Chi-Town Heater

Installation and Operation Manual

PNEG-297

Date: 12-07-10

GSI GROUP

GSI

PNEG-297

Check List

1. All wire connections
2. Ignitor gap - 1/8"
3. Pipe train tightness and gas leaks
4. Flame probe adjusted
5. Fuse in place, extra fuse provided
6. Reset lock out after 30 second flame out
7. Indicator light
8. Pressure gauge
9. Regulator adjusted
10. Solenoid valve operates correctly
11. Unit cycles ON to OFF
12. Burns evenly around ring
13. All decals and serial number tag
14. Aesthetic appearance
15. Manual

Tester Signature: _____

Date: _____

Model #: _____

Contents

1. Introduction

Thank you for choosing a GSI product. It is designed to give excellent performance and service for many years.

This manual describes the operation of the Chi-Town Heater. It is designed for low to medium temperature grain conditioning and is ideal for the aeration of rice, popcorn or other select grains. It is designed to be used with propane vapor or natural gas.

Our foremost concern is your safety and the safety of others associated with this equipment. We want to keep you as a customer. This manual is to help you understand safe operating procedures and some problems which may be encountered by the operator and other personnel.

As owner and/or operator, it is your responsibility to know what requirements, hazards and precautions exist, and to inform all personnel associated with the equipment or in the area. Safety precautions may be required from the personnel. Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation where SERIOUS INJURY or DEATH may occur.

This equipment shall be installed in accordance with the current installation codes and applicable regulations which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

Safety Guidelines

This manual contains information that is important for you, the owner/operator, to know and understand. This information relates to protecting ***personal safety*** and ***preventing equipment problems.*** It is the responsibility of the owner/operator to inform anyone operating or working in the area of this equipment of these safety guidelines. To help you recognize this information, we use the symbols that are defined below. Please read the manual and pay attention to these sections. Failure to read this manual and its safety instructions is a misuse of the equipment and may lead to serious injury or death.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

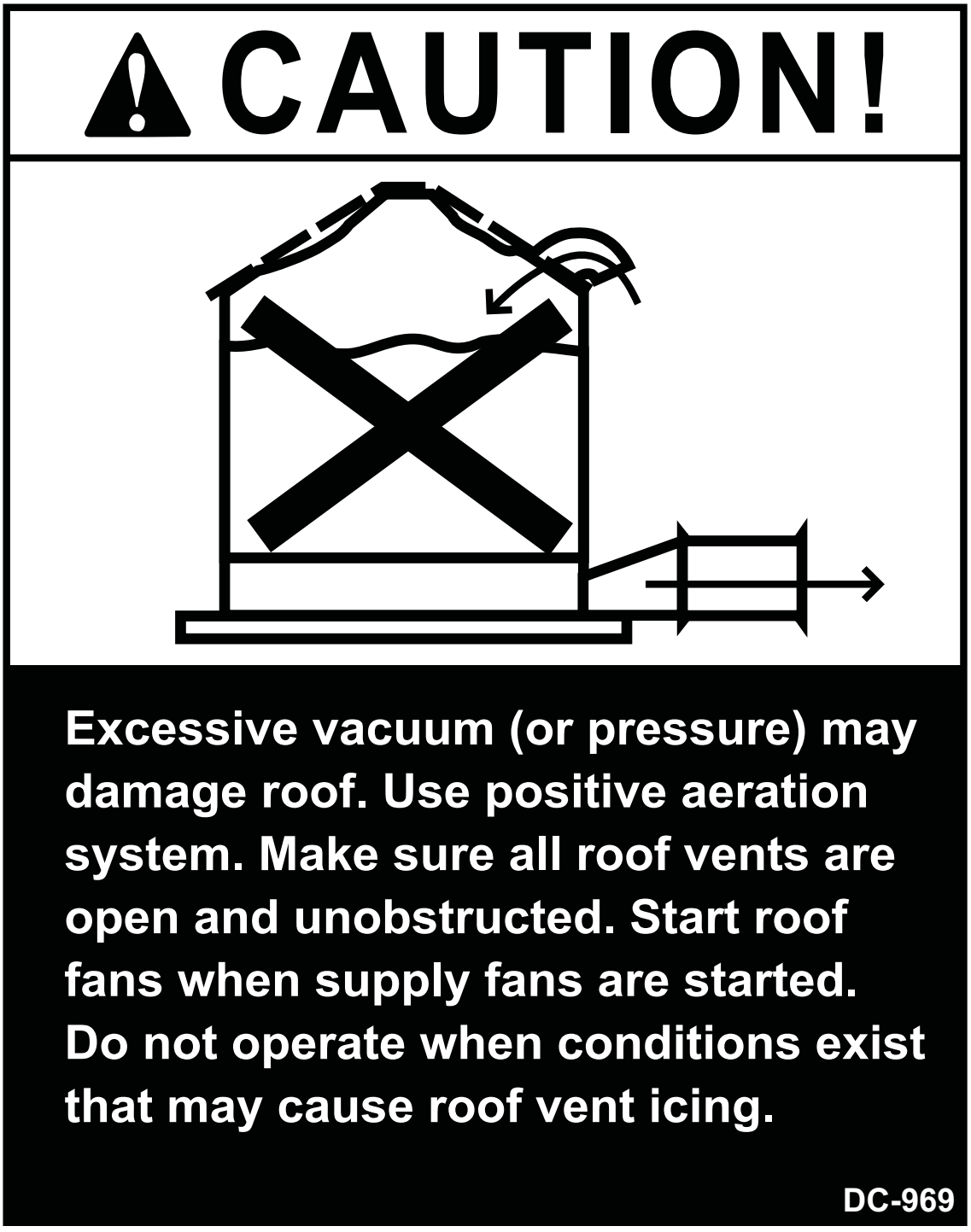
NOTE indicates information about the equipment that you should pay special attention.

WARNING! BE ALERT!

Personnel operating or working around electric fans should read this manual. This manual must be delivered with the equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

Roof Damage Warning and Disclaimer

The manufacturer does not warrant any roof damage caused by excessive vacuum or internal pressure from fans or other air moving systems. Adequate ventilation and/or “makeup air” devices should be provided for all powered air handling systems. The manufacturer does not recommend the use of downward flow systems (suction). Severe roof damage can result from any blockage of air passages. Running fans during high humidity/cold weather conditions can cause air exhaust or intake ports to freeze.

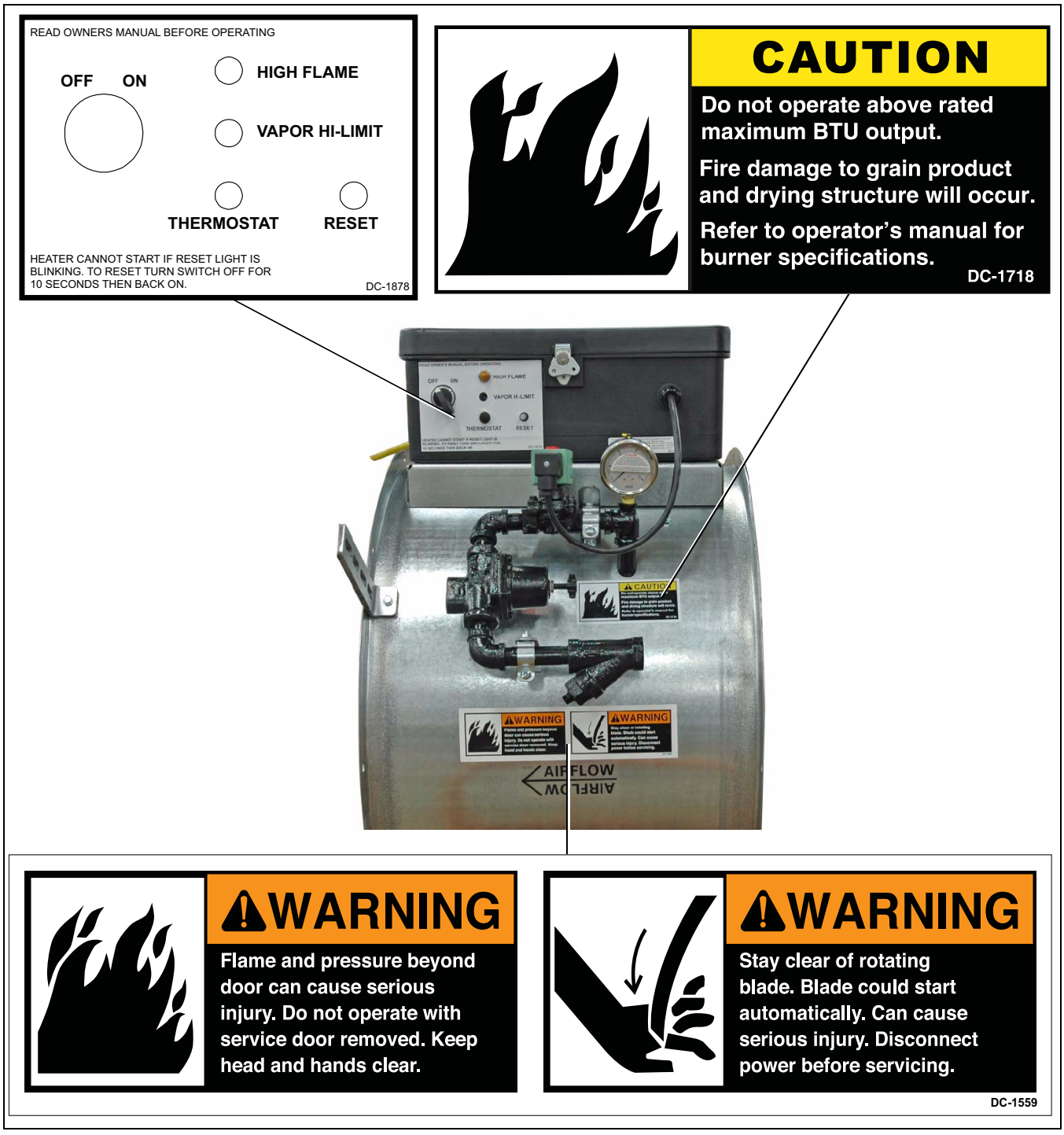


GSI Group recommends contacting the local power company and having a representative survey the installation so the wiring is compatible with their system and adequate power is supplied to the unit. Safety decals should be read and understood by all people in the grain handling area.

