OWNER'S MANUAL

Chi-Town Heater
INSTALLATION AND OPERATION
PNEG-#297

Model #: _____

_____ 1. All wire connections

_____ 2. Ignitor gap - .125

_____ 3. Pipetrain tightness and gas leaks

_____ 4. Flame probe adjusted

_____ 5. Fuse in place, extra fuse provided

_____ 6. Reset kicks out after 60 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_____

TABLE OF CONTENTS

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 available in both propane vapor and natural gas models.

The principal concern of the The GSI Group Inc. ("GSI") is your safety and the safety of others associated with grain handling equipment. This manual is written to help you understand safe operating procedures, and some of the problems that may be encountered by the operator or 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 who are in the dryer area. Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation, where serious injury or death may occur.

Roof Damage Warning And Disclaimer

GSI 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. GSI 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.

SAFETY FIRST
General Safety Statements

The GSI Group Inc's Principal concern is your safety and the safety of others associated with grain handling 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 inform all personnel associated with, or in the area of the product. Safety precautions may be required from the personnel. This product is ideal for the conditioning of corn, soy beans or other select grains. Avoid any alteration to the equipment, such alterations may produce a very dangerous situation, where serious injury or death may occur.

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

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

WARNING

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

CAUTION

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

CAUTION

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

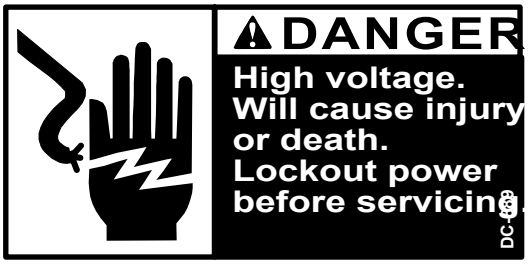
If a decal is damaged or missing contact:
The GSI Group Inc.
1004 E. Illinois St.
Assumption, IL 62510
217-226-4421
A free replacement will be sent to you.

BE ALERT!
Danger!

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

The GSI Group Inc. recommends that you contact your local power company and have a representative review your installation so your wiring will be compatible with their system and so that you will have adequate power supplied to your unit.


WARNING
Stay clear of rotating blade. Blade could start automatically. Can cause serious injury. Disconnect power before servicing.
DC-1225


DANGER
High voltage. Will cause injury or death. Lockout power before servicing.
DC-1228


WARNING
Flame and pressure beyond door. Do not operate with service door removed. Keep head and hands clear. Can cause serious injury.
DC-1227

Heater Specifications

Common Measurements

Inside Diameter	25-7/8"
Bolt Circle Diameter	27-3/16"
Length	13-1/2"
Weight	73 lbs

Vapor Models

Med-Temp

Orifice (inches)	11/64
Maximum Fuel Flow (CFH)	460
Min. Operating Pressure (psi)	1
Max. Operating Pressure (psi)	10
Min. Supply Line (inches)	1/2
BTU Rating @ Max. Pressure	1,100,000

Lo-Temp

Orifice (inches)	3/32
Maximum Fuel Flow (CFH)	167
Min. Operating Pressure (psi)	1
Max. Operating Pressure (psi)	10
Min. Supply Line (inches)	1/2
BTU Rating @ Max. Pressure	400,000

Natural Gas Models

Med-Temp

Orifice (inches)	17/64
Maximum Fuel Flow (CFH)	1100
Min. Operating Pressure (psi)	1
Max. Operating Pressure (psi)	4
Min. Supply Line (inches)	3/4
BTU Rating @ Max. Pressure	1,100,000

Lo-Temp

Orifice (inches)	11/64
Maximum Fuel Flow (CFH)	400
Min. Operating Pressure (psi)	1
Max. Operating Pressure (psi)	4
Min. Supply Line (inches)	3/4
BTU @ Max. Pressure	400,000

Heater Installation

1. Install three(3) mounting brackets on fan as indicated by the arrows shown in figure 2. Install loosely.

2. Set heater in place and install fourth (4) mounting bracket.

3. Level heater and tighten mounting brackets.

4. Attach heater to mounting brackets using self-drilling screws.

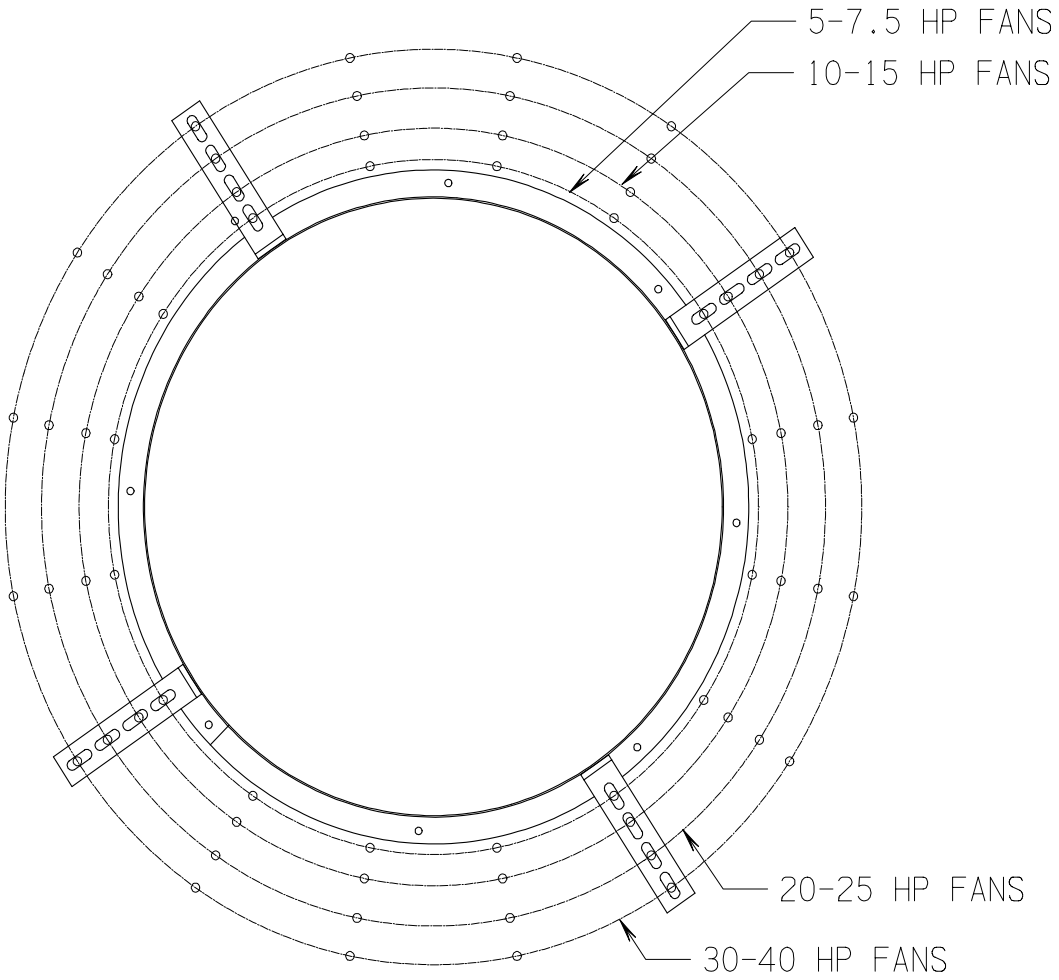


Figure 1: Heater mounting brackets illustration.

