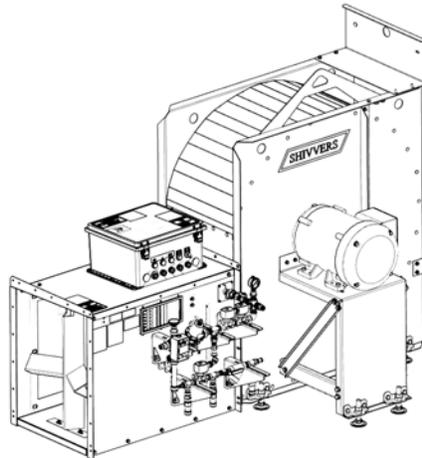




BLUE FLAME II **CROP DRYER FOR SINGLE WIDTH,** **SINGLE INLET CENTRIFUGAL FANS**



Installation & Operating Instructions

For Models:

FH1527C1P240LP -- 15 Hp, 1 Phase, 240V, LP, CSA W/ CONTROLS
FH1527C1P240NG -- 15 Hp, 1 Phase, 240V, NG, CSA W/ CONTROLS
FH1527-1P240LP-CSA -- 15 Hp, 1 Phase, 240V, LP, CSA
FH1527-1P240NG-CSA -- 15 Hp, 1 Phase, 240V, NG, CSA
FH1527-3P230LP-CSA -- 15 Hp, 3 Phase, 230V, LP, CSA
FH1527-3P230NG-CSA -- 15 Hp, 3 Phase, 230V, NG, CSA
FH1527-3P460LP-CSA -- 15 Hp, 3 Phase, 460V, LP, CSA
FH1527-3P460NG-CSA -- 15 Hp, 3 Phase, 460V, NG, CSA
FH1527-3P575LP-CSA -- 15 Hp, 3 Phase, 575V, LP, CSA
FH1527-3P575NG-CSA -- 15 Hp, 3 Phase, 575V, NG, CSA
FH2030-3P230LP-CSA -- 20 Hp, 3 Phase, 230V, LP, CSA
FH2030-3P230NG-CSA -- 20 Hp, 3 Phase, 230V, NG, CSA
FH2030-3P460LP-CSA -- 20 Hp, 3 Phase, 460V, LP, CSA
FH2030-3P460NG-CSA -- 20 Hp, 3 Phase, 460V, NG, CSA
FH2030-3P575LP-CSA -- 20 Hp, 3 Phase, 575V, LP, CSA
FH2030-3P575NG-CSA -- 20 Hp, 3 Phase, 575V, NG, CSA

**For outdoor installation only.
Use heated air for non-occupied spaces only.**

Shivers Manufacturing, Inc.
614 West English St.
Corydon, IA 50060 USA
Ph. (641)872-1005 ** Fax (641)872-1593



WARNING: If the information in this manual is not followed exactly, a fire or explosion may result 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.
- Extinguish any open flames.
- Do not touch any electrical switch.
- Immediately call your gas supplier. 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: Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

FOR YOUR SAFETY

The use and storage of gasoline and other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.

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DEALER INFORMATION

DEALER

Name: _____

Address: _____

Phone #: _____

INSTALLING CONTRACTOR (if different from above)

Name: _____

Address: _____

Phone #: _____

SERVICE CONTRACTOR (if different from above)

Name: _____

Address: _____

Phone #: _____

- MODEL:
- | | |
|---|---|
| <input type="checkbox"/> FH1527C1P240LP | <input type="checkbox"/> FH1527C1P240NG |
| <input type="checkbox"/> FH1527-1P240LP-CSA | <input type="checkbox"/> FH1527-1P240NG-CSA |
| <input type="checkbox"/> FH1527-3P230LP-CSA | <input type="checkbox"/> FH1527-3P230NG-CSA |
| <input type="checkbox"/> FH1527-3P460LP-CSA | <input type="checkbox"/> FH1527-3P460NG-CSA |
| <input type="checkbox"/> FH1527-3P575LP-CSA | <input type="checkbox"/> FH1527-3P575NG-CSA |
| <input type="checkbox"/> FH2030-3P230LP-CSA | <input type="checkbox"/> FH2030-3P230NG-CSA |
| <input type="checkbox"/> FH2030-3P460LP-CSA | <input type="checkbox"/> FH2030-3P460NG-CSA |
| <input type="checkbox"/> FH2030-3P575LP-CSA | <input type="checkbox"/> FH2030-3P575NG-CSA |

SERIAL NUMBER: _____

DATE OF INSTALLATION: _____

INTRODUCTION

COMPLETELY READ THIS MANUAL BEFORE INSTALLING OR USING THE BLUE FLAME II CROP DRYER (FAN AND HEATER), CSA Version.

This manual is intended for use with the Shivvers 15 or 20 Hp Blue Flame II Crop Dryer which is CSA (Canadian Standards Association) certified. The Crop Dryer consists of a Blue Flame II heater connected to a Shivvers 15 or 20 Hp Centrifugal Fan. The heater may **not** be used with any other manufacturer's centrifugal fan. The complete crop dryer is shipped in three or four separate pieces which must be installed and wired together at the installation site.

FH1527C1P240LP

118X-001A 15 Hp C-Fan
119M-001A BFII Heater, LP, 15 Hp, CSA
119N-001A Op. Control & H.L.
E-6617 Freq. Drive, 240V,1P

FH1527-1P240LP-CSA

118Y-001A 15 Hp C-Fan, 1 Phase
119M-001A BFII Heater, LP, 15 Hp, CSA
119N-001A Op. Control & H.L.

FH1527-3P230LP-CSA

118X-001A 15 Hp C-Fan
119M-001A BFII Heater, LP, 15 Hp, CSA
119N-001A Op. Control & H.L.

FH1527-3P460LP-CSA

118X-001A 15 Hp C-Fan
119M-001A BFII Heater, LP, 15 Hp, CSA
119N-001A Op. Control & H.L.

FH1527-3P575LP-CSA

118Z-001A 15 Hp C-Fan, 575V
119M-001A BFII Heater, LP, 15 Hp, CSA
119N-001A Op. Control & H.L.

FH2030-3P230LP-CSA

118AA-001A 20 Hp C-Fan
119P-001A BFII Heater, LP, 20 Hp, CSA
119N-001A Op. Control & H.L.

FH2030-3P460LP-CSA

118AA-001A 20 Hp C-Fan
119P-001A BFII Heater, LP, 20 Hp, CSA
119N-001A Op. Control & H.L.

FH1527C1P240NG

118X-001A 15 Hp C-Fan
119Q-001A BFII Heater, NG, 15 Hp, CSA
119N-001A Op. Control & H.L.
E-6617 Freq. Drive, 240V,1P

FH1527-1P240NG-CSA

118Y-001A 15 Hp C-Fan, 1 Phase
119Q-001A BFII Heater, NG, 15 Hp, CSA
119N-001A Op. Control & H.L.

FH1527-3P230NG-CSA

118X-001A 15 Hp C-Fan
119Q-001A BFII Heater, NG, 15 Hp, CSA
119N-001A Op. Control & H.L.

FH1527-3P460NG-CSA

118X-001A 15 Hp C-Fan
119Q-001A BFII Heater, NG, 15 Hp, CSA
119N-001A Op. Control & H.L.

FH1527-3P575NG-CSA

118Z-001A 15 Hp C-Fan, 575V
119Q-001A BFII Heater, NG, 15 Hp, CSA
119N-001A Op. Control & H.L.

FH2030-3P230NG-CSA

118AA-001A 20 Hp C-Fan
119R-001A BFII Heater, NG, 20 Hp, CSA
119N-001A Op. Control & H.L.

FH2030-3P460NG-CSA

118AA-001A 20 Hp C-Fan
119R-001A BFII Heater, NG, 20 Hp, CSA
119N-001A Op. Control & H.L.

FH2030-3P575LP-CSA

118AB-001A 20 Hp C-Fan, 575V
119P-001A BFII Heater, LP, 20 Hp, CSA
119N-001A Op. Control & H.L.

FH2030-3P575NG-CSA

118AB-001A 20 Hp C-Fan, 575V
119R-001A BFII Heater, NG, 20 Hp, CSA
119N-001A Op. Control & H.L.

For best results and ease of installation and service, the Shivers 565D-001A Transition and 74C-001A or 74D-001A Entrance Collars are recommended.

The Blue Flame II heaters provide from approx. 0.75 million to 3.6 million BTU/Hr of heat utilizing Liquid Propane or Natural Gas fuel. This heater would not normally be considered a low temperature rise heater for applications such as drying rice. The LP Heater is equipped with a built in vaporizer. The pipe train is configured in a hi-low-off configuration for a wide temperature operating range. A 3-wire thermostat system is included to control the heater.

This series of Blue Flame II heaters are similar to the centrifugal heaters manufactured by Shivers in the past. These dryers use a flame sensing system called flame rectification. There are no moving parts in the flame rod. It just has to be in the flame but not touching the burner element or housing. The flame sense module will apply an AC current to the flame rod. If a flame is present, the flame will rectify or change it to a DC current. If the flame sense module detects this DC current, it will turn off the ignition transformer and the burner will continue to burn. If the DC current is not detected, the flame sense module will lockout the burner, and the heater power switch will have to be shut off for a few seconds, then turned back on and re-started, to reset the module.

The Blue Flame II Crop Dryers, CSA versions, were first introduced in the fall of 2015. Additional models were added in 2019.

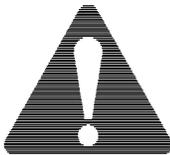
The equipment shall be installed in accordance with the *Natural Gas and Propane Installation Code, CSA B149.1* and the *Propane Storage and Handling Code, CSA B149.2*, or applicable Provincial Regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

SAFETY INFORMATION

The operator of this machinery must assume the responsibility for his own safety, and that of those who are working with him. He must also make sure the equipment was installed properly. Factors that contribute to the overall safety of operation are: proper use, maintenance, and frequent inspection of the equipment. All of these are the operator's responsibility.

If any items covered in this manual are not completely understood, or there is a concern with the safety of the product, contact SHIVVERS Manufacturing Incorporated at the address shown on the front cover.

SHIVVERS is genuinely interested in providing the safest practical equipment to our customers. If you have a suggestion which you believe will enhance the safety of this product, please write us and let us know.



TAKE NOTE ANYTIME THIS SAFETY ALERT SYMBOL APPEARS. YOUR SAFETY, AND THAT OF PERSONS AROUND YOU IS AT STAKE.

The safety alert symbol will be accompanied by one of three signal words whose definitions are given as:

DANGER: Red and white. Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

WARNING: Orange and black. Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION: Yellow and black. Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

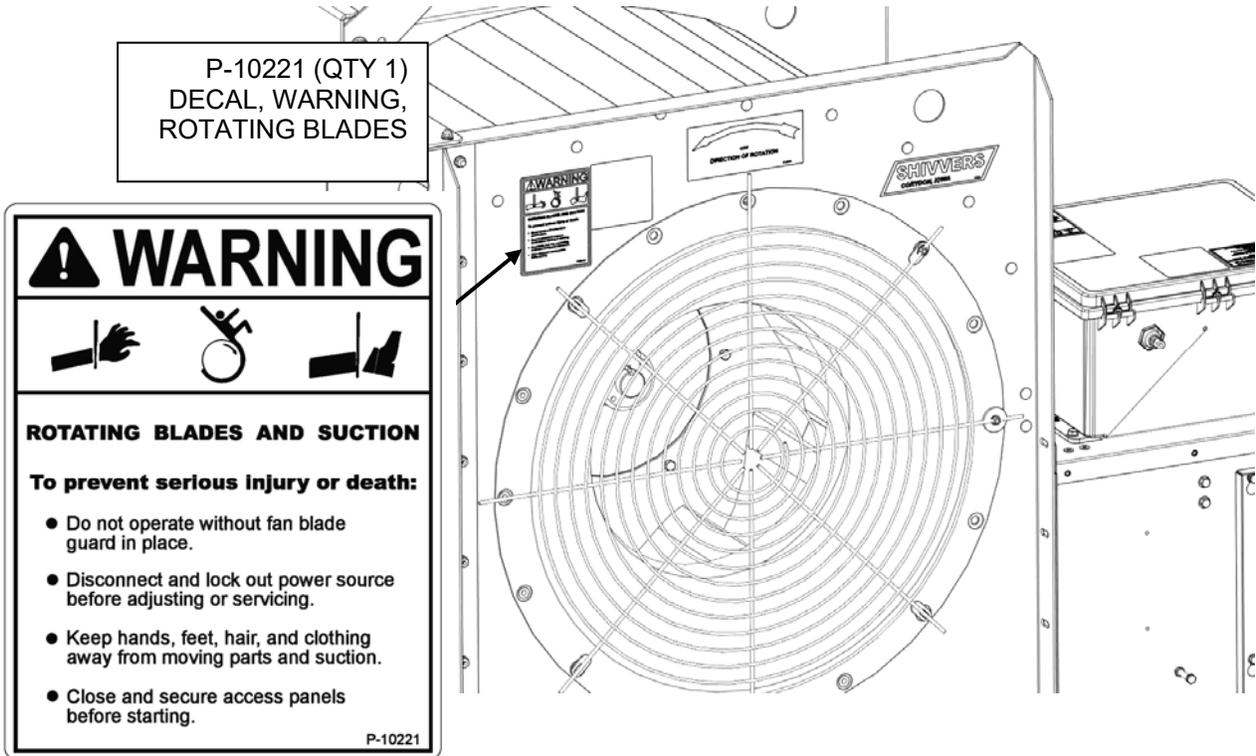
Be sure to observe these common sense rules when working with the dryer equipment:

- 1). All units must be equipped with a main power disconnect switch. This disconnect switch must shut power off to the complete drying system. It must have the capability of being locked into the OFF or OUT position. Disconnect and **LOCK OUT** this main power disconnect switch before conducting any inspection, maintenance, repair, adjustment, or cleaning of the drying system. When you must have the electrical power on to troubleshoot equipment, do it from a safe distance, and always from outside the bin.
- 2). Keep the bin entrances locked at all times. To unlock the bin, first lower the Level-Dry (if so equipped), then shut the main power disconnect off. Take the safety lock off the bin entrance and place it on the main power disconnect before opening the bin entrance. **Never enter the drying bin unless the Level-Dry (if so equipped), is completely lowered, and all power is disconnected and locked out.**
- 3). Always keep all shields and guards in place. If shields or guards must be removed for inspection or maintenance, replace them before unlocking and turning the power back on.
- 4). Be sure everyone is clear of all the drying and transferring equipment, and outside of all bins, before unlocking and turning the power on. Some equipment may run upon re-application of power.
- 5). Make sure that all decals are in place and are easy to read. Do not operate the equipment with missing or illegible decals. If replacements are needed, contact SHIVVERS Manufacturing Incorporated or your dealer.
- 6). Prior to use, inspect all equipment to insure that it is in good operating condition. Do not operate with missing, damaged, or worn parts. Use only SHIVVERS approved replacement parts.
- 7). Metal edges can be sharp. Wear protective clothing and handle equipment and parts with care.
- 8). Keep children and bystanders away from drying and transferring equipment at all times.
- 9). If going up the bin ladder and/or performing maintenance on the top of the bin, take precautions to prevent accidental falls. When on top of the bin, wear a safety harness or other safety device.
- 10). At least annually, review all operating and safety manuals with any personnel working with this equipment. Always train new employees before they operate the drying equipment. Insist that they read and understand the operating and safety manuals.

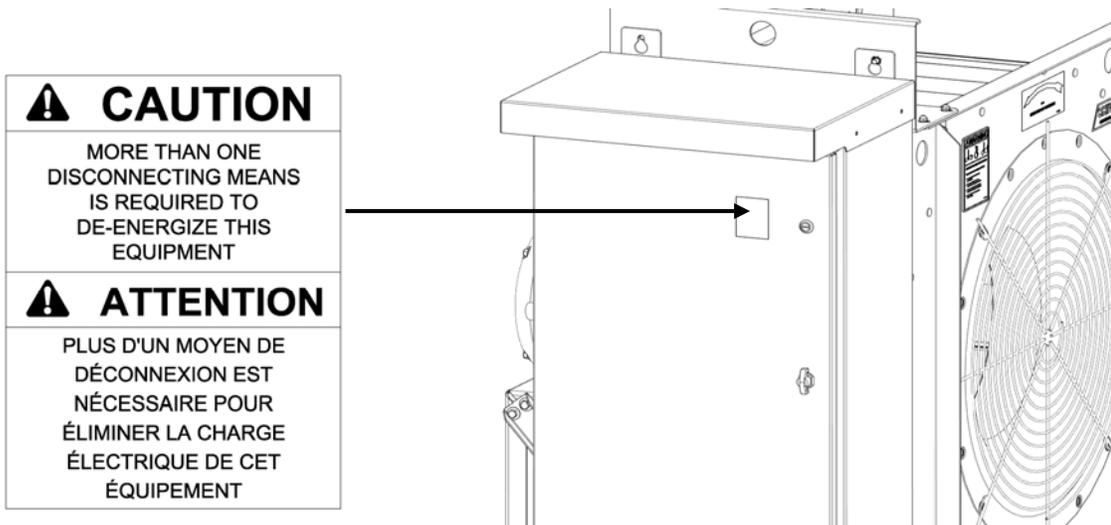
LOCATION OF SAFETY DECALS ON CROP DRYER

This manual shows the location of safety decals that apply to the Blue Flame II Crop Dryer.

LOCATION OF SAFETY DECALS ON FAN



LOCATION OF SAFETY DECALS ON FREQUENCY DRIVE (if used)



LOCATION OF SAFETY DECALS ON HEATER



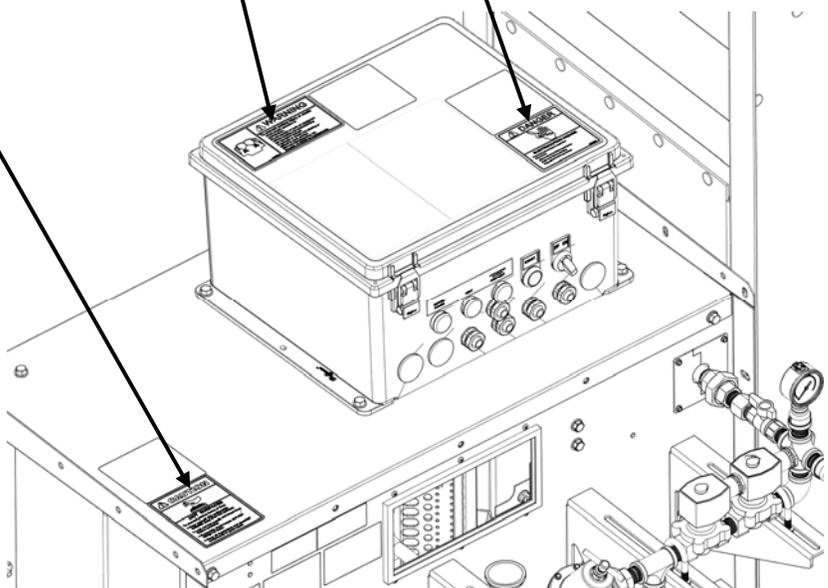
P-10367 (QTY 1)
DECAL, WARNING,
READ MANUAL



P-11146 (QTY 1)
DECAL, DANGER,
ELECTROCUTION
HAZARD



P-11157 (QTY 1)
DECAL, CAUTION,
HOT SURFACES



LOCATION OF OTHER DECALS ON CROP DRYER

LOCATION OF OTHER DECALS ON HEATER

CSA 3.8-2014 Crop Dryer
 CSA 3.8 visant les séchoirs pour récoltes

Fan / dryer unit for use in crop drying.
 Ventilateur / séchoir pour le séchage des récoltes.

For Industrial / Commercial Use
 Pour utilisation industrielle / commerciale

For Outdoor Installation Only
 Installer à l'extérieur seulement

Intended for Non-Occupied Spaces Only
 Pour utilisation dans des espaces non occupés uniquement

To be used only in the open, not closer than 50 ft (15 m) from any inhabited building.
 Utiliser à l'extérieur uniquement, à au moins 50 pi (15 m) de tout bâtiment habité.

