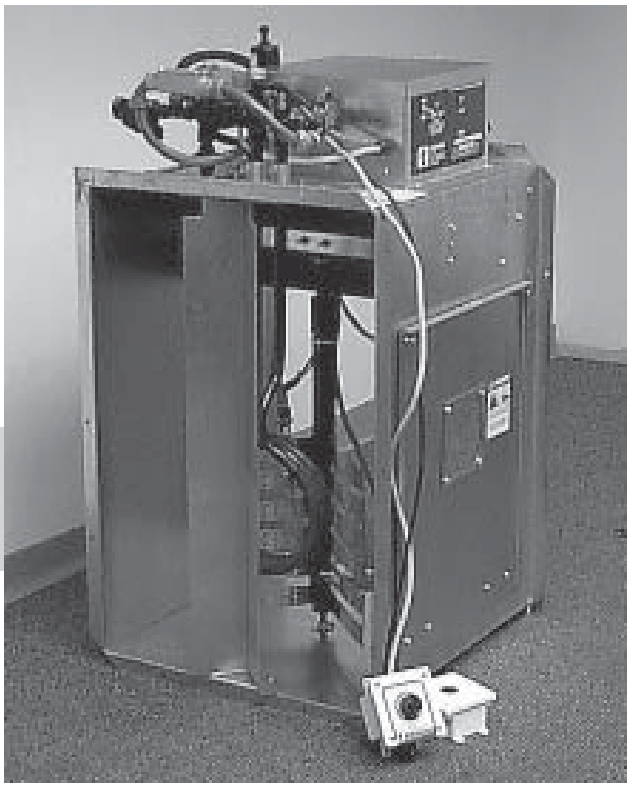
Neco Series One Centrifugal Heater Installation And Operating Instructions

MODEL # CHN - __ __ - __ __ - D (HIGH)

MODEL # CLN - __ __ - __ __ - D (LOW)

Owner's Manual

MANUAL # PNEG-583
Version 2 2/99



OMAHA NECO MADE IN USA

CENTRIFUGAL HEATER CHECK LIST

_____ 1. All wire connections

_____ 2. Spark plug gap - .125

_____ 3. Pipe train tightness and gas leaks

_____ 4. Flame sensor tight

_____ 5. Fuse in place, extra fuse provided

_____ 6. Flame out light

_____ 7. Indicator light

_____ 8. Pressure gauge

_____ 9. Regulator adjusted

_____ 10. Shut off valve operates correctly

_____ 11. Vapor high limit

_____ 12. Unit cycles ON to OFF

_____ 13. Heat rise even across transition

_____ 14. Unit cycles HI to LO (HI-LO only)

_____ 15. Mod valve holds temp within 1 degree (mod units only)

_____ 16. All decals and serial number tag

_____ 17. Aesthetic appearance

_____ 18. Manual

Tester Signature_____

Date_____

CENTRIFUGAL HEATER OPERATING INSTRUCTIONS

TABLE OF CONTENTS

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

HEATER OPERATION

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

This manual describes the operation of the Neco Series One Centrifugal 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 Neco 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.

SAFETY ALERT SYMBOL

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

The symbol shown is used to call your attention to instructions concerning your personal safety. Watch for this symbol; it points out important safety precautions. It means "ATTENTION", "WARNING", "CAUTION", and "DANGER". Read the message and be cautious to the possibility of personal injury or death.

IMPORTANT: Safety decals should be read and understood by all people in the grain handlng area. The bottom right decal should be present on the inside bin door cover and the roof manway cover. If a decal is damaged or is missing contact:

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 Heater System. Safety precautions may be required from the personnel. 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 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, ifnot 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.

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.

This product has sharp edges! These sharp edges may cause serious injury. To avoid injury handle sharp edges with caution and use proper protective clothing and equipment at all times.

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.

The Chain Disk drive unit weights 159 lbs (72kg). All precautions should be taken when lifting and/or moving. Use at least two men when moving the unit anywhere.

The safety pages that follow are to show you where you can find the safety decals. The photographs show exactly where the decals should be. If a decal has been damaged or is missing contact The GSI Group, Inc. for a free replacement.

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.

Be sure fuel supply system complies with all local codes for L. P. gas installations.

LIQUID PROPANE MODELS

1. LP models are designed to run on liquid propane, with liquid draw from the propane tank.Avoid using propane supply tanks that have been used for vapor draw for long periods of time. When using liquid draw systems any moisture that may be present in tank or lines may freeze when system is used in cold weather. To avoid this, the usual precaution is to purge the system with methanol.

2. Run proper size line (see specifications) to liquid pipe train on heater. Have a qualified gas service man inspect installation to be sure that everything is installed according to local codes and ordinances.

3. After installation is complete check all connections for leaks with liquid detergent or comparable. Wear rubber gloves and eye protection. Avoid contact with liquid propane. DO NOT USE FLAME FOR LEAK TESTING.