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 L.P. Association.

Investigate to be sure that the fuel supply system complies with all local codes for L.P. 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 specification on page 6) to pipetrain 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 6) to pipetrain 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 2. ***IMPORTANT!*** *Heater must be interlocked with fan for safe operation.*
3. Connect deluxe thermostat control (optional) as shown in Figure 2. ***IMPORTANT!*** *Thermostat must be installed for safe operation.*

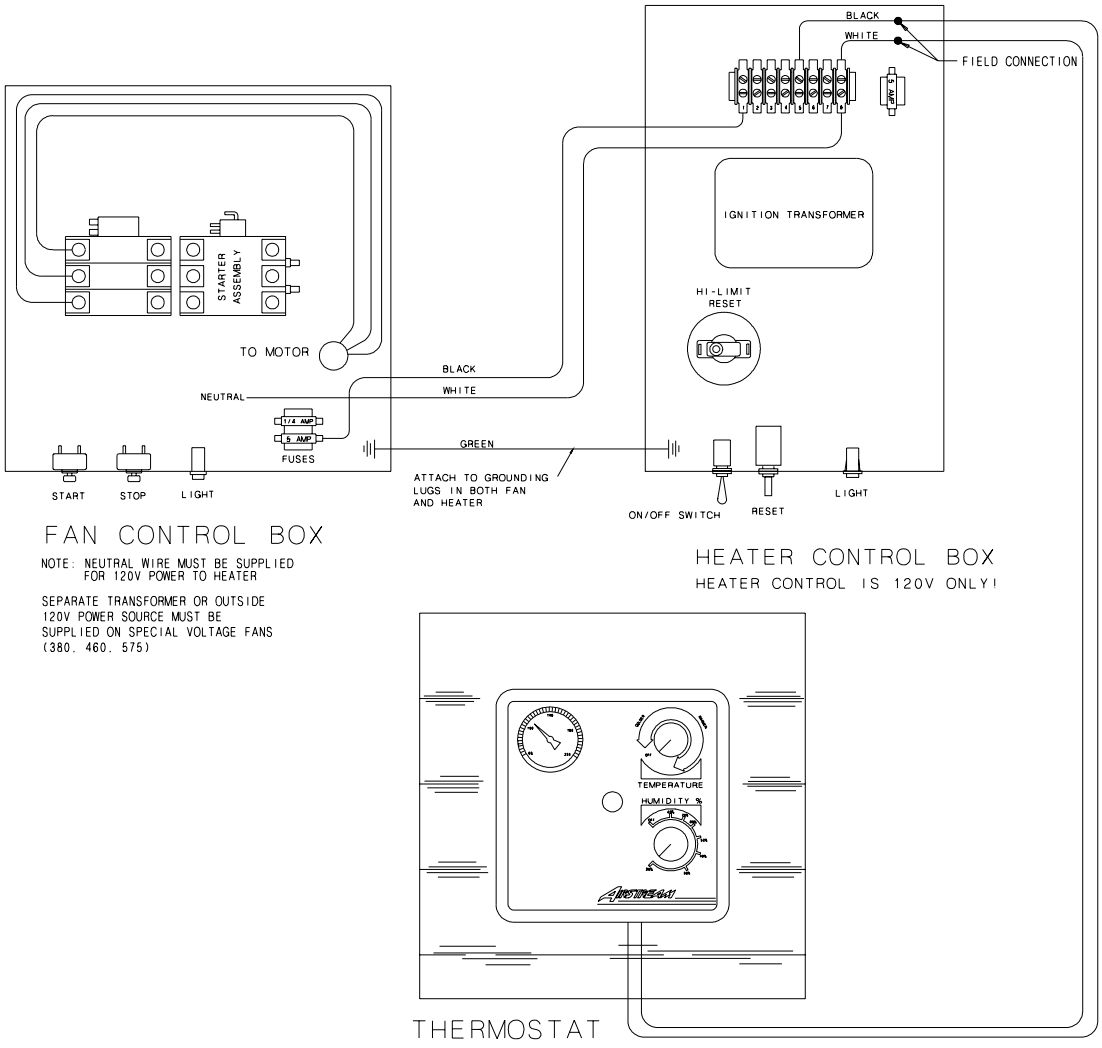


Figure 2: Illustration of Heater wiring installation on a fan unit.

Second Heater Installation

Two 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 master. The other heater (without the thermostat) will be referred to as the slave.

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

Follow these additional steps for HI-LO 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 HI-LO 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.
4. Run 2 wires (18 gauge) between master and slave heater.
5. Connect wires to terminals 5 and 9 (points C and D) on relay base in master heater.
6. Connect wire from terminal 9 in master to terminal 6 (point H) in slave unit.
7. 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.

