VersaPro™ 80% Gas Furnace

Service Manual

MODELS:

- **MGA80EE040A3B**
- **MGA80EE060B4B**
- **MGA80EE080B4B**
- **MGA80EE080C4B**
- **MGA80EE100C5B**
- **MGA80EE120D5B**

Read this manual carefully before installation and keep it where the operator can easily find it for future reference.

Due to updates and constantly improving performance, the information and instructions within this manual are subject to change without notice.

Version Date: 05/23/24
Please visit www.mrcool.com/documentation
to ensure you have the latest version of this manual.

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COMFORT MADE SIMPLE

CONTENTS

1.1 Product Overview

- North American gas furnaces are mainly divided into 96% and 80% condensing types.
- The 80% furnaces are divided into 5 different capabilities (40, 60, 80, 100, and 120), and 4 different cabinet sizes.
- It can be combined with an A-Coil module to utilize gas heating in winter, air conditioning and external mechanism cooling in summer, and sharing gas furnace fans and air ducts for refrigeration and heating.

1.2 Product Images

Cabinet A
40/60

Cabinet B
60/80

Cabinet C
80/100

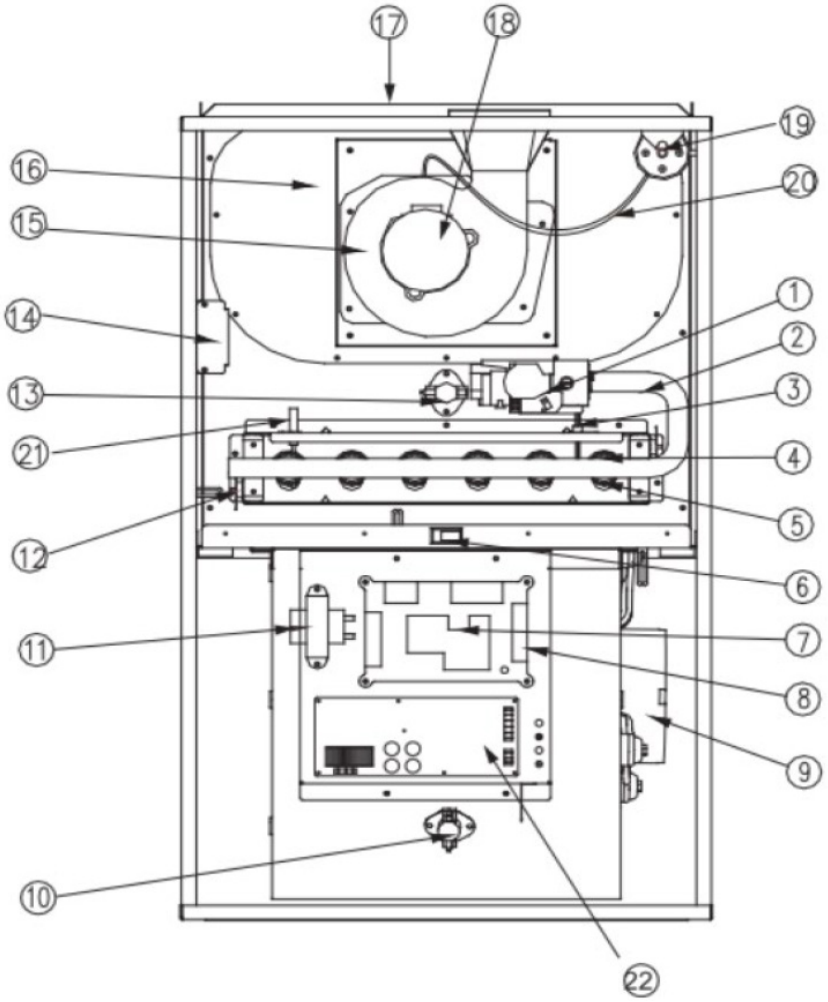
Cabinet D
120

1.3 Product Images

M	G	A	80	E	E	040	A	3	B
1	2	3	4	5	6	7	8	9	10

1	**M**	MRCOOL
2	**G**	Gas Furnace
3	**A**	Airflow: **M** = Multi-Position (Upflow/Horizontal) **D** = Downflow **A** = All (Upflow/Horizontal/Downflow)
4	**80**	AFUE: **96:** 96% AFUE **80:** 80% AFUE
5	**E**	**S** = Single Stage / Multi-Speed **H** = Two Stage / Multi-Speed **E** = Two Stage / DC Motor
6	**E**	Motor: **C** = PSC **E** = ECM
7	**040**	BTU
8	**A**	Cabinet Size: **A** = 14.5 **B** = 17.5 **C** = 21 **D** = 24.5
9	**3**	CFM: **2** = 800 **3** = 1200 **4** = 1600 **5** = 2000
10	**B**	3rd Generation

