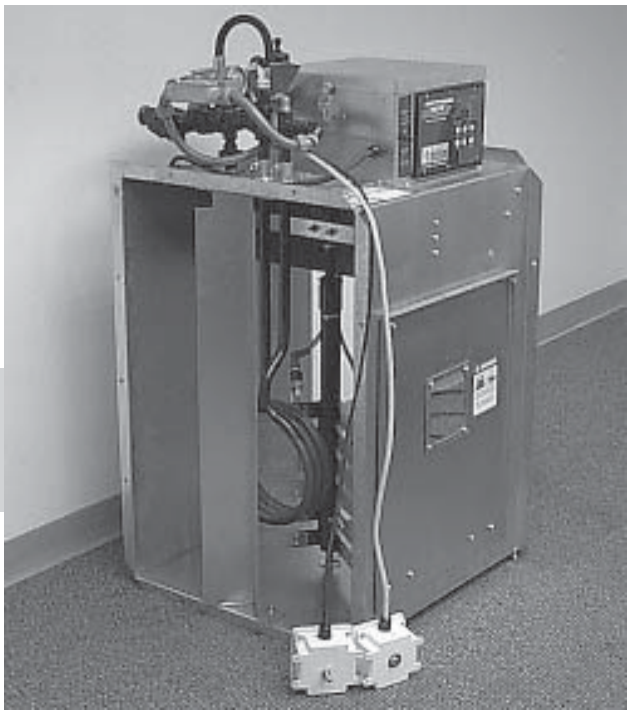
Neco Series Two Centrifugal Heater Installation And Operating Instructions

MODEL # CHN - __ __ - __ __ - 2 __ (HIGH)

MODEL # CLN - __ __ - __ __ - 2 __ (LOW)

Owner's Manual

MANUAL # PNEG-584



OMAHA NECO MADE IN USA

_____ 1. Check all wire connections
_____ 2. Spark plug and flame sensor tightness set plug gap to 1/8"
_____ 3. Check plug in terminal strips on back of circuit board to be sure they are plugged into proper position.
_____ 4. Software settings correct for type of heater (hi-low, on-off)
_____ 5. Dip switch settings correct for heater model (slave, master)
_____ 6. Most current software version installed
_____ 7. Turn heater toggle switch on. Most current software version should be displayed first, fol lowed by temperature. Screen should read "NO AIRFLOW".
_____ 8. Turn fan on. Screen should read "AIRFLOW".
_____ 9. Program hi-limit set point to 140 degrees F.
_____ 10. Program cycle set point to 120 degrees F (only on hi-lo units).
_____ 11. Program differential to 10 degrees F/
_____ 12. Turn gas on to heater unit.
_____ 13. Press start switch on heater. Screen should flash "PURGE".
_____ 14. After 10 second purge heater should light screen, and should read "HI-FLAME". "FLAME" should appear on lower right hand corner of screen.
_____ 15. Adjust pressure to 10 psi (lp units) 5 psi (ng units).
_____ 16. Check pipe train for leaks with soapy water.
_____ 17. Temperature should rise to 120 degrees. Screen should read "LO-FLAME" and unit should cycle to lo-flame. (hi-lo units only)
_____ 18. Adjust pressure with ball valve to 2 psi (lp units) 1 psi (ng units). (hi-lo units only)
_____ 19. On standard units temperature will rise to 140 degrees. Screen will read "OFF-CYCLE". Heater will shut off at this point.
_____ 20. Temperature will drop 10 degrees and unit will cycle back to hi-flame. Screen should read "HI-FLAME".
_____ 21. Observe unit go through 3 cycles.
_____ 22. Pull wire off of housing hi-limit switch. Screen should read "ERROR 000" and "HOUSING TEMP HI-LIMIT". Heater should shut down and lock out. Fan should shut off.
_____ 23. Turn heater toggle switch on. Most current software version should be displayed first, followed by temperature. Screen should read "NO AIRFLOW".
_____ 24. Turn fan on. Screen should read "AIRFLOW".
_____ 25. Press start switch on heater. Screen should flash "PURGE".
_____ 26. After 10 second purge heater should light. Screen should read "HI-FLAME". "FLAME" should appear on lower right hand corner of screen.
_____ 27. Shut gas off to heater and allow gas to burn out of system.
_____ 28. 2-4 seconds after flame goes out on heater, "FLAME" in lower right hand corner of screen should go out. Unit should begin to spark.
_____ 29. After 10 seconds fan and heater should shut down and lock out. Screen should read "ERROR 000" and "FLAME OUT".
_____ 30. Check heater visually to see that all decals are in place and correctly located.
_____ 31. Place owners manual in control box.

Tester Signature_____

Date_____

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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 Two 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

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.