Clearance for service availability = 39" (1 m)
 Dégagement pour la disponibilité du service = 39" (1 m)

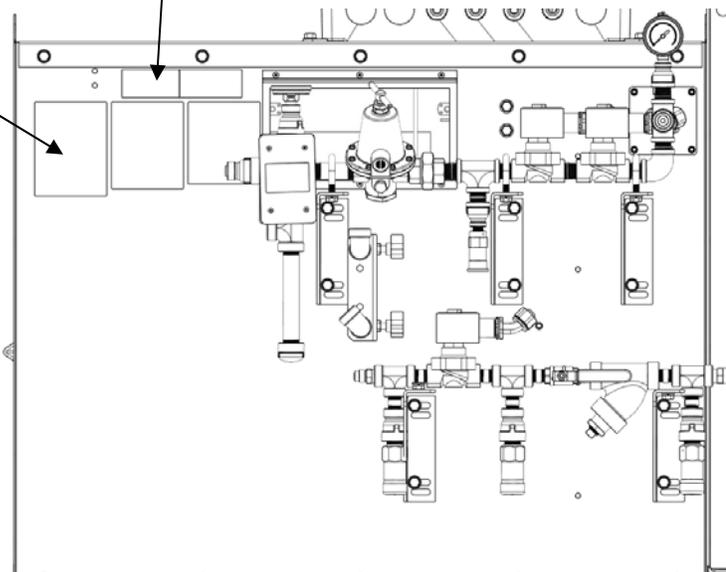
P-13234

P-13234 (QTY 1)
 DECAL, CROP
 DRYER, CSA

<p>FOR YOUR SAFETY</p> <p>The use and storage of gasoline and other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.</p>	<p>POUR VOTRE SÛRETÉ</p> <p>Il est dangereux d'utiliser et d'entreposer de l'essence et autres vapeurs et des liquides inflammables se trouvant dans des contenants ouverts à proximité de cet appareil .</p>
--	--

P-13236

P-13236 (QTY 2, ONE ON OTHER SIDE, ON ACCESS DOOR)
 DECAL, FLAMMABLE LIQUIDS



LOCATION OF OTHER DECALS ON CROP DRYER

PRESSURE RATINGS DECAL, MODEL SPECIFIC

15 HP NG			
AMBIENT TEMP LA TEMPÉRATURE AMBIANTE (°F / °C)	BTU INPUT BTU INPUT (MBTU/HR)	MANIFOLD PRESSURE PRESSION DU COLLECTEUR (PSIG)	MIN SUPPLY PRESSURE LA PRESSION D'ALIMENTATION MINIMALE (PSIG)
0 / -18	3.2	4.7 (MAX)	10.0
40 / 5	3.2	4.7 (MAX)	10.0
80 / 27	2.1	2.0	4.75
ANY	0.8	0.5 (MIN)	1.25

MIN. AMBIENT TEMPERATURE = 0°F / -18°C
TEMPÉRATURE AMBIANTE MINIMUM = 0°F / -18°C

MAX. DISCHARGE AIR TEMP. = 280°F / 138°C
TEMPÉRATURE DE L'AIR DE DÉCHARGE MAXIMALE = 280°F / 138°C

MAX. TEMP. RISE AT MAX. AIRFLOW = 156°F / 69°C
HAUSSE DE TEMPÉRATURE MAXIMALE AU DÉBIT D'AIR MAXIMAL = 156°F / 69°C

MAX. TEMP. RISE AT MIN. AIRFLOW = 225°F / 107°C
HAUSSE DE TEMPÉRATURE MAXIMAL AU FLUX D'AIR MINIMAL = 225°F / 107°C

P-13441

20 HP LP			
AMBIENT TEMP LA TEMPÉRATURE AMBIANTE (°F / °C)	BTU INPUT BTU INPUT (MBTU/HR)	MANIFOLD PRESSURE PRESSION DU COLLECTEUR (PSIG)	MIN SUPPLY PRESSURE LA PRESSION D'ALIMENTATION MINIMALE (PSIG)
0 / -18	3.6	25.0 (MAX)	50.0
40 / 5	3.1	20.0	47.0
80 / 27	2.2	10.0	33.0
ANY	0.75	1.0 (MIN)	10.0

MIN. AMBIENT TEMPERATURE = 0°F / -18°C
TEMPÉRATURE AMBIANTE MINIMUM = 0°F / -18°C

MAX. DISCHARGE AIR TEMP. = 280°F / 138°C
TEMPÉRATURE DE L'AIR DE DÉCHARGE MAXIMALE = 280°F / 138°C

MAX. TEMP. RISE AT MAX. AIRFLOW = 155°F / 68°C
HAUSSE DE TEMPÉRATURE MAXIMALE AU DÉBIT D'AIR MAXIMAL = 155°F / 68°C

MAX. TEMP. RISE AT MIN. AIRFLOW = 242°F / 117°C
HAUSSE DE TEMPÉRATURE MAXIMAL AU FLUX D'AIR MINIMAL = 242°F / 117°C

P-13440

AMBIENT TEMP LA TEMPÉRATURE AMBIANTE (°F / °C)	BTU INPUT BTU INPUT (MBTU/HR)	MANIFOLD PRESSURE PRESSION DU COLLECTEUR (PSIG)	MIN SUPPLY PRESSURE LA PRESSION D'ALIMENTATION MINIMALE (PSIG)
0 / -18	3.2	25 (MAX)	50
40 / 5	2.5	15	40
80 / 27	1.7	5	25
ANY	1.0	1 (MIN)	10

MIN. AMBIENT TEMPERATURE = 0°F / -18°C
TEMPÉRATURE AMBIANTE MINIMUM = 0°F / -18°C

MAX. DISCHARGE AIR TEMP. = 280°F / 138°C
TEMPÉRATURE DE L'AIR DE DÉCHARGE MAXIMALE = 280°F / 138°C

MAX. TEMP. RISE AT MAX. AIRFLOW = 185°F / 85°C
HAUSSE DE TEMPÉRATURE MAXIMALE AU DÉBIT D'AIR MAXIMAL = 185°F / 85°C

MAX. TEMP. RISE AT MIN. AIRFLOW = 240°F / 115°C
HAUSSE DE TEMPÉRATURE MAXIMAL AU FLUX D'AIR MINIMAL = 240°F / 115°C

P-13239

P-13441 (QTY 1)
FOR 15 HP NG
UNITS

OR

P-13440 (QTY 1)
FOR 20 HP LP
UNITS

OR

P-13239 (QTY 1)
FOR 15 HP LP
UNITS

OR

P-13442 (QTY 1)
FOR 20 HP NG
UNITS

20 HP NG			
AMBIENT TEMP LA TEMPÉRATURE AMBIANTE (°F / °C)	BTU INPUT BTU INPUT (MBTU/HR)	MANIFOLD PRESSURE PRESSION DU COLLECTEUR (PSIG)	MIN SUPPLY PRESSURE LA PRESSION D'ALIMENTATION MINIMALE (PSIG)
0 / -18	3.2	4.7 (MAX)	10.0
40 / 5	3.2	4.7 (MAX)	10.0
80 / 27	2.5	3.0	6.75
ANY	0.8	0.5 (MIN)	1.25

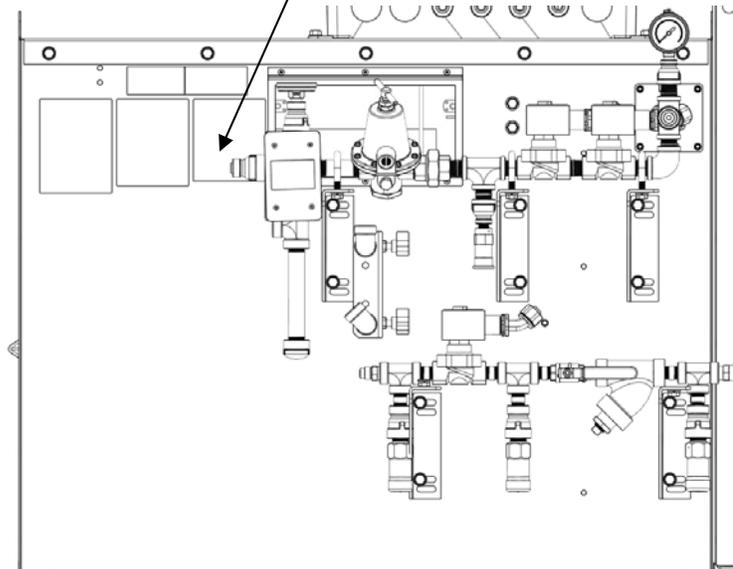
MIN. AMBIENT TEMPERATURE = 0°F / -18°C
TEMPÉRATURE AMBIANTE MINIMUM = 0°F / -18°C

MAX. DISCHARGE AIR TEMP. = 280°F / 138°C
TEMPÉRATURE DE L'AIR DE DÉCHARGE MAXIMALE = 280°F / 138°C

MAX. TEMP. RISE AT MAX. AIRFLOW = 117°F / 47°C
HAUSSE DE TEMPÉRATURE MAXIMALE AU DÉBIT D'AIR MAXIMAL = 117°F / 47°C

MAX. TEMP. RISE AT MIN. AIRFLOW = 212°F / 100°C
HAUSSE DE TEMPÉRATURE MAXIMAL AU FLUX D'AIR MINIMAL = 212°F / 100°C

P-13442



LOCATION OF OTHER DECALS ON CROP DRYER

RATINGS, SERIAL TAG DECAL, MODEL SPECIFIC



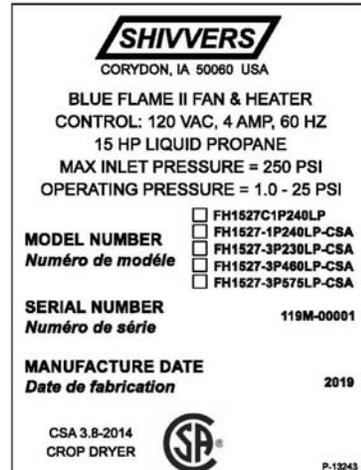
P-13444 (QTY 1)
FOR 20 HP LP
UNITS

OR



P-13443 (QTY 1)
FOR 15 HP NG
UNITS

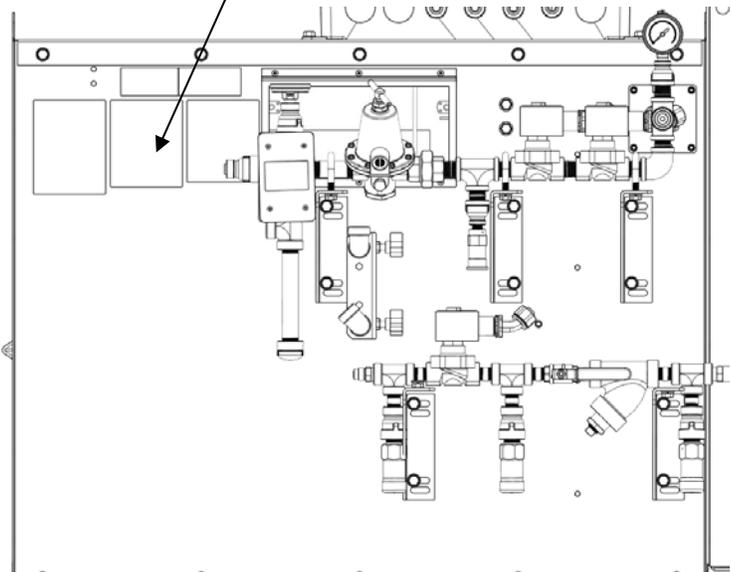
OR



P-13243 (QTY 1)
FOR 15 HP LP
UNITS

OR

P-13445 (QTY 1)
FOR 20 HP NG
UNITS



LOCATION OF OTHER DECALS ON HEATER

START-UP INSTRUCTIONS

(Read Operating Manual for Full Instructions)

Fan must be running to provide power to burner.

Fuel supply must be turned on.

Plenum thermostat must be set above ambient temperature and be calling for heat.

Low Grain Shut Off or Grain Level Indicator (if used) must be on.

- 1). Turn on Burner Power switch.
- 2). Press Burner Start switch.
- 3). Burner Power light should come on. High Heat light will also come on.
- 4). After 15 second purge, Ignition (spark) should start.
- 5). After 6 more seconds, Heat light should come on and gas pressure come up.
- 6). Burner should fire within 4 seconds, then shut off ignition.
- 7). Adjust gas pressure for ambient conditions.
- 8). On LP units, adjust vaporizer in, to keep pipe train from frosting up, or out, to keep vapor temp below 140°F. Vapor temp will normally be highest on low fire.
- 9). Adjust gas pressure so burner cycles between high fire and low fire. If burner cycles off, reduce gas pressure. On LP units, re-adjust vaporizer as required.
- 10). If "HIGH HEAT" light stays on for more than 30 seconds without the "HEAT" light, the burner is locked out. Reset by turning Burner Power switch off then back on, and pressing the Burner Start switch.

SHUT-DOWN INSTRUCTIONS

Short Term Stop (less than a couple days):

- 1). Close manual gas valve on lower pipe train.
- 2). Allow all gas in pipe train to burn out.
- 3). Turn Burner Power switch off.
- 4). Let burner cool down for a few minutes then stop fan.

Long Term Stop (more than a couple days):

- 1). Close gas valve(s) at supply.
- 2). Allow all gas in line to burn out. This may take a while on LP units.
- 3). Turn Burner Power switch off.
- 4). Let burner cool down for a few minutes then stop fan.

INSTRUCTIONS DE DÉMARRAGE

(Lire le manuel d'utilisation pour les Instructions complètes)

Le ventilateur doit être exécuté pour alimenter le brûleur.

L'alimentation en combustible doit être allumée.

Plenum thermostat doit être réglé au-dessus de la température ambiante et il doit avoir besoin de la chaleur.

Bas Grain Shut Off ou indicateur de niveau de Grain (si utilisé) doit être activé.

- 1). Mettre en marche l'interrupteur d'alimentation de brûleur.
- 2). Pousser le contacteur de démarrage de brûleur.
- 3). Le voyant devrait s'allumer. Le voyant d'haute chaleur s'allumera aussi.
- 4). Après 15 secondes de purge, il devrait commencer à l'allumage (étincelle).
- 5). Après 6 secondes de plus, la lumière de chaleur devrait s'allumer et la pression du gaz devrait monter.
- 6). Le brûleur devrait tirer dans les 4 secondes, puis s'éteindre l'allumage.
- 7). Régler la pression du gaz pour les conditions ambiantes.
- 8). Sur les unités de LP, avancer le vaporisateur pour empêcher de glaçage de la tuyauterie de gaz OU reculer le vaporisateur pour maintenir la température de vapeur moins que 140°F. La température de vapeur sera normalement plus élevée sur le feu doux.
- 9). Régler la pression du gaz pour que le brûleur cycle entre le feu haut et le feu bas. Si le brûleur s'éteint, réduire la pression du gaz. Sur les unités de LP, régler à nouveau le vaporisateur comme demandé.
- 10). Si la lumière "HIGH HEAT" reste allumée pendant plus de 30 secondes sans la lumière de "HEAT", le brûleur est verrouillé. Corriger en mettant l'interrupteur d'alimentation de brûleur en position d'arrêt, puis rallumer et appuyer sur le contacteur de démarrage de brûleur.

INSTRUCTIONS DE FERMETURE

L'arrêt à court terme (moins que quelques jours) :

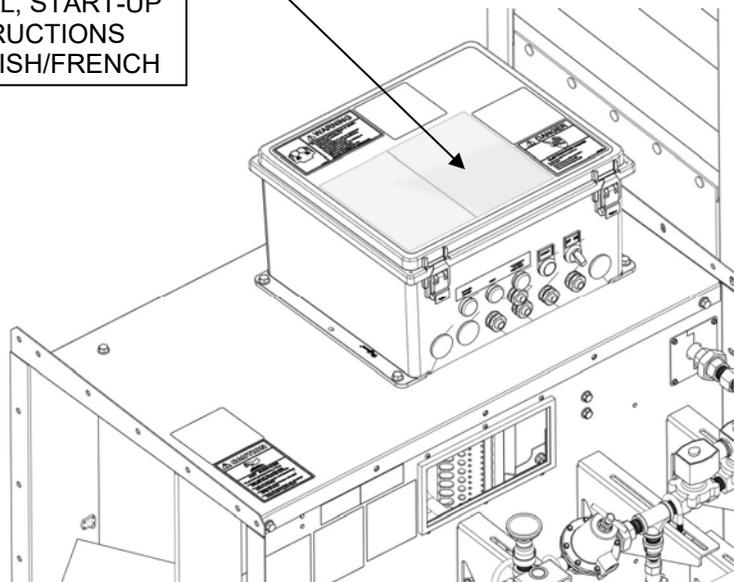
- 1). Fermer la vanne manuelle de gaz du brûleur.
- 2). Permettre se consumer à tout le gaz.
- 3). Mettre l'interrupteur d'alimentation en position d'arrêt.
- 4). Laisser refroidir le brûleur pendant quelques minutes, puis arrêter le ventilateur.

L'arrêt à long terme (plus de quelques jours) :

- 1). Fermer les vannes de gaz au tableau de distribution.
- 2). Permettre à tout le gaz en ligne à épuiser. Cela peut prendre un peu de temps sur les unités de LP.
- 3). Mettre l'interrupteur d'alimentation en position d'arrêt.
- 4). Laisser refroidir le brûleur pendant quelques minutes, puis arrêter le ventilateur.

P-13241

P-13241 (QTY 1)
DECAL, START-UP
INSTRUCTIONS
ENGLISH/FRENCH



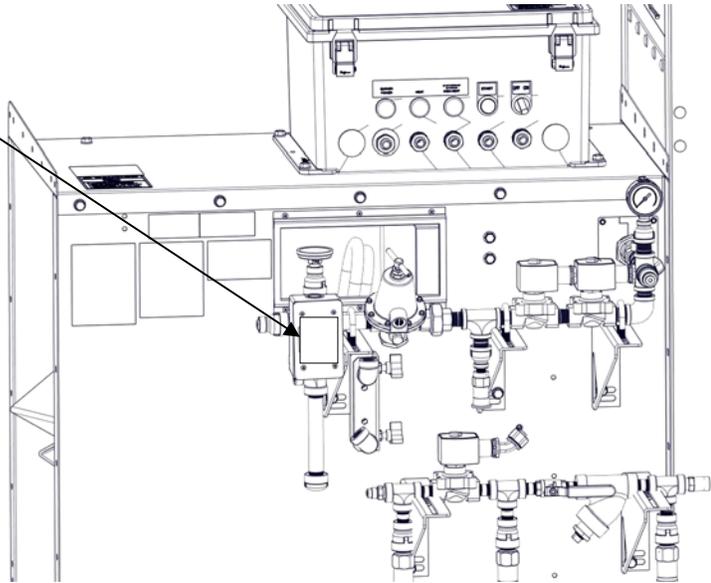
LOCATION OF OTHER DECALS ON HEATER

VAPORIZER HI-LIMIT
 120° F / 49° C AUTO RESET
 Adjust vaporizer in to keep pipe
 train from frosting up. Adjust out
 to keep temperature below
 120° F / 49° C on low heat.

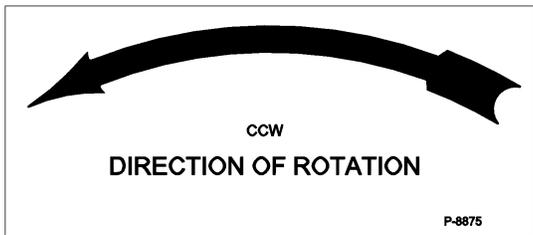
**VAPORISATEUR
 LIMITE MAXIMA**
 RÉINITIALISATION
 AUTOMATIQUE
 Avancer le vaporisateur pour
 empêcher de glaçage de la
 tuyauterie de gaz OU reculer le
 vaporisateur pour maintenir la
 température de vapeur moins que
 120° F / 49° C sur feu doux.

P-13227

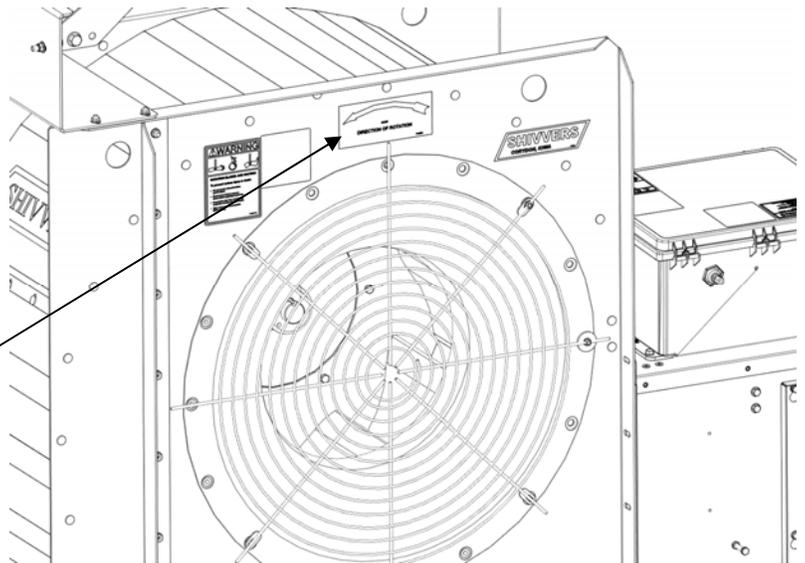
P-13227 (QTY 1)
 DECAL,
 VAPORIZER HI-
 LIMIT (LP ONLY)



LOCATION OF OTHER DECALS ON FAN



P-8875 (QTY 1)
 DECAL, DIRECTION
 OF ROTATION, CCW



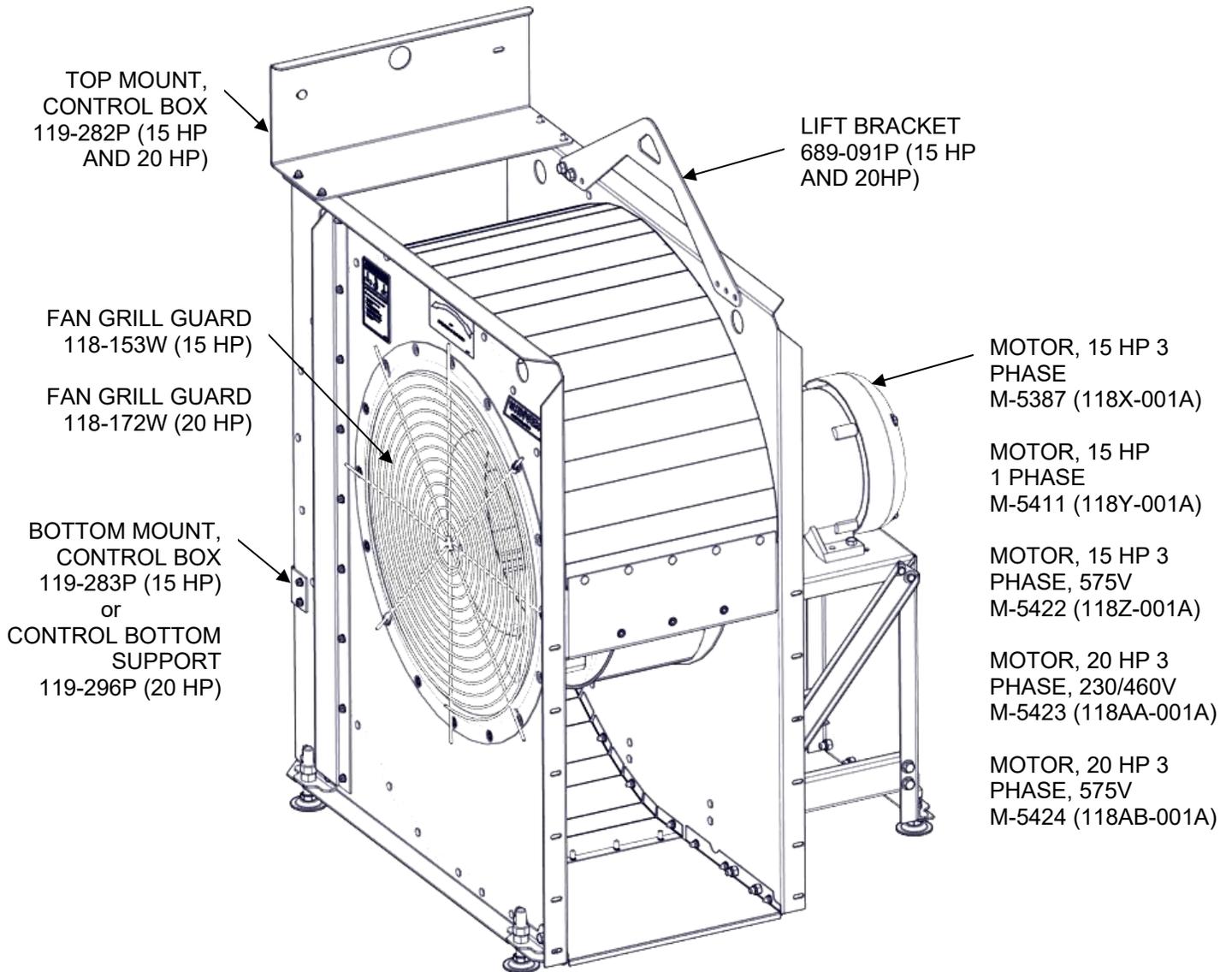
IDENTIFICATION OF PARTS

Refer to other installed equipment manuals for a complete understanding of the total drying and grain handling system.