If a decal is damaged or is missing, contact:

GSI Decals
1004 E. Illinois St.
Assumption, IL. 62510
Phone: 1-217-226-4421

A free replacement will be sent to you.



DANGER

HIGH VOLTAGE.

- **Will cause serious injury or death.**
- **Lockout power before servicing.**

DC-1224

IMPORTANT

THIS UNIT IS WIRED FOR

115 VOLT, 1-PHASE

POWER SUPPLY

420-1422-5

CAUTION

Thermostat must be installed for operation.

Failure to do so may damage equipment and cause fire.

DC-1702

Heater Specifications

Common Measurements

Inside Diameter	25-7/8"
Bolt Circle Diameter	27-3/16"
Length	18"
Weight	110 Lbs.

All Models

Propane Vapor	
Orifice (inches)	5/32
Maximum Fuel Flow (CFH)	475
Minimum Operating Pressure (PSI)	1
Maximum Operating Pressure (PSI)	15
Minimum Supply Line (inches)	1/2
BTU Rating at Maximum Pressure	1,100,000
Natural Gas	
Orifice (inches)	7/32
Maximum Fuel Flow (CFH)	1083
Minimum Operating Pressure (PSI)	1
Maximum Operating Pressure (PSI)	8
Minimum Supply Line (inches)	3/4
BTU Rating at Maximum Pressure	1,100,000

Heater Installation

1. Install three (3) mounting brackets on fan as indicated by the arrows shown in *Figure 5A*. Install loosely.
2. Set heater in place and install four (4) mounting bracket.
3. Level heater and tighten mounting brackets.
4. Attach heater to mounting brackets using 1/4" bolts and nuts.

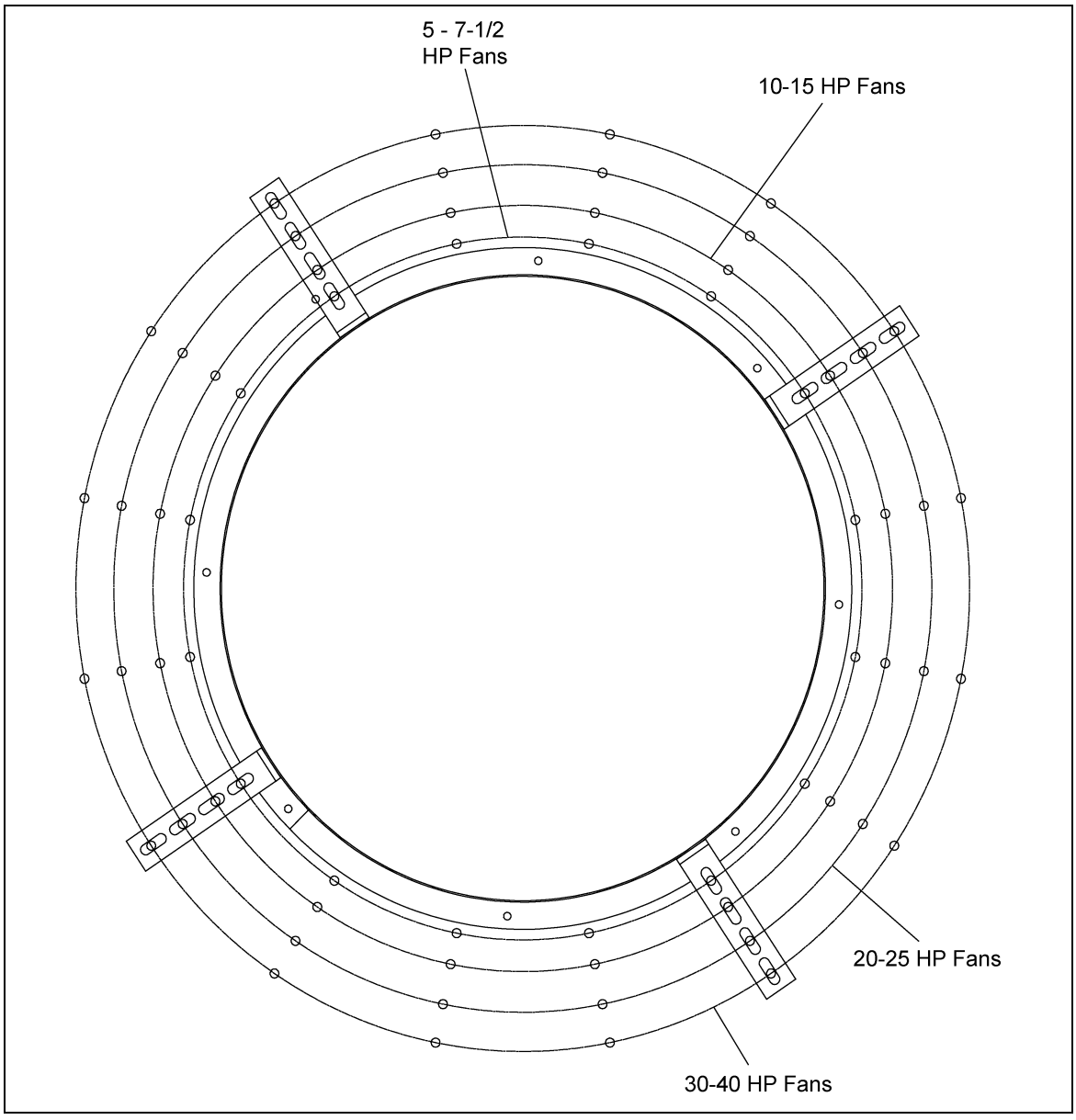


Figure 5A *Heater Mounting Brackets Illustration*

Fuel Connection

IMPORTANT: *Do not use propane tanks which have previously been used for ammonia unless they have been purged according to procedures of the National LP Association. Investigate to be sure that the fuel supply system complies with all local codes for LP gas installations.*

Propane Vapor Models

1. Propane vapor models are designed to run directly off of supply tank or from a separate external vaporizer.
2. Run proper size line (see specifications on *Page 9*) to pipe train on heater. Have a qualified gas service person inspect installation to be sure everything is installed according to local codes and ordinances.
3. After installation is complete check all connections for leaks.

Natural Gas Models

1. Natural gas models are similar to vapor models, but have a larger orifice to accommodate lower pressure, sometimes found with natural gas.
2. Run proper size line (see specifications on *Page 9*) to pipe train on heater. Have a qualified gas service person inspect installation to be sure everything is installed according to local codes and ordinances.
3. After installation is complete check all connections for leaks.

Electrical Connection

Always disconnect and lock out power before working on or around heater.

Standard electrical safety practices and codes should be used when working with a heater. Refer to the National Electric Code Standard Handbook by the National Fire Protection Association. *A qualified electrician should make all wiring installations.*

1. Connect power cord to fan control box.
2. Make field connections in fan box as shown in *Figure 5B on Page 12*.

   IMPORTANT: *Heater must be interlocked with fan for safe operation.*
3. Connect deluxe thermostat control (optional) as shown in *Figure 5B on Page 12*.

   IMPORTANT: *Thermostat must be installed for safe operation.*

   IMPORTANT: *Heater must be interlocked with fan for safe operation.*

Heater Power Connection

1. Connect power cord to fan control box.
2. Make field connections in fan box as shown in *Figure 5B on Page 12*.
3. Connect deluxe thermostat control as shown in *Figure 5B on Page 12*.