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.

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 Fill/Feed 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 is intended for the use of conveying feed only. Any other use is a misuse of the product!

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.

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"

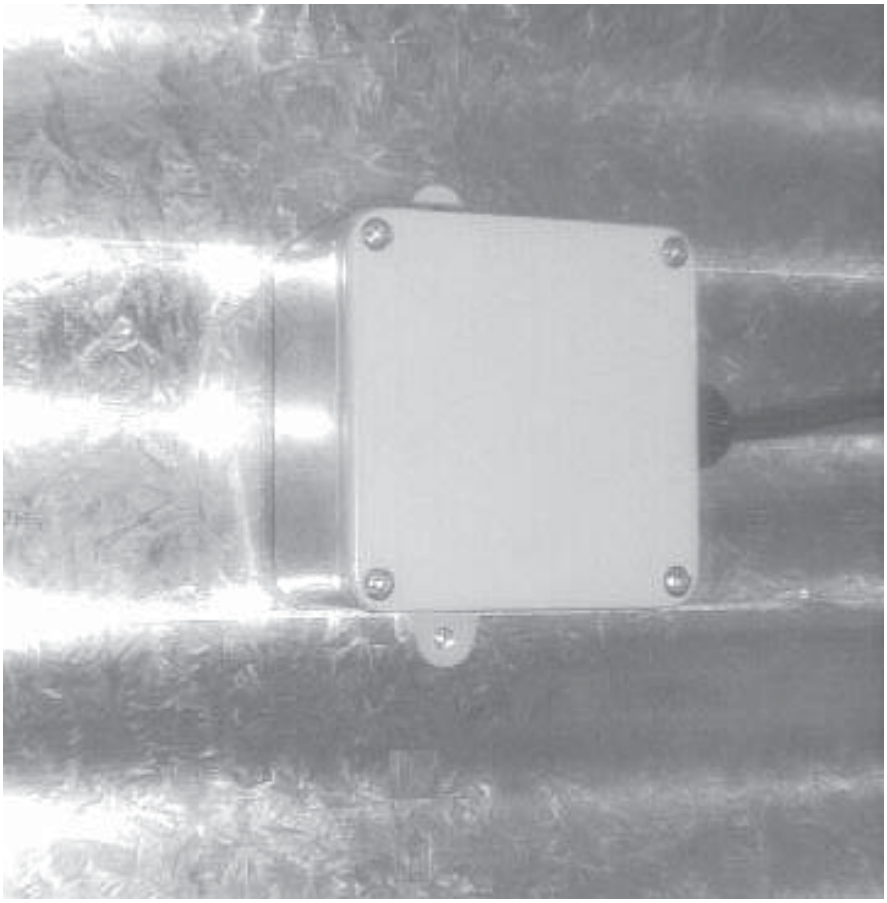
HEATER DIMENSIONAL SPECIFICATIONS

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"

PLENUM TEMPERATURE SENSOR MOUNTING

The plenum temperature sensor is the white PVC junction box with bolt extending from outside attached by a cord to the fan/heater control box.

1. 24" to the right side of the transition, drill one 3/8" hole in the center of the plenum in a valley on the 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 two self drilling screws to mount the housing to the bin sidewall.
5. Caulk between the housing and the sidewall to seal.



Plenum temperature sensor installation.

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.

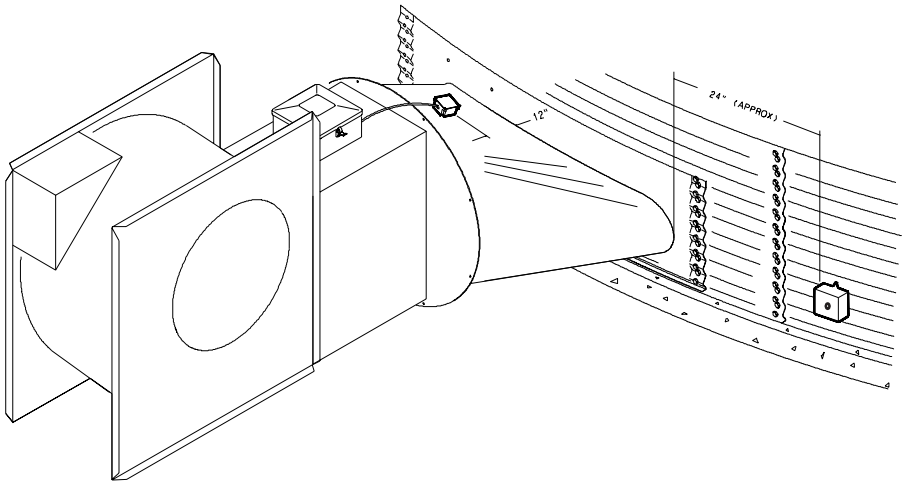


Figure 1: The transition connecting the heater to the bin with the plenum thermostat in place.