PROPANE VAPOR MODELS

1. Propane vapor models are designed to run directly off of supply tank or from a separate external vapor-1izer.

2. Run proper size line (see specifications) to pipe train on heater. Have a qualified gas service person in spect installation to be sure everything iinstalled according to local codes and ordinances.

3. After installation is complete check all connections for leaks. DO NOT USE FLAME FOR LEAK TESTING. (see above for other precautions.)

NATURAL GAS MODELS

1. Natural gas models are similar to vapor models, but have a larger orifice to accommodate lower pres sure sometimes found with natural gas.

2. Run proper size line (see specifications) to pipe train on heater. Have a qualified gas service man inspect installation to be sure everything is in stalled according to local codes and ordinances.

3. After installation is complete check all connections for leaks. DO NOT USE FLAME FOR LEAK TESTING. (See above for other precautions.)

Power Supply

An adequate power supply and proper wiring are important factors for maximum performance and long life of the dryer. Electrical service must be adequate enough to prevent low voltage damage to motors and control circuits. **In 220V 1 ph and 220V 3 ph systems a separate neutral wire is required for the 120V heater circuit, and should be connected to terminal #1 in the master heater. Do not run in conduit with motor power lines.**

Machine To Earth Grounding

It is very important that a Machine To Earth ground be installed at the worksite. The complete unit must be wired and grounded to all local applicable codes. The proper grounding will provide safty to the operators and ensure long life to all circuit boards.

Transformer and Wiring Voltage Drop

It is necessary to know the distance from the unit to the available transformer, and the horsepower of your fan unit. Advise the service representative of your local power supplier that an additional load will be placed on the line. Each fan motor should be wired through a fused or circuit breaker disconnect switch. Check the KVA rating of the transformers, considering horsepower and load. The power supply wiring , main switch equipment and transformers must provide adequate motor starting and operating voltage. Voltage drop during startup should not exceed 14% of normal voltage, and after motor is running at full speed it should be within 8% of normal voltage. Check Electrical Load Information for HP ratings and maximum amp loads to properly size wire and fusing elements. Standard electrical safty practices and codes should be used. (Refer to National Electrical Code)

HEATER ELECTRICAL INSTALLATION (230V FANS)

1. Connect power cord to fan control box.
2. Make field connections of wires in fan box as shown in Figure 1. IMPORTANT! HEATER MUST BE INTERLOCKED WITH FAN FOR SAFE OPERATION.
3. Connect deluxe thermostatcontrol (optional) in heater box as shown in Figure 1. IMPORTANT! THERMOSTAT MUST BE INSTALLED FOR SAFE OPERATION.