   IMPORTANT: *Thermostat must be installed for safe operation.*

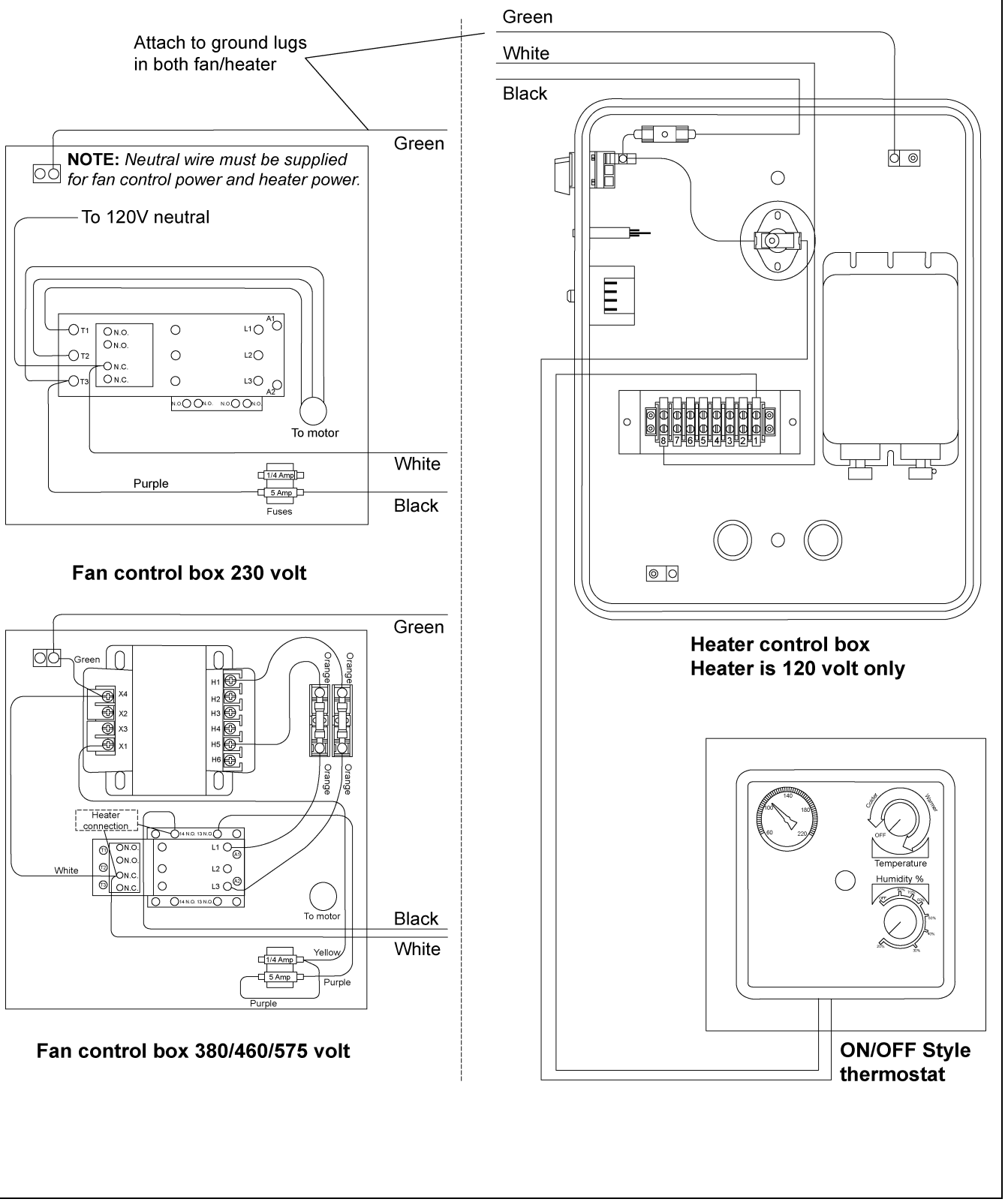


Figure 5B *Heater Wiring Installation on a Fan Unit*

Standard Heater - Second Heater Installation

Two (2) standard heaters may be connected to one grain drying system and wired so they cycle together. One of the heaters should have a thermostat connected to it as per the installation instructions. That heater will be referred to as the primary. The other heater (without the thermostat) will be referred to as the secondary.

1. Install relay base (TD-100283) in primary heater control box.
2. Connect wire between terminal 13 on relay base to terminal 6 on terminal strip in primary heater.
3. Connect wire between terminal 14 on relay base to terminal 3 on terminal strip in primary heater.
4. Run two (2) wires (18 gauge) between primary and secondary heater.
5. Connect wires to terminals 5 and 9 (points A and B) on relay base in primary heater.
6. Connect wire from terminal 9 in primary to terminal 5 (point F) in secondary unit.
7. Connect wire from terminal 5 in primary to terminal 8 (point G) in secondary unit.
8. Install relay (TD-100282) in relay base.

Follow these additional steps for HIGH-LOW units.

1. Install relay base (TD-100283) in master heater control box.
2. Connect wire between terminal 13 (point E) on relay base to green wire from HIGH-LOW thermostat in master unit. Do not disconnect other wires from green wire 3. Connect wire between terminal 14 on relay base to terminal 14 on other relay base in master heater.
3. Run two (2) wires (18 gauge) between master and slave heater.
4. Connect wires to terminals 5 and 9 (points C and D) on relay base in master heater.
5. Connect wire from terminal 9 in master to terminal 6 (point H) in slave unit.
6. Connect wire from terminal 5 in master to cycle solenoid and red light in slave unit. Do not connect wire to side of cycle solenoid and light that are connected to terminal.