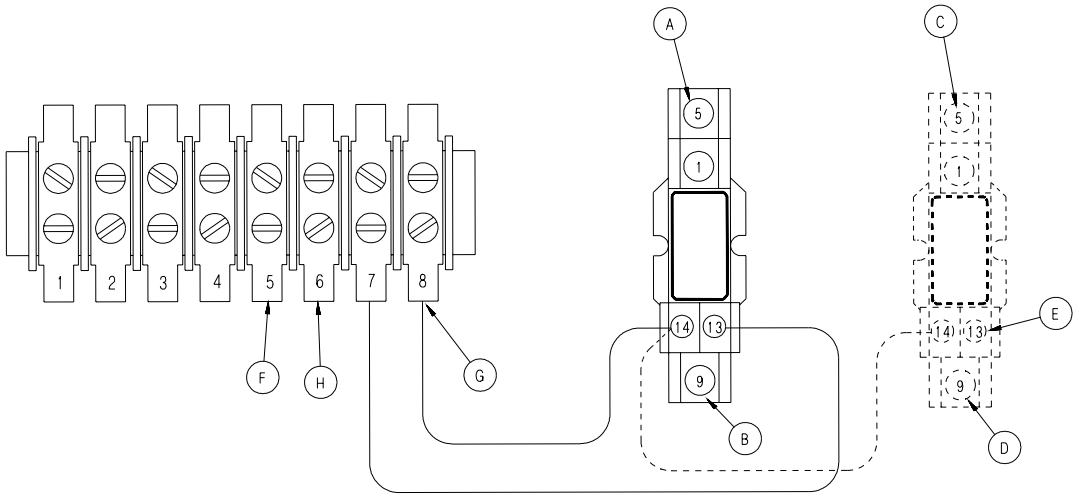
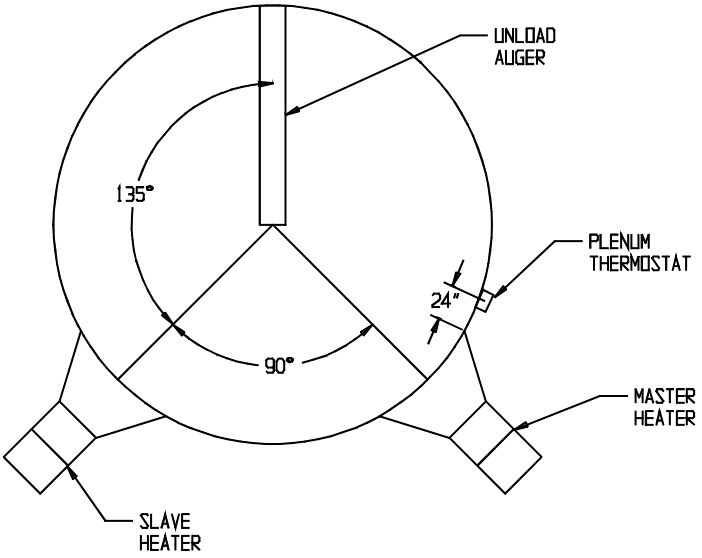


Figure 2: Illustration of second heater wiring.

Bin Configuration



IMPORTANT!
When mounting (2) heaters on a bin it is imperative that they be situated as in above drawing. Plenum thermostat must be to the right of master heater and master heater must be to the right of slave heater.

Plenum Temperatures

Operating Temperature Table

	LO-TEMP BATCH	HIGH-TEMP BATCH DRY NO STIRRING	HIGH-TEMP WITH STIRRING	CONTINUOUS FLOW (RECIRCULATING)
CORN	5-20^0 ABOVE AMBIENT TEMP	120^0	140^0	160^0
RICE	5-10^0 ABOVE AMBIENT TEMP	100^0	100^0	NOT RECOMMENDED
BEANS & WHEAT	5-20^0 ABOVE AMBIENT TEMP	110^0	120^0	NOT RECOMMENDED

IMPORTANT!
DO NOT EXCEED PLENUM TEMPERATURES LISTED IN TABLE

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 intoheater 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 pages 11 and 12)

9. Watch plenum temperature as burner goes through a few cycles to be sure it is operating properly.

View of propane vapor pipetrain.

BTUs Per Gauge Pressure (psi) - Propane Models Approximate

Medium Temperature

	Operating Pressure (psi)									
Diameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
26"	354,164	502,530	615,001	710,721	794,476	871,052	940,449	1,007,453	1,064,885	1,124,710

Low Temperature

	Operating Pressure (psi)									
Diameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
26"	105,292	148,366	181,868	210,584	236,907	258,444	279,981	299,125	315,876	335,020

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

Fan Model	Static Pressure	Heat Rise Degrees F						
		20	**30**	**40**	**50**	**60**	**70**	**80**
10 hp	2"	1	2	3	4	5	7	10
	3"	1	2	3	4	5	7	8
	4"	1	2	2	3	4	6	8
	5"	1	2	2	3	4	5	7
15 hp	2"	1	2	4	6	8	10	10
	3"	1	2	4	6	8	10	10
	4"	1	2	3	5	8	10	10
	5"	1	2	3	4	6	7	8
20 hp	3"	2	3	5	8	10		
	4"	2	3	5	7	10		
	5"	2	3	5	7	10		
	6"	2	3	4	6	9		
25 hp	3"	2	5	8	10			
	4"	2	4	7	10			
	5"	2	4	7	10			
	6"	2	4	6	9			
30 hp	4"	3	5	9	10			
	6"	2	4	8	10			
	8"	2	4	7	10			
	10"	1	3	5	7	9		
40 hp	4"	4	7	10				
	6"	3	7	10				
	8"	3	6	9				
	10"	2	4	7	10			

BTUs Per Gauge Pressure (psi) - Natural Gas Models Approximate

Medium Temperature

	Operating Pressure (psi)			
Diameter	**1**	**2**	**3**	**4**
26"	562,000	798,000	975,000	1,125,000

Low Temperature

	Operating Pressure (psi)			
Diameter	**1**	**2**	**3**	**4**
26"	235,000	334,000	408,000	471,000

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

		Heat Rise Degrees F						
Fan Model	**Static Pressure**	**20**	**30**	**40**	**50**	**60**	**70**	**80**
10 hp	2"	1	1	1	2	2	3	4
	3"	1	1	1	2	2	3	4
	4"	1	1	1	1	2	3	4
	5"	1	1	1	1	2	2	4
15 hp	2"	1	1	2	3	4	4	
	3"	1	1	2	2	3	4	
	4"	1	1	2	2	3	4	4
	5"	1	1	2	2	3	4	4
20 hp	3"	1	2	2	4	4		
	4"	1	2	2	3	4		
	5"	1	2	2	3	4		
	6"	1	2	2	3	4		
25 hp	3"	1	2	3	4			
	4"	1	2	3	4			
	5"	1	2	3	4			
	6"	1	2	3	4			
30 hp	4"	1	2	4				
	6"	1	2	3	4			
	8"	1	2	3	4			
	10"	1	1	2	3	4		
40 hp	4"	2	3	4				
	6"	2	3	4				
	8"	1	3	4				
	10"	1	2	3	4			

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 lockout 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.