WIRING

HEATER UNIT

1. Be sure fan unit is installed and wired to meet local codes. Be sure equipment is well grounded (see page 9).

2. A separate neutral is required for 120 volt heater circuit in 220 volt 1PH and 3PH fan units. For 460 volt fan units a separate 120 volt power supply or transformer is required.

3. Run S-wire black cord from heater unit to fan unit and secure to fan.

4. Orange and red wires should be connected in series with coil in fan. When contacts in heater between these wires open fan shuts down. Recommended wiring is shown in Figure 2.

5. Black and white wires should be connected to a fused 120V power supply as shown. Green wire should be connected to ground in fan.

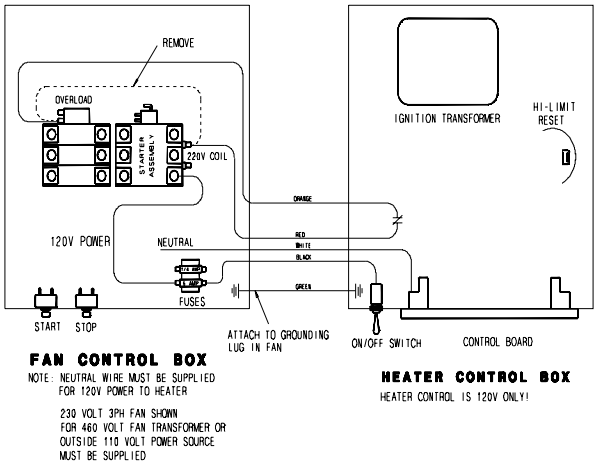


Figure 2: Wiring diagram for the fan and heater unit.

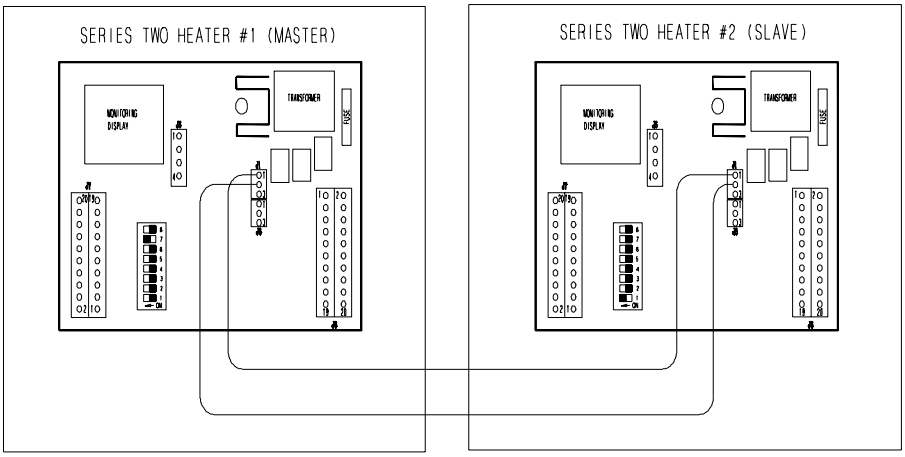


Figure 3: Secondary heater wiring diagram.

SECONDARY HEATER UNIT

1. Secondary heater unit runs as a slave of heater unit #1 and re-quires no plenum or grain temperature sensor.

2. Run (2) 20 gauge (minimum) wires from secondary heater unit (slave) to heater unit #1 (master).

3. Connect wires as shown in Figure 3.

4. Third heater unit may also be added to system. If adding third unit, run connections to master unit #1 and connect them in parallel with secondary heater unit.

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 (see Electrical Load Informationon page 40) **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)

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.* IMPORTANT! Do not use propane tanks that have previously been used for ammonia unless they have been purged according to procedures of the National L.P. Association.

Fuel supply system must comply with local codes for L.P. gas installation.

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

FUEL CONNECTION

LIQUID PROPANE MODELS

1. L.P. 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 situation, purge the system with methanol.
2. Run proper size line (see specification on page 6) to liquid pipe train on heater. Have a qualified gas ser vice person inspect installation to be sure that every thing is installed according to local codes and ordi nances.
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 a supply tank or from a separate external va porizer.
2. Run proper size line (see specifications on page 6) to pipe train on heater. Have a qualified gas service person 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. DO NOT USE FLAME FOR LEAK TESTING.

NATURAL GAS MODELS

1. Natural gas models are designed to run directly off of a supply tank or from a separate external vapor izer.
2. Run proper size line (see specification on page 6) 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. DO NOT USE FLAME FOR LEAK TESTING.