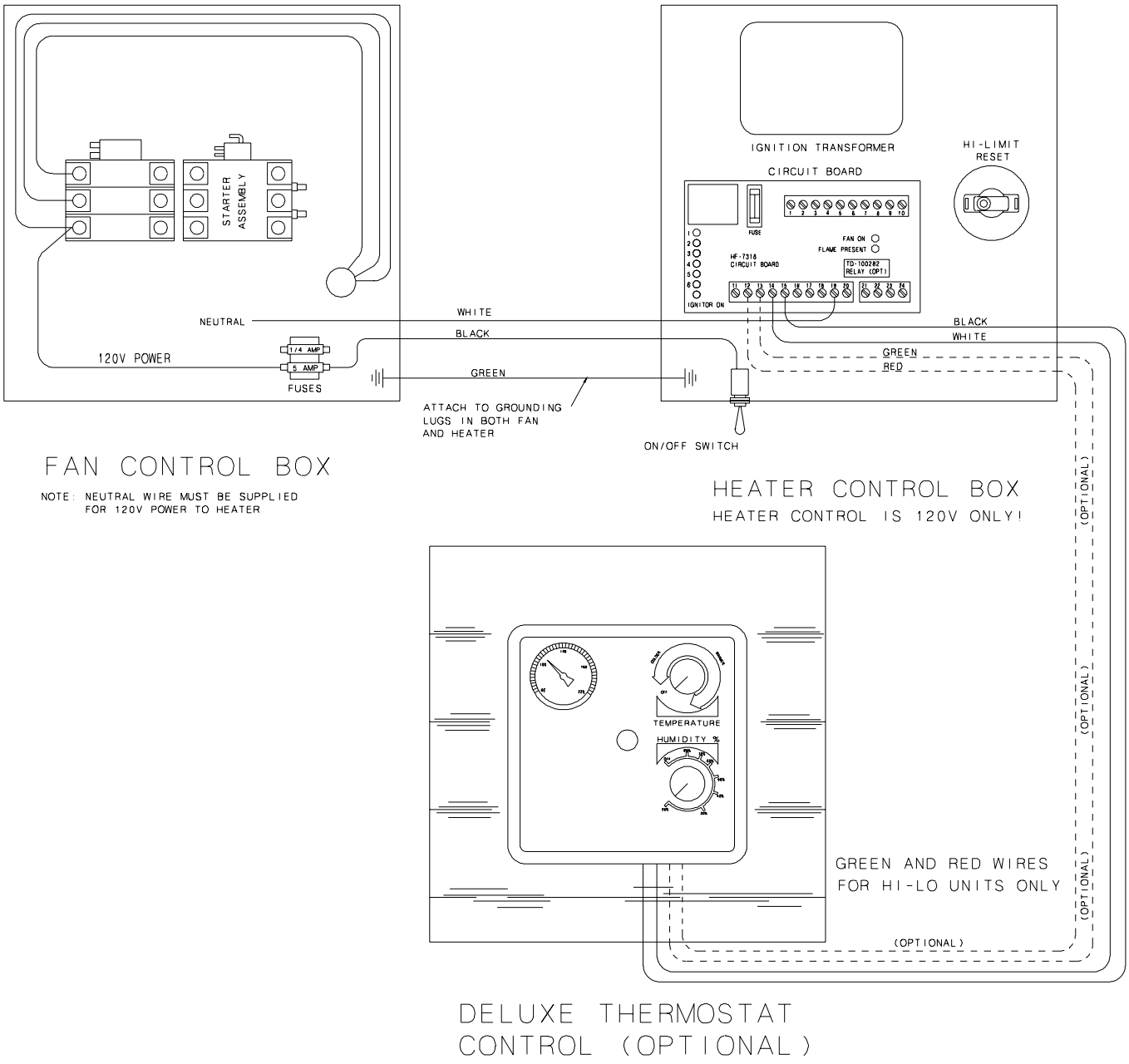


Figure 1: 230 volt fan control box.

HEATER ELECTRICAL INSTALLATION (460V FANS)

1. Connect power cord to fan control box.

2. Make field connections of wires in fan box as shown in Figure 2. 110V power supply or .5KVA 460V to 110V transformer must be used to supply power for heater.IMPORTANT! HEATER MUST BE INTER-LOCKED WITH FAN FOR SAFE OPERATION.

3. Connect deluxe thermostat control (optional) as shown in Figure 2. IMPORTANT! THERMOSTAT MUST BE INSTALLED FOR SAFE OPERATION.

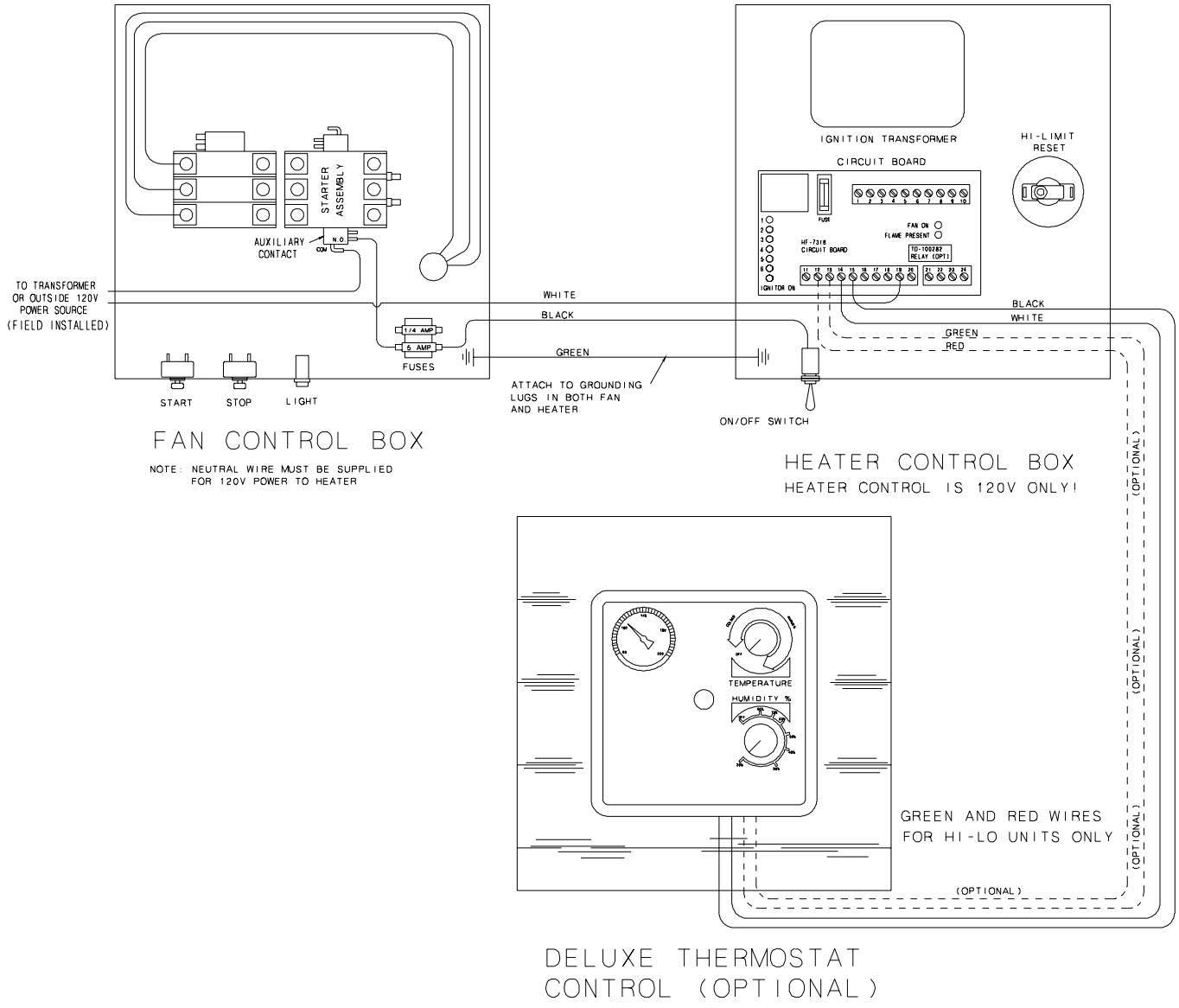
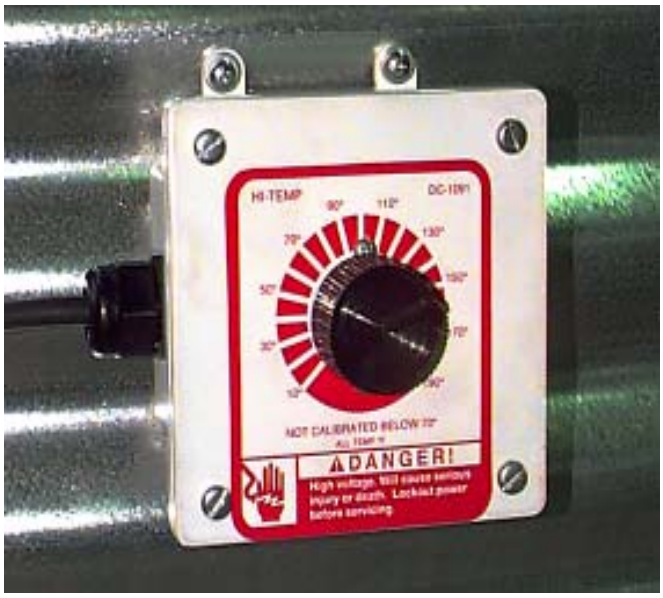


