sending 24VAC from to the W2 low voltage terminal of the IFC. Technician should read 24VAC 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 2<sup>nd</sup> 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 2<sup>nd</sup> 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 1<sup>st</sup> stage. If PS2 closes, 2<sup>nd</sup> 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 steps 3 & 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 1<sup>st</sup> 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 2<sup>nd</sup> stage gas valve will close, the indoor blower motor will ramp down to 1<sup>st</sup> 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 byproducts 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 24VAC to the Y1 and G low voltage terminals on the IFC. Technician should read 24VAC between Y1-B/C and between G-B/C.

**Note:** For 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 1".

2. 24VAC is sent to the OD unit via thermostat wiring.
3. The indoor blower ramps to the cooling airflow. The seven-segment LED for example will alternately read:
  - $\text{CL } 1$  = Cooling, Stage 1 (S8X2)
  - $\text{CP } 1$  = Cooling, Stage 1 (S8B1/S8X1)
  - $\text{EP } 3$  = 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 "*IdL*" = Idle, no thermostat demand.

### Two Stage Cooling

1. See sequence of operation for Single stage cooling operation above (steps 1–3)
2. R-Y2 contact on the thermostat close sending 24VAC to Y2 low voltage terminal on the IFC. Technician should read 24VAC between Y2 and B/C.
3. 24VAC is sent to the OD unit via thermostat wiring.
4. The indoor airflow ramps to 2<sup>nd</sup> stage airflow. The seven-segment LED for example will read:

- $\text{CL } 2$  = Cooling, Stage 2 (S8X2)
  - $\text{CP } 2$  = Cooling, Stage 2 (S8X1)
  - $\text{EP } 7$  = 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 24VAC to the Y1 and G low voltage terminals on the IFC. Technician should read 24VAC between Y1-B/C and between G-B/C.

**Note:** For 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  $\text{CL } 1$

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:
  - $\text{HP } 1$  = Cooling, Stage 1 (S8X2)
  - $\text{CP } 1$  = Cooling, Stage 1 (S8B1/S8X1)
  - $\text{EP } 3$  = 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 (steps 1–3).
2. R-Y2 contact on the thermostat close sending 24VAC to Y2 low voltage terminal on the IFC. Technician should read 24VAC between Y2 and B/C.
3. 24VAC is sent to the OD unit via thermostat wiring.
4. The indoor airflow ramps to 2<sup>nd</sup> stage airflow. The seven-segment LED for example will read:
  - $\text{HP } 2$  = Cooling, Stage 2 (S8X2)
  - $\text{CP } 2$  = Cooling, Stage 2 (S8X1)
  - $\text{EP } 7$  = 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 midsummer or midwinter.
3. BLOWERS – The Blower size and speed determine the air volume delivered by the Furnace. The Blower motor bearings are factory lubricated and under normal operating conditions do not require servicing. Annual cleaning of the Blower wheel and housing is recommended for maximum air output, and this must be performed only by a qualified servicer or service agency.
4. IGNITER – This unit has a special hot surface direct ignition device that automatically lights the burners. Please note that it is very fragile and should be handled with care. ! CAUTION Do NOT touch igniter. It is extremely hot.
5. BURNER – Gas burners do not normally require scheduled servicing, however, accumulation of foreign material may cause a yellowing flame or delayed ignition. Either condition indicates that a service call is required. For best operation, burners must be cleaned annually using brushes and vacuum cleaner. Turn off gas and electric power supply. To clean burners, remove burner bottom plate (2 screws) and bottom burner bracket (2 screws). Twist burner towards slot, lift, and push forward away from orifice. Remove burners.

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

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

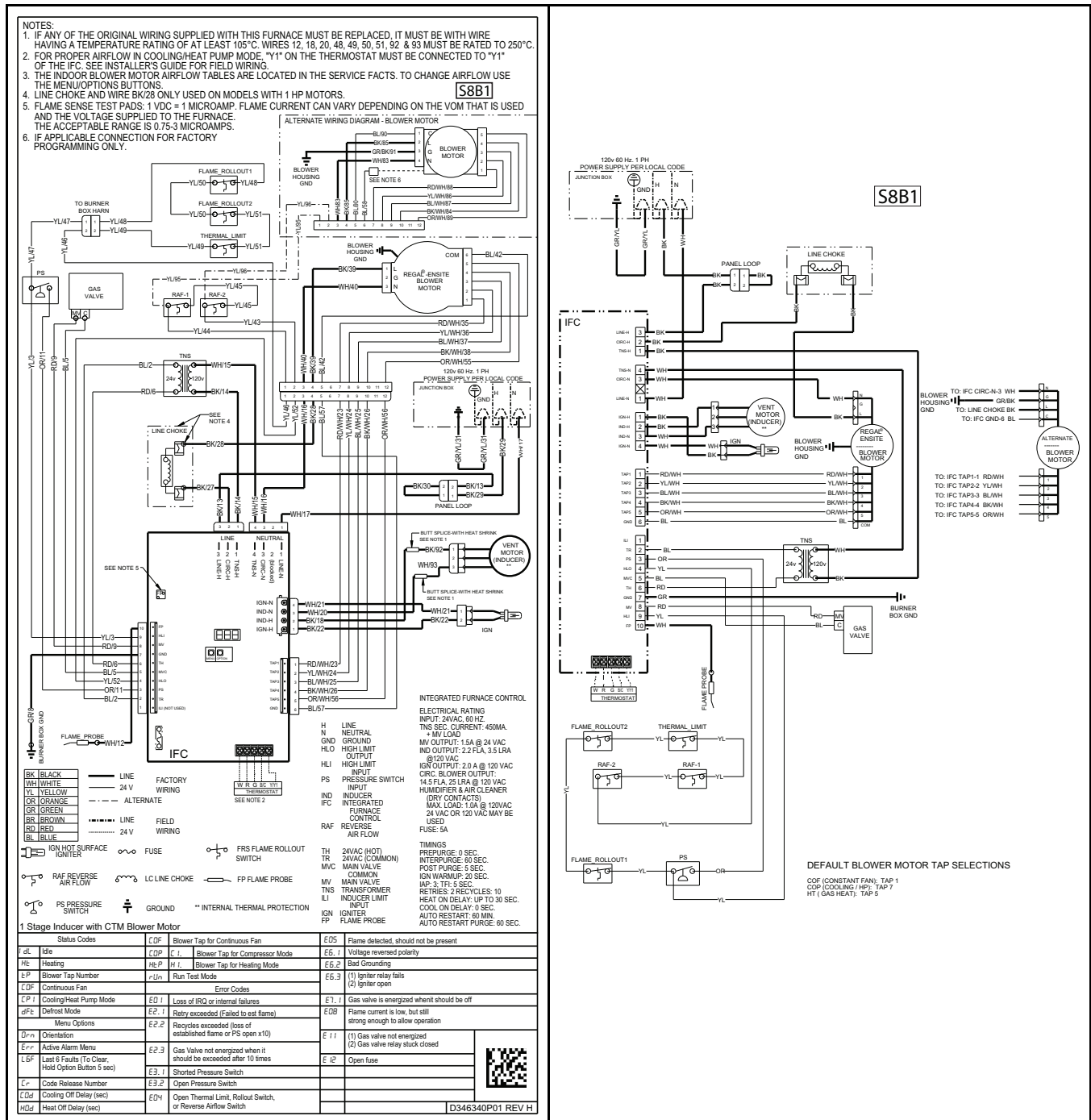
Clean burners with brush and/ or vacuum cleaner. Reassemble parts by reversal of the above procedure.

**Note:** 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

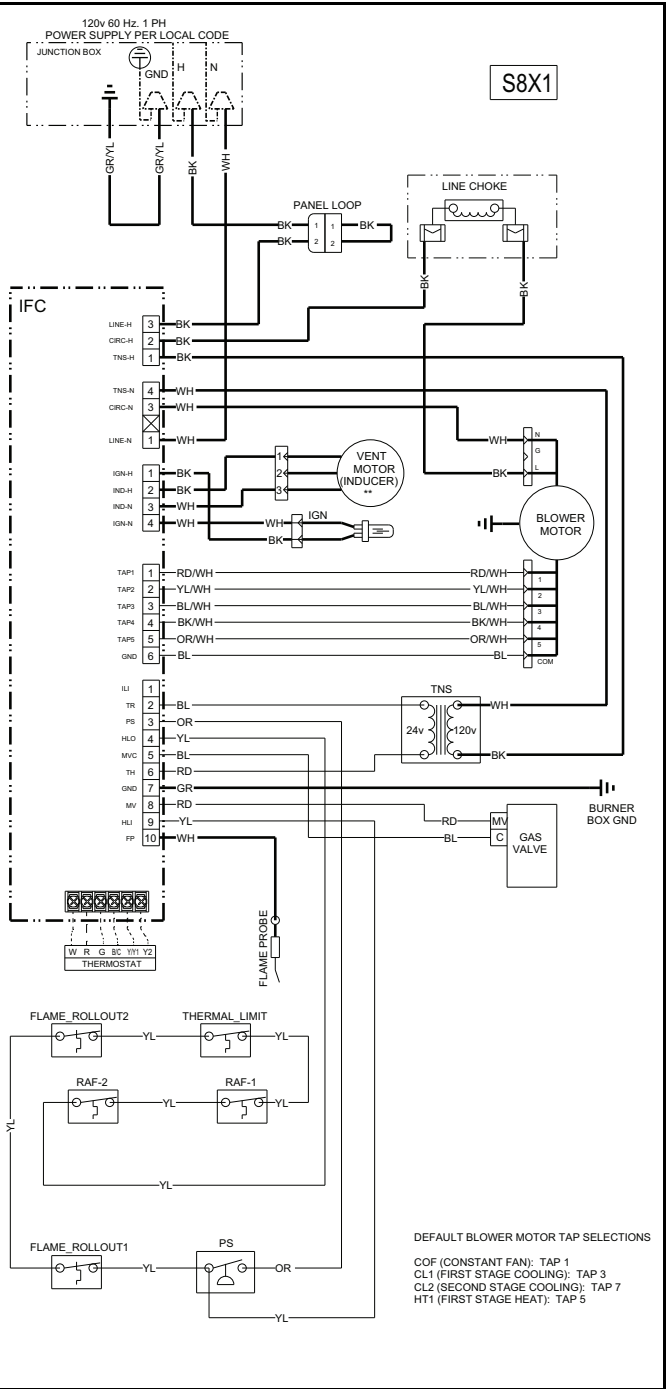
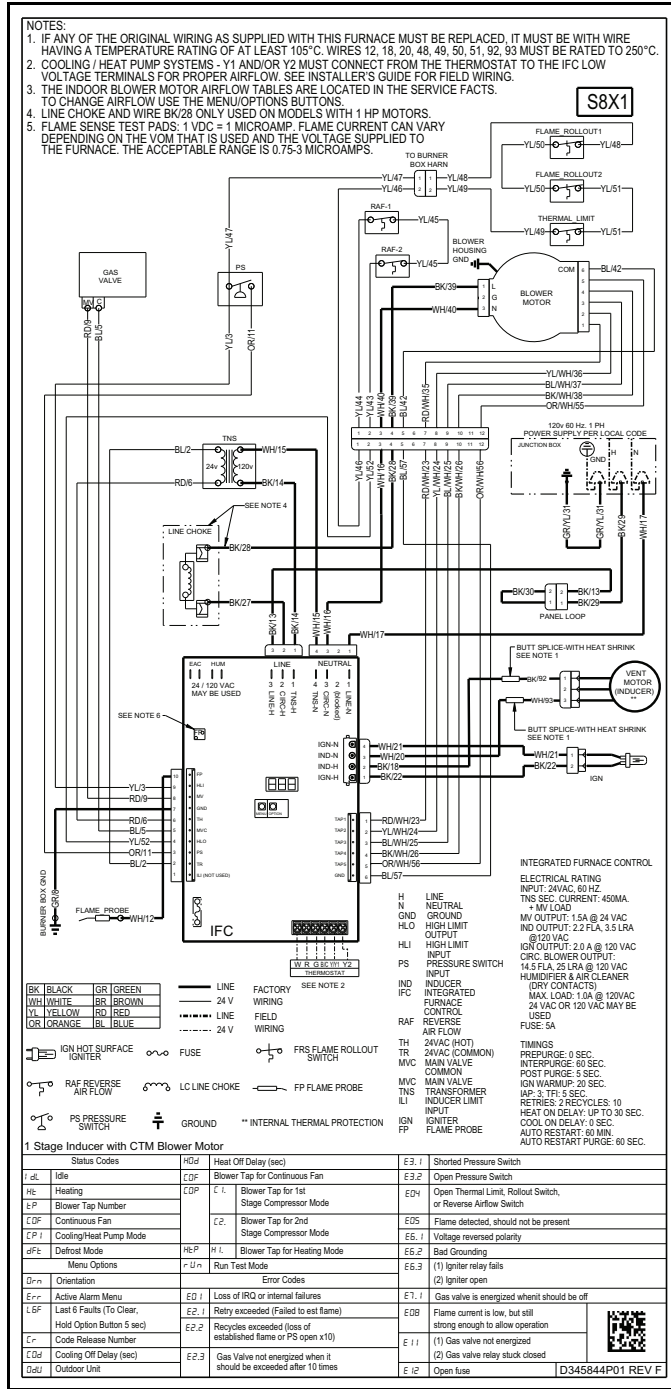
**Note:** On Propane units, due to variations in BTU content and altitude, servicing may be required at shorter intervals.

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 5. Burner)
  - 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. (See Condensate Drain in Installer's Guide.)