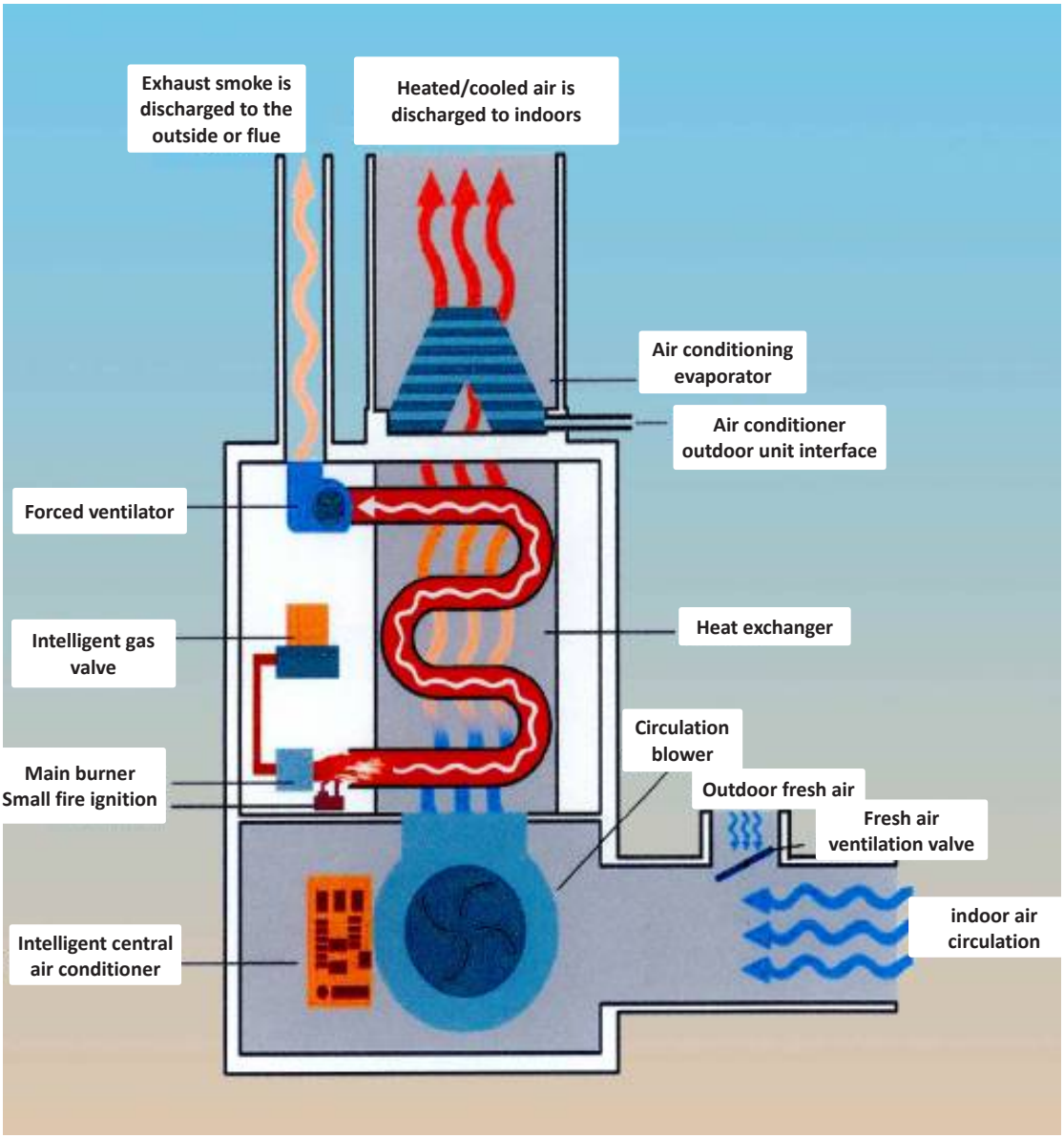
1.4 Exploded View of Unit



1	Gas Valves
2	Gas Pipe Assembly
3	Ignition Needle
4	Nozzle
5	Burner
6	Door Switch
7	Main Control Board
8	24V Wired Remote Interface
9	Internal Motor
10	Counter Flow Thermostat
11	Transformer

12	Overflow Thermostat
13	Master Thermostat
14	Junction Box
15	Smoke Exhaust Fan Volute
16	Gas Collection Hood
17	Heat Exchanger Tube Assembly
18	Smoke Extraction Motor
19	Wind Pressure Switch
20	Wind Pressure Connection Pipe
21	Flame Sensor
22	Fan Drive Module

1.5 System Schematic Diagram



1.6 Individual Components & Roles

Gas Valves

The gas input load is controlled by adjusting the spring screw penetration depth and adjusting the pressure after the gas valve.

Gas Pipe Assemblies

Deliver the gas and distribute it evenly to each copper nozzle.

Ignition Needle

Provide a gas ignition heat source to ignite the gas; silicon nitride material, 115V strong electricity, reach a surface temperature of >1292°F (700°C) within 15 seconds.

Nozzles

Control gas flow; the flow rate is determined by the pressure and channel area (nozzle aperture), after the gas valve determines the gas pressure after the valve is delivered to the nozzle, the nozzle aperture determines the actual gas flow, thereby determining the gas input load.

Burners

The function of the burner is to fully mix the gas ejected from the nozzle with the inhaled air and evenly distribute it to the head to form a combustible - mixture to ensure that the gas is fully burned and can not produce undesirable phenomena such as separation flame and tempering.

Door Switch

The function is to prevent electric shock and protect the safety of maintenance personnel. When the cover is opened, the door switch automatically cuts off the power supply.

Main Control Board

Control center of gas furnace; controls the gas furnace according to the received signal demand, open the corresponding cooling/heating/air supply and other functions, and can protect the machine in time when encountering a situation.

24V Interface

Windshield output interface

Internal Motor

Provides air duct circulating air volume

Counter-current Thermostats

Prevent heat backflow when the fan fails, and protect and cut off the gas in time.

Transformers

Convert 115V strong current into 24V weak current, and supply the low-voltage control circuit of the control board.

Overflow Thermostat

Prevent the line body from being burned when the flame overflows, and protect it in time.

Main Thermostat

Protection when the cavity temperature is too high to prevent insufficient air volume and excessive air temperature.

Junction Box

The user installs the port connecting the power cord at the site.

Smoke Exhaust Fans

The driving force of the sucked air required for gas combustion, and the exhaust gas after combustion is discharged outdoors.

Gas Gathering Hood

The function of the gas collection hood is to collect the flue gas in multiple heat exchange tubes, and then discharge it to the outside by the smoke exhaust fan.

Heat Exchanger Tube Assemblies

The heat exchanger tube is a mixture of gas and air, and then the high-temperature flue gas formed by combustion flows along the tube to transfer the heat to the wall of the heat exchanger tube, and then the tube wall transfers the heat to the air flowing outside the tube, so as to achieve the purpose of heating the air outside the tube.

Wind Pressure Switch

The role of the wind pressure switch to monitor the pressure of the smoke exhaust fan pressure measuring port, when the negative pressure of the smoke exhaust fan is less than the set value, it indicates that the air volume of the smoke exhaust fan decreases due to the failure of the smoke exhaust fan / the blockage of the smoke pipe, etc., which will cause the risk of CO exceeding the standard due to insufficient gas combustion air, at this time the wind pressure switch protects and cuts off the gas supply, It can not be recovered until the negative pressure value of the smoke exhaust fan is higher than the set value.

