Service Facts

***UD2-2-SF-1D**

Gas Furnace – Induced Draft – Two Stage Heat

Models:

***UD2A040A9242A**	***UD2A060A9362A**	***UD2B060A9362A**	***UD2B080A9362A**
***UD2B080A9482A**	***UD2B100A9362A**	***UD2C100A9482A**	***UD2C100A9602A**
***UD2D100A9602A**	***UD2C120A9542A**	***UD2D120A9602A**	***UD2D140A9602A**
***DD2A040A9242A**	***DD2A060A9362A**	***DD2B060A9362A**	***DD2B080A9362A**
***DD2B100A9482A**	***DD2C100A9482A**	***DD2C100A9602A**	***DD2D120A9602A**
***DD2D140A9602A**	*** First letter may be "A" or "T"**		

IMPORTANT — This document 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 DISCONNECT POWER BEFORE SERVICING

PRODUCT SPECIFICATIONS ①

MODEL	*UD2A040A9242A	*UD2A060A9362A	*UD2B060A9362A	*UD2B080A9362A
TYPE	Upflow / Horizontal	Upflow / Horizontal	Upflow / Horizontal	Upflow / Horizontal
RATINGS ②				
1st Stage Input BTUH	26,000	39,000	39,000	52,000
1st Stage Capacity BTUH (ICS) ③	20,800	31,200	31,200	41,600
2nd Stage Input BTUH	40,000	60,000	60,000	80,000
2nd Stage Capacity BTUH (ICS) ③	32,000	47,000	47,000	63,000
Temp. rise (Min.-Max.) °F.	30 - 60	30 - 60	30 - 60	30 - 60
BLOWER DRIVE	DIRECT	DIRECT	DIRECT	DIRECT
Diameter - Width (In.)	10 x 6	10 x 6**	10 x 6**	10 x 7
No. Used	1	1	1	1
Speeds (No.)	4	4	4	4
CFM vs. in. w.g.	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table
Motor HP	1/5	1/3	1/3	1/3
R.P.M.	1080	1075	1075	1075
Volts / Ph / Hz	115/1/60	115/1/60	115/1/60	115/1/60
COMBUSTION FAN — Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Drive - No. Speeds	Direct - 2	Direct - 2	Direct - 2	Direct - 2
Motor HP - RPM	1/100 - 2544/1374	1/100 - 2543/1727	1/100 - 2543/1727	1/100 - 2543/1727
Volts / Ph / Hz	115/1/60	115/1/60	115/1/60	115/1/60
FLA	.76/.37	.70/.40	.70/.40	.70/.40
FILTER — Furnished?	No	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 17x25 - 1in.	1 - 17x25 - 1in.	1 - 17x25 - 1in.	1 - 17x25 - 1in.
VENT — Size (in.)	4 Round	4 Round	4 Round	4 Round
HEAT EXCHANGER				
Type - Fired	Alum. Steel	Alum. Steel	Alum. Steel	Alum. Steel
- Unfired				
Gauge (Fired)	20	20	20	20
ORIFICES — Main				
Nat. Gas. Qty. — Drill Size	2 — 45	3 — 45	3 — 45	4 — 45
L.P. Gas Qty. — Drill Size	2 — 56	3 — 56	3 — 56	4 — 56
GAS VALVE	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
PILOT SAFETY DEVICE				
Type	Hot Surface Ignition	Hot Surface Ignition	Hot Surface Ignition	Hot Surface Ignition
BURNERS — Type	Multiport Inshot	Multiport Inshot	Multiport Inshot	Multiport Inshot
Number	2	3	3	4
POWER CONN. — V / Ph / Hz ④	115/1/60	115/1/60	115/1/60	115/1/60
Ampacity (In Amps)	4.5	8.2	9.0	8.2
Max. Breaker Size (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
Crated (In.)	41-3/4 x 16-1/2 x 30-1/2	41-3/4 x 16-1/2 x 30-1/2	41-3/4 x 16-1/2 x 30-1/2	41-3/4 x 19-1/2 x 30-1/2
WEIGHT				
Shipping (Lbs.) / Net (Lbs)	119 / 110	127 / 118	137 / 127	142 / 132

**UD060R936K0 was built with a 10 X 7 blower housing, however the 10 X 7 and 10 X 6 have identical airflow in this model.

① Central Furnace heating designs are certified to ANSI Z21.47 and CSA 2.3.
② For U.S. applications, above input ratings (BTUH) are up to 2,000 feet, derate 4% per 1,000 feet for elevations above 2,000 feet above sea level.
For Canadian applications, above input ratings (BTUH) are up to 4,500 feet, derate 4% per 1,000 feet for elevations above 4,500 feet above sea level.
③ Based on U.S. government standard tests.
④ The above wiring specifications are in accordance with National Electrical Code; however, installations must comply with local codes.

NOTICE: Since the manufacturer has a policy of continuous product and product data improvement, it reserves the right to change design and specifications without notice.

Service Facts

PRODUCT SPECIFICATIONS ①

MODEL	*UD2B080A9482A	*UD2B100A9362A	*UD2C100A9482A	*UD2C100A9602A
TYPE	Upflow / Horizontal	Upflow / Horizontal	Upflow / Horizontal	Upflow / Horizontal
RATINGS ②				
1st Stage Input BTUH	52,000	65,000	65,000	65,000
1st Stage Capacity BTUH (ICS) ③	41,600	52,000	52,000	52,000
2nd Stage Input BTUH	80,000	100,000	100,000	100,000
2nd Stage Capacity BTUH (ICS) ③	63,000	79,000	79,000	80,000
Temp. rise (Min.-Max.) °F.	30 - 60	40 - 70	35 - 65	30 - 60
BLOWER DRIVE	DIRECT	DIRECT	DIRECT	DIRECT
Diameter - Width (In.)	10 x 8	10 x 7	10 x 8	11 x 10
No. Used	1	1	1	1
Speeds (No.)	4	4	4	4
CFM vs. in. w.g.	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table
Motor HP	1/3	1/3	1/2	1/2
R.P.M.	1075	1075	1075	1075
Volts / Ph / Hz	115/1/60	115/1/60	115/1/60	115/1/60
COMBUSTION FAN — Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Drive - No. Speeds	Direct - 2	Direct - 2	Direct - 2	Direct - 2
Motor HP - RPM	1/100 - 2543/1727	1/75 - 2708/1868	1/75 - 2708/1868	1/75 - 2708/1868
Volts / Ph / Hz	115/1/60	115/1/60	115/1/60	115/1/60
FLA	.70/.40	.87/.49	.87/.49	.87/.49
FILTER — Furnished?	No	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 17x25 - 1in.	1 - 17x25 - 1in.	1 - 20x25 - 1in.	1 - 20x25 - 1in.
VENT — Size (in.)	4 Round	4 Round	4 Round	4 Round
HEAT EXCHANGER				
Type-Fired -Unfired	Alum. Steel	Alum. Steel	Alum. Steel	Alum. Steel
Gauge (Fired)	20	20	20	20
ORIFICES — Main				
Nat. Gas. Qty. — Drill Size	4 — 45	5 — 45	5 — 45	5 — 45
L.P. Gas Qty. — Drill Size	4 — 56	5 — 56	5 — 56	5 — 56
GAS VALVE	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
PILOT SAFETY DEVICE				
Type	Hot Surface Ignition	Hot Surface Ignition	Hot Surface Ignition	Hot Surface Ignition
BURNERS — Type	Multiport Inshot	Multiport Inshot	Multiport Inshot	Multiport Inshot
Number	4	5	5	5
POWER CONN. — V / Ph / Hz ④	115/1/60	115/1/60	115/1/60	115/1/60
Ampacity (In Amps)	8.9	8.4	11.0	12.8
Max. Breaker Size (Amps)	15	15	15	20
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
Crated (In.)	41-3/4 x 19-1/2 x 30-1/2	41-3/4 x 19-1/2 x 30-1/2	41-3/4 x 23 x 30-1/2	41-3/4 x 23 x 30-1/2
WEIGHT				
Shipping (Lbs.) / Net (Lbs)	142 / 132	151 / 141	162 / 151	162 / 151

① Central Furnace heating designs are certified to ANSI Z21.47 and CSA 2.3.
② For U.S. applications, above input ratings (BTUH) are up to 2,000 feet, derate 4% per 1,000 feet for elevations above 2,000 feet above sea level.
For Canadian applications, above input ratings (BTUH) are up to 4,500 feet, derate 4% per 1,000 feet for elevations above 4,500 feet above sea level.
③ Based on U.S. government standard tests.
④ The above wiring specifications are in accordance with National Electrical Code; however, installations must comply with local codes.

MODEL	*UD2D100A9602A	*UD2C120A9542A	*UD2D120A9602A	*UD2D140A9602A
TYPE	Upflow / Horizontal	Upflow / Horizontal	Upflow / Horizontal	Upflow / Horizontal
RATINGS ②				
1st Stage Input BTUH	65,000	78,000	78,000	91,000
1st Stage Capacity BTUH (ICS) ③	52,000	62,400	62,400	72,800
2nd Stage Input BTUH	100,000	120,000	12,000	140,000
2nd Stage Capacity BTUH (ICS) ③	80,000	95,000	95,000	111,000
Temp. rise (Min.-Max.) °F.	30 - 60	35 - 65	30 - 60	40 - 70
BLOWER DRIVE	DIRECT	DIRECT	DIRECT	DIRECT
Diameter - Width (In.)	10 x 10	11 x 10	11 x 10	11 x 10
No. Used	1	1	1	1
Speeds (No.)	4	4	4	4
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	1/2	1/2	3/4
R.P.M.	1075	1075	1075	1075
Volts / Ph / Hz	115/1/60	115/1/60	115/1/60	115/1/60
COMBUSTION FAN — Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Drive - No. Speeds	Direct - 2	Direct - 2	Direct - 2	Direct - 2
Motor HP - RPM	1/75 - 2708/1868	1/60 - 3090/2225	1/60 - 3090/2225	1/60 - 3100/2350
Volts / Ph / Hz	115/1/60	115/60/1	115/60/1	115/60/1
FLA	.87/.49	1.14/0.51	1.14/0.51	1.16/0.54
FILTER — Furnished?	No	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	1 - 24x25 - 1in.	1 - 20x25 - 1in.	1 - 24x25 - 1in.	1 - 24x25 - 1in.
VENT — Size (in.)	4 Round	4 Round	4 Round	4 Round
HEAT EXCHANGER				
Type-Fired -Unfired	Alum. Steel	Alum. Steel	Alum. Steel	Alum. Steel
Gauge (Fired)	20	20	20	20
ORIFICES — Main				
Nat. Gas. Qty. — Drill Size	5 — 45	6 — 45	6 — 45	7 — 45
L.P. Gas Qty. — Drill Size	5 — 56	6 — 56	6 — 56	7 — 56
GAS VALVE	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
PILOT SAFETY DEVICE				
Type	Hot Surface Ignition	Hot Surface Ignition	Hot Surface Ignition	Hot Surface Ignition
BURNERS — Type	Multiport Inshot	Multiport Inshot	Multiport Inshot	Multiport Inshot
Number	5	6	6	7
POWER CONN. — V / Ph / Hz ④	115/1/60	115/1/60	115/1/60	115/1/60
Ampacity (In Amps)	12.8	13.2	13.2	13.6
Max. Breaker Size (Amps)	20	20	20	20
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
Crated (In.)	41-3/4 x 26-1/2 x 30-1/2	41-3/4 x 23 x 30-1/2	41-3/4 x 26-1/2 x 30-1/2	41-3/4 x 26-1/2 x 30-1/2
WEIGHT				
Shipping (Lbs.) / Net (Lbs)	175 / 163	176 / 165	186 / 174	193 / 181

PRODUCT SPECIFICATIONS ①

MODEL	*DD2A040A9242A	*DD2A060A9362A	*DD2B060A9362A	*DD2B080A9362A	*DD2B100A9482A
TYPE	Downflow / Horizontal	Downflow / Horizontal	Downflow / Horizontal	Downflow / Horizontal	Downflow / Horizontal
RATINGS ②					
1st Stage Input BTUH	26,000	39,000	39,000	52,000	65,000
1st Stage Capacity BTUH (ICS) ③	20,800	31,200	31,200	41,600	52,000
2nd Stage Input BTUH	40,000	60,000	60,000	80,000	100,000
2nd Stage Capacity BTUH (ICS) ③	32,000	47,000	47,000	64,000	79,000
Temp. rise (Min.-Max.) °F.	30 - 60	30 - 60	30 - 60	35 - 65	40 - 70
BLOWER DRIVE	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT
Diameter - Width (In.)	10 x 6	10 x 7	10 x 7	10 x 7	10 x 8
No. Used	1	1	1	1	1
Speeds (No.)	4	4	4	4	4
CFM vs. in. w.g.	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table	See Fan Performance Table
Motor HP	1/5	1/3	1/3	1/3	1/3
R.P.M.	1075	1075	1075	1075	1075
Volts / Ph / Hz	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60
COMBUSTION FAN — Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Drive - No. Speeds	Direct - 2	Direct - 2	Direct - 2	Direct - 2	Direct - 2
Motor HP - RPM	1/100 - 2544/1374	1/100 - 2543/1727	1/100 - 2543/1727	1/100 - 2543/1727	1/75 - 2708/1868
Volts / Ph / Hz	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60
FLA	0.76/0.37	0.70/0.40	0.70/0.40	0.70/0.40	0.87/0.49
FILTER — Furnished?	No	No	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	2 - 14x20 - 1in.	2 - 14x20 - 1in.	2 - 14x20 - 1in.	2 - 14x20 - 1in.	2 - 16x20 - 1in.
VENT — Size (in.)	4 Round	4 Round	4 Round	4 Round	4 Round
HEAT EXCHANGER					
Type-Fired -Unfired	Alum. Steel	Alum. Steel	Alum. Steel	Alum. Steel	Alum. Steel
Gauge (Fired)	20	20	20	20	20
ORIFICES — Main					
Nat. Gas. Qty. — Drill Size	2 — 45	3 — 45	3 — 45	4 — 45	5 — 45
L.P. Gas Qty. — Drill Size	2 — 56	3 — 56	3 — 56	4 — 56	5 — 56
GAS VALVE	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
PILOT SAFETY DEVICE					
Type	Hot Surface Ignition	Hot Surface Ignition	Hot Surface Ignition	Hot Surface Ignition	Hot Surface Ignition
BURNERS — Type	Multiport Inshot	Multiport Inshot	Multiport Inshot	Multiport Inshot	Multiport Inshot
Number	2	3	3	4	5
POWER CONN. — V / Ph / Hz ④	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60
Ampacity (In Amps)	4.5	8.2	8.2	8.2	9.2
Max. Breaker Size (Amps)	15	15	15	15	15
PIPE CONN. SIZE (IN.)	1/2	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	H x W x D
Crated (In.)	41-3/4 x 16-1/2 x 30-1/2	41-3/4 x 16-1/2 x 30-1/2	41-3/4 x 16-1/2 x 30-1/2	41-3/4 x 19-1/2 x 30-1/2	41-3/4 x 19-1/2 x 30-1/2
WEIGHT					
Shipping (Lbs.) / Net (Lbs)	119 / 109	129 / 119	129 / 119	146 / 135	156 / 145

① Central Furnace heating designs are certified to ANSI Z21.47 and CSA 2.3.
② For U.S. applications, above input ratings (BTUH) are up to 2,000 feet, derate 4% per 1,000 feet for elevations above 2,000 feet above sea level.
For Canadian applications, above input ratings (BTUH) are up to 4,500 feet, derate 4% per 1,000 feet for elevations above 4,500 feet above sea level.
③ Based on U.S. government standard tests.
④ The above wiring specifications are in accordance with National Electrical Code; however, installations must comply with local codes.