FAN

118X-001A, 118Y-001A, OR 118Z-001A (15 HP)

118AA-001A OR 118AB-001A (20 HP)

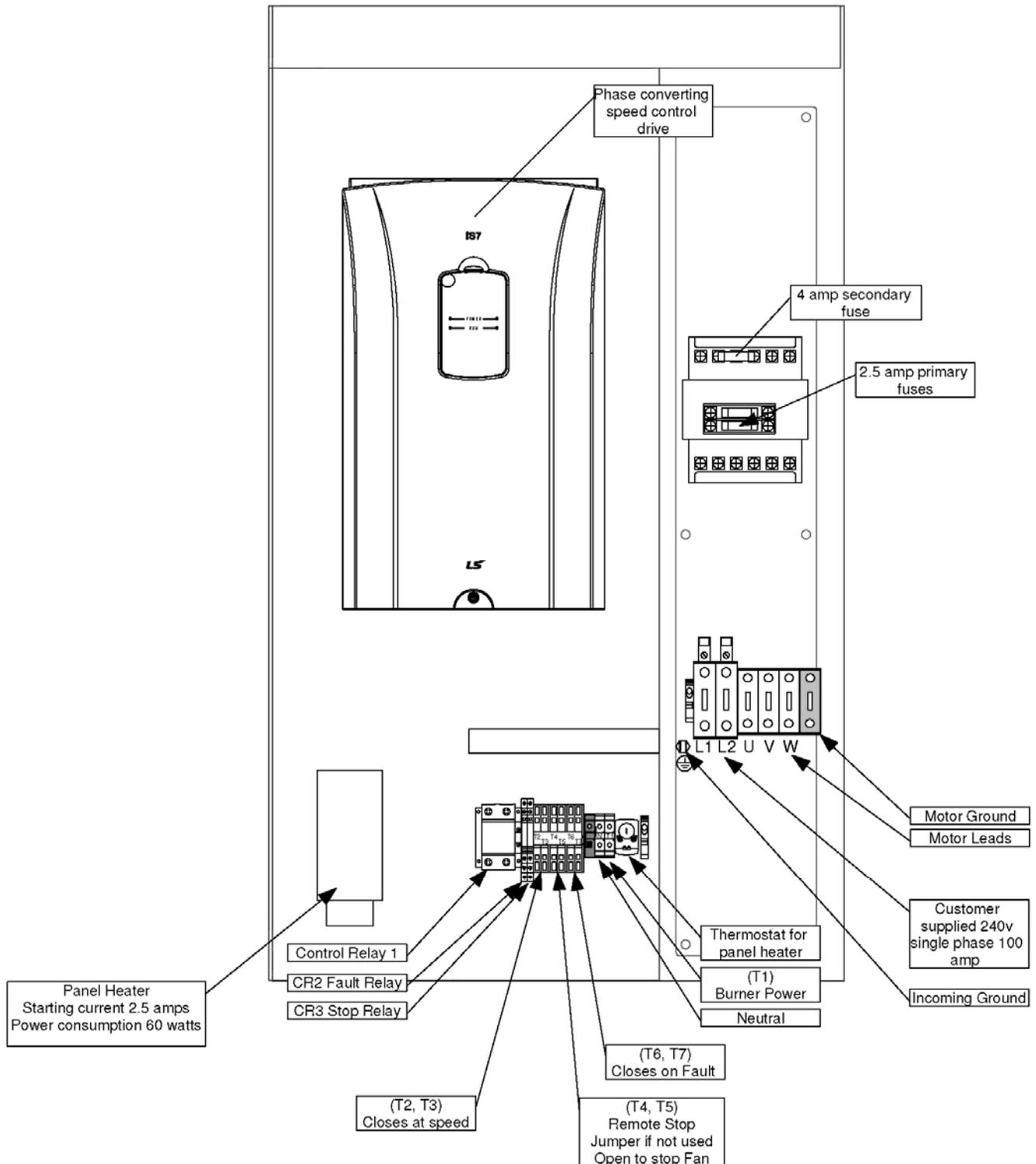


Identification of parts, con't:

FAN FREQUENCY DRIVE CONTROL (if used)

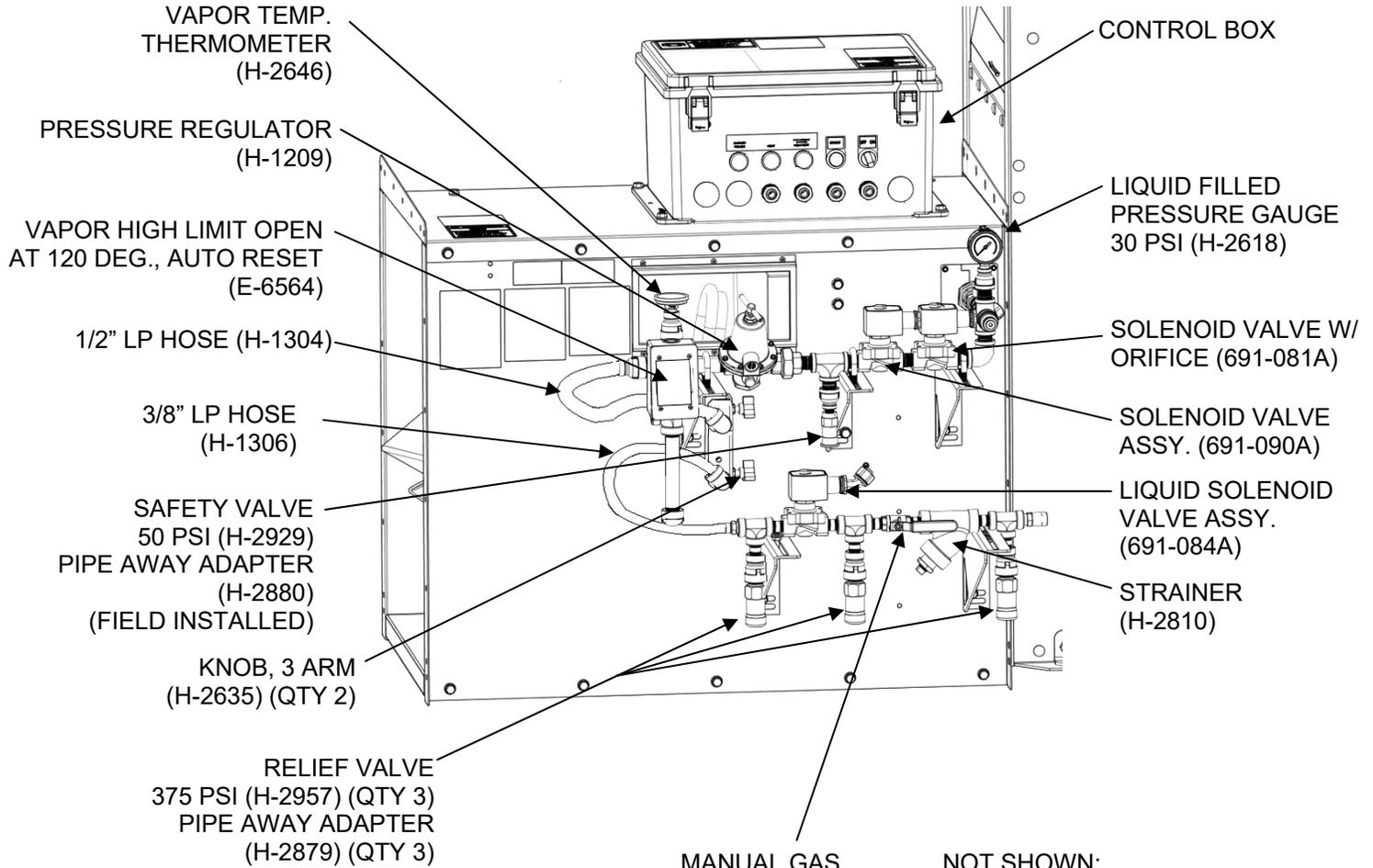
E-6617

15 Hp, 1 Phase Input



Identification of parts, con't:

LIQUID PROPANE HEATER



VAPOR TEMP.
THERMOMETER
(H-2646)

PRESSURE REGULATOR
(H-1209)

VAPOR HIGH LIMIT OPEN
AT 120 DEG., AUTO RESET
(E-6564)

1/2" LP HOSE (H-1304)

3/8" LP HOSE
(H-1306)

SAFETY VALVE
50 PSI (H-2929)
PIPE AWAY ADAPTER
(H-2880)
(FIELD INSTALLED)

KNOB, 3 ARM
(H-2635) (QTY 2)

RELIEF VALVE
375 PSI (H-2957) (QTY 3)
PIPE AWAY ADAPTER
(H-2879) (QTY 3)

CONTROL BOX

LIQUID FILLED
PRESSURE GAUGE
30 PSI (H-2618)

SOLENOID VALVE W/
ORIFICE (691-081A)

SOLENOID VALVE
ASSY. (691-090A)

LIQUID SOLENOID
VALVE ASSY.
(691-084A)

STRAINER
(H-2810)

MANUAL GAS
VALVE, 3/8"
(H-2956)

NOT SHOWN:

69-220A – IGNITION WIRE, 37"

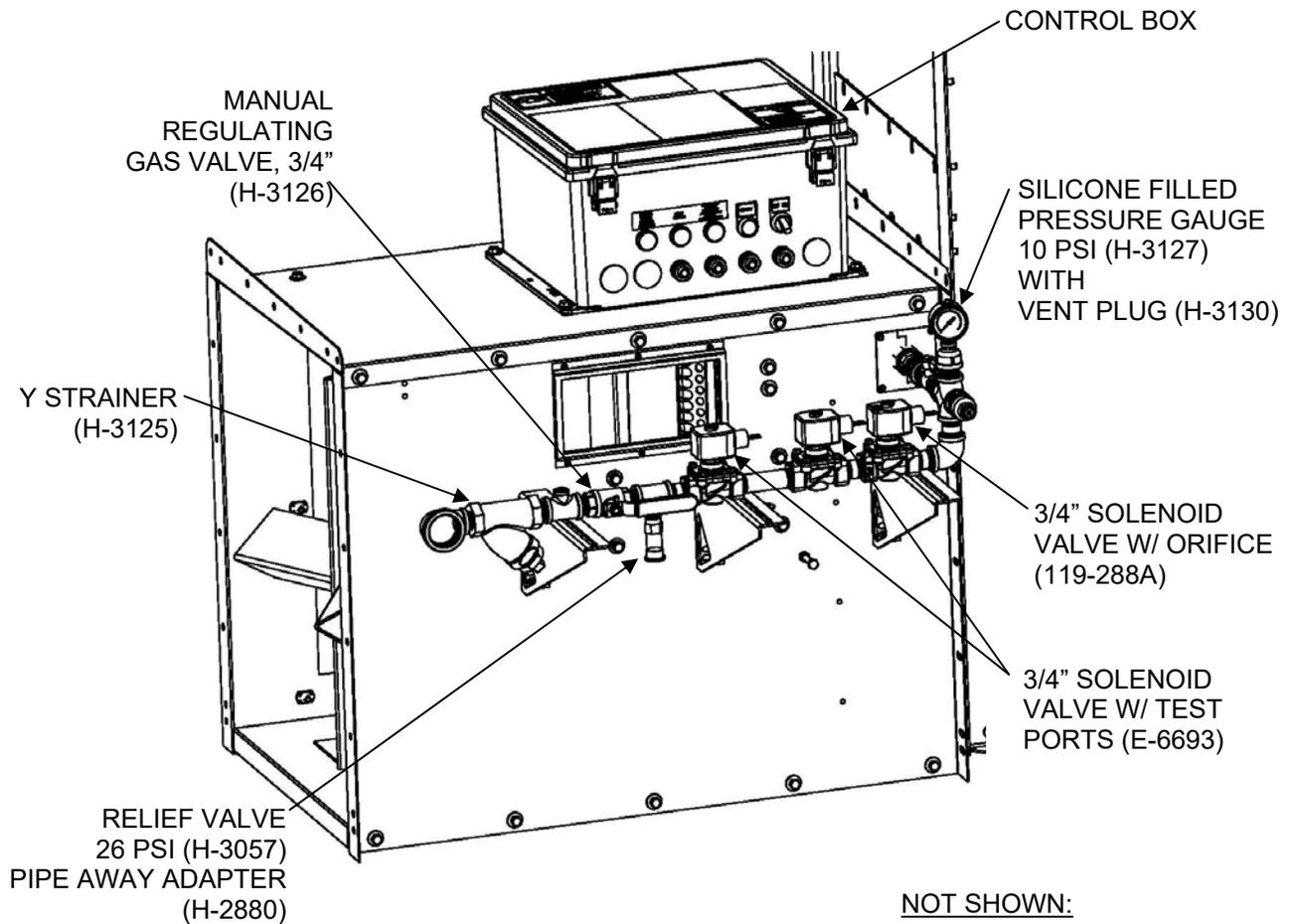
119-233P – VAPORIZER

E-6273 – IGNITION PLUG, SIDE
WIRE (For LP)

119-276A – 20" STRAIGHT
BURNER ASSEMBLY, LP

Identification of parts, con't:

NATURAL GAS HEATER



NOT SHOWN:

69-220A – IGNITION WIRE, 37"

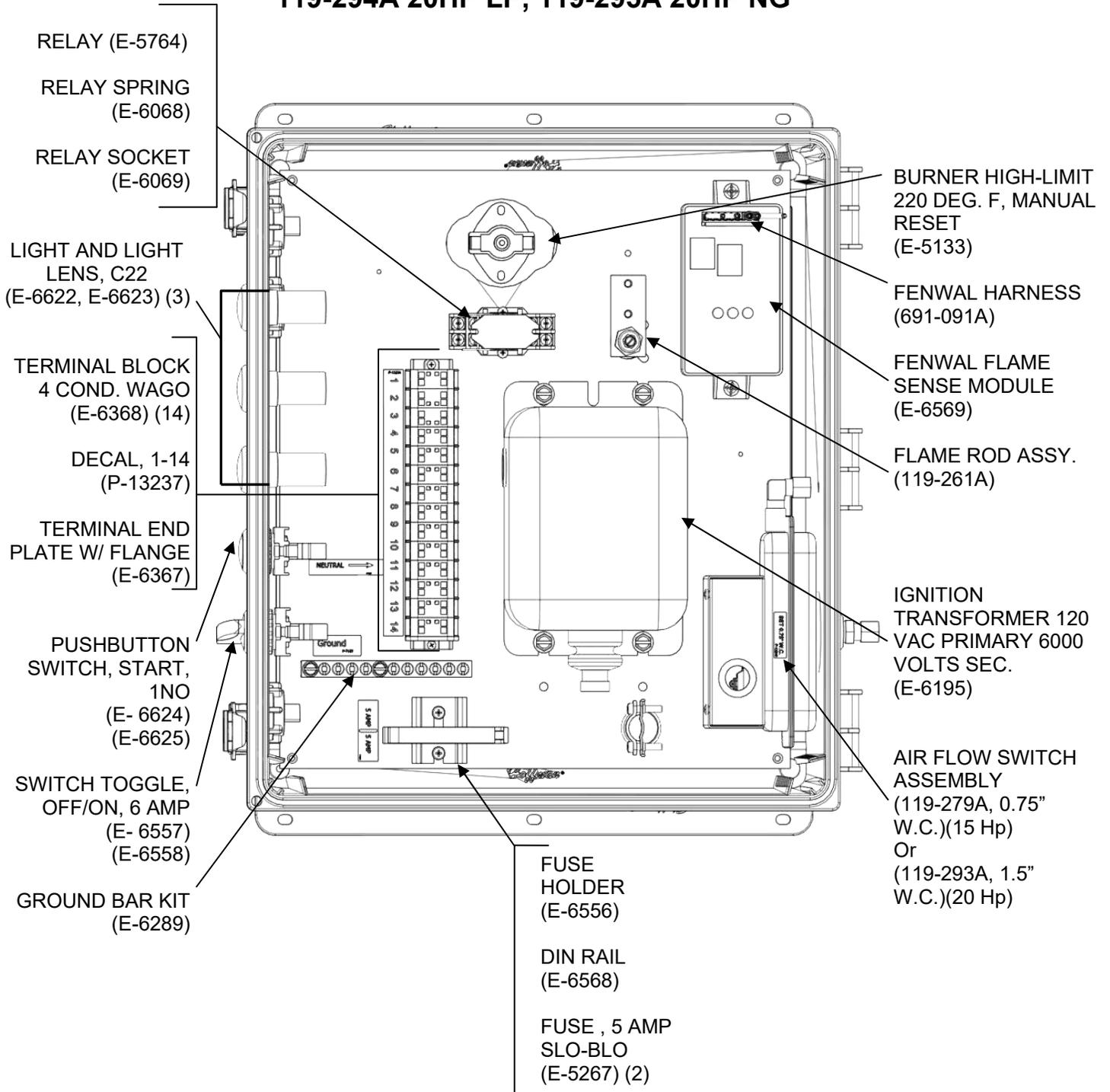
E-6701 – IGNITION PLUG, SHORT REACH (For NG)

119-291P – SPACER RING

119-300A – 20" STRAIGHT BURNER ASSEMBLY, NG

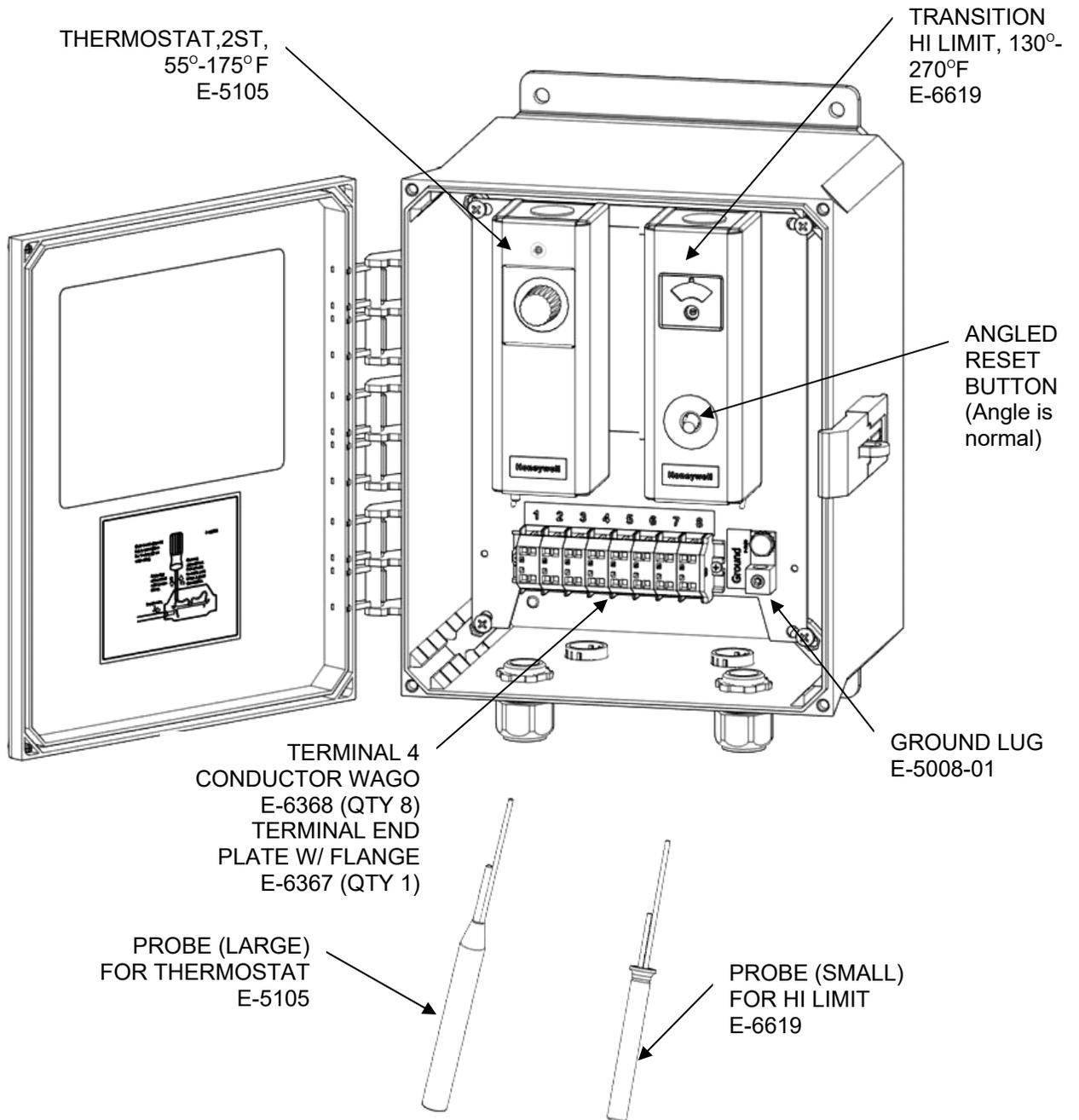
Identification of parts, con't:

BLUE FLAME II CONTROL BOX, CSA
119-278A 15HP LP, 119-292A 15 HP NG
119-294A 20HP LP, 119-295A 20HP NG



Identification of parts, con't:

**OPERATOR CONTROL AND TRANSITION HIGH LIMIT
(119N-001A)**



Identification of parts, con't:

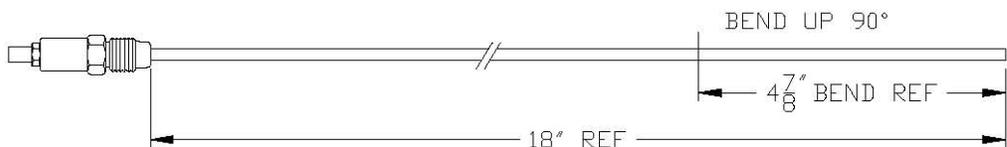
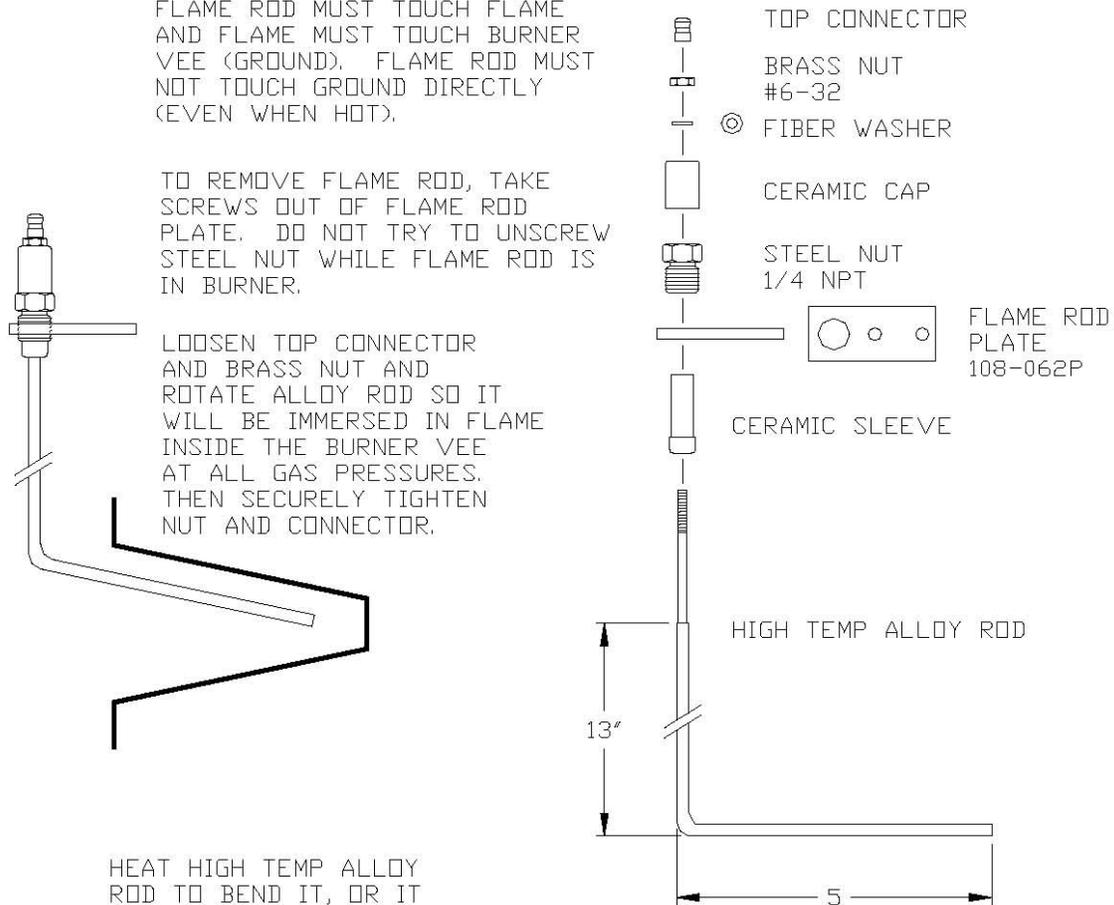
FLAME ROD, 1/4" NPT

FLAME ROD MUST TOUCH FLAME AND FLAME MUST TOUCH BURNER VEE (GROUND). FLAME ROD MUST NOT TOUCH GROUND DIRECTLY (EVEN WHEN HOT).