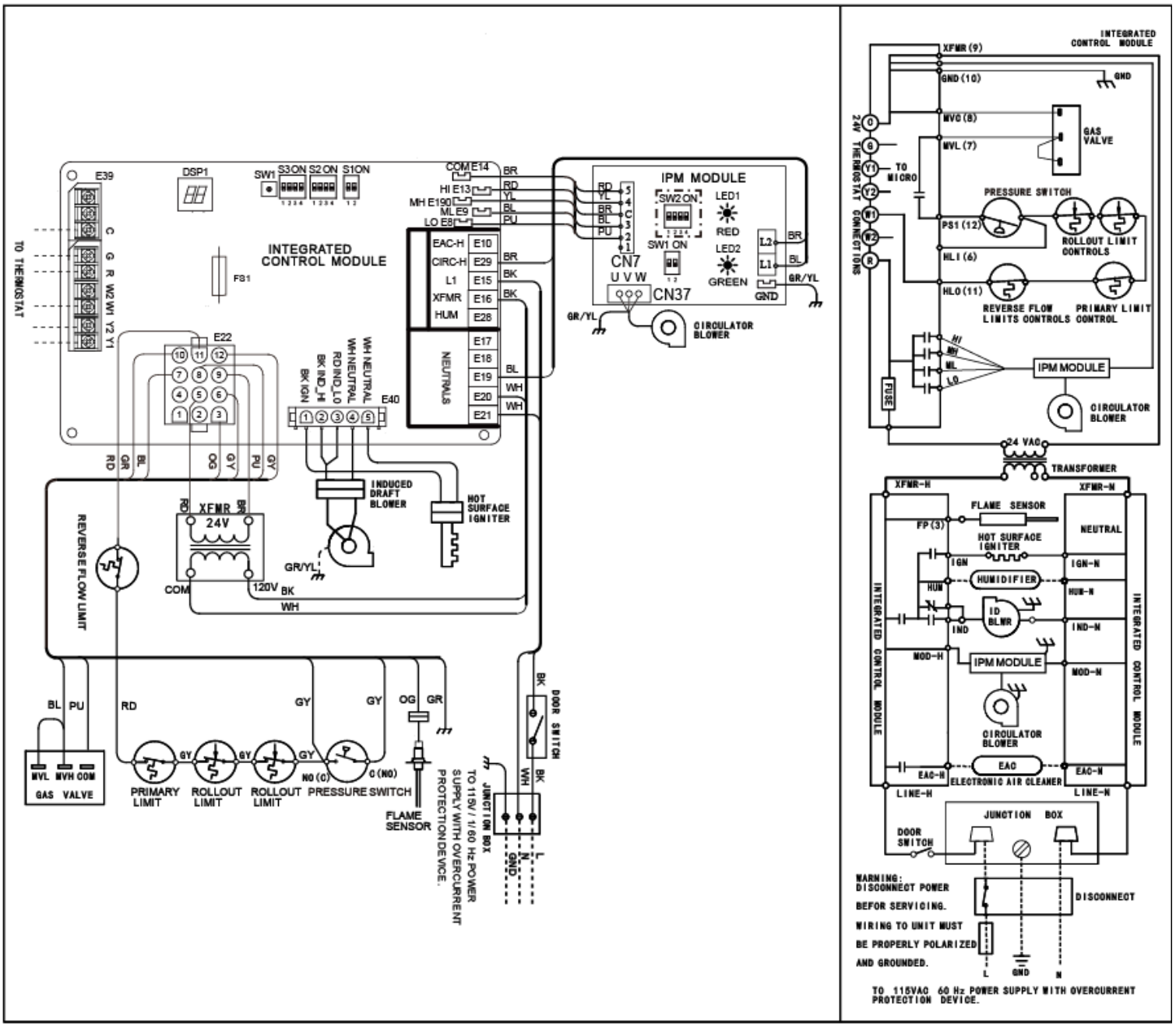
Wind Pressure Connection Pipe

The silicone tube connecting the smoke exhaust fan and the wind pressure switch, the function is to transmit the pressure of the pressure measuring port of the smoke exhaust fan to the wind pressure switch, because the flue gas temperature of 80% general energy efficiency gas furnace products is higher, so this connection pipe has higher temperature resistance requirements (about 392°F (200 °C)). Flame Sensors monitor the flame, mainly to prevent ignition failure, or accidental flameout during operation, turn off the gas in time to prevent gas leakage.

Fan Drive Modules

The drive module of the internal fan is used in the internal motor model of the external drive, and the function is to control the operation logic of the internal fan (at this stage, the internal motor of the external drive is constant air volume control).

2.1 Wiring Summary



2.2 Dialing Instructions

A

80% Machine Windshield Setting	Fan Speed							
	DIP SW				Nominal Speed			
	S3-1	S3-2	S3-3	S3-4	H-Heat	L-Heat	H-Cool	L-Cool
100C / 120D	*OFF	ON	OFF	OFF	4	3	3	2
	OFF	ON	OFF	OFF	4	3	5	3
	OFF	ON	ON	ON	5	4	4	4
	OFF	ON	OFF	ON	4	3	4	3
60A / 80B / 80C	*ON	OFF	OFF	ON	5	5	5	4
	OFF	ON	OFF	ON	4	3	4	3
	OFF	ON	OFF	OFF	4	3	3	2
60B	OFF	ON	OFF	OFF	4	3	3	2
	*OFF	ON	ON	OFF	4	3	5	3
	OFF	ON	ON	ON	5	4	4	4
	OFF	ON	OFF	ON	4	3	4	3
40A	*ON	OFF	ON	ON	5	3	5	4
	OFF	OFF	ON	OFF	4	2	3	2
	ON	ON	OFF	ON	4	2	4	3

B

Heat Off Delay		
DIP SW		Nominal (Minutes)
S2-1	S2-2	
*OFF	OFF	90
ON	OFF	120
OFF	ON	150
ON	ON	180