The control panel display showing initial start up.

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.*

POWER UP

All safety and high limit switches are checked upon power up. If a safety or limit is open, the control displays it. The control cannot operate with a safety switch error, and the fan cannot turn on with an error condition. There is no way to bypass an error condition. It must be fixed. (see errors on page 20)

The air switch is also checked on power up. The air switch must indicate no airflow. This is necessary to check the function of the air switch. However, if the opera-tor forgets and turns the fan on before the controller has been powered up, the controller locks up with the main display alternating between a "FAN" and "ON" message. This may be bypassed by depressing and holding the "FAN BYPASS" switch (lower right switch). Normal operating procedure should be to power up the controller with the fan off.

If multiple heaters are tied together, and the master detects that the slave fan is on (the air switch stuck?), the master will lock up displaying "SLA ERROR". This condition may be bypassed with the "FAN BYPASS" switch.

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

NORMAL OPERATING DISPLAYS WITH HEATER NOT RUNNING

The main display shows the plenum temperature. If the dryer has not been running, the display should show outside temperature. The control is preset at the factory to display temperature in centigrade or fahrenheit "AIRFLOW" or "NO AIRFLOW" is displayed if air is flowing or not flowing. "RX TX" (receive, transmit) is displayed if multiple heaters are connected. All safeties or high limits are continuously checked during the off mode. A limit switch open, or any other error condition will cause the display to show the limit or error condition. When drying is not occurring, and the limit or error condition is corrected, the display returns to its normal output. This is not the case with an error or limit condition during the drying operation. This causes the display to lock up in the error display mode. This is to keep the display locked up with the condition illuminated. (see section on "Running the Dryer" for mode explanation on page 16)

The heater display with fan off (no airflow).

STARTING THE DRYER

After heater power is turned on, the fan must be turned on. Attempting to start the dryer without the air switch indicating there is airflow will cause an airflow alarm to go off when the start switch is depressed. The airflow alarm is simply the entire display going blank, and the "NO AIRFLOW" message flashing for a few seconds. The display must show "AIRFLOW" before the dryer can be started.

To start the dryer, just push the "START" switch. The first message to come up will be the "PURGE" message--the drying process begins with a 10 second purge.

When multiple heaters are connected together, drying may be started from any heater control.

SETTING GAS PRESSURE

1. At heater turn toggle switch to "ON" position.

2. Press the "PROGRAM TEMPERATURE" button.

3. Use the increase or decrease button to set the "PLENUM HIGH LIMIT SET POINT" to desired setting (100°-160°*).

4. Press the "PROGRAM TEMPERATURE" button to continue to set the "CYCLE SET POINT". (hi-lo units only)

5. Use the increase or decrease buttons to set the "CYCLE SET POINT" to desired setting (90°-150°*) (hi-lo units only).

Programming the temperature differential.

6. Press the "PROGRAM TEMPERATURE" button to continue to set the "TEMPERATURE DIFFERENTIAL".

7. Use the increase or decrease buttons to set the "TEMPERATURE DIFFERENTIAL" to 10°*.

8. Open all manual gas shut off valves, on and to the heater unit.

9. Start the fan unit.

10. Make sure that the blade is spinning in the right direction. If not place the toggle switch in the "OFF" position and correct the problem.

11. After the fan reaches full speed the display should read "AIRFLOW" in the upper right hand corner.

12. Press the start button on the heater control.

13. After 10 seconds the burner should ignite. If not, turn "OFF" the toggle switch and then back "ON". Repeat 12-15.

14. When the burner ignites the display should read "HI-FLAME" at the left of the display. Loosen the nut on the main regulator and turn screw in, to increase pressure and out to decrease pressure. The pressure gauge should be set at 10-15 lbs. for LP units, or 4-6 lbs. for natural gas units. (use the charts on the following pages to set pressure)

15. Press the "PROGRAM TEMPERATURE" button to change the high limit set point. Press it again to change the "CYCLE SET POINT". (hi-lo units only)

16. Decrease the "CYCLE SET POINT TEMPERATURE" until the heater cycles to low flame. (hi-lo units only)

17. Open or close the low cycle ball valve until the gas pressure is 3-5 lbs. for LP, or 1-2 lbs. for natural gas. (hi-lo units only)

18. Increase the cycle set point to return to high flame. (hi-lo units only)

19. Watch heater run several minutes to make sure it cycles between hi and lo flame or on and off properly.

20. Hi-flame pressure should be adjusted so plenum reaches cycling temperature easily.

21. Adjust pressure on on/off units so that unit is on approximately 75% of the time.

 *Temperatures are fahrenheit.