Figure 2: 460 volt fan control box.

PLENUM THERMOSTAT MOUNTING

The plenum thermostat is the 4 x 4 white box with knob that is preconnected to heater when heater is ordered with thermostat.

1. 24" to the right side of the transition, drill one $^{3}/_{8}$" hole (high temp) or 1 $^{1}/_{2}$" hole (low temp) in the center of the plenum in a valley (4.00" corrugation) or hill (2.66" corrugation) on bin sidewall.
2. Insert the probe through the hole.
3. Position the housing so that the tabs are vertical, and the cord exits the housing horizontally.
4. Use 4 self drilling screws to mount the housing to the bin sidewall.
5. Caulk between the housing and the sidewall to seal.



Plenum thermostat mounting on bin wall.

TRANSITION HI-LIMIT INSTALLATION

1. Mark location on transition one (1) foot up from the bottom (entrance collar) and centered in the transition.
2. Drill or knock out 7/8" diameter hole on marked location.
3. Install transition hi-limit using supplied self drilling screws.

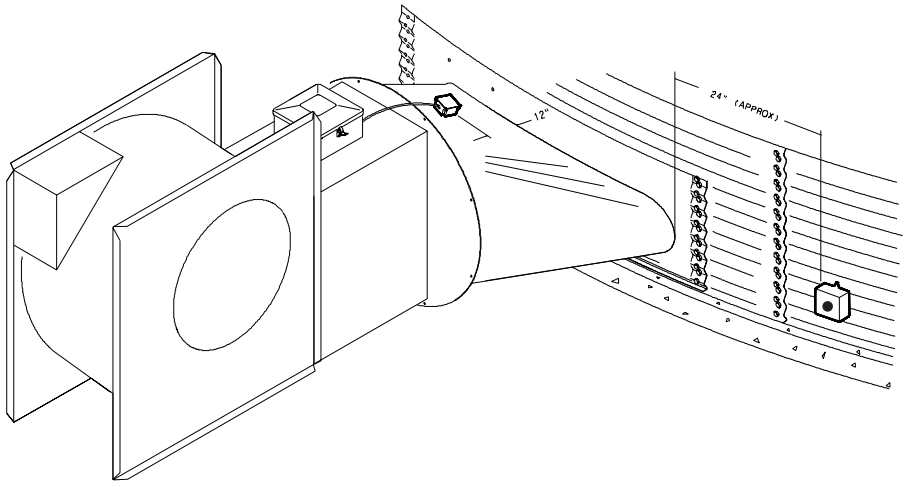


Figure 3: The transition connecting the heater to the bin with the plenum thermostat in place.