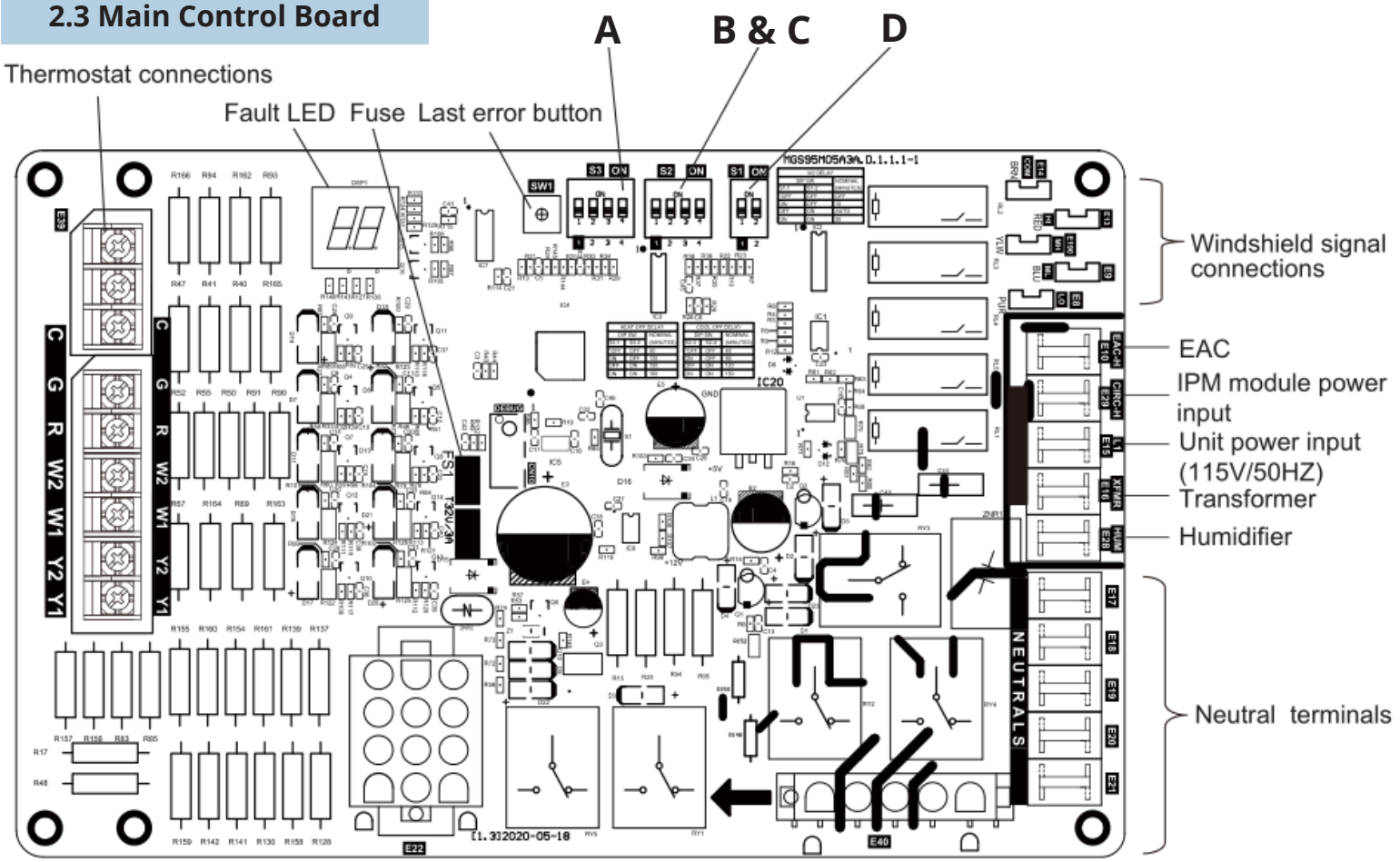
C

Cool Off Delay		
DIP SW		Nominal (Minutes)
S2-3	S2-4	
*OFF	OFF	60
ON	OFF	90
OFF	ON	120
ON	ON	150

D

W2 Delay		
DIP SW		Nominal (Minutes)
S1-1	S1-2	
OFF	OFF	*OFF
ON	OFF	RESERVE
OFF	ON	RESERVE
ON	ON	RESERVE

2.3 Main Control Board



2.4 Fan Drive Board

A

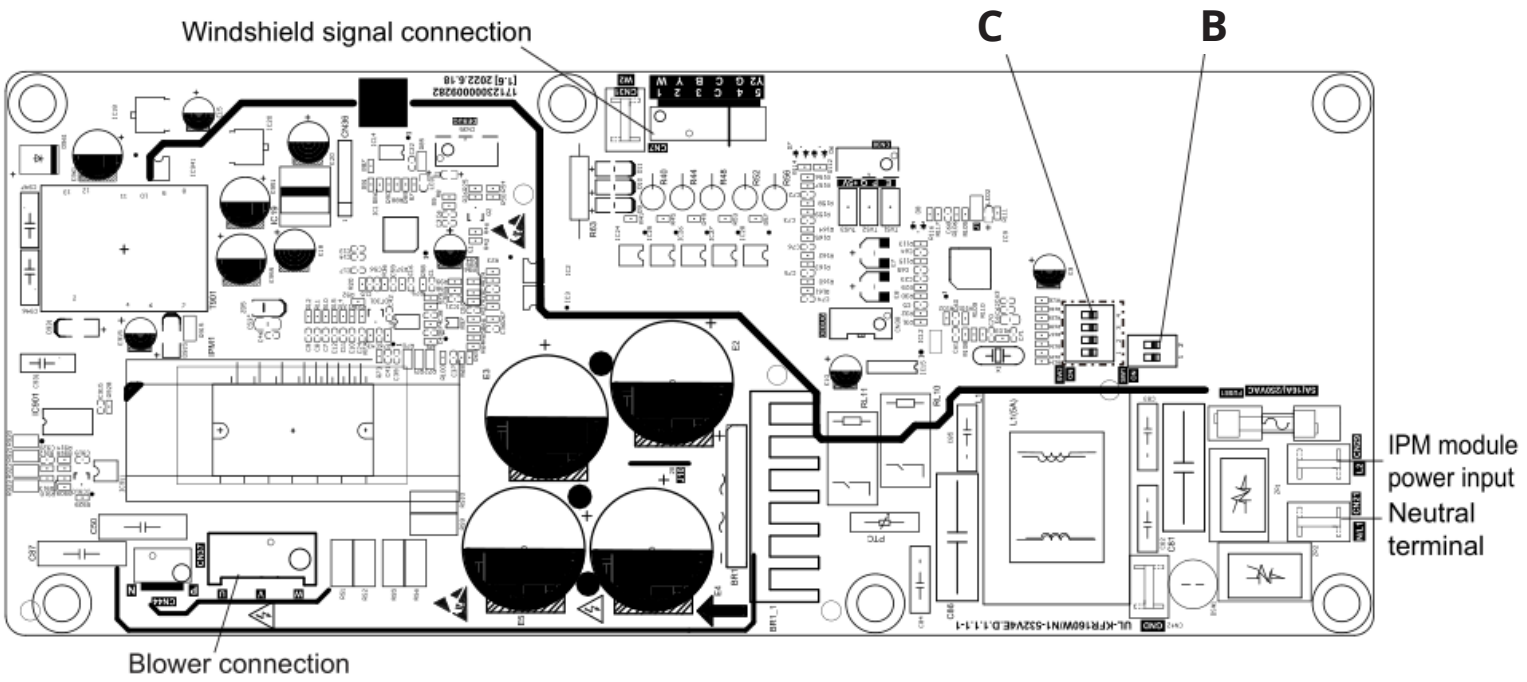
Series of Products		
SW2-4	OFF	80% Gas Furnace
	ON	96% Gas Furnace