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
	2"	2	4	6	8	10	13	
10HP	4"	1	3	5	6	8	11	14
	6"	1	1	3	5	6	8	10
	2"	3	6	9	12	15		
15HP	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
	2"	1	1.75	2.5	3.5	4.75	6	
10HP	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
	2"	1.5	2.5	3.75	5.5			
15HP	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		

HEATER OPOERATION PROCEDURE

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

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 temperature to equalize.

5. Tighten 5/16" bolts and watch heater run for several minutes to verify adjustment.

The limits are continuously checked during the drying operation. A limit switch open or any other error condition will cause the dryer to shut down, and the fan will be shutdown. ***If a limit opens, or an error condition occurs during drying, the control will lockup in the error display mode. Power must be shut off and back on to the control to clear the error condition****--even if the error or limit that caused the shutdown has been corrected.* This is to keep the display locked up with the condition that caused the error, allowing the operator time to determine what caused the shutdown.

PROGRAMMING SET POINTS

Depressing the "PROGRAM" switch (lower left) causes the display to enter the program mode. Each item below is programmed by using the up and down arrow switches. Holding down these up and down arrow switches for about 2 seconds will cause the numbers to increase/decrease rapidly until the switch is released. When finished programming an item, depressing the "PROGRAM" switch again will cause the new setting to be entered into memory, and the display will advance to the next function to be programmed.

Programming may be done at anytime (unless an error condition exists) even while the dryer is in operation.

Programming a system with multiple heaters may be done at any heater control console. The information programmed is automatically transmitted to all other heaters when the programming is complete.

Hi Limit Set Point--The upper left cursor is flashing indicating the mode. If the plenum temperature increases above this point, the flame is shut off--"OFF-CYCLE" is displayed on screen.

Cycle Set Point--The upper 2nd from left cursor is flashing indicating the mode. ***If the dryer is not a hi-lo dryer, this function is skipped.*** If the plenum temperature increases above this point, the flame reduces to "LO-FLAME".

Humidity Set Point--The upper 2nd from right cursor is flashing indicating the mode. If the humidity is above this point the dryer operates normally--flame on and off at the high limit and cycle set points. If the humidity is below this point the dryer goes into the "OFF-CYCLE" mode. ***Note: At this time a true humidity sensor has not been introduced. To use this option, set the humidity setting to 50% and use a humidistat switch.*** When the humidity is high the switch is closed, indicating high humidity. At this setting, the dryer runs normally.

Temperature Differential--The upper right cursor is flashing indicating the mode. If the flame shuts off because the temperature is greater than the high limit set point, the temperature must fall below the (Set Point minus Temperature Differential) for the flame to come back on.

Programming the high-limit set point.

On hi-lo units when the unit reaches cycle set point, the flame will switch to lo-flame and unit will not cycle back to hi-flame until (Set Point minus Temperature Differential) is reached.

Temperature differential would normally be set for 10-15 degrees F for high temp units, and 2-5 degrees F for lo-temp units.

Humidity Differential--The upper right cursor is flashing indicating the mode. If the flame shuts off because the humidity is less than the humidity set point, the humidity must rise above the (Set Point plus Humidity Differential) for the flame to come back on.

Setting the cycle set point.

PROGRAMMING HOURS TO SHUT DOWN

To change the hours to shut down, depress and hold the "SHUTDOWN HOURS" switch. While holding in on the switch, depress the up and down arrow switches to alter the hours. Setting range is 0 to 200 hours.

DRYING GRAIN IN THE HOURS TO SHUT DOWN MODE

While drying grain, depress and hold the "SHUTDOWN HOURS" switch. While holding in on that switch, depress the "START" switch. After depressing the start switch one time, the heater is in the shutdown mode. Then, the fan and heater shut down when the time expires. This is indicated by the lower left cursor flashing.

Depressing the start switch again (while holding in on the "SHUTDOWN HOURS" switch) will cause only the heater to shut off. This leaves the fan on when the time expires. This is indicated by the 2nd from lower left cursor flashing. Depressing the start switch one more time returns the heater into the continuous--non-shutdown mode.

RUN HOURS DISPLAY

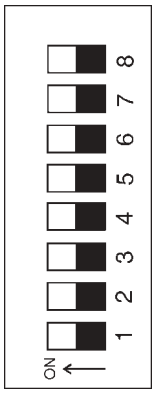
Run hours are recorded when the controller detects that the fan is on (airflow). The hours may be viewed by depressing the "HOURS" to get hours and "HOURS X 1000" to get the number of 1000 hours accumulated.

MULTIPLE HEATER NOTES

When multiple heaters are connected together, the temperature and humidity sensors must be connected to the master.