CENTRIFUGAL HEATER SPECIFICATIONS

		Hi-Temp Model	Lo-Temp Model
All models	BTU rating Weight	4000000 145	500000 135
Liquid models	Maximum fuel flow (GPH) Orifice size Minimum operating pressure Maximum operating pressure Minimum line size	43 .25 3 30 3/8"	N/A N/A N/A N/A N/A
Vapor models	Maximum fuel flow (CFH) Orifice size Minimum operating pressure Maximum operating pressure Minimum line size	1590 .25 2 30 1"	210 .109 1 15 1/2"
Natural gas models	Maximum fuel flow (CFH) Orifice size Minimum operating pressure Maximum operating pressure Minimum line size	4200 .375 1 15 1.1/4"	500 .156 1 7 1"

HEATER DIMENSIONAL SPECIFICATIONS

Heater Size	10-15	20-30	40
Inside Height	30.1/4"	33.1/4"	33.1/4"
Inside Width	19.1/2"	21.3/4"	23.11/16"
Inside length	24"	24"	24"

STANDARD 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 toggle switch on.
6. Heater should now be lit. If not check to see that all gas is on.
7. Set thermostat to desired setting (see deluxe thermostat manual for adjusting deluxe thermostat control).
8. Gas pressure should be adjusted so burner is on 75 percent of the time.
9. Watch as burner goes through a few cycles, to be sure that it is operating properly.

HI-LO 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 toggle switch on.
6. After 20 seconds both red lights should light up indi cating power to the control circuit.
7. Heater should now be lit. If not check to see that all gas is on.
8. Open low-fire ball valve all the way.
9. Turn thermostat dial back slowly until heater cycles to low flame.
10. Adjust ball valve so that low-flame pressure is at desired setting.
11. Turn thermostat dial to desired setting and wait for bin plenum to come up to temperature. Heater should cycle to low flame after a few minutes. If heater does not cycle to low flame increase hi-flame gas pressure.
12. Low-flame should be adjusted so that temperature drops slowly until burner goes back to high flame.
13. Watch as burner goes through a few cycles, to be sure that it is operating properly.

10 - 15 HP UNITS

BTU's Per Gauge Pressure (PSI)
PROPOANE MODELS
(Approximate)

HIGH TEMPERATURE 10-15hp 7/32" orifice
OPERATING PRESSURE (PSI)

	2	4	6	8	10	12	14	15
ALL MODELS	816013	1148640	1409477	1632026	1825859	1995762	2153700	2227883

Gauge Pressure (Psi) Required To Maintain Temperature (Approximate) (10-15 Horsepower High Temp Propane Units Only)								
	Static	Heat Rise Degrees F						
Fan Model	Pressure	60	80	100	120	140	160	180
10HP	2"	2	4	6	8	10	13	
	4"	1	3	5	6	8	11	14
	6"	1	1	3	5	6	8	10
15HP	2"	3	6	9	12	15		
	4"	3	5	7	10	13		
	6"	2	3	5	6	9	11	14

BTU's Per Gauge Pressure (PSI)
NATURAL GAS MODELS
(Approximate)

HIGH TEMPERATURE 10-15hp 11/32" orifice
OPERATING PRESSURE (PSI)

	1	2	3	4	5	6	7
ALL MODELS	859104	1218432	1489296	1718208	1921584	2107632	2276352

Gauge Pressure (Psi) Required To Maintain Temperature (Approximate) (10-15 Horsepower High Temp Natural Gas Units Only)								
	Static	Heat Rise Degrees F						
Fan Model	Pressure	60	80	100	120	140	160	180
10HP	2"	1	1.75	2.5	3.5	4.75	6	
	4"	0.75	1.25	2	2.75	3.75	4.75	6
	6"	0.5	1	1.5	2	2.75	3.5	4.25
15HP	2"	1.5	2.5	3.75	5.5			
	4"	1.25	2	3	4.25	5.75		
	6"	0.75	1.25	2	2.75	3.75	5	6

20 - 40 HP UNITS

BTU's Per Gauge Pressure (PSI) PROPANE MODELS (Approximate)

HIGH TEMPERATURE 20-40hp 5/16" orifice
OPERATING PRESSURE (PSI)

	2	4	6	8	10	12	14	15
ALL MODELS	1663135	2345140	2878779	3328663	3721115	4068100	4393548	4541914

Gauge Pressure (Psi) Required To Maintain Temperature (Approximate)
(20-40 Horsepower High Temp Propane Units Only)

Fan Model	Static Pressure	Heat Rise Degrees F 60	80	100	120	140	160	180
20HP	2"	2	2	4	5	7	8	10
	4"	1	2	3	4	5	7	8
	6"	1	2	3	4	5	6	7
25HP	2"	2	3	5	7	9	12	15
	4"	2	3	4	6	8	10	13
	6"	2	2	4	5	6	8	10
30HP	2"	2	4	6	8	11	15	
	4"	2	4	5	7	10	13	
	6"	2	3	4	6	8	10	13
40HP	2"	3	6	8	12			
	4"	3	5	7	11	14		
	6"	3	4	7	9	12		