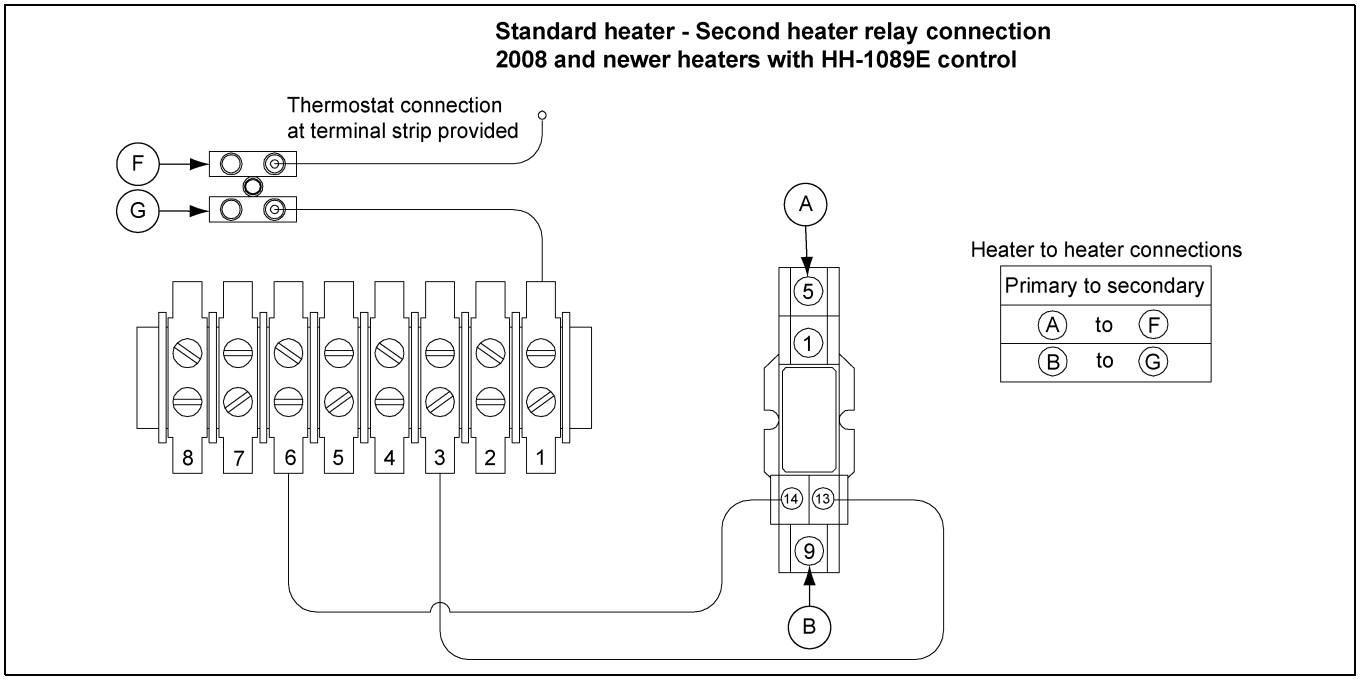


Figure 5C *Standard Heater - Second Heater Relay Connection*

Bin Configuration

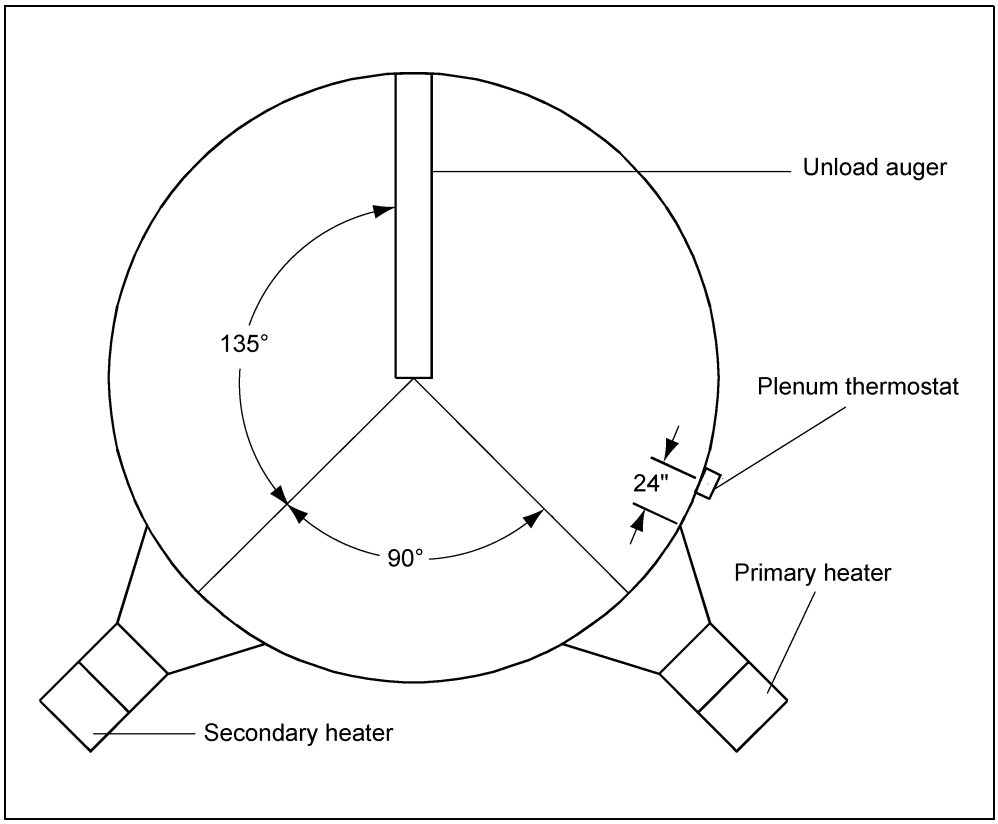


Figure 6A

IMPORTANT: *When mounting two (2) heaters on a bin it is imperative that they be situated as in Figure 6A. Plenum thermostat must be to the right of primary heater and primary heater must be to the right of secondary heater.*

Plenum Temperatures

IMPORTANT: *Do not exceed plenum temperatures listed in table below.*

Operating Temperature Table

	Low Temperature Batch	High Temperature Batch Dry No Stirring	High Temperature with Stirring	Continuous Flow (Recirculating)
Corn	5°-20° above Ambient Temperature	120°	140°	160°
Rice	5°-10° above Ambient Temperature	100°	100°	Not Recommended
Beans and Wheat	5°-20° above Ambient Temperature	110°	120°	Not Recommended

NOTE: *This table is not intended as a drying guide. It should be used as a reference for setting maximum plenum temperature for safe operation.*

Heater Operation

1. Thermostat must be wired into heater control box for heater to operate.
2. Open all manual shut off valves to heater unit.
3. Start fan. This will supply power to heater.
4. Turn thermostat dial to its highest setting.
5. Turn heater toggle switch to ON.
6. Heater should now be lit. If not, check to see that all gas is on and thermostat is wired in.
7. Watch thermometer on plenum and when it reaches desired temperature turn thermostat back slowly until heater cycles OFF.
8. Gas pressure should be adjusted so burner is on 75% of the time. (See charts on *Page 14*.)
9. Watch plenum temperature as burner goes through a few cycles to be sure it is operating properly.

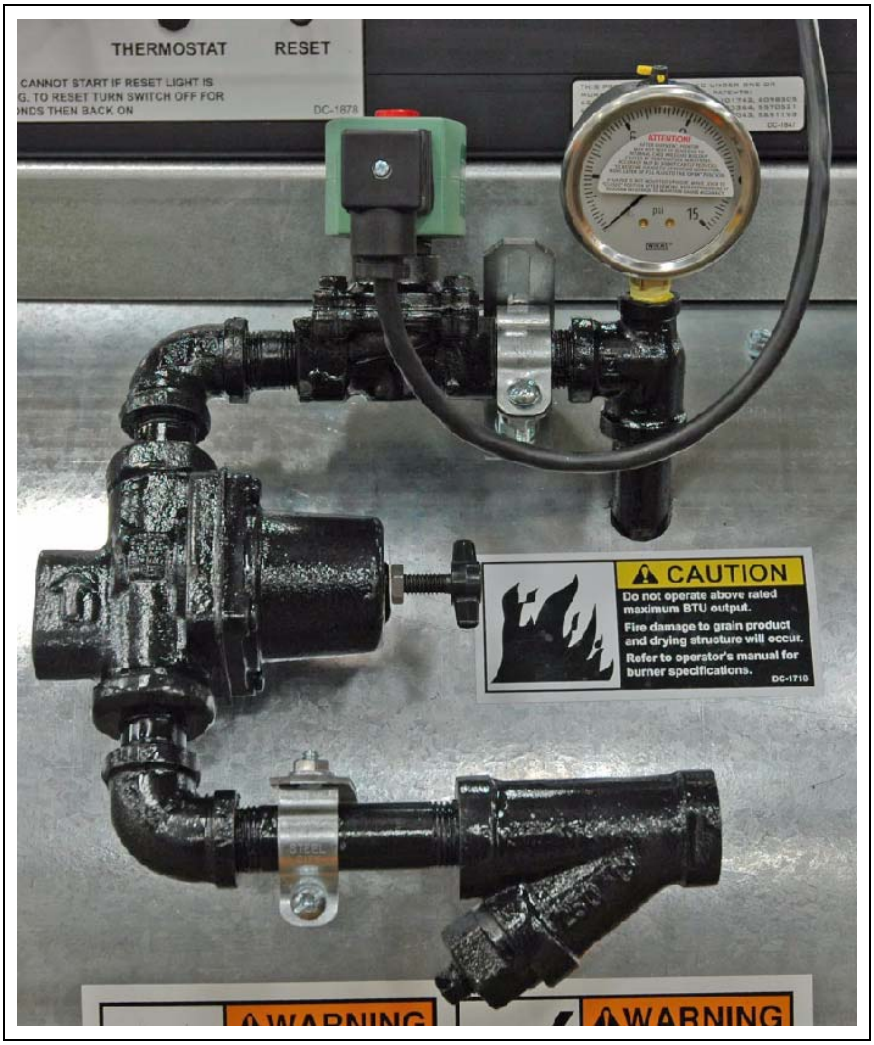


Figure 7A *Propane Vapor Pipe Train*

BTU's per Gauge Pressure (PSI) - Propane Models Approximate

Operating Pressure (PSI)												
1	2	3	4	5	6	7	8	9	10	12	14	15
294,339	416,382	509,709	588,678	658,075	720,293	777,725	832,764	880,624	930,877	1,019,418	1,100,780	1,136,675

Gauge Pressure (PSI) Required to Maintain Temperatures (Approximate)

Fan Model	Static Pressure	Heat Rise °F						
		20	30	40	50	60	70	80
10 HP	2	1	2	4	5	8	10	14
	3	1	2	3	5	7	9	12
	4	1	2	3	4	6	8	12
	5	1	2	3	4	5	7	9
15 HP	2	2	3	6	8	12	-	-
	3	2	3	5	8	12	14	-
	4	1	3	4	7	9	14	-
	5	1	2	4	6	8	10	14
20 HP	3	2	4	7	12	-	-	-
	4	2	4	7	10	15	-	-
	5	2	4	6	10	14	-	-
	6	2	3	6	9	12	-	-
25 HP	3	3	6	12	-	-	-	-
	4	3	6	10	-	-	-	-
	5	3	5	9	14	-	-	-
	6	2	5	8	14	-	-	-
30 HP	4	3	7	12	-	-	-	-
	6	3	6	10	-	-	-	-
	8	3	5	9	14	-	-	-
	10	2	4	6	9	14	-	-
40 HP	4	5	12	-	-	-	-	-
	6	4	9	-	-	-	-	-
	8	4	8	14	-	-	-	-
	10	3	6	10	15	-	-	-

BTU's per Gauge Pressure (PSI) - Natural Gas Models Approximate

Operating Pressure (PSI)							
1	2	3	4	5	6	7	8
397,280	562,640	688,480	793,520	888,160	973,440	1,051,440	1,126,320

Gauge Pressure (PSI) Required to Maintain Temperatures (Approximate)

Fan Model	Static Pressure	Heat Rise °F						
		20	30	40	50	60	70	80
10 HP	2	1	1	2	3	4	6	7
	3	1	1	2	3	4	5	7
	4	1	1	2	3	4	5	6
	5	1	1	2	2	3	4	5
15 HP	2	1	2	3	5	7	-	-
	3	1	2	3	4	5	8	-
	4	1	2	3	4	5	7	-
	5	1	2	2	3	5	6	8
20 HP	3	1	3	4	6	-	-	-
	4	1	2	4	6	8	-	-
	5	1	2	4	6	8	-	-
	6	1	2	3	5	7	-	-
25 HP	3	2	4	6	-	-	-	-
	4	2	3	6	-	-	-	-
	5	2	3	5	8	-	-	-
	6	2	3	5	7	-	-	-
30 HP	4	2	4	7	-	-	-	-
	6	2	4	6	-	-	-	-
	8	2	3	5	7	-	-	-
	10	1	2	4	5	7	-	-
40 HP	4	3	6	-	-	-	-	-
	6	3	5	-	-	-	-	-
	8	2	4	8	-	-	-	-
	10	2	3	5	8	-	-	-