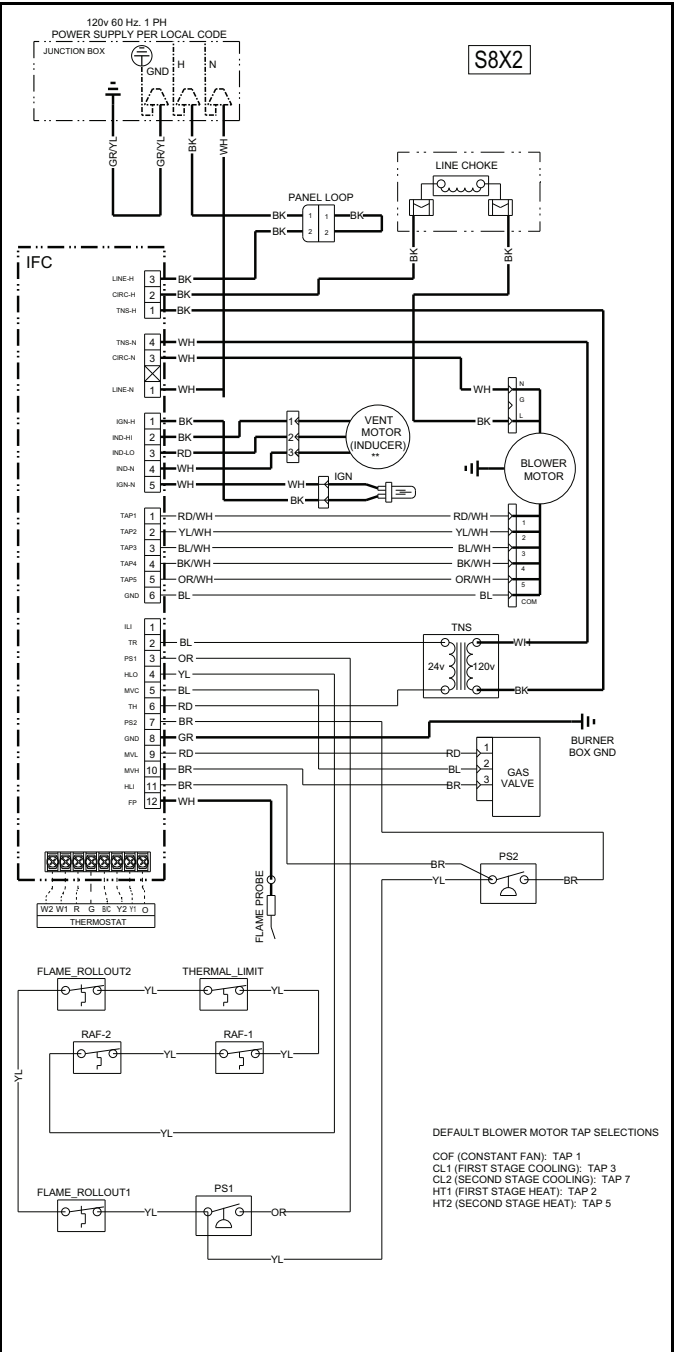
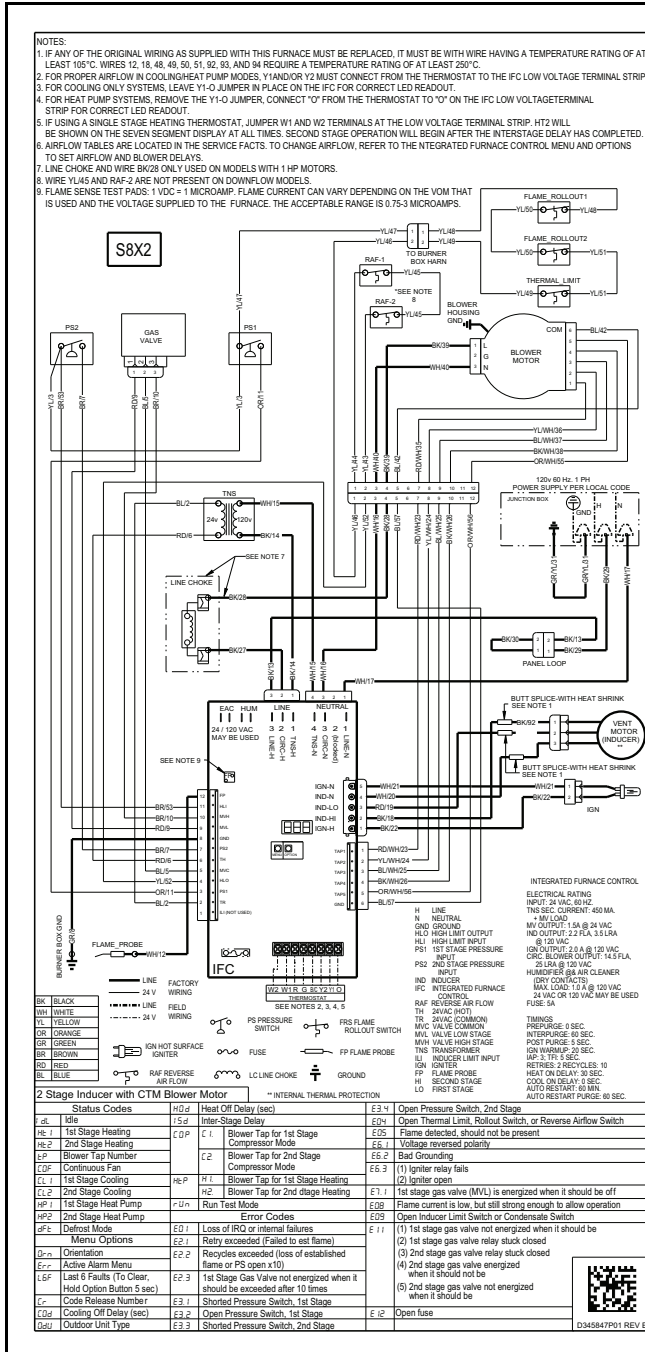
# Wiring Diagrams



# Wiring Diagrams







# Airflow Tables

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	Tap	Static	0.1	0.3	0.5	0.7	0.9
<b>S8*1A026M2PSC</b>	<b>1</b>	<b>SCFM</b>	437				
		<b>Watts</b>	29				
	<b>2</b>	<b>SCFM</b>	600	359	119		
		<b>Watts</b>	42	48	54		
	<b>3</b>	<b>SCFM</b>	650	435	219		
		<b>Watts</b>	47	56	65		
	<b>4</b>	<b>SCFM</b>	721	533	344	155	
		<b>Watts</b>	59	69	79	89	
	<b>5</b>	<b>SCFM</b>	936	782	629	475	321
		<b>Watts</b>	104	116	128	140	152
	<b>6</b>	<b>SCFM</b>	997	854	720	586	452
		<b>Watts</b>	123	136	149	162	175
	<b>7</b>	<b>SCFM</b>	1037	906	776	646	516
		<b>Watts</b>	137	151	165	178	192
	<b>8</b>	<b>SCFM</b>	1117	1000	883	766	650
		<b>Watts</b>	168	183	199	214	230
	<b>9</b>	<b>SCFM</b>	1251	1149	1048	946	845
		<b>Watts</b>	231	248	266	283	301

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	Tap	Static	0.1	0.3	0.5	0.7	0.9
<b>S8*1A040M3PSC S8X2A040M3PSC</b>	<b>1</b>	<b>SCFM</b>	592	342	93		
		<b>Watts</b>	40	43	46		
	<b>2</b>	<b>SCFM</b>	666	467	268	70	
		<b>Watts</b>	48	56	65	74	
	<b>3</b>	<b>SCFM</b>	687	493	299	105	
		<b>Watts</b>	49	59	69	78	
	<b>4</b>	<b>SCFM</b>	938	788	638	488	338
		<b>Watts</b>	100	111	123	134	146
	<b>5</b>	<b>SCFM</b>	1006	870	733	597	461
		<b>Watts</b>	119	131	144	156	169
	<b>6</b>	<b>SCFM</b>	1068	944	820	696	573
		<b>Watts</b>	140	154	167	181	194
	<b>7</b>	<b>SCFM</b>	1174	1066	957	848	740
		<b>Watts</b>	181	196	211	226	241
	<b>8</b>	<b>SCFM</b>	1167	1098	1029	960	891
		<b>Watts</b>	194	219	244	269	294
	<b>9</b>	<b>SCFM</b>	1556	1474	1392	1310	1228
		<b>Watts</b>	398	416	435	453	471

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	Tap	Static	0.1	0.3	0.5	0.7	0.9
<b>S8*1B040M2PSC</b>	<b>1</b>	<b>SCFM</b>	526				
		<b>Watts</b>	34				
	<b>2</b>	<b>SCFM</b>	744	533	322	110	
		<b>Watts</b>	54	63	72	81	
	<b>3</b>	<b>SCFM</b>	820	662	504	346	188
		<b>Watts</b>	68	81	94	106	119
	<b>4</b>	<b>SCFM</b>	967	811	654	498	341
		<b>Watts</b>	97	110	122	135	148
	<b>5</b>	<b>SCFM</b>	997	840	687	533	380
		<b>Watts</b>	104	116	129	142	154
	<b>6</b>	<b>SCFM</b>	1052	911	771	630	490
		<b>Watts</b>	119	133	148	162	176
	<b>7</b>	<b>SCFM</b>	1099	968	837	706	575
		<b>Watts</b>	134	150	165	180	196
	<b>8</b>	<b>SCFM</b>	1168	1047	926	805	684
		<b>Watts</b>	157	174	191	208	225
	<b>9</b>	<b>SCFM</b>	1303	1196	1088	981	874
		<b>Watts</b>	214	233	252	271	290

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	Tap	Static	0.1	0.3	0.5	0.7	0.9
<b>S8*1B060M4PSC S8X2B060M4PSC</b>	<b>1</b>	<b>SCFM</b>	596	287			
		<b>Watts</b>	38	42			
	<b>2</b>	<b>SCFM</b>	851	667	483	299	115
		<b>Watts</b>	70	81	92	102	113
	<b>3</b>	<b>SCFM</b>	1142	1018	893	769	644
		<b>Watts</b>	141	156	172	187	203
	<b>4</b>	<b>SCFM</b>	1196	1079	961	844	726
		<b>Watts</b>	160	176	192	208	224
	<b>5</b>	<b>SCFM</b>	1362	1258	1154	1050	946
		<b>Watts</b>	220	239	257	276	294
	<b>6</b>	<b>SCFM</b>	1416	1319	1221	1124	1026
		<b>Watts</b>	250	269	288	307	327
	<b>7</b>	<b>SCFM</b>	1495	1402	1309	1216	1123
		<b>Watts</b>	287	307	327	347	367
	<b>8</b>	<b>SCFM</b>	1574	1487	1401	1314	1228
		<b>Watts</b>	337	357	378	399	420
	<b>9</b>	<b>SCFM</b>	1983	1899	1815	1730	1646
		<b>Watts</b>	659	670	680	691	701

## Airflow Tables

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	Tap	Static	0.1	0.3	0.5	0.7	0.9
<b>S8*1B080M4PSC S8X2B080M4PSC</b>	<b>1</b>	<b>SCFM</b>	552	160			
		<b>Watts</b>	34	34			
	<b>2</b>	<b>SCFM</b>	891	720	549	378	207
		<b>Watts</b>	82	93	105	117	129
	<b>3</b>	<b>SCFM</b>	1123	996	869	742	615
		<b>Watts</b>	141	157	173	189	205
	<b>4</b>	<b>SCFM</b>	1344	1240	1136	1033	929
		<b>Watts</b>	224	244	263	283	302
	<b>5</b>	<b>SCFM</b>	1479	1384	1290	1196	1102
		<b>Watts</b>	290	312	333	354	375
	<b>6</b>	<b>SCFM</b>	1583	1496	1408	1321	1234
		<b>Watts</b>	354	376	398	420	442
	<b>7</b>	<b>SCFM</b>	1654	1572	1491	1409	1327
		<b>Watts</b>	405	428	451	474	496
	<b>8</b>	<b>SCFM</b>	1818	1739	1661	1582	1503
		<b>Watts</b>	542	561	581	600	619
	<b>9</b>	<b>SCFM</b>	1926	1841	1756	1670	1585
		<b>Watts</b>	645	656	667	679	690

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	Tap	Static	0.1	0.3	0.5	0.7	0.9
<b>S8*1C080M5PSC S8X2C080M5PSC</b>	<b>1</b>	<b>SCFM</b>	728	358			
		<b>Watts</b>	44	49			
	<b>2</b>	<b>SCFM</b>	809	540	271		
		<b>Watts</b>	53	63	74		
	<b>3</b>	<b>SCFM</b>	1440	1273	1105	938	770
		<b>Watts</b>	185	201	218	234	250
	<b>4</b>	<b>SCFM</b>	1536	1385	1233	1081	929
		<b>Watts</b>	220	238	257	275	293
	<b>5</b>	<b>SCFM</b>	1689	1552	1414	1277	1140
		<b>Watts</b>	278	299	320	342	363
	<b>6</b>	<b>SCFM</b>	1792	1661	1530	1400	1269
		<b>Watts</b>	326	348	371	394	417
	<b>7</b>	<b>SCFM</b>	1899	1771	1643	1515	1387
		<b>Watts</b>	373	397	422	446	471
	<b>8</b>	<b>SCFM</b>	2094	1985	1875	1766	1656
		<b>Watts</b>	500	527	554	582	609
	<b>9</b>	<b>SCFM</b>	2533	2414	2295	2176	2058
		<b>Watts</b>	931	932	933	933	934

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	Tap	Static	0.1	0.3	0.5	0.7	0.9
<b>S8*1C100M5PSC S8X2C100M5PSC</b>	<b>1</b>	<b>SCFM</b>	821	442			
		<b>Watts</b>	55	55			
	<b>2</b>	<b>SCFM</b>	1359	1195	1031	868	704
		<b>Watts</b>	163	180	198	215	233
	<b>3</b>	<b>SCFM</b>	1602	1461	1321	1180	1040
		<b>Watts</b>	246	268	290	312	334
	<b>4</b>	<b>SCFM</b>	1807	1678	1550	1421	1292
		<b>Watts</b>	336	362	388	414	440
	<b>5</b>	<b>SCFM</b>	1827	1700	1572	1444	1317
		<b>Watts</b>	345	371	398	425	451
	<b>6</b>	<b>SCFM</b>	1925	1800	1675	1550	1425
		<b>Watts</b>	395	423	451	479	508
	<b>7</b>	<b>SCFM</b>	2102	1985	1869	1752	1635
		<b>Watts</b>	503	534	566	597	628
	<b>8</b>	<b>SCFM</b>	2222	2115	2008	1901	1794
		<b>Watts</b>	602	635	667	700	732
	<b>9</b>	<b>SCFM</b>	2458	2351	2245	2138	2032
		<b>Watts</b>	896	913	930	947	964

Furnace Airflow (CFM) Vs. External Static Pressure (in. W.C.)							
Model	Tap	Static	0.1	0.3	0.5	0.7	0.9
<b>S8*1D120M5PSC S8X2D120M5PSC</b>	<b>1</b>	<b>SCFM</b>	1469	912	355		
		<b>Watts</b>	184	126	68		
	<b>2</b>	<b>SCFM</b>	1429	1165	900	636	371
		<b>Watts</b>	175	171	168	164	160
	<b>3</b>	<b>SCFM</b>	1567	1401	1235	1069	903
		<b>Watts</b>	215	232	248	264	280
	<b>4</b>	<b>SCFM</b>	1858	1731	1605	1478	1351
		<b>Watts</b>	334	361	388	415	441
	<b>5</b>	<b>SCFM</b>	2004	1890	1776	1662	1548
		<b>Watts</b>	418	447	476	505	534
	<b>6</b>	<b>SCFM</b>	2110	2004	1898	1792	1686
		<b>Watts</b>	488	518	549	580	611
	<b>7</b>	<b>SCFM</b>	2245	2148	2052	1956	1860
		<b>Watts</b>	596	629	662	695	729
	<b>8</b>	<b>SCFM</b>	2440	2345	2250	2155	2060
		<b>Watts</b>	765	794	824	854	884
	<b>9</b>	<b>SCFM</b>	2536	2431	2325	2220	2114
		<b>Watts</b>	882	904	927	949	972

# CFM Versus Temperature Rise

**S8B1/S8X1 Furnaces have one stage heating**

**S8X2 Furnaces have two stage heating. First Stage is Low heating and Second Stage is High heating.**

**Table 1. S8B1/S8X1**

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	
S8*1A026M2PSC	48	39	32																			
S8*1A040M3PSC		59	49	42	37	33	30	27														
S8*1B040M2PSC		59	49	42	37	33	30	27														
S8*1B060M4PSC					56	49	44	40	37	34	32											
S8*1B080M4PSC							59	54	49	46	42	40	37	35	33							
S8*1C080M5PSC							59	54	49	46	42	40	37	35	33							
S8*1C100M5PSC										57	53	49	46	44	41	39	37	35	34	32	31	
S8*1D120M5PSC												59	56	52	49	47	44	42	40	39	37	