BTU's Per Gauge Pressure (PSI) NATURAL GAS MODELS (Approximate)

HIGH TEMPERATURE 20-40hp 15/32" orifice
OPERATING PRESSURE (PSI)

	1	2	3	4	5	6	7
ALL MODELS	1597824	2266320	2770656	3195648	3573216	3919776	4234416

Gauge Pressure (Psi) Required To Maintain Temperature (Approximate)
(20-40 Horsepower High Temp Natural Gas Units Only)

Fan Model	Static Pressure	Heat Rise Degrees F 60	80	100	120	140	160	180
20HP	2"	0.75	1.25	1.75	2.5	3.25	4.25	5.5
	4"	0.5	1	1.5	2	2.75	3.5	4.5
	6"	0.5	0.75	1.25	1.75	2.25	3	3.75
25HP	2"	1	1.75	2.25	3.5	4.75	6.25	
	4"	0.75	1.5	2.25	3.25	4	5.25	6.25
	6"	0.5	1.25	1.75	2.5	3.25	4.25	5.5
30HP	2"	1.25	2	3	4.5	6		
	4"	1	1.75	2.75	3.75	5	7	
	6"	0.75	1.5	2.25	3	4	5.25	7
40HP	2"	1.75	3	4.5	6.25			
	4"	1.5	2.5	4	5.5			
	6"	1.25	2.25	3.5	4.75	6.75		

Lo Temp Units

BTU's Per Gauge Pressure (PSI)
PROPANE MODELS
(Approximate)

LOW TEMPERATURE ALL HP's 7/64" orifice
OPERATING PRESSURE (PSI)

	2	4	6	8	10	12	14	15
ALL MODELS	203405	287160	351771	409203	457063	497744	538425	555176

BTU's Per Gauge Pressure (PSI)
NATURAL GAS MODELS
(Approximate)

LOW TEMPERATURE ALL HP's 5/32" orifice
OPERATING PRESSURE (PSI)

	1	2	3	4	5	6	7
ALL MODELS	177840	251712	308256	355680	397632	435936	470592

BTU'S PER GAUGE PRESSURE (PSI) NATURAL GAS MODELS (APPROXIMATE)

HIGH TEMPERATURE

	Operating Pressure (PSI)						
	2	4	6	8	10	12	14
All Models	1590000	2375000	2749000	3180000	3555000	3886000	4195000

LOW TEMPERATURE

	Operating Pressure (PSI)						
	1	2	3	4	5	6	7
All Models	195000	276000	338000	390000	436000	478000	500000

GAUGE PRESSURE (PSI) REQUIRED TO MAINTAIN TEMPERATURE (APPROXIMATE)
(HIGH TEMP UNITS ONLY)

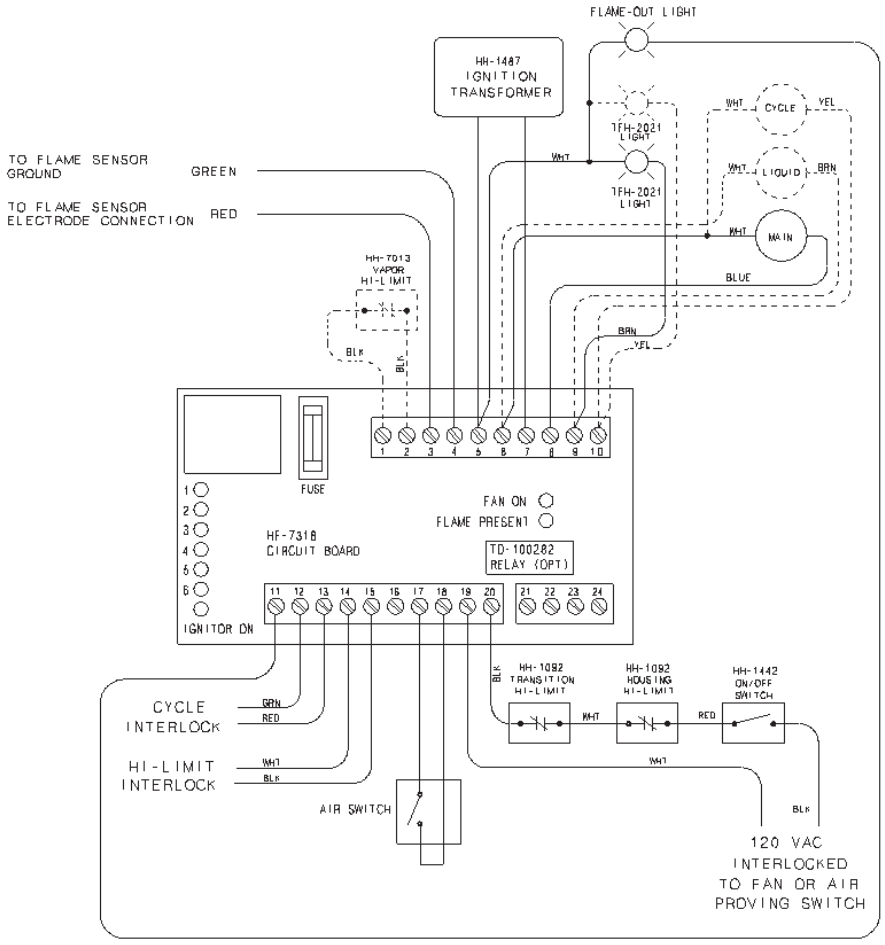
Fan Model	Static Pressure	Heat Rise Degrees F						
		60	80	100	120	140	160	180
10HP	2"	1	1.5	2	2.5	3	3.5	4
	4"	1	1.5	1.75	2	2.5	3	3.5
	6"	.75	1.25	1.5	1.75	2	2.25	2.5
15HP	2"	1	1.75	2.5	3.25	4	5	7
	4"	1	1.5	2	2.5	3.25	4	5.5
	6"	1	1.25	1.5	1.75	2.25	3	3.75
20HP	2"	1.75	2.5	3.5	5	7	9.5	12
	4"	1.25	2	3	4	5	7	9
	6"	1	1.75	2.5	3.25	4	5	7
25HP	2"	2	3.25	5	7.5	10	13	
	4"	2	3	4	6	8.5	11	14
	6"	1.75	2.5	3.5	5	7	9.5	12
30HP	2"	2.5	4	6.5	9	13		
	4"	2	3.5	5	8	11	14	
	6"	2	3	4	6	8.5	11	14
40HP	2"	3	6	10	14			
	4"	2.75	5	8	11	15		
	6"	2.5	4	6.5	9	13		