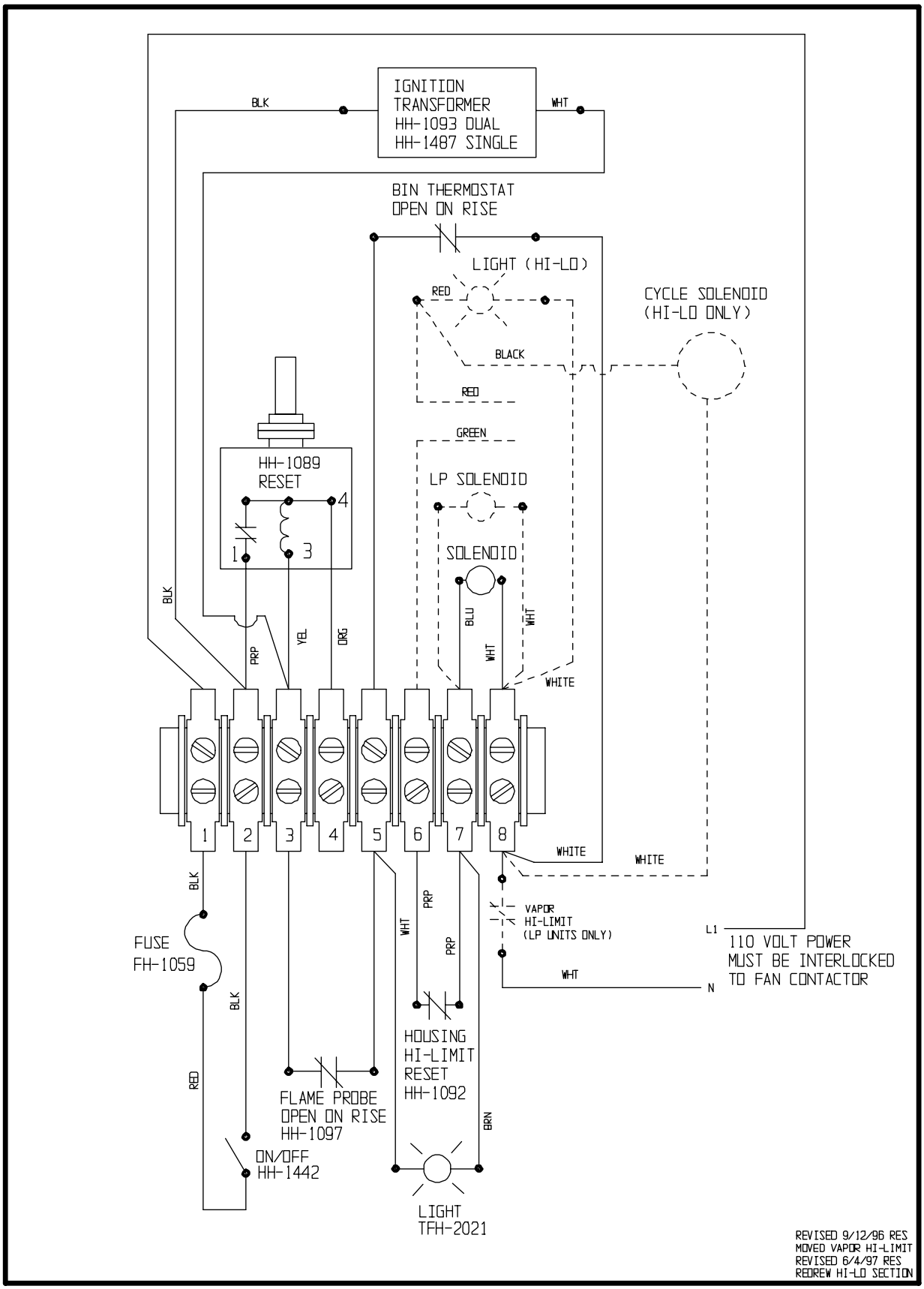
3. Inspect holes in burner ring for possible corrosion or plugging with dirt or rust. Clean if necessary.

4. Be sure primary air inlet screen is intact and clean for proper burn.

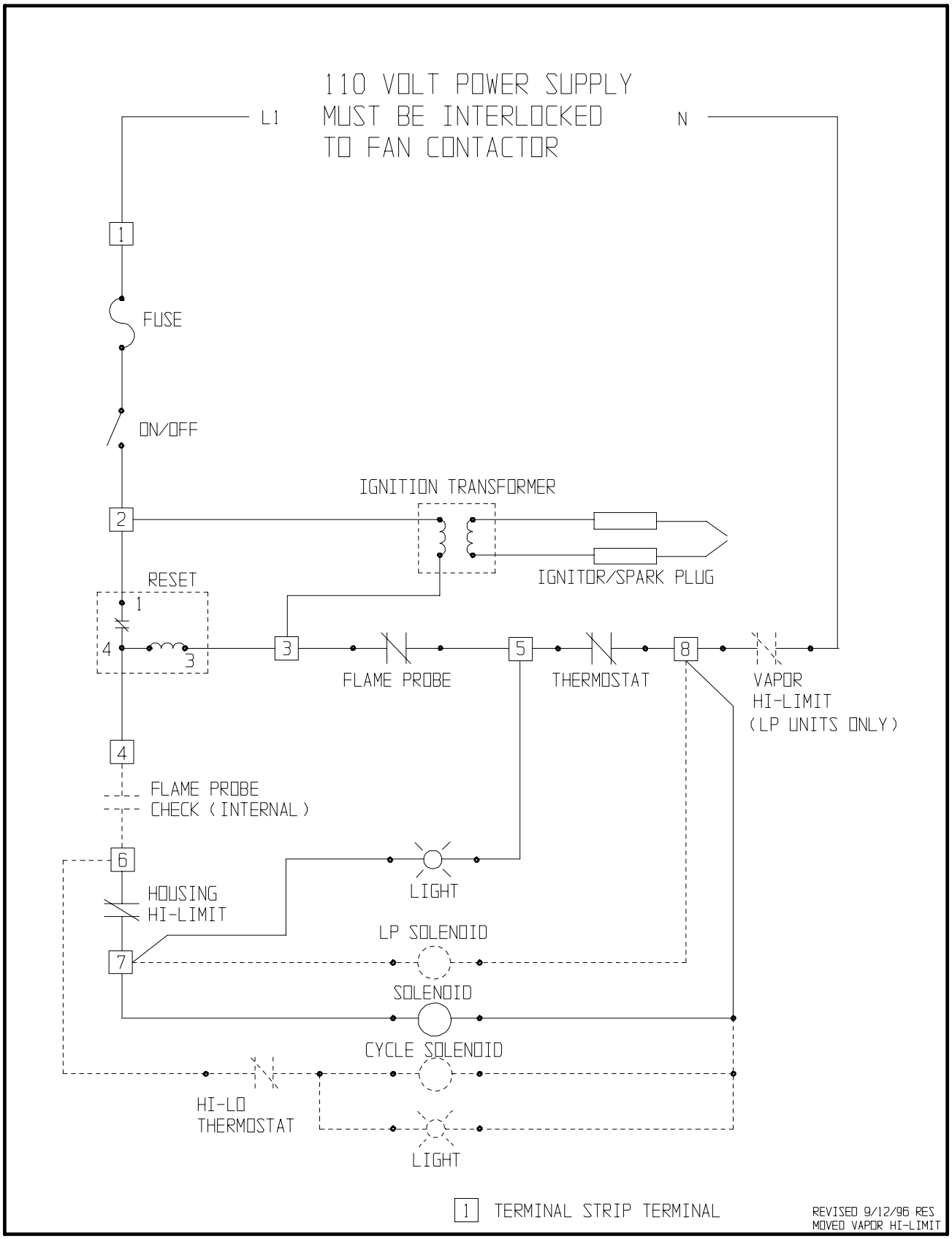
5. Check perforated ring on natural gas models to be sure it is clean and no holes are plugged.