**Table 2. S8X2 – Low Heat**

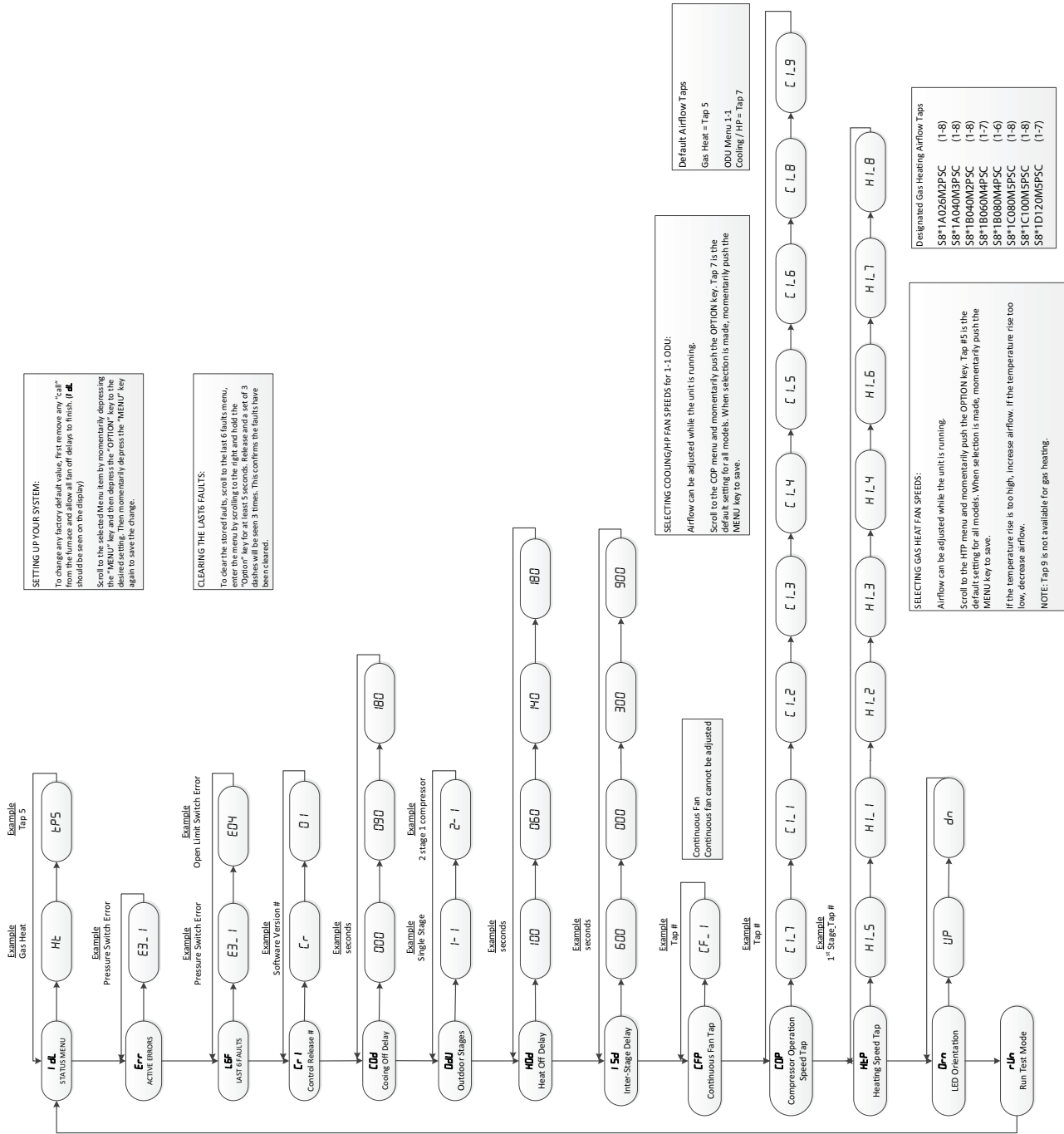
Model	CFM Versus Temperature Rise – First Stage (Low) Heating																	
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	
S8X2A040M3PSC	48	39	32	28														
S8X2B060M4PSC		56	47	40	35	31	28											
S8X2B080M4PSC				55	48	43	39	35	32	30	28							
S8X2C080M5PSC				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 3. S8X2 – High Heat**

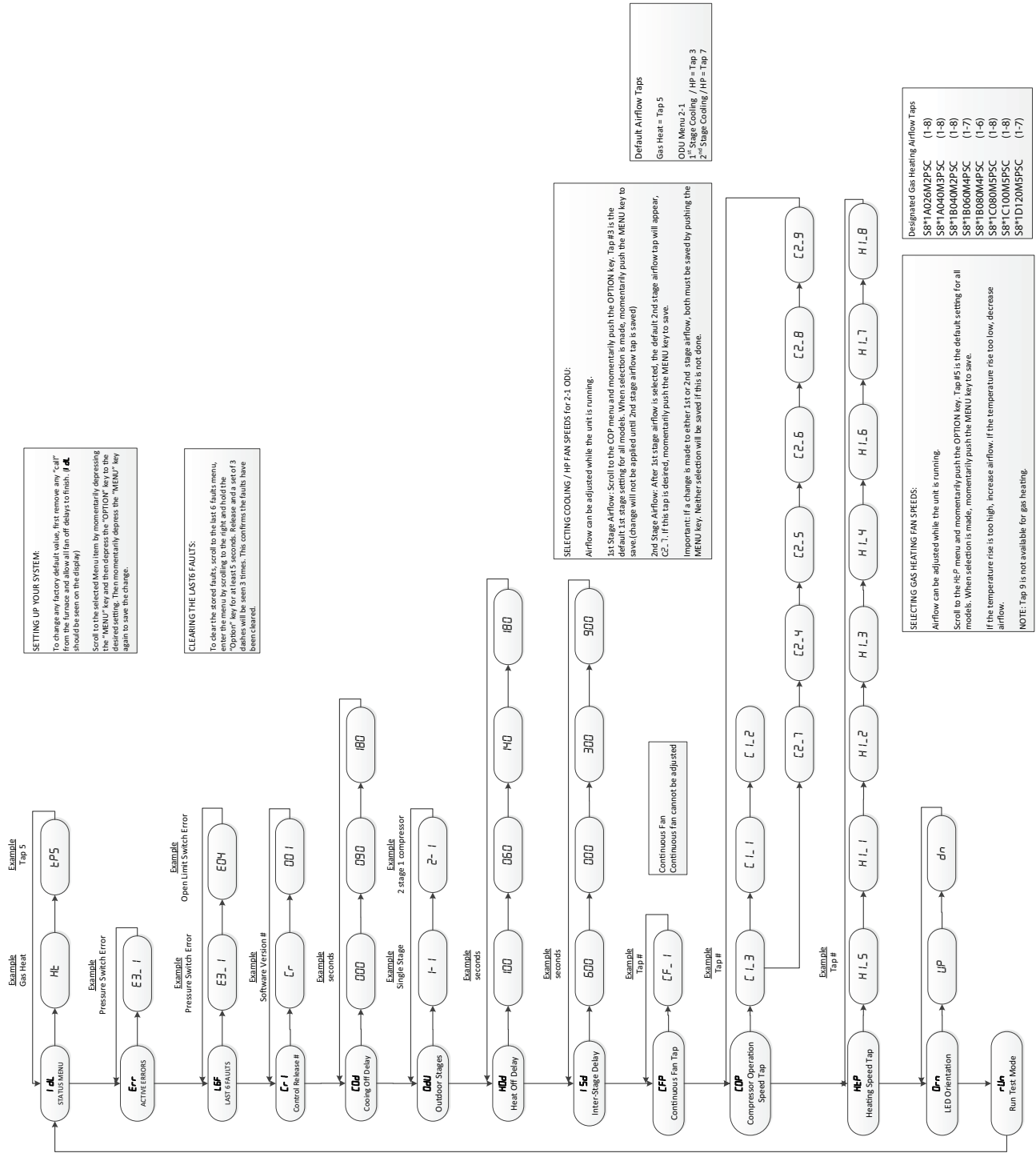
Model	CFM Versus Temperature Rise – Second Stage (High) Heating																					
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	
S8X2A040M3PSC		59	49	42	37	33	30	27														
S8X2B060M4PSC					56	49	44	40	37	34	32											
S8X2B080M4PSC							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	