B

Fan Speed		
SW1-1	OFF	Normal Speed
	ON	Slow Speed
SW1-2	OFF	Reserve
	ON	Reserve

C

80% Machine Type			
DIP SW			Type
SW2-1	SW2-2	SW2-3	
OFF	OFF	OFF	*
OFF	OFF	ON	40A, 60A
OFF	ON	OFF	60B, 80B
OFF	ON	ON	80C
ON	OFF	OFF	100C
ON	OFF	ON	120D



2.5 Fan Speed Dialing

80% Machine Windshield Setting	Fan Speed							
	DIP SW				Nominal Speed			
	S3-1	S3-2	S3-3	S3-4	H-Heat	L-Heat	H-Cool	L-Cool
100C / 120D	*OFF	ON	OFF	OFF	4	3	3	2
	OFF	ON	OFF	OFF	4	3	5	3
	OFF	ON	ON	ON	5	4	4	4
	OFF	ON	OFF	ON	4	3	4	3
60A / 80B / 80C	*ON	OFF	OFF	ON	5	5	5	4
	OFF	ON	OFF	ON	4	3	4	3
	OFF	ON	OFF	OFF	4	3	3	2

80% Machine Windshield Setting	Fan Speed							
	DIP SW				Nominal Speed			
	S3-1	S3-2	S3-3	S3-4	H-Heat	L-Heat	H-Cool	L-Cool
60B	OFF	ON	OFF	OFF	4	3	3	2
	*OFF	ON	ON	OFF	4	3	5	3
	OFF	ON	ON	ON	5	4	4	4
	OFF	ON	OFF	ON	4	3	4	3
40A	*ON	OFF	ON	ON	5	3	5	4
	OFF	OFF	ON	OFF	4	2	3	2
	ON	ON	OFF	ON	4	2	4	3

3.1 Common Failure Codes

Type	Content	Code	Remark
Normal	Standby Mode	--	Idle
Run	Primary Heating (low heat)	H1	1st Heat
Run	Secondary Heating (high fire)	H2	2nd Heat
Run	Air Supply Mode	CF	Continuous Fan
Run	Primary Refrigeration	C1	1st Cooling
Run	Secondary Refrigeration	C2	2nd Cooling
Fault	When the exhaust fan is turned off, the wind pressure switch 1st-stage is detected for a long shutdown	E1	Shorted Pressure Switch
Fault	When the smoke exhaust fan is running, the 1st-stage air pressure switch is normally open	E2	Open Pressure Switch
Fault	When the smoke exhaust fan is turned on in high gear, the 2nd-stage air pressure switch is normally open	E3	Open Pressure Switch
Fault	Wind pressure switch cyclic lock (not recovered for more than 5 minutes)	E4	Open Pressure Switch
Fault	The thermostat switch is open/flame spills	E5	Open Thermal Limit, Rollout Switch
Fault	The thermostat switch is open/flame spilling lasts for more than 5 minutes	E6	Open Thermal Limit, Rollout Switch
Fault	External Locking (more than 4 failed ignitions)	E7	Ignition Failure Locked
Fault	External Locking (flame detected and lost more than the re-ignition limit (5))	E8	Flame loss locked
Fault	No gas valve was opened to detect a flame signal	FE	Gas value relay stuck closed
Fault	The flame is low and the flame sensor induces a small current but still operates	FL	Flame low
Fault	The power supplies are polarized in reverse	Pr	Power Reversed
Fault	The fuse is disconnected	Fo	Fuse Open
Fault	The electronic control board fails	bE	Board Error
Fault	Incorrect signal combination	nL	Signal Error

3.2 Fault Code Procedures

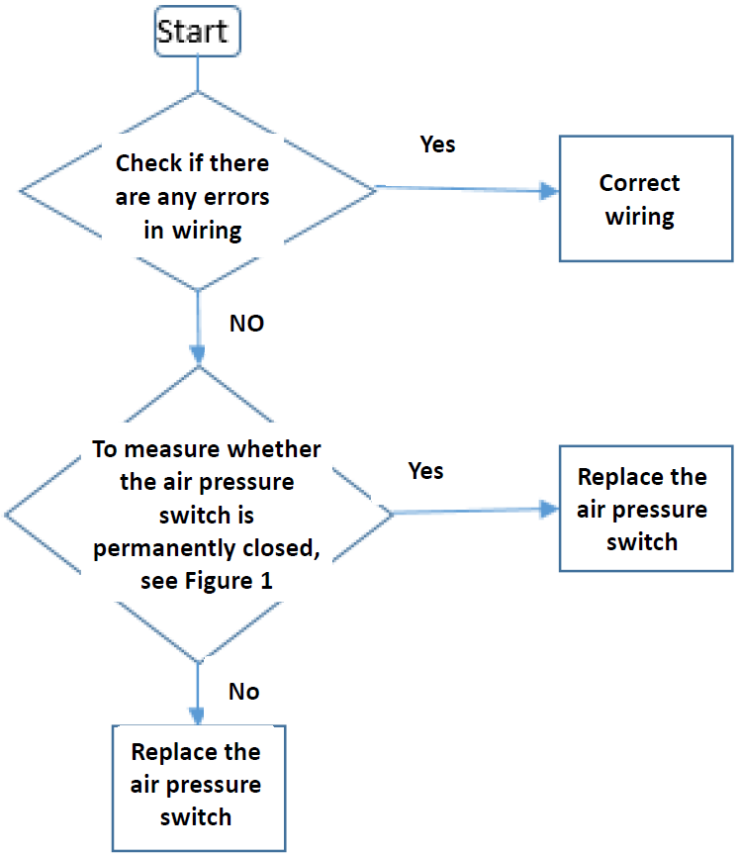
Display Code:

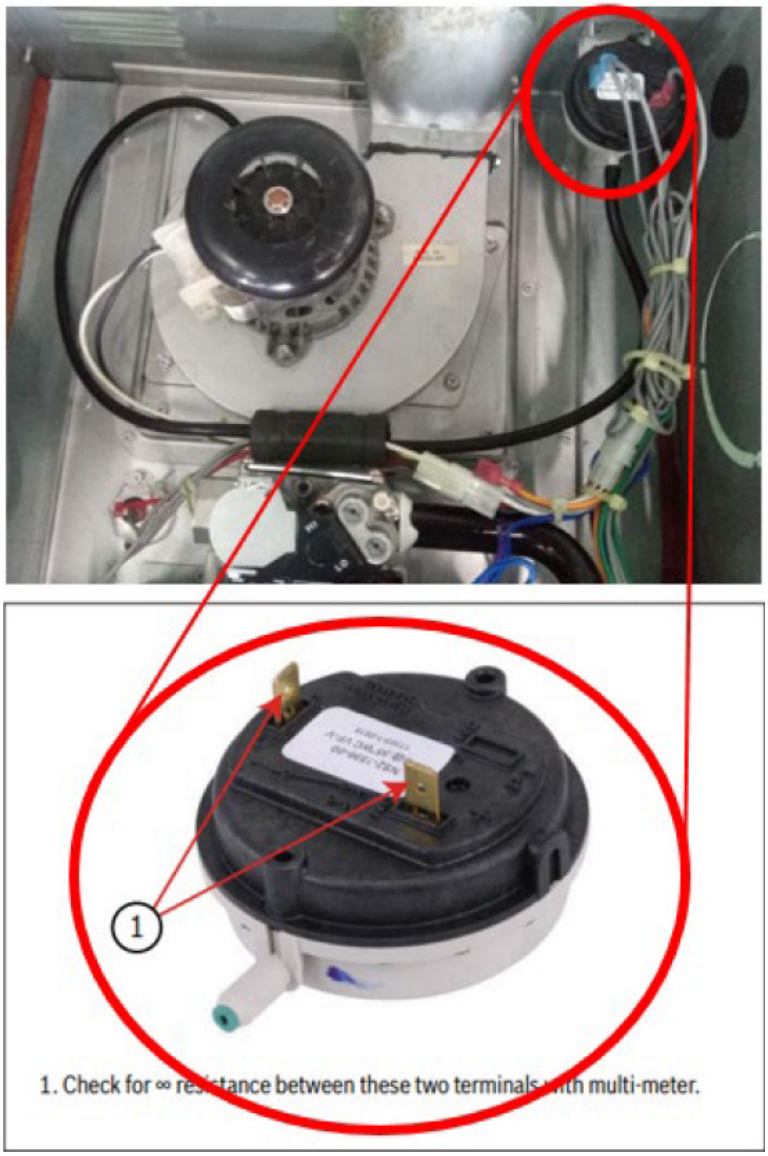
The E1 smoke exhaust fan detects a long closure of the wind pressure switch 1st-stage when it is off.

Cause of Failure:

1. Incorrect wiring
2. The wind pressure switch is damaged
3. The electric control board itself is damaged

Processing Flow:





Display Code:

When the E2 smoke exhaust fan is running, the 1st-stage air pressure switch is normally open.

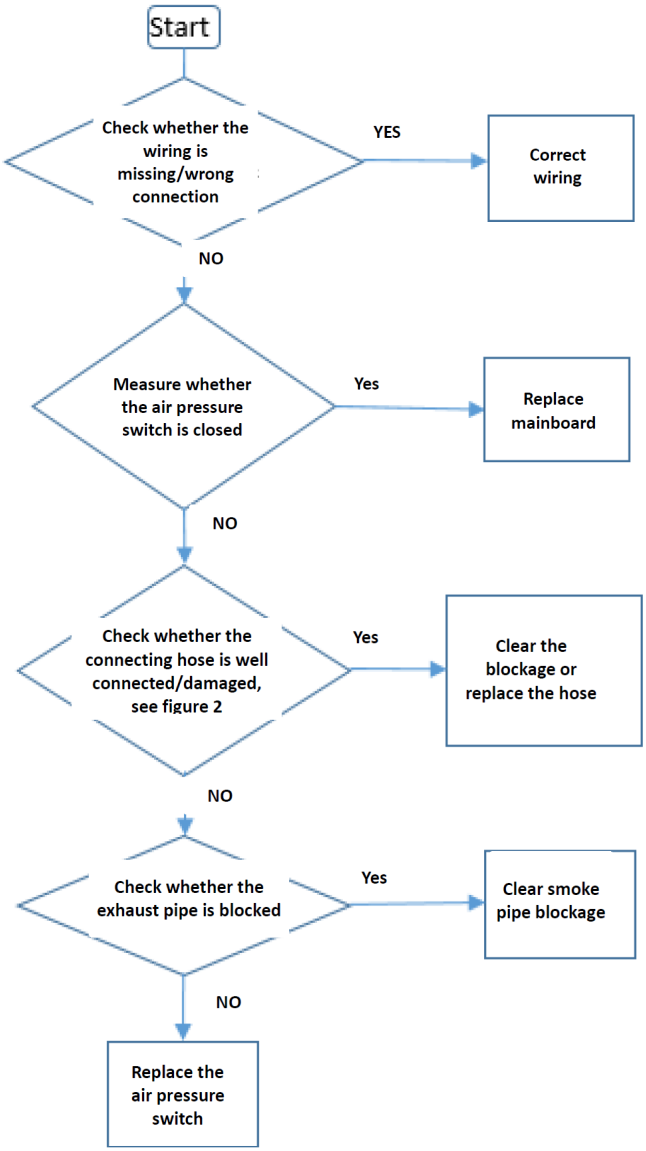
The E3 smoke exhaust fan is normally open when the 2nd-stage air pressure switch is normally open when the high air gear is turned on.

The E4 wind switch cycles locked (not recovered for more than 5 minutes).

Cause of Failure:

1. Incorrect wiring
2. The wind pressure switch is damaged
3. The connection hose is damaged or not connected / the pressure measuring port of the smoke exhaust fan is blocked, and the pressure cannot be transmitted to the air pressure switch
4. The smoke pipe is blocked
5. The exhaust fan motor is damaged
6. The electric control board is damaged.