6. Inspect flame probe and ignitor and adjust or replace if necessary.

ALWAYS DISCONNECT AND LOCK OUT POWER BEFORE WORKING ON OR AROUND HEATER

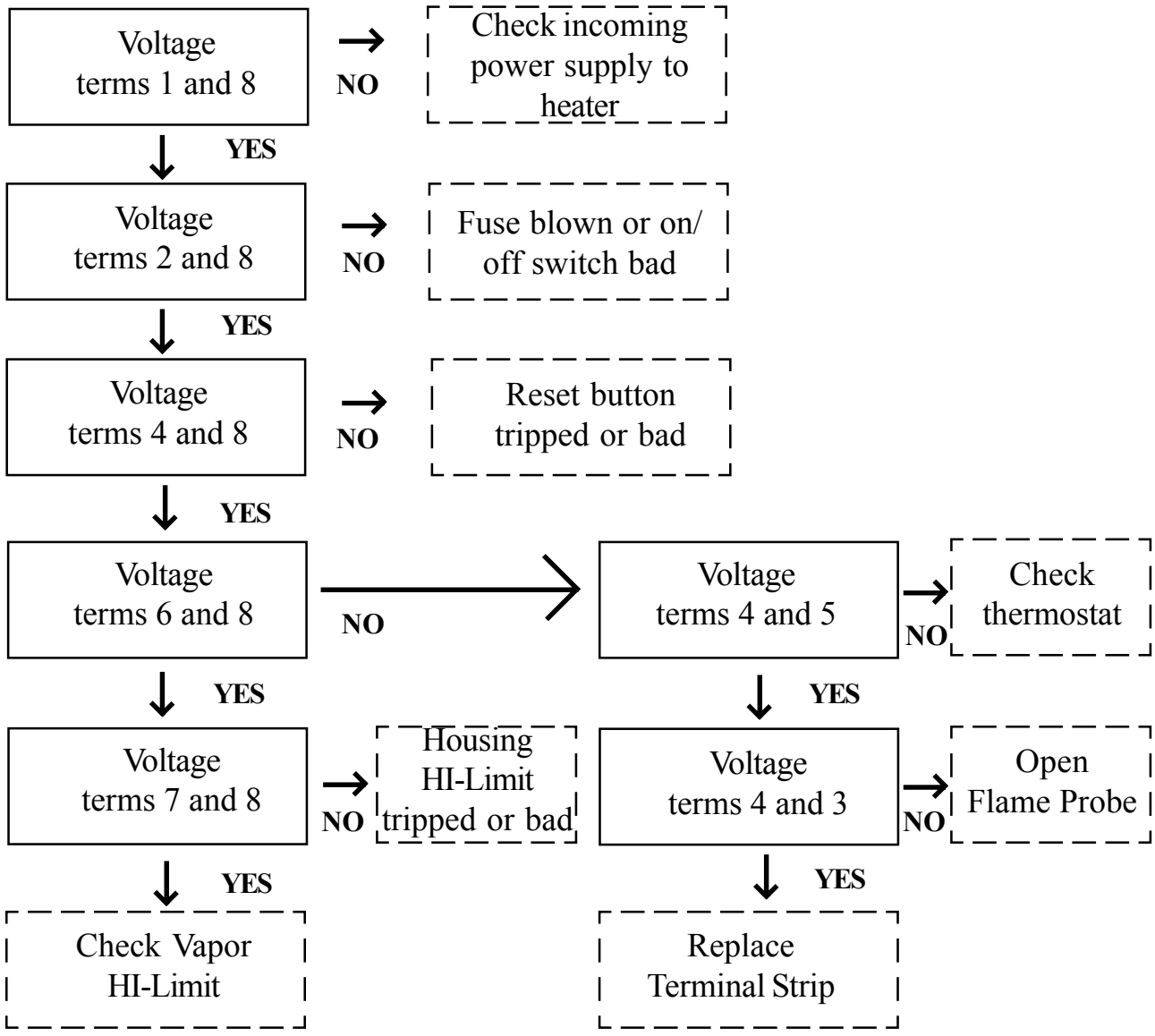


Note: Move transformer wire from terminal 3 to terminal 8 for contiunous spark.

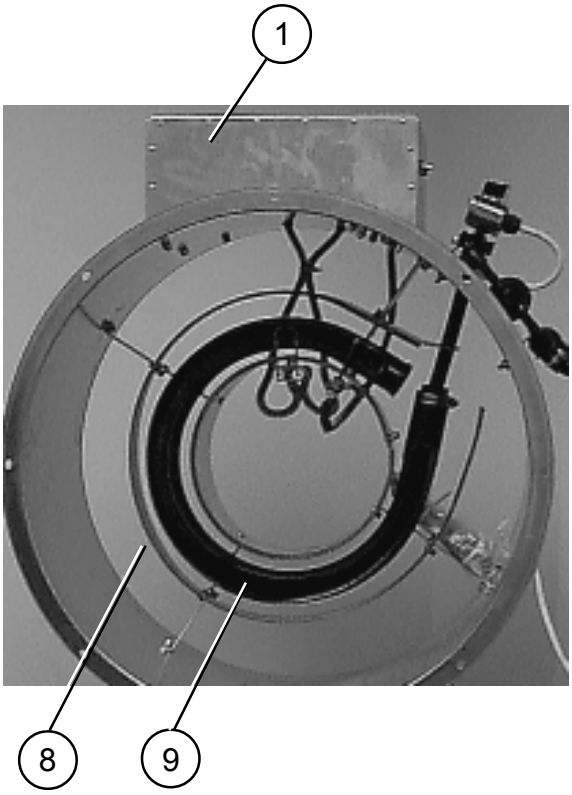


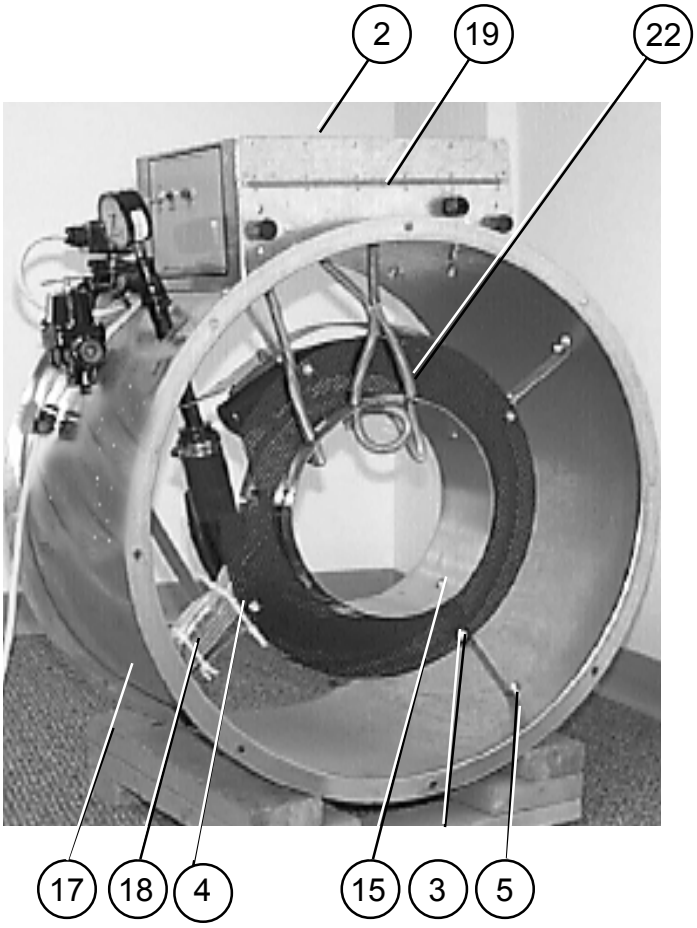
Note: Move transformer wire from terminal 3 to terminal 8 for contiunous spark.