# Integrated Furnace Control Menu

## S881 - S8X1 Control System Menu Single Stage OD

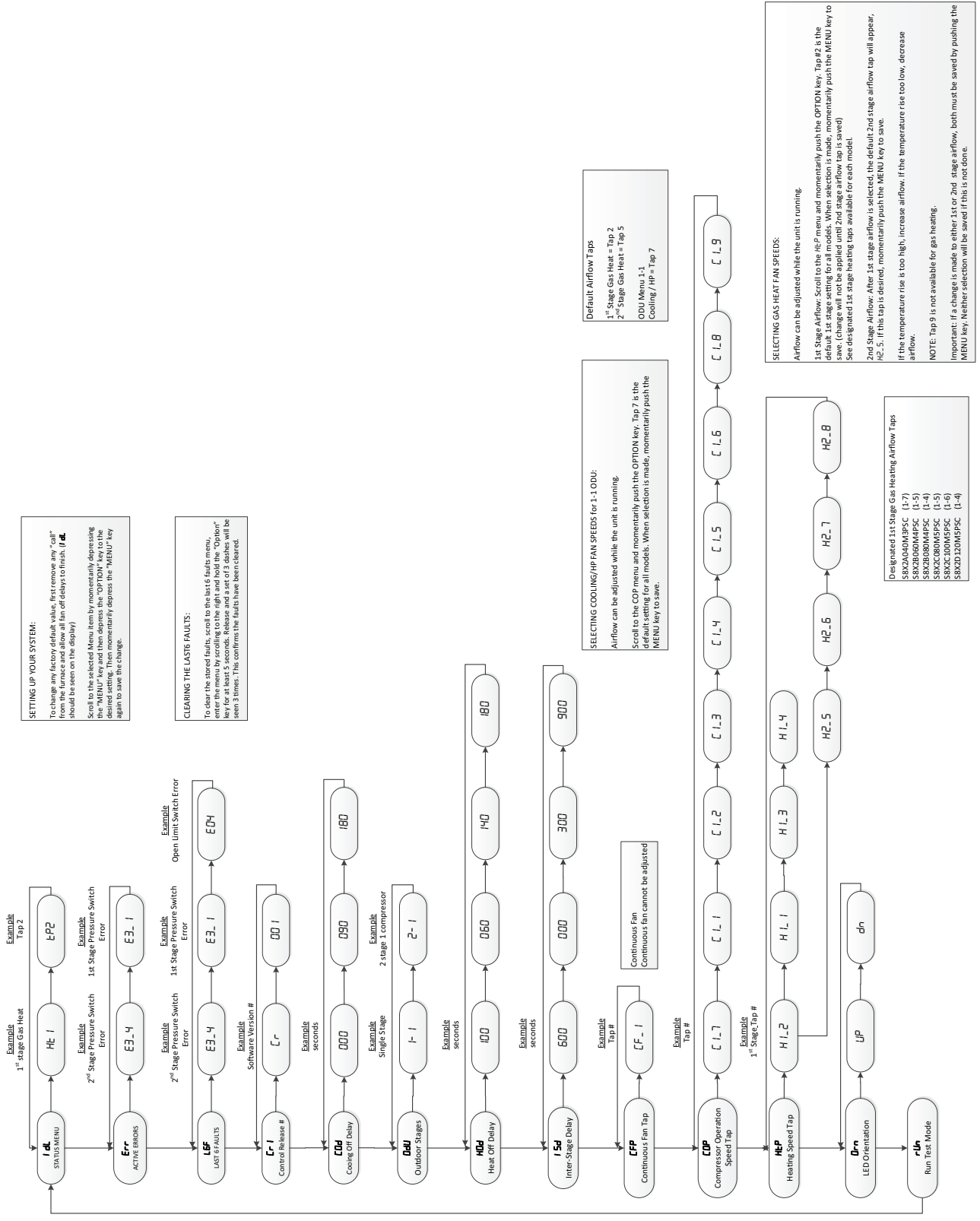


## S8X1 Control System Menu Two Stage OD

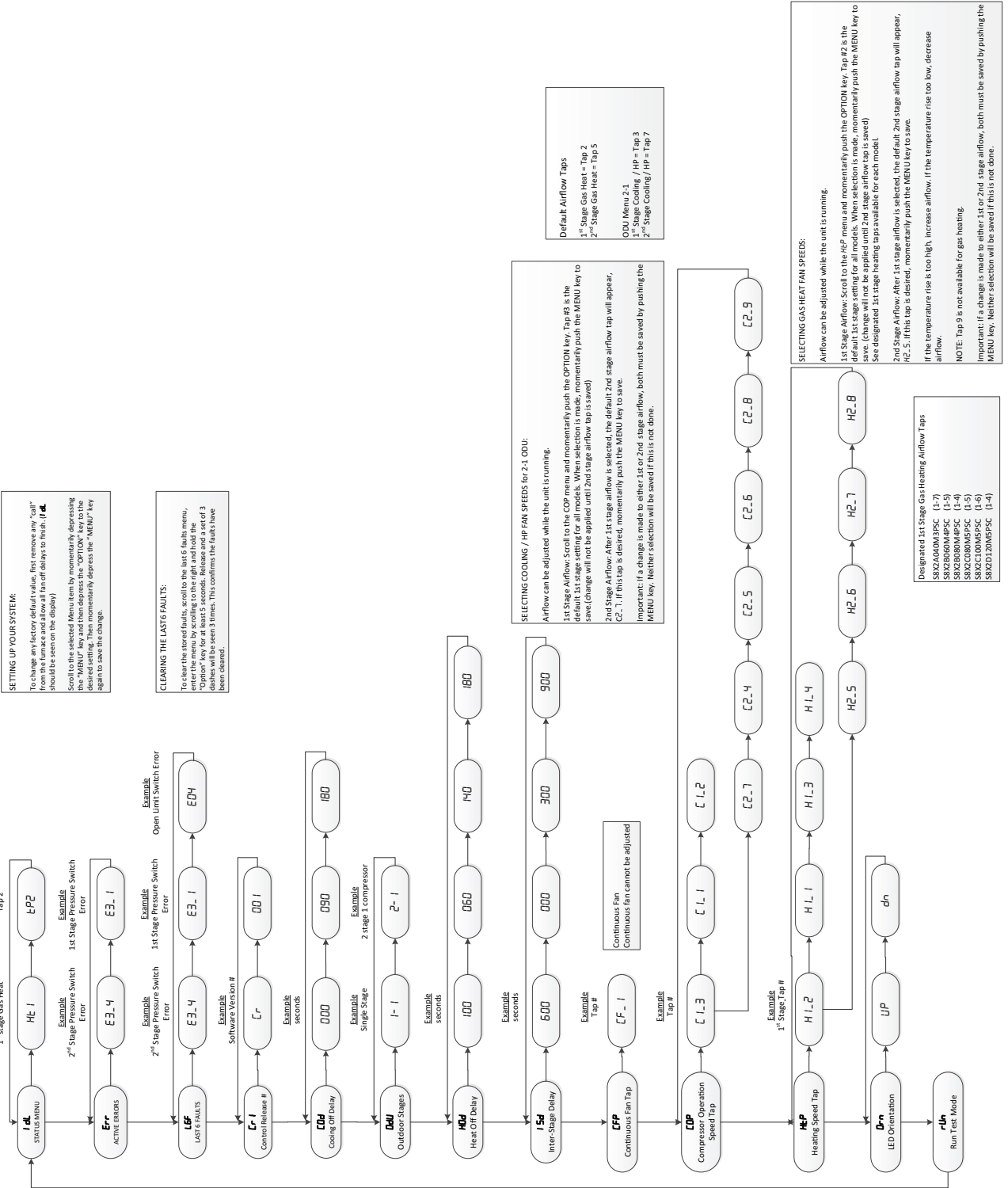




S8X2  
Control System Menu Single Stage OD



## S8X2 Control System Menu Two Stage OD



## S8B1 - S8X1 - S8X2 Run Test Mode

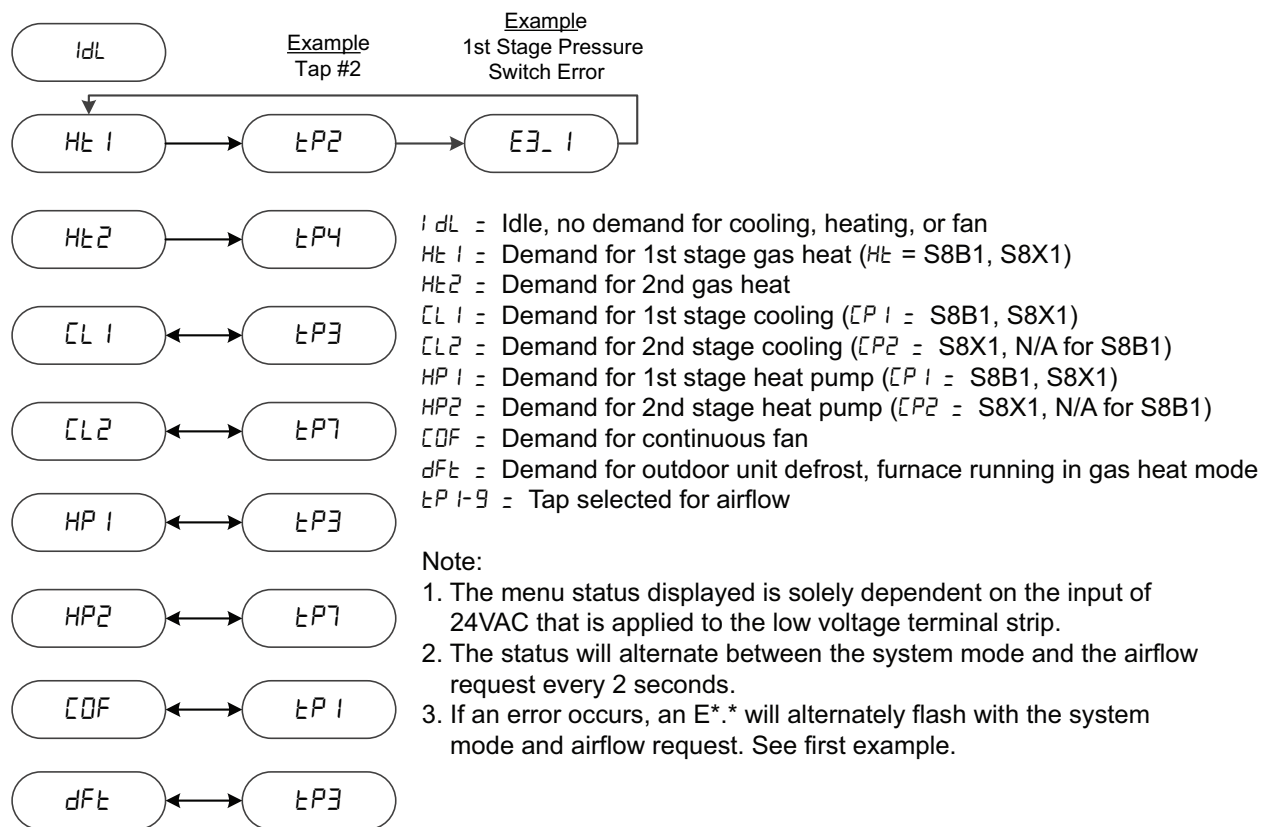
**Run Test Mode:**  
To enter Run Test Mode, scroll to *rUn* using the Menu key, then push the option key. The LED will flash *rUn* three times, then begin the test.  
To exit the test mode, momentarily push the Menu key, cycle power to the furnace, or make a valid thermostat call for capacity or fan.

### Sequence of Run Test Mode

- rU1* - Turns the inducer on in 1<sup>st</sup> stage for 30 seconds
  - rU2* - Turns on the inducer on 2<sup>nd</sup> stage for 30 seconds (N/A for S8B1, S8X1)
  - rU3* - Turns the igniter on for 10 seconds
  - rU4* - Turns the circulating blower on 1<sup>st</sup> stage compressor speed for 10 seconds
  - rU5* - Turns the circulating blower on 2<sup>nd</sup> stage compressor speed for 10 seconds (N/A for S8B1)
  - rU6* - Turns the circulating blower on 1<sup>st</sup> stage gas heat speed for 10 seconds
  - rU7* - Turns on the circulating blower on 2<sup>nd</sup> stage gas heat speed for 10 seconds (N/A for S8B1, S8X1)
- The above sequence will repeat two more times unless the Run Test Mode is exited, see above.

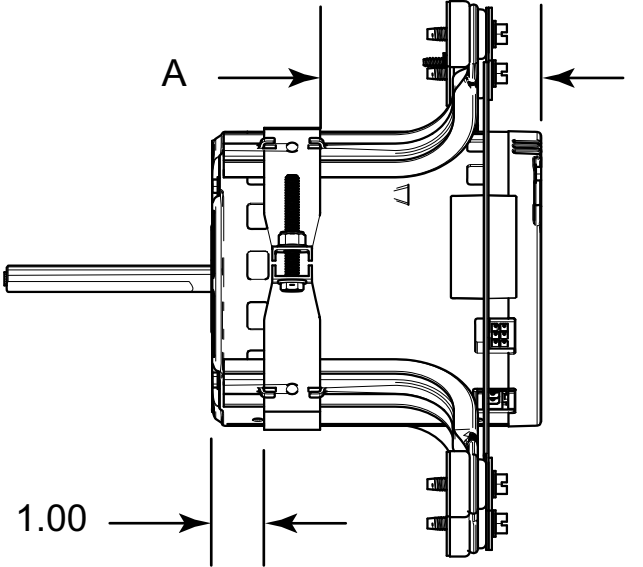
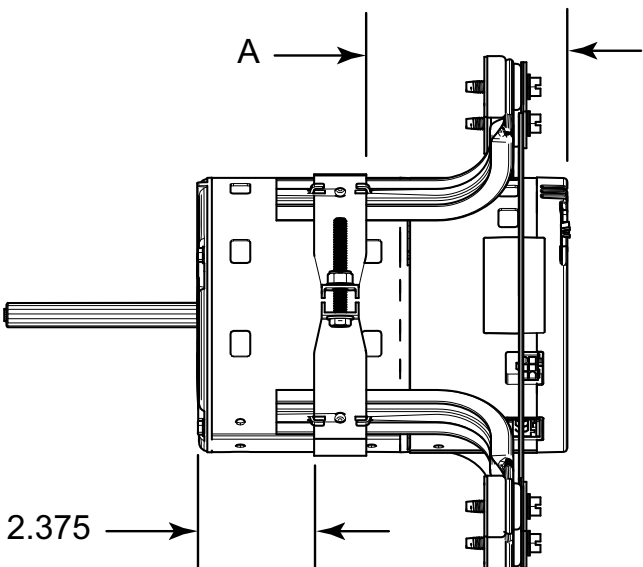
**Important:** The Run Test Mode does not test fire the furnace or bring the outdoor unit on. It is designed to allow the technician to observe each mode to ensure the IFC, inducer, and circulating blower are performing as intended.

## S8B1 - S8X1 - S8X2 System Status Menu



# Belly Band Location

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

 <p>Blower housing and wheel removed from view for clarity.</p>	<table border="1"> <thead> <tr> <th>Furnace Model</th> <th>Dimension "A" (inches)</th> </tr> </thead> <tbody> <tr> <td>A026</td> <td>3.5 (3-1/2)</td> </tr> <tr> <td>A040</td> <td>3.75 (3-3/4)</td> </tr> <tr> <td>B040</td> <td>3.5 (3-1/2)</td> </tr> <tr> <td>B060 4 ton</td> <td>4.25 (4-1/4)</td> </tr> <tr> <td>B080</td> <td>4.25 (4-1/4)</td> </tr> </tbody> </table>	Furnace Model	Dimension "A" (inches)	A026	3.5 (3-1/2)	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)	
Furnace Model	Dimension "A" (inches)													
A026	3.5 (3-1/2)													
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)													
 <p>Blower housing and wheel removed from view for clarity.</p>	<table border="1"> <thead> <tr> <th>Furnace Model</th> <th>Dimension "A" (inches)</th> </tr> </thead> <tbody> <tr> <td>C080</td> <td>4.125 (4-1/8)</td> </tr> <tr> <td>C100</td> <td>4.125 (4-1/8)</td> </tr> <tr> <td>D120</td> <td>4.125 (4-1/8)</td> </tr> </tbody> </table>	Furnace Model	Dimension "A" (inches)	C080	4.125 (4-1/8)	C100	4.125 (4-1/8)	D120	4.125 (4-1/8)					
Furnace Model	Dimension "A" (inches)													
C080	4.125 (4-1/8)													
C100	4.125 (4-1/8)													
D120	4.125 (4-1/8)													

# Troubleshooting

The following pages include troubleshooting flowcharts in reference for the 1 Stage S8B1, 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.

## 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 – 1<sup>st</sup> Stage Gas Valve energized when it should not be (10 times)

E3.1 – Shorted Pressure Switch, 1<sup>st</sup> Stage

E3.2 – Open Pressure Switch, 1<sup>st</sup> Stage

E3.3 – Shorted Pressure Switch, 2<sup>nd</sup> Stage

E3.4 – Open Pressure Switch, 2<sup>nd</sup> 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

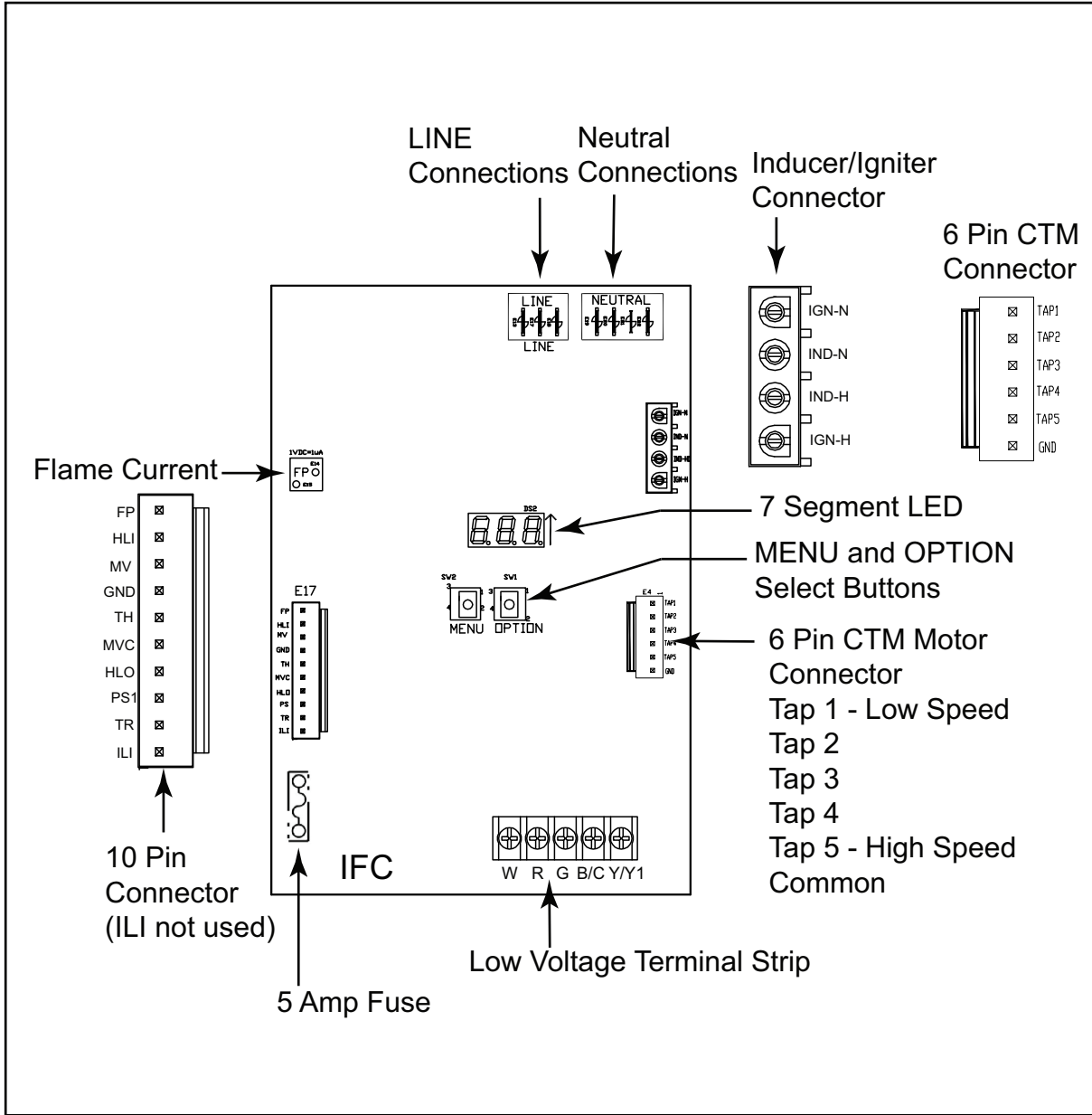
E07 – 1<sup>st</sup> Stage Gas Valve (MVL) energized when it should not be