MODEL	*DD2C100A9482A	*DD2C100A9602A	*DD2D120A9602A	*DD2D140A9602A
TYPE	Downflow / Horizontal	Downflow / Horizontal	Downflow / Horizontal	Downflow / Horizontal
RATINGS ②				
1st Stage Input BTUH	65,000	65,000	78,000	91,000
1st Stage Capacity BTUH (ICS) ③	52,000	52,000	62,400	72,800
2nd Stage Input BTUH	100,000	100,000	120,000	140,000
2nd Stage Capacity BTUH (ICS) ③	79,000	79,000	96,000	112 ,000
Temp. rise (Min.-Max.) °F.	35 - 65	30 - 60	35 - 65	45 - 75
BLOWER DRIVE	DIRECT	DIRECT	DIRECT	DIRECT
Diameter - Width (In.)	10 x 8	11 x 10	11 x 10	11 x 10
No. Used	1	1	1	1
Speeds (No.)	4	4	4	4
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	1/2	1/2	3/4
R.P.M.	1075	1075	1075	1075
Volts / Ph / Hz	115/1/60	115/1/60	115/1/60	115/1/60
COMBUSTION FAN — Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Drive - No. Speeds	Direct - 2	Direct - 2	Direct - 2	Direct - 2
Motor HP - RPM	1/75 - 2708/1868	1/75 - 2708/1868	1/60 - 3090/2225	1/60 - 3100/2350
Volts / Ph / Hz	115/1/60	115/1/60	115/1/60	115/1/60
FLA	0.87/0.49	0.87/0.49	1.14/0.51	1.16/0.54
FILTER — Furnished?	No	No	No	No
Type Recommended	High Velocity	High Velocity	High Velocity	High Velocity
Hi Vel. (No.-Size-Thk.)	2 - 16x20 - 1in.	2 - 16x20 - 1in.	2 - 16x20 - 1in.	2 - 16x20 - 1in.
VENT — Size (in.)	4 Round	4 Round	4 Round	4 Round
HEAT EXCHANGER				
Type-Fired -Unfired	Alum. Steel	Alum. Steel	Alum. Steel	Alum. Steel
Gauge (Fired)	20	20	20	20
ORIFICES — Main				
Nat. Gas. Qty. — Drill Size	5 — 45	5 — 45	6 — 45	7 — 45
L.P. Gas Qty. — Drill Size	5 — 56	5 — 56	6 — 56	7 — 56
GAS VALVE	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage	Redundant - Two Stage
PILOT SAFETY DEVICE				
Type	Hot Surface Ignition	Hot Surface Ignition	Hot Surface Ignition	Hot Surface Ignition
BURNERS — Type	Multiport Inshot	Multiport Inshot	Multiport Inshot	Multiport Inshot
Number	5	5	6	7
POWER CONN. — V / Ph / Hz ④	115/1/60	115/1/60	115/1/60	115/1/60
Ampacity (In Amps)	11.0	12.8	13.2	13.6
Max. Breaker Size (Amps)	15	20	20	20
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
Crated (In.)	41-3/4 x 23 x 30-1/2	41-3/4 x 23 x 30-1/2	41-3/4 x 26-1/2 x 30-1/2	41-3/4 x 26-1/2 x 30-1/2
WEIGHT				
Shipping (Lbs.) / Net (Lbs)	166 / 154	167 / 155	189 / 176	197 / 184

SAFETY SECTION

⚠ 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:

1. Seal any unused openings in the venting system.
2. 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 CAN/CGA B149 Installation Codes and these instructions. Determine that there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
3. 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 deficiencies which could cause an unsafe condition.
4. Close fireplace dampers.
5. 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.
6. Follow the lighting instructions. Place the appliance being inspected into operation. Adjust the thermostat so appliance is operating continuously.
7. 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 and/or CAN/CGA B149 Installation Codes.
8. After it has been determined that each appliance connected to the venting system properly vents where tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-fired burning appliance to their previous conditions of use.

⚠ WARNING

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

FIRE OR EXPLOSION HAZARD
Failure to follow the safety warnings exactly could result in serious injury, death or property damage.
Improper servicing could result in dangerous operation, serious injury, death, or property damage.

⚠ WARNING

The cabinet must have an uninterrupted or unbroken ground according to National Electrical Code, ANSI/NFPA 70 - "latest edition" and Canadian Electrical Code, CSA C22.1 or local codes to minimize personal injury if an electrical fault should occur.
Failure to follow this warning could result in an electrical shock, fire, injury, or death.

SEQUENCE OF OPERATION

Comfort Control call for heat (2-stage Comfort Control)
Call for 1st stage only:
R and W1 Comfort Control contacts close signaling the control module to run its self-check routine. After the control module has verified that the 1st stage pressure switch contacts are open and the limit switch(es) contacts are closed, the draft blower will be energized.

As the induced draft blower comes up to speed, the pressure switch contacts will close and the ignitor warm up period will begin. The ignitor will heat for approx. 20 seconds, then the gas valve is energized in 1st stage to permit gas flow to the burners. The flame sensor confirms that ignition has been achieved within the 5 second ignition trial period.

As the flame sensor confirms that ignition has been achieved, the delay to fan ON period begins timing and after approx. 45 seconds the indoor blower motor will be energized at low speed and will continue to run during the heating cycle.

Call for 2nd stage after 1st stage:
R and W2 Comfort Control contacts close signaling a call for 2nd stage heat. The induced draft blower will be energized on high speed and the 2nd stage pressure switch contacts will close allowing the gas valve to be energized in 2nd stage and the indoor blower motor in high speed.

2nd stage satisfied, 1st stage still called:
R and W2 Comfort Control contacts open signaling that 2nd stage heating requirements are satisfied. The induced draft blower is reduced to low speed allowing the 2nd stage pressure switch contacts to open and the gas valve is reduced to 1st stage. After aprox. 30 seconds the indoor blower motor is reduced to low speed.

1st stage satisfied:
R and W1 thermostat contacts open signaling that 1st stage heating requirements are satisfied. The gas valve will close and the induced draft blower will be de-energized. The indoor blower motor will continue to run for the fan off period (Field selectable at 90, 120, 150 or 180 seconds, then will be de-energized by the control module.

Thermostat call for heat (1-stage Thermostat)
R and W thermostat contacts close signaling a call for heat. 1st stage sequence of operation remains the same as above. 2nd stage delay will be reflective by dip switch S1-1 and S1-2. Reference the wiring diagrams for delay options.
Thermostat satisfied: R and W contacts open signaling the control module to close the gas valve and de-energize the induced draft blower. The indoor blower motor will continue to operate at high heat speed (if running on second stage) for approximately 30 seconds after the flames are extinguished. It will then switch to low heat speed for the remaining FAN-OFF period selected on dip switch S1-3 and S1-4.

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.
   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.
   e. There are no obvious signs of deterioration of the furnace.
2. FILTERS – Filters should be cleaned or replaced 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. If motor lubrication is required it should only be done by a qualified servicer. 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.

⚠ WARNING

Do NOT touch igniter. It is extremely hot.
Failure to follow this warning could result in severe burns.

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 the top burner bracket. Lift burners from orifices.

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:
On LP (propane) units, some light yellow tipping of the outer mantle is normal. Inner mantle should be bright blue.

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 LP (propane) units, due to variations in BTU content and altitude, servicing may be required at shorter intervals.

⚠ WARNING

CARBON MONOXIDE POISONING HAZARD
Failure to follow the service and/or periodic maintenance instructions for the furnace and venting system, could result in carbon monoxide poisoning or death.

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.
   c. Remove burner compartment door from furnace.
   d. Inspect around insulation covering flue collector box. Inspect induced draft blower connections to the flue pipe connection.
   e. Remove burners. (See 4.)
   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, contact a service agency. 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.

⚠ 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.

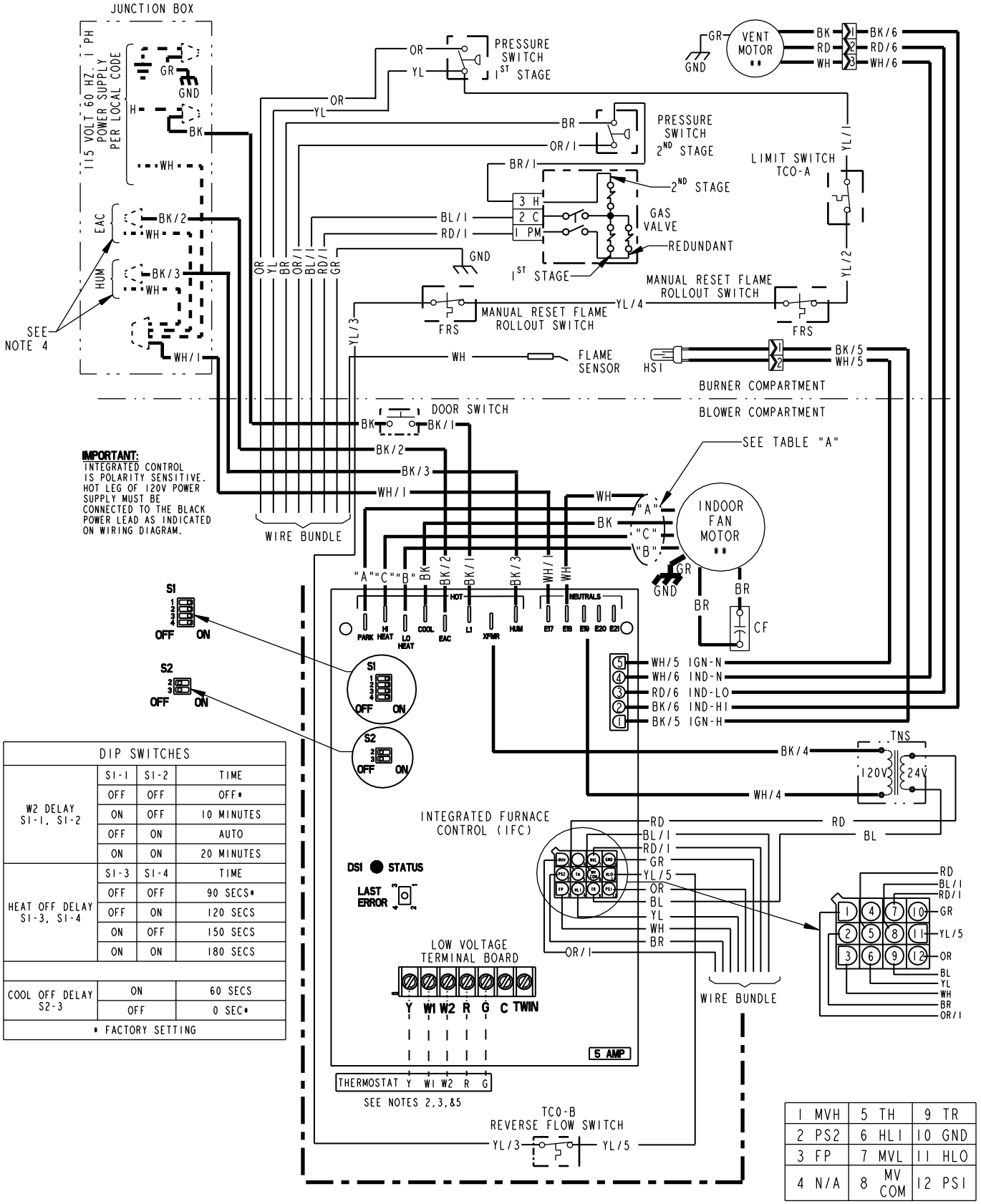
7. COOLING COIL CONDENSATE DRAIN – If a cooling coil is installed with the furnace, condensate drains should be checked and cleaned periodically to assure that condensate can drain freely from coil to drain. If condensate cannot drain freely water damage could occur. (See Condensate Drain in Installer's Guide)

⚠ CAUTION

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

Verify proper operation after servicing.

*UD2-2 WIRING DIAGRAM



DIP SWITCHES			
W2 DELAY S1-1, S1-2	S1-1	S1-2	TIME
	OFF	OFF	OFF*
	ON	OFF	10 MINUTES
	OFF	ON	AUTO
	ON	ON	20 MINUTES
HEAT OFF DELAY S1-3, S1-4	S1-3	S1-4	TIME
	OFF	OFF	90 SECS*
	OFF	ON	120 SECS
	ON	OFF	150 SECS
	ON	ON	180 SECS
COOL OFF DELAY S2-3	ON		60 SECS
	OFF		0 SEC*
* FACTORY SETTING			

1 MVH	5 TH	9 TR
2 PS2	6 HLI	10 GND
3 FP	7 MVL	11 HLO
4 N/A	8 MV COM	12 PSI

(continued on next page)

From Dwg. D344429P01

*UD2-2 SCHEMATIC DIAGRAM

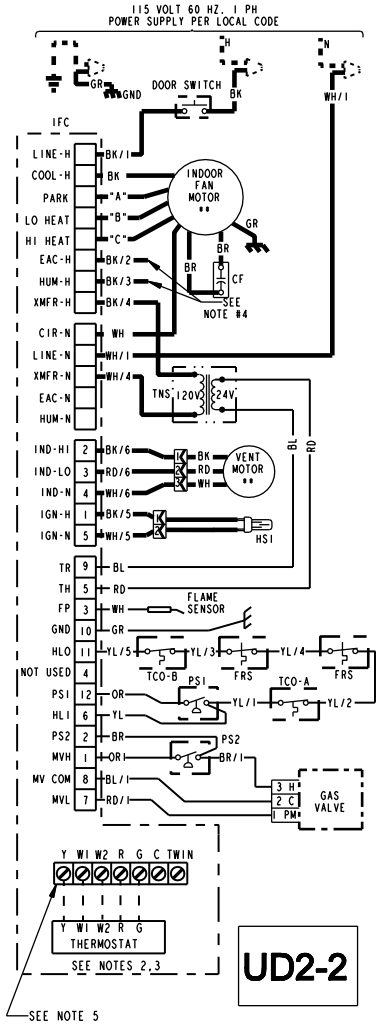


TABLE "A"							
SPEED TAPS FOR I.D. FAN MOTOR							
MODEL	PARK "A"	LO HEAT "B"	HI HEAT "C"	MODEL	PARK "A"	LO HEAT "B"	HI HEAT "C"
*UD2A040A9242^^	BL	RD	YL	*UD040R924^^	BL	RD	YL
*UD2A060A9362^^	BL	RD	YL	*UD060R936^^	BL	RD	YL
*UD2B060A9362^^	BL	RD	YL	*UD060R937^^	BL	RD	YL
*UD2B080A9362^^	YL	RD	BL	*UD080R936^^	YL	RD	BL
*UD2B080A9482^^	YL	RD	BL	*UD080R948^^	YL	RD	BL
*UD2B100A9362^^	YL	RD	BL	*UD100R936^^	YL	RD	BL
*UD2C100A9482^^	YL	RD	BL	*UD100R948^^	YL	RD	BL
*UD2C100A9602^^	YL	RD	BL	*UD100R960^^	YL	RD	BL
*UD2D100A9602^^	BL	RD	YL	*UD100R961^^	BL	RD	YL
*UD2C120A9542^^	YL	RD	BL	*UD120R954^^	YL	RD	BL
*UD2D120A9602^^	YL	RD	BL	*UD120R960^^	YL	RD	BL
*UD2D140A9602^^	YL	RD	BL	*UD140R960^^	YL	RD	BL

* PREFIX MAY BE "A" OR "T"
^^ SUFFIX MAY BE A THROUGH Z
RD = LOW BL = MED.HIGH
YL = MED. LOW BK = HIGH

WARNING

HAZARDOUS VOLTAGE:

DISCONNECT ALL ELECTRICAL POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING.

FAILURE TO DISCONNECT POWER BEFORE SERVICING CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.

CAUTION

USE COPPER CONDUCTORS ONLY!

UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.

FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

TCO THERMAL CUT OUT
PS PRESSURE SWITCH
FRS FLAME ROLLOUT SWITCH
FP FLAME SENSOR
CHASSIS GROUND
HSI HOT SURFACE IGNITER
DOOR SWITCH
CF CAPACITOR
COIL

LINE, 24 V } FACTORY WIRING
LINE, 24 V } FIELD WIRING

** INTERNAL THERMAL PROTECTION

WIRE COLOR
BK/1
NUMBER ID (IF ANY)

BK	BLACK	GR	GREEN
WH	WHITE	BR	BROWN
YL	YELLOW	RD	RED
OR	ORANGE	BL	BLUE

L	LINE	TH	24 VAC (HOT)
N	NEUTRAL	TR	24 VAC (COMMON)
GND	GROUND	MV	MAIN GAS VALVE
B/C	COMMON	TNS	TRANSFORMER
HLO	HIGH LIMIT OUTPUT		
HLI	HIGH LIMIT INPUT		

NOTES:

1. IF ANY OF THE ORIGINAL WIRING AS SUPPLIED WITH THIS FURNACE MUST BE REPLACED, IT ,MUST BE WITH WIRE HAVING A TEMPERATURE RATING OF AT LEAST 105 C.
2. THERMOSTAT HEAT ANTICIPATOR SETTING: FIRST STAGE .38 AMPS, SECOND STAGE .13 AMPS. IF SETTING IS NOT FIXED ON THERMOSTAT, FOR SINGLE STAGE HEATING THERMOSTAT SET AT .51 AMPS.
3. FOR PROPER OPERATION OF COOLING SPEED, "Y" TERMINAL MUST BE CONNECTED TO THE ROOM THERMOSTAT.
4. THESE LEADS PROVIDE 120V POWER CONNECTIONS FOR ELECTRONIC AIR CLEANER (EAC) AND HUMIDIFIER (HUM). MAX. LOAD: 1.0 AMPS EACH.
5. WHEN TWINNING TWO FURNACES, BOTH UNITS MUST BE CONNECTED TO THE SAME 115 VAC PHASE CONNECT THE TWO UNITS 'TWIN' TERMINALS WITH 14 TO 22AWG. WIRE.

INTEGRATED FURNACE CONTROL

REPLACE WITH PART CNT06424 OR EQUIVALENT

ELECTRICAL RATING

INPUT: 25 VAC, 60 HZ.
XFMR SEC. CURRENT: 800 MA. + MV
MV 1ST STAGE OUTPUT: 1.5 A @ 24 VAC
MV 2ND STAGE OUTPUT: 0.5 A @ 24 VAC
IGN. OUTPUT: 2A @ 132VAC
IND OUTPUT: 2.2 FLA, 3.5 LRA @ 120 VAC
CIRC. BLOWER OUTPUT:
14.5 FLA, 25.0 LRA @ 120 VAC

TIMINGS

PREPURGE: 0 SEC; INTERPURGE:60 SEC.
POST PURGE: 5 SECONDS
IGNITOR WARMUP: 20 SECONDS
IAP: 2 SECONDS; TFI: 5 SECONDS
RETRIES: 2; RECYCLES: 10
HEAT ON DELAY: 45 SECONDS
COOL ON DELAY: 5 SECONDS
AUTO RESTART: 60 MINUTES
AUTO RESET PURGE PERIOD: 15 SECONDS

DIAGNOSTIC CODES

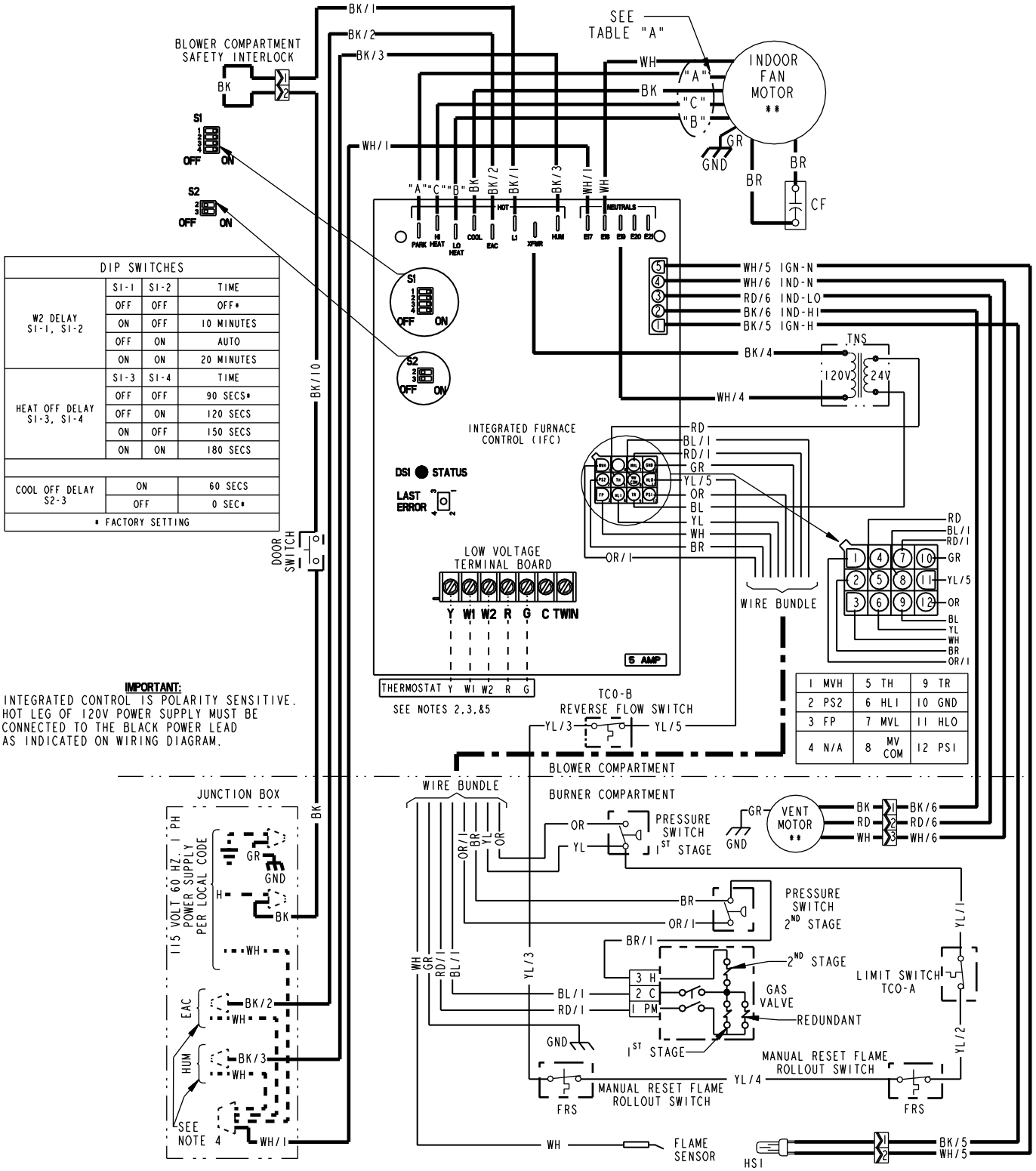
RED LED FLASH:
1 FLASH : FLAME SENSED WHEN NO FLAME SHOULD BE PRESENT
2 FLASHES: PRESSURE SWITCH STUCK CLOSED /INDUCER ERROR
3 FLASHES: 1ST-STAGE PRESSURE SWITCH STUCK OPEN/ INDUCER ERROR
4 FLASHES: OPEN LIMIT SWITCH
5 FLASHES: OPEN ROLLOUT/OPEN FUSE DETECT
6 FLASHES: PRESSURE SWITCH CYCLE LOCKOUT
7 FLASHES: EXTERNAL LOCKOUT (RETRIES)
8 FLASHES: EXTERNAL LOCKOUT (RECYCLES)
9 FLASHES: GROUNDING OR REVERSED POLARITY
10 FLASHES:GAS FLOW WITH NO CALL FOR HEAT
11 FLASHES: LIMIT SWITCH OPEN-BLOWER FAILURE
12 FLASHES:IGNITOR FAILURE
SOLID : INTERNAL GV ERROR, MICRO, AND FREQUENCY CHECK
RAPID: TWINNING ERROR, INCORRECT 24V PHASING
3 DOUBLE: 2ND STAGE PRESSURE SWITCH OPEN OR INDUCER ERROR

AMBER LED FLASH:
1 FLASH : 1ST STAGE CALL FOR HEAT
2 FLASHES: 2ND STAGE CALL FOR HEAT
3 FLASHES: W2 CALL PRESENT WITH NO W1
4 FLASHES: Y PRESENT WITH NO G CALL
RAPID : LOW FLAME SENSE CURRENT

GREEN LED FLASH:
1 FLASH: STANDBY MODE OF CALL FOR COOLING

From Dwg. D344930P01

*DD2-2 WIRING DIAGRAM



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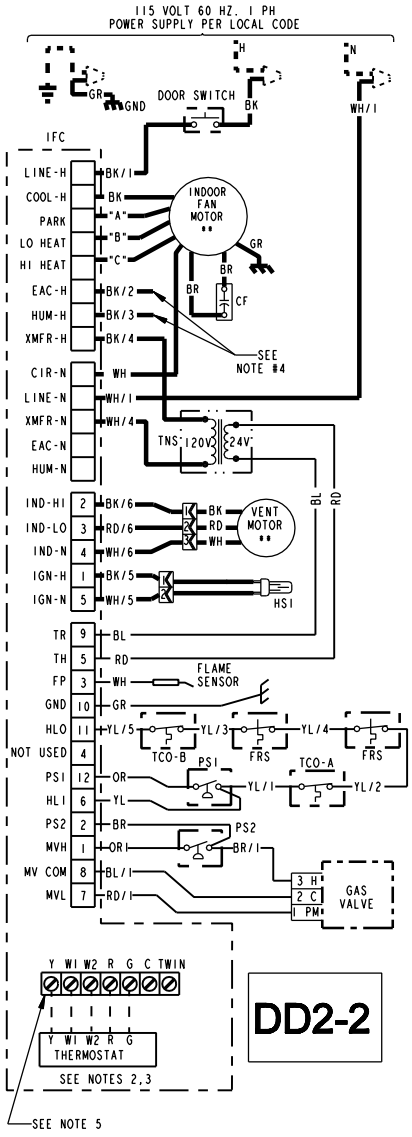
	OFF	OFF	OFF*
	ON	OFF	10 MINUTES
	OFF	ON	AUTO
	ON	ON	20 MINUTES
HEAT OFF DELAY S1-3, S1-4	S1-3	S1-4	TIME
	OFF	OFF	90 SECS*
	OFF	ON	120 SECS
	ON	OFF	150 SECS
	ON	ON	180 SECS
COOL OFF DELAY S2-3	ON		60 SECS
	OFF		0 SEC*
* FACTORY SETTING			

IMPORTANT:
INTEGRATED CONTROL IS POLARITY SENSITIVE. HOT LEG OF 120V POWER SUPPLY MUST BE CONNECTED TO THE BLACK POWER LEAD AS INDICATED ON WIRING DIAGRAM.

(continued on next page)

From Dwg. D344430P01

*DD2-2 SCHEMATIC DIAGRAM



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*DD2A060A9362^^	BL	RD	YL	*DD060R936^^	BL	RD	YL
*DD2B060A9362^^	BL	RD	YL	*DD060R937^^	BL	RD	YL
*DD2B080A9362^^	YL	RD	BL	*DD080R936^^	YL	RD	BL
*DD2B100A9482^^	YL	RD	BL	*DD100R945^^	YL	RD	BL
*DD2C100A9482^^	YL	RD	BL	*DD100R948^^	YL	RD	BL
*DD2C100A9602^^	BL	RD	YL	*DD100R960^^	BL	RD	YL
*DD2D120A9602^^	YL	RD	BL	*DD120R960^^	YL	RD	BL
*DD2D140A9602^^	YL	RD	BL	*DD140R960^^	YL	RD	BL

* PREFIX MAY BE "A" OR "T"
^^ SUFFIX MAY BE A THROUGH Z
RD = LOW BL = MED.HIGH
YL = MED. LOW BK = HIGH

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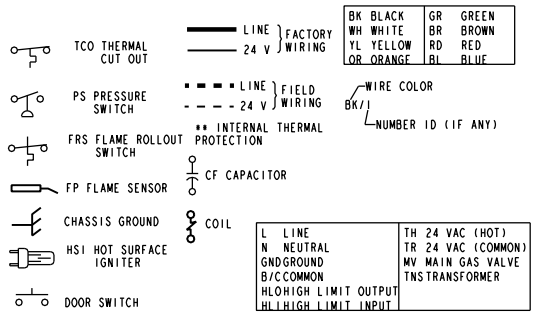

NOTES:

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INTEGRATED FURNACE CONTROL

REPLACE WITH PART CNT06424 OR EQUIVALENT

ELECTRICAL RATING

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XFMR SEC. CURRENT: 800 MA. + MV
MV 1ST STAGE OUTPUT: 1.5 A @ 24 VAC
MV 2ND STAGE OUTPUT: 0.5 A @ 24 VAC
IGN. OUTPUT: 2A @ 132VAC
IND OUTPUT: 2.2 FLA, 3.5 LRA @ 120 VAC
CIRC. BLOWER OUTPUT:
14.5 FLA, 25.0 LRA @ 120 VAC

TIMINGS
PREPURGE: 0 SEC; INTERPURGE:60 SEC.
POST PURGE: 5 SECONDS
IGNITOR WARMUP: 20 SECONDS
IAP: 2 SECONDS; TFI: 5 SECONDS
RETRIES: 2; RECYCLES: 10
HEAT ON DELAY: 45 SECONDS
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11 FLASHES: LIMIT SWITCH OPEN-BLOWER FAILURE
12 FLASHES:IGNITOR FAILURE
SOLID : INTERNAL GV ERROR, MICRO, AND FREQUENCY CHECK
RAPID: TWINNING ERROR, INCORRECT 24V PHASING
3 DOUBLE: 2ND STAGE PRESSURE SWITCH OPEN OR INDUCER ERROR

AMBER LED FLASH:
1 FLASH : 1ST STAGE CALL FOR HEAT
2 FLASHES: 2ND STAGE CALL FOR HEAT
3 FLASHES: W2 CALL PRESENT WITH NO W1
4 FLASHES: Y PRESENT WITH NO G CALL
RAPID : LOW FLAME SENSE CURRENT
GREEN LED FLASH:
1 FLASH: STANDBY MODE OF CALL FOR COOLING