TO REMOVE FLAME ROD, TAKE SCREWS OUT OF FLAME ROD PLATE. DO NOT TRY TO UNSCREW STEEL NUT WHILE FLAME ROD IS IN BURNER.

LOOSEN TOP CONNECTOR AND BRASS NUT AND ROTATE ALLOY ROD SO IT WILL BE IMMERSSED IN FLAME INSIDE THE BURNER VEE AT ALL GAS PRESSURES. THEN SECURELY TIGHTEN NUT AND CONNECTOR.

HEAT HIGH TEMP ALLOY ROD TO BEND IT, OR IT MAY BREAK.



FLAME ROD NOT BENT IS # E-6370

NOTE: PARTS ARE FRAGILE. HANDLE WITH CARE.

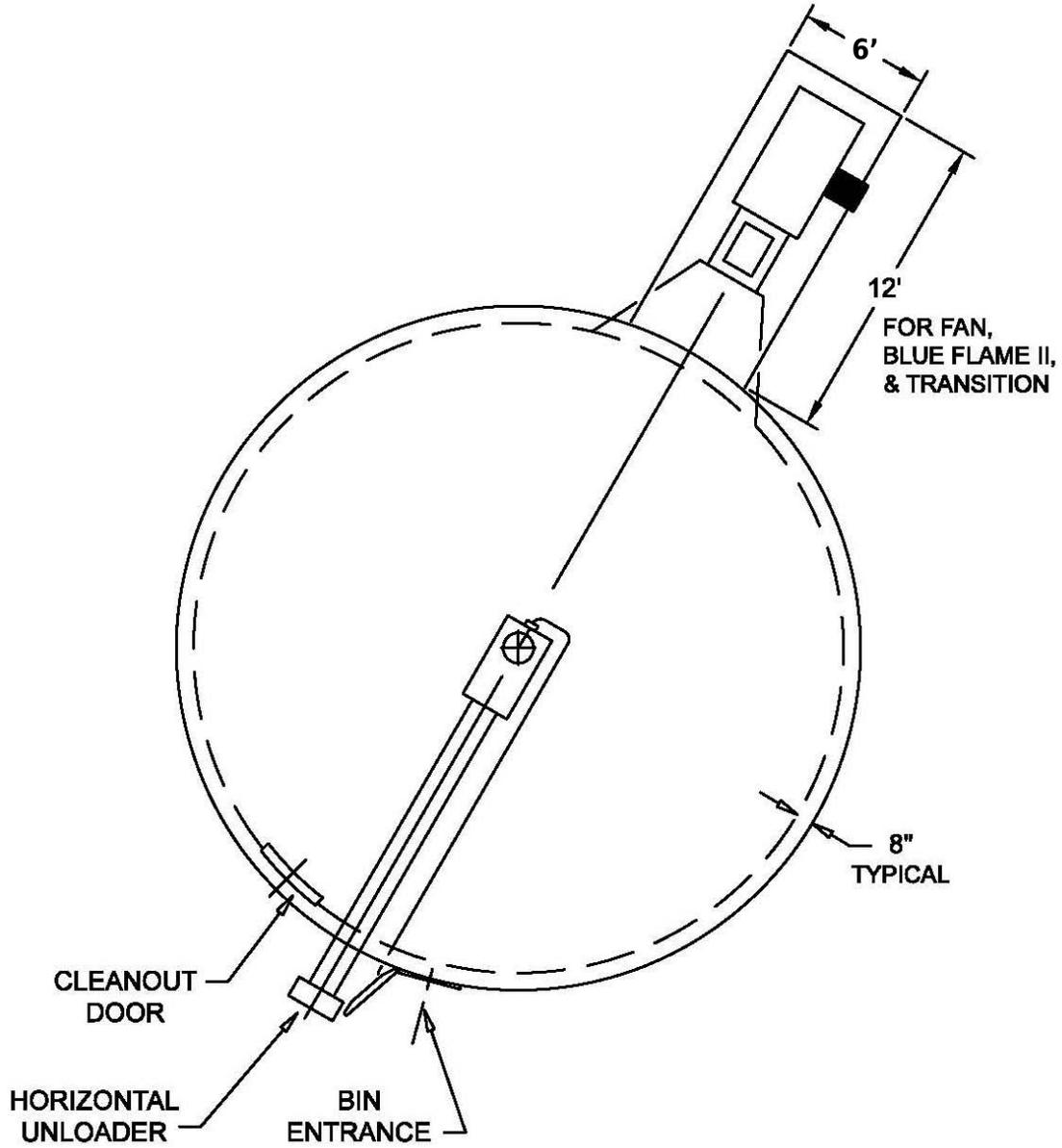
FLAME ROD ASSY, BLUE FLAME II
119-261A
CFROD.DWG

MECHANICAL INSTALLATION

- a). An electrical disconnect switch rated for the fan motor should be installed near the crop dryer fan control panel. Allow for this switch in the mechanical layout.
- b). For single Blue Flame II Crop Dryer installations, the dryer should be located straight away from the unloading auger as shown in the following drawing whenever possible. For 2 or 3 fan installations, consult Shivvers for recommendations.
- c). It is recommended to use only Shivvers entrance collars and transitions for high temperature (greater than 140° F), high capacity drying. Follow instructions provided with transitions for their installation. For drying bins with more than one Blue Flame II Crop Dryer, air dampers are required to prevent reverse airflow.
- d). Keep the floor space in front of the entrance collar as free of obstructions as possible. Concrete blocks are not recommended for floor supports. They block too much airflow. For high temperature dryer operation, floor supports should be at least 15" tall. Shorter supports do not allow even heat under the floor.
- e). Concrete pads for 15 Hp Blue Flame II Crop Dryer installations should be 12 feet long by 6 feet wide. The pad could be offset to the motor side of the fan which would allow a slightly narrower pad. Pads should be flush and level with the top of the bin concrete. Place footers under the pads and use rebars to keep the pads from cracking and moving.
- f). The flame rod should be installed before connecting the heater to the transition. It is not installed at the factory to protect it from shipping damage. It should be in the burner vee, but not touching metal. See instructions later in this manual.
- g). The Operating Control and Transition Hi-Limit must be installed as shown in this manual for each Blue Flame II Crop Dryer.

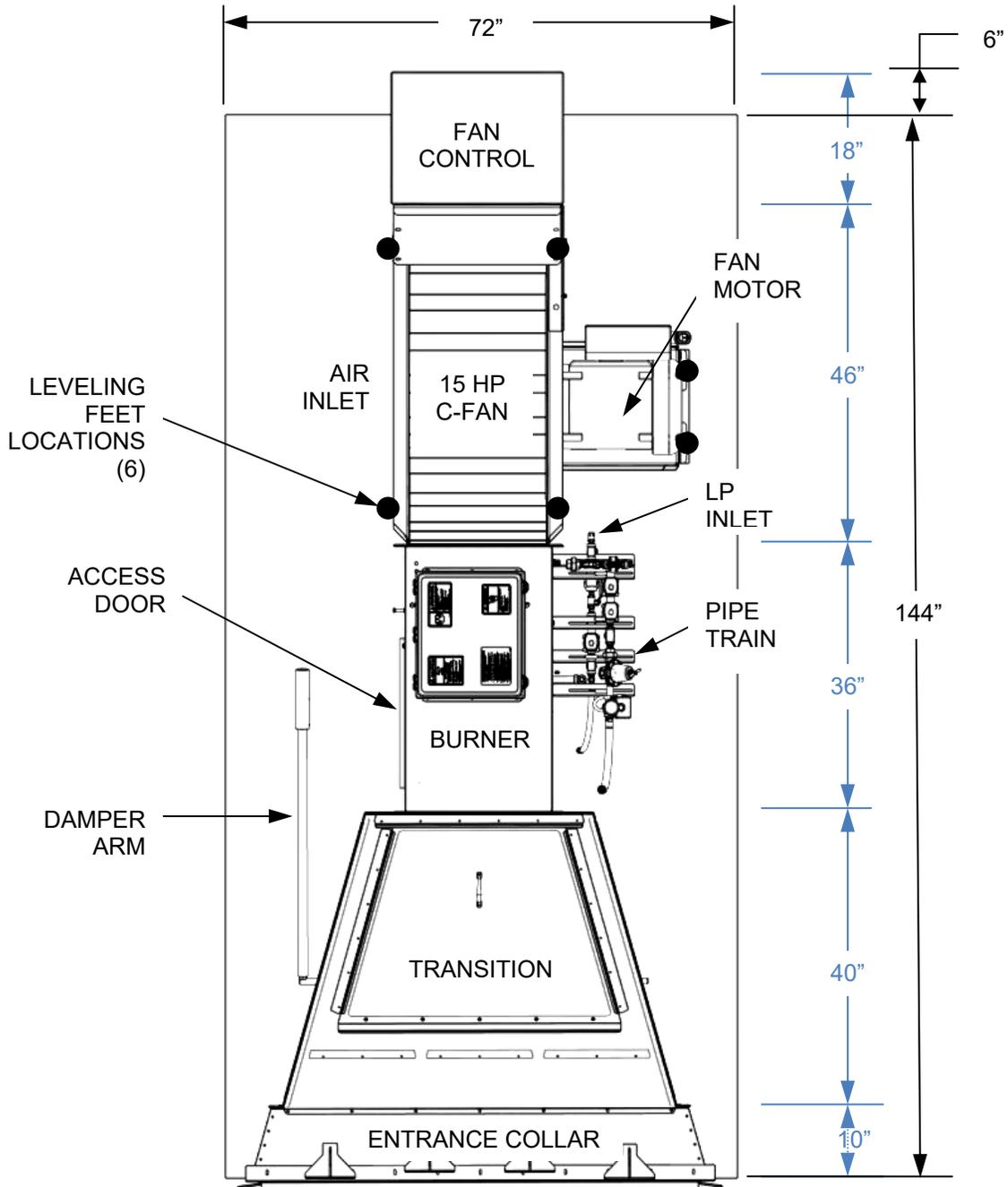
DRYING BIN LAYOUT

Shivvers Circulator 1-Fan Layout

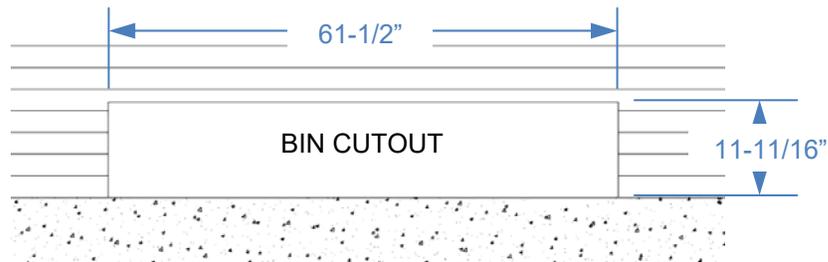
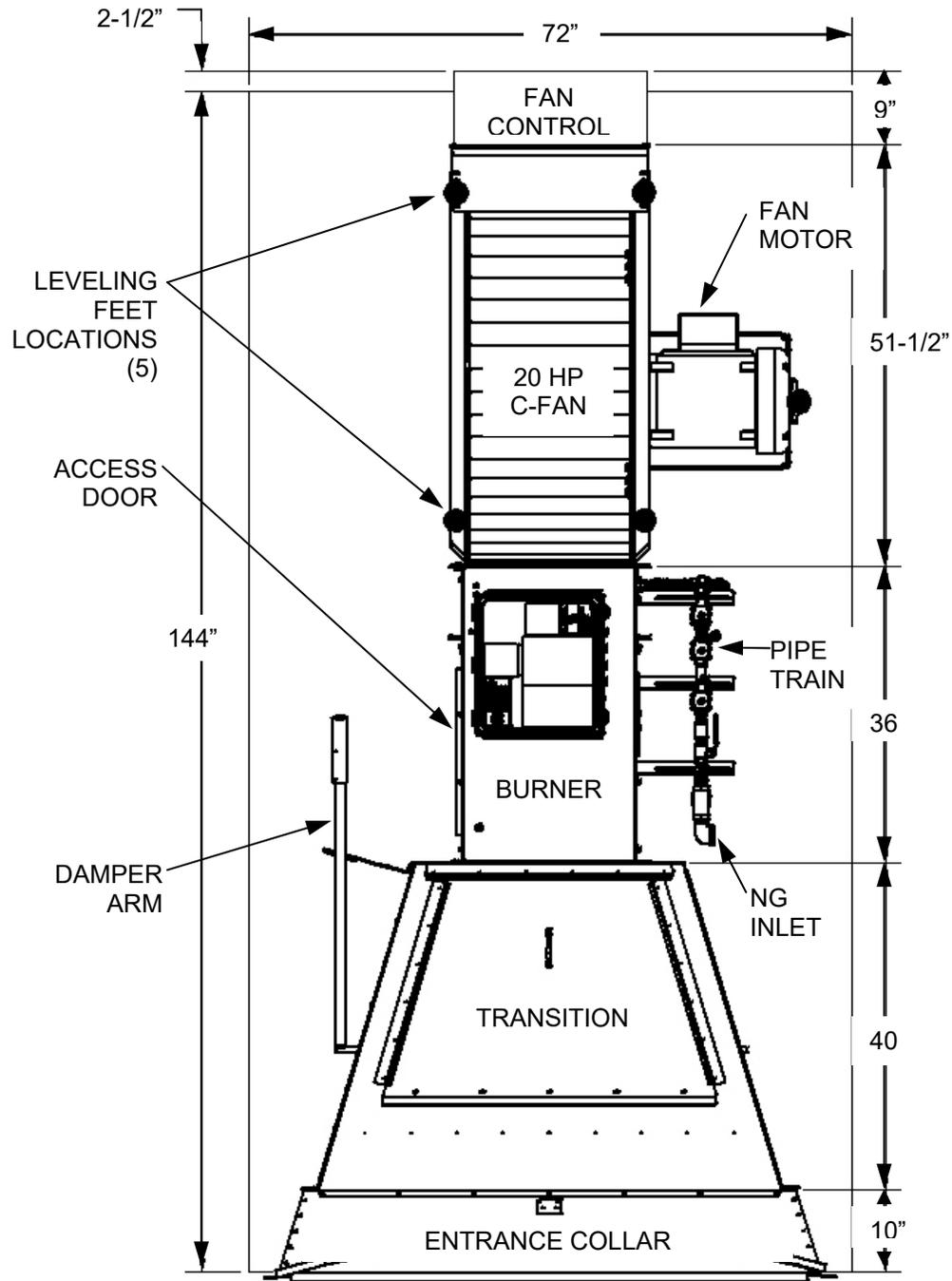


CFANLYT-1.DWG

PAD LAYOUT 15 HP LP



PAD LAYOUT 20 HP NG



HEATER INSTALLATION

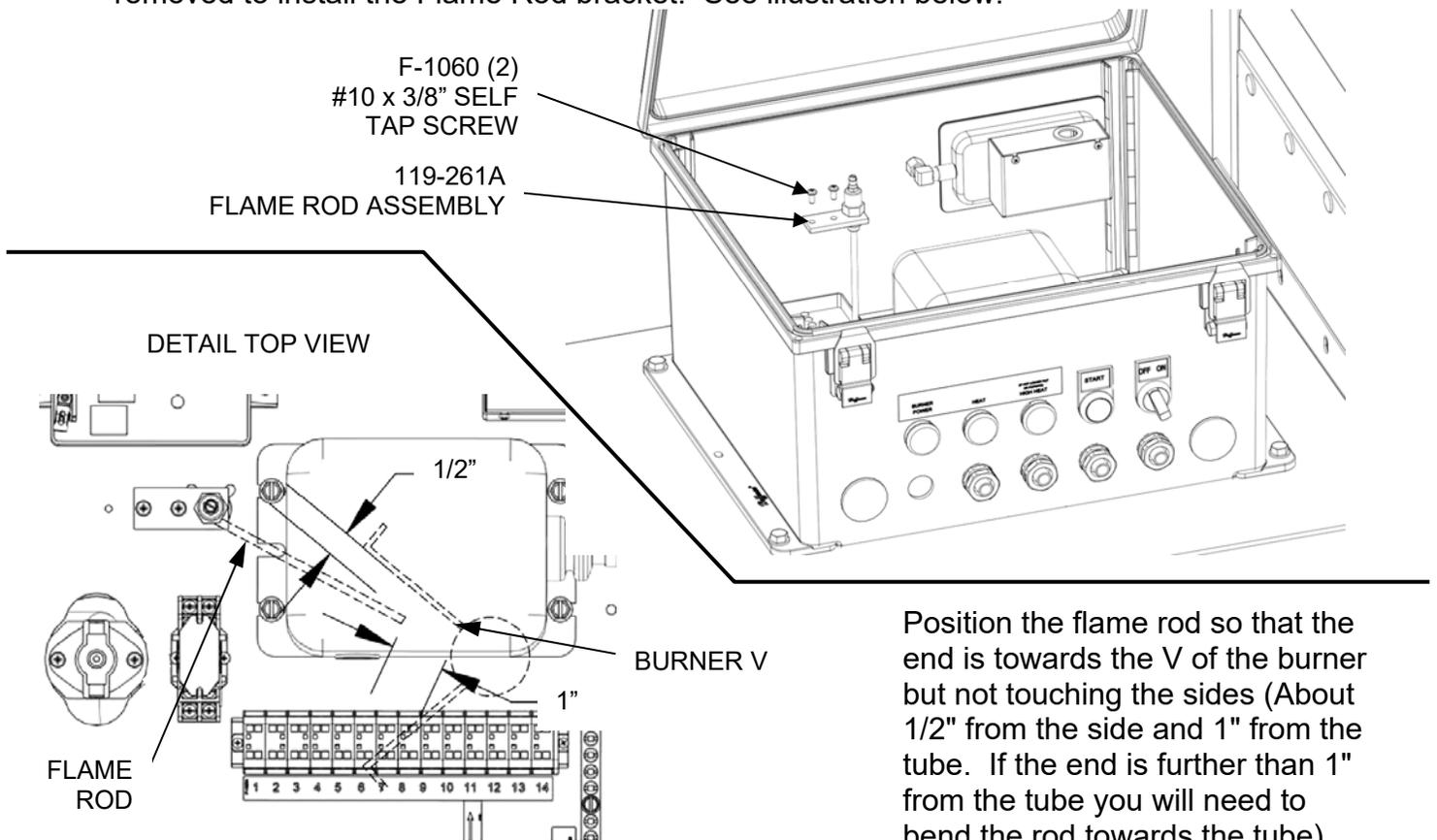
Install the flame rod located in the heater control box.

Due to some flame rods breaking during shipping, we are now putting the flame rod assembly (119-261A) in the control box of the burner to be installed after the burner is shipped. It will be a little easier to install the flame rod before the burner is installed, but it can also be done after installation. The burner will not function properly until the flame rod is installed properly.

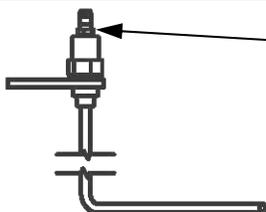


Disconnect and lock out all power before opening the control box.

Remove the latch bolts to access the inside of the control box. Locate the flame rod and install. Mounting screws are already installed in the box and will need to be removed to install the Flame Rod bracket. See illustration below.



Position the flame rod so that the end is towards the V of the burner but not touching the sides (About 1/2" from the side and 1" from the tube. If the end is further than 1" from the tube you will need to bend the rod towards the tube).



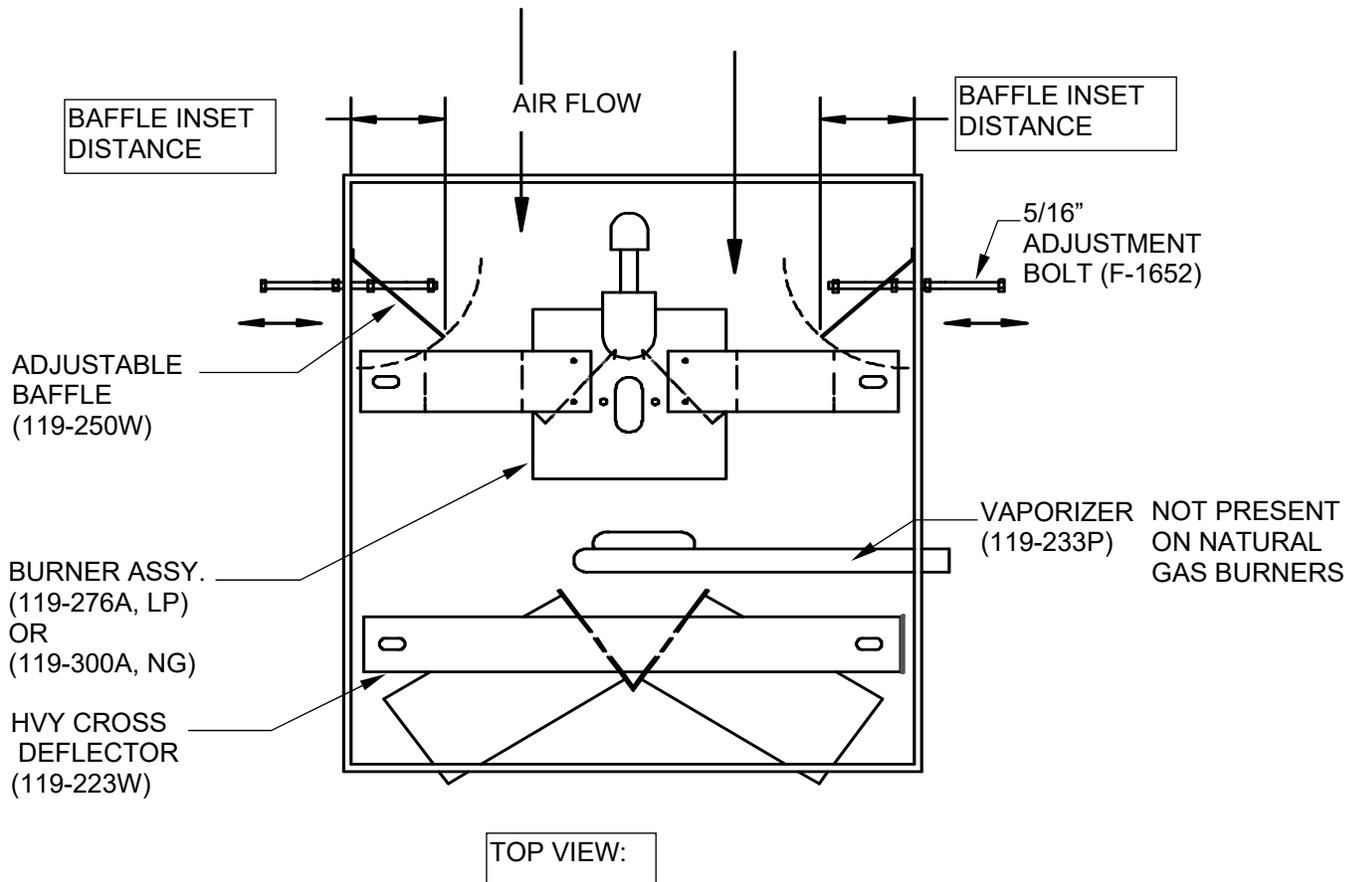
If the flame rod swings from side to side, tighten the nut on top of the ceramic while holding the rod in place. Do not over tighten as this may cause the ceramic to break.

