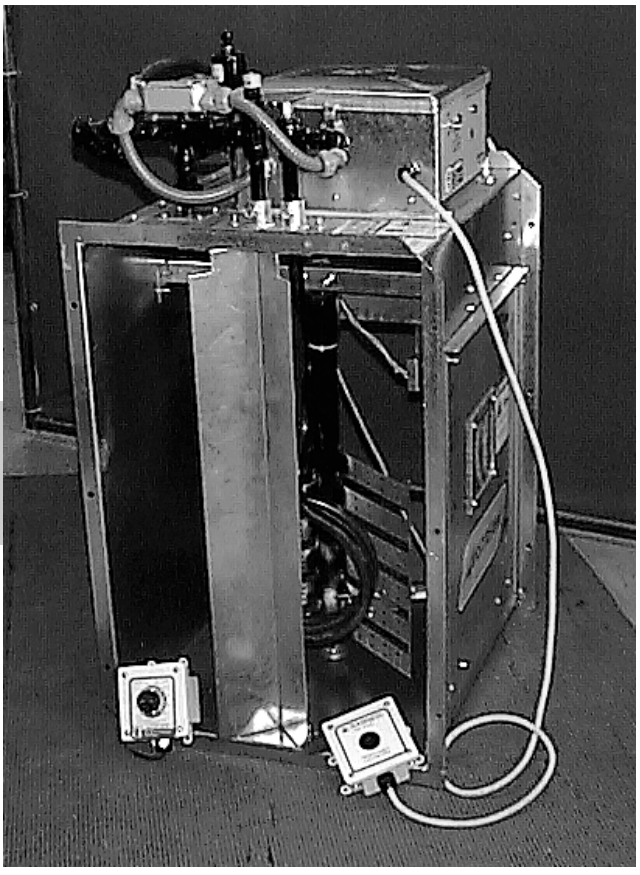
Standard Centrifugal Heater Installation And Operating Instructions

MODEL # CH - __ __ - __ __ - S (HIGH)

MODEL # CH - __ __ - __ __ - S (LOW)

Owner's Manual

MANUAL # PNEG-179
Version 2 3/99



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✓OK

_____ 1. All wire connections
_____ 2. Spark plug tightness set gap .039
_____ 3. All nut bolts for tightness
_____ 4. Pipetrain tightness and gas leaks
_____ 5. Flame probe tightness
_____ 6. Off-on switch
_____ 7. Reset control button
_____ 8. Indicator light
_____ 9. Pressure gauge proper reading
_____ 10. Regulator proper adjustment
_____ 11. Check gas valve for proper function
_____ 12. Humid-thermo receptacle for proper cycle
_____ 12. Burner for proper burn
_____ 13. Heat rise even across transition
_____ 14. Aesthetic appearance
_____ 16. All decals and serial number tag
_____ 17. Manual in control box
_____ 18. Air switch

Tester Signature_____

Date_____

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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 Standard Centrifugal Heater. Safety precautions may be required from the personnel. This product is ideal for the aeration 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 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.

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 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.

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 HU-

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 pipetrain 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 vaporizer.

2. Run proper size line (see specifications) 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.
   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 pressure sometimes found with natural gas.

2. Run proper size line (see specifications) to pipetrain on heater. Have a qualified gas service man inspect installation to be sure every thing 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. (See above for other precautions.)

Heater Electrical Installation

These Instructions Are For Heater Installation On Fan Units With 230v Motors.

Be Sure Power Is Disconnected And Locked Out Before Installation! Failure To Do So May Cause Serious Injury Or Death.

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.

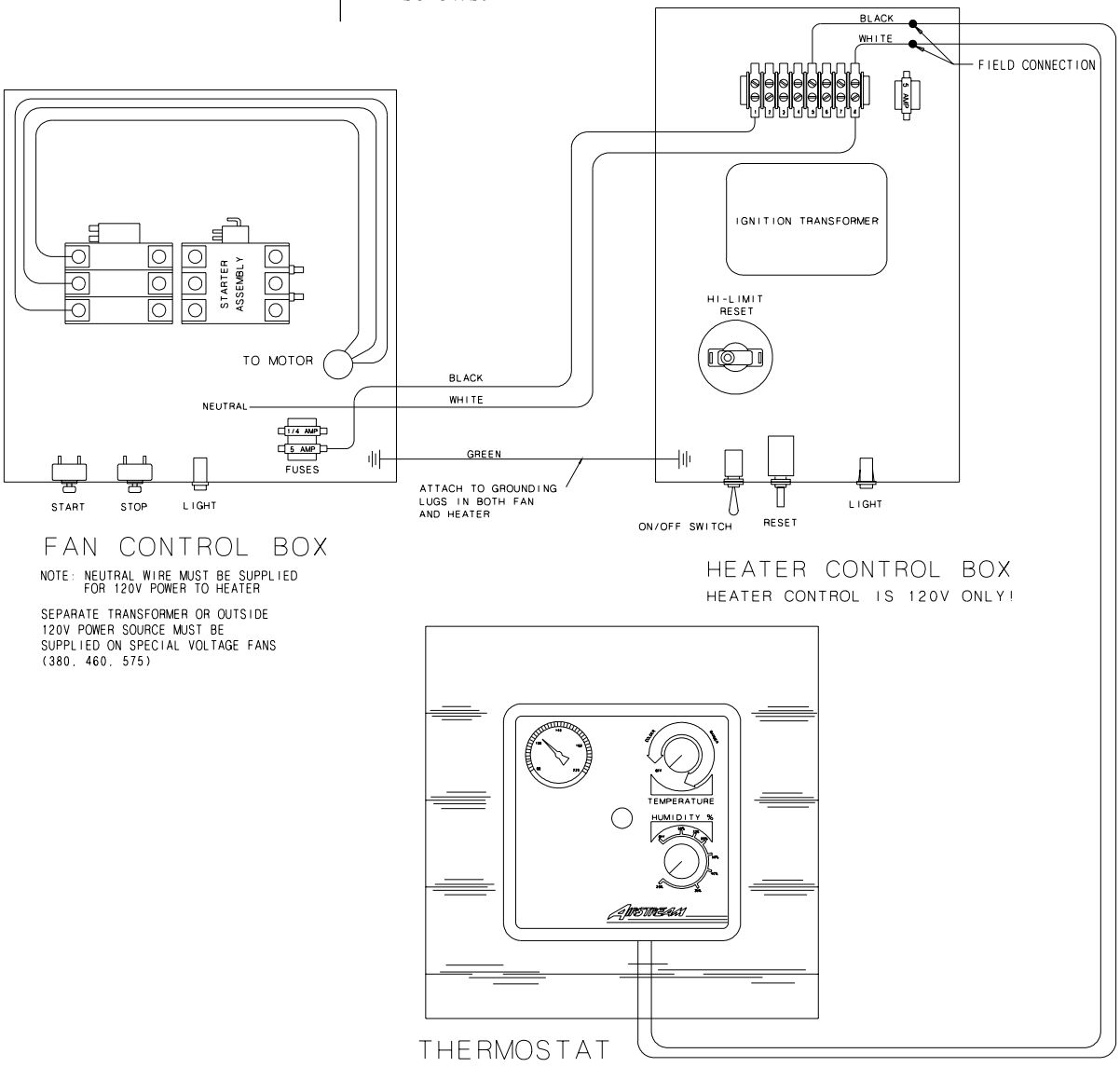


Figure 1: Standard centrifugal heater wiring to fan unit.

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 Modulating valve bypass orifice Minimum operating pressure Maximum operating pressure Minimum line size	43 .25 Aluminum 3 30 3/8"	210 .109 Yellow 1 15 1/2"
Vapor models	Maximum fuel flow (CFH) Orifice size Modulating valve bypass orifice Minimum operating pressure Maximum operating pressure Minimum line size	1590 .25 Aluminum 2 30 1"	N/A N/A N/A N/A N/A N/A
Natural gas models	Maximum fuel flow (CFH) Orifice size Modulating valve bypass orifice Minimum operating pressure Maximum operating pressure Minimum line size	4200 .375 Aluminum 1 15 1.1/4"	500 .156 Green 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"

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.