Adjusting the vaporizer coil on a liquid propane model. The top photo shows the setting up (cool), and the bottom photo shows the coil down (hot).

ADJUSTING THE VAPORIZOR

1. Vaporizer should be adjusted so the vapor pipe train runs warm to the touch (100°-120°F).
2. Loosen 5/16" bolts on adjustment bracket.
3. Raise vaporizer if running too hot, lower if too cold.
4. Move vaporizer only 1" at a time and allow a few minutes for tem-perature to equalize.
5. Tighten 5/16" bolts and watch heater run for several minutes to verify adjustment.

SERIES ONE WIRING DIAGRAM



● INDICATES LIGHT ON ○ INDICATES LIGHT OFF

INDICATION	POSSIBLE CAUSE	POSSIBLE SOLUTION
○ ○ ○ ○ ○ ○ 1 2 3 4 5 6	Bad On/Off Switch	Replace Switch
	Heater Housing Hi-Limit	Reset Or Replace Hi-Limit
	Transition Hi-Limit	Reset Or Replace Hi-Limit
	No Power To Heater	Check Heater
● ○ ○ ○ ○ ○ 1 2 3 4 5 6	Blown Fuse	Replace Fuse
● ● ○ ○ ○ ○ 1 2 3 4 5 6	Flame Sensor (if flame present light on)	Clean Or Replace Flame Sensor
	Control Board	Replace Control Board
	Air Switch (if fan on light not on)	Check Air Switch
● ● ● ○ ○ ○ 1 2 3 4 5 6	Vaporizor Hi-Limit	Adjust Vaporizor Coil Replace Vapor Hi-Limit
● ● ● ● ○ ○ 1 2 3 4 5 6	Humidistat/Thermostat	Temperature Reached Replace Thermostat Or Humidistat
● ● ● ● ● ○ 1 2 3 4 5 6	Spark Plug	Clean Or Replace Spark Plug
	No Fuel To Burner	Check Fuel Supply
	Bad Solenoid	Replace Solenoid

● ● ● ● ● ○ 1 2 3 4 5 6 **WAIT FOR 20 SECOND PURGE DELAY TO TROUBLESHOOT!** INDICATING LIGHTS SHOWN ON LEFT SHOULD BE LIT WHEN UNIT IS OPERATING PROPERLY

DC-1161

SECOND HEATER INSTALLATION

FOR UNITS USING HF-7318 CONTROL BOARD

Second heater control is available with the HF-7318 heater control board. For standard units no extra parts are required. For HI-LO units (1) TD-100282 relay must be installed. INSTALLATION SHOULD BE MADE BY A QUALIFIED ELECTRICIAN. When points are called out in instructions they are in reference to points on drawing below text.

INSTALLATION FOR STANDARD UNITS

1. Run (2) wires from main heater (heater that thermo stat is connected to) to second heater.

2. Connect 2 wires to terminals 23 and 24 (points B and A) of second heater control terminal strip in main heater.

3. Connect other end of these wires to terminals 14 and 15 (points F and E) on lower left hand corner of HF-7318 board in second heater.

INSTALLATION FOR HI-LO UNITS

1. Plug (1) TD-100282 relay into empty socket on HF-7100 control board in main heater.

2. Run (4) wires from main heater (heater that thermo stat is connected to) to second heater.

3. Connect 2 of the wires to terminal 23 and 24 (points B and A) of second heater control terminal strip in main heater.

4. Connect other end of these wires to terminals 14 and 15 (points F and E) on lower left hand corner of HF-7318 board in second heater.