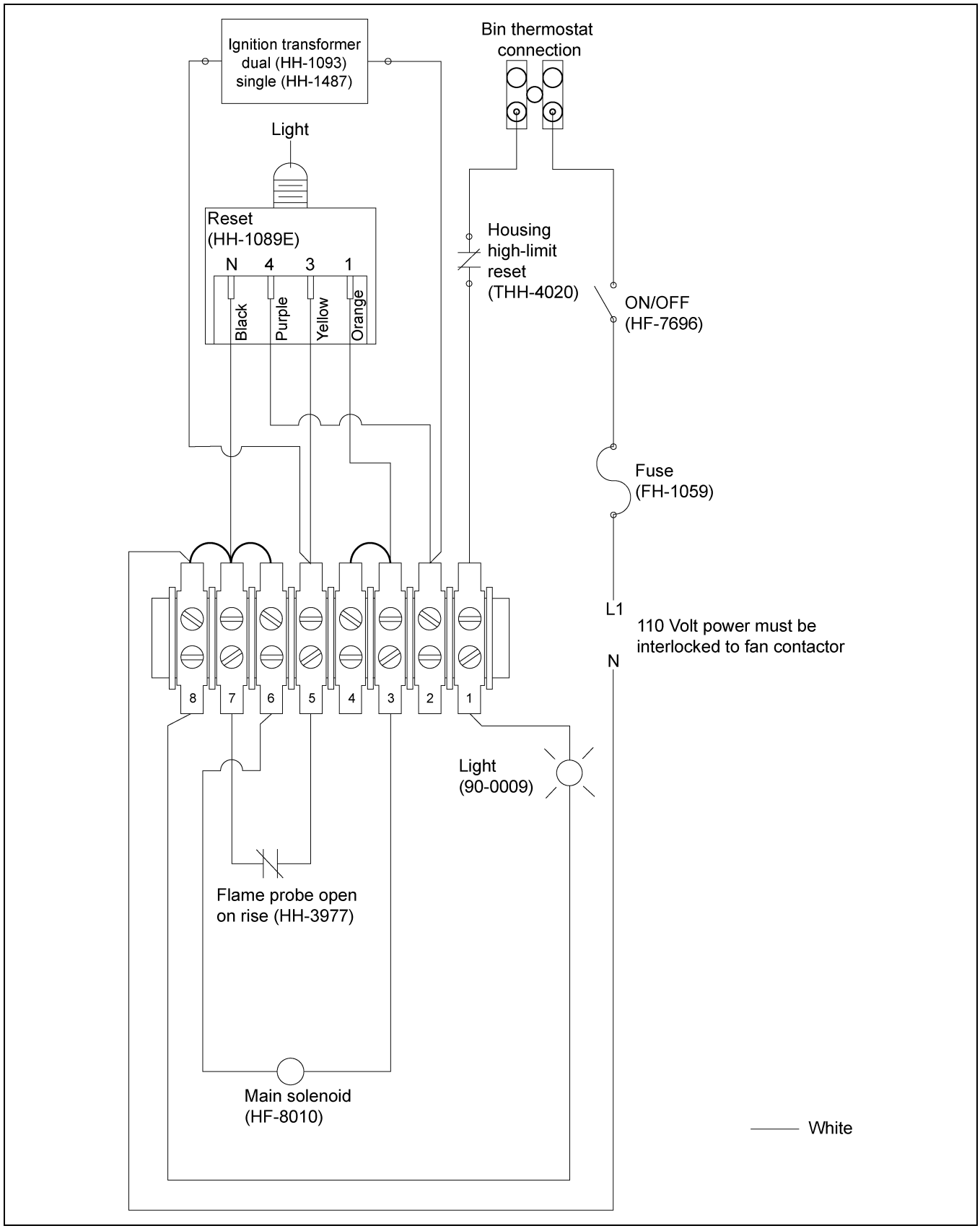
8. Heater Service

All heaters are constructed of durable weather-resistant materials, so a minimum amount of service should be required. Before the unit is started for the first time each season there are a few items that need to be checked out. All damaged parts should be repaired or replaced.

1. Disconnect and lock out power to fan and heater. Open control box lid and inspect all components for moisture, vibration or rodent damage. Inspect and tighten all loose terminal connections. Replace any damaged wiring.
2. Remove burner orifice tube and inspect for dirt or foreign material. Clean out if necessary.
3. Inspect holes in burner ring for possible corrosion or plugging with dirt or rust. Clean if necessary.
4. Be sure primary air inlet screen is intact and clean for proper burn.
5. Check perforated ring on natural gas models to be sure it is clean and no holes are plugged.
6. Inspect flame probe and ignitor and adjust or replace if necessary.

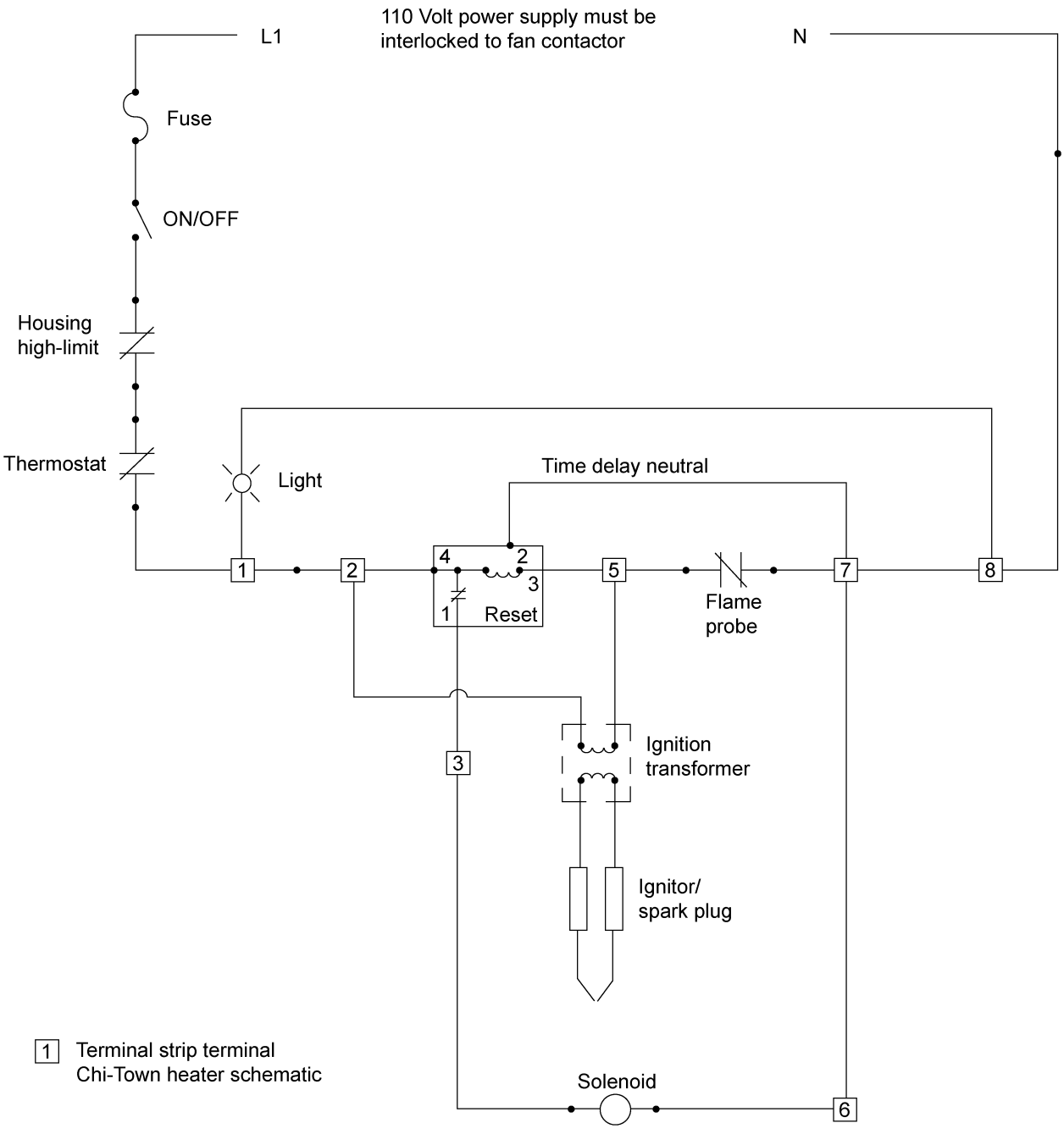
Always disconnect and lock out power before working on or around heater.

Standard Heater Wiring



NOTE: *Move transformer wire from terminal 5 to 8 for continuous spark.*

Standard Heater Schematic



NOTE: *Move transformer wire from terminal 5 to 8 for continuous spark.*

Time Delay Reset (HH-1089E) Operation

The electronic time delay will indicate the operating condition of the heater through the LED light shown in *Figure 11A*. This light should be on the exterior control panel of the heater when the unit is installed correctly. This light is very helpful in identifying the status of the flame probe (open or closed) and will indicate a lock out condition.

Start-Up

The light should be ON when the ON/OFF switch is set to ON. This indicates that the heater has power and the flame probe is closed. The gas solenoid should open and ignitor should spark. The light will remain on until the flame probe opens. The light should go OFF if flame is established within the 30 second trial for ignition.