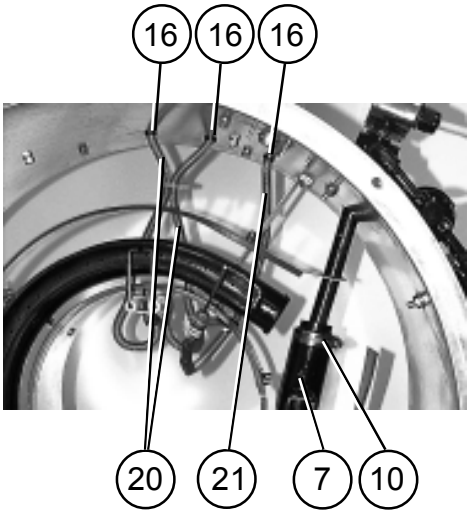
This chart should be used step by step to troubleshoot heater if heater does not start immediatly after turning on switch. This troubleshooting flow chart requires use of a voltmeter to check for 110 volts on designated terminals on terminal strip in heater. **Always use voltmeter to check between terminals that are designated not between terminals and ground.**

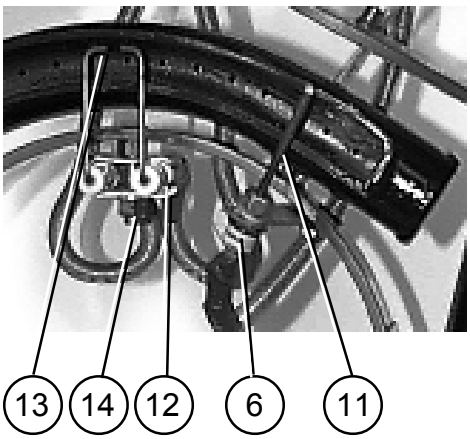


Trouble	Probable Cause	Check-out Procedure
Burner will not fire. No gas pressure on gage. No ignition spark.	Heater not wired in	Visually check fan control box to see if wires are connected.
	Fan not running	Fan contactor must be energized for heater to run.
	Blown fuse Bad on/off switch	Visually check fuse. Check for power on terminals 2 and 8. If no power, check on/off switch.
Burner will not fire. No gas pressure on gage. Ignition spark is constant.	Housing high-limit switch	Reset switch. With fan running check for 110V power between terms 7 and 8.
	Flame probe open	Remove wires from flame probe and check with ohm meter. Probe should be closed when cold.
	Reset switch	Reset switch. If switch will not reset after 60 seconds replace. If reset button pops out again after 30-60 seconds check flame probe to see that it is getting hot. If flame probe appears to be getting hot, then replace the flame probe.
	Gas supply	Make sure all valves are on to heater and gas tank is not empty.
Burner will not fire. Gas pressure on gage. No ignition spark.	Terminal strip	Turn power off to heater. Connect flame probe wires together. Check for power on terms 6 and 8. If no power is present, check for power on terms 4 and 8. If power is present, replace terminal strip.
	Ignitor/spark plug	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 plug wire by insulation. Try to get an arc between end of wire and heater housing (or other wire if using 2 pole transformer).
	Ignition transformer/plug wire	Turn gas off to heater. If no spark present after checking ignitor, remove spark plug 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. If spark is established, replace the plug wires.
Burner will not fire or fires for 60 seconds and kicks out reset switch. Gas pressure on gage. Ignition is sparking.	Plugged orifice	Check for gas at burner. If no gas, remove pipetrain and check orifice and burner or burner ring for blockages.
	Flame probe	Check to be sure flame probe is in good condition and is located in flame. Flame probe contacts should open when probe gets hot.
	Incorrect supply voltage	Voltage to heater must be 110 volts AC.
	Regulator set too low	See that flame burns continuous and is not intermittent. On ring burners be sure flame burns completely around ring.
	Moisture in fuel	Have tank and lines checked by qualified gas service man.
	Heater hose gets very hot. Heater shuts down and reset button trips.	Adjust vaporizor out of flame. Move a small amount at a time and allow heater to equalize between adjustments. Also check fan inlet screen for plugging. If flame is very yellow it is due to lack of airflow to unit.