Heater Installation, con't:

Two hinged Side Baffles (119-250W) are located on opposite sides inside of the Burner housing. The purpose of these are to channel sufficient air flow from the fan into the burner element for proper fuel/air mixture. The Side Baffles also aid in giving adequate heat/air mixture for uniform heat to enter the plenum.

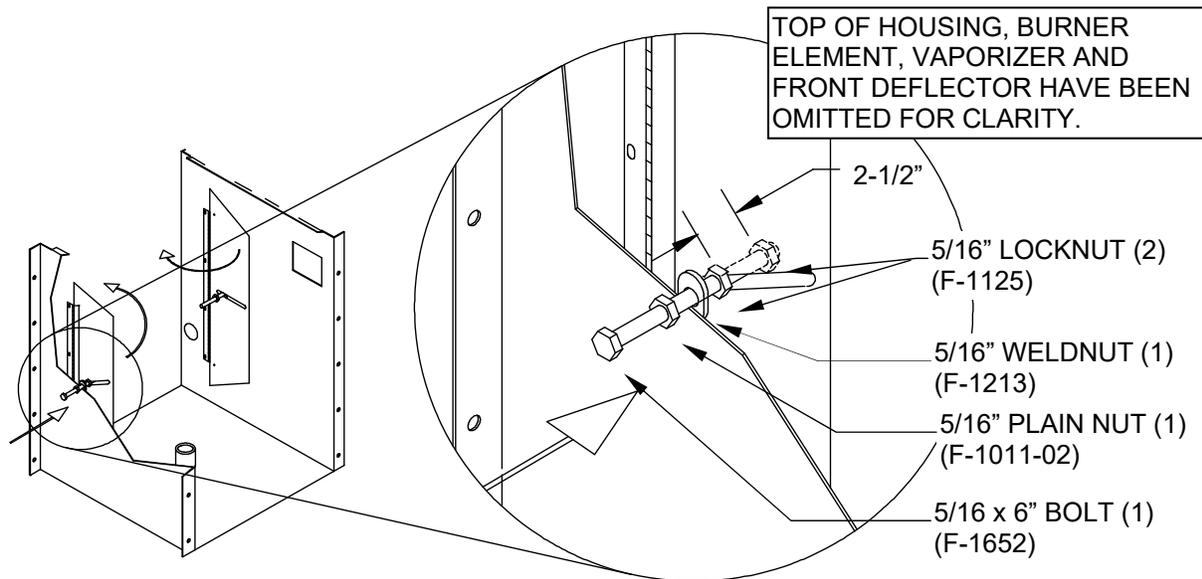
Adjustments to the Side Baffles are achieved by threading, inward or outward, the 5/16" bolt (F-1652). The distance that the Side Baffles are set will vary between installations and will have to be customized for each situation under operating conditions.

A starting point for setting these distances will depend on the fan airflow output and is given in the table below.

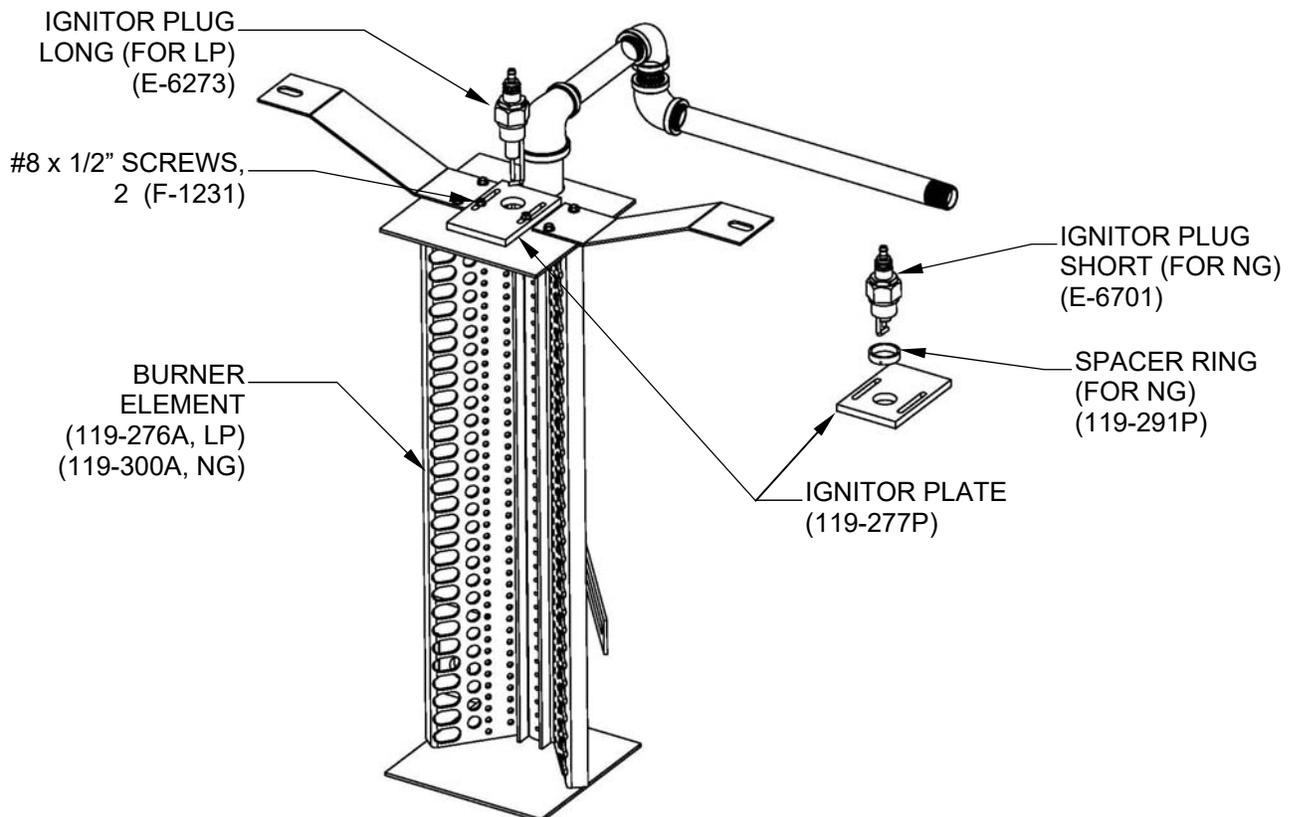


FAN HP	FUEL	STARTING BAFFLE INSET DISTANCE
15 hp	Propane	4"
20+ hp	Propane	3"
15 hp	Natural Gas	3"
20+ hp	Natural Gas	1.5"

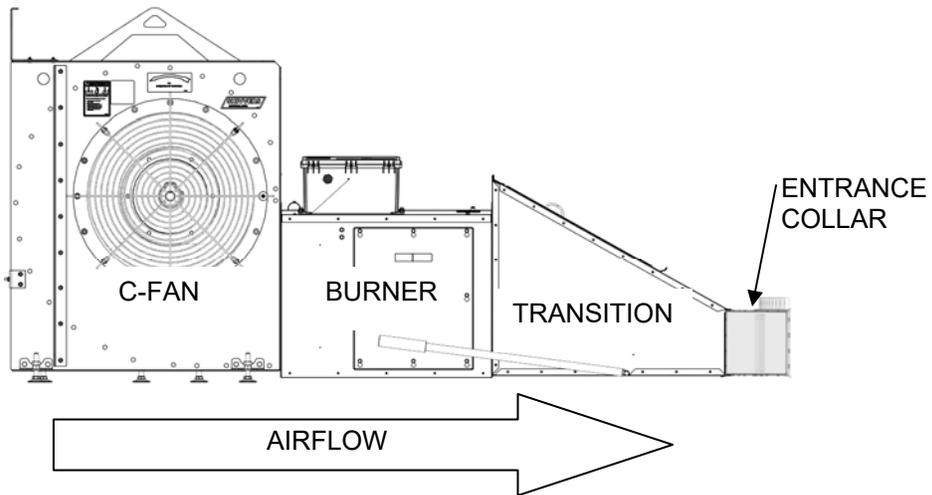
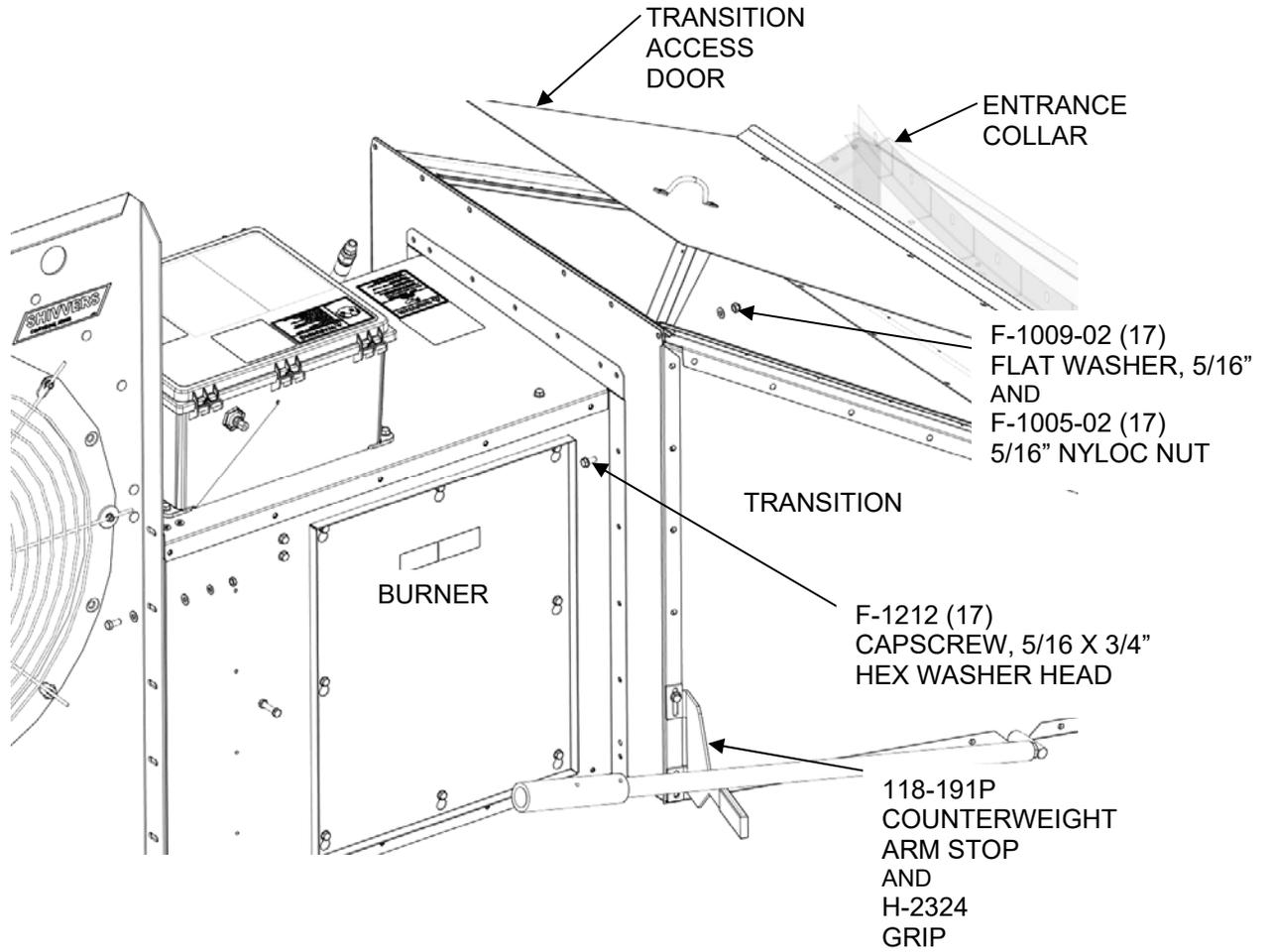
Heater Installation, con't:



Verify that the spark plug mount is in the proper starting position. For LP fuel, the Ignitor is as close as possible to the Burner Element. For NG fuel, the Ignitor is as far away as possible from the Burner Element. If ignition problems occur, this plate can be adjusted inward or outward as necessary.



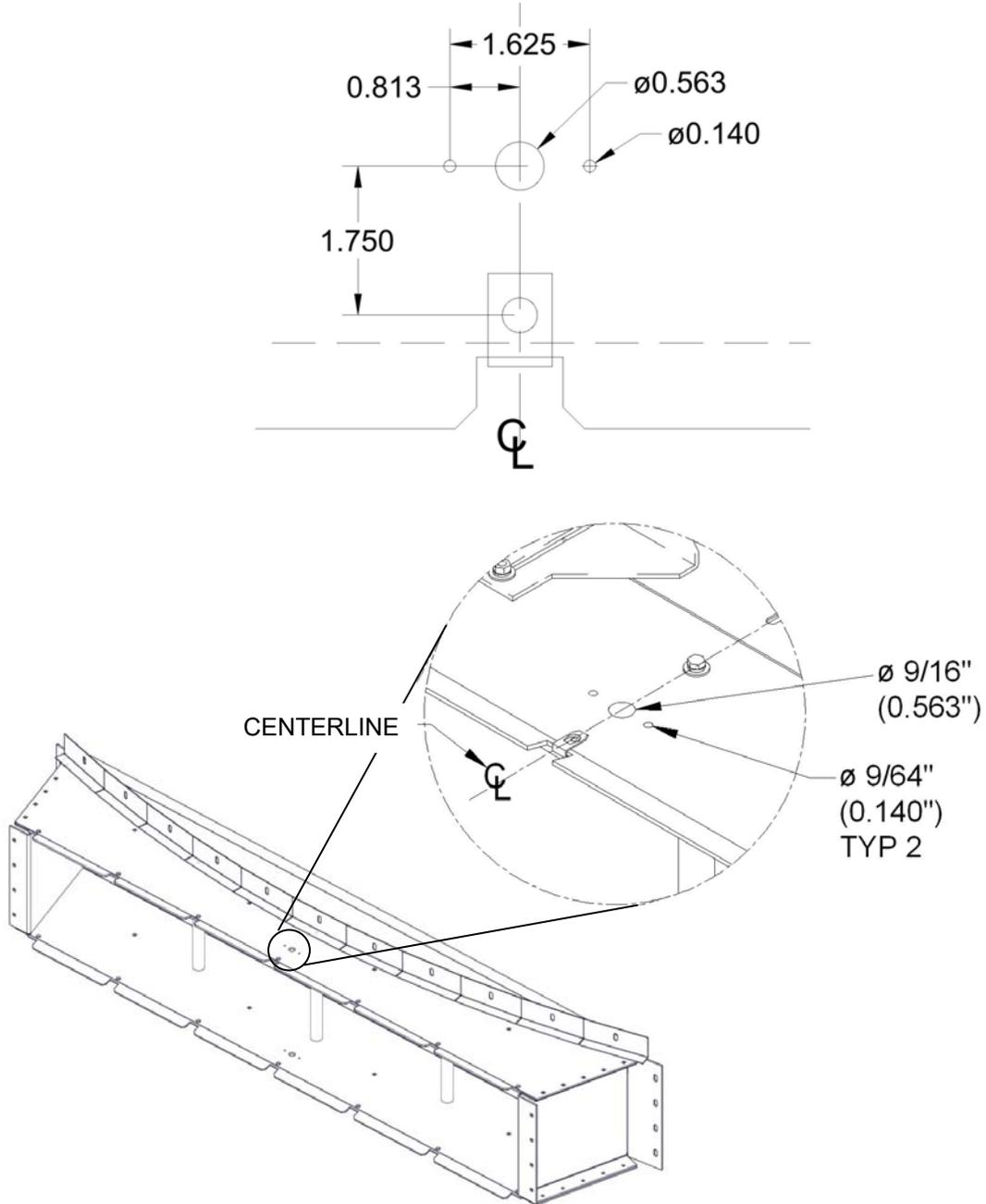
Connect the Blue Flame II heater to the transition. 5/16" hardware is provided in the 565D-001A Transition Box, in the 565-037A Entrance Collar – Trans – Burner Hardware sack. Note the proper orientation with respect to airflow.



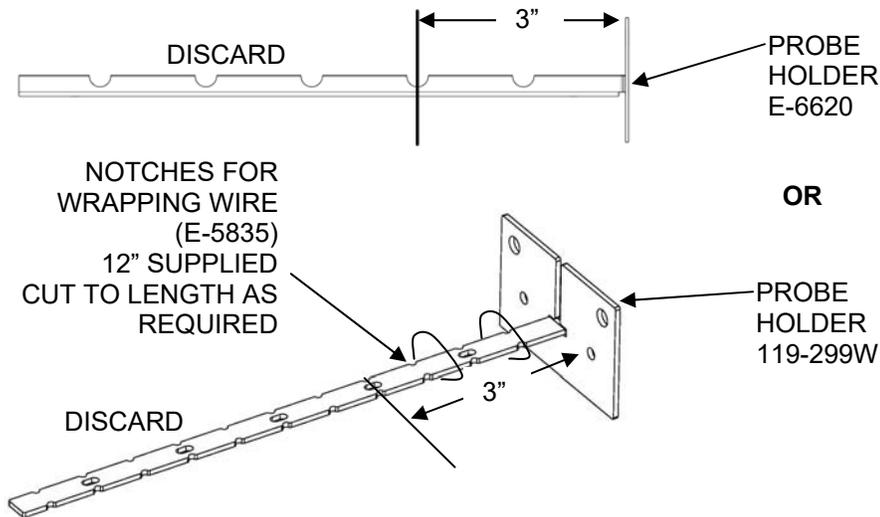
OPERATING CONTROL AND TRANSITION HI-LIMIT INSTALLATION

Install the Operating Control and Transition Hi-Limit as shown below. It is best to install the Transition Hi-Limit probe first, then mount the box, being careful to not kink the capillary tubes. The capillary tubes cannot be extended, so they dictate where the box can be mounted.

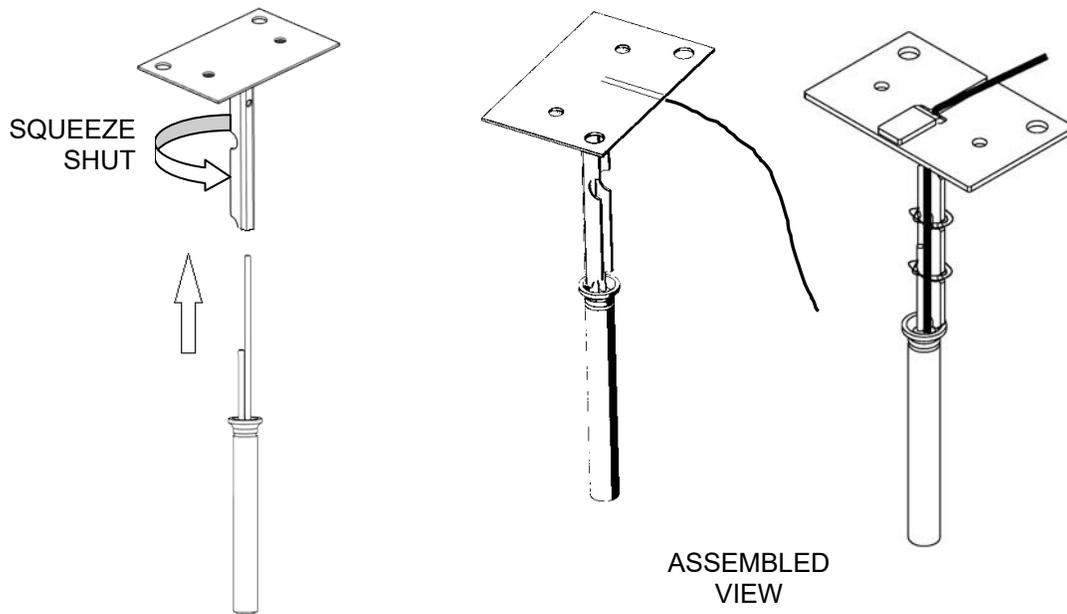
If it isn't already done, drill the Entrance Collar, as shown, for the Transition Hi-Limit probe, in the center of the Entrance Collar.



Two types of probe holders may be provided. E-6620 or 119-299W. Cut or break the probe holder to 3" long for the Transition Hi Limit probe.