Processing Flow:



Display Code:

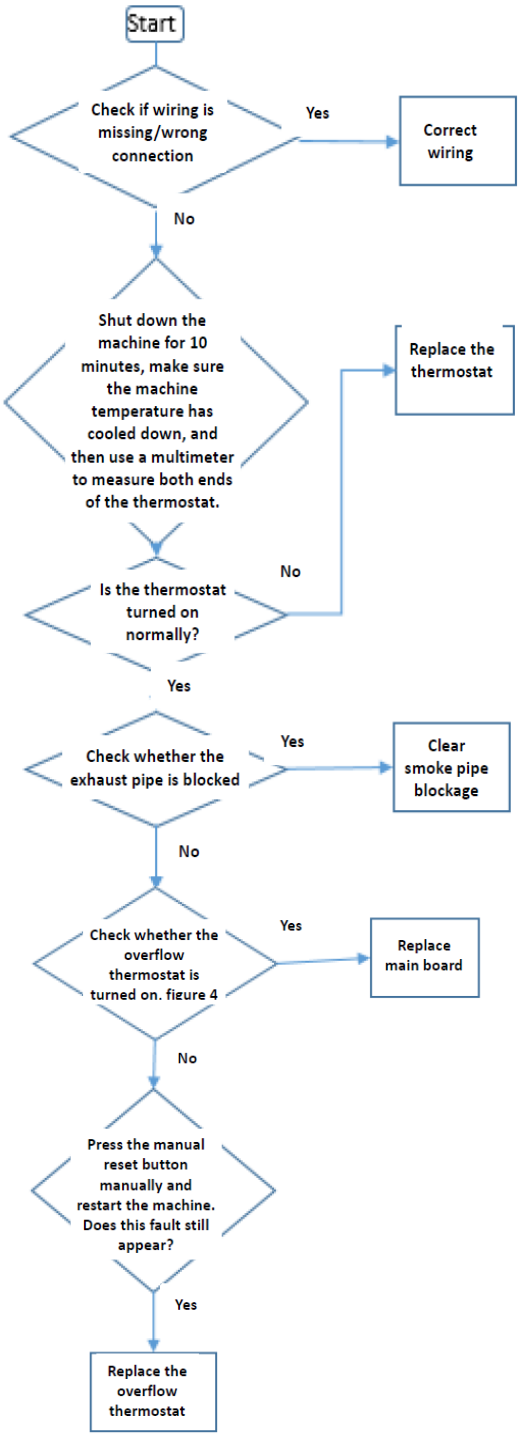
E5 thermostat switch open/flame spill

E6 thermostat switch open/flame spillage lasts more than 5 minutes

Cause of Failure:

1. Incorrect wiring
2. Thermostat is damaged

Processing Flow:



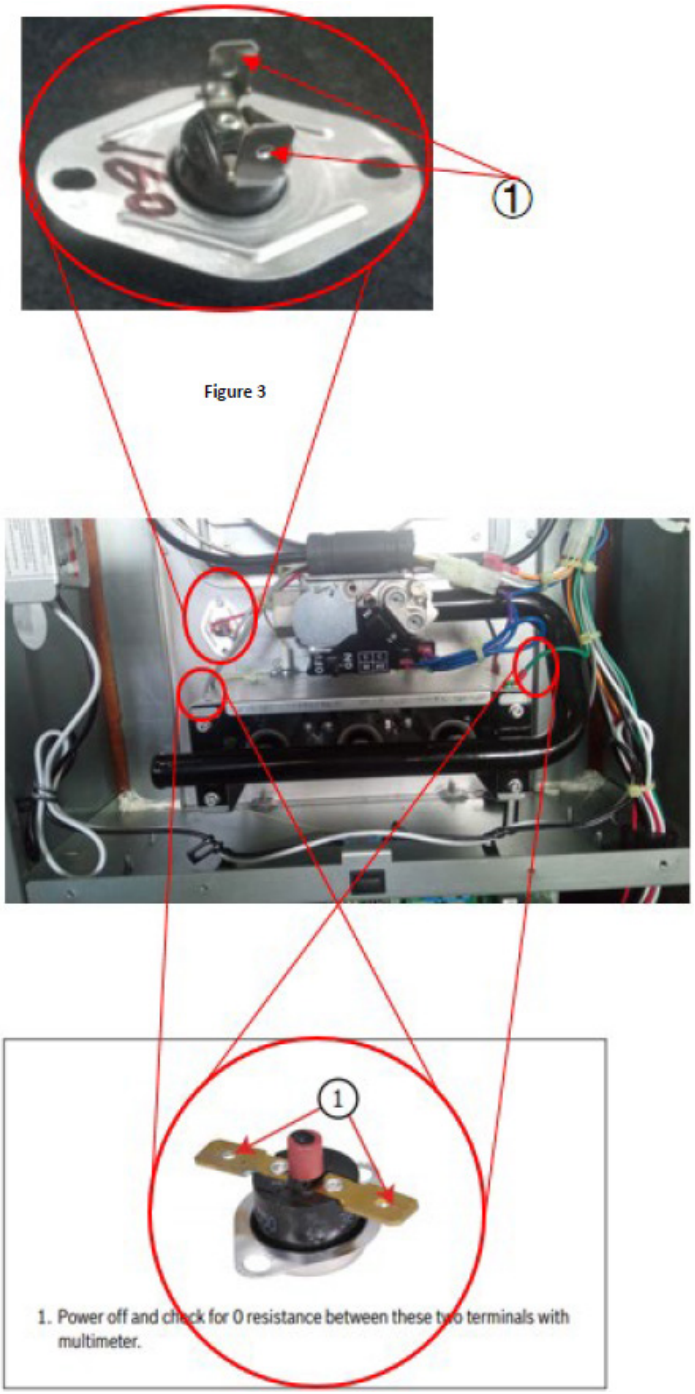


Figure 3

Display Code:

E7 External Locking (more than 4 failed ignitions)

E8 External Lock (flame is detected and lost more than the limit number of re-ignitions (5))

Cause of Failure:

1. The wiring between the flame sensor and the main control board is virtual connection/the line body is broken
2. The ground wire is not grounded
3. The supply pressure/gas valve adjustment pressure is not correct, resulting in no fire at the point

