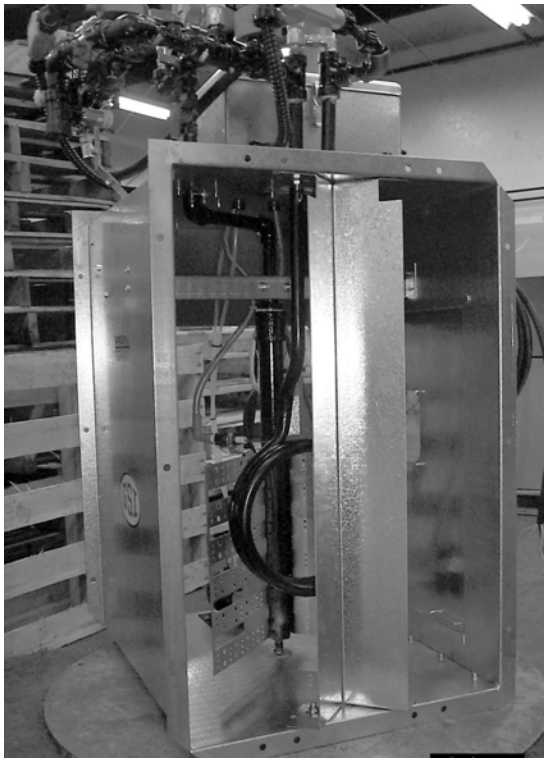


Deluxe Downwind Centrifugal Heater Installation and Operating Instructions

Model # CH_-_ _-_ _-D (HIGH)
Model # CL_-_ _-_ _-D (LOW)

Owner's Manual

PNEG-823
Date: 07-18-08

GSI GROUP

PNEG-823

Check List

1. **All wire connections**
2. **Spark plug gap 0.125**
3. **Pipe train tightness and gas leaks**
4. **Flame sensor tight**
5. **Fuse in place, extra fuse provided**
6. **Time delay reset**
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 High-Low (High-Low only)**
15. **Modulating valve holds temperature within 1 degree (modulating units only)**
16. **All decals and serial number tag**
17. **Aesthetic appearance**
18. **Manual**

Tester Signature:_____

Date:_____

This equipment shall be installed in accordance with the current **installation codes for gas burning appliances and equipment, CAN1-B149.1 and B149.2,** or applicable provincial regulations which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

Contents

Safety Guidelines

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

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

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

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

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

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

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

DANGER! BE ALERT!

Personnel operating or working around electrical equipment 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.

Fuel Warning

Do not use propane tanks which have previously been used for ammonia unless they have been purged according to procedures of the National LP Association.

Be sure fuel supply system complies with all local codes for LP gas installations. DO NOT USE FLAME FOR LEAK TESTING.

Power Warning

Be sure power is disconnected and locked out before installation. Failure to do so may cause serious injury or death.

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

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

Proper Use of Product

This product is intended for the use of grain drying only. Any other use is a misuse of this 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. Guards are removed for illustration only. All guards must be in place before and during operation.

Heater Operation

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

This manual describes the operation of the GSI Deluxe Downwind Centrifugal Heater. Many models are available to accommodate low, medium or High-Temperature grain conditioning.

Safety Instructions

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

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

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

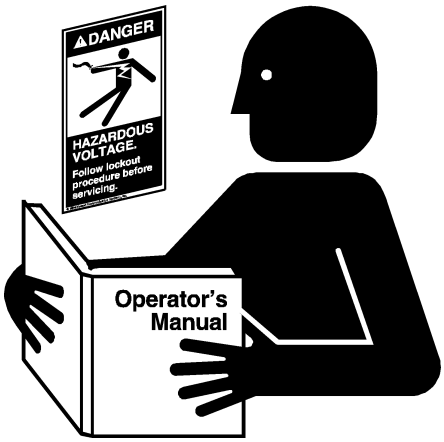
Follow Safety Instructions

Carefully read all safety messages in this manual and safety signs on your machine. Keep signs in good condition. Replace missing or damaged safety signs. Be sure new equipment components and repair parts include the current safety signs. Replacement safety signs are available from the manufacturer.

Learn how to operate the machine and how to use controls properly. Do not let anyone operate without instruction.

Keep your machinery in proper working condition. Unauthorized modifications to the machine may impair the function and/or safety and affect machine life.

If you do not understand any part of this manual or need assistance, contact your dealer.



Read and Understand Manual

Install and Operate Electrical Equipment Properly

Electrical controls should be installed by a qualified electrician and must meet the standards set by the National Electrical Code and all local and state codes.

Disconnect and lock out all power sources before installing wires/cables or servicing equipment.

Electric Shock Hazard

Install and Operate Gas-Fired Equipment Properly

Fuel supply should be installed by a qualified gas technician and must meet local and state codes for gaseous fuel supplies.

Disconnect and lock out all fuel sources before servicing equipment.

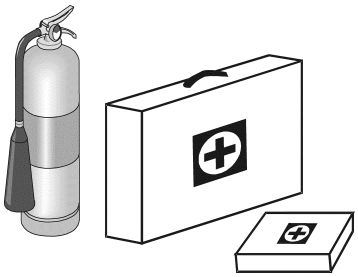
Explosive Gases

Prepare for Emergencies

Be prepared if fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital and fire department near your telephone.



Keep Emergency Equipment Quickly Accessible

Wear Protective Clothing

Wear close fitting clothing and safety equipment appropriate to the job.

Remove all jewelry.

Long hair should be tied up and back.

Safety glasses should be worn at all times to protect eyes from debris.

Wear gloves to protect your hands from sharp edges on plastic or steel parts.

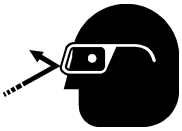
Wear steel toe boots to help protect your feet from falling debris. Tuck in any loose or dangling shoe strings.

A respirator may be needed to prevent breathing potentially toxic fumes and dust.

Wear hard hat to help protect your head.

Wear appropriate fall protection equipment when working at elevations greater than six feet (6').

Eye Protection



Gloves

Steel Toe Boots

Respirator

Hard Hat

Fall Protection

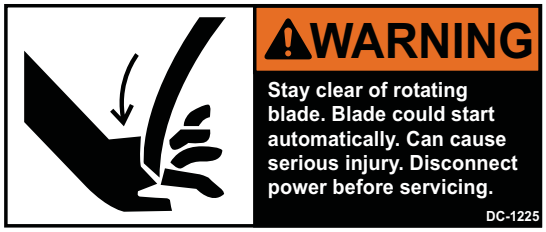
The GSI Group recommends contacting your local power company, and having a representative survey the installation so the wiring is compatible with their system, and adequate power is supplied to the unit. If a decal is damaged or missing, contact:

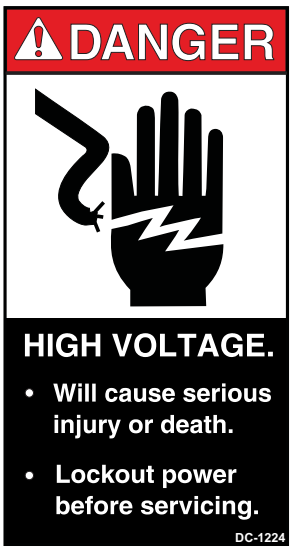
GSI Decals
1004 E. Illinois St.
Assumption, IL. 62510
Phone: 217-226-4421

A free replacement will be sent to you.

Roof Damage Warning and Disclaimer

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





Machine to Earth Ground

It is very important that a machine to earth ground rod be installed at the fan. This is true even if there is a ground at the pole 15**'** away. This ground needs to be as close to the fan as possible, but no more than 8**'** away. The ground rod should be connected to the fan control panel with at least a #6 solid bare copper ground wire, or in accordance with local requirements. The machine to earth ground provides additional safety if there is a short. It also provides the grounding necessary for long life and operation of the solid state circuit boards used on control circuits and the electronic ignition systems.

Figure 3A

Dig a hole large enough to hold one (1) or two (2) gallons of water. Work the ground rod into the earth until it is completely in the ground.

Proper Installation of the Ground Rod

(Ground rods and wires are not supplied by Airstream). It is recommended that the rod not be driven into dry ground. The following steps ensure proper ground rod installation:

1. Dig a hole large enough to hold one (1) to two (2) gallons of water.
2. Fill hole with water.
3. Insert rod through water and jab it into the ground.
4. Continue jabbing the rod up and down, the water will work its way down the hole, making it possible to work the rod completely into the ground. This method of installing the rod gives a good conductive bond with the surrounding soil.

Proper Installation of the Ground Rod (Continued)

5. Connect the bare copper ground wire to the rod with the proper ground rod clamp.
6. Connect the bare ground wire to the fan control boxes with a grounding lug. *(See Figure 3B.)*
7. Ground wire must not have any breaks or splices. Insulated wire is not recommended for grounding.

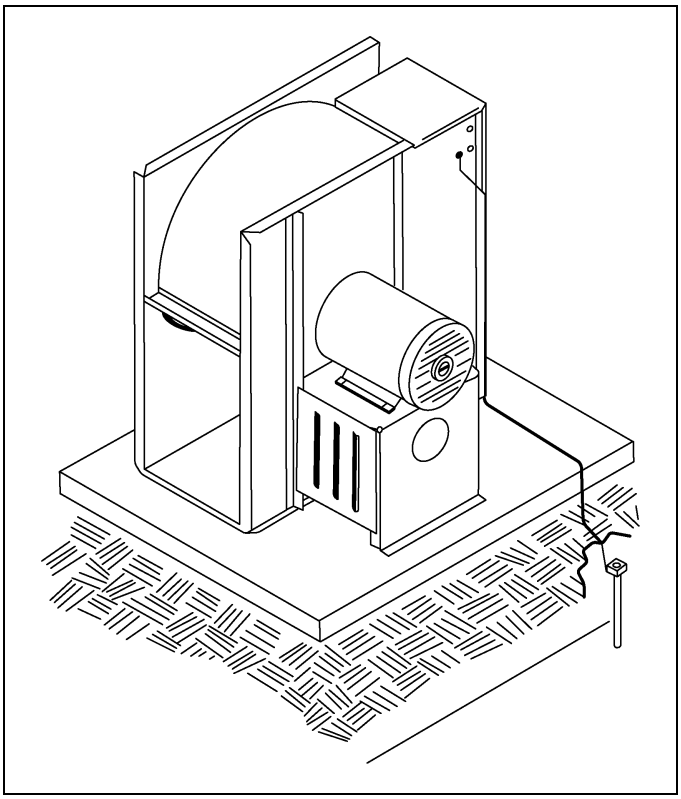


Figure 3B

Use a #6 or approved size bare copper ground wire. Install a 5/8" diameter 8' long copper-clad ground rod, 2' away from the foundation and 1' below the surface of the ground or in accordance with local requirements.

Previously Installed Units

It is recommended that previously installed units be checked to see that a machine to earth ground *on Page 10* has been installed by an electrician.

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*.

WARNING

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

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

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

Fuel Connection

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 situation, purge the system with methanol.
2. Run proper size line *(see Specification on Page 13)* to liquid pipetrain 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 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 vaporizer.
2. Run proper size line *(see Specification on Page 13)* to pipetrain 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 vaporizer.
2. Run proper size line *(see Specification on Page 13)* 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.

Heater Specifications

Centrifugal Heater Specifications

		High-Temperature Model	Low-Temperature Model
All Models	BTU Rating	4000000	500000
	Weight	145	135
Liquid Models	Maximum Fuel Flow (GPH)	43	N/A
	Orifice Size	0.25	N/A
	Minimum Operating Pressure	3	N/A
	Maximum Operating Pressure	30	N/A
	Minimum Line Size	3/8"	N/A
Vapor Models	Maximum Fuel Flow (CFH)	1590	210
	Orifice Size	0.25	0.109
	Minimum Operating Pressure	2	1
	Maximum Operating Pressure	30	15
	Minimum Line Size	1"	1/2"
Natural Gas Models	Maximum Fuel Flow (CFH)	4200	500
	Orifice Size	0.375	0.156
	Minimum Operating Pressure	1	1
	Maximum Operating Pressure	15	7
	Minimum Line Size	1-1/4"	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 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 (1) 3/8" hole (High-Temperature) or 1-1/2" hole (Low-Temperature) 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 four (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 (Continued)

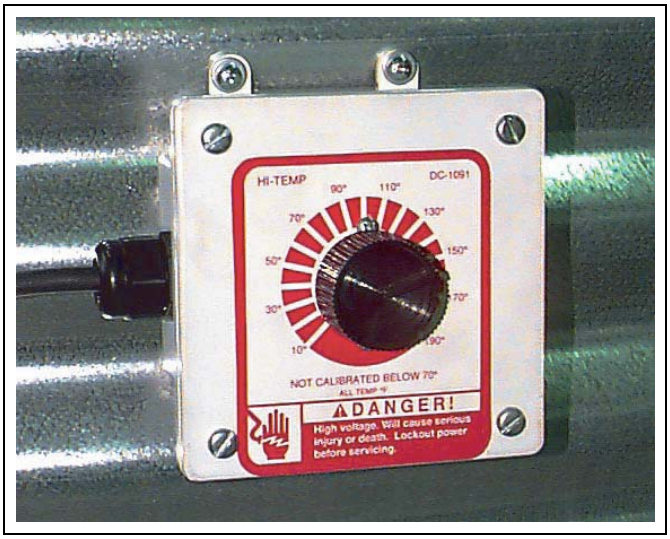


Figure 4A *Plenum Thermostat Mounting on Bin Wall*

Transition High-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 High-Limit using supplied self-drilling screws.

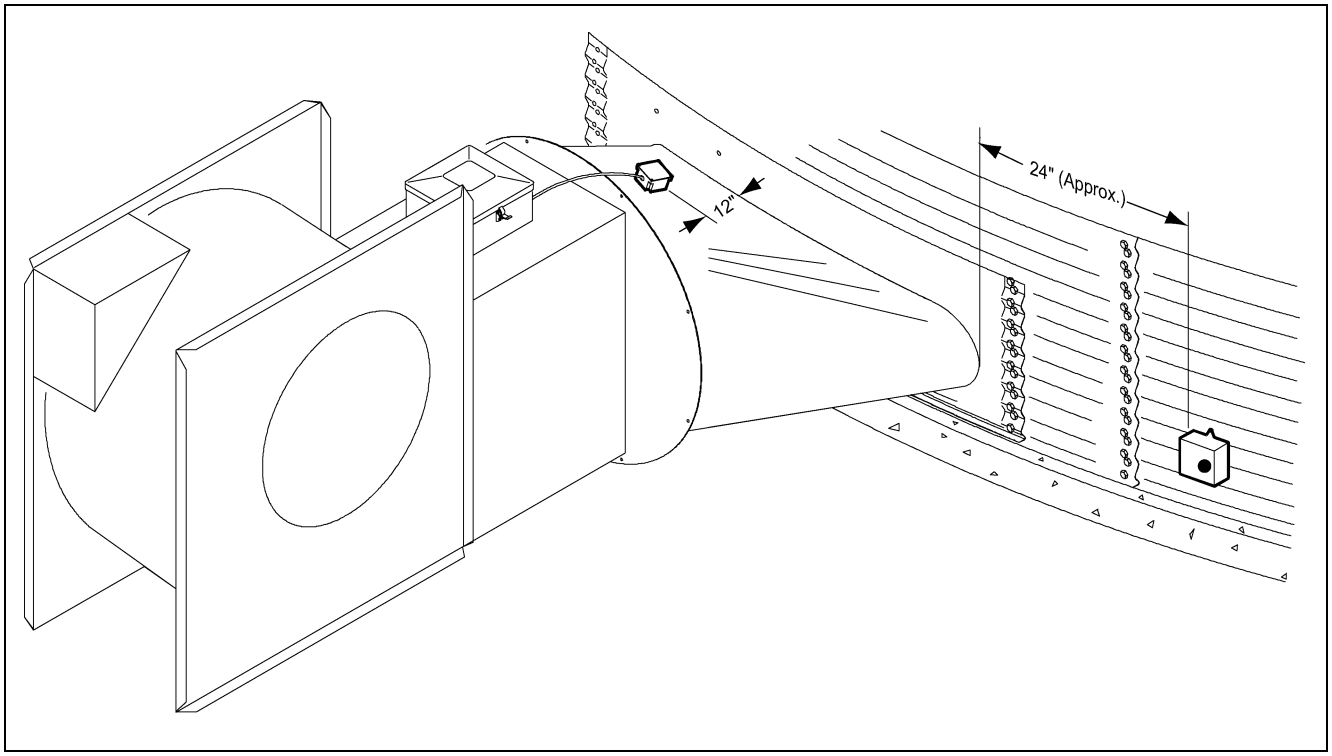


Figure 4B *The transition connecting the heater to the bin with the plenum thermostat in place.*

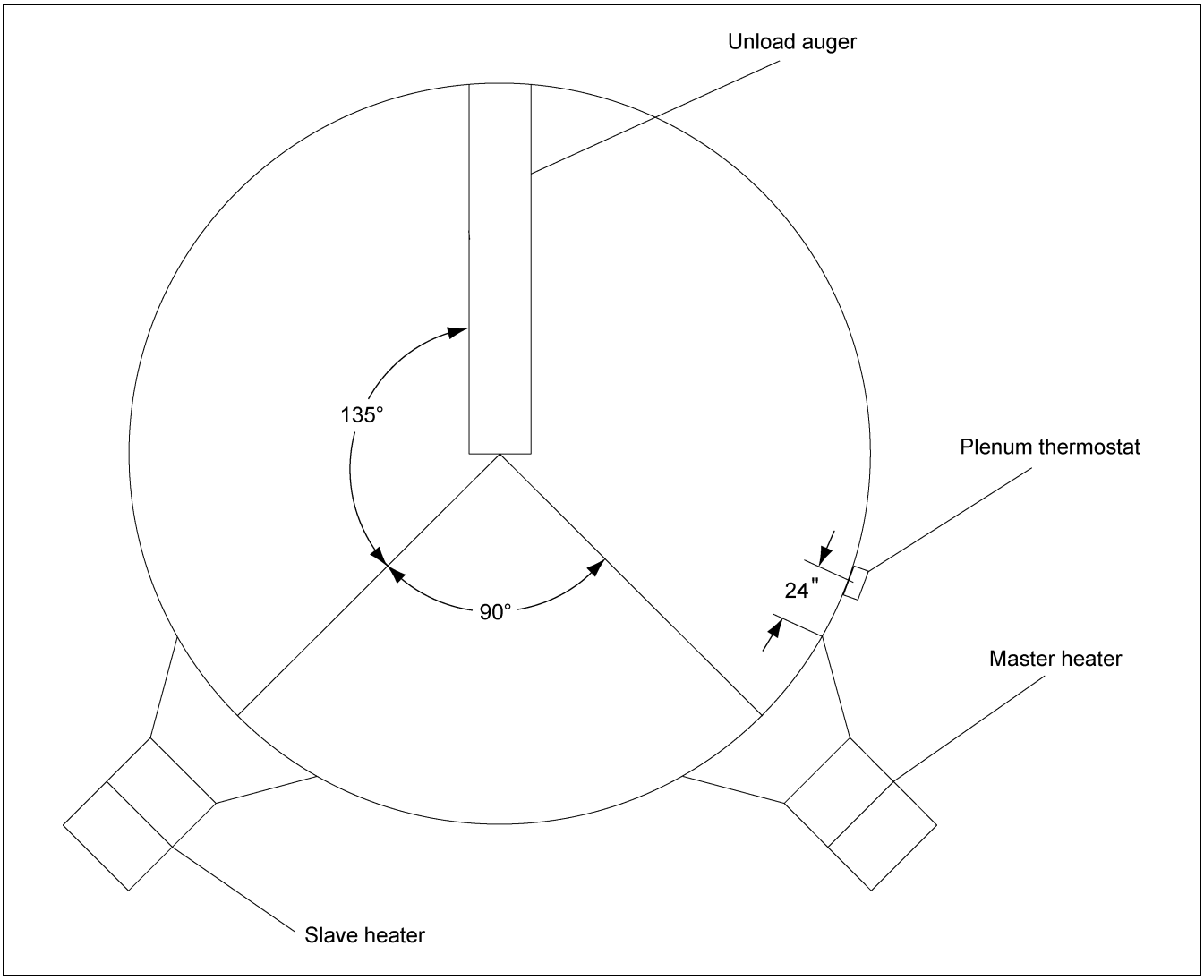


Figure 5A

IMPORTANT: *When mounting two (2) heaters on a bin it is imperative that they be situated as in above Figure 5A. Plenum thermostat must be to the right of master heater and master heater must be to the right of slave heater.*

Operating Temperature Table

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

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

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

For Units Using HF-7318 Control Board

Two (2) Deluxe heaters may be connected to one (1) grain drying system and wired so they cycle together. One (1) 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.

Installation for Standard Units

1. Install relay base (TD-100283) in master heater control box.
2. Connect wire between terminal 6 on circuit board and terminal 14 on relay base in master heater.
3. Connect wire between terminal 13 on relay base and terminal 8 on circuit board in master heater.
4. Run two (2) wires (18 gauge) between master and slave heaters.
5. Connect wires to terminal 5 and 9 (points A and B) on relay base in master heater.
6. Connect wire from terminal 9 in master to terminal 14 (point F) in slave unit.
7. Connect wire from terminal 5 in master to terminal 15 (point E) in slave unit.
8. Install relay (TD-100282) in relay base.

Additional Steps for High-Low Units

1. Run two (2) wires (18 gauge) between master and slave unit.
2. Connect wires to terminal 21 and 22 (points C and D) on circuit board in main heater.
3. Connect wire from terminal 21 in master to terminal 12 (point H) in slave unit.
4. Connect wire from terminal 22 in master to terminal 13 (point G) in slave unit.
5. Install relay (TD-100282) in relay base.

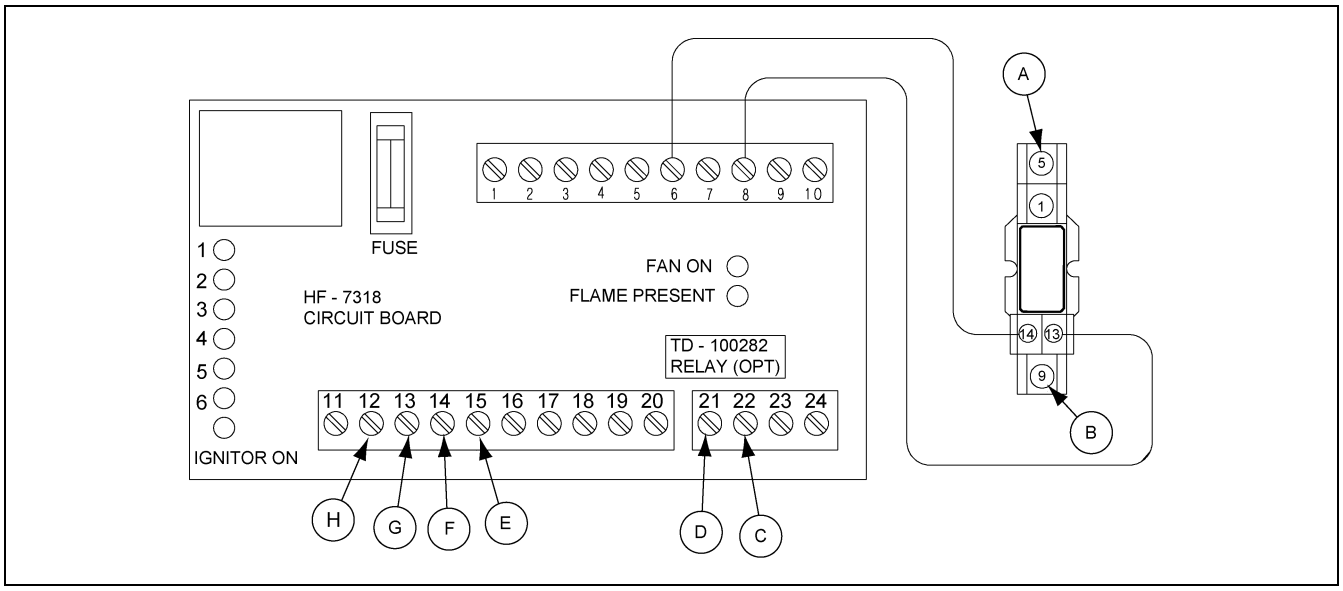


Figure 6A *The HF-7318 Control Board*

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 6B*.
3. Connect deluxe thermostat control (optional) in heater box as *shown in Figure 6B*.

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

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

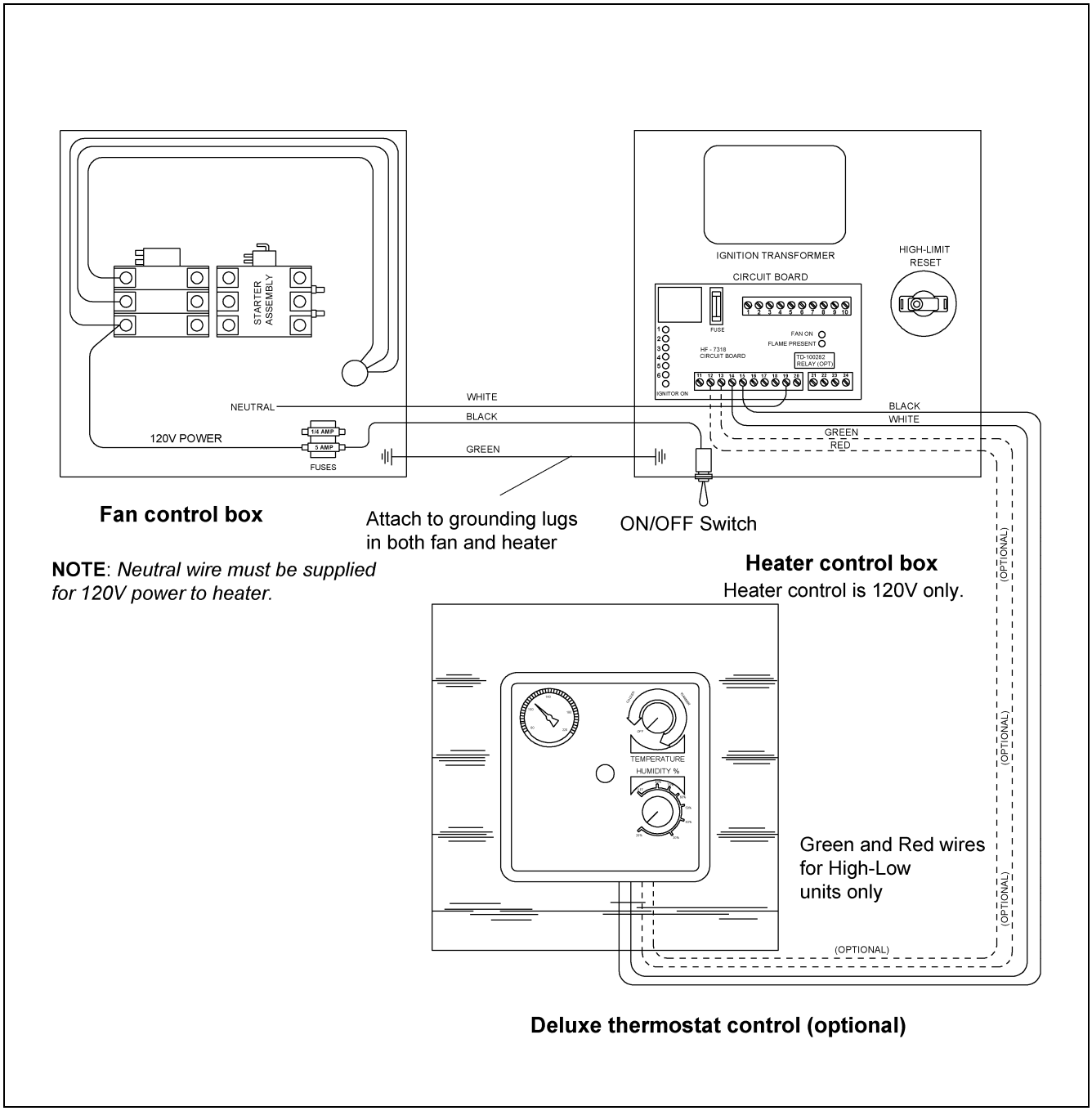


Figure 6B *230 Volt Fan Control Box*

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 6C*. 110V power supply or 0.5 KVA 460V to 110V transformer must be used to supply power for heater.
3. Connect deluxe thermostat control (optional) in heater box as *shown in Figure 6B on Page 17*.

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

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

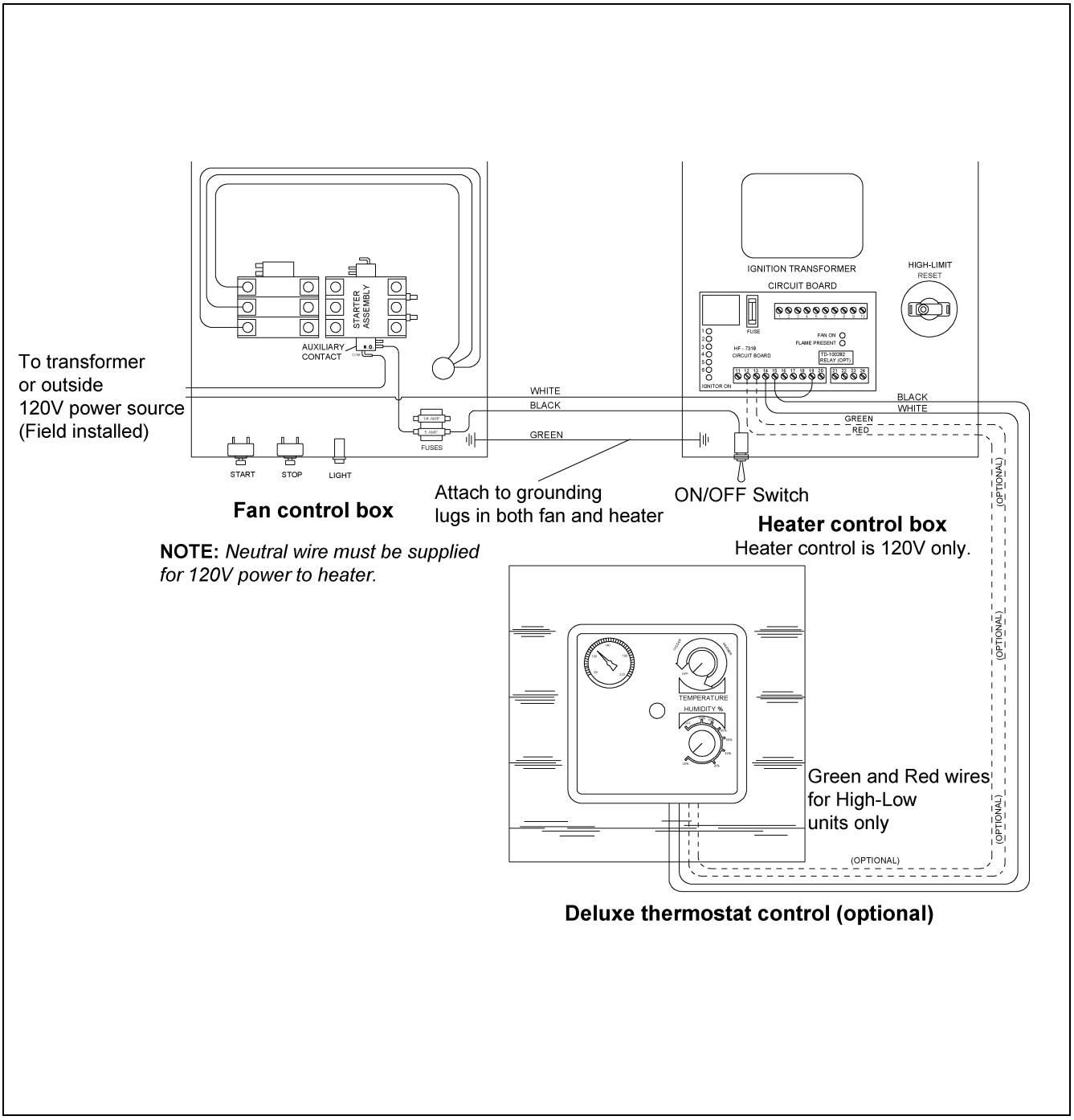