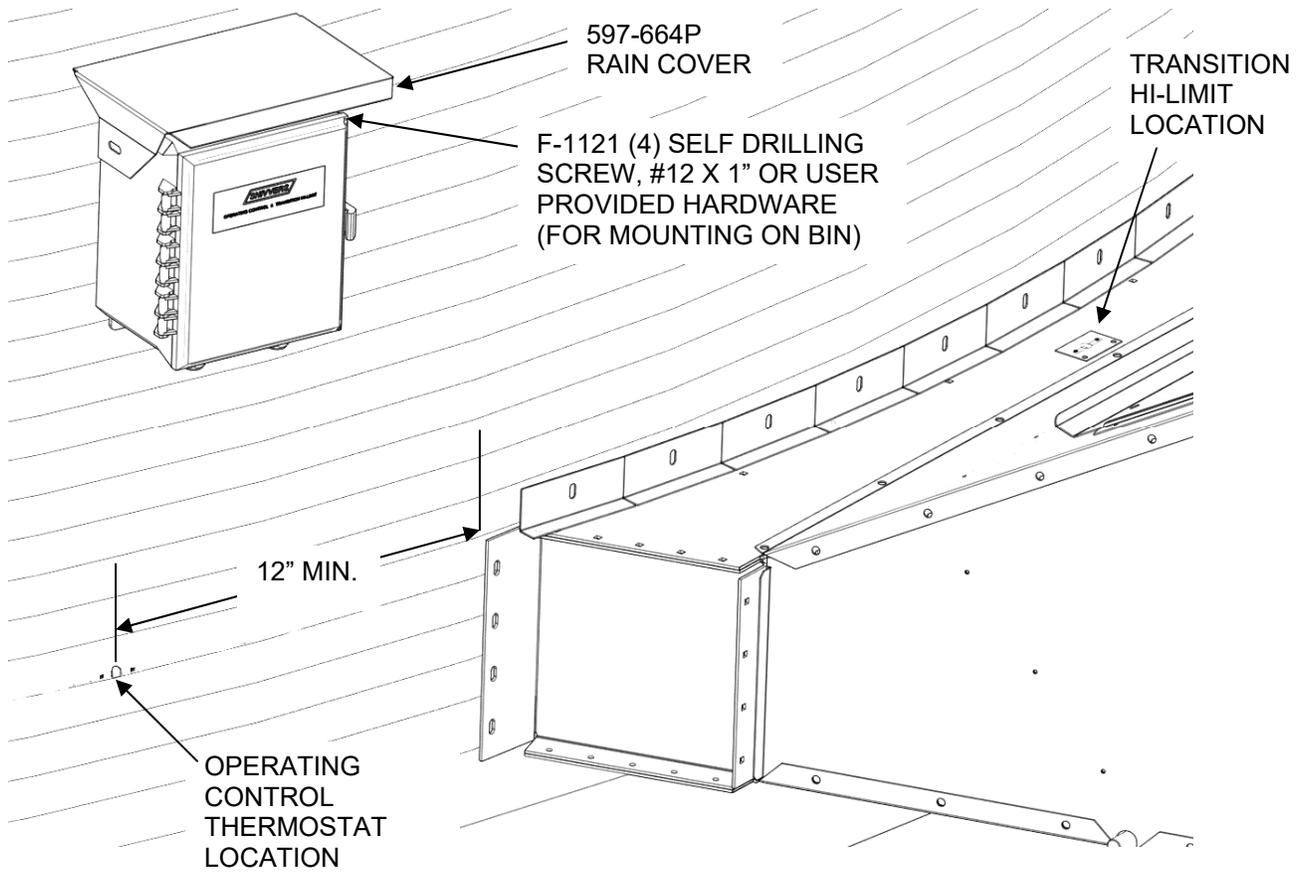


Position the Transition Hi-Limit probe in the holder and either squeeze the holder channel shut in several places, or wrap wire around it, to hold the probe capillary tube.



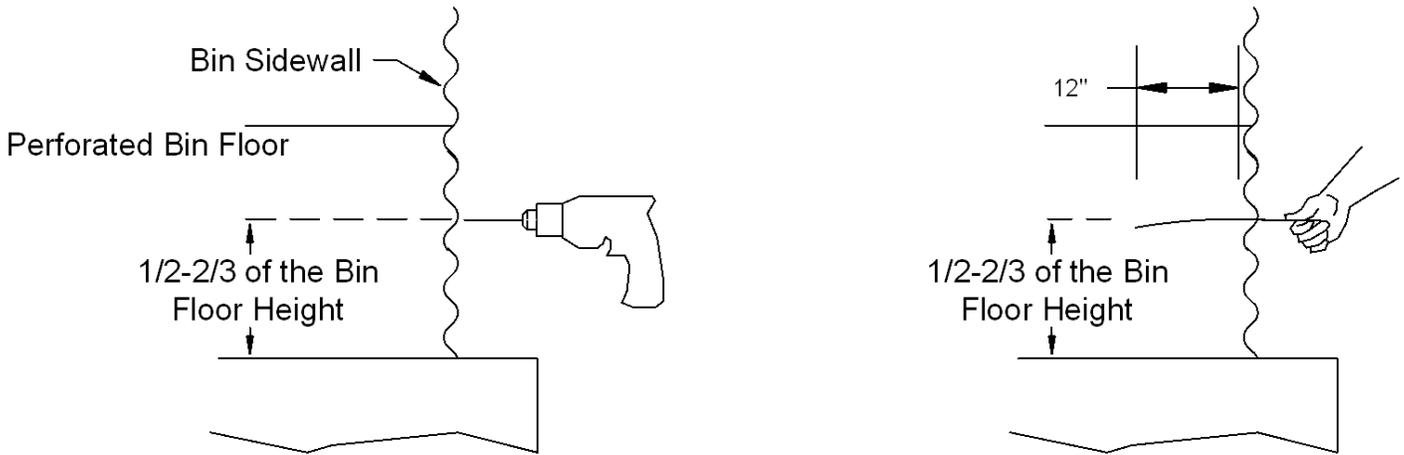
Mount the probe and holder in the Entrance collar using the two (F-2042) #8-32 x 5/8" thread forming screws provided. Use silicone caulking to seal any openings.

Route the Transition Hi-Limit capillary tube to the bin wall and mount the control box. Be sure that the Operating Control thermostat probe will reach the plenum chamber.

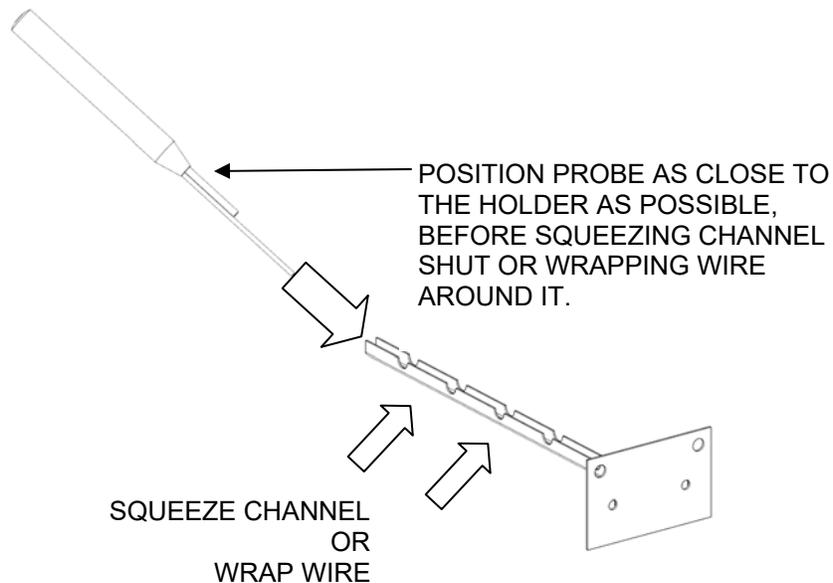


The Operating Control thermostat probe is installed in a similar manner, but the holder usually does not need to be shortened. The probe should be at least 12" away from the Entrance Collar.

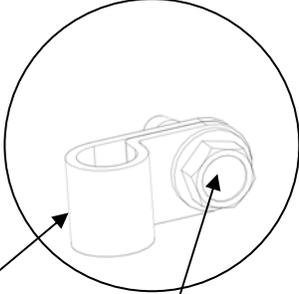
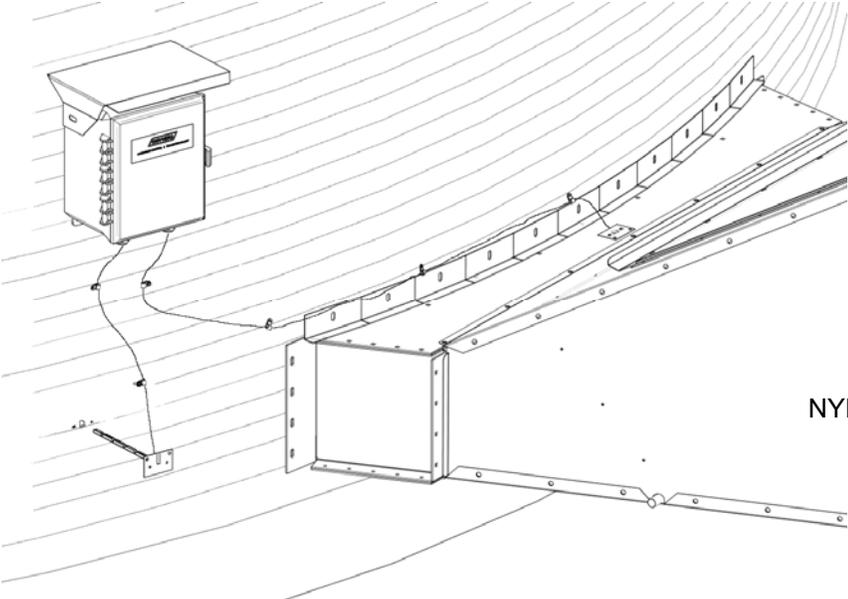
Once a location is selected, drill a small hole 1/2 to 2/3 up from the bin concrete to the drying floor. Insert a wire 1 foot into the plenum area to make sure the hole is not obstructed by a floor leg or other structure. If it is obstructed, insert sheet metal screw to plug the hole and move to another location. If clear, drill the 9/16" (0.563") hole into the bin and insert the probe holder to mark and drill the two 9/64" (0.140) mounting holes.



Position the Operating Control probe in the holder and squeeze the holder channel shut, or wrap wire around it, in several places to hold the probe and capillary tube. Mount the probe and holder in the bin plenum chamber using the two (F-2042) #8-32 x 5/8 thread forming screws provided.



Finish the installation by securing the capillary tubes to the bin wall using the (E-5064) nylon loop clamps and (F-1231) #8 x 1/2" self-drilling screws, to protect the capillary tubes from damage



E-5064 (6)
NYLON LOOP
CLAMP

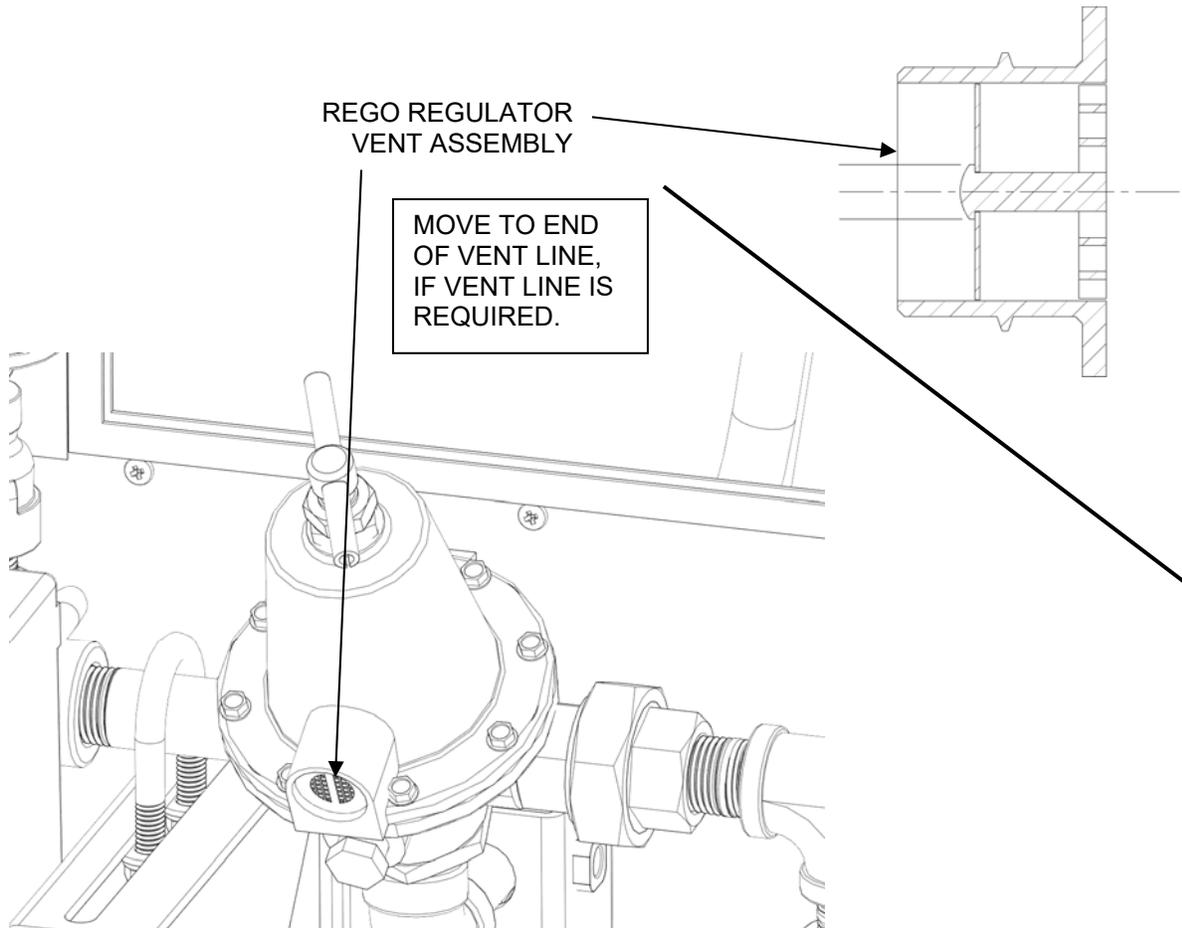
F-1231 (6)
#8 X 1/2
SELF DRILLING
SCREWS

LIQUID PROPANE INSTALLATION AND GAS HOOK-UP

ALL FUEL COMPONENTS MUST BE INSTALLED IN COMPLIANCE WITH NATIONAL AND LOCAL CODES AS APPLICABLE. USE THESE INSTRUCTIONS AS A GUIDE ONLY.

- 1). The LP storage tank(s) should be placed at least 25 feet from the heater (some places require 50 feet, so check local regulations), and should not be near any structure.
- 2). A 1000 gallon tank is recommended as a minimum size to avoid nuisance refilling and to allow proper tank vaporization. At the maximum firing rate of 3.6 million BTU/hr the burner will consume 40 gallons of LP per hour, or up to 960 gallons per day.
- 3). If the Blue Flame II will be used when outside temperatures are below 20° F, and the tank size is less than 1000 gallons per Blue Flame II, a vapor return line may be required. The LP vapor heated in the Blue Flame II is fed back into the tank to help keep a steady supply of liquid fuel to the burner. Connect at least 1/2 inch copper tubing from the tee immediately in front of the pressure regulator on the Blue Flame II, to the vapor outlet on the LP tank. A check valve must be installed to allow vapor flow into the tank only. Some installations may require a LP pump.
- 4). The liquid propane should be drawn through a snorkel located 12 inches above the tank bottom. This prevents impurities in the LP from being fed into the heater and clogging the strainer and potentially causing other problems. A pressure regulator is not normally required on the storage tank.
- 5). Never use an ammonia tank for LP gas storage. It can be harmful to the dryer and is very dangerous.
- 6). Use at least 1/2 inch copper tubing from the LP tank to Blue Flame II. Bury the line 18 to 24 inches deep or route it such that it will not get damaged. For multiple heater installations try to keep the fuel line length as equal as possible to each heater.
- 7). Install a flexible gas line when making the connection to the Blue Flame II.
- 8). Purge the gas line(s) before hooking to the Blue Flame II to blow any debris out which may have collected in the line during hookup.

9). Follow local requirements for venting away pressure relief valves and the pressure regulator. The screen vent on the regulator must be moved to end of the vent line for proper regulator operation. A pipe away adapter (H-2806) is provided for the 50 PSI relief valve located after the pressure regulator. It is shipped in the heater control box. If desired, the first liquid pressure relief valve may be relocated to near the tank so that the exhaust won't have to be piped away from the heater. Anywhere liquid propane can be trapped needs to have a relief valve.



10). Turn on the LP and check all connections for leaks with soapy water.

NATURAL GAS INSTALLATION AND GAS HOOK-UP

ALL FUEL COMPONENTS MUST BE INSTALLED IN COMPLIANCE WITH NATIONAL AND LOCAL CODES AS APPLICABLE. USE THESE INSTRUCTIONS AS ONLY A GUIDE.

- 1). For adequate heat, the natural gas supply must provide the following for each heater. Absolute maximum supply pressure allowable is 15 PSIG.

<u>MODEL</u>	<u>SUPPLY PRESSURE (PSIG)</u>	<u>MANIFOLD PRESSURE (PSIG)</u>	<u>OUTPUT MBTU/HR</u>
15 HP	10.0	4.7	3.2
20 HP	10.0	4.7	3.2

- 2). Use at least 1-1/2 inch gas pipe from the Natural Gas Meter/Regulator to the MAXX heater, and attach it with a flexible hose and a manual shutoff valve.
- 3). Purge the gas line(s) before hooking to the MAXX heater to blow any debris out which may have collected in the line during hookup.
- 4). Turn on the Natural Gas and check all connections for leaks with soapy water.

PAINT

The pipe trains are just primed and will need to be painted after installation.

ELECTRICAL INSTALLATION

ALL ELECTRICAL WIRING SHALL BE INSTALLED IN COMPLIANCE WITH THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE, CSA C22.1, AS A MINIMUM REQUIREMENT, AND IN COMPLIANCE WITH LOCAL WIRING CODES AS APPLICABLE.

WIRING MUST BE DONE BY A COMPETENT ELECTRICIAN. A LICENSED ELECTRICIAN IS RECOMMENDED, AND MUST BE USED WHEN REQUIRED BY LOCAL OR PROVINCIAL STATUTES.

An electric disconnect switch having adequate ampacity shall be installed in accordance with the latest edition of the Canadian Electrical Code, CSA-C22.1.



Disconnect and lock out all power before wiring.

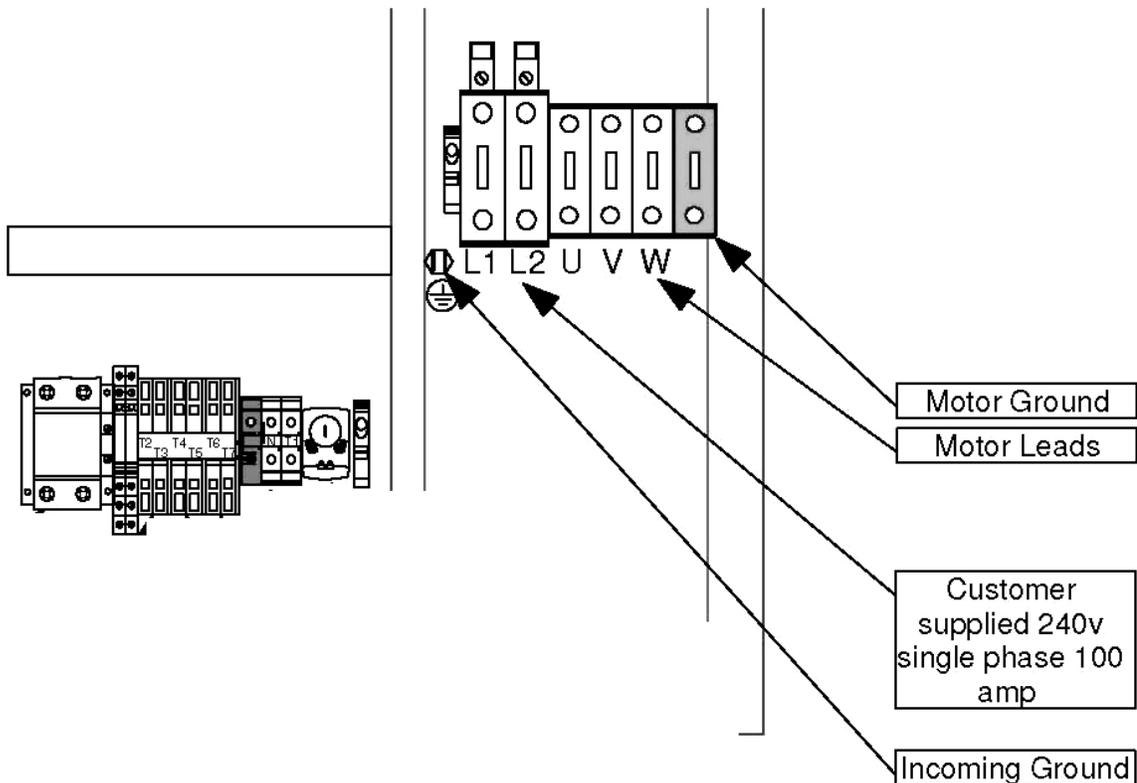
INCOMING FAN POWER HOOKUP

- 1). The 15 Hp Centrifugal fans are available for 240 volt single phase input. One model uses a single phase motor for “across the line” starting. Another model uses a frequency drive which takes the incoming power, converts it to DC, and then outputs three phase AC to the motor. The frequency drive control panel is shipped separate from the fan to allow flexibility in mounting it. It can either be mounted on the back of the fan, or in a nearby location.
- 2). A circuit breaker disconnect must be installed in-line with the incoming power to the C-Fan control panel. The circuit breaker should break all incoming power if an overload occurs on any single line. Aluminum wire is not recommended, but if used, the wire size must be increased. Copper wire **must** be used from the output of the frequency drive to the fan motor. If the distance from the power company transformer, or the C-Fan circuit breaker, is greater than 100 feet, it may be necessary to increase the wire sizes.
- 3). All wiring should be installed into the bottom, or bottom couple of inches, of the control panel. If conduit is attached to the drying bin wall, keep it at least 3 feet above the foundation to keep the ambient temperature lower. If the bin sidewall will be covered with insulating foam, make sure the electrical conduit is not under the foam. When running conduit from the bin wall to the C-Fan, make sure it does not interfere with air damper operation. Make sure it does not block access through the transition lid or the heater side access panel. Make sure the conduit does not touch the entrance collar or transition as these can get hot.

- 4). It is recommended to use at least some flexible conduit to the C-Fan and heater. Leave enough flex so the fan and heater can be moved to allow servicing or replacement of the dryer components.
- 5). It is necessary to have an incoming ground wire (marked green) with the incoming power leads. Consult the electrical code for the minimum size of the equipment grounding conductor. It should be connected to earth ground at the breaker panel and at the grounding terminal in the C-Fan control box.
- 6). The incoming power leads are connected to the control panel L1, L2, and L3 (if provided) terminals.

15 Hp C-FAN 1 PHASE WITH VFD INCOMING POWER WIRING

VOLTS	PHASE	MAX FULL LOAD AMPS	MIN. BREAKER SIZE	MAX. BREAKER SIZE	MIN. COPPER WIRE SIZE	RECOMMENDED CONDUIT SIZE
240	1	80	100	100	2 AWG	1-1/4 INCH



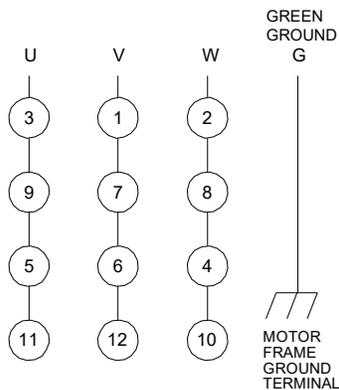
OTHER C-FAN INCOMING POWER WIRING

HP	VOLTS	PHASE	MAX FULL LOAD AMPS	MIN. BREAKER SIZE	MAX. BREAKER SIZE	MIN. COPPER WIRE SIZE	RECOMMENDED CONDUIT SIZE
15	240	1	62	100	150	4 AWG	1-1/4 INCH
15	208/230	3	39/35	80	100	6 AWG	1 INCH
15	460	3	18	40	50	10 AWG	3/4 INCH
15	575	3	14	35	40	12 AWG	3/4 INCH
20	208/230	3	51/46	90	110	4 AWG	1-1/4 INCH
20	460	3	23	50	60	8 AWG	1 INCH
20	575	3	19	40	50	10 AWG	3/4 INCH

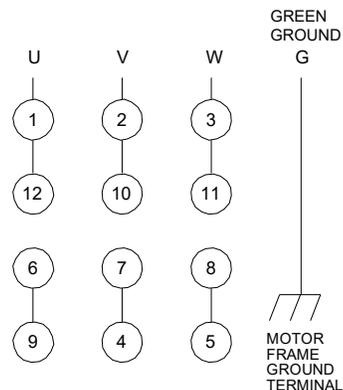
OTHER C-FAN WIRING FROM CONTROL TO MOTOR

Always use motor nameplate connection diagrams for final wiring. Generally, 12 lead 3 phase motors are connected as delta run.