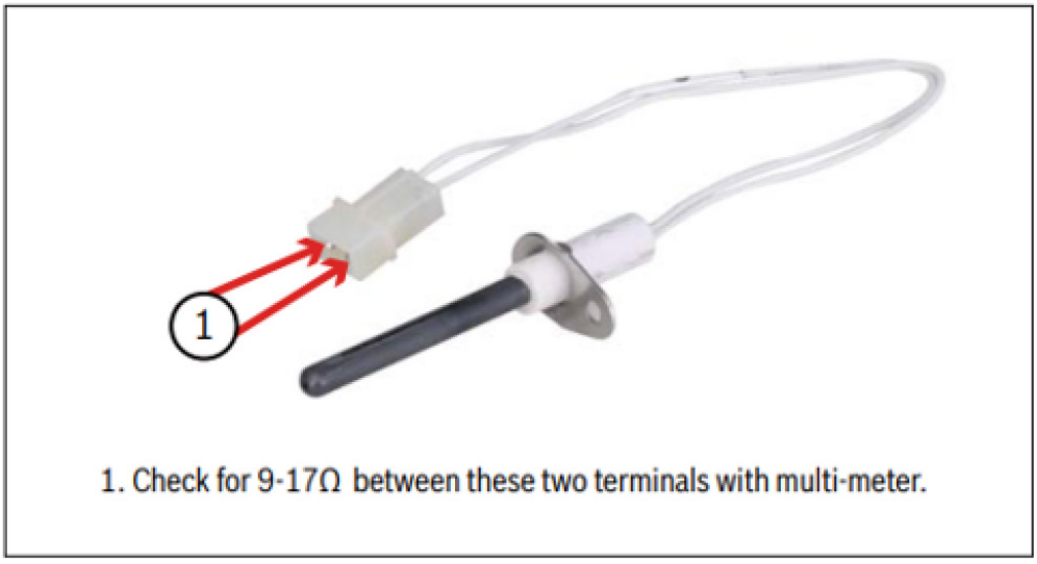
Processing Flow:

Manifold Gas Pressure		
Input Rating KBTU/H	**Natural Gas**	**Propane Gas**
40A	3.0" W.C.	10.5" W.C.
60A	3.5" W.C.	10" W.C.
60B	3.5" W.C.	10" W.C.
80B	3.8" W.C.	10" W.C.
80C	3.8" W.C.	10" W.C.
100C	3.8" W.C.	10" W.C.
120D	3.8" W.C.	10.5" W.C.

Table 1

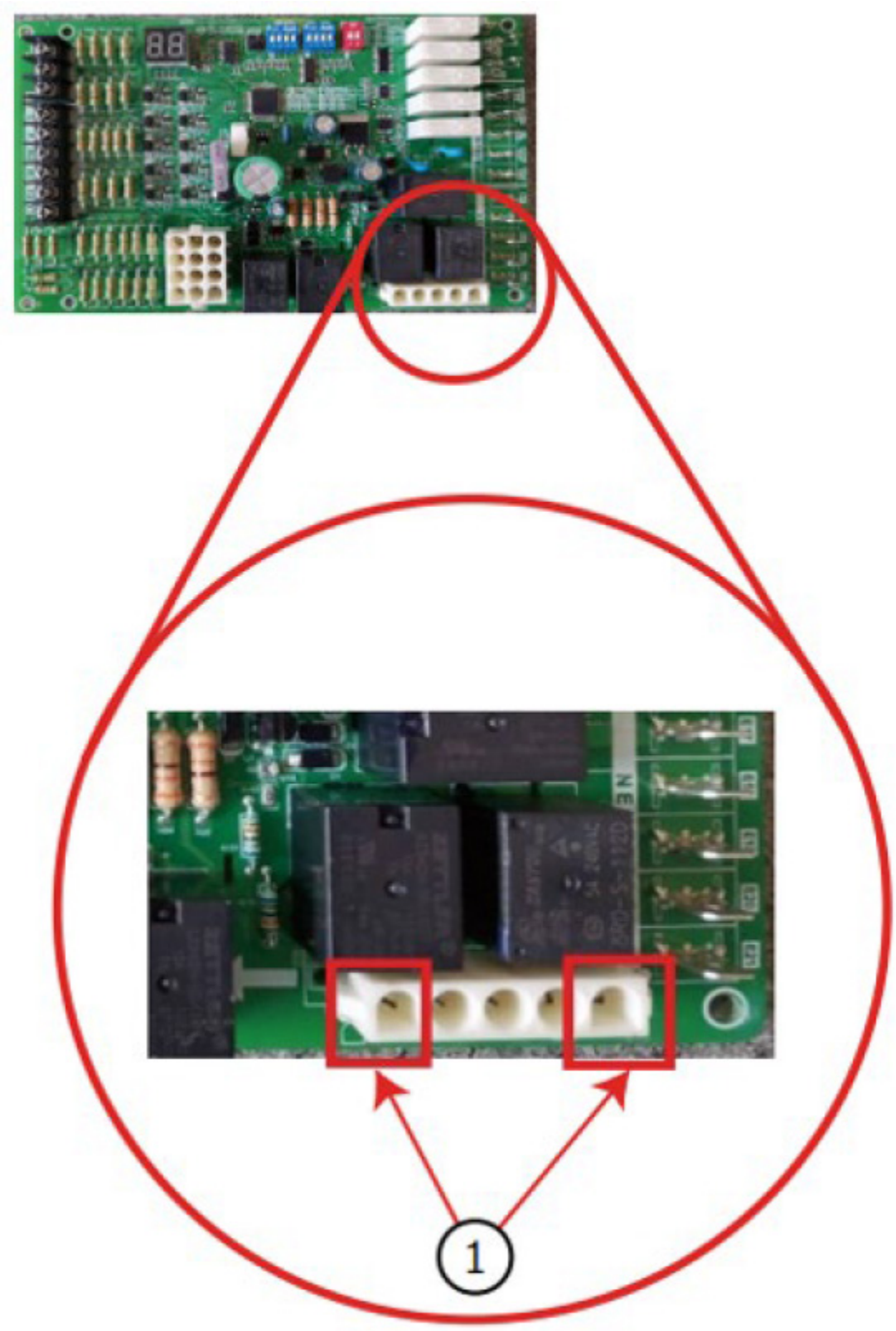
Inlet Gas Supply Pressure		
Natural Gas	Minimum: 4.5" W.C.	Maximum: 10.5" W.C.
Propane Gas	Minimum: 11" W.C.	Maximum: 13.0" W.C.

Table 2



Use a multi-meter to measure whether the ignition pin resistance is between 9-17 Ω

Figure 5



Use a multi-meter to measure whether there is 115V voltage

Figure 6

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