5. Connect other 2 wires to terminal 21 and 22 (points D and C) of second heater control terminal strip in main heater.

6. Connect other end of these wires to terminals 12 and 13 (points H and G) on lower left hand corner of HF-7318 board in second heater.

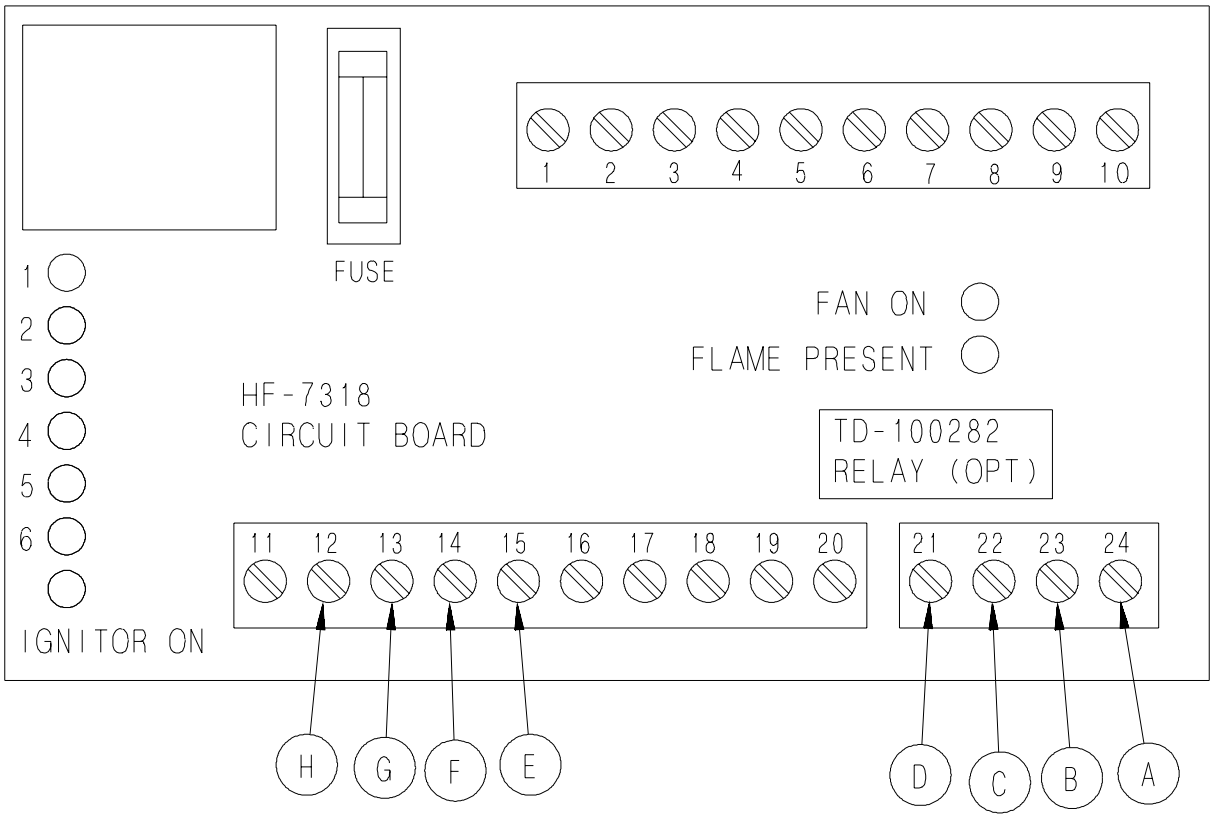


Figure 4: The HF-7318 control board.

NOTES

NECO WARRANTS ALL PRODUCTS MANUFACTURED BY NECO TO BE FREE OF DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USAGE AND CONDITIONS FOR A PERIOD OF 36 MONTHS AFTER RETAIL SALE TO THE ORIGINAL END USER OF SUCH PRODUCTS. NECO'S ONLY OBLIGATION IS, AND PURCHASER'S SOLE REMEDY SHALL BE FOR NECO, TO REPAIR OR REPLACE, AT NECO'S OPTION AND EXPENSE, PRODUCTS THAT, IN NECO'S SOLE JUDGMENT, CONTAIN A MATERIAL DEFECT DUE TO MATERIALS OR WORKMANSHIP. ALL DELIVERY AND SHIPMENT CHARGES TO AND FROM NECO'S FACTORY WILL BE PURCHASER'S RESPONSIBILITY. EXPENSES INCURRED BY OR ON BEHALF OF THE PURCHASER WITHOUT PRIOR WRITTEN AUTHORIZATION FROM AN AUTHORIZED EMPLOYEE OF NECO SHALL BE THE SOLE RESPONSIBILITY OF THE PURCHASER.

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