From Dwg. D344430P01

FURNACE AIRFLOW (CFM) VS. EXTERNAL STATIC PRESSURE (IN. W.C.)										
MODEL	**SPEED TAP**	**0.10**	**0.20**	**0.30**	**0.40**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**
*UD2A040A9242A	4 -HIGH - Black	1018	1004	982	950	910	860	802	763	660
	3 -MED.-HIGH - Blue	847	832	809	779	742	697	644	585	517
	2 -MED.-LOW - Yellow	716	701	678	648	610	585	512	452	384
	1 -LOW - Red	617	599	575	544	507	463	413	357	294
*UD2A060A9362A	4 -HIGH - Black	1426	1389	1345	1298	1236	1171	1099	1020	934
	3 -MED.-HIGH - Blue	1243	1225	1197	1160	1113	1057	991	916	831
	2 -MED.-LOW - Yellow	1042	1039	1027	1005	973	931	879	817	745
	1 -LOW - Red	900	903	895	877	848	809	760	700	629
*UD2B060A9362A	4 -HIGH - Black	1426	1389	1345	1298	1236	1171	1099	1020	934
	3 -MED.-HIGH - Blue	1243	1225	1197	1160	1113	1057	991	916	831
	2 -MED.-LOW - Yellow	1042	1039	1027	1005	973	931	879	817	745
	1 -LOW - Red	900	903	895	877	848	809	760	700	629
*UD2B080A9362A	4 -HIGH - Black	1393	1384	1364	1335	1296	1247	1189	1120	1042
	3 -MED.-HIGH - Blue	1210	1209	1198	1177	1147	1107	1058	999	930
	2 -MED.-LOW - Yellow	1046	1052	1047	1033	1008	973	928	873	808
	1 -LOW - Red	900	903	895	888	869	842	808	766	717
*UD2B080A9482A	4 -HIGH - Black	1839	1821	1796	1756	1710	1641	1573	1480	1392
	3 -MED.-HIGH - Blue	1323	1325	1329	1319	1308	1275	1246	1201	1165
	2 -MED.-LOW - Yellow	1092	1090	1091	1083	1076	1059	1040	1005	970
	1 -LOW - Red	788	783	780	768	758	737	719	674	630
*UD2B100A9362A	4 -HIGH - Black	1476	1464	1441	1408	1363	1307	1241	1163	1074
	3 -MED.-HIGH - Blue	1249	1257	1252	1234	1203	1158	1101	1030	946
	2 -MED.-LOW - Yellow	1020	1046	1058	1050	1028	990	936	866	780
	1 -LOW - Red	873	887	890	883	864	834	794	742	680
*UD2C100A9482A	4 -HIGH - Black	1880	1846	1799	1740	1669	1595	1489	1381	1260
	3 -MED.-HIGH - Blue	1662	1635	1598	1551	1493	1424	1345	1256	1157
	2 -MED.-LOW - Yellow	1428	1421	1402	1370	1326	1269	1199	1117	1022
	1 -LOW - Red	1208	1215	1210	1193	1164	1124	1073	1009	935
*UD2C100A9602A	4 -HIGH - Black	2181	2143	2104	2053	2001	1929	1856	1766	1676
	3 -MED.-HIGH - Blue	1908	1888	1868	1834	1800	1745	1690	1631	1572
	2 -MED.-LOW - Yellow	1621	1609	1597	1582	1567	1533	1498	1438	1377
	1 -LOW - Red	1443	1419	1395	1381	1367	1335	1302	1256	1209
*UD2C120A9542A	4 -HIGH - Black	2162	2130	2097	2067	2037	1976	1914	1833	1752
	3 -MED.-HIGH - Blue	1889	1881	1873	1839	1805	1776	1746	1670	1593
	2 -MED.-LOW - Yellow	1654	1643	1631	1619	1606	1572	1538	1483	1428
	1 -LOW - Red	1427	1421	1414	1400	1386	1357	1327	1285	1243
*UD2D100A9602A	4 -HIGH - Black	2250	2185	2120	2046	1972	1868	1762	1640	1517
	3 -MED.-HIGH - Blue	2085	2039	1992	1918	1843	1760	1677	1567	1456
	2 -MED.-LOW - Yellow	1860	1842	1824	1773	1722	1651	1579	1465	1350
	1 -LOW - Red	1638	1630	1621	1591	1561	1497	1433	1321	1208
*UD2D120A9602A	4 -HIGH - Black	2135	2101	2066	2036	2005	1923	1840	1750	1659
	3 -MED.-HIGH - Blue	1906	1881	1856	1817	1777	1724	1671	1602	1533
	2 -MED.-LOW - Yellow	1646	1632	1617	1596	1575	1535	1494	1427	1360
	1 -LOW - Red	1423	1415	1407	1391	1375	1338	1300	1246	1192
*UD2D140A9602A	4 -HIGH - Black	2462	2407	2351	2284	2216	2143	2069	1989	1908
	3 -MED.-HIGH - Blue	2128	2112	2096	2054	2011	1949	1887	1797	1706
	2 -MED.-LOW - Yellow	1755	1746	1736	1719	1702	1656	1609	1564	1518
	1 -LOW - Red	1450	1446	1442	1427	1411	1383	1354	1298	1241

* - First letter may be "A" or "T"

From D330672 Rev. 17

AIRFLOW ADJUSTMENT

Check inlet and outlet air temperatures to make sure they are within the ranges specified on the furnace rating nameplate. If the airflow needs to be increased or decreased, see the wiring diagram for information on changing the speed of the blower motor.

⚠ WARNING

Disconnect power to the unit before removing the blower door.
Failure to follow this warning could result in personal injury from moving parts.

This unit is equipped with a blower door switch which cuts power to the blower and gas valve causing shutdown when the door is removed. Operation with the door removed or ajar can permit the escape of dangerous fumes. All panels must be securely closed at all times for safe operation of the furnace.

⚠ WARNING

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 ELECTRICAL SUPPLY MUST BE DISCONNECTED AND THE MAIN GAS VALVE MUST BE TURNED OFF. IF OPERATING CHECKS MUST BE PERFORMED WITH THE UNIT OPERATING, IT IS THE TECHNICIANS RESPONSIBILITY TO RECOGNIZE THESE HAZARDS AND PROCEED SAFELY.

CFM VS. TEMPERATURE RISE																				
MODEL	CFM (CUBIC FEET PER MINUTE)																			
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
*UD2A040A9242A	54	49	42	37	33	30														
*UD2A060A9362A				56	49	44	40	37	34	32										
*UD2B060A9372A				56	49	44	40	37	34	32										
*UD2B080A9362A						59	54	49	46	42										
*UD2B080A9482A						58	52	49	46	42	40	37	35	33						
*UD2B100A9362A							67	62	57	53	49									
*UD2C100A9482A							67	62	57	53	49	46	44	41	39	37				
*UD2C100A9602A								62	57	53	49	46	44	41	39	37	35	34	32	31
*UD2C120A9542A										63	49	46	44	41	39	37	35	34	32	31
*UD2D100A9612A										63	49	46	44	41	39	37	35	34	32	31
*UD2D120A9602A											59	56	52	49	47	44	42	40		
*UD2D140A9602A											69	65	61	58	55	52	49	47	45	

* - First letter may be "A" or "T"

⚠ WARNING

Disconnect power to the unit before removing the blower door.
Failure to follow this warning could result in personal injury from moving parts.

INDOOR BLOWER TIMING

Heating: The control module controls the indoor blower. The blower start is fixed at 45 seconds after ignition. The FAN-OFF period is field selectable by dip switches at 90, 120, 150, or 180 seconds. The factory setting is 90 seconds (See wiring diagram).

Cooling: The fan delay off period is factory set at 0 seconds. The option for 60 second delay off is field selectable (See wiring diagram).

NOTE:
Direct drive motors have bearings which are permanently lubricated and under normal use, lubrication is not recommended.

⚠ WARNING

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

GREEN LED FLASH	AMBER LED FLASH	RED LED FLASH	ERROR
		1	Flame sensed when no flame should be present
		2	Pressure switch is stuck closed
		3	1st stage pressure switch is stuck open (not closing)
		4	Open primary limit, flame roll out or reverse flow switch
		5	Open roll out / Open low voltage fuse
		6	1st stage pressure switch has opened 5 times within one cycle--1 hour lockout
		7	System lockout Retry
		8	System lockout Recycle
		9	Reverse polarity or poor grounding
		10	Gas valve energized without call for heat
		11	Primary limit has been open for more than 5 minutes, check blower
		12	Ignitor relay failure internal in board. Replace IFC
		Solid On	Gas valve relay failure internal in board. Replace IFC
		Rapid	Twinning Error, incorrect 24V Phasing
		3 Double	2nd stage pressure switch open. Furnace reverts back to 1st stage heating
	1		1st stage call for heat
	2		2nd stage call for heat
	3		W2 call present without W1
	4		Y call present without G
	Rapid		Low flame sense
1			Standby mode or call for cooling

FURNACE AIRFLOW (CFM) VS. EXTERNAL STATIC PRESSURE (IN. W.C.)										
MODEL	**SPEED TAP**	**0.10**	**0.20**	**0.30**	**0.40**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**
*DD2A040A9242A	4 -HIGH - Black	1070	1033	1000	960	920	860	810	740	-
	3 -MED.-HIGH - Blue	870	850	823	790	753	813	667	613	490
	2 -MED.-LOW - Yellow	740	720	690	663	627	588	547	483	-
	1 -LOW - Red	633	600	577	543	507	463	420	360	-
*DD2A060A9362A	4 -HIGH - Black	-	1429	1376	1318	1282	1188	1112	1029	959
	3 -MED.-HIGH - Blue	1302	1276	1229	1188	1141	1088	1024	953	882
	2 -MED.-LOW - Yellow	1115	1100	1070	1035	1000	965	918	859	790
	1 -LOW - Red	956	947	918	888	859	824	788	741	682
*DD2B060A9362A	4 -HIGH - Black	-	1429	1376	1318	1282	1188	1112	1029	959
	3 -MED.-HIGH - Blue	1302	1276	1229	1188	1141	1088	1024	953	882
	2 -MED.-LOW - Yellow	1115	1100	1070	1035	1000	965	918	859	790
	1 -LOW - Red	956	947	918	888	859	824	788	741	682
*DD2B080A9362A	4 -HIGH - Black	1523	1496	1463	1420	1369	1310	1243	1172	1100
	3 -MED.-HIGH - Blue	1317	1307	1261	1260	1223	1175	1122	1060	1000
	2 -MED.-LOW - Yellow	1123	1119	1106	1082	1056	1016	976	930	880
	1 -LOW - Red	942	943	931	920	898	818	833	795	760
*DD2B100A9482A	4 -HIGH - Black	1767	1731	1669	1615	1546	1469	1392	1300	1146
	3 -MED.-HIGH - Blue	1382	1354	1323	1292	1254	1207	1177	1108	1038
	2 -MED.-LOW - Yellow	1130	1138	1115	1085	1054	1015	977	938	877
	1 -LOW - Red	840	831	815	792	762	731	700	654	625
*DD2C100A9482A	4 -HIGH - Black	1965	1915	1865	1805	1740	1670	1587	1500	1370
	3 -MED.-HIGH - Blue	1645	1627	1605	1575	1535	1482	1421	1330	1220
	2 -MED.-LOW - Yellow	1407	1398	1387	1375	1347	1318	1275	1190	1095
	1 -LOW - Red	1202	1208	1205	1195	1166	1140	1105	1045	970
*DD2C100A9602A	4 -HIGH - Black	2165	2112	2060	1995	1929	1842	1755	1674	1593
	3 -MED.-HIGH - Blue	1962	1927	1891	1839	1786	1724	1662	1581	1500
	2 -MED.-LOW - Yellow	1705	1688	1671	1671	1600	1547	1492	1435	1377
	1 -LOW - Red	1492	1467	1442	1442	1385	1346	1307	1243	1179
*DD2D120A9602A	4 -HIGH - Black	2241	2202	2163	2106	2049	1979	1908	1804	1700
	3 -MED.-HIGH - Blue	1981	1962	1942	1904	1866	1805	1743	1680	1617
	2 -MED.-LOW - Yellow	1721	1705	1688	1671	1653	1611	1569	1515	1461
	1 -LOW - Red	1476	1466	1456	1440	1423	1392	1361	1302	1243
*DD2D140A9602A	4 -HIGH - Black	2377	2321	2265	2199	2133	2050	1967	1877	1786
	3 -MED.-HIGH - Blue	2115	2081	2046	1992	1938	1872	1805	1727	1649
	2 -MED.-LOW - Yellow	1806	1793	1779	1738	1696	1655	1614	1556	1497
	1 -LOW - Red	1527	1507	1486	1473	1459	1422	1384	1329	1273

* - First letter may be "A" or "T"

CFMVS. TEMPERATURE RISE																				
MODEL	CFM (CUBIC FEET PER MINUTE)																			
	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
*DD2A040A9242A	59	49	42	37	33															
*DD2A060A9362A				56	49	44	40	37	34	32										
*DD2B060A9362A				56	49	44	40	37	34	32										
*DD2B080A9362A						59	54	49	46	42										
*DD2B100A9482A								62	57	53	49	46	44	41						
*DD2C100A9482A								62	57	53	49	46	44	41	39	37				
*DD2C100A9602A								62	57	53	49	46	44	41	39	37	35	34	32	31
*DD2D120A9602A											59	56	52	49	47	44	42	40		
*DD2D140A9602A											69	65	61	58	55	52	49	47	45	

* - First letter may be "A" or "T"

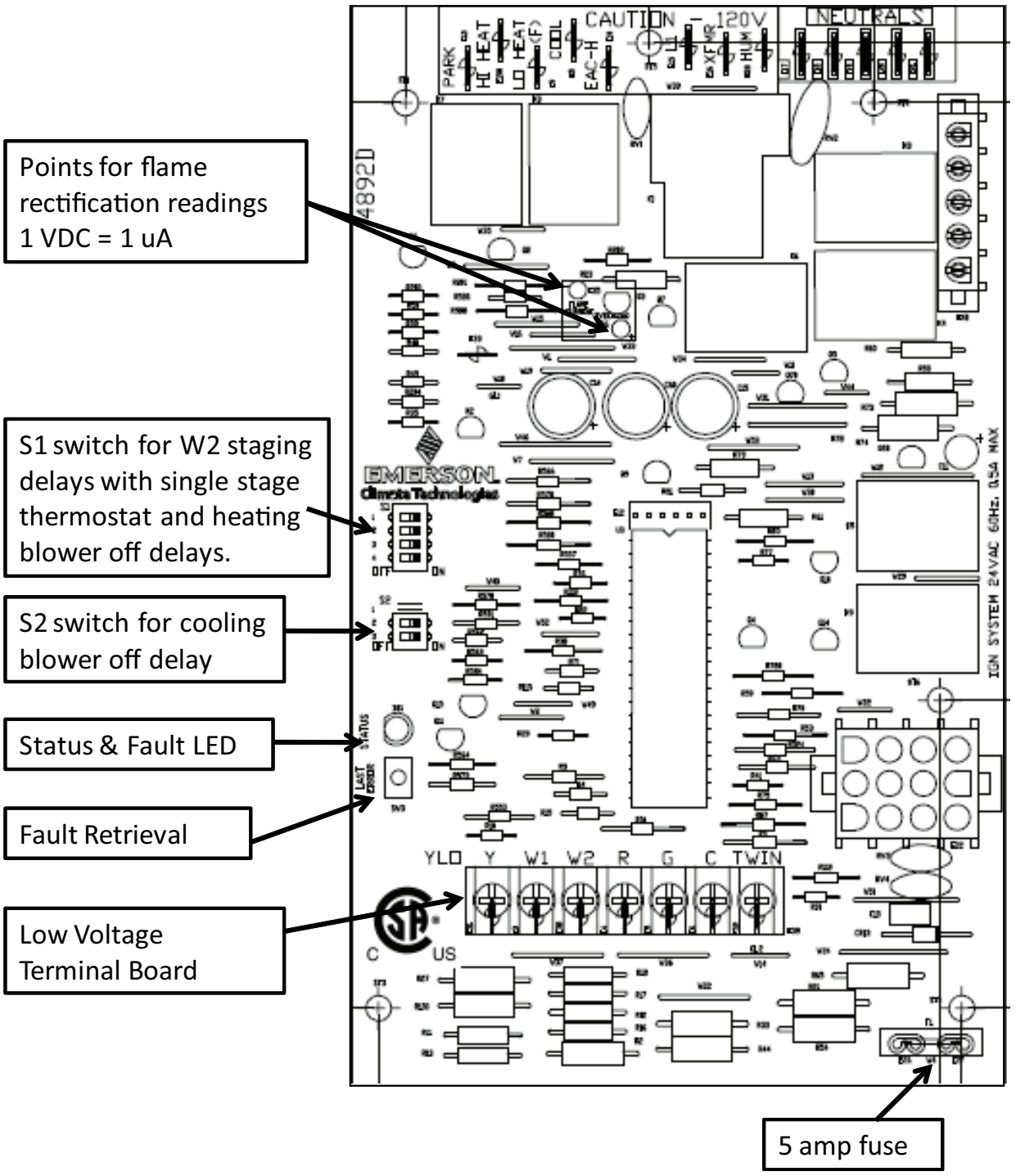
Troubleshooting Flowchart Index

The following pages include troubleshooting flowcharts in reference to the 80% Two Stage furnaces ONLY (*UD2 - *DD2-A9); using the FAULT LED as starting points.