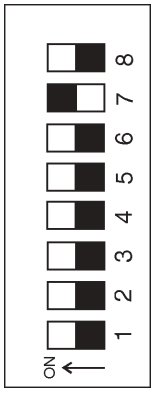
CONFIGURATION DIP SWITCHES (NORMALLY DONE AT FACTORY)

These switches are used to configure the heater control for various types of heaters.



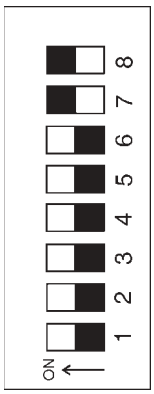
Stand alone heater with no slaves, all dip switches in the off state.

Multiple heaters connected together through the serial link.



Master with one slave-dip switch 7 on/all others off.

Master with two slaves-dip switch 8 on/all others off.

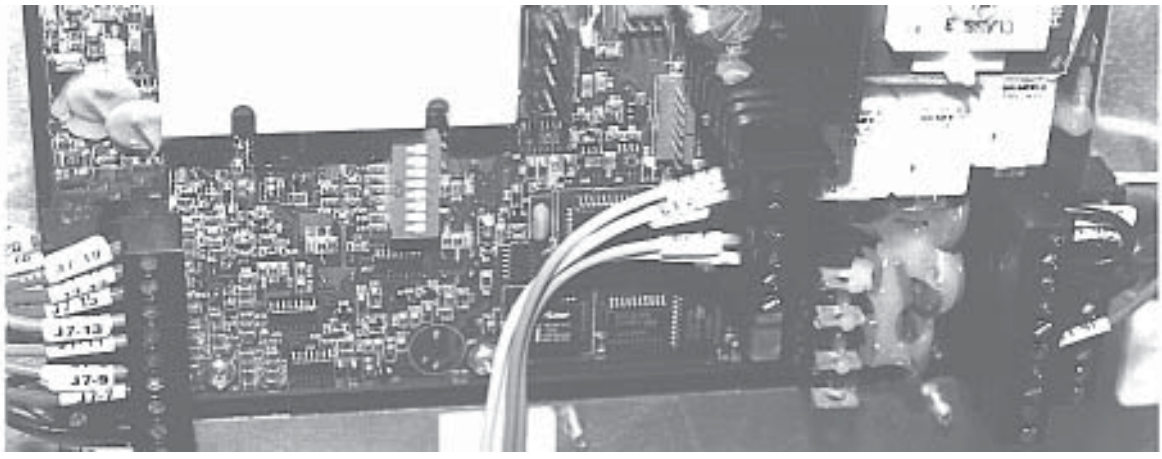


Master with 3 slaves-dip switch 7 & 8 on/all others off.

Slave #1-dip switch one on/all others off.

Slave #2-dip switch two on/all others off.

Slave #3-dip switch one & two on/all others off.



The backside of the control board, showing the dip switch placement.

LIMIT SWITCHES

The following limit switch errors light up individually on the heaters LCD screen: PLENUM, HOUSING, VAPOR, TEMP HI LIMIT.

Note: When a shutdown does occur due to an error condition, the amount of time elapsed since the shutdown can be viewed by pressing the down arrow switch (up to 218 hours).

MULTIPLE HEATER ERROR CONDITIONS

If two or more heaters are connected together through the serial link, and the master cannot communicate with a slave controller, the master will display "SLA" on the main display and the "RX" "TX" symbols will be flashing. ***If a limit switch error or one of the error numbers 1 through 8 occurs, that error is displayed on the slave where the error originates. The master displays "SLA ERROR".***

MISC ERROR NUMBERS

1

Temperature probe 1 open.

2

Temperature probe 1 short.

3

Temperature probe 2 open.

4

Temperature probe 2 short.

5

Airflow open.

6

Airflow short.

7

Illegal flame sense. Error 7 is most likely caused by stuck open solenoid. Error 7 will not shut down fan until loss of flame is detected by control.

8

Flame probe short error.

9

Slave #1 inconsistent with master with either the drying grain flag or the LP main solenoid or cycle solenoid. Most likely the slave got reset powering up with the solenoids off.

10

Slave #2 inconsistent. Same as error 9 for slave #1.

11

Slave #3 inconsistent. Same as error 9 for slave #1.

12

Wrong voltage. Dip switch #5 is the voltage selector switch. If dip switch #5 in "ON" that selects 240 VAC. If the unit has only 120 VAC applied, error 12 will show up. If dip switch #5 is"OFF" that selects 120 VAC. If the unit has 240 VAC applied error 12 will show up.

This is important because if the heater is set up at NECO for 120 VAC and the customer connects to 240 VAC the heater control will work, but if allowed to operate the solenoids will have 240 VAC applied to them which will damage solenoids.

13

+11 volt DC shorted to ground.