E08 – Flame Current Low, operation allowed

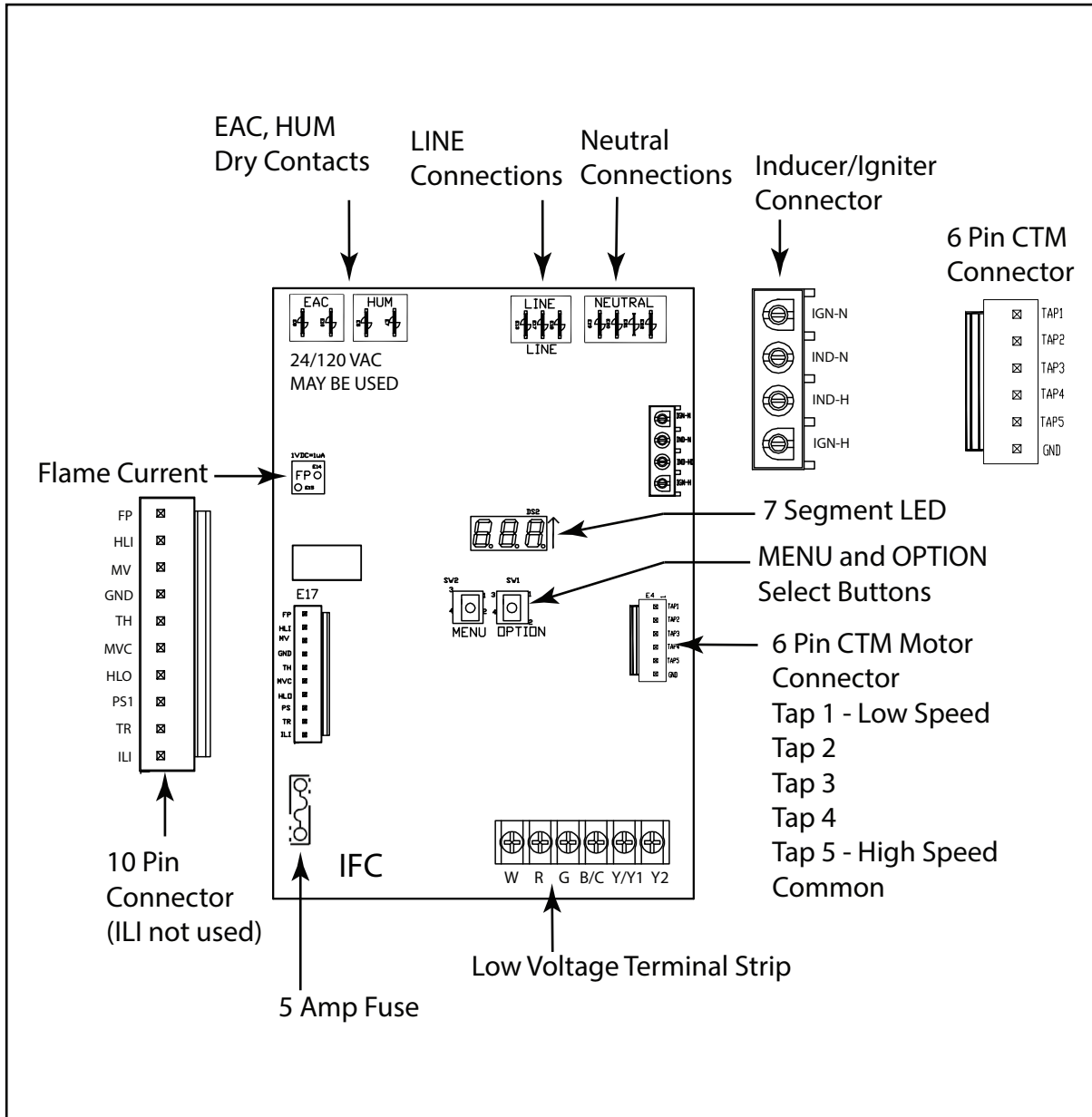
E11 – See troubleshooting Instructions

E12 – Open fuse

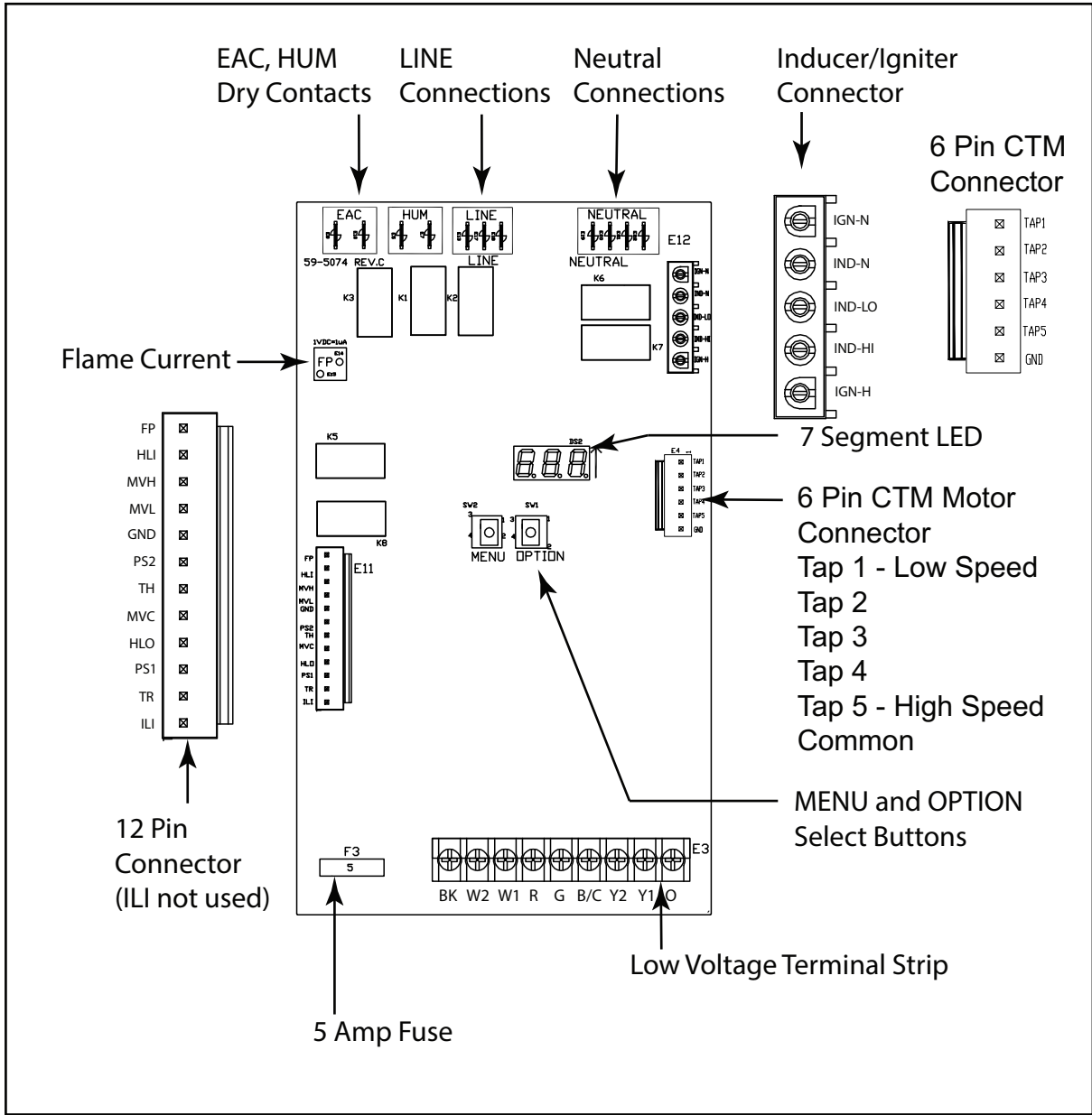
S8B1 IFC Component Layout



S8X1 IFC Component Layout

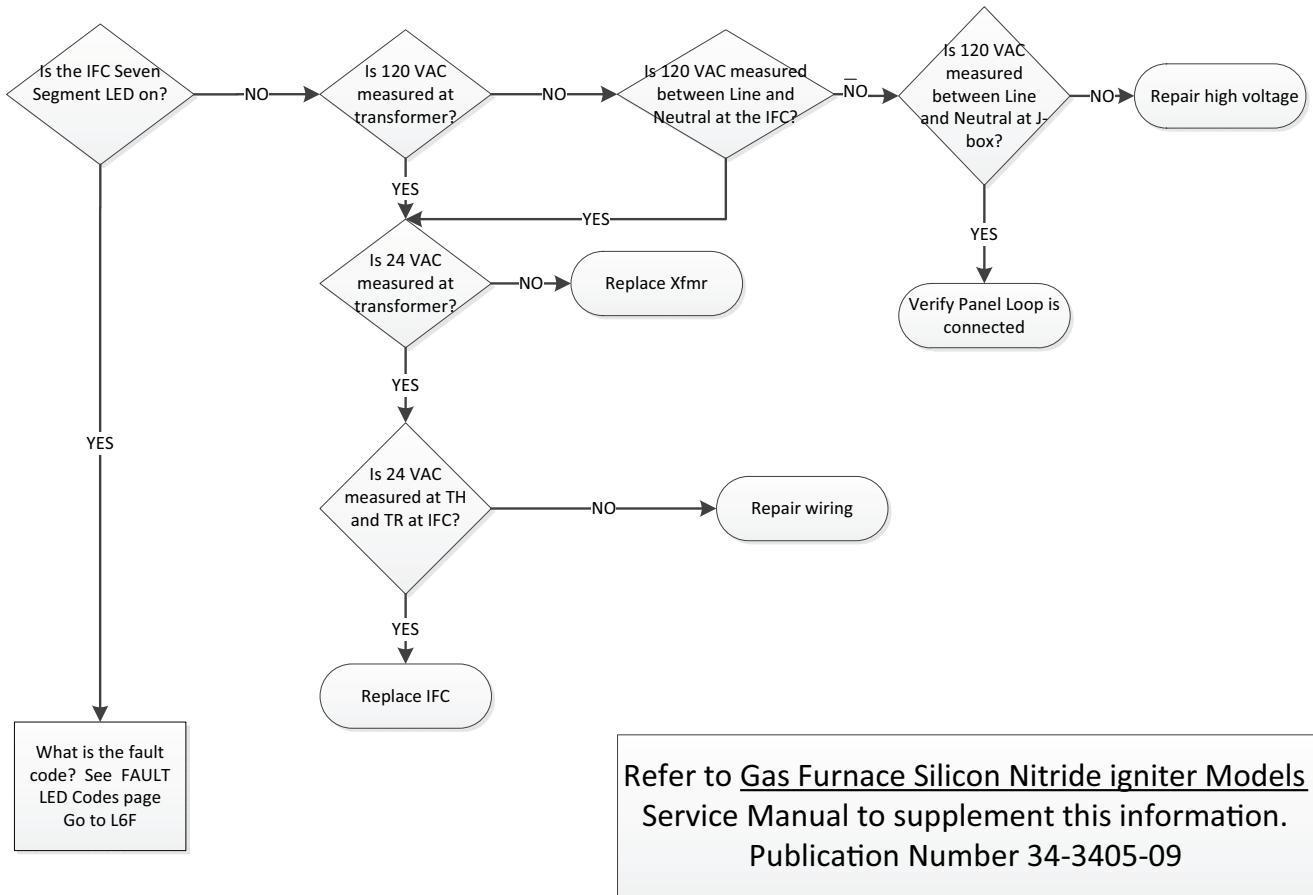


S8X2 IFC Component Layout



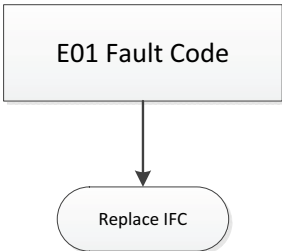


GETTING STARTED

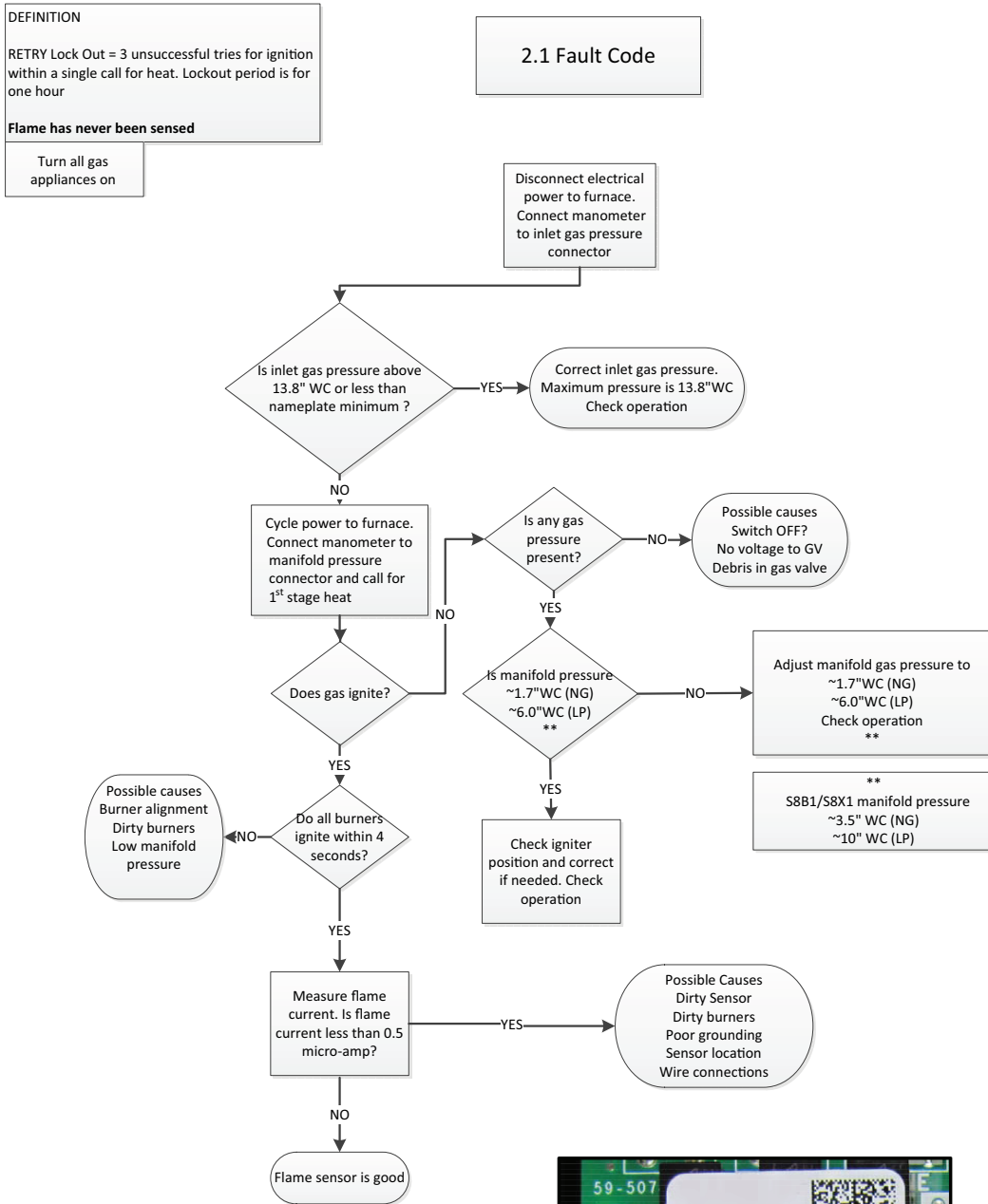


Refer to Gas Furnace Silicon Nitride igniter Models Service Manual to supplement this information. Publication Number 34-3405-09

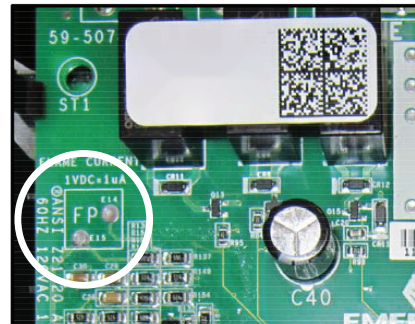
DEFINITION :  
Internal Failure of the Control Board