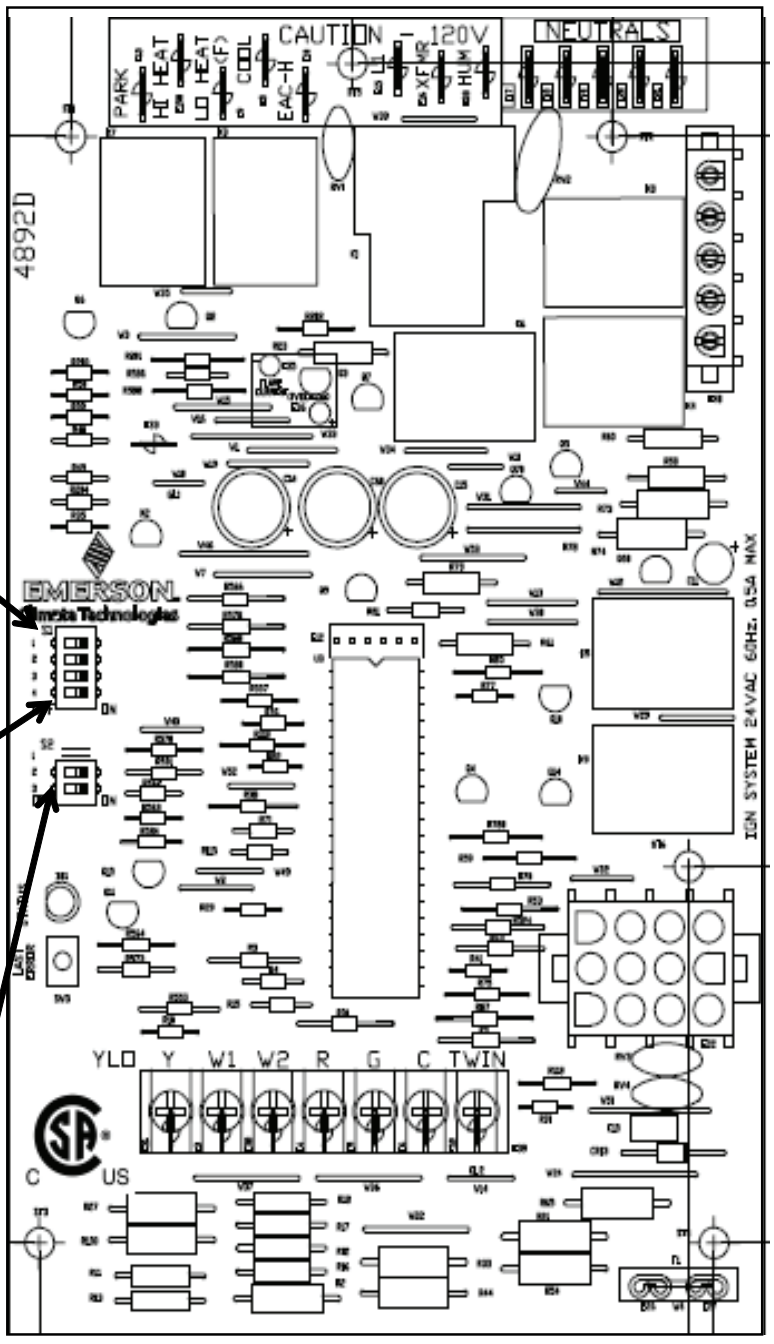
The information contained is for reference only and does not cover all scenarios or problems that may be encountered by a qualified field technician.

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.

Integrated Furnace Control (IFC) Component Layout



Integrated Furnace Control (IFC) Component Layout (continued)



S1 switches 1 & 2 for W2 delay

Leave both switches off when using a 2-stage thermostat or when enabling a W1 only application. This is the factory default setting.

W2 DELAY		
DIP SW S1-1	DIP SW S1-2	NORMINAL (MINUTES)
*OFF	OFF	OFF
ON	OFF	10
OFF	ON	AUTO
ON	ON	20

S1 switches 3 & 4 for blower delays in heating

HEAT OFF DELAY		
DIP SW S1-3	DIP SW S1-4	NORMINAL (SECONDS)
*OFF	OFF	90
OFF	ON	120
ON	OFF	150
ON	ON	180

S2 switch for blower delays in cooling

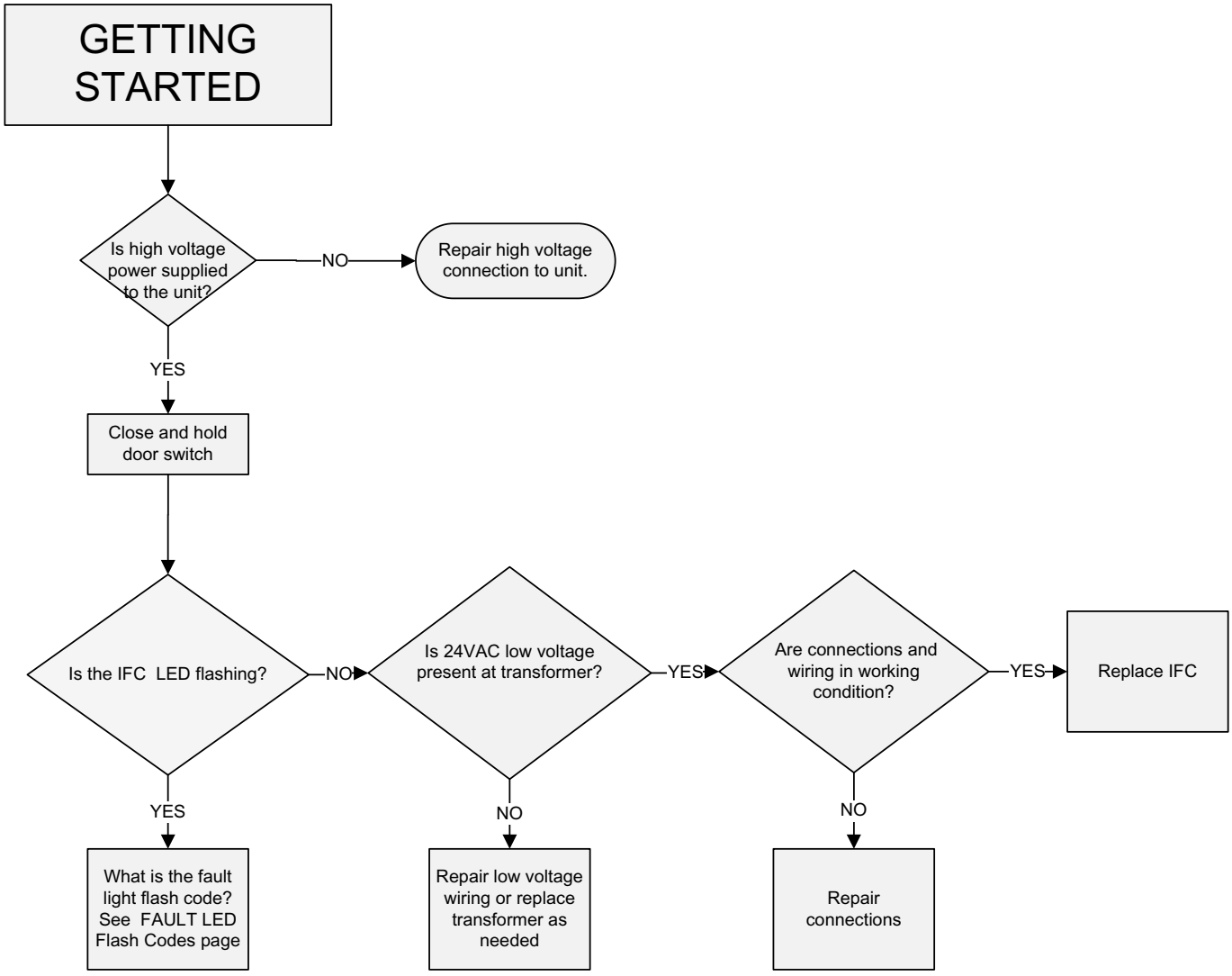
COOL OFF DELAY	
S2-3	SECONDS
ON	60
*OFF	0

S2-2 FOR FUTURE USE

*Factory Setting

Fault LED Flash Code Definitions

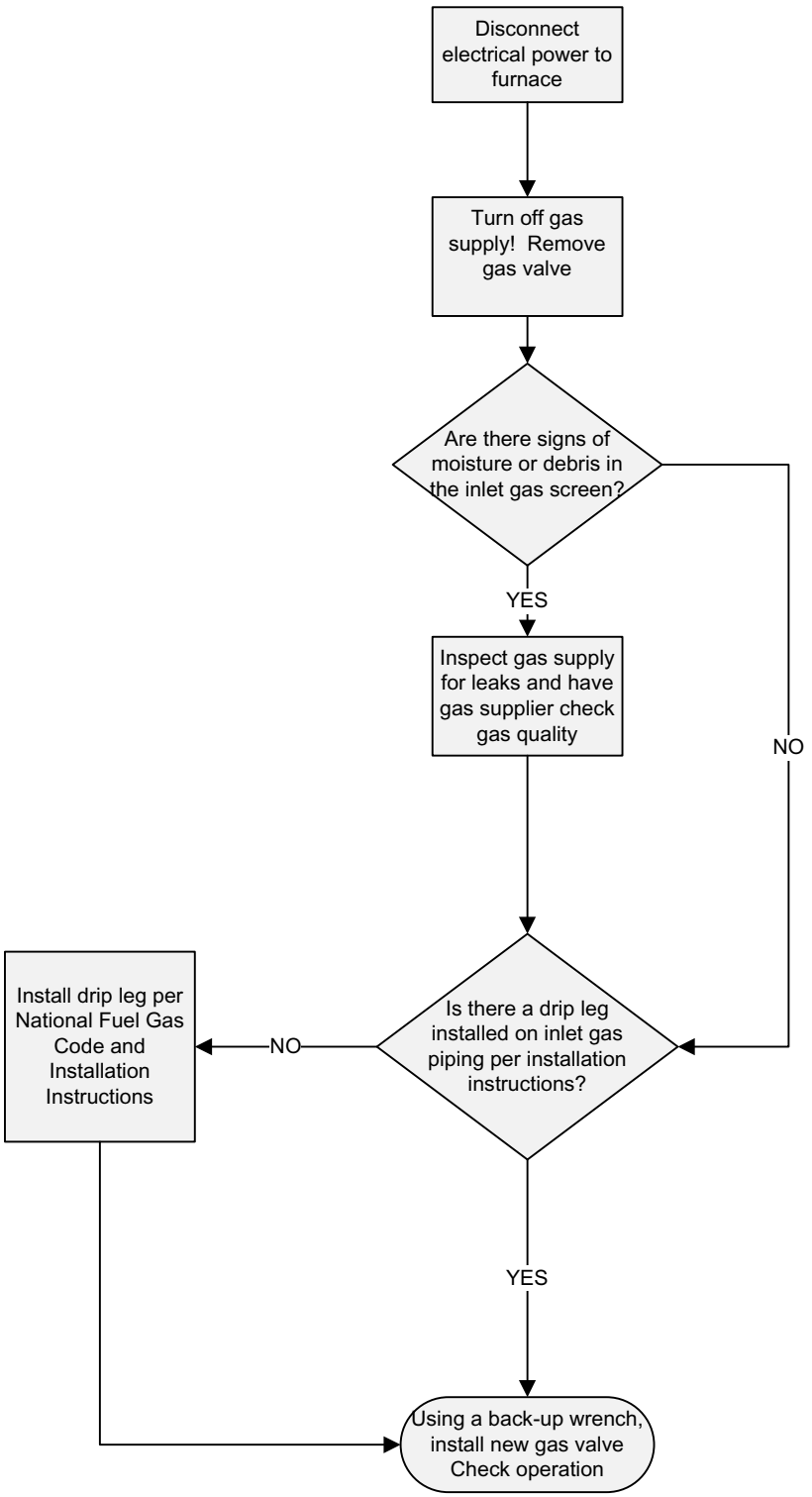
GREEN LED FLASH	AMBER LED FLASH	RED LED FLASH	ERROR
		1	Flame sensed when no flame should be present
		2	Pressure switch is stuck closed
		3	1st stage pressure switch is stuck open (not closing)
		4	Open primary limit, flame roll out or reverse flow switch
		5	Open roll out / Open low voltage fuse
		6	1st stage pressure switch has opened 5 times within one cycle--1 hour lockout
		7	System lockout Retry
		8	System lockout Recycle
		9	Reverse polarity or poor grounding
		10	Gas valve energized without call for heat
		11	Primary limit has been open for more than 5 minutes, check blower
		12	Ignitor relay failure internal in board. Replace IFC
		Solid On	Gas valve relay failure internal in board. Replace IFC
		Rapid	Twinning Error, incorrect 24V Phasing
		3 Double	2nd stage pressure switch open. Furnace reverts back to 1st stage heating
	1		1st stage call for heat
	2		2nd stage call for heat
	3		W2 call present without W1
	4		Y call present without G
	Rapid		Low flame sense
1			Standby mode or call for cooling


GETTING STARTED
Is high voltage power supplied to the unit?
NO
Repair high voltage connection to unit.
YES
Close and hold door switch
Is the IFC LED flashing?
NO
Is 24VAC low voltage present at transformer?
YES
Are connections and wiring in working condition?
YES
Replace IFC
YES
What is the fault light flash code? See FAULT LED Flash Codes page
NO
Repair low voltage wiring or replace transformer as needed
NO
Repair connections

DEFINITION:

Flame is sensed when it should not be sensed.

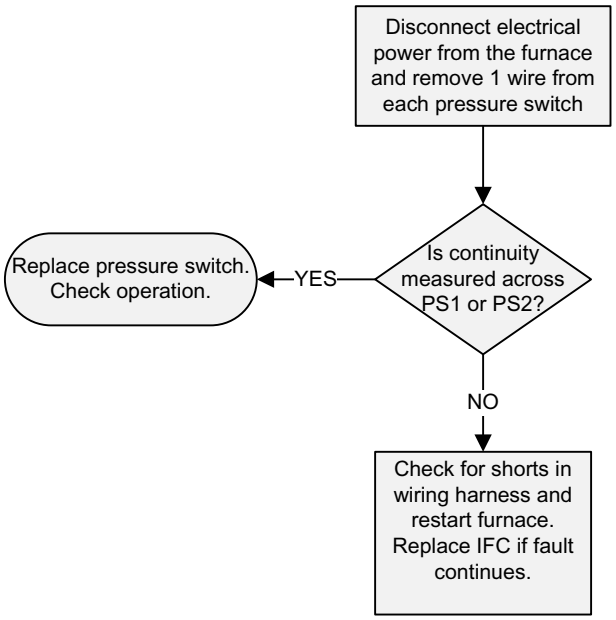
1 Flash Fault LED



DEFINITION
An error has occurred with the PS1 or PS2.
The error will be reported, indicating that the pressure switch is stuck closed.

Note: Verify all wiring to pressure switch is correct per wiring diagram

2 Flash Fault LED



DEFINITION
An error has occurred with PS1.
The error will be reported, indicating that the pressure switch is stuck open.