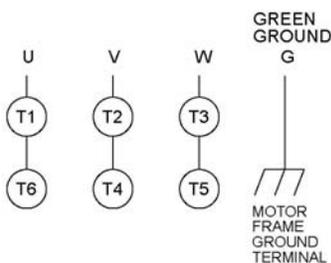
208/230 LOW VOLTAGE



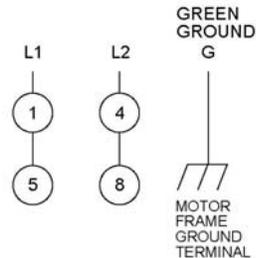
460 HIGH VOLTAGE



575V



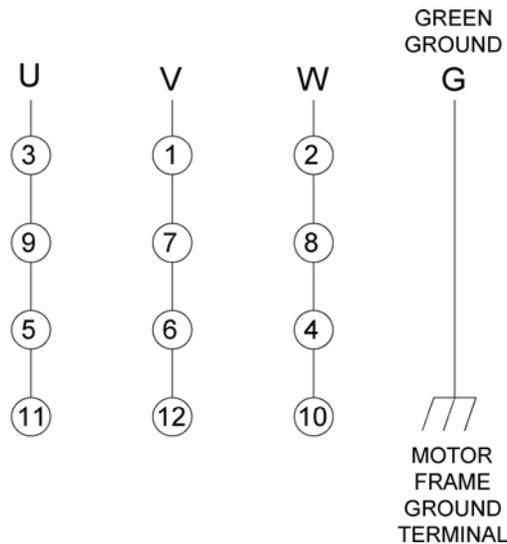
15 HP C-FAN, 1 PHASE MOTOR



TO REVERSE ROTATION, EXCHANGE WIRES 5 AND 8.

15 Hp C-FAN 1 PHASE, WITH VFD WIRING FROM DRIVE TO MOTOR

Use at least #6 copper wire, in at least 1" conduit, from the drive panel to the C-Fan 15 Hp motor. Do not use aluminum wire here! To reduce electrical interference it is recommended to use a metal or metal lined conduit. Try to keep the length of wire as short as possible and do not ever exceed 50'. Do not route the conduit near any sensitive electronic sensors. It is necessary to have an outgoing ground connection to the motor. The ground wire is connected to the ground terminal of the frequency drive. This is not the same place as the incoming ground connection, although they are connected together in the panel with factory wiring. The outgoing motor wires are connected to the control panel U, V, and W terminals. The 12 lead fan motor is connected as low voltage delta run. When ready, check fan for proper rotation. Reverse rotation by interchanging any two outgoing motor wires.



FIELD INSTALLED CONTROL WIRING

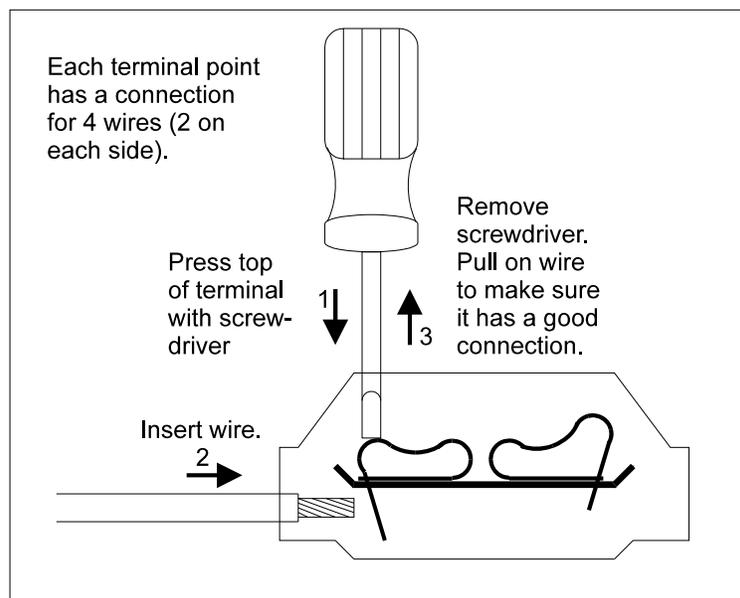
There are many different configurations possible for field installed control wiring. Control wiring is shown for the most common configuration. If another configuration is required, consult the factory for assistance. The way shown is for if the C-Fan control panel is mounted on the back of the fan. The C-Fan control panel could also be mounted in a nearby location. The connections will be the same, it just may be easier to route the conduits differently.

The Blue Flame II heaters use 120 Volt AC control voltage. This control voltage is interlocked with the fan, so it is only available when the fan is running at full speed. A 0.5 kVA control voltage transformer is installed in the fan control panel to provide heater power. Do not pick up heater power from any other source!

If conduit is attached to the bin wall, keep it at least 3 feet above the foundation or space it off the bin wall, to keep the ambient temperature lower. If the bin side wall will be covered with insulating foam, make sure the electrical conduit is not under the foam. When running the conduit from the C-Fan drive control panel or to the Blue Flame II Heater, make sure there is enough flex to be able to slide the fan and heater back for service. Make sure it does not block access through the transition lid or heater side access panel. Make sure it does not touch the entrance collar or transition as these can get hot. All control wiring should be either #16 or #14 AWG stranded wire.

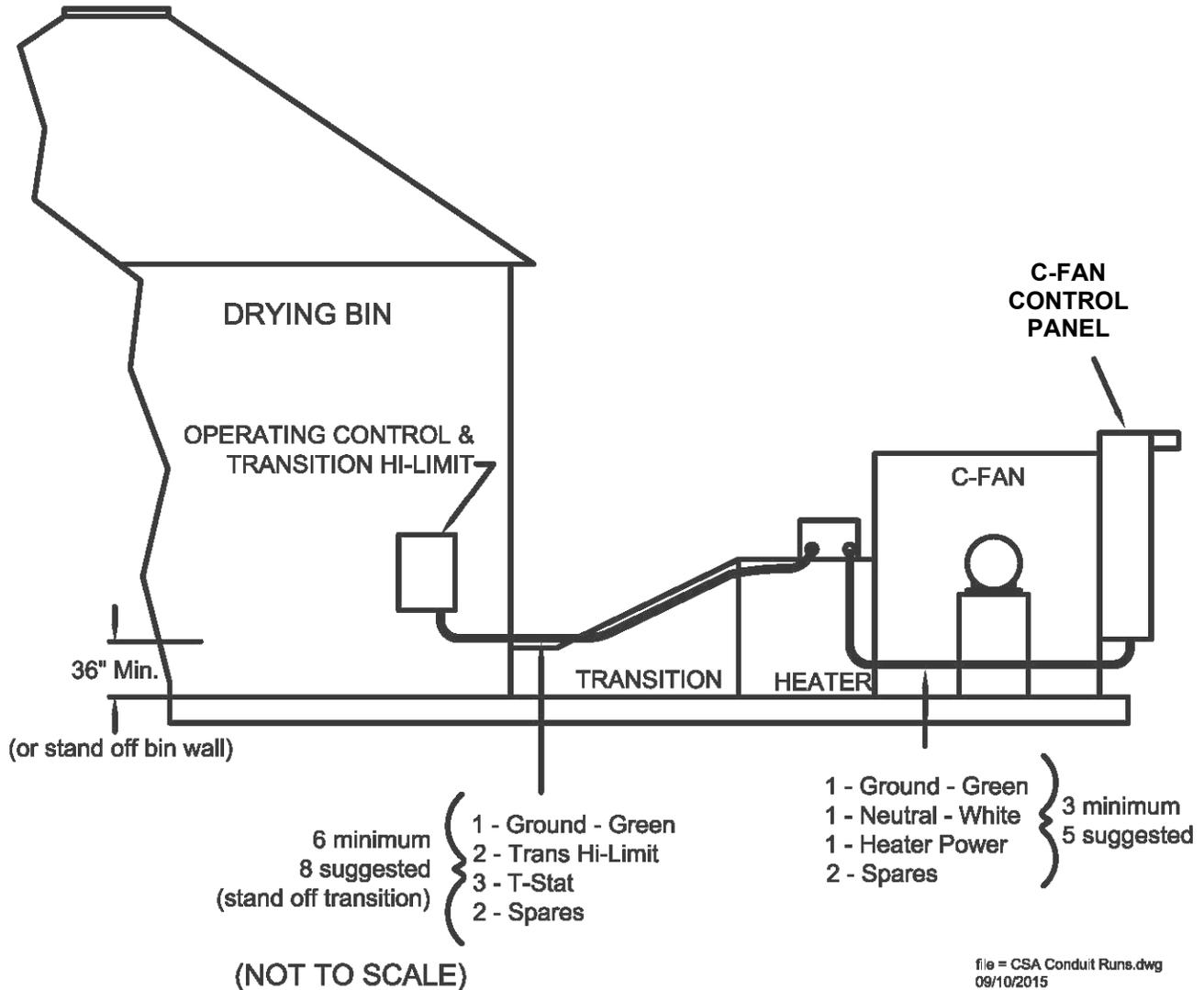
Pay attention to which control box the terminals are located in, as some numbers are the same.

The Blue Flame II Crop Dryer terminals are mostly a spring cage clamp type. The following diagram shows how to properly connect the wires. Make sure the wire is lined up to go straight into the terminal before pressing on the spring.



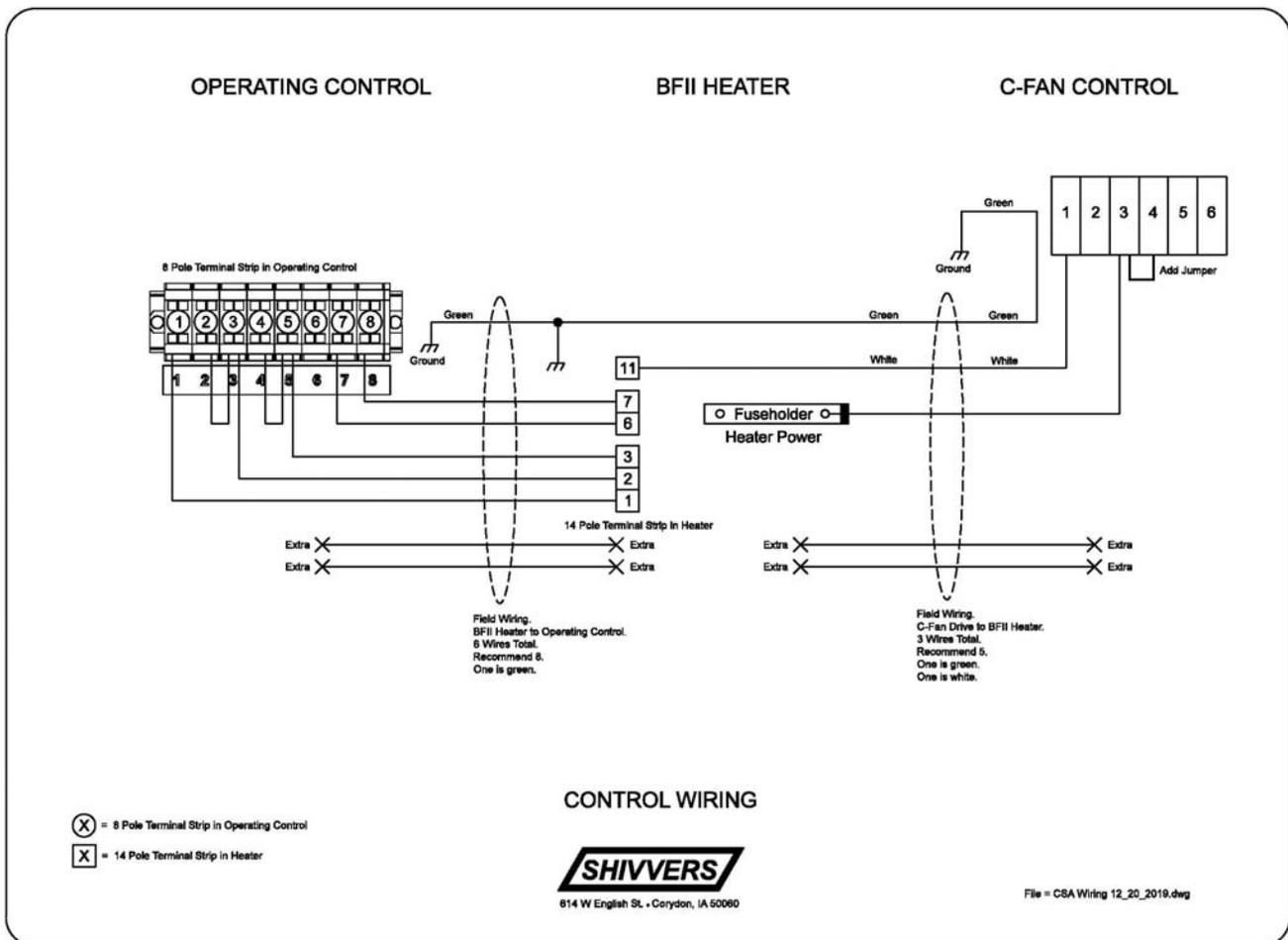
TYPICAL FIELD INSTALLED CONTROL WIRING CONDUIT RUNS

- Use #16 or #14 stranded wire.
- Space conduit off of transition and entrance collar surfaces because of heat.
- Do not block access to transition entrance or heater side access panel.
- Leave flex for service.

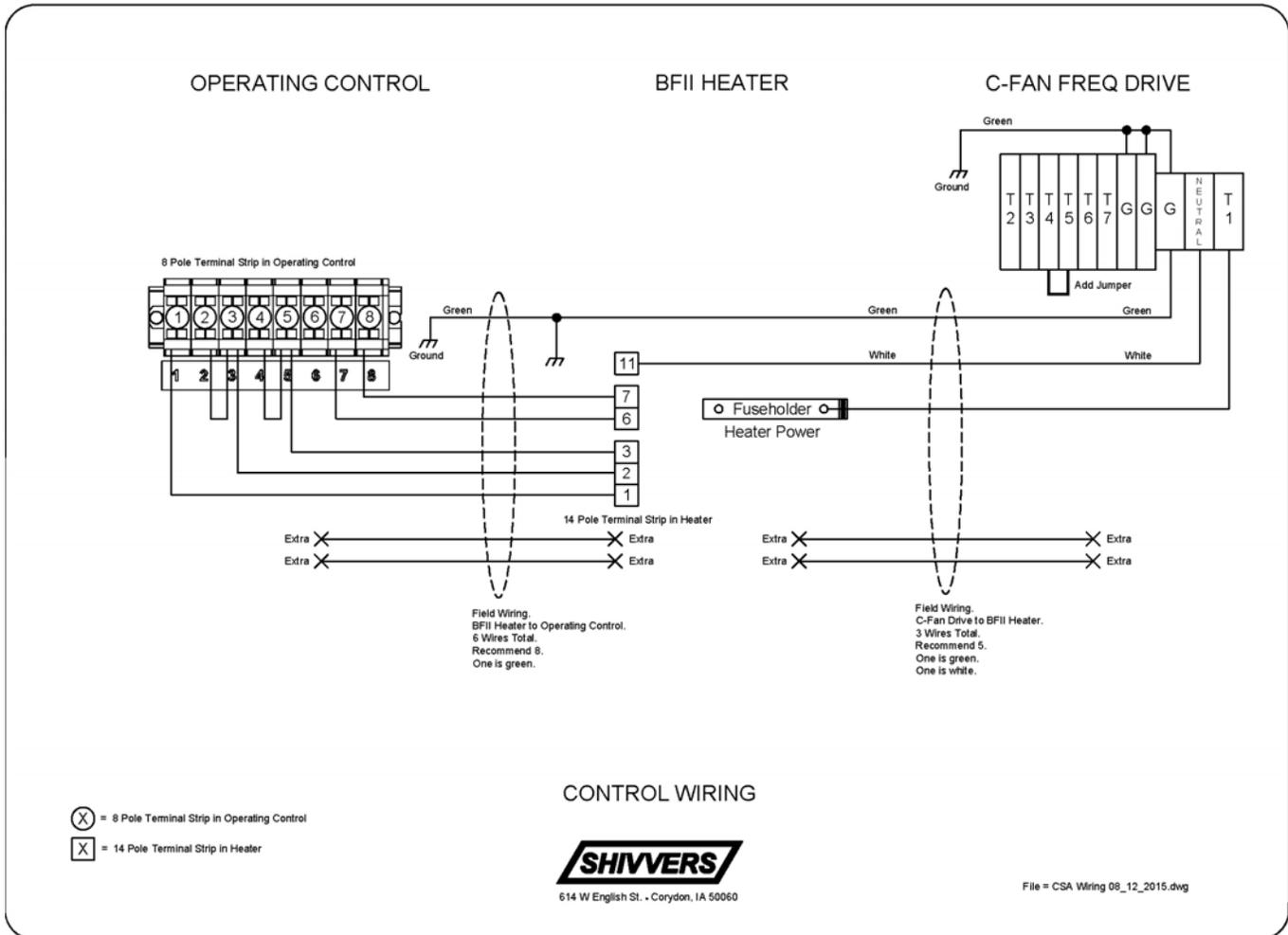


CONTROL WIRING FOR FAN CONTROL PANEL ON BACK OF FAN

- 1). Install a conduit from the C-Fan control panel to the BFII heater. This conduit will have at least 3 wires in it but it is recommended to install two extra wires. One needs to be green for ground. One white for neutral. One black for heater power. Two of any other color for future fan interrupt or shutdown.
- 2). Install a conduit from the BFII heater to the Operating Control and Transition Hi-Limit box. This conduit will have at least 6 wires in it, but it is recommended to install two extra wires. One needs to be green for ground. Three wires for thermostat operation. Two wires for the Transition Hi-Limit. The two extra wires could be used for future fan interrupt or shutdown.
- 3a). If the fan is used stand-alone without any other dryer control or interlock, make sure a jumper is installed between terminals 3 and 4 in the C-Fan control panel. The fan will not run without a connection between these terminals.



- 3b). **For 1 Phase panel with VFD:** If the fan is used stand-alone without any other dryer control or interlock, install a jumper between terminals T4 and T5 in the fan frequency drive control panel. The fan will not run without a connection between these terminals.



INITIAL CHECKOUT

- 1). Once the wiring is completed, make sure the heater power switch is off. Make sure everyone is out of the grain bin and are safely away from all drying equipment, then unlock the main power. Lock the bin entrances shut, and then turn on the main power. Check for proper incoming voltages in the fan control box. On the fan, press the fan start switch, then before the rotation gets too fast, press the fan stop switch. Check the fan blade for proper rotation. Looking into the air inlet venturi, rotation should be counterclockwise. If the rotation is not correct, disconnect and lock out the power first! Wait at least 10 minutes for the frequency drive capacitors to discharge. Check the motor terminals with a known good voltmeter to verify that the voltage has dissipated. Exchange any two motor leads. Re-apply power and re-check rotation.
- 2). Make sure the bin roof vents are open. Make sure the fan wheel is not spinning. If it is spinning so fast that the individual blades can't be seen, wait until it slows down. Trying to restart the fan with the wheel rapidly spinning may trip an error code or could even damage the frequency drive. Press the fan start switch.
- 3). Set the Operating Control thermostat to call for heat. If any other controls are connected, they must be calling for heat also. Leave the fuel shut off for now.
- 4). Turn on the heater power switch. Press the heater Start switch. The Burner Power and High Heat lights should come on. After a 15 second purge delay, the spark plug should start sparking for six seconds. The Heat light should come on for 4 seconds, and then go out. The burner is now locked out because there wasn't any fuel to burn.
- 5). Shut the heater power switch off and turn on the fuel supply. Turn the heater power switch back on. Press the heater Start switch. The Burner Power and High Heat lights should come on. After about 20 seconds the burner should fire. On LP units adjust the vaporizer and regulator as required. If the burner does not continue to run, inspect the flame rod to make sure it hasn't gotten out of adjustment. It should be in the burner vee, immersed in the flame, but not touching metal.
- 6). Adjust the Operating Control thermostat to cycle the burner to low fire and off, and then back on.
- 7). Shut off the fuel supply and allow the lines to burn out. Once the flame is gone, the heater should go into lockout.
- 8). Shut the fan off, then disconnect and lock out the main power.

OPERATING INSTRUCTIONS

To Operate:

Do not start the fan unless the bin roof vents are open. Air pressure could cause roof damage. Do not start the fan if the fan wheel is spinning rapidly (so fast that you cannot see the individual fan blades). Trying to restart the fan with the wheel spinning rapidly may trip an error code or could even damage the frequency drive. To start the fan, press the fan start switch.

The fan must ramp up to full speed before providing power to the heater. The fuel supply must be turned on. There must be call for heat from the thermostat controls. On LP units, the regulator should initially be set about 1/2 way between full on (all the way in) and full off (all the way out). Slide the vaporizer about half way out as a starting point.

On NG units, open the 3/4" manual gas valve about 1/2 way.

- 1). Turn on the Burner Power Switch. Press and release the green Start switch on the heater.
- 2). The Burner Power and High Heat lights should come on. After a 15 second purge the ignition transformer will come on for six seconds, then the Heat light will come on and the gas valves will open.
- 3). The burner should fire within 4 seconds, then shut off the ignition transformer.
- 4). On LP units, adjust the vaporizer in or out, so the gas line before the regulator is between 50° F and 120° F, not hot, to touch. **CAUTION:** The vaporizer line can become scalding hot if set too far into the flame. The pipe train can freeze up if the vaporizer is too far away from the flame. Keep checking the vaporizer as it will require several minutes for the temperature to stabilize. See the "Vaporizer Operation" page for details.
- 5). Set gas pressure based mostly on ambient temperature. Static pressure (depth of grain) and desired operating temperature will also affect the gas pressure setting. Generally, the heater should cycle between High Fire and Low Fire. If the heater cycles off, reduce gas pressure. If the heater stays on High Fire, increase gas pressure, but don't exceed the maximum pressure for the ambient temperature conditions. On LP units, gas pressure is adjusted with the pressure regulator. On NG units, gas pressure is adjusted with the 3/4" manual gas valve.