# Troubleshooting



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)



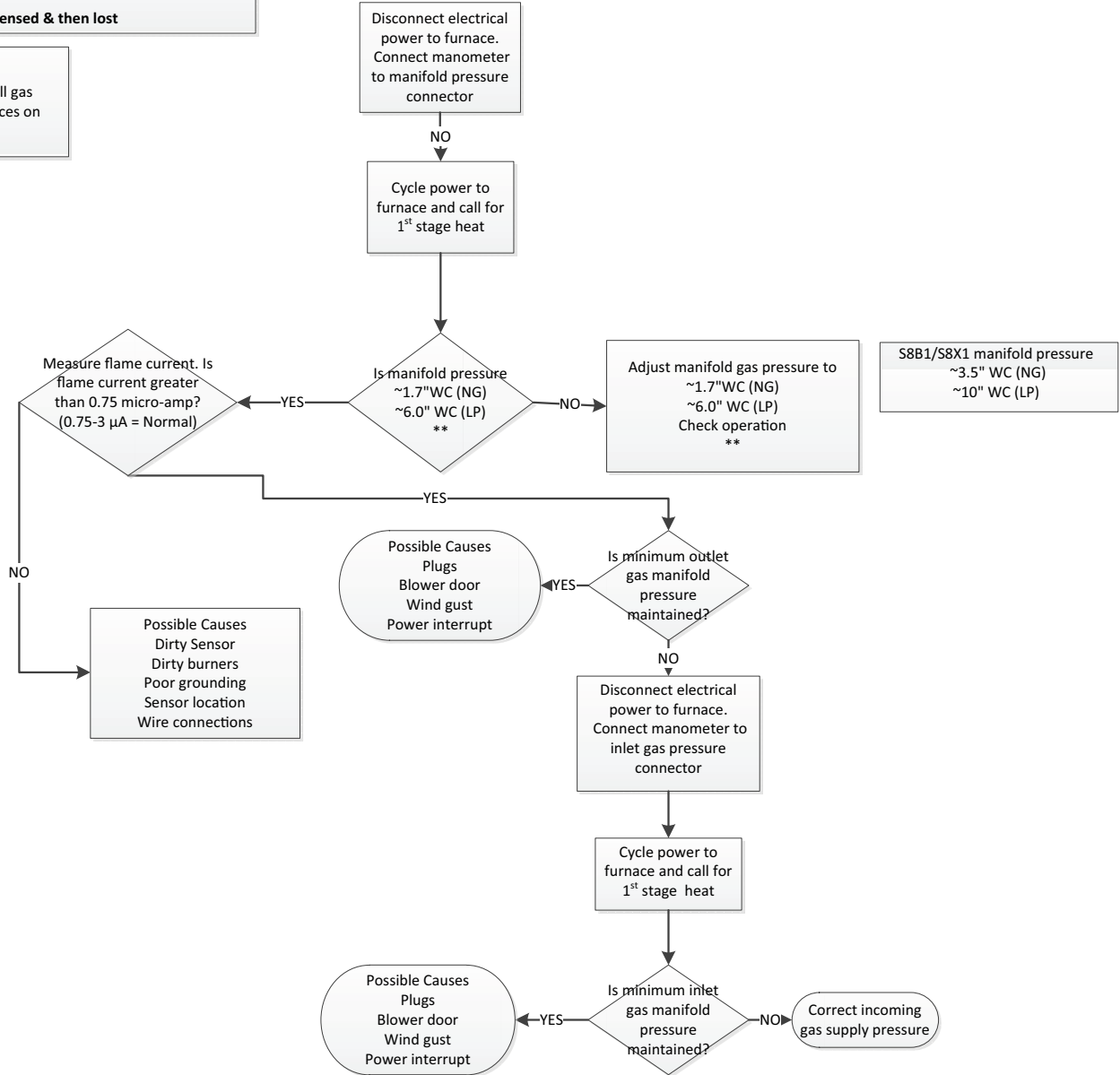
DEFINITION

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



S8B1/S8X1 manifold pressure  
~3.5" WC (NG)  
~10" WC (LP)

DEFINITION

1<sup>st</sup> 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

# Troubleshooting

## DEFINITION

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

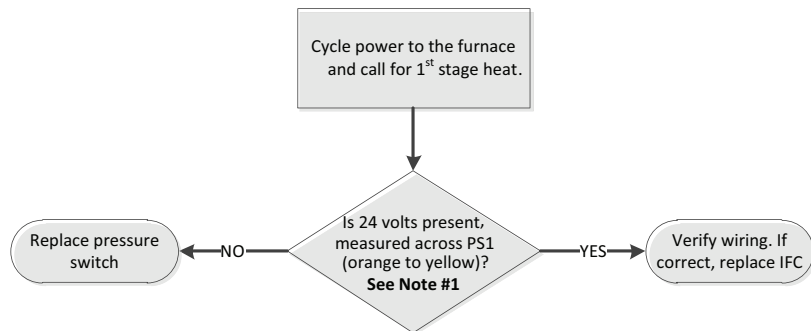
In most cases, the pressure switch is not the problem.

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

## Note #1

24 volts = Open Switch  
0 volts = 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 2<sup>nd</sup> stage during such an event.

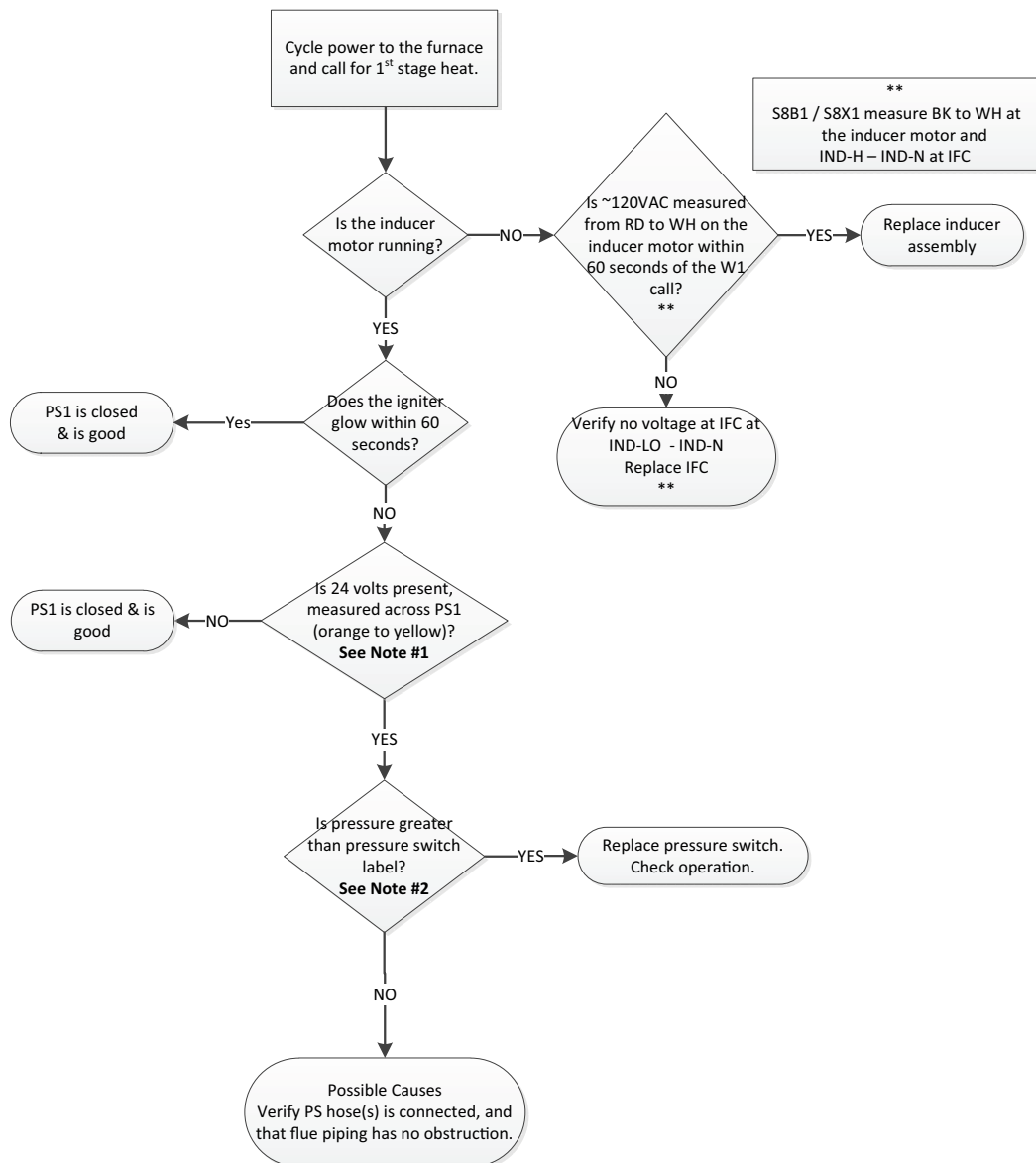
## 3.2 Fault Code

**Note #1**

24 volts = Open Switch  
0 volts = Closed Switch

**Note #2**

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



# Troubleshooting

## DEFINITION

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

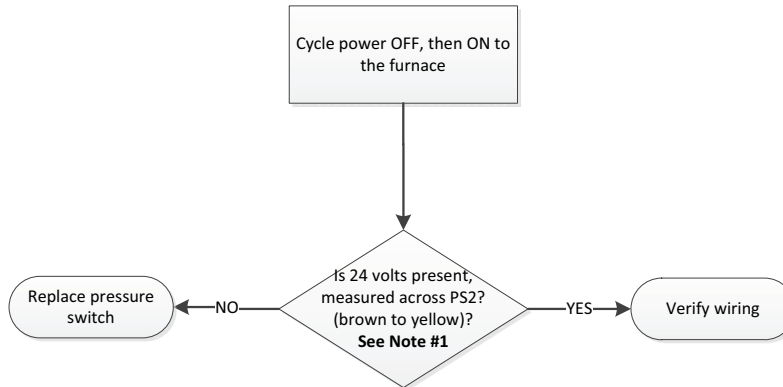
**In most cases, the pressure switch is not the problem.**

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

## 3.3 Fault Code

### Note #1

24 volts = Open Switch  
0 volts = 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.

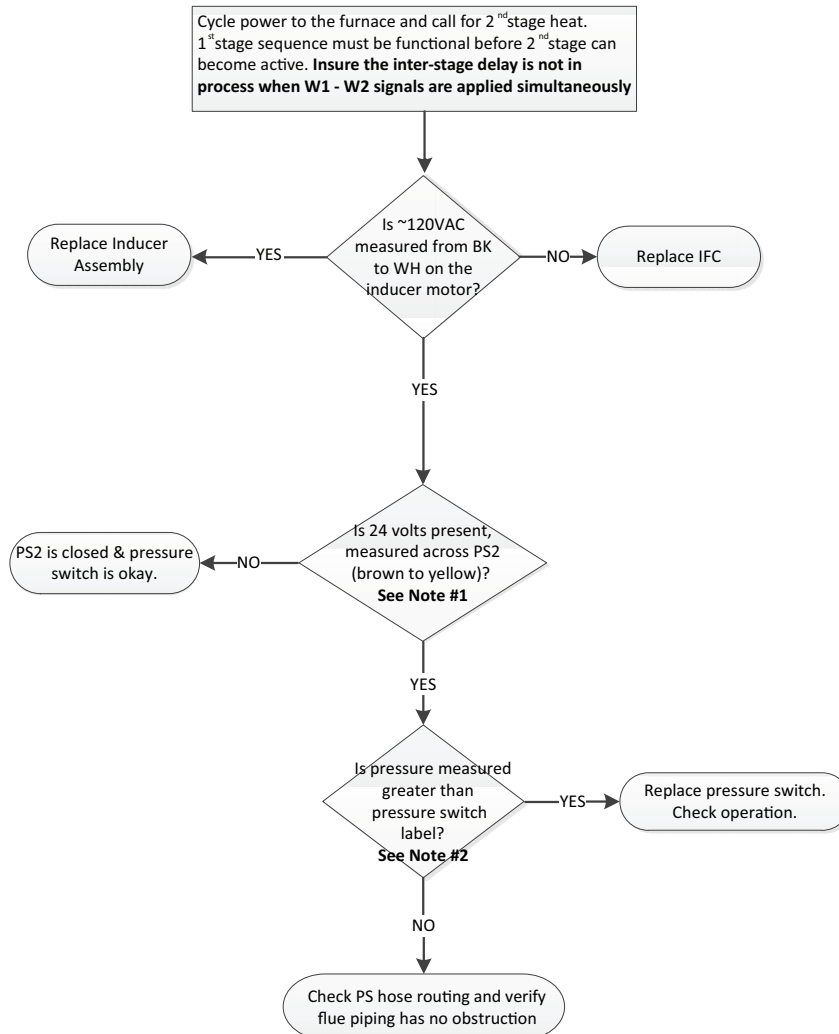
## 3.4 Fault Code

**Note #1**

24 volts = Open Switch  
0 volts = Closed Switch

**Note #2**

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

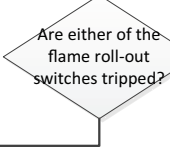
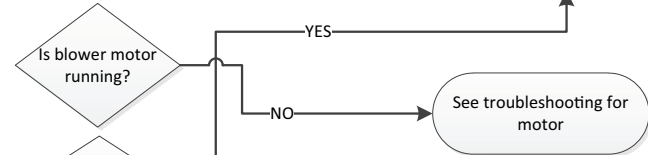


# Troubleshooting

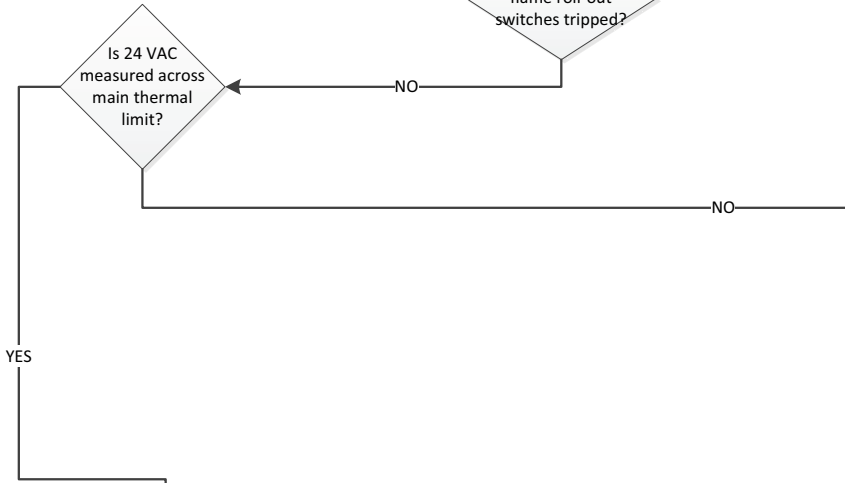
**DEFINITION**  
 Limit switches are safety devices that will open when an abnormal high temperature has been sensed. REMOVE ALL JUMPER WIRING TO SWITCHES!  
 Under no circumstances, shall these switches be left jumpered when not troubleshooting. Verify filters and blower wheels are clean

## 4.0 Fault Code

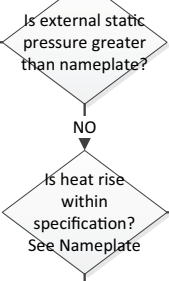
See next page for additional 4 flash faults



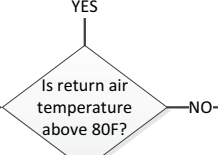
Note:  
 S8X2 will need to be checked in both 1<sup>st</sup> & 2<sup>nd</sup> stage operation.