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

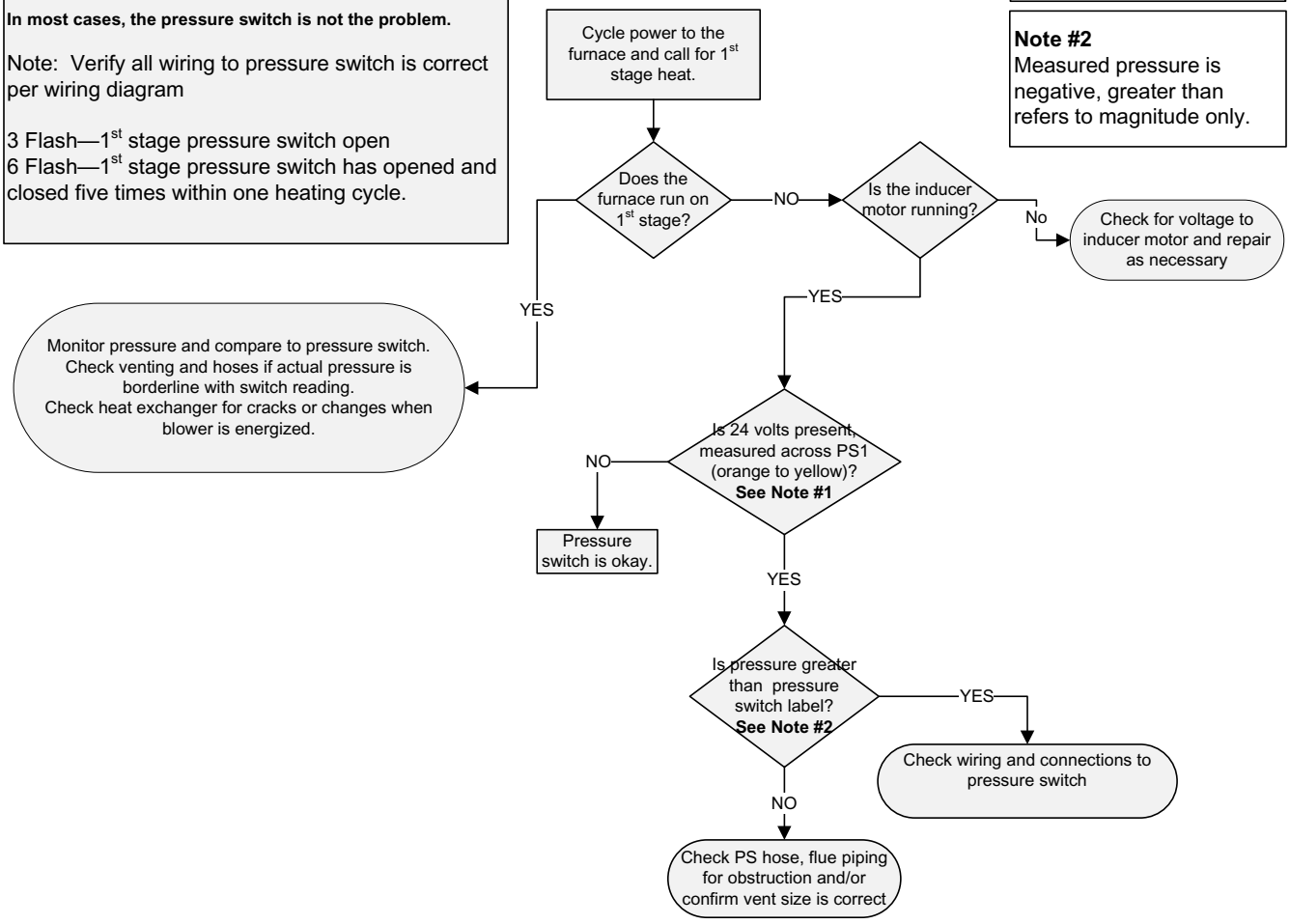
Note: Verify all wiring to pressure switch is correct per wiring diagram

3 Flash—1st stage pressure switch open
6 Flash—1st stage pressure switch has opened and closed five times within one heating cycle.

3 Flash & 6 Flash

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

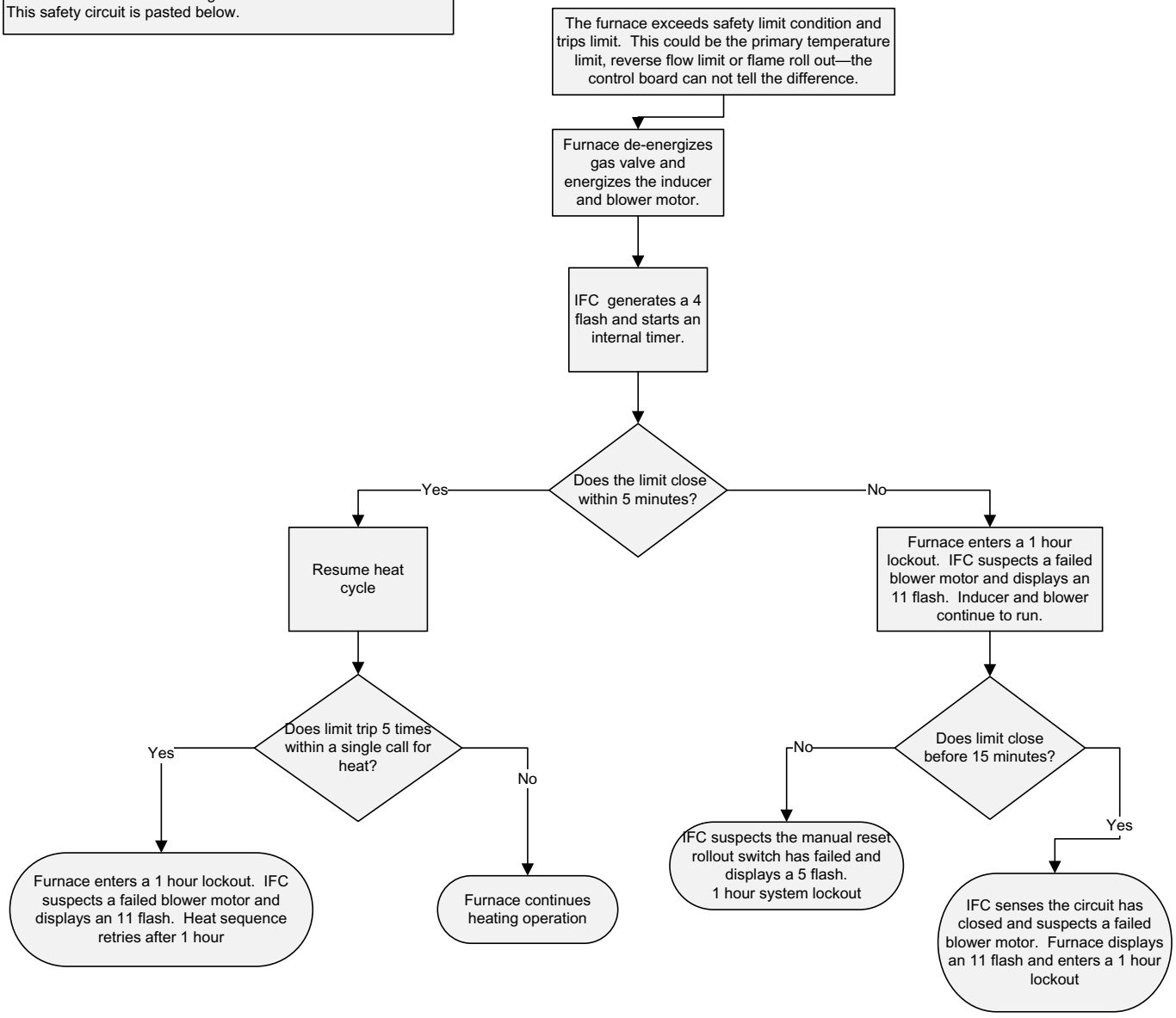
Note #2
Measured pressure is negative, greater than refers to magnitude only.

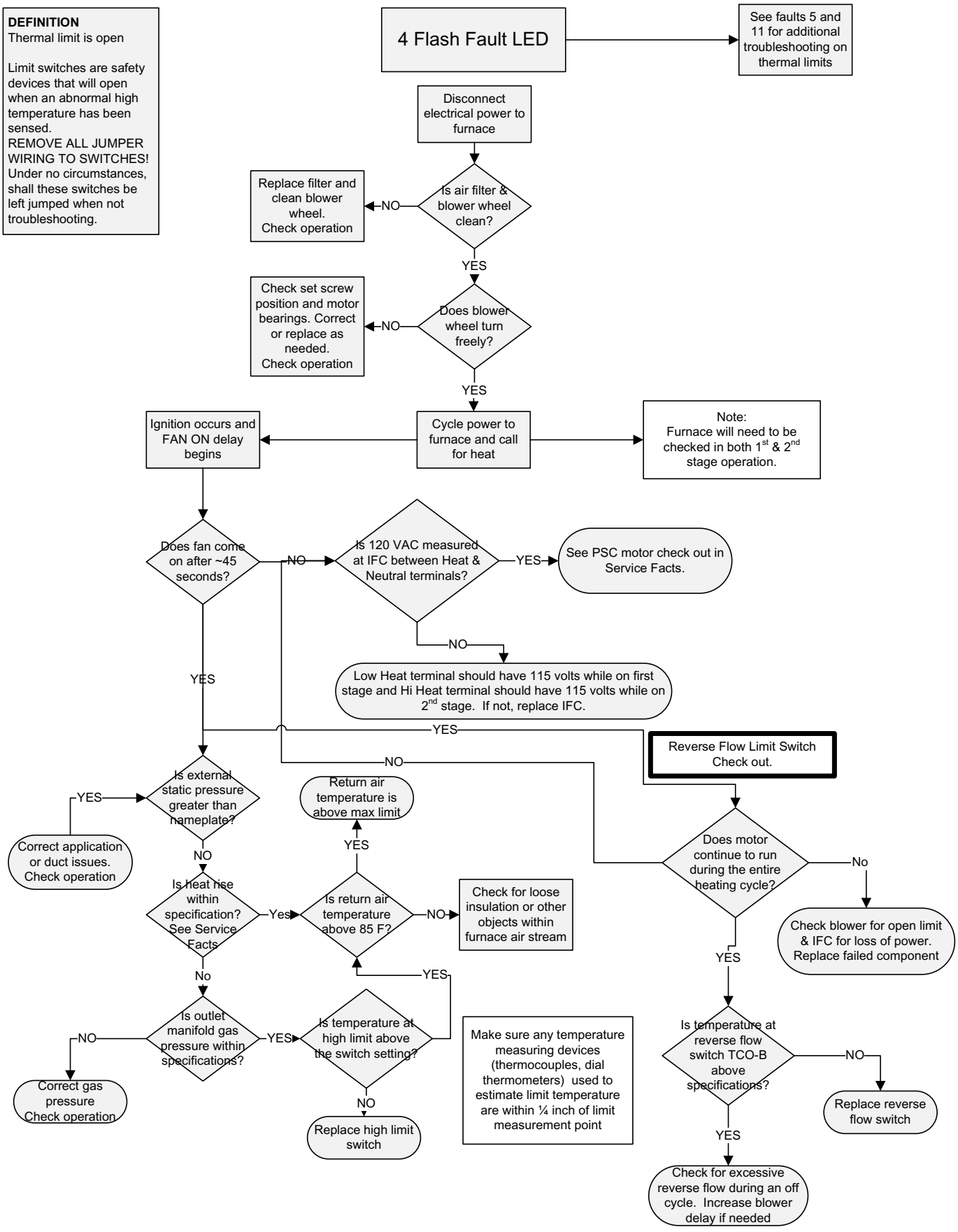


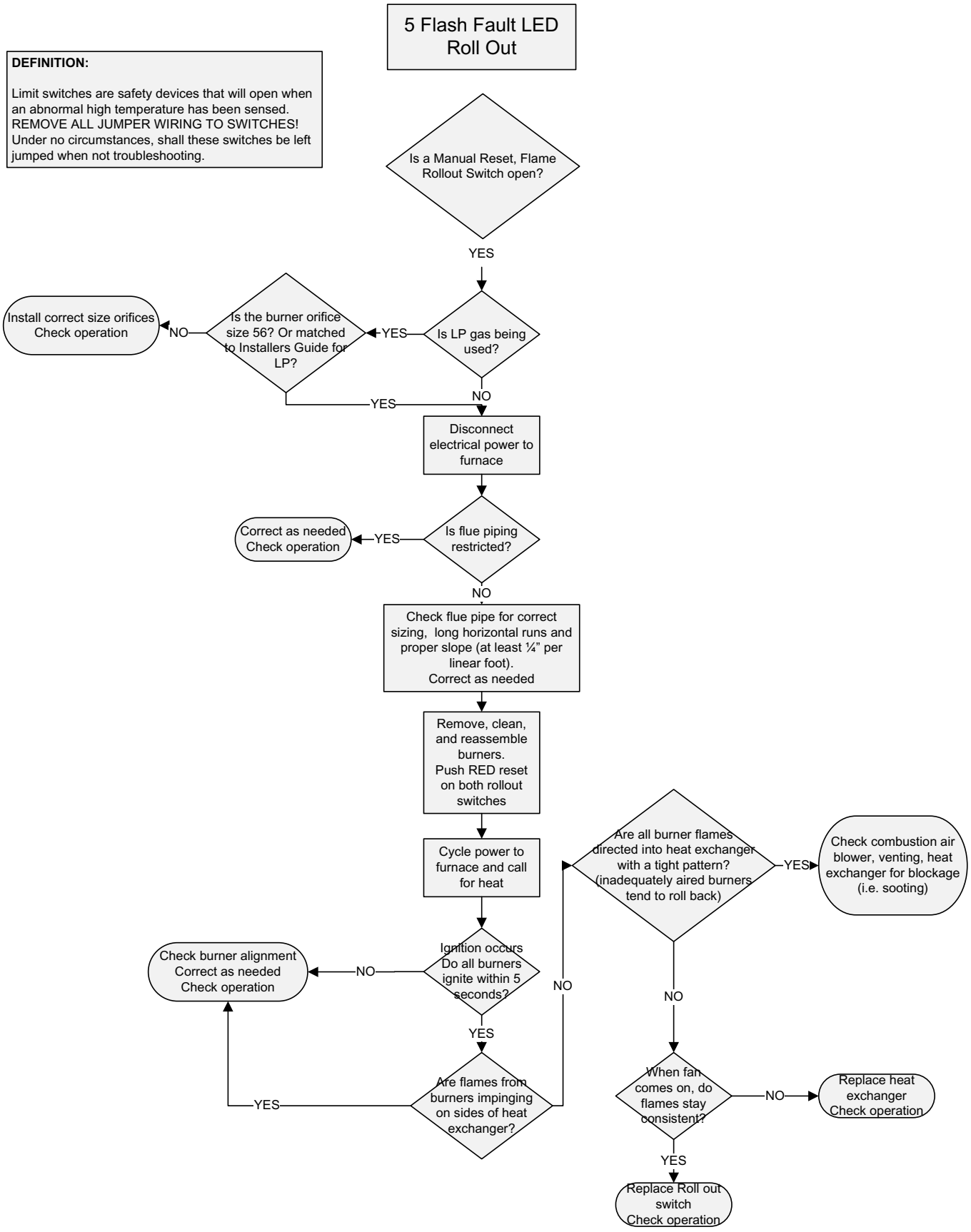
Definition:

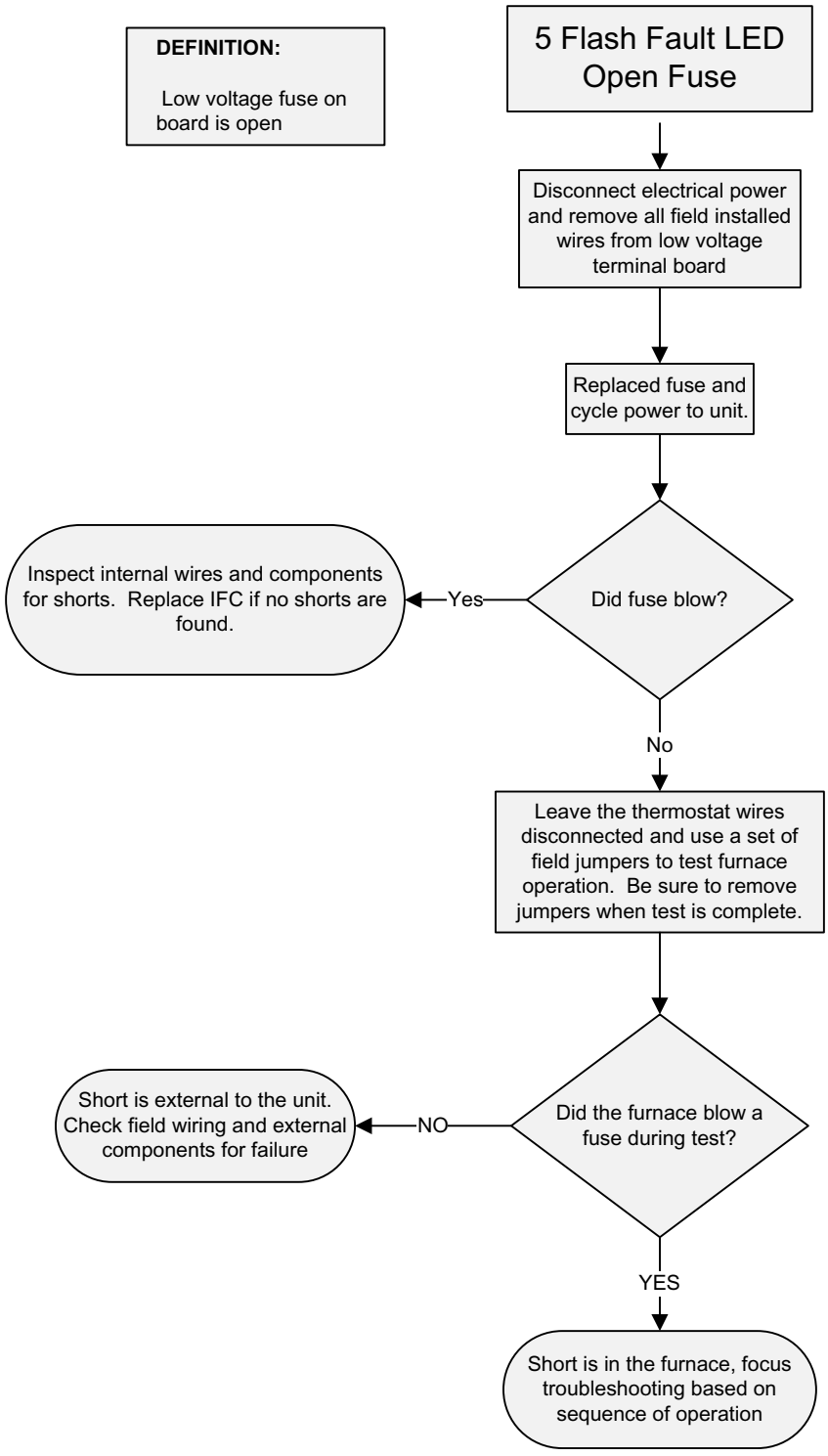
Furnace has exceeded a high temperature limit. All limit switches run through a series circuit, so the control board can not tell which switch has tripped.
The control board can however infer fault conditions based on the time it takes a limit to reset. This flow sheet covers the three fault codes derived from a single series circuit.
This safety circuit is pasted below.