AMBIENT TEMP		15HP / 20HP LP	15HP / 20HP NG
		MAX GAS MANIFOLD PRESSURE (PSI)	MAX GAS MANIFOLD PRESSURE (PSI)
°F	°C		
0	-18	25 / 25 (max)	4.7 / 4.7 (max)
40	5	15 / 20	4.7 / 4.7 (max)
80	27	5 / 10	2.0 / 3.0

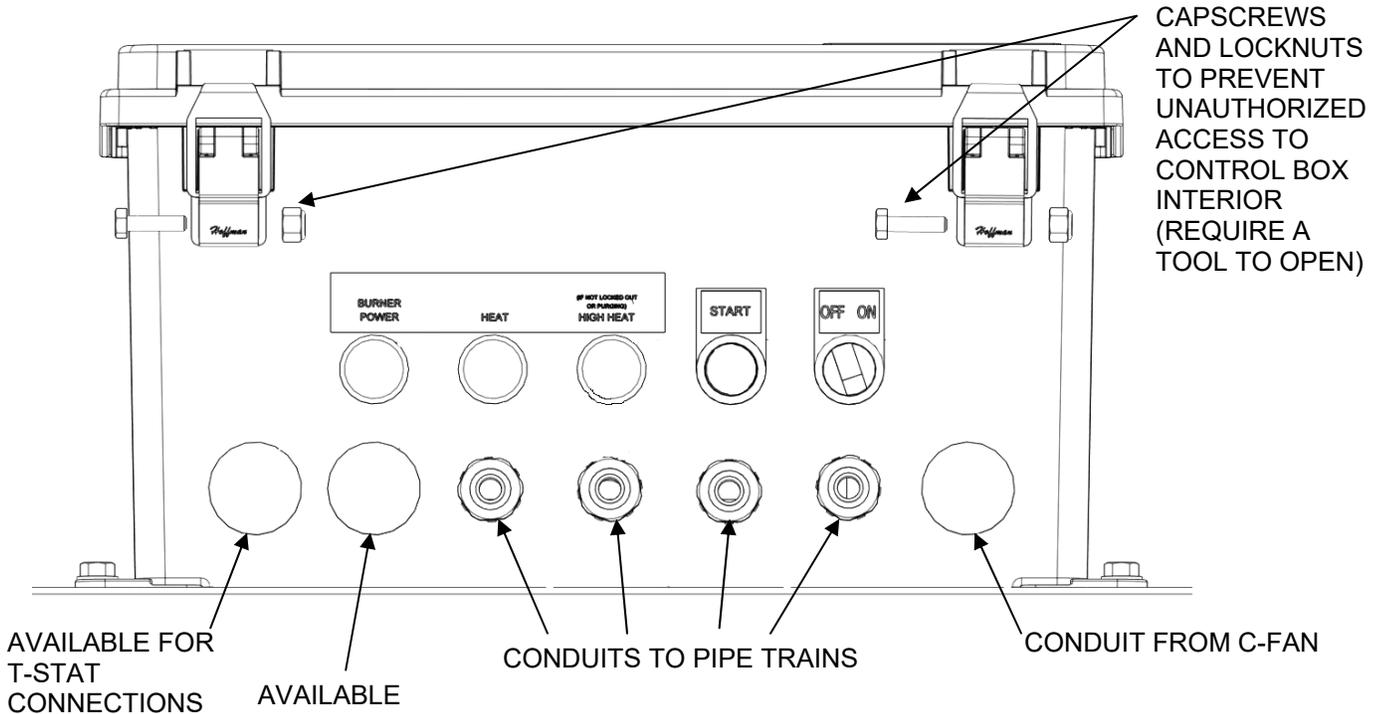
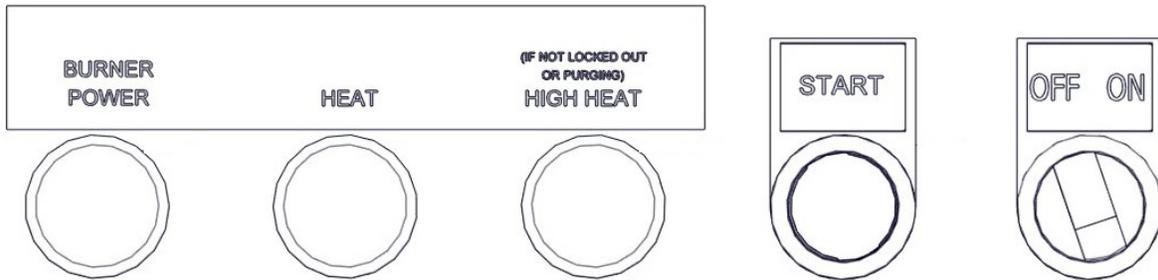
TABLE 1: Gas Pressure Setting Guidelines

If gas pressure is set too high, the Transition Hi-Limit may trip. The heater will operate with gas pressures as low as 1 PSI on LP and 0.5 PSI on NG. On LP units, when gas pressure is changed, re-adjust the vaporizer as required.

- 6). If the Heat light is off for more than 25 seconds and the High Heat light is on, the burner is locked out. Reset the control by turning the burner switch off for a few seconds, then back on. Press the heater Start switch.

BLUE FLAME II HEATER OPERATOR'S CONTROL PANEL

LIGHT AND SWITCH DETAIL ON HEATER



Short Term Stop (less than a couple days):

- 1). Close manual gas valve at Blue Flame II heater.
- 2). Burn out all gas in pipe train.
- 3). Turn burner switch off.
- 4). Let burner cool down for a few minutes then stop fan.

Long Term Stop (more than a couple days):

- 1). Close gas valve at the supply.
- 2). Burn out all gas in line. This may take a while on LP units.
- 3). Turn burner switch off.
- 4). Let burner cool down for a few minutes then stop fan.

Uneven Heat/Air mixtures could cause hot spots within the bin and affect drying capacity and grain quality. The use of dial thermometers (E-5226) placed through the bin wall into the plenum will aid in establishing actual temperature variations. 423-382-001A is a kit which can be purchased. It includes a thermometer and a bracket which can be left in place for continuous temperature monitoring.

If plenum temperatures are not within 30° F, transition baffles may need to be installed. Contact the factory for more details. The best overall performance will come from an installation that has plenum temperatures within 30° F around the bin under normal operating conditions.

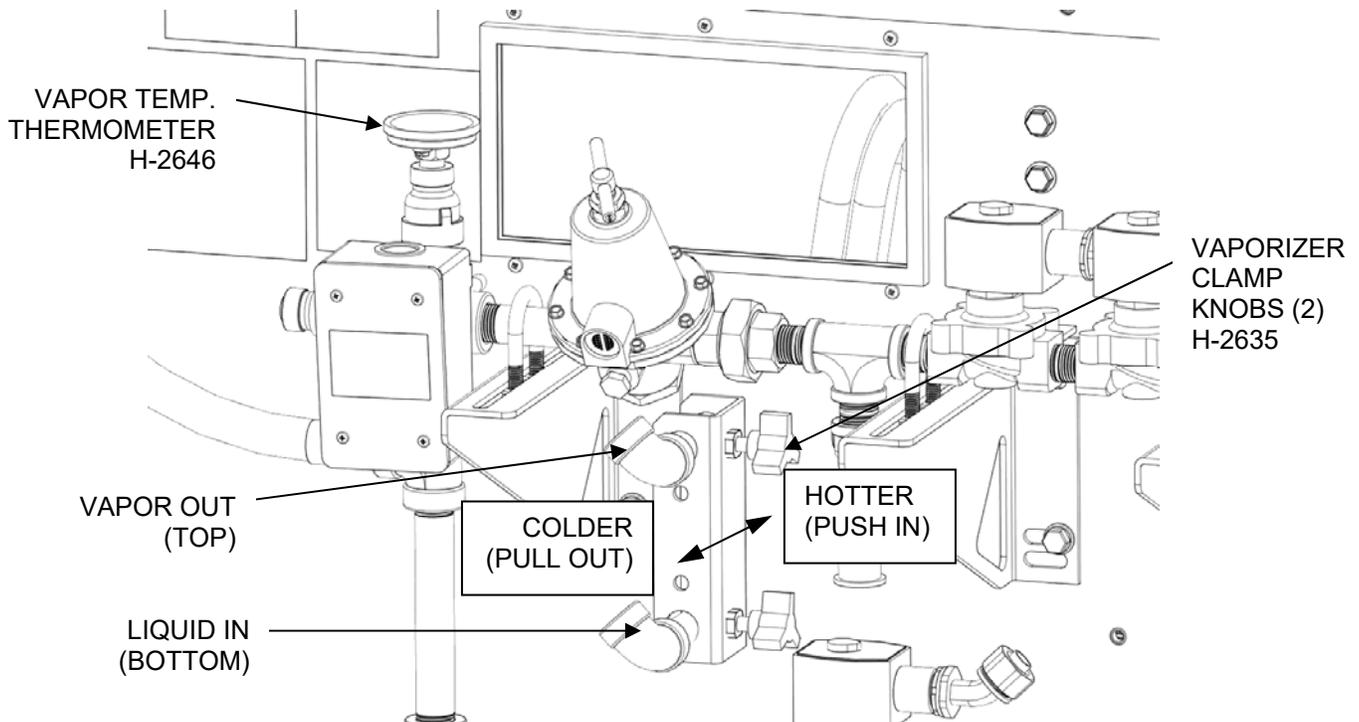
Vaporizer Operation: (LP units only)

Liquid propane is fed through the vaporizer coils to change its state from a liquid to a gas. It is desirable to keep the propane vapor temperature between 50° F and 120° F.

If the temperature of the gas exiting the vaporizer exceeds 140° F it may cause the propane to break down resulting in incomplete combustion and the formation of deposits on the burner surfaces and the burner orifices.

Vapor temperatures below 40° F anywhere along the upper pipe train, may cause the pipe train to frost up causing the regulator and solenoid valves to malfunction.

The vaporizer is adjusted in to increase vapor temperature or out to reduce the vapor temperature.



The Vapor Temp Thermometer turns red at 140° F.

The CSA LP pipe train has a 120° F Hi-Limit installed to protect the solenoid valves used.

If the vaporizer coil is set for a vapor exit temperature of 120° F when the grain bin is at the maximum operational depth and on low fire, it will in most cases provide enough vaporization to function properly as the grain depth decreases during the drying operation. If the vapor temperature does fall below 40° F it should be increased by 10° to 20° F. If the upper pipe train frosts up, it will also be necessary to set the vaporizer hotter.

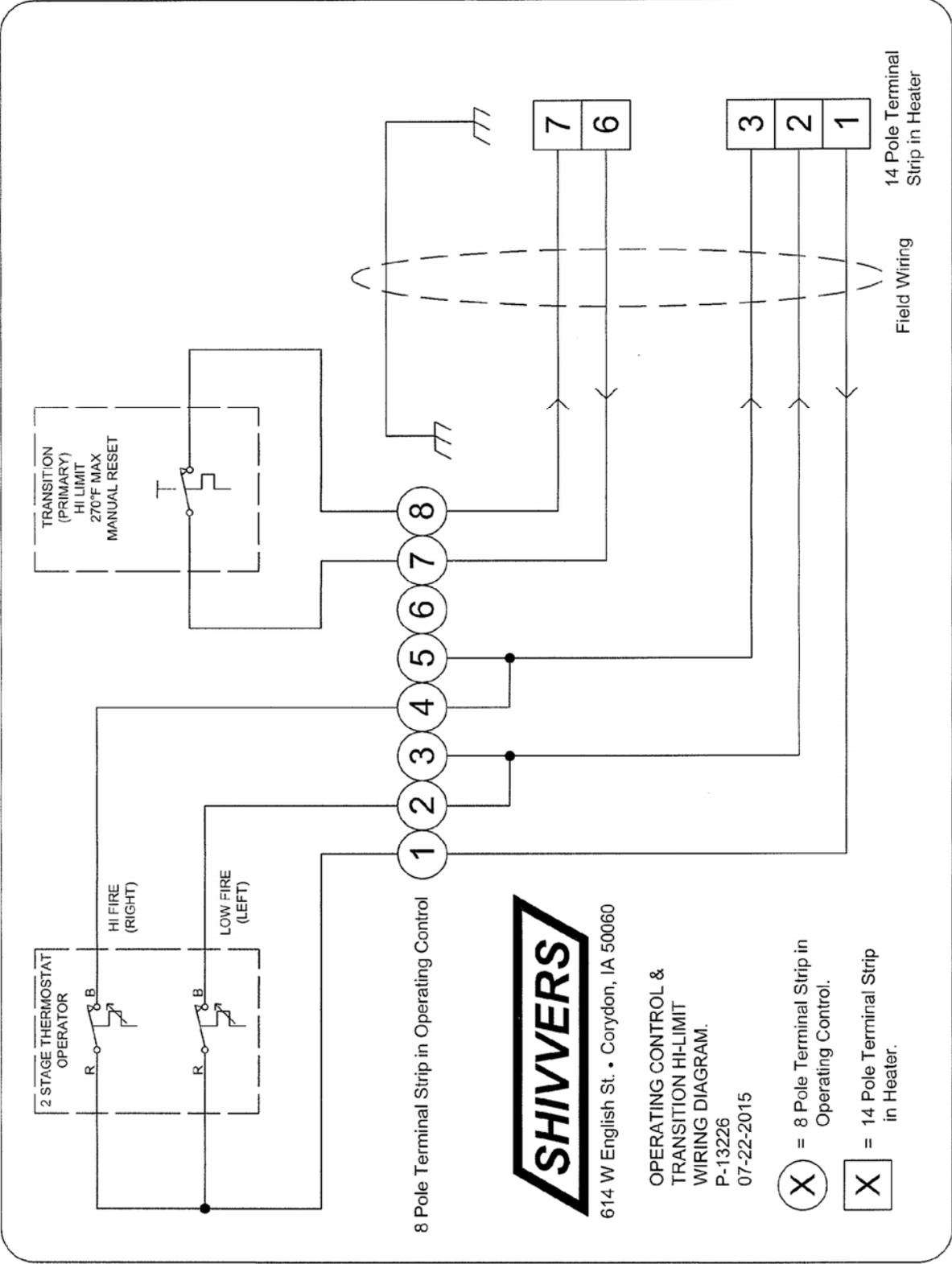
MAINTENANCE

! DANGER

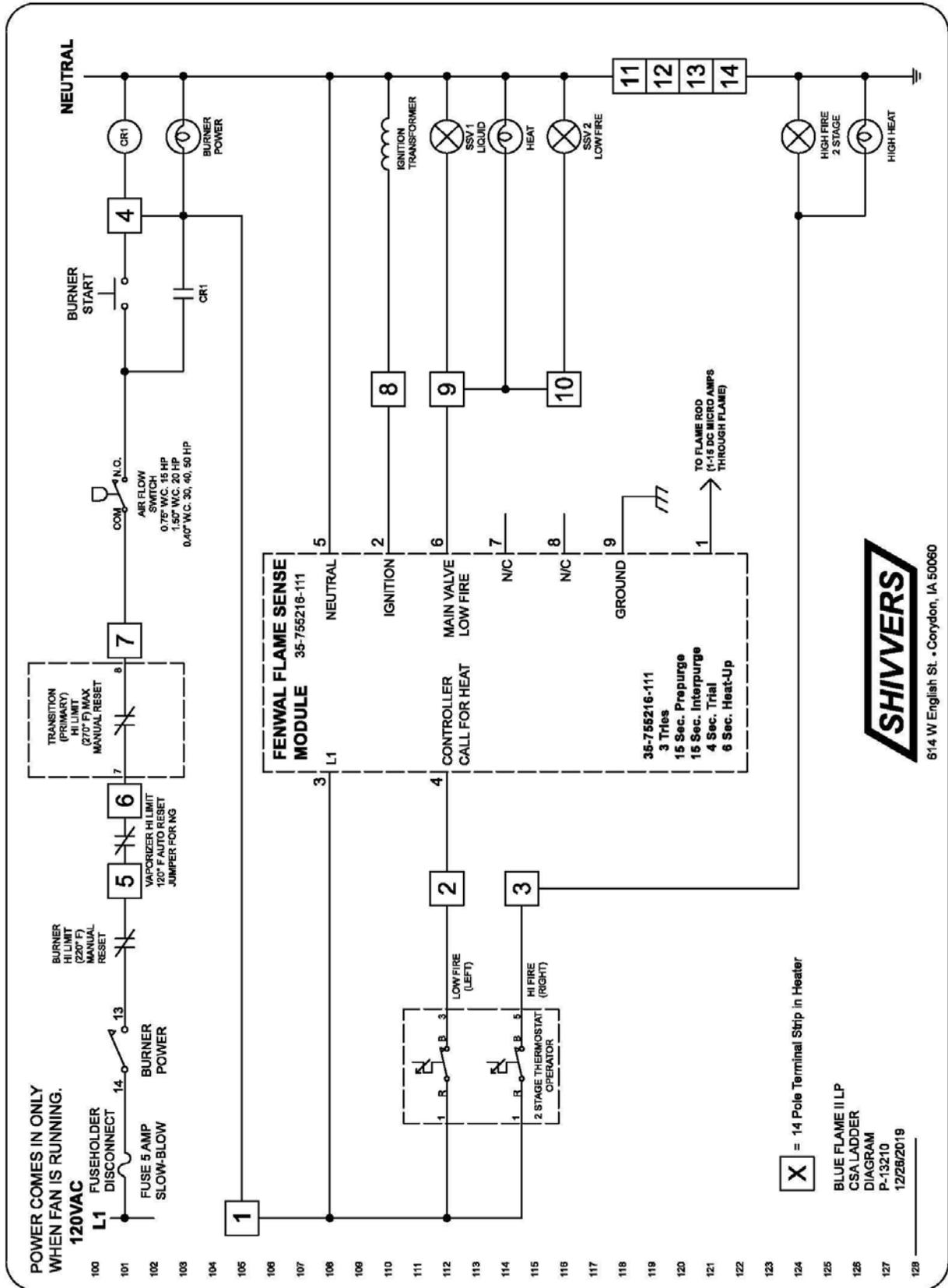
Disconnect and lock out all power before opening any control boxes or removing any shields. Make sure everyone is clear of all drying equipment before restoring power.

- 1). Yearly, remove the wire screen in the gas strainer and clean it. The big plug at the bottom of the strainer must be removed to remove the screen. Make sure the fuel supply is shut off first!
- 2). Yearly, check all wiring and gas connections to be sure they are tight and in good condition. A mixture of one part soap to three parts water can be brushed or sprayed onto pressurized gas line connections to check for leaks. Check all flexible hoses for wear or cracks and replace if necessary.
- 3). Yearly, inspect the burner element for pieces missing and plugged holes. It is normal for the Blue Flame II burner element to initially crack in the corners. Once the stress is relieved, the burner should continue to operate without any problems for a long time. Check for an even burn when operating. On LP units, check the vaporizer tube and replace if there are splits or cracks.
- 4). Maintain a clean operation. Clean up spilled corn, clean out fines under the bin floor (contact Shivvers about clean-out doors and floor doors), keep all control boxes shut and replace seals if required. Control the rodent population. Control weeds and tall grasses around the Blue Flame II. They can get sucked in and block airflow or start a fire. They can interfere with damper operation.
- 5). At the beginning of each season, check for proper operation of the flame lockout system. With the burner running, shut off the fuel supply. Approximately 5 seconds after the flame goes out, the Heat light on the front panel should go out and stay out for more than 15 seconds. There may be up to two more trials for ignition. It is not safe to operate the burner without this circuit operating properly.
- 6). During the drying season, check the transition dampers for free movement and proper operation.
- 7). At the end of the season, make sure the main power is disconnected and locked off. There will be fewer problems with lightning damage with all switches and breakers open.
- 8). The flame rod may corrode and it won't conduct enough current, especially when hot. Cleaning it before the season may be required. Disconnect and lock out power. Open Blue Flame II heater control box. Remove the orange wire from the top of the flame rod. Remove two screws from flame rod plate. Remove flame rod and plate, being careful not to change the rotational angle of the flame rod to the plate. Clean the flame rod with emery cloth and carefully re-insert it. Reconnect the orange wire. Shut the control box.

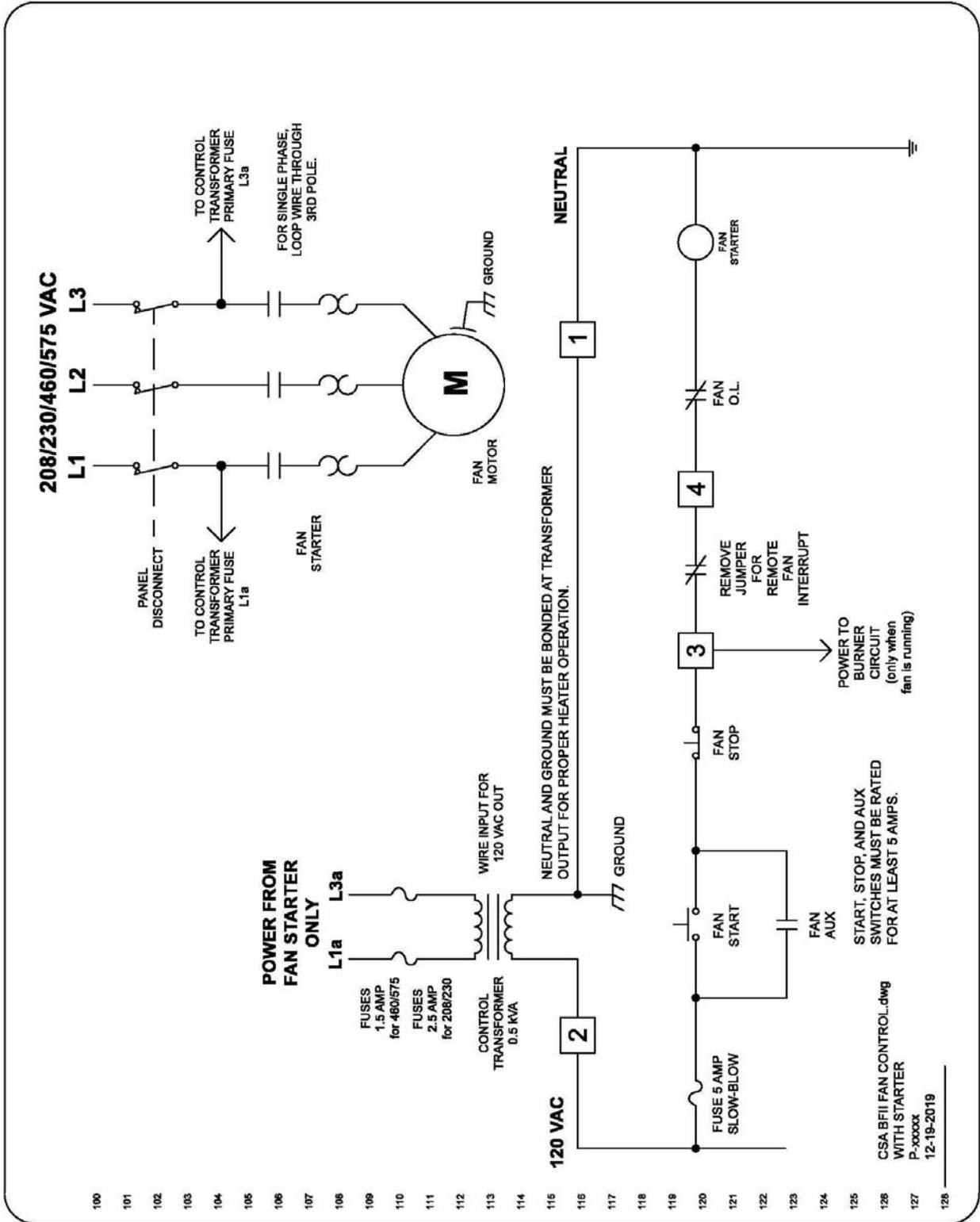
OPERATING CONTROL SCHEMATIC



HEATER SCHEMATIC



FAN CONTROL SCHEMATIC



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