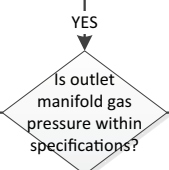
Correct application or duct issues. Check operation



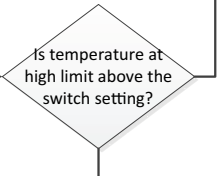
Return air temperature is above max limit



Check for loose insulation or other objects within furnace air stream

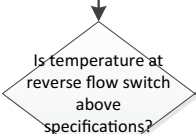
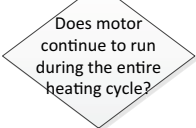


Correct gas pressure Check operation



Make sure any temperature measuring devices (thermocouples, dial thermometers) used to estimate limit temperature are within 1/4 inch of limit disc

### Reverse flow switch checkout

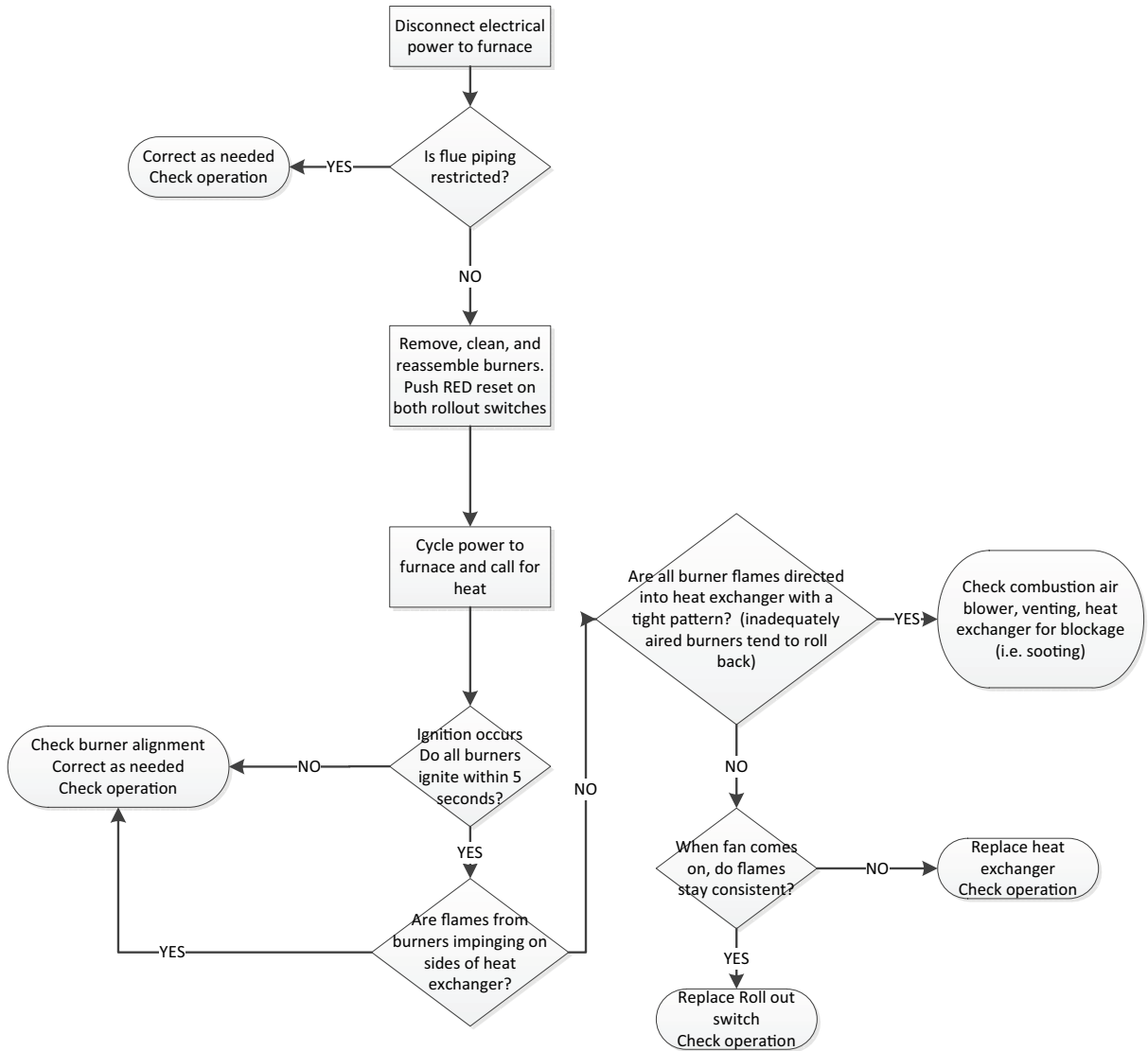


Increase blower off delay

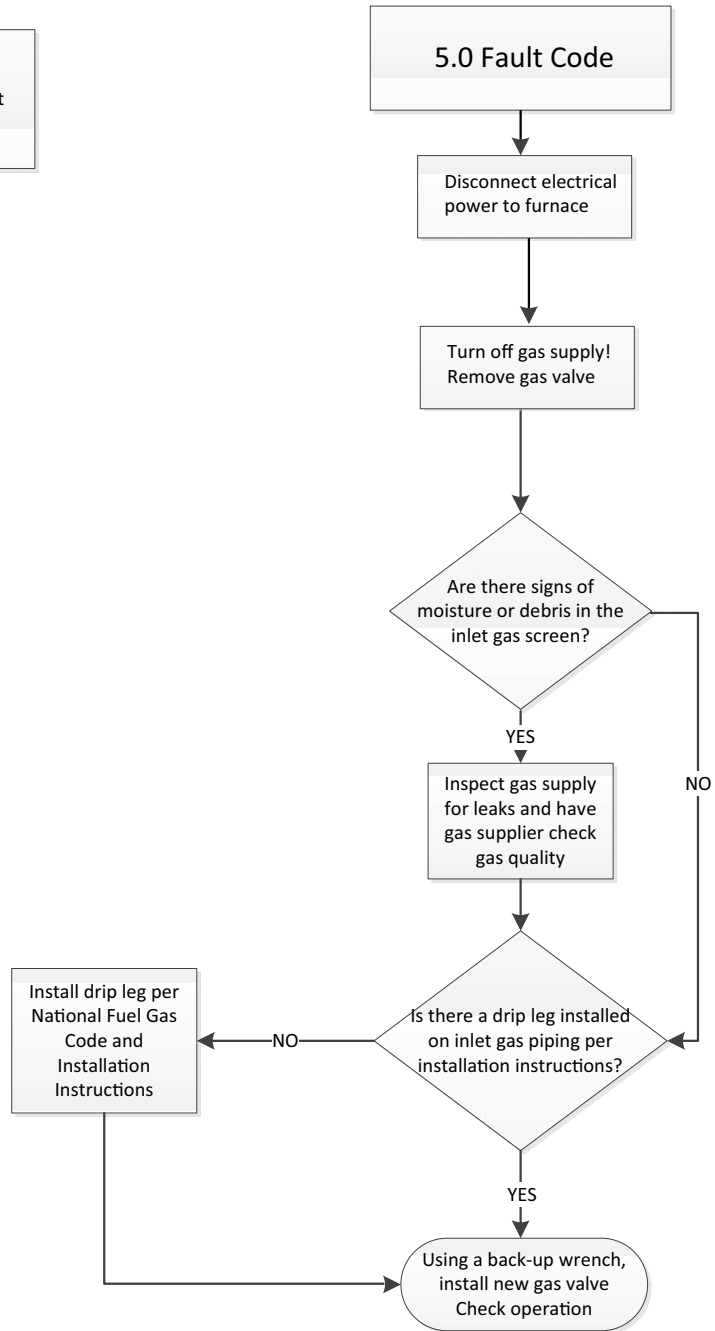


**DEFINITION:**  
 Limit switches are safety devices that will open when an abnormal high temperature has been sensed.  
**REMOVE ALL JUMPER WIRING TO SWITCHES!**  
 Under no circumstances, shall these switches be left jumpered when not troubleshooting.

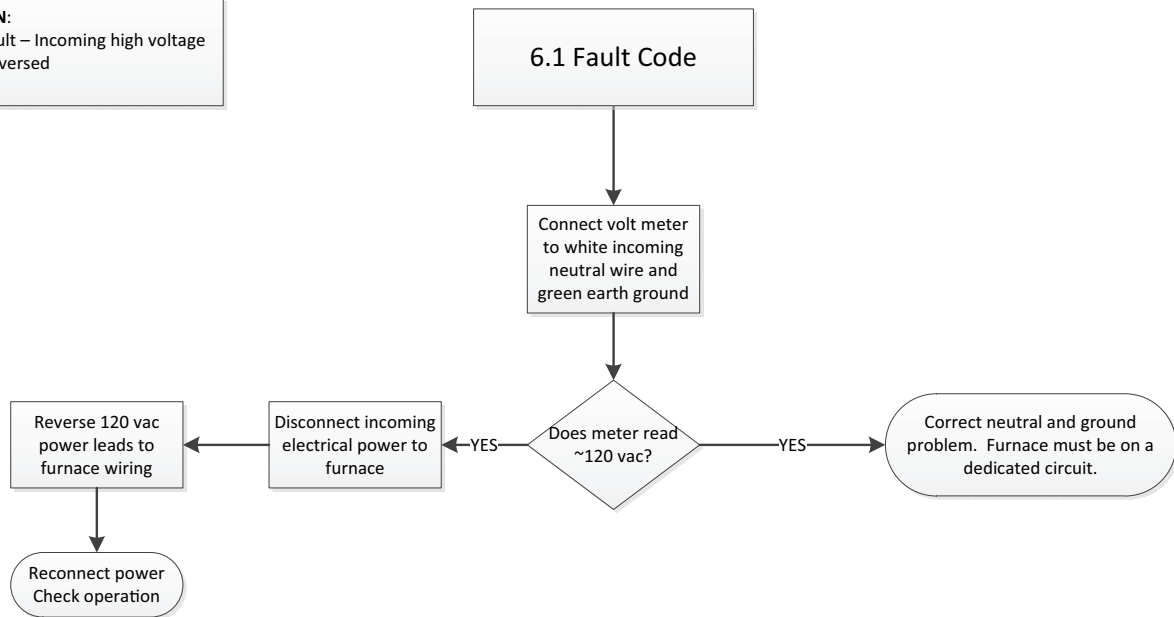
**4.0 Fault Code  
 Flame Rollout**



**DEFINITION:**  
Flame is sensed when it should not be sensed.

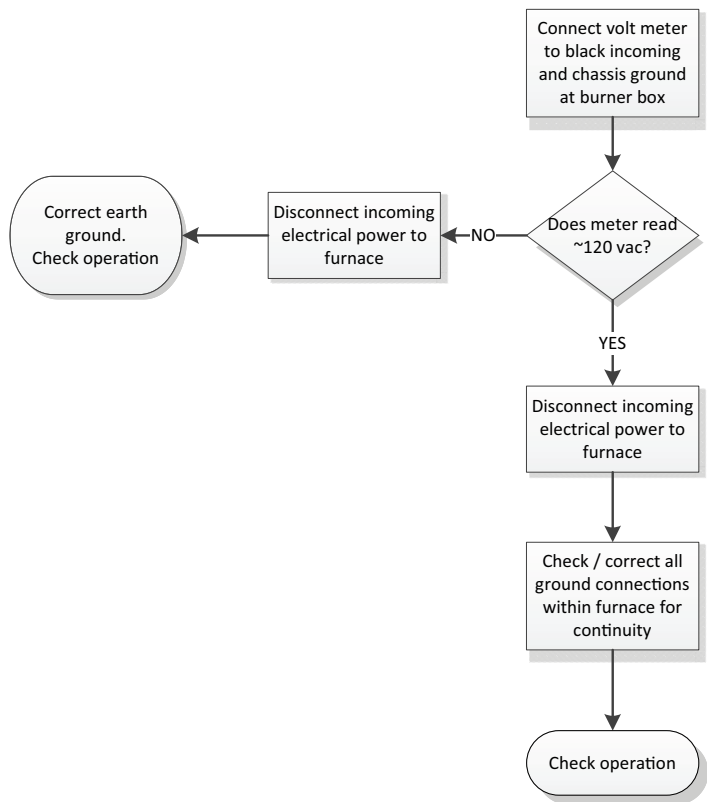


**DEFINITION:**  
Polarity Fault – Incoming high voltage wiring is reversed



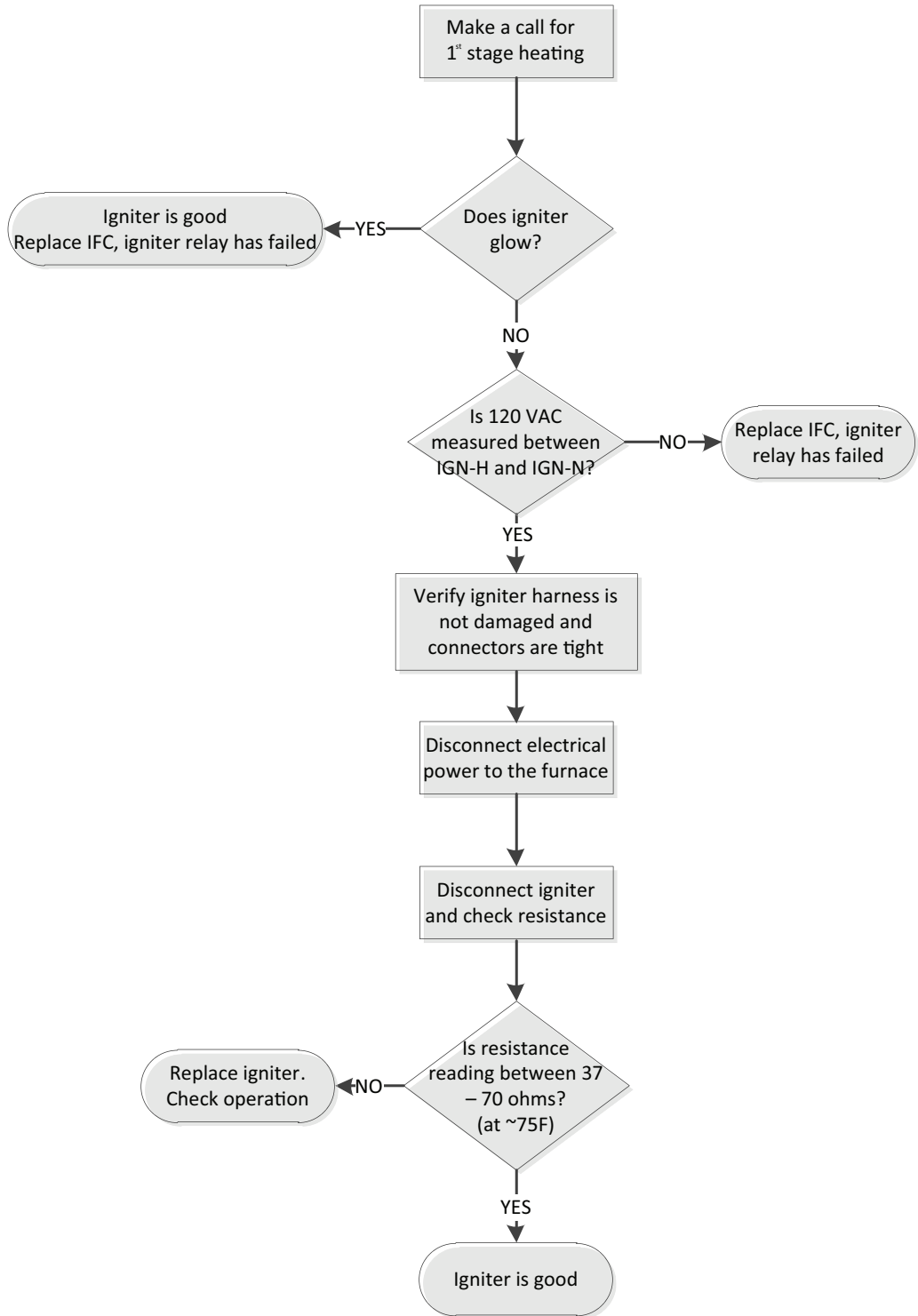
**DEFINITION:**  
Ground Fault - Incoming or chassis ground connection is not sensed