000

This indicates that one of the other on screen errors (vapor, plenum or housing temp hi-limit or flame out or no airflow has occured.

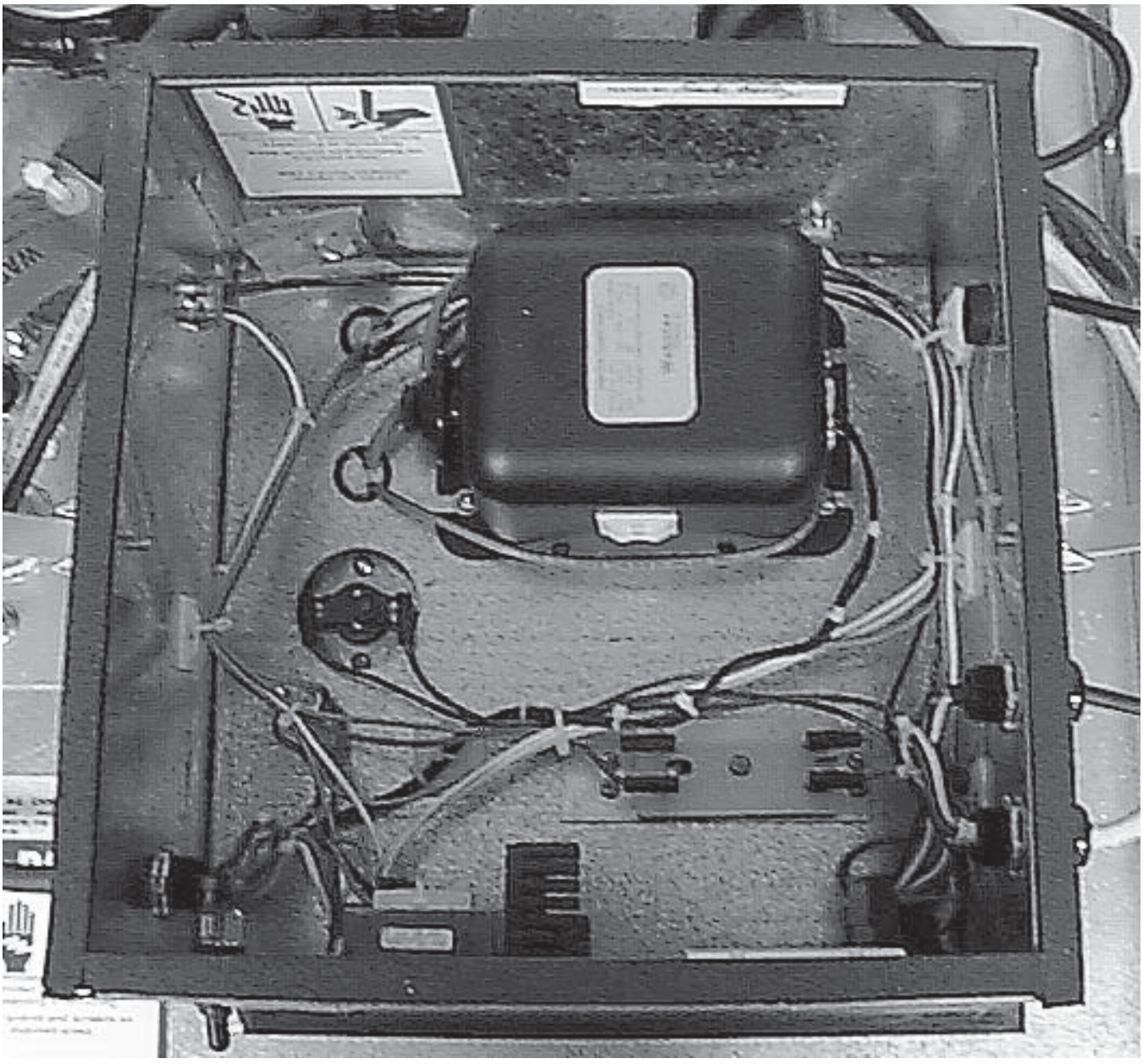
(Errors 9 through 11 are displayed only if multiple heaters are tied together through serial link).

Note: Temperature sensor connection-the temperature sensor (bolt) must always be connected to the master.