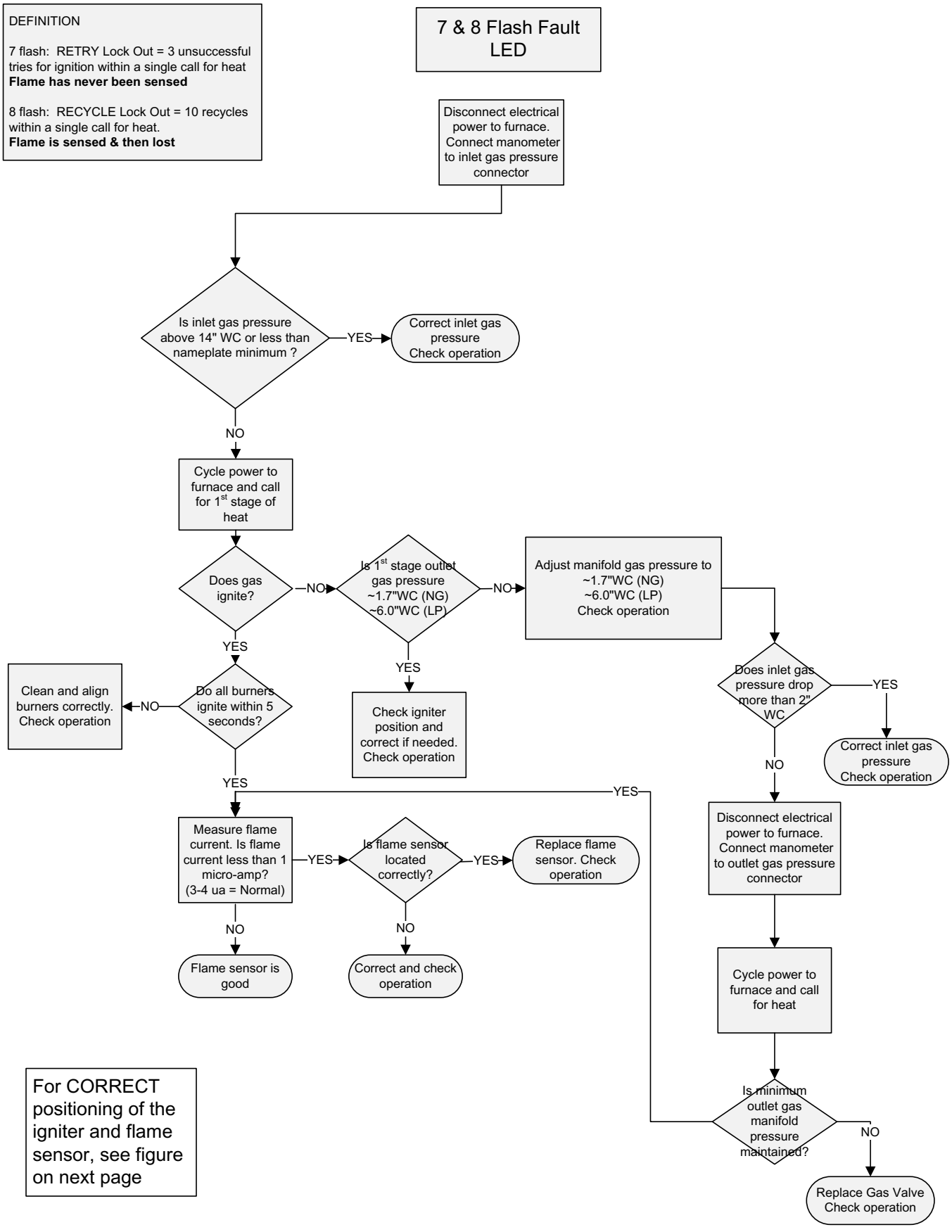
4, 5 & 11 Flash Fault Codes High Temperature

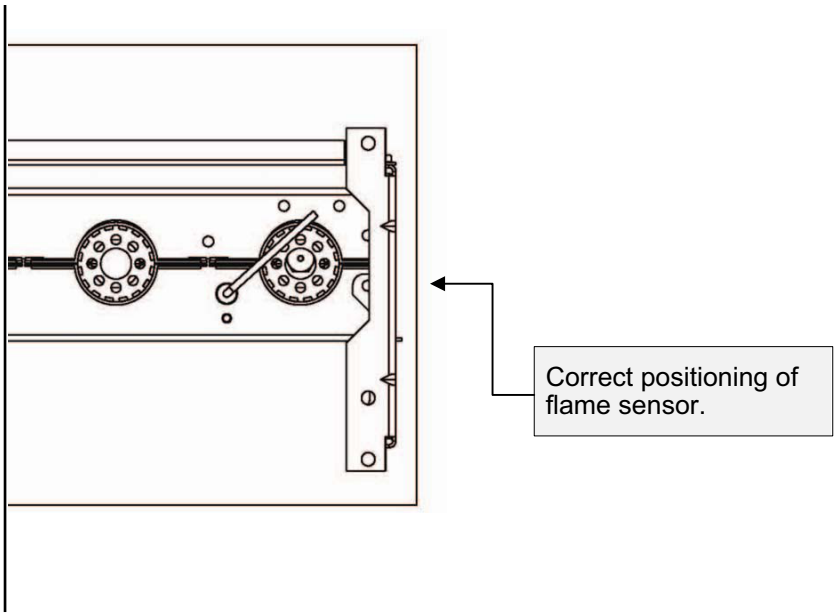



DEFINITION
Thermal limit is open
Limit switches are safety devices that will open when an abnormal high temperature has been sensed.
REMOVE ALL JUMPER WIRING TO SWITCHES! Under no circumstances, shall these switches be left jumped when not troubleshooting.
4 Flash Fault LED
See faults 5 and 11 for additional troubleshooting on thermal limits
Disconnect electrical power to furnace
Is air filter & blower wheel clean?
NO
Replace filter and clean blower wheel. Check operation
YES
Does blower wheel turn freely?
NO
Check set screw position and motor bearings. Correct or replace as needed. Check operation
YES
Cycle power to furnace and call for heat
Note: Furnace will need to be checked in both 1st & 2nd stage operation.
Ignition occurs and FAN ON delay begins
Does fan come on after ~45 seconds?
NO
Is 120 VAC measured at IFC between Heat & Neutral terminals?
YES
See PSC motor check out in Service Facts.
NO
Low Heat terminal should have 115 volts while on first stage and Hi Heat terminal should have 115 volts while on 2nd stage. If not, replace IFC.
YES
YES
Reverse Flow Limit Switch Check out.
NO
Is external static pressure greater than nameplate?
YES
Correct application or duct issues. Check operation
NO
Return air temperature is above max limit
YES
Is heat rise within specification? See Service Facts
Yes
Is return air temperature above 85 F?
NO
Check for loose insulation or other objects within furnace air stream
YES
No
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 measurement point
Does motor continue to run during the entire heating cycle?
No
Check blower for open limit & IFC for loss of power. Replace failed component
YES
Is temperature at reverse flow switch TCO-B above specifications?
NO
Replace reverse flow switch
YES
Check for excessive reverse flow during an off cycle. Increase blower delay if needed

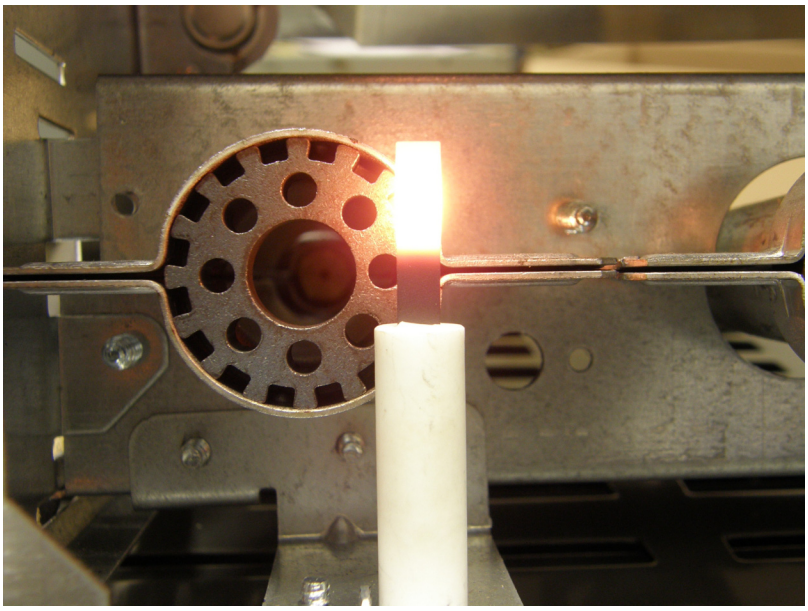

5 Flash Fault LED
Roll Out
DEFINITION:
Limit switches are safety devices that will open when an abnormal high temperature has been sensed. REMOVE ALL JUMPER WIRING TO SWITCHES! Under no circumstances, shall these switches be left jumped when not troubleshooting.
Is a Manual Reset, Flame Rollout Switch open?
YES
Is LP gas being used?
YES
Is the burner orifice size 56? Or matched to Installers Guide for LP?
NO
Install correct size orifices
Check operation
YES
NO
Disconnect electrical power to furnace
Is flue piping restricted?
YES
Correct as needed
Check operation
NO
Check flue pipe for correct sizing, long horizontal runs and proper slope (at least ¼" per linear foot).
Correct as needed
Remove, clean, and reassemble burners.
Push RED reset on both rollout switches
Cycle power to furnace and call for heat
Ignition occurs
Do all burners ignite within 5 seconds?
NO
Check burner alignment
Correct as needed
Check operation
YES
Are flames from burners impinging on sides of heat exchanger?
YES
NO
Are all burner flames directed into heat exchanger with a tight pattern? (inadequately aired burners tend to roll back)
YES
Check combustion air blower, venting, heat exchanger for blockage (i.e. sooting)
NO
When fan comes on, do flames stay consistent?
NO
Replace heat exchanger
Check operation
YES
Replace Roll out switch
Check operation


DEFINITION:
Low voltage fuse on board is open
5 Flash Fault LED Open Fuse
Disconnect electrical power and remove all field installed wires from low voltage terminal board
Replaced fuse and cycle power to unit.
Did fuse blow?
Yes
Inspect internal wires and components for shorts. Replace IFC if no shorts are found.
No
Leave the thermostat wires disconnected and use a set of field jumpers to test furnace operation. Be sure to remove jumpers when test is complete.
Did the furnace blow a fuse during test?
NO
Short is external to the unit. Check field wiring and external components for failure
YES
Short is in the furnace, focus troubleshooting based on sequence of operation


DEFINITION
7 flash: RETRY Lock Out = 3 unsuccessful tries for ignition within a single call for heat
Flame has never been sensed
8 flash: RECYCLE Lock Out = 10 recycles within a single call for heat.
Flame is sensed & then lost
7 & 8 Flash Fault LED
Disconnect electrical power to furnace. Connect manometer to inlet gas pressure connector
Is inlet gas pressure above 14" WC or less than nameplate minimum ?
YES
Correct inlet gas pressure Check operation
NO
Cycle power to furnace and call for 1st stage of heat
Does gas ignite?
NO
Is 1st stage outlet gas pressure ~1.7"WC (NG) ~6.0"WC (LP)
NO
Adjust manifold gas pressure to ~1.7"WC (NG) ~6.0"WC (LP) Check operation
YES
Check igniter position and correct if needed. Check operation
YES
Do all burners ignite within 5 seconds?
NO
Clean and align burners correctly. Check operation
YES
Measure flame current. Is flame current less than 1 micro-amp? (3-4 ua = Normal)
YES
Is flame sensor located correctly?
YES
Replace flame sensor. Check operation
NO
Flame sensor is good
NO
Correct and check operation
Does inlet gas pressure drop more than 2" WC
YES
Correct inlet gas pressure Check operation
NO
Disconnect electrical power to furnace. Connect manometer to outlet gas pressure connector
Cycle power to furnace and call for heat
Is minimum outlet gas manifold pressure maintained?
YES
NO
Replace Gas Valve Check operation
For CORRECT positioning of the igniter and flame sensor, see figure on next page



Correct positioning of flame sensor.

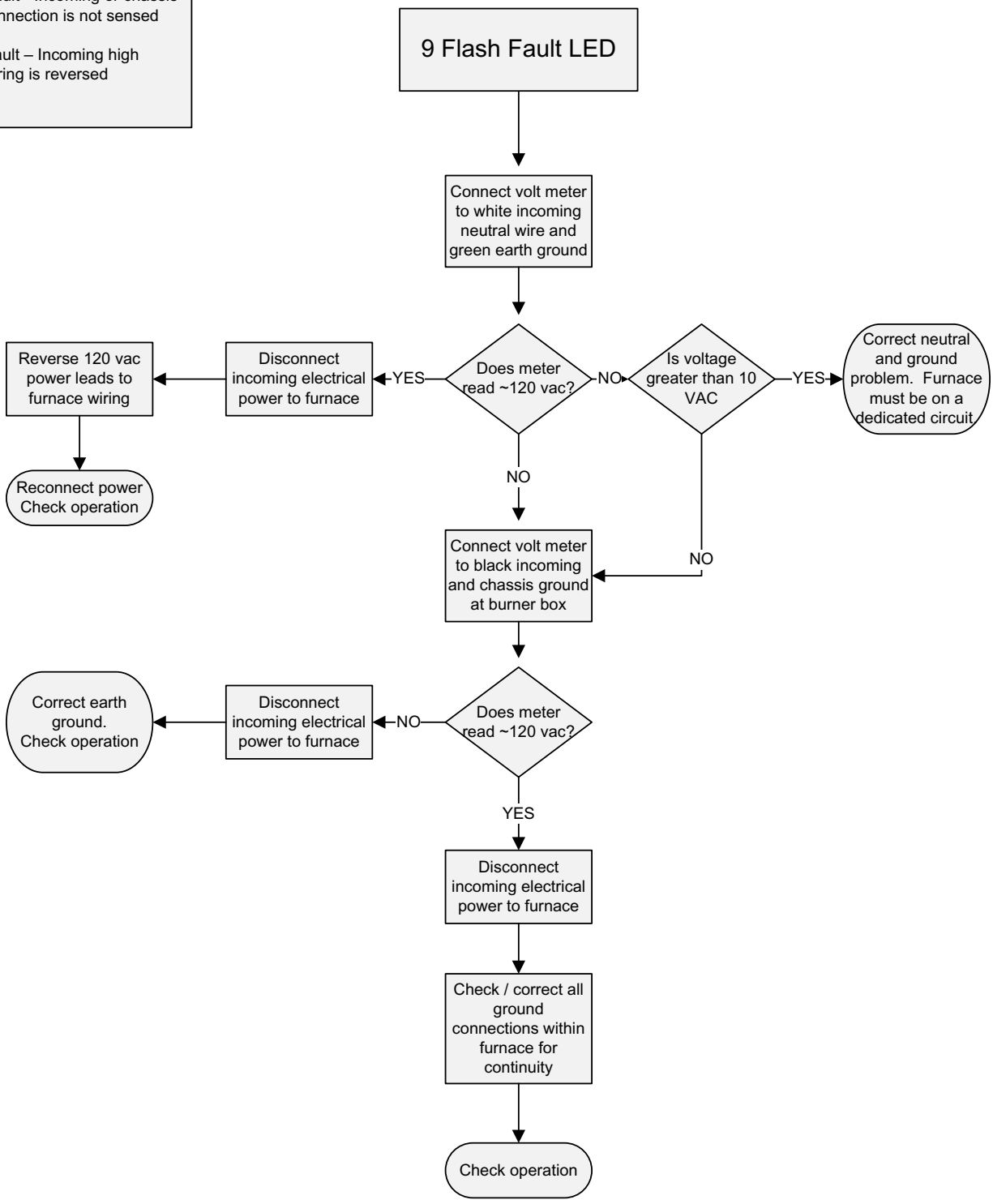


CORRECT positioning of ignitor.