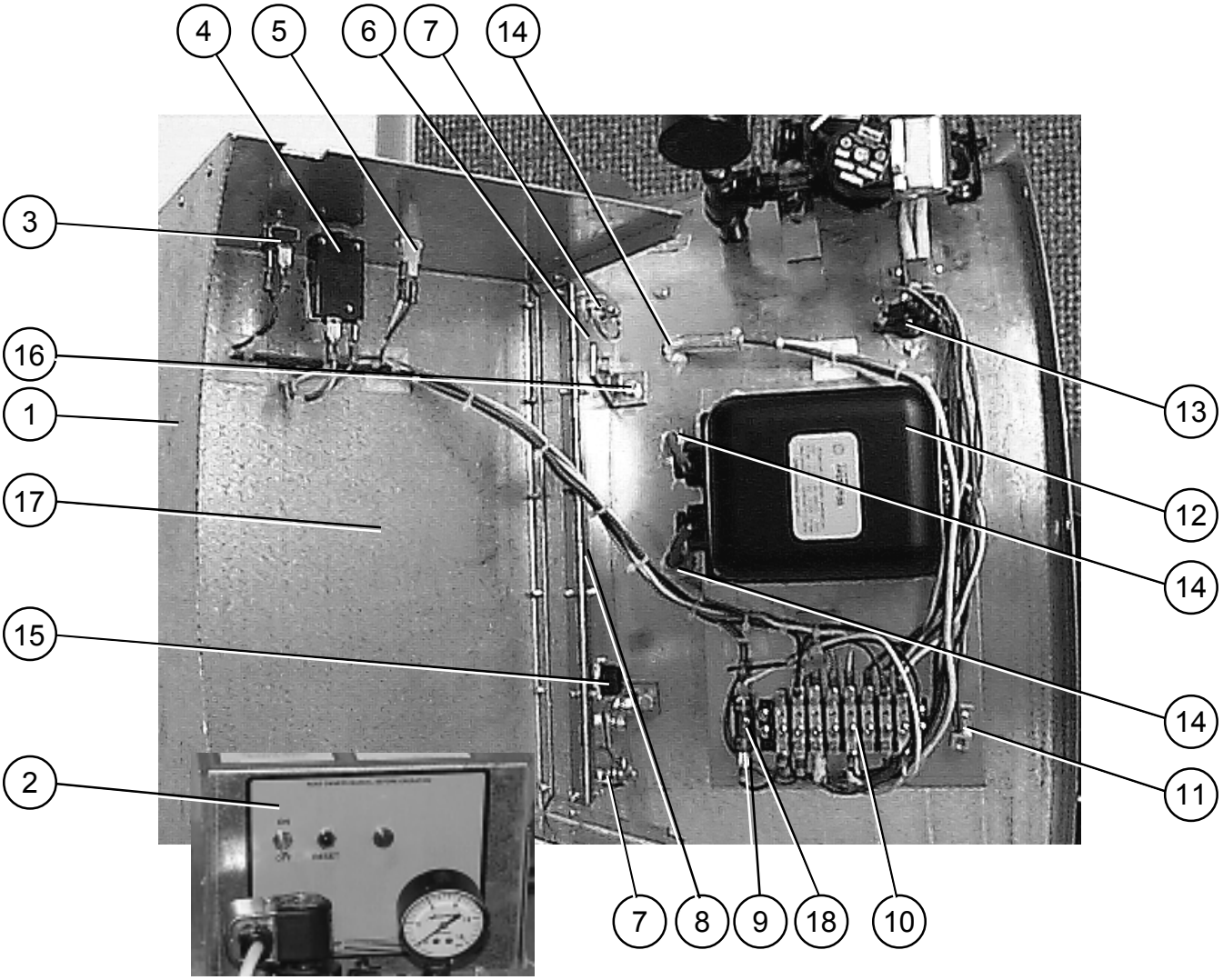






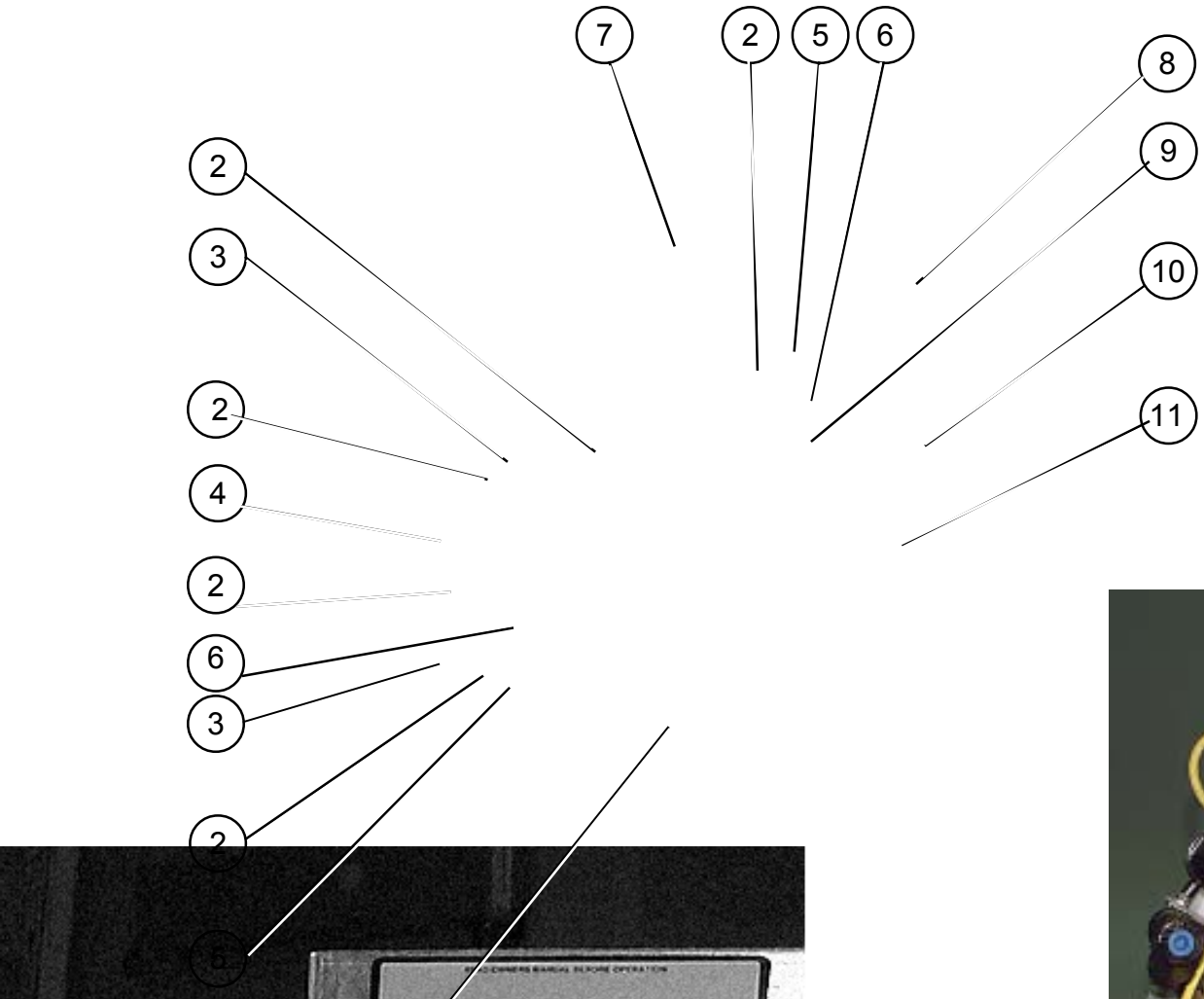


Key	Part Number	Description
1	HF-7152	Control box end plate
2	HF-7151	Control box hinge plate
3	HF-7170	Perforated screen ring (natural gas only)
4	HF-7169	Screen mounting bracket (natural gas only)
5	HF-7159	Burner mounting bracket
6	HF-7376	Flame probe bracket
7	HF-7303	3" x 4" Ring Burner intake screen
8	HF-7157	Outer air deflector
9	HF-7147	Ring burner weldment
9	HF-7232	Ring burner weldment (lo-fire)
10	HF-7286	Clamp, hose #24
11	HH-1097	Flame probe
12	HF-7375	Ignitor half clamp
13	HF-7373	Ignitor flame pair
14	S-4373	3/8" x 1 1/2" bolt
15	HF-7158	Inner air deflector
16	D02-0026(3)	1/2" Plastic grommet
17	HF-7156	Housing wrapper weldment (can)
18	HF-7165	Heater mounting bracket w/hardware
19	HF-7150	Control box base plate
20	HF-7432	Ignitor wire assembly
21	HF-7433	Flame probe wire assembly
22	07098556	Wire shroud (spring)