**6.2 Fault Code**

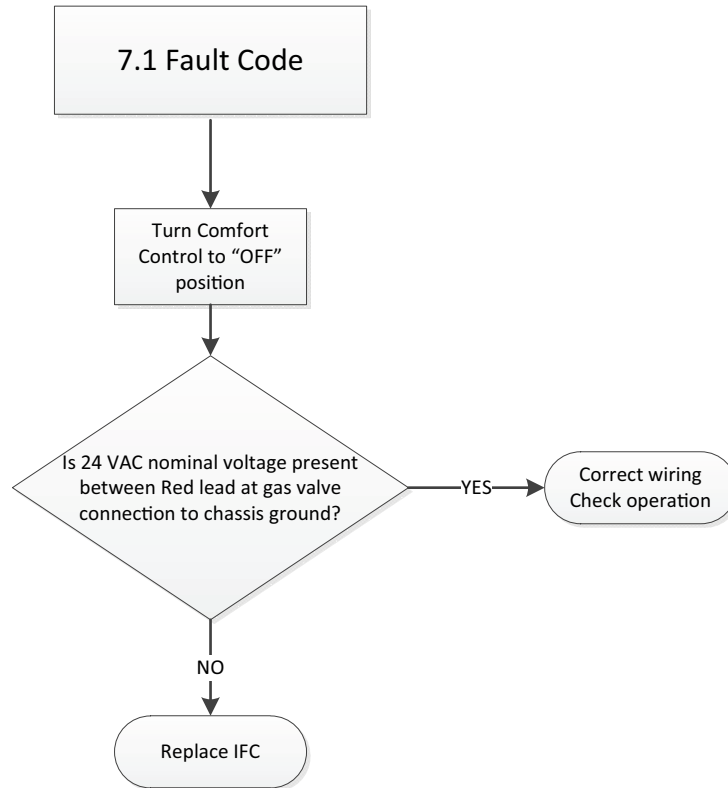


**DEFINITION:**  
Igniter Relay Fault – The control board has sensed that the igniter relay has stuck closed  
  
igniter Fault – The control board has sensed that the igniter circuit is open or shorted.

6.3 Fault Code



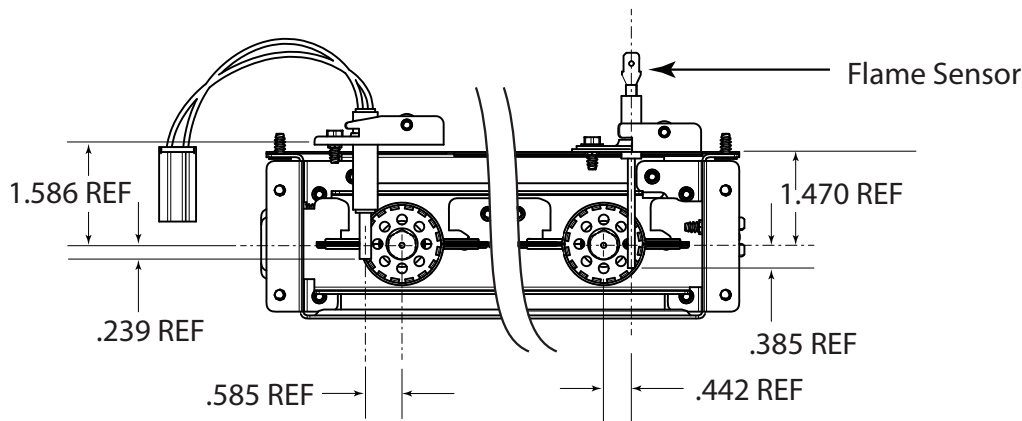
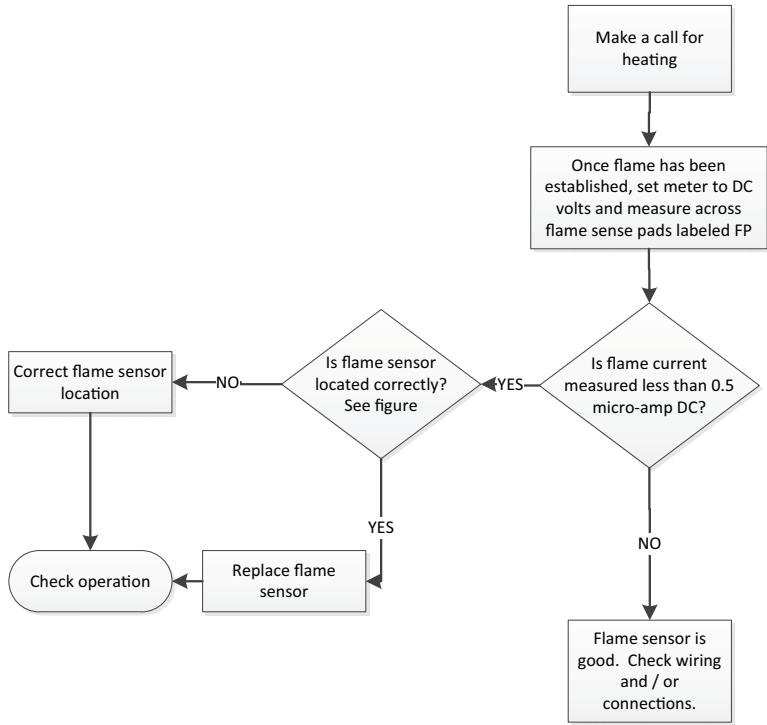
DEFINITION: External Gas Valve  
Circuit Error (24 volts is present  
when it should not be present)



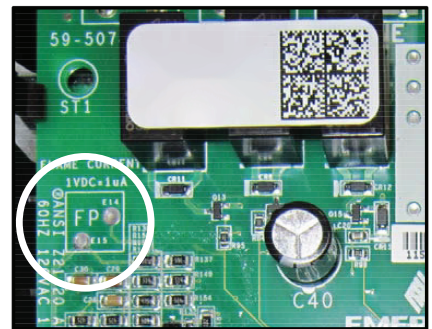
# Troubleshooting

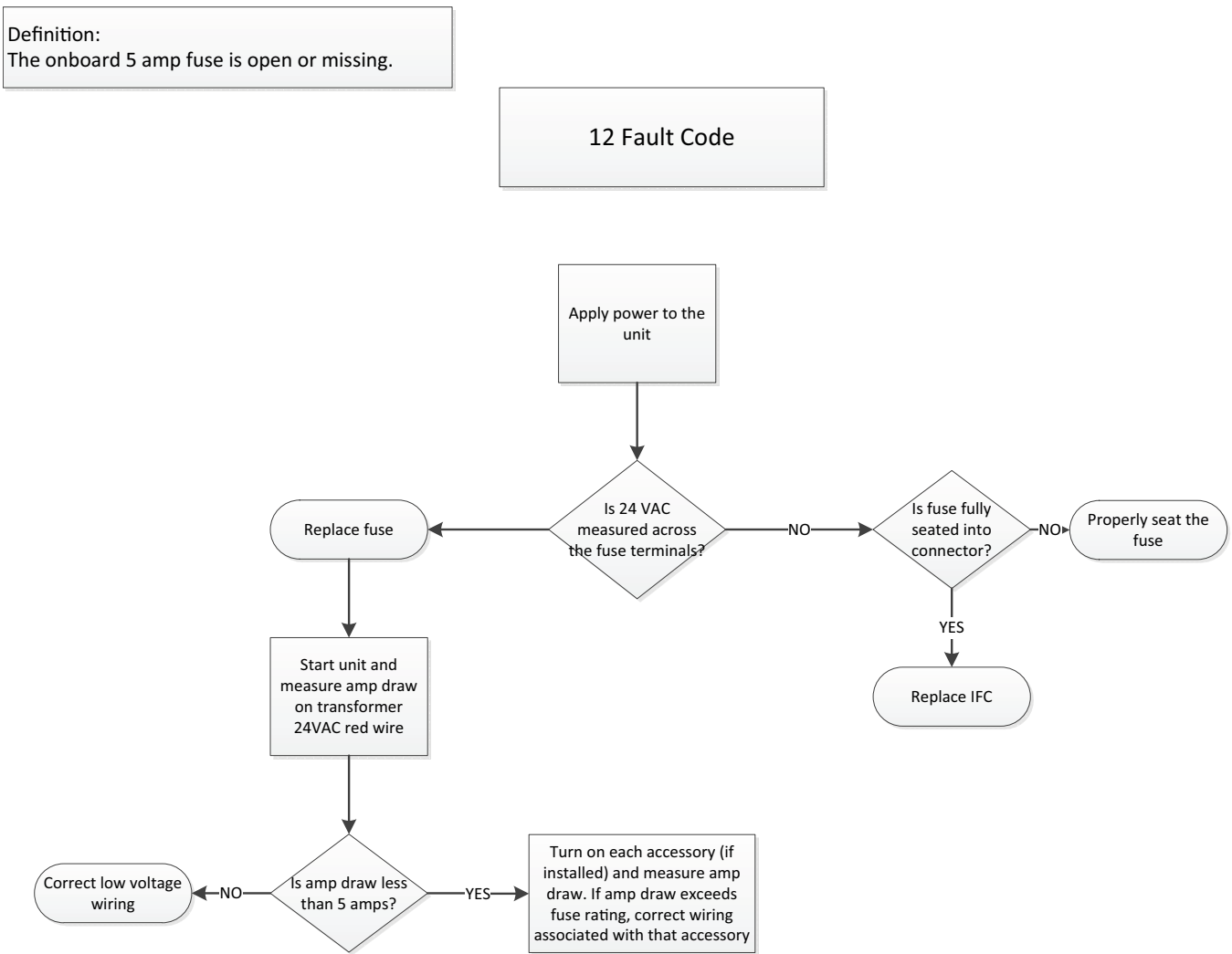
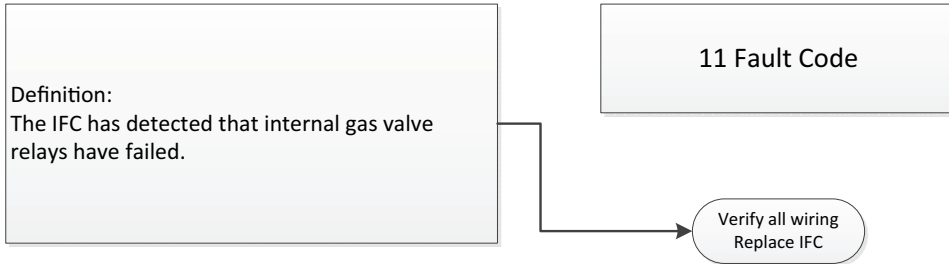
**DEFINITION:**  
The flame sense current is less than 0.5 micro-amp DC

**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)





# Troubleshooting

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

## Constant Torque Motor Troubleshooting

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

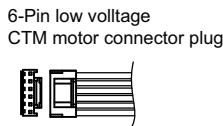
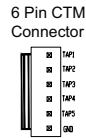
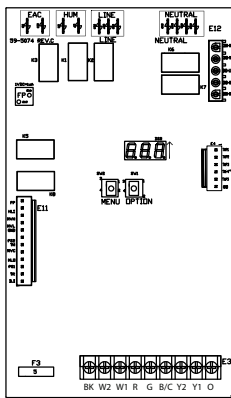
Turn fan to ON at thermostat and verify that COF and TP1 alternately appear on the seven segment display

Does motor run?

YES → Motor & IFC are good

NO → Verify voltage(s) listed

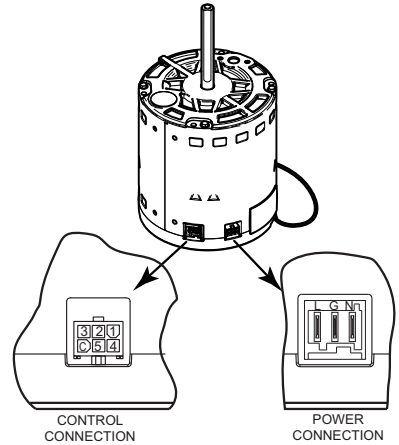
1. Remove the 6-pin low voltage connector from the IFC
2. Apply 24 VAC to Common tap (Blue) and any speed tap on the CTM motor 6-pin plug. The motor should run.



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

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

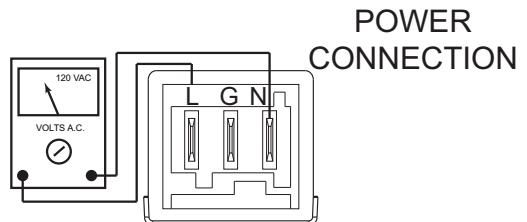
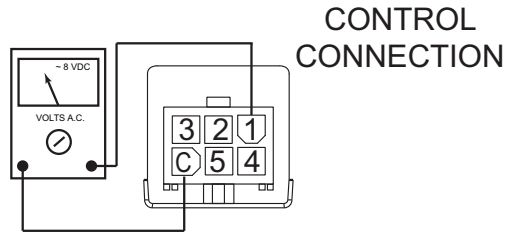


### 9 Tap CTM Voltages

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





# Part List

<ul style="list-style-type: none"><li>• Igniter</li><li>• Flame Sensor</li><li>• In-shot Burner(s)</li><li>• Gas Valve</li></ul>	<ul style="list-style-type: none"><li>• Inducer Assembly</li><li>• Blower Motor</li><li>• Blower Wheel</li><li>• IFC (Integrated Furnace Control)</li></ul>	<ul style="list-style-type: none"><li>• Pressure Switch(es)</li><li>• Main Thermal Limit</li><li>• Roll-Out Switch(es)</li><li>• Reverse Air Switch(es)</li></ul>
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## About Trane and American Standard Heating and Air Conditioning

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