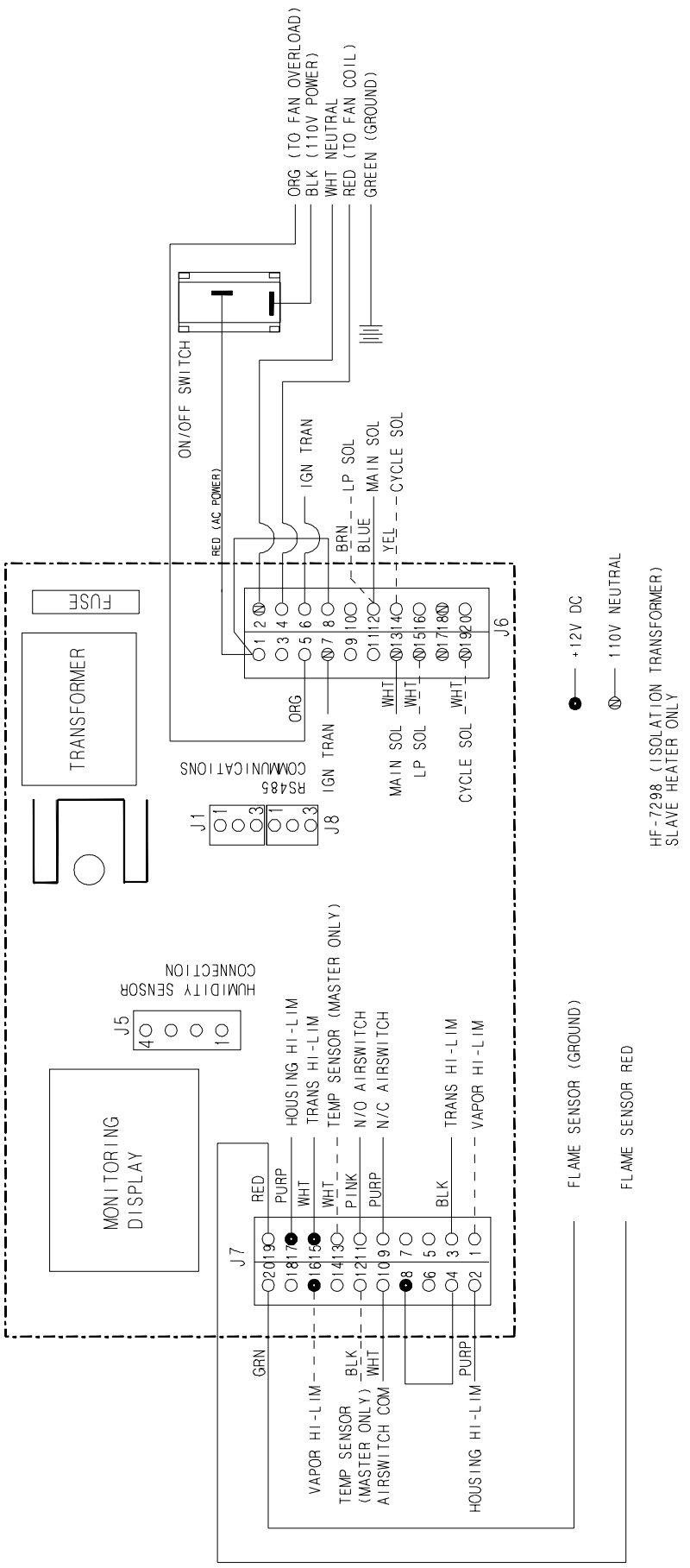
The heater control display showing error 000.

All NECO heaters are constructed of durable weather-resistant materials, so a minimum amount of service should be required; however 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 burner for wear or foreign material in any of the ports. Clean or replace parts if necessary.
4. Inspect the spark plug and flame probe for corrosion and damage. Clean or replace if necessary.



The Series Two control box.


ORG (TO FAN OVERLOAD)
BLK (110V POWER)
WHT NEUTRAL
RED (TO FAN COIL)
GREEN (GROUND)
ON/OFF SWITCH
RED (AC POWER)
IGN TRAN
LP SOL
MAIN SOL
CYCLE SOL
BRN
BLUE
YEL
J6
ORG
IGN TRAN
MAIN SOL WHT
LP SOL WHT
CYCLE SOL WHT
FUSE
TRANSFORMER
J1
J8
RS485 COMMUNICATIONS
HUMIDITY SENSOR CONNECTION
J5
MONITORING DISPLAY
J7
RED
PURP
WHT
HOUSING HI-LIM
TRANS HI-LIM
TEMP SENSOR (MASTER ONLY)
PINK
N/O AIRSWITCH
PURP
N/C AIRSWITCH
BLK
TRANS HI-LIM
VAPOR HI-LIM
+12V DC
110V NEUTRAL
HF-7298 (ISOLATION TRANSFORMER)
SLAVE HEATER ONLY
FLAME SENSOR (GROUND)
FLAME SENSOR RED
GRN
VAPOR HI-LIM
TEMP SENSOR (MASTER ONLY)
BLK
AIRSWITCH COM
WHT
HOUSING HI-LIM
PURP

NOTES

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