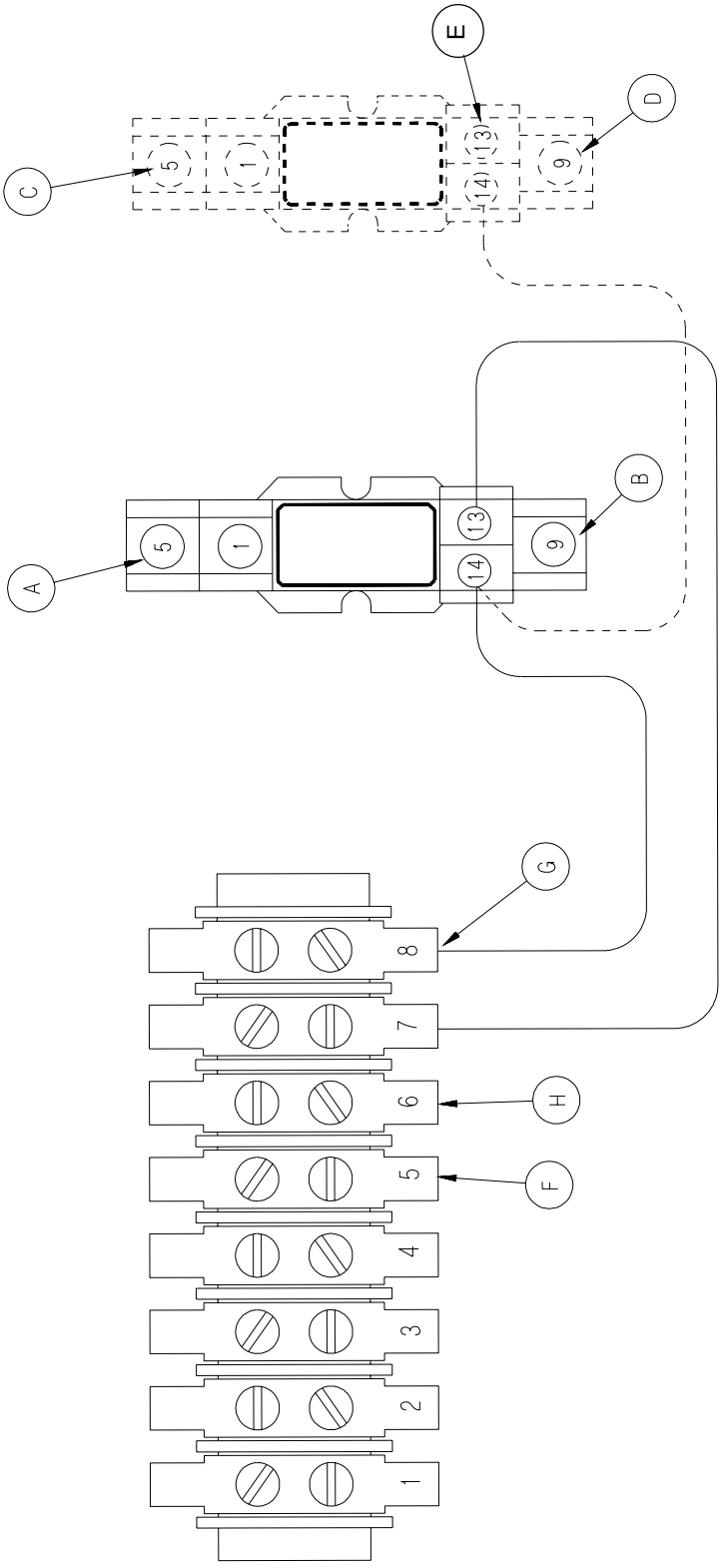
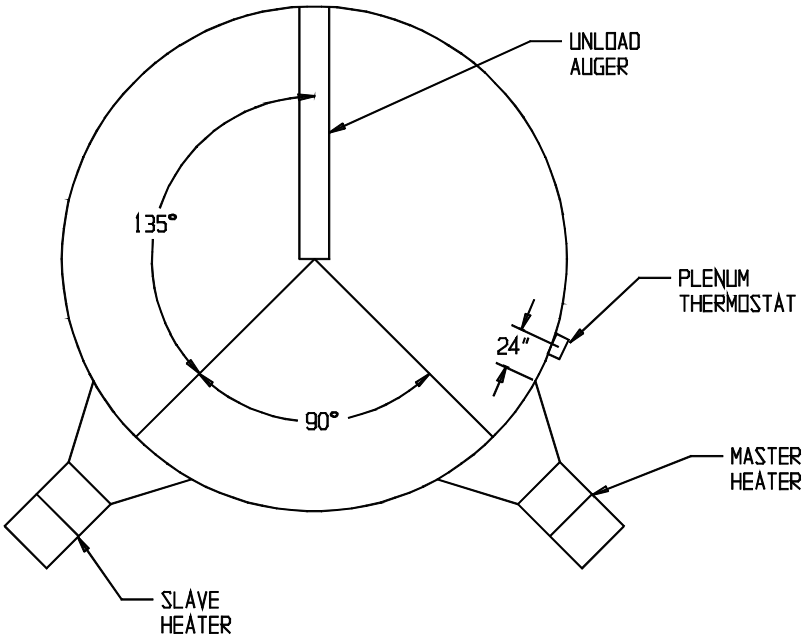


Figure 2: Illustration of second heater wiring.

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.

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.

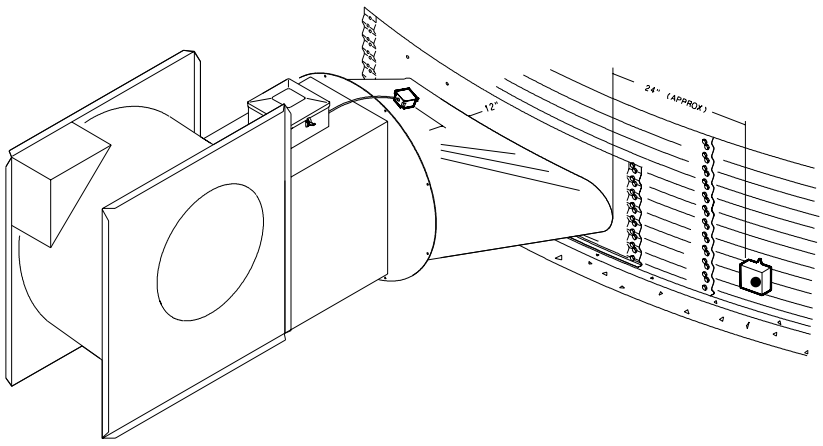


Figure 2: The transition connecting the Vane Axial Heater to the bin with the plenum sensor in place.

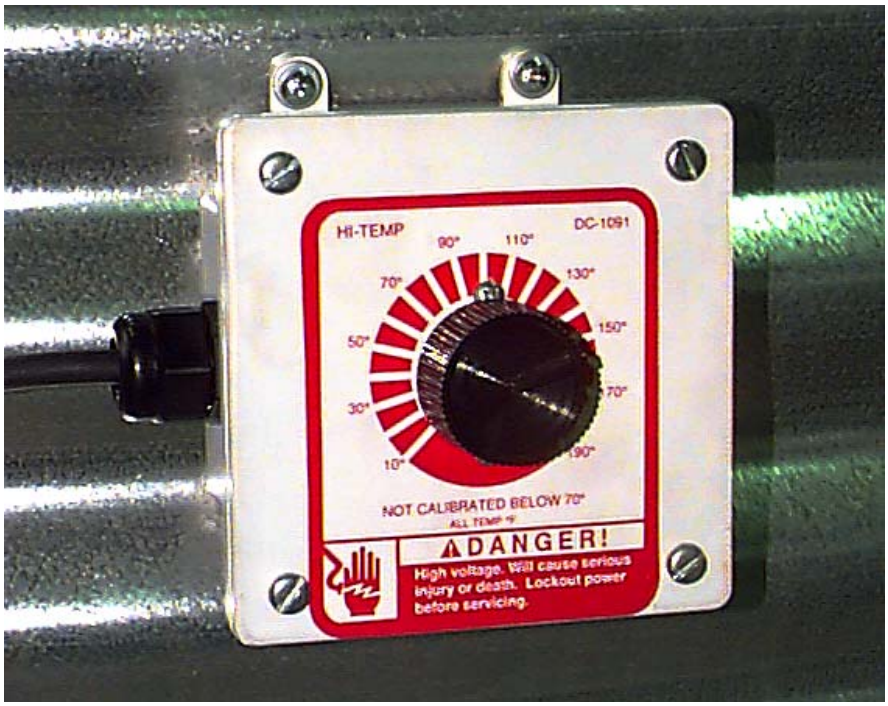
Plenum Thermostat Mounting

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.



Plenum thermostat mounting on bin wall.

4. Use 4 self drilling screws to mount the housing to the bin sidewall.

5. Caulk between the housing and the sidewall to seal.

THIS TABLE IS NOT INTENDED AS A DRYING GUIDE.
IT SHOULD BE USED AS A REFERENCE FOR SETTING MAXIMUM PLENUM TEMPERATURE FOR SAFE OPERATION.

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

Standard Heater Operation

1. Thermostat must be wired into heater control box for heater to operate.
2. Open all manual shutoff 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. 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.
9. Watch plenum temperature as burner goes through a few cycles, to be sure that it is operating properly.

Hi-lo Heater Operation

1. Hi-limit and cycling thermostat must be wired into heater control box for heater to operate.
2. Open all manual shutoff 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. Both red lights should light up indicating power to the control circuit.
6. Heater should now be lit. If not check to see that all gas is on.
7. Open low-fire ball valve all the way.
8. Turn thermostat dial back slowly until heater cycles to low flame.
9. Adjust ball valve so that low flame pressure is at desired setting.
10. 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.
11. 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.

Modulating Valve Operation

1. The modulating valve regulates gas flow through the heater based on sensing unit in the plenum, and maintains a constant drying air temperature.

2. The sensing bulb of the modulating valve should be mounted through the bin wall with the side reading "top" up. The bulb reacts to temperature. It changes the amount of gas (increase or decrease), burning warmer or cooler depending on the position of the valve SET POINT. If the bulb is cooler than it was at the SET POINT, the bulb senses the cooler temperature and opens the valve further so more heat is applied to the drying air. If the bulb is warmer than it was at the SET POINT, the valve closes further and reduces the temperature until the air is at the valve SET POINT.

3. It is important that the pressure regulator be set high enough to allow the modulating valve to deliver enough gas to maintain the plenum temperature necessary. The regulator is normally factory set at 15 psi (propane units). To set the regulator, run the heater and turn the modulating valve T-handle in. This gets full line pressure to the burner. Then adjust regulator to read 15 psi (depending on the plenum temperature needed).

4. Turn the fan and heater on. To set the modulating valve, turn the T-handle out (counterclockwise) until loose and wait a few minutes for the plenum temperature to equalize. When the temperature under the bin has equalized, gradually turn T-handle in (clockwise) about 1/2 turn at a time. Wait until temperature under bin has equalized as before. If temperature under bin is less than the desired temperature, continue turning T-handle in, increasing gas flow and waiting for plenum temperature to equalize until the desired temperature is the stable temperature of the plenum. If temperature under bin is the same 10 minutes after you last made any adjustments to the T-handle you can be certain that the temperature under the bin is the SET POINT of the valve. **1 turn of the T-handle equals approximately 7 degrees F of temperature.**

5. The valve will now keep the plenum temperature at the set point regardless of ambient conditions as long as humidistat or thermostat do not shut down the heater. A bypass orifice is used to maintain a small flame when outside temperature is near or above the set point of the valve. The bypass insures steady application of heat at minimum gas flow operation. Bypass orifice will only operate correctly if pressure regulator is set correctly.

6. To observe how the modulating valve increases the efficiency of bin drying, check the gas pressure of the unit in the morning and compare to the pressure read mid-afternoon. If the ambient (outside) temperature is significantly greater later in the day (as normal), the gas pressure will be less. Since less heat is required to maintain the same temperature in the plenum, the modulating valve will have reduced the amount of gas used by the heater.

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
	2"	2	2	4	5	7	8	10
20HP	4"	1	2	3	4	5	7	8
	6"	1	2	3	4	5	6	7
	2"	2	3	5	7	9	12	15
25HP	4"	2	3	4	6	8	10	13
	6"	2	2	4	5	6	8	10
	2"	2	4	6	8	11	15	
30HP	4"	2	4	5	7	10	13	
	6"	2	3	4	6	8	10	13
	2"	3	6	8	12			
40HP	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
	2"	0.75	1.25	1.75	2.5	3.25	4.25	5.5
20HP	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
	2"	1	1.75	2.25	3.5	4.75	6.25	
25HP	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
	2"	1.25	2	3	4.5	6		
30HP	4"	1	1.75	2.75	3.75	5	7	
	6"	0.75	1.5	2.25	3	4	5.25	7
	2"	1.75	3	4.5	6.25			
40HP	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)

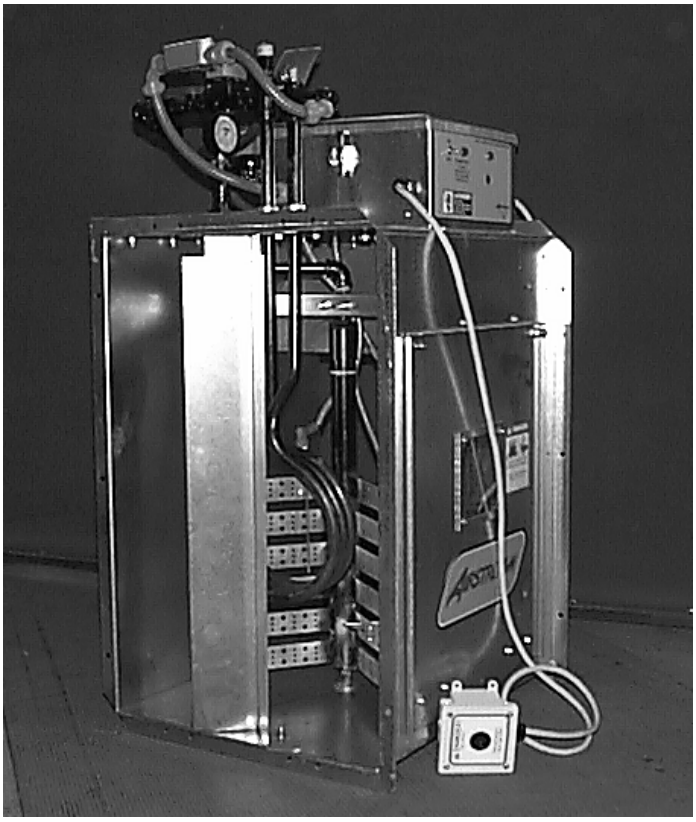
LOW TEMPERATURE ALL HP's 7/64" orifice
OPERATING PRESSURE (PSI)

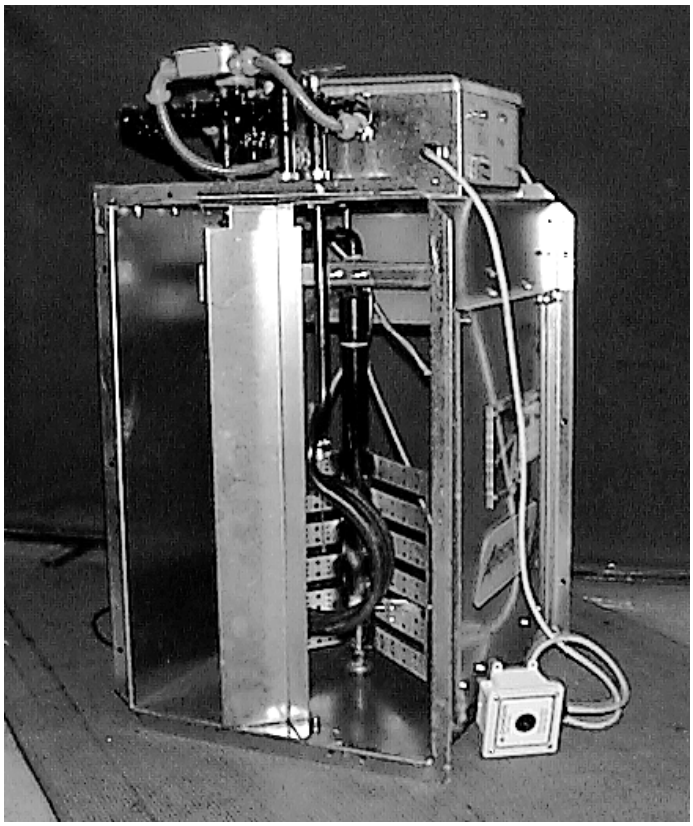
	2	4	6	8	10	12	14	15
ALL MODELS	203405	287160	351771	409203	457063	497744	538425	555176

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





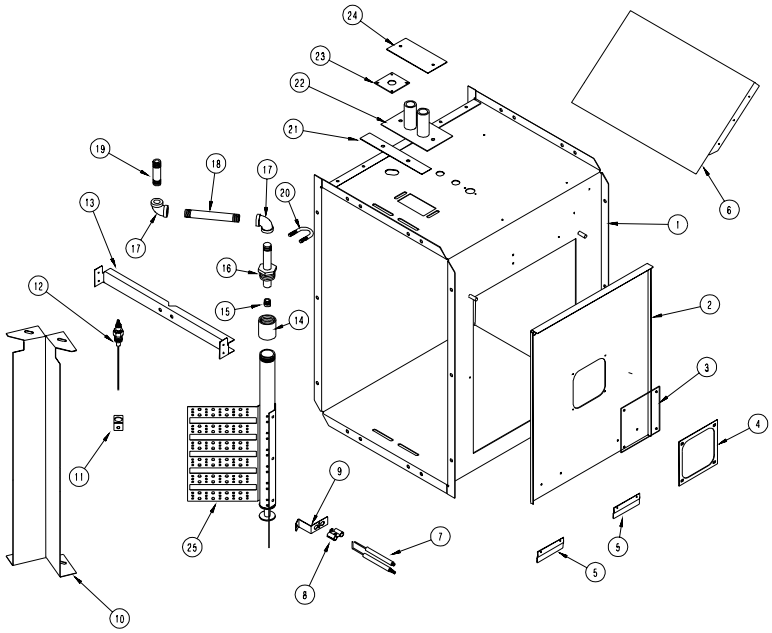
Adjusting The Vaporizor

1. Vaporizer should be adjusted so the vapor pipetrain 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.

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).

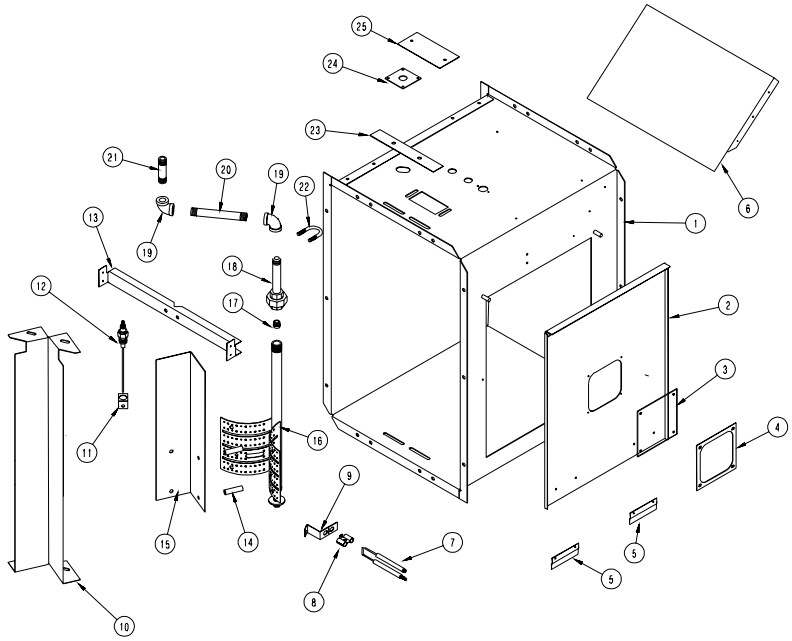
Trouble	Probable Cause	Check-out Procedure
Burner will not fire. No gas pressure on gage. No ignition spark.	Heater not wired in	Visually check fan control box to see if wires are connected.
	Fan not running	Fan contactor must be energized for heater to run.
	Blown fuse Bad on/off switch	Visually check 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.

10-15 Dw High Temp Heater Parts



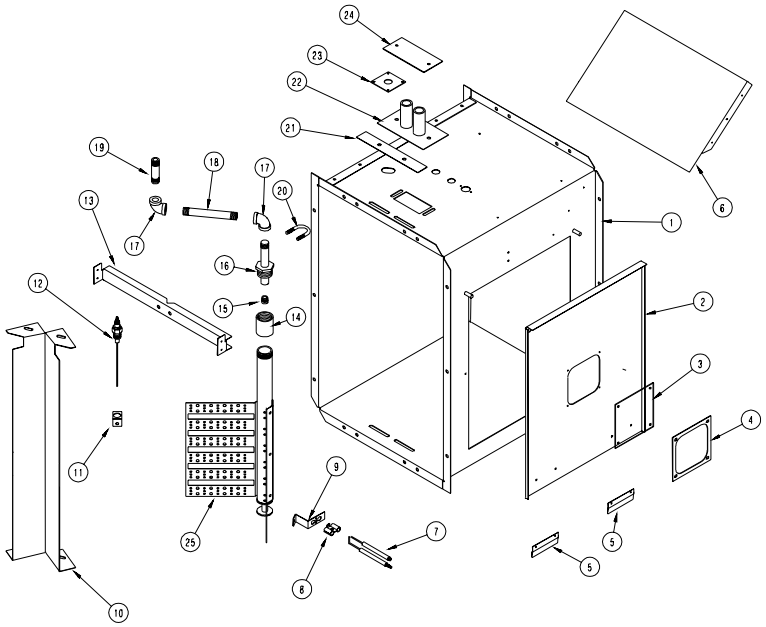
Key	Part Number	Description
1	HF-7076	10-15 HP Housing Assembly
2	HF-7288	Access Side Cover
3	HF-7380	Plastic View Window
4	HF-7379	Access Panel Cover Plate
5	HF-7287	Access Panel Holders
6	HF-7063	10-15 Diverter Plate
7	CD-0238	Ignitor (2 Required)
8	HF-7201	Ignitor Clamp Half (2 Required)
9	HF-7204	Ignitor Bracket
10	HF-7101	10-15 Diverter Angle
11	HF-4485	Flame Probe Bracket (Standard)
12	HH-1097	Flame Probe (Standard)
13	HF-7290	10-15 Burner Brace
14	HH-7035	1 1/4" Coupling
15	HF-7083	1/4" Orifice (Propane)
15	HF-7034	3/8" Orifice (Natural Gas)
16	HF-7027	Orifice Tube Weldment
17	THH-4071	1/2" Elbow
18	HH-3854	1/2" x 6" Nipple
19	HH-3670	1/2" x 2.1/2" Nipple
20	S-7259	5/16" U-Bolt
21	HF-7079	Diverter Angle Cover
22	HF-7020	Vaporizer Support Weldment
23	HF-7297	Burner Support Plate
24	HF-7032	Vapor Cover Plate
25	HF-7023	HI-Fire Burner Assembly
NS	HF-7261	10-40HP Spark Plug Wire
NS	HF-7263	10-40HP Flame Probe Wire

10-15 Dw Low Temp Heater Parts



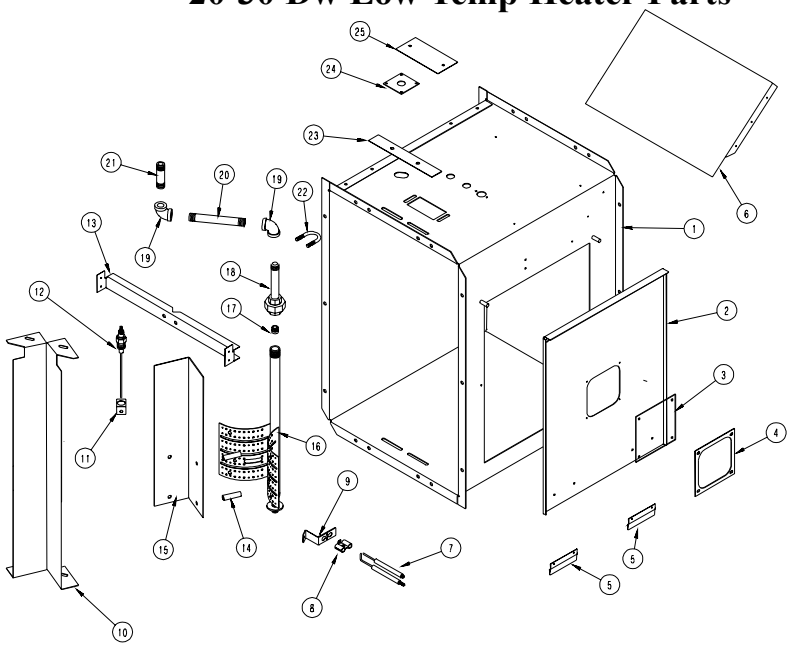
Key	Part Number	Description
1	HF-7076	10-15 HP Housing Assembly
2	HF-7288	Access Side Cover
3	HF-7380	Plastic View Window
4	HF-7379	Access Panel Cover Plate
5	HF-7287	Access Panel Holders
6	HF-7063	10-15 Diverter Plate
7	CD-0238	Ignitor (2 Required)
8	HF-7201	Ignitor Clamp Half (2 Required)
9	HF-7204	Ignitor Bracket
10	HF-7101	10-15 Diverter Angle
11	HF-4485	Flame Sensor Bracket (Standard)
12	HH-1097	Flame Probe (Standard)
13	HF-7290	10-15 Burner Brace
14	HF-7072	LO-Fire Diverter Spacer
15	HF-7071	LO-Fire Diverter
16	HF-7070	LO-Fire Burner Assembly
17	HF-7035	7/64" Orifice (Propane)
17	HF-7036	5/32" Orifice (Natural Gas)
18	HF-7069	LO-fire Orifice Weldment
19	THH-4071	1/2" Elbow
20	HH-3854	1/2" x 6" Nipple
21	HH-3670	1/2" x 2.1/2" Nipple
22	S-7259	5/16" U-Bolt
23	HF-7079	Diverter Angle Cover
24	HF-7297	Burner Support Plate
25	HF-7032	Vapor Cover Plate
NS	HF-7261	10-40HP Spark Plug Wire
NS	HF-7263	10-40HP Flame Probe Wire

20-30 Dw High Temp Heater Parts



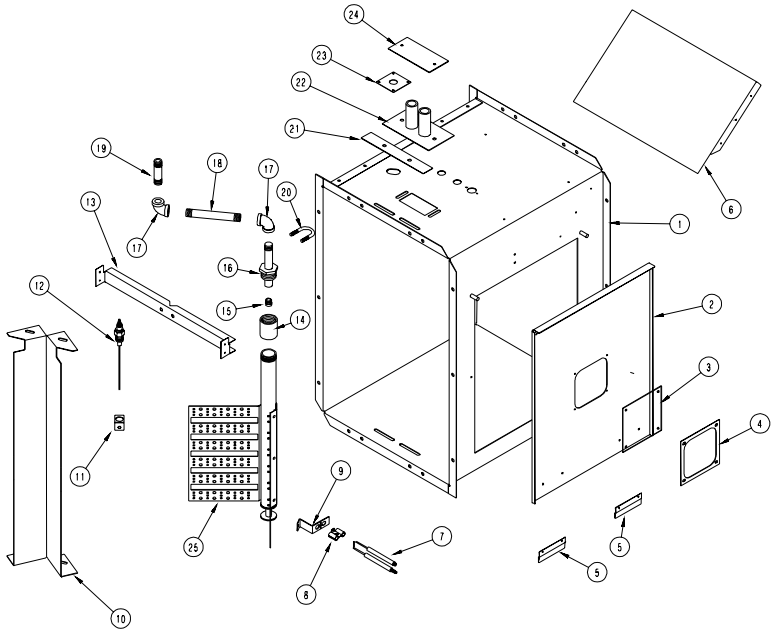
Key	Part Number	Description
1	HF-7077	20-30 HP Housing Assembly
2	HF-7288	Access Side Cover
3	HF-7380	Plastic View Window
4	HF-7379	Access Panel Cover Plate
5	HF-7287	Access Panel Holders
6	HF-7064	20-30 Diverter Plate
7	CD-0238	Ignitor (2 Required)
8	HF-7201	Ignitor Clamp Half (2 Required)
9	HF-7204	Ignitor Bracket
10	HF-7102	20-30 Diverter Angle
11	HF-4485	Flame Probe Bracket (Standard)
12	HH-1097	Flame Probe (Standard)
13	HF-7300	20-30 Burner Brace
14	HH-7035	1 1/4" Coupling
15	HF-7083	1/4" Orifice (Propane)
15	HF-7034	3/8" Orifice (Natural Gas)
16	HF-7027	Orifice Tube Weldment
17	THH-4071	1/2" Elbow
18	HH-3854	1/2" x 6" Nipple
19	HH-3670	1/2" x 2.1/2" Nipple
20	S-7259	5/16" U-Bolt
21	HF-7079	Diverter Angle Cover
22	HF-7020	Vaporizer Support Weldment
23	HF-7297	Burner Support Plate
24	HF-7032	Vapor Cover Plate
25	HF-7023	HI-Fire Burner Assembly
NS	HF-7261	10-40HP Spark Plug Wire
NS	HF-7263	10-40HP Flame Probe Wire

20-30 Dw Low Temp Heater Parts



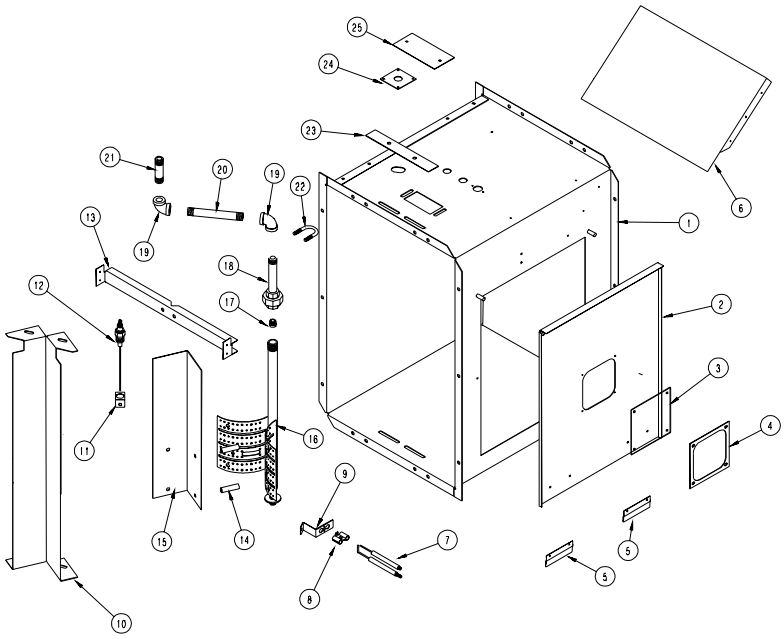
Key	Part Number	Description
1	HF-7077	20-30 HP Housing Assembly
2	HF-7288	Access Side Cover
3	HH-2020	Plastic View Window
4	HF-6914	Access Cover Plate
5	HF-7287	Access Panel Holders
6	HF-7064	20-30 Diverter Plate
7	CD-0238	Ignitor (2 Required)
8	HF-7201	Ignitor Clamp Half (2 Required)
9	HF-7204	Ignitor Bracket
10	HF-7102	20-30 Diverter Angle
11	HF-4485	Flame Probe Bracket (Standard)
12	HH-1097	Flame Probe (Standard)
13	HF-7300	20-30 Burner Brace
14	HF-7072	LO-Fire Diverter Spacer
15	HF-7071	LO-Fire Diverter
16	HF-7070	LO-Fire Burner Assembly
17	HF-7035	7/64" Orifice (Propane)
17	HF-7036	5/32" Orifice (Natural Gas)
18	HF-7069	LO-fire Orifice Weldment
19	THH-4071	1/2" Elbow
20	HH-3854	1/2" x 6" Nipple
21	HH-3670	1/2" x 2.1/2" Nipple
22	S-7259	5/16" U-Bolt
23	HF-7079	Diverter Angle Cover
24	HF-7297	Burner Support Plate
25	HF-7032	Vapor Cover Plate
NS	HF-7261	10-40HP Spark Plug Wire
NS	HF-7263	10-40HP Flame Probe Wire

40 Dw High Temp Heater Parts



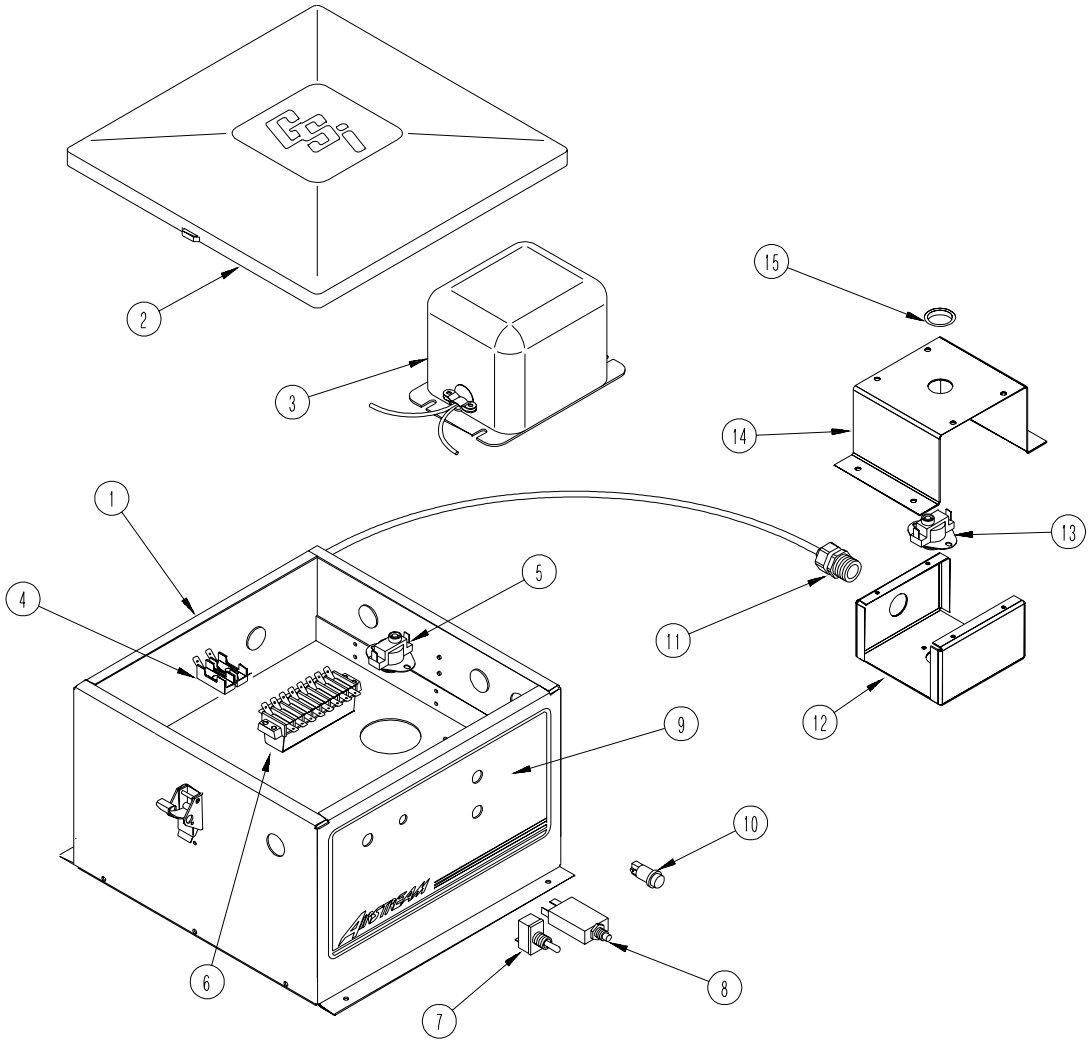
Key	Part Number	Description
1	HF-7472	40 HP Housing Assembly
2	HF-7288	Access Side Cover
3	HF-7380	Plastic View Window
4	HF-7379	Access Panel Cover Plate
5	HF-7287	Access Panel Holders
6	HF-7140	40 HP Diverter Plate
7	CD-0238	Ignitor (2 Required)
8	HF-7201	Ignitor Clamp Half (2 Required)
9	HF-7204	Ignitor Bracket
10	HF-7102	20-40 Diverter Angle
11	HF-4485	Flame Probe Bracket (Standard)
12	HH-1097	Flame Probe (Standard)
13	HF-7304	40 Burner Brace
14	HH-7035	1 1/4" Coupling
15	HF-7083	1/4" Orifice (Propane)
15	HF-7034	3/8" Orifice (Natural Gas)
16	HF-7027	Orifice Tube Weldment
17	THH-4071	1/2" Elbow
18	HH-3854	1/2" x 6" Nipple
19	HH-3670	1/2" x 2.1/2" Nipple
20	S-7259	5/16" U-Bolt
21	HF-7079	Diverter Angle Cover
22	HF-7020	Vaporizer Support Weldment
23	HF-7297	Burner Support Plate
24	HF-7032	Vapor Cover Plate
25	HF-7023	HI-Fire Burner Assembly
NS	HF-7261	10-40HP Spark Plug Wire
NS	HF-7263	10-40HP Flame Probe Wire

40 Dw Low Temp Heater Parts



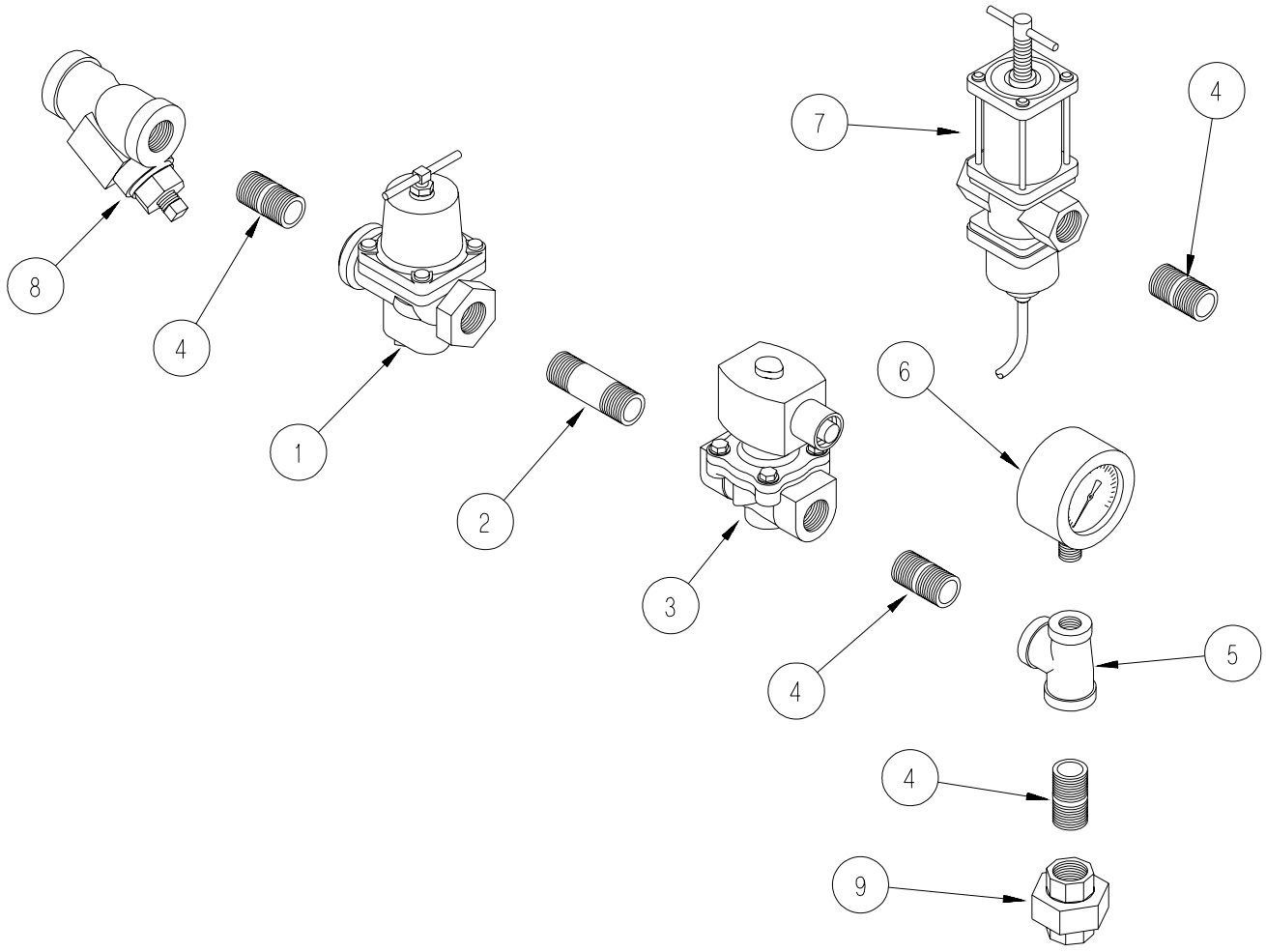
Key	Part Number	Description
1	HF-7472	40 HP Housing Assembly
2	HF-7288	Access Side Cover
3	HH-2020	Plastic View Window
4	HF-6914	Access Cover Plate
5	HF-7287	Access Panel Holders
6	HF-7140	40 Diverter Plate
7	CD-0238	Ignitor (2 Required)
8	HF-7201	Ignitor Clamp Half (2 Required)
9	HF-7204	Ignitor Bracket
10	HF-7102	20-40 Diverter Angle
11	HF-4485	Flame Probe Bracket (Standard)
12	HH-1097	Flame Probe (Standard)
13	HF-7304	40 Burner Brace
14	HF-7072	LO-Fire Diverter Spacer
15	HF-7071	LO-Fire Diverter
16	HF-7070	LO-Fire Burner Assembly
17	HF-7035	7/64" Orifice (Propane)
17	HF-7036	5/32" Orifice (Natural Gas)
18	HF-7069	LO-fire Orifice Weldment
19	THH-4071	1/2" Elbow
20	HH-3854	1/2" x 6" Nipple
21	HH-3670	1/2" x 2.1/2" Nipple
22	S-7259	5/16" U-Bolt
23	HF-7079	Diverter Angle Cover
24	HF-7297	Burner Support Plate
25	HF-7032	Vapor Cover Plate
NS	HF-7261	10-40HP Spark Plug Wire
NS	HF-7263	10-40HP Flame Probe Wire

Standard Dw Gas Heater Control Box Parts



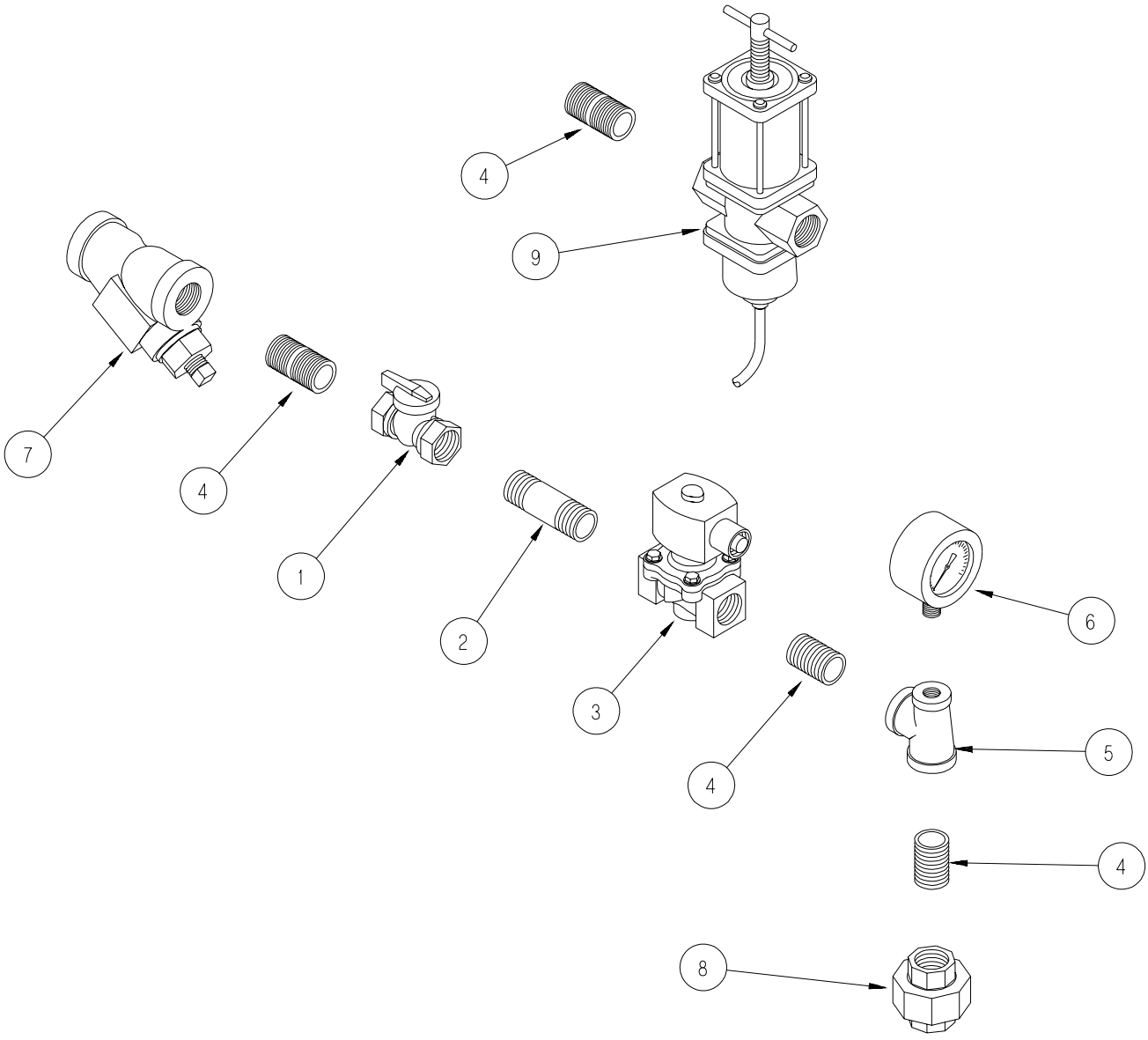
Key	Part Number	Description
1	HF-7315	Control Box Housing
2	F-942	Control Box Lid
3	HH-1487	Igniton Transformer
4	FH-1059	5 Amp Fuse
4	FH-1058	Fuse Holder
5	HH-1092	High Limit Switch 180 Degree
6	HF-7356	Terminal Strip Flame Proving
7	HH-1442	Toggle Switch
8	HH-1089	Reset Time Delay
9	DC-483	Decal Standard Heater Front Panel
10	TFH-2021	Red Light (110V)
11	FH-1310	Cord Connector
12	HF-7455	High Limit Switch Box Bottom
13	HF-7439	High Limit Switch 250 Degree
14	HF-7454	High Limit Switch Box Top
15	HF-7414	Recessed Plastic Plug

Dw Propane Vapor Pipetrain Parts



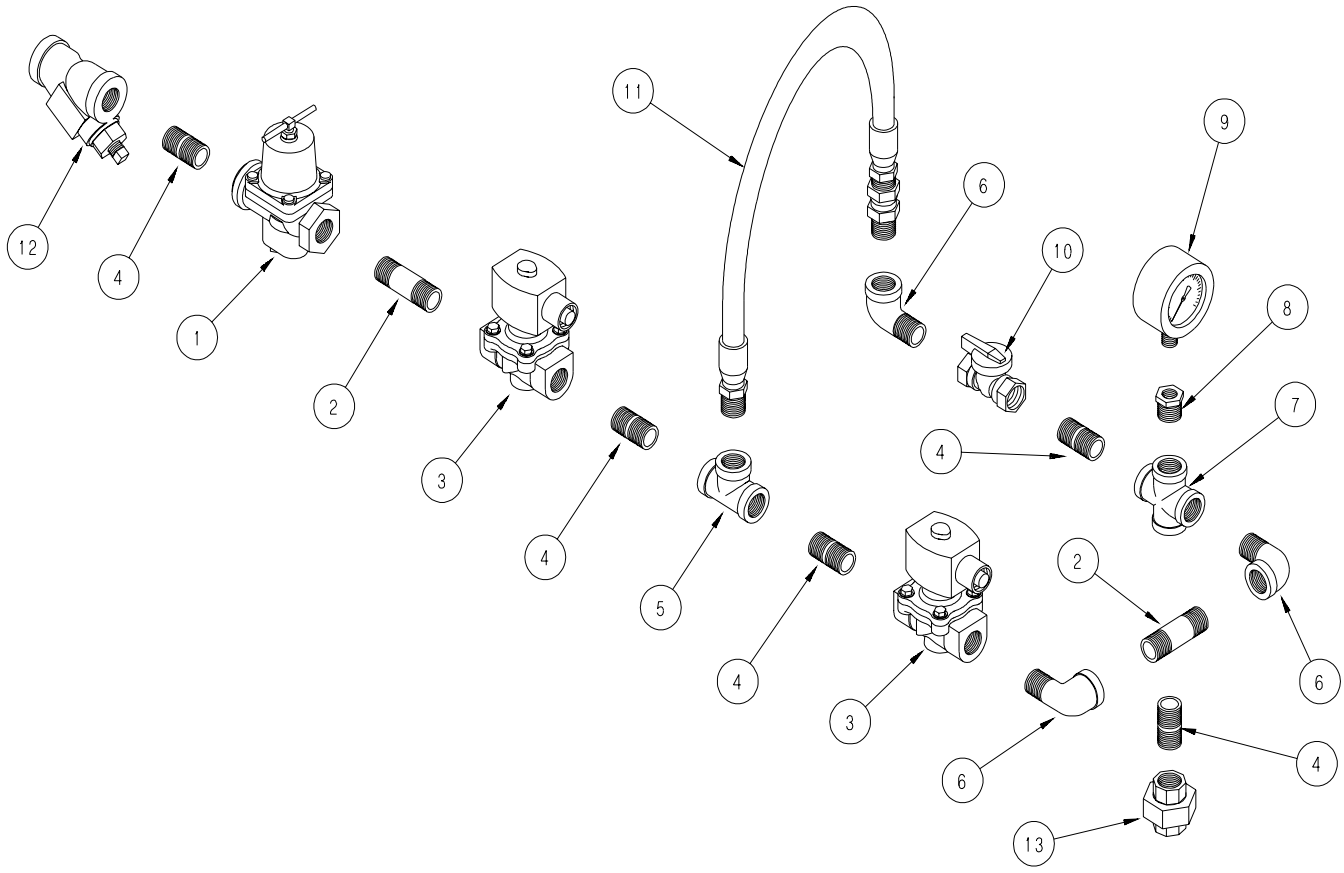
Key	Part Number	Description
1	HH-1077	1/2" 0-30 PSI Regulator (Standard)
2	HH-3670	1/2" x 2 1/2" Nipple
3	HH-1081	1/2" Solenoid (Standard)
4	HH-2029	1/2" x 1 1/2" Nipple
5	S-3853	1/2" x 1/4" x 1/2" Tee
6	HH-2984	30 PSI gauge
7	HH-2653	Modulating Valve
8	HH-1251	1/2" Strainer
9	HH-2028	1/2" Female Union

Dw Natural Gas Vapor Pipetrain Parts



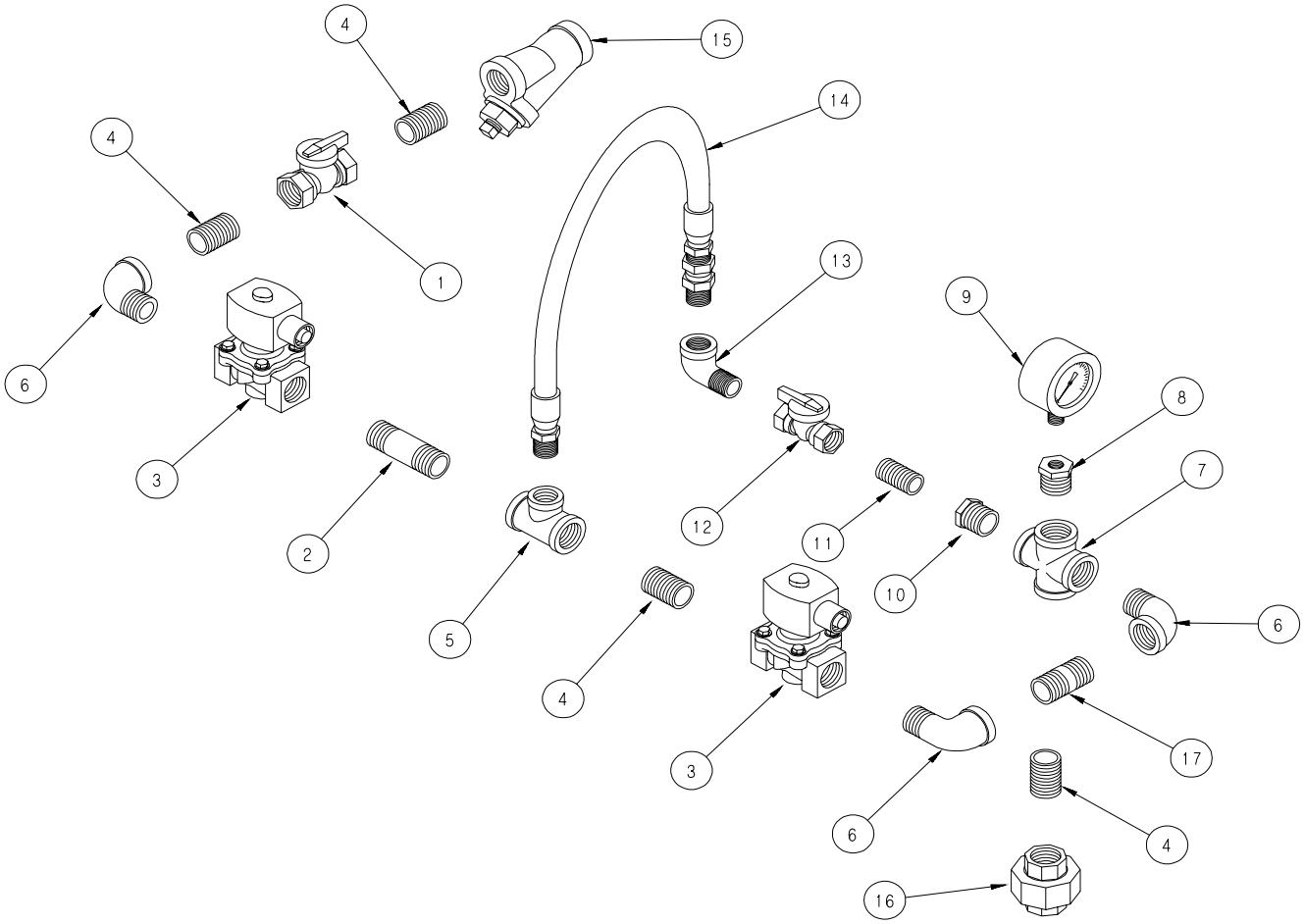
Key	Part Number	Description
1	TFC-0051	3/4" Ball Valve
2	THH-4136	3/4" x 3" Nipple
3	THH-4039	3/4" Solenoid (Standard)
4	THH-4121	3/4" Close Nipple
5	THH-4158	3/4" x 1/4" x 3/4" Tee
6	D08-0022	15 PSI Gauge
7	D67-0008	3/4" Strainer
8	HF-7230	3/4" Female Union
9	HH-7064	3/4" Modulating Valve (Optional)

Dw Propane Vapor Hi-lo Pipetrain Parts



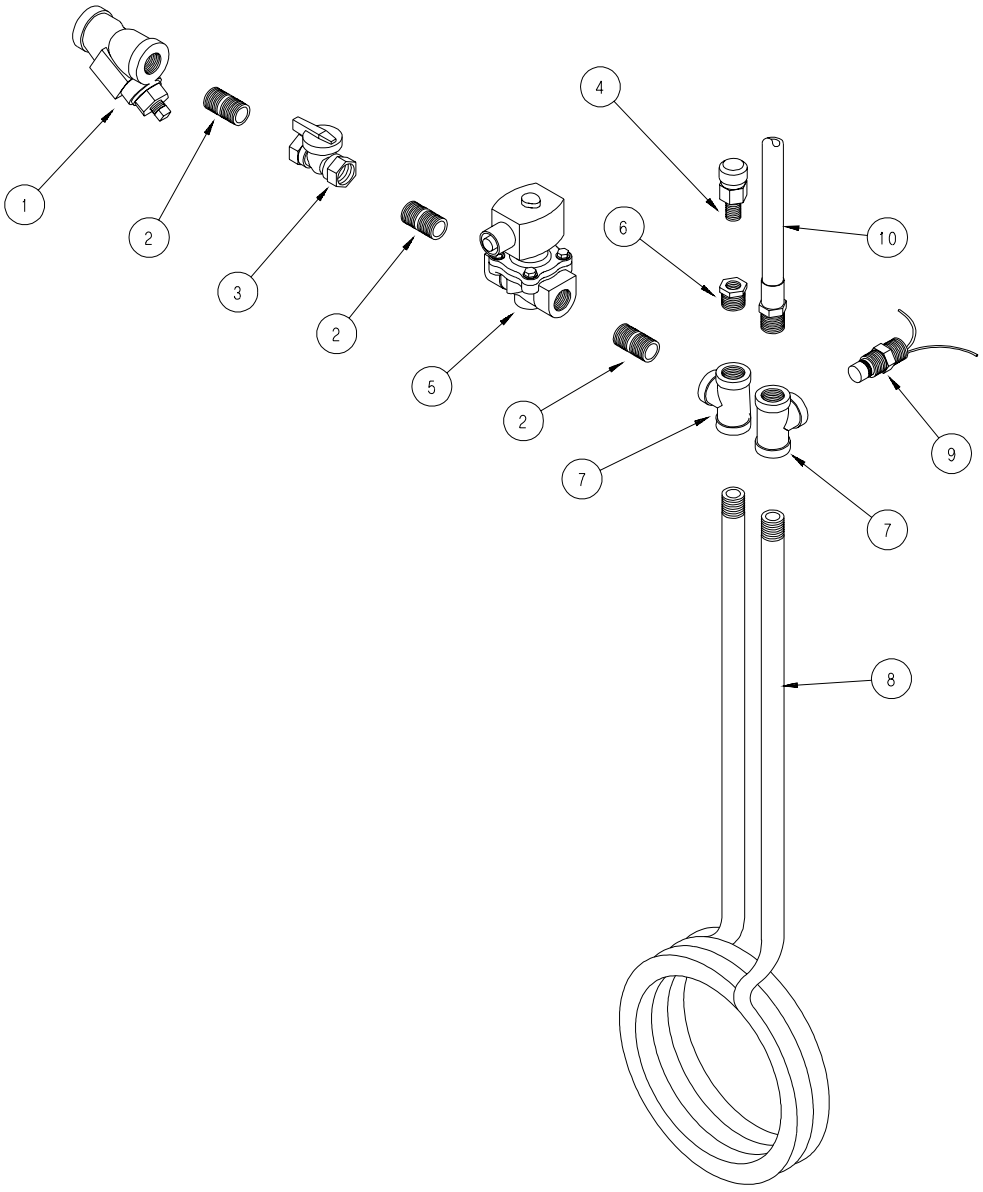
Key	Part Number	Description
1	HH-1077	1/2" 0-30 PSI Regulator (Standard)
2	HH-3670	1/2" x 2 1/2" Nipple
3	HH-1081	1/2" Solenoid (Standard)
4	HH-2029	1/2" x 1 1/2" Nipple
5	HH-1453	1/2" x 1/2" x 1/2" Tee
6	THH-4067	1/2" Street Elbow
7	THH-4127	1/2" Cross
8	THH-4032	1/2" x 1/4" Reducer Bushing
9	HH-2984	30 PSI gauge
10	TFC-0030	1/2" Ball Valve
11	HH-7019	1/2" Gas Hose
12	HH-1251	1/2" Strainer
13	HH-2028	1/2" Female Union

Dw Natural Gas Hi-lo Pipetrain Parts



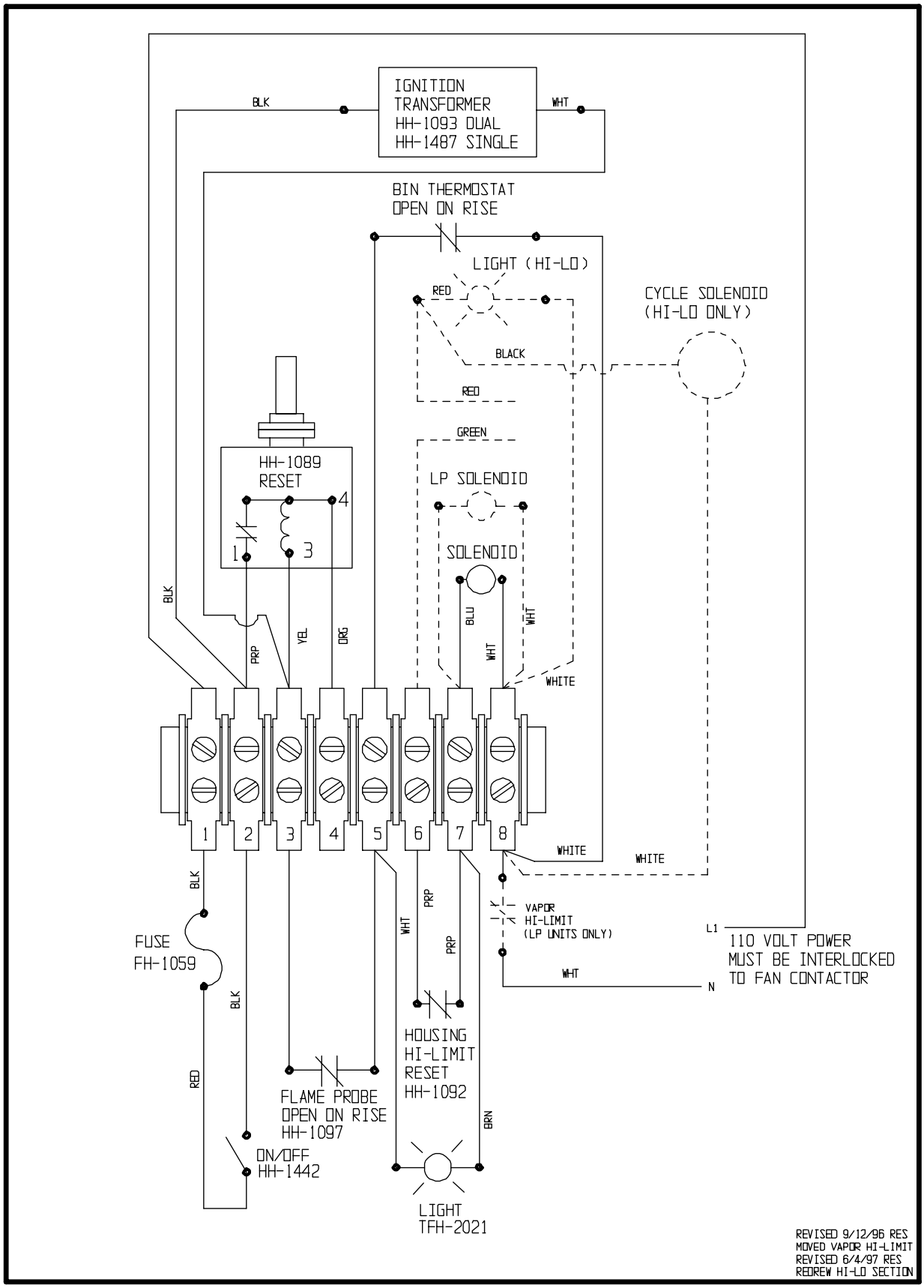
Key	Part Number	Description
1	TFC-0051	3/4" Ball Valve
2	THH-4136	3/4" x 3" Nipple
3	THH-4039	3/4" Solenoid (Standard)
4	THH-4121	3/4" Close Nipple
5	THH-4174	3/4" x 3/4" x 1/2" Tee
6	THH-4066	3/4" Street Elbow
7	THH-4068	3/4" Cross
8	THH-4042	3/4" x 1/4" Reducer Bushing
9	D08-0022	15 PSI Gauge
10	D07-0028	3/4" x 1/2" Reducer Bushing
11	HH-2029	1/2" x 1 1/2" Nipple
12	TFC-0030	1/2" Ball Valve
13	THH-4067	1/2" Street Elbow
14	HH-7019	1/2" Gas Hose
15	D67-0008	3/4" Strainer
16	HF-7230	3/4" Female Union
17	THH-4125	3/4" x 2" Nipple

Dw Lp Pipetrain Parts

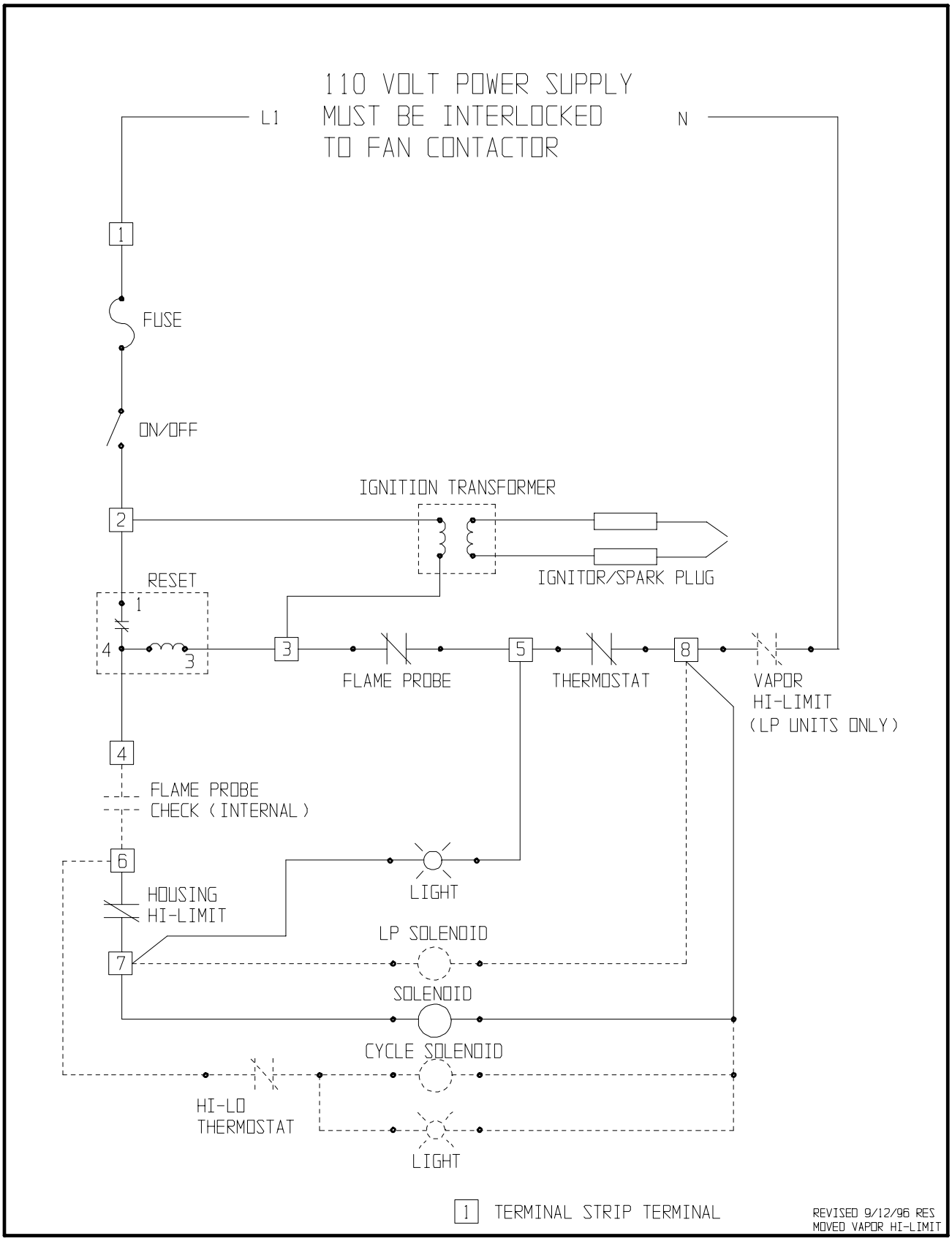


Key	Part Number	Description
1	HH-1251	1/2" Strainer
2	D07-0019	1/2" x 1 1/2" Nipple Sh. 80
3	TFC-0030	1/2" Ball Valve
4	HH-4845	1/4" Relief Valve
5	TFC-0092	1/2" Solenoid Valve 300 PSI
6	THH-4023	1/2" x 1/4" Reducer Bushing
7	THH-4058	1/2" x 1/2" x 1/2" Tee Sh. 80
8	CD-0197	Vaporizer Coil
9	HH-7013	200 Degree Vapor High Limit
10	D07-0009	5/16" x 24" LP Gas Hose

Standard Heater Wiring



Standard Heater Schematic



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