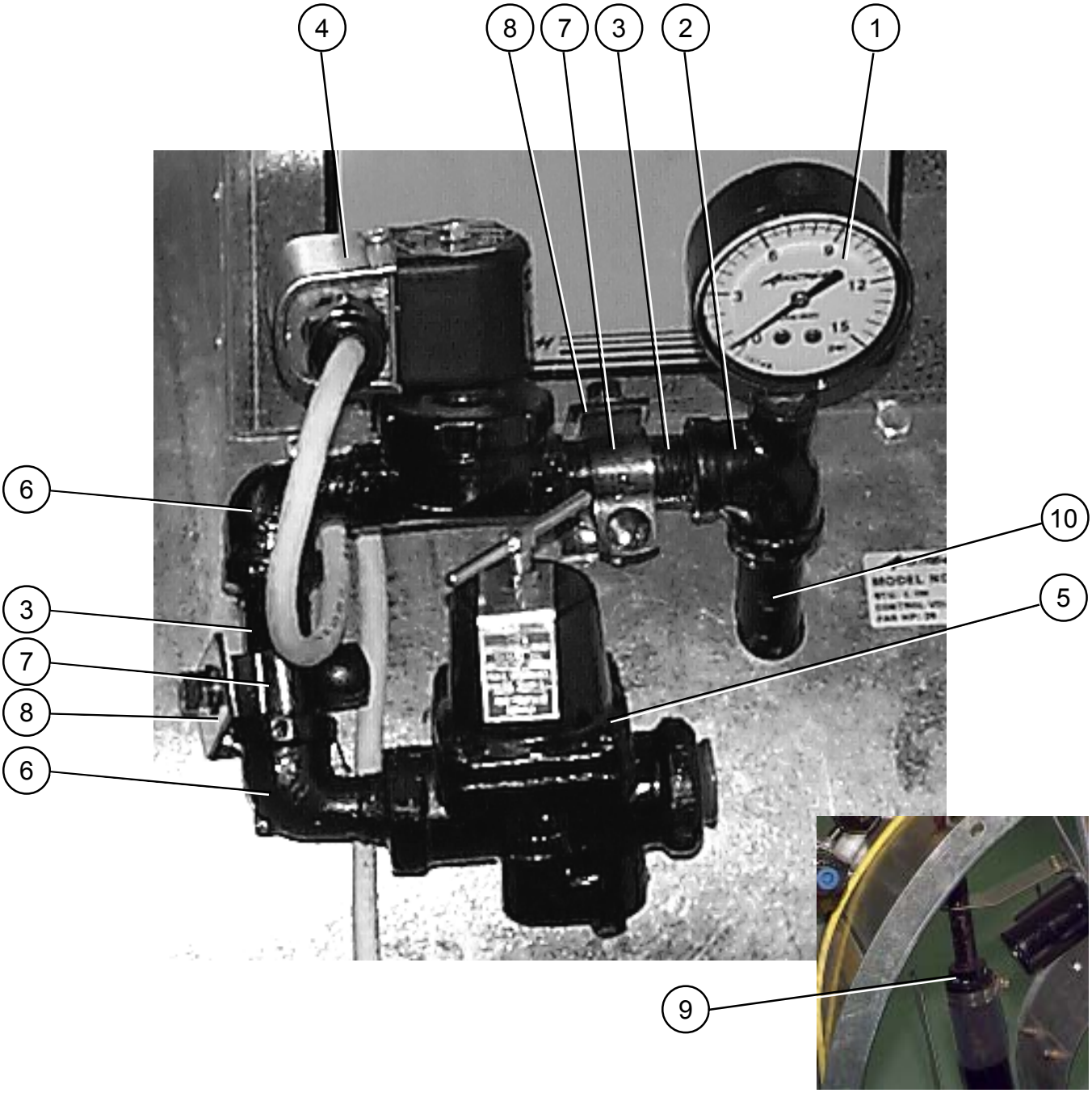


Key	Part Number	Description
1	HF-7152	Control box end plate
2	DC-449	Decal, galvanized downwind heater
3	HH-1442	10A-125V Toggle switch SPST
4	HH-1089	Switch reset-time delay
5	TFH-2021	Light red neon (no leads)
6	HF-7374	Control box base
7	TFH-2046(2)	Spring latch-Southco. (w/blk. kn.)
8	HF-7194	Piano Hinge
9	FH-1058	Fuse Holder
10	HF-7356	Terminal Strip (flame probe checking)
11	FH-1093	Ground lug-Blackburn
12	HH-1093	Transformer 2 pole
13	HH-1092	Switch gas high-limit
14	D02-0026(3)	1/2" Plastic grommet
15	FH-1310(2)	Connector cord
16	HF-7153(2)	Control box mounting bracket
17	HF-7149	Control box lid
18	FH-1059	Fuse

PROPANE VAPOR PIPE TRAIN PARTS



Key	Part Number	Description
1	HH-7051	1/4" Gas strainer (sch. 40 blk.)
2	HH-7052	1/4" x 2" Nipple (sch. 40 blk.)
3	HH-7053	1/4" Elbow 90 (sch. 40 blk.)
4	HH-7050	1/4" Regulator 0-30 PSI
5	HH-1096	1/2" Conduit clamp
6	HF-1026	Support bracket
7	THH-4029	1/4" Solenoid valve
8	D08-0022	Gauge 0-15# pressure LP
9	THH-4023	1/2" x 1/4" Hex bushing
10	S-3853	1/2" x 1/4" x 1/2" Tee (sch. 40 blk.)
11	HF-7161	Ring burner orifice pipe
12	HF-7036	1/2" Orifice plug drilled .156" (med.)
12	HH-4415	1/2" Orifice drilled .094 (low)



Key	Part Number	Description
1	D08-0022	Pressure gauge 0-15# PSI
2	S-3853	1/2" x 1/4" x 1/2" Tee (sch. 40 blk.)
3	HH-3670	1/2" x 2-1/2" Nipple (sch. 40 blk.)
4	HH-1081	1/2" Solenoid valve
5	HH-1077	1/2" Regulator
6	D07-0022	1/2" Elbow 90 street (sch. 40 blk.)
7	HH-1096	1/2" Conduit clamp
8	HF-1026	Support bracket
9	HF-7087	1/2" Orifice drilled 7/32" (med.)
9	HF-7085	1/2" Orifice drilled 9/64" (low)
10	HF-7161	Ring burner orifice pipe

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