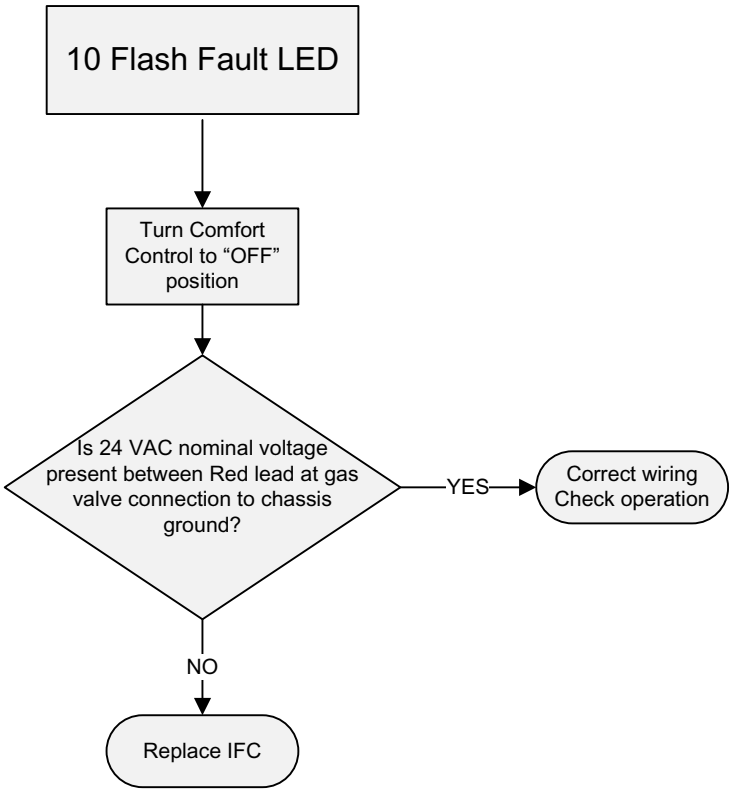
HOT ZONE is not centered over the cross-over

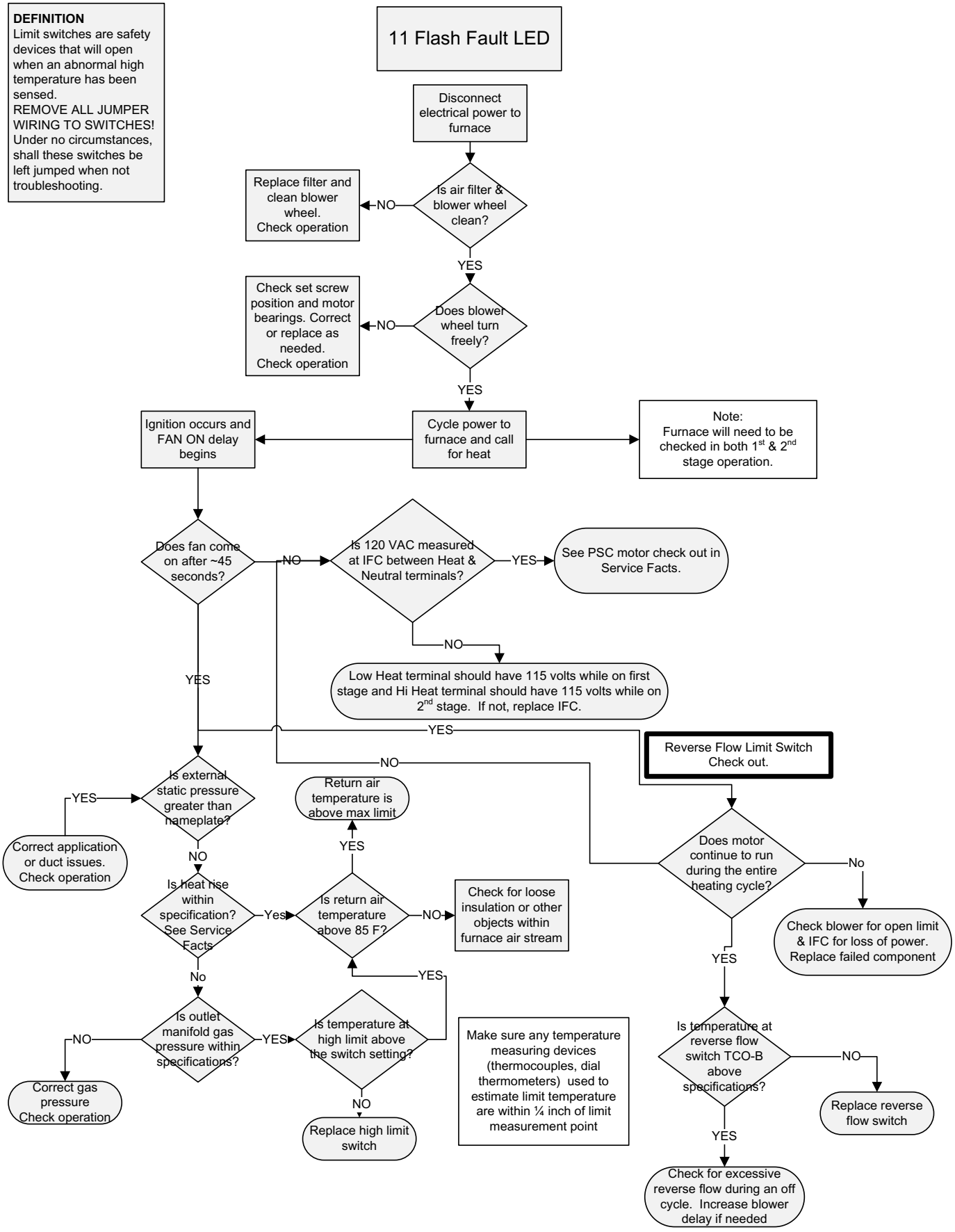
DEFINITION:
Ground Fault - Incoming or chassis ground connection is not sensed

Polarity Fault – Incoming high voltage wiring is reversed



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




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 jumped when not troubleshooting.
11 Flash Fault LED
Disconnect electrical power to furnace
Is air filter & blower wheel clean?
NO
Replace filter and clean blower wheel. Check operation
YES
Does blower wheel turn freely?
NO
Check set screw position and motor bearings. Correct or replace as needed. Check operation
YES
Cycle power to furnace and call for heat
Note: Furnace will need to be checked in both 1st & 2nd stage operation.
Ignition occurs and FAN ON delay begins
Does fan come on after ~45 seconds?
NO
Is 120 VAC measured at IFC between Heat & Neutral terminals?
YES
See PSC motor check out in Service Facts.
NO
Low Heat terminal should have 115 volts while on first stage and Hi Heat terminal should have 115 volts while on 2nd stage. If not, replace IFC.
YES
YES
Reverse Flow Limit Switch Check out.
NO
Is external static pressure greater than nameplate?
YES
Correct application or duct issues. Check operation
NO
Return air temperature is above max limit
YES
Is heat rise within specification? See Service Facts
Yes
Is return air temperature above 85 F?
NO
Check for loose insulation or other objects within furnace air stream
YES
No
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 measurement point
Does motor continue to run during the entire heating cycle?
No
Check blower for open limit & IFC for loss of power. Replace failed component
YES
Is temperature at reverse flow switch TCO-B above specifications?
NO
Replace reverse flow switch
YES
Check for excessive reverse flow during an off cycle. Increase blower delay if needed

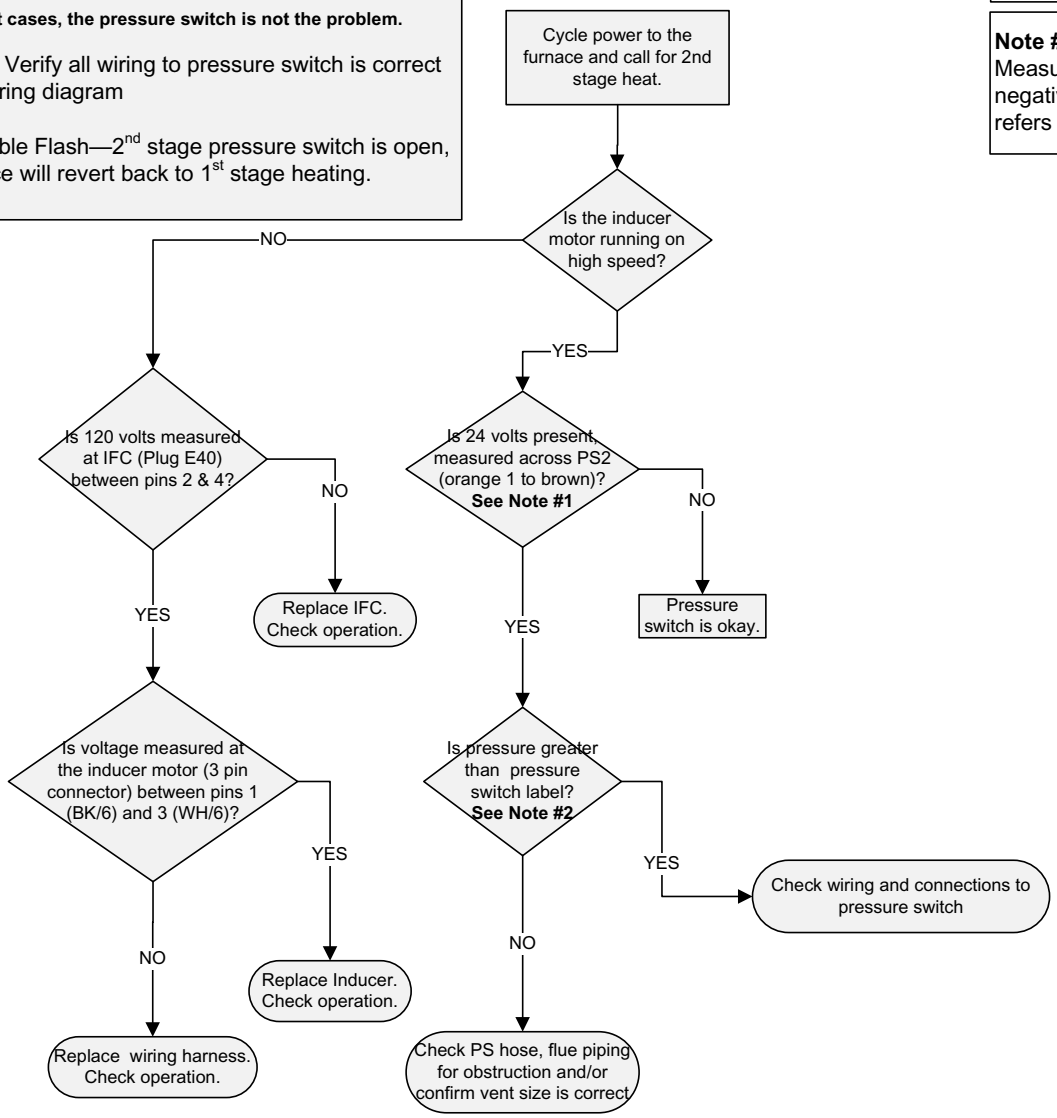
DEFINITION
An error has occurred with PS2.
The error will be reported, indicating that the pressure switch is stuck open.

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

Note: Verify all wiring to pressure switch is correct per wiring diagram

3 Double Flash—2nd stage pressure switch is open, furnace will revert back to 1st stage heating.

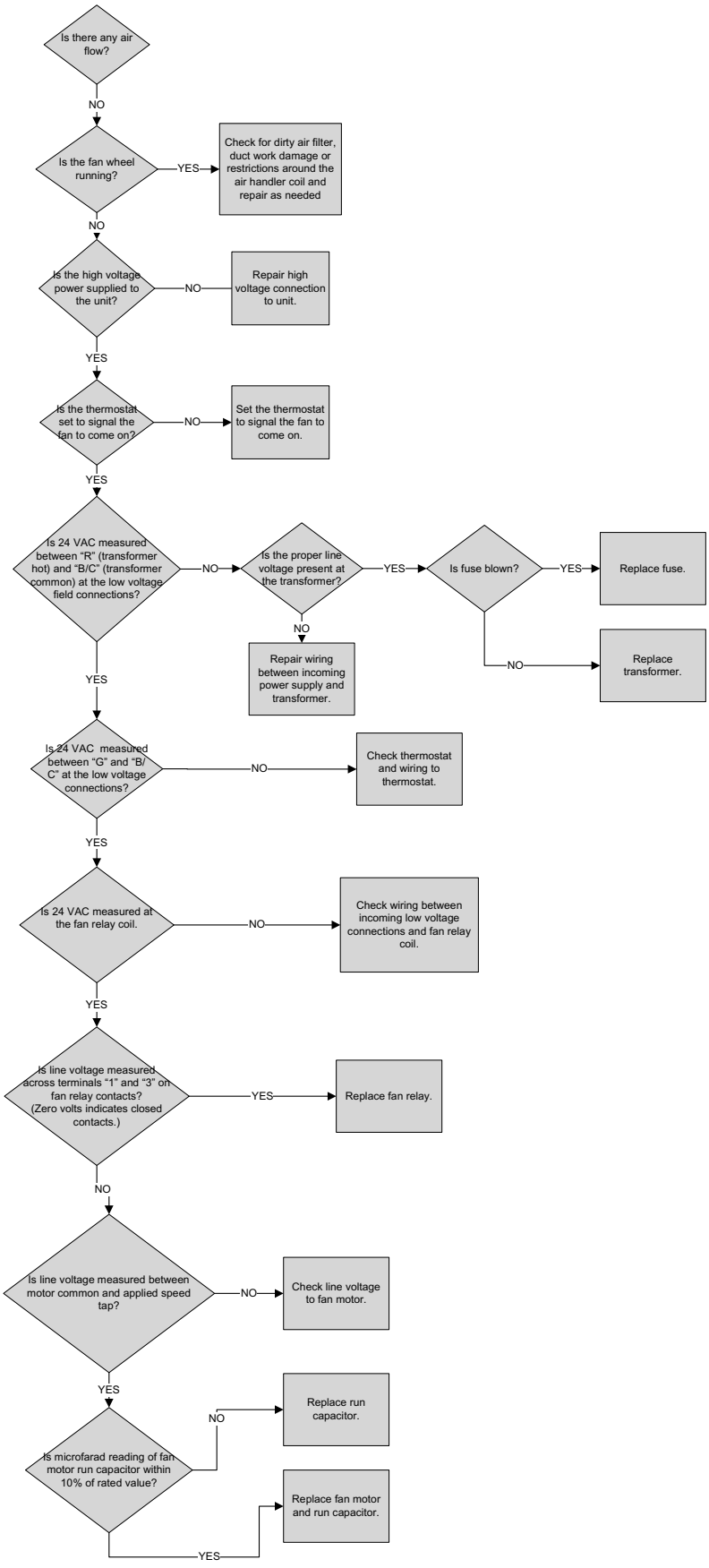
3 Double Flash LED



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

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

PSC - No Air Flow



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