If flame is not present or the probe does not open, then the light will blink continuously after the 30 second time period. It will blink continuously until the heater is reset.

Turn power OFF for 10 second to reset a lock out condition. The light will stop blinking after the 10 second time period. The heater cannot be restarted if the light is blinking continuously.

Thermostat Cycle

The heater thermostat will cycle the gas solenoid OFF when temperature is reached. The flame probe should cool to a closed condition when this occurs. The thermostat will also cool to a closed condition with a drop in plenum temperature. The thermostat closure is a call for heat and the normal start-up for the time delay begins again.

A condition can occur where the thermostat can call for heat before the flame probe cools to a closed condition. The light ON the time delay will flash once at thermostat closure and remain OFF until the flame probe closes again. The heater will not operate until this “closed” condition of both switches is achieved.

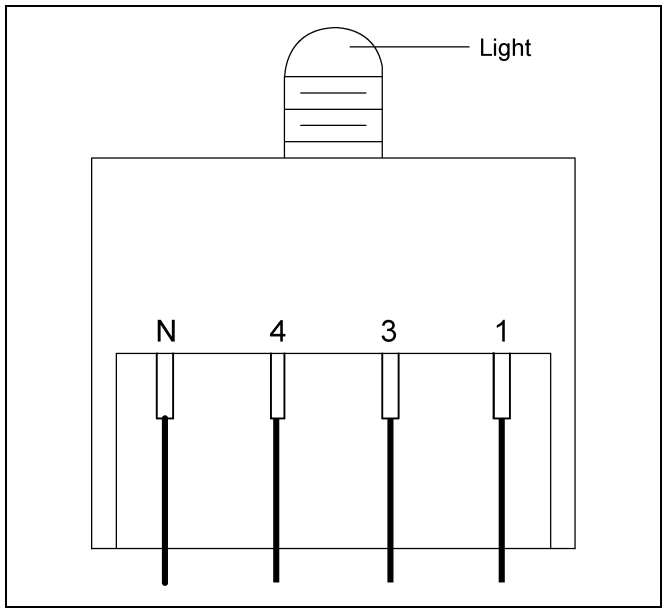


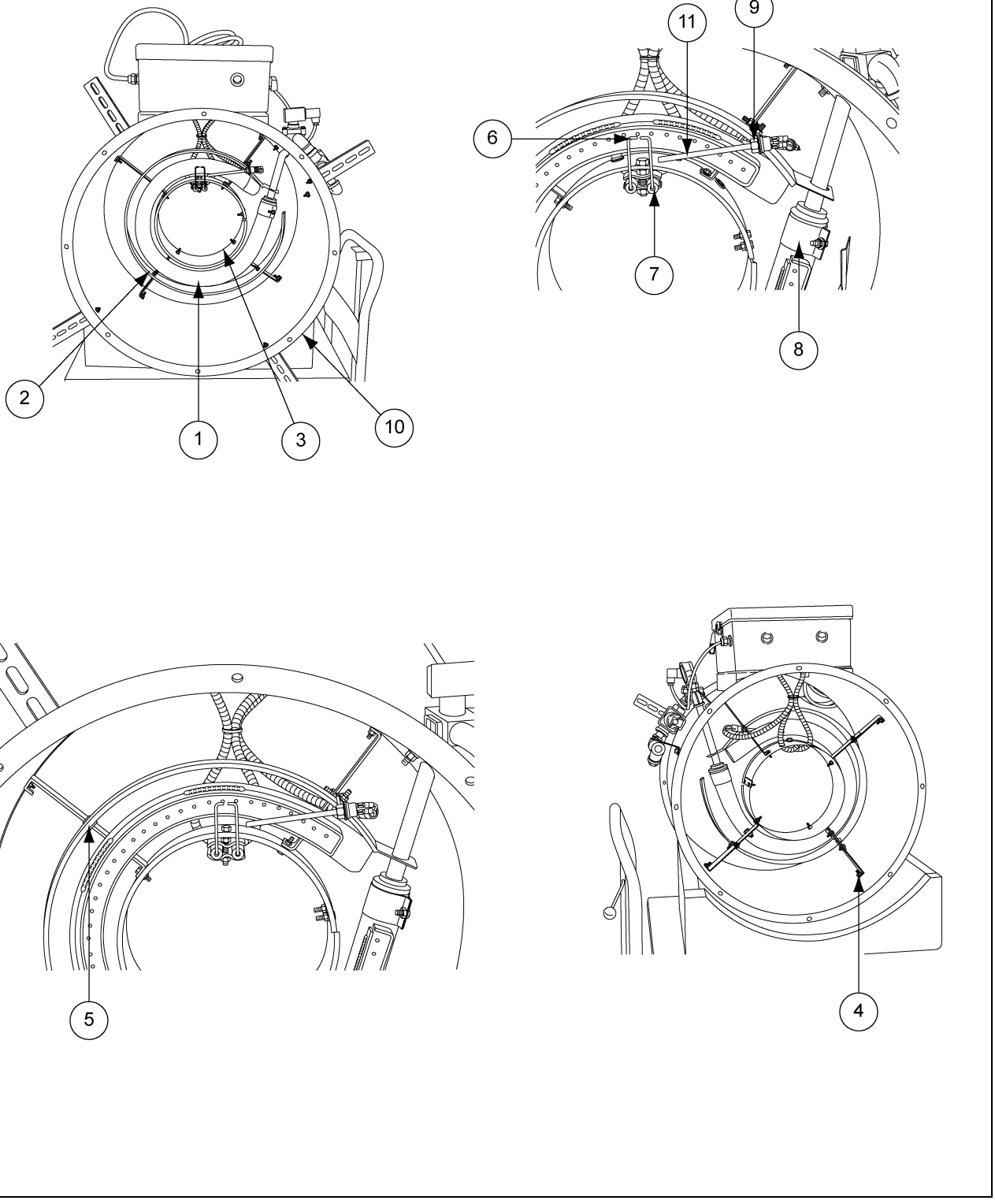
Figure 11A *Flame Probe Light ON Time Delay*

Light Status	Indication
ON	Flame probe is closed. Time delay in 30 second trial for ignition period.
OFF	Normal operation with flame present. Flame probe open. Thermostat closed. Normal operation with no flame present. Flame probe open. Thermostat open.
BLINKING	Lock out: Flame probe closed after 30 second. To reset: Turn power OFF. Wait 10 second. Turn power ON.

Trouble	Probable Cause	Check-out Procedure
Burner will not fire. No gas pressure on gauge. No ignition spark.	1. Heater not wired.	1. Visually check fan control box to see if wires are connected.
	2. Fan not running.	2. Fan contactor must be energized for heater to run.
	3. Blown fuse.	3. Visually check fuse.
	4. Bad ON/OFF switch.	4. Check ON/OFF switch contact block for proper installation and continuity. Check for power on terminals 1 and 8.
	5. Housing high-limit switch.	5. Reset switch. Check for power on terminals 1 and 8.
	6. Thermostat open.	6. Plenum temperature above set point temperature or open circuit.
	7. Flame probe open.	7. Remove wires from flame probe and check with ohm meter. Probe should be closed when cold.
Burner will not fire. No gas pressure on gauge. Constant ignition spark.	1. Electronic time delay.	1. Time delay is in lock out or not receiving power.
	2. Gas supply.	2. Make sure all valves are open to heater and gas tank is not empty.
Burner will not fire. Gas pressure on gauge. No ignition spark.	1. Loose wire.	1. Check for power on terminals 2 and 5. Look for loose wires or incorrect wiring.
	2. Ignitor/spark plug.	2. Turn gas OFF to heater. Check gap on ignitor. Check porcelain for any sign of cracks. Remove plug wire from spark plug/ignitor. Carefully holding wire by insulation. Try to get an arc between end of wire and heater housing (or other wire using 2 pole transformer).
	3. Ignition transformer/wire.	3. Turn gas OFF to heater. If no spark present after checking ignitor, remove wire from ignition transformer. Check for spark at ignition transformer with an insulated screwdriver. Spark should jump a minimum 1/4" gap. Replace transformer if no spark is established, replace the ignition wires.
Burner will not fire or fires for 30 second and locks out. Gas pressure on gauge. Spark is ON.	1. Plugged orifice.	1. Check for gas at burner. If no gas, remove pipe train and check orifice and burner ring for blockage.
	2. Flame probe.	2. Check to be sure flame probe is in good condition and is located in flame. Flame probe contacts should open when probe gets hot.
	3. Incorrect supply voltage.	3. Voltage to heater must be 110V AC.
	4. Regulator set too low.	4. See that flame burns continuous and is not intermittent. On ring burners be sure flame burns completely around ring.
	5. Moisture in fuel.	5. Have tank and lines checked by a qualified gas service man.

1. **Gas Heater Parts (HF-7385)**
2. **Control Box Parts (HF-8084)**
3. **Pipe Train Parts (HF-7712 and HF-7713)**

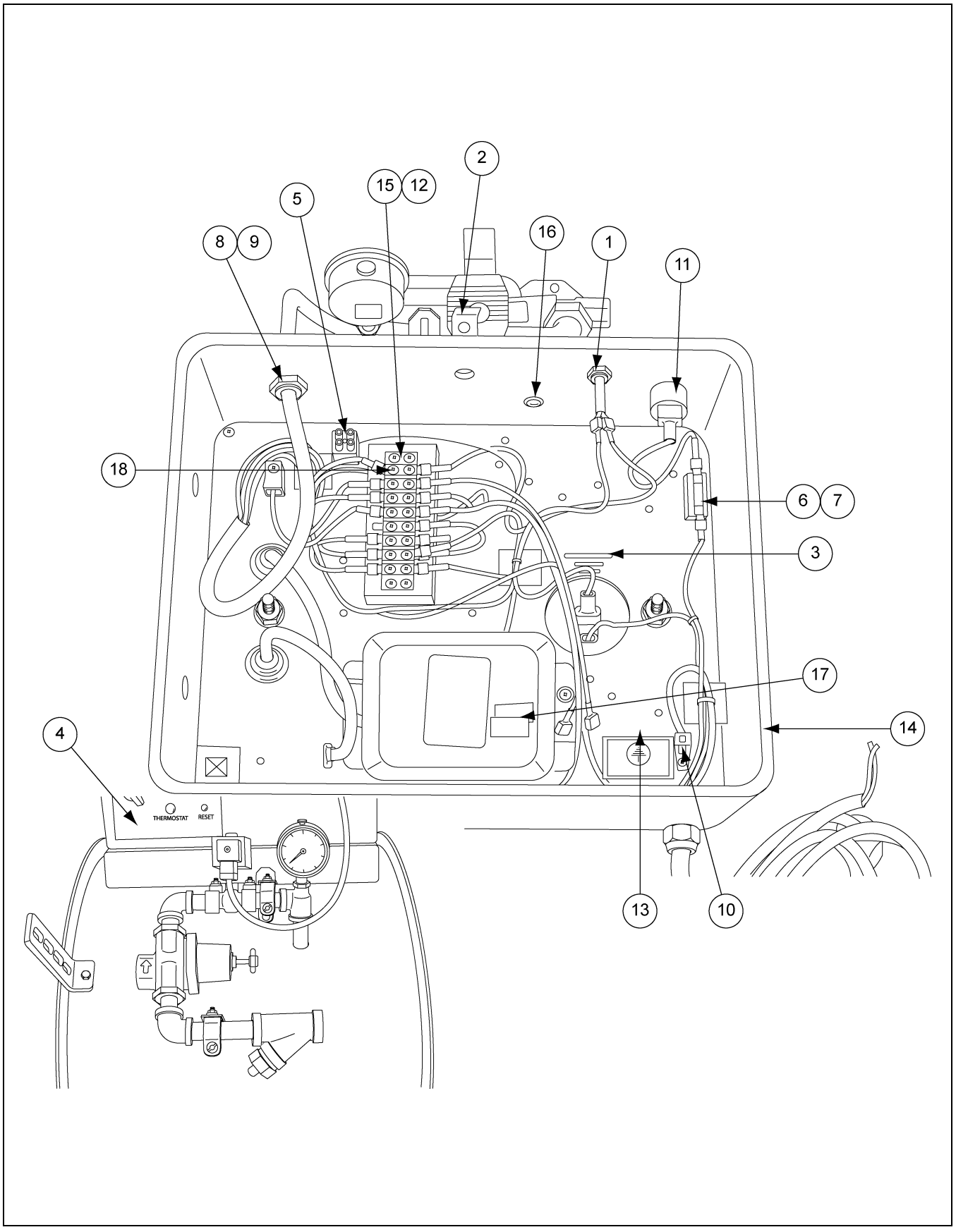
Gas Heater Parts (HF-7385)



Gas Heater (HF-7385) Parts List

Ref #	Part #	Description	Qty
1	HF-7147	Chi-Town Burner Weldment	1
2	HF-7157	Outer Air Deflector	1
3	HF-7158	Inner Air Deflector	1
4	HF-7159	Burner Mounting Bracket	4
5	HF-7160	Outer Air Deflector Bracket	4
6	HF-7373	Ignitor Pair: Chi-Town R.H. and L.H.	1
7	HF-7375	Chi-Town Ignitor Bracket	2
8	HF-7636	Burner Pipe Band: Chi-Town	1
9	HF-8028	Flame Probe Bracket - Chi-Town w/ GFS	1
10	HF-8080	Wrapper Chi-Town Heater	1
11	HH-3977	Flame Switch N/ Closed 3/8"-24	1
N/S	S-1101	Bolt, HHCS 1/4"-20 x 1/2" ZN Grade 2	1
N/S	S-3611	Flange Nut 5/16"-18 YDP Grade 2	8
N/S	S-456	Hex Nut 3/8"-16 YDP Grade 5	2
N/S	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5	8
N/S	S-7215	Flange Nut 1/4"-20 ZN	17
N/S	S-845	Flat Washer 5/16" USS SAE YDP Grade 2	8
N/S	S-8680	Flange Bolt 1/4"-20 x 3/4" ZN Grade 5	16
N/S	S-9303	Flange Bolt 3/8"-16 x 1-1/2" Grade 8	1
N/S	S-9345	Hex Nut 3/8"-24 SS	1
N/S	D02-0026	Bushing, 1/2" Plastic	3
N/S	D03-0247	Tie, Wire 5" Panduit # Plate 1-1/2 M-M	15
N/S	DC-113	Decal, Air Flow	1
N/S	DC-1559	Decal, Warning: DC-1225/DC-1227	1
N/S	DC-1718	Decal, Warning Heater Fire	1
N/S	HF-7377	Bushing, Dravo 9/16" Chi-Town	2
N/S	HF-7758	Adapter Plate GRP: 26" Heater	1

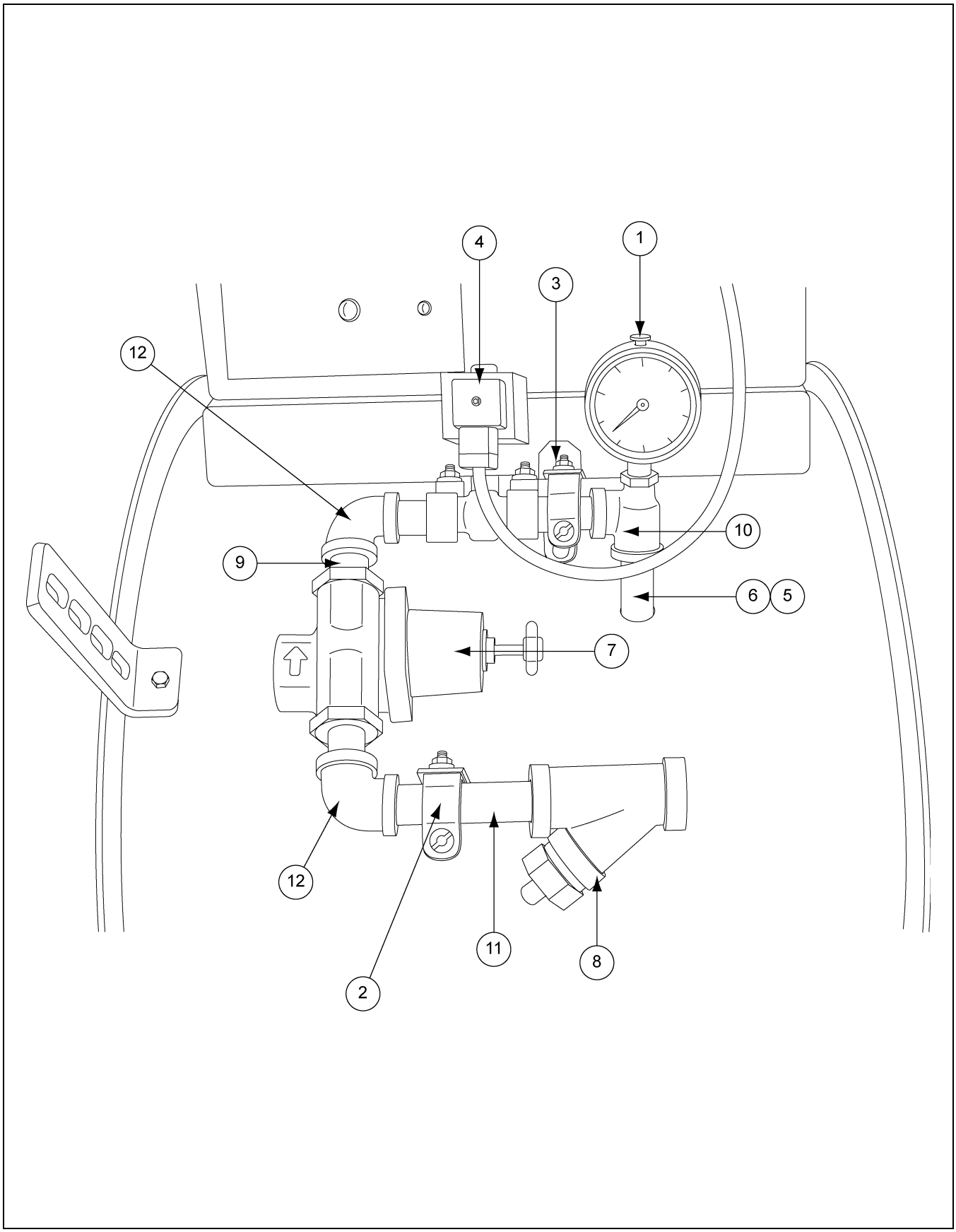
Control Box Parts (HF-8084)



Control Box (HF-8084) Parts List

Ref #	Part #	Description	Qty
1	90-0009	Light Oil Tight 1/4" TAB 120V Amber	1
2	D03-0696	Farm Fans Control Box Latch	2
3	DC-108	Decal, High-Limit Button	1
4	DC-1878	Decal: Heater Standard w/ Reset	1
5	E240-1107	Connector, T.B., 12 Pole, 10A, 12 Gauge	0.16667
6	FH-1058	Fuse Block	0.5
7	FH-1059	5 Amp Fuse	2
8	FH-1309	Lock Nut 1/2" with Pipe Threads	2
9	FH-1310	Cord Connector, HEYCO #3231	2
10	FH-6634	Guard, ITT Blackburn Ground Lug ADR-6	2
11	HF-7696	Switch 2 Position Selector: Lever	1
12	HF-7697	Bracket Standard Term Strip	1
13	HF-7698	Backing Plate - Heater Controls	1
14	HF-7718	Axial Heater Box - CNC OPS	1
15	HF-8077	Connector, Terminal Block 8 Pole w/ Slides	1
16	HH-1089E	Switch, Reset - Time Delay Electr	1
17	HH-1093-GRP	GRP - Transformer 2 Pole Ignition	1
18	TFC-0048	Disconnect 1/4 Insulation Female CSA	4
N/S	DC-1891	Decal, Terminal Label - HH-1089E	1
N/S	PNEG-1530	HH-1089E Wiring Instructions	1
N/S	S-9111	Screw, TCSF #6-32 x 3/4" PHP ZN	1
N/S	HH-2833	Plug 1/2" Diameter Plastic Hole	1
N/S	006-1363-8	Sealing Washer 0.85 I.D. Black	1
N/S	069-1376-8	Cover, Control Box Lid - Poly Blank	1
N/S	090-1699-9	Rivet, Poe 1/8 Diameter x 0.775 Long Arsm 0.501-0.625 Grip Range	4
N/S	090-1701-3	Screw, MS #10-24 x 1/2" PHS ZN	4
N/S	090-1705-4	Screw, MS #8-32 x 3/8" Phillips PHSEMS	4
N/S	420-1422-5	Decal, 115 Volt 1 Phase	1
N/S	D02-0039	Wire Tie Anchors	6
N/S	D03-0247	Tie, Wire 5" Panduit # Plate 1-1/2 M-M	35
N/S	DC-1224	Decal, Danger High Voltage (LG)	1
N/S	DC-1254	Decal, Ground Lug 24 per Sheet	0.05
N/S	DC-1702	Decal, Caution Use TSTAT w/ Heater	1
N/S	DC-1879	Decal, Standard Heater Wiring w/ Reset	1
N/S	DC-889	Decal, Danger High Voltage	1
N/S	E105-1110	Wire Kit - Chi-Town in Black Box	1
N/S	LABEL-STD	Wire Labels Standard Heater CB	1
N/S	PNEG-297	Manual, Heater GSI Chi-Town	1
N/S	S-2786	Screw, TCSF #8-32 x 3/8" PHP ZN	3
N/S	S-3674	Flat Washer #10 x 7/32" I.D. x 1/2" O.D. x 18 Gauge TSAE ZN Grade 2	2
N/S	S-7192	Screw, TCSF #8-32 x 5/8" PHP ZN	4

Pipe Train Parts (HF-7712 and HF-7713)



Pipe Train (HF-7712 and HF-7713) Parts List

Ref #	Part #	Description	Qty
1	D08-0022	Gauge, Pressure 0-15# Bottom Mount Liquid Filled	1
2	HF-1026	Pipe Train Bracket: VA Heaters	2
3	HH-1096	Clamp, 1/2" Conduit	2
4	056-2222-0	Valve, Solenoid 1/2" NPT 115V Din	1
5	HF-7161	Chi-Town Orifice Pipe: 9.00"	1
6	HF-7714	Orifice (1/2) Drilled 11/64"	1
7	HH-1077	Regulator, 1/2" E-75	1
8	HH-1251	Strainer, 1/2" Y 250# WOG SCH 80 Black	1
9	HH-2029	Nipple, 1/2" x 1-1/2" SCH 40 Black	3
10	S-3853	Tee, 1/2" x 1/4" x 1/2" SCH 40 Black	1
11	THH-4061	Nipple, 1/2" x 3-1/2" SCH 40 Black	1
12	THH-4071	Elbow, 1/2"-90° SCH 40 Black	2
N/S	THH-4128	Nipple, 1/2" x 2" SCH 40 Black	1
N/S	DC-1461	Decal, Tag Attention Pressure Gauges Paper Tag Telling to Punch	1
N/S	S-1101	Bolt, HHCS 1/4"-20 x 1/2" ZN Grade 2	2
N/S	S-3611	Flange Nut 5/16"-18 YDP Grade 2	2
N/S	S-6606	Flange Bolt 5/16"-18 x 3/4" ZN Grade 5	2
N/S	S-7215	Flange Nut 1/4"-20 ZN	2

NOTES

GSI Group, LLC Limited Warranty

The GSI Group, LLC ("GSI") warrants products which it manufactures to be free of defects in materials and workmanship under normal usage and conditions for a period of 12 months after sale to the original end-user or if a foreign sale, 14 months from arrival at port of discharge, whichever is earlier. The end-user's sole remedy (and GSI's only obligation) is to repair or replace, at GSI's option and expense, products that in GSI's judgment, contain a material defect in materials or workmanship. Expenses incurred by or on behalf of the end-user without prior written authorization from the GSI Warranty Group shall be the sole responsibility of the end-user.

Warranty Extensions:

The Limited Warranty period is extended for the following products:

	Product	Warranty Period
AP Fans and Flooring	Performer Series Direct Drive Fan Motor	3 Years
	All Fiberglass Housings	Lifetime
	All Fiberglass Propellers	Lifetime
Cumberland Feeding/Watering Systems	Feeder System Pan Assemblies	5 Years **
	Feed Tubes (1-3/4" and 2.00")	10 Years *
	Centerless Augers	10 Years *
	Watering Nipples	10 Years *
Grain Systems	Grain Bin Structural Design	5 Years
Grain Systems Farm Fans Zimmerman	Portable and Tower Dryers	2 Years
	Portable and Tower Dryer Frames and Internal Infrastructure †	5 Years

* Warranty prorated from list price:
0 to 3 years - no cost to end-user
3 to 5 years - end-user pays 25%
5 to 7 years - end-user pays 50%
7 to 10 years - end-user pays 75%

** Warranty prorated from list price:
0 to 3 years - no cost to end-user
3 to 5 years - end-user pays 50%

† Motors, burner components and moving parts not included. Portable dryer screens included. Tower dryer screens not included.

GSI further warrants that the portable and tower dryer frame and basket, excluding all auger and auger drive components, shall be free from defects in materials for a period of time beginning on the twelfth (12^{th}) month from the date of purchase and continuing until the sixtieth (60^{th}) month from the date of purchase (extended warranty period). During the extended warranty period, GSI will replace the frame or basket components that prove to be defective under normal conditions of use without charge, excluding the labor, transportation, and/or shipping costs incurred in the performance of this extended warranty.

Conditions and Limitations:

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY DESCRIPTION SET FORTH ABOVE. SPECIFICALLY, GSI MAKES NO FURTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH: (I) PRODUCT MANUFACTURED OR SOLD BY GSI OR (II) ANY ADVICE, INSTRUCTION, RECOMMENDATION OR SUGGESTION PROVIDED BY AN AGENT, REPRESENTATIVE OR EMPLOYEE OF GSI REGARDING OR RELATED TO THE CONFIGURATION, INSTALLATION, LAYOUT, SUITABILITY FOR A PARTICULAR PURPOSE, OR DESIGN OF SUCH PRODUCTS.

GSI shall not be liable for any direct, indirect, incidental or consequential damages, including, without limitation, loss of anticipated profits or benefits. The sole and exclusive remedy is set forth in the Limited Warranty, which shall not exceed the amount paid for the product purchased. This warranty is not transferable and applies only to the original end-user. GSI shall have no obligation or responsibility for any representations or warranties made by or on behalf of any dealer, agent or distributor.

GSI assumes no responsibility for claims resulting from construction defects or unauthorized modifications to products which it manufactured. Modifications to products not specifically delineated in the manual accompanying the equipment at initial sale will void the Limited Warranty.

This Limited Warranty shall not extend to products or parts which have been damaged by negligent use, misuse, alteration, accident or which have been improperly/inadequately maintained. This Limited Warranty extends solely to products manufactured by GSI.

Prior to installation, the end-user has the responsibility to comply with federal, state and local codes which apply to the location and installation of products manufactured or sold by GSI.

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This equipment shall be installed in accordance with the current installation codes and applicable regulations which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

GSI GROUP

GSI Group
1004 E. Illinois St.
Assumption, IL 62510-0020
Phone: 1-217-226-4421
Fax: 1-217-226-4420
www.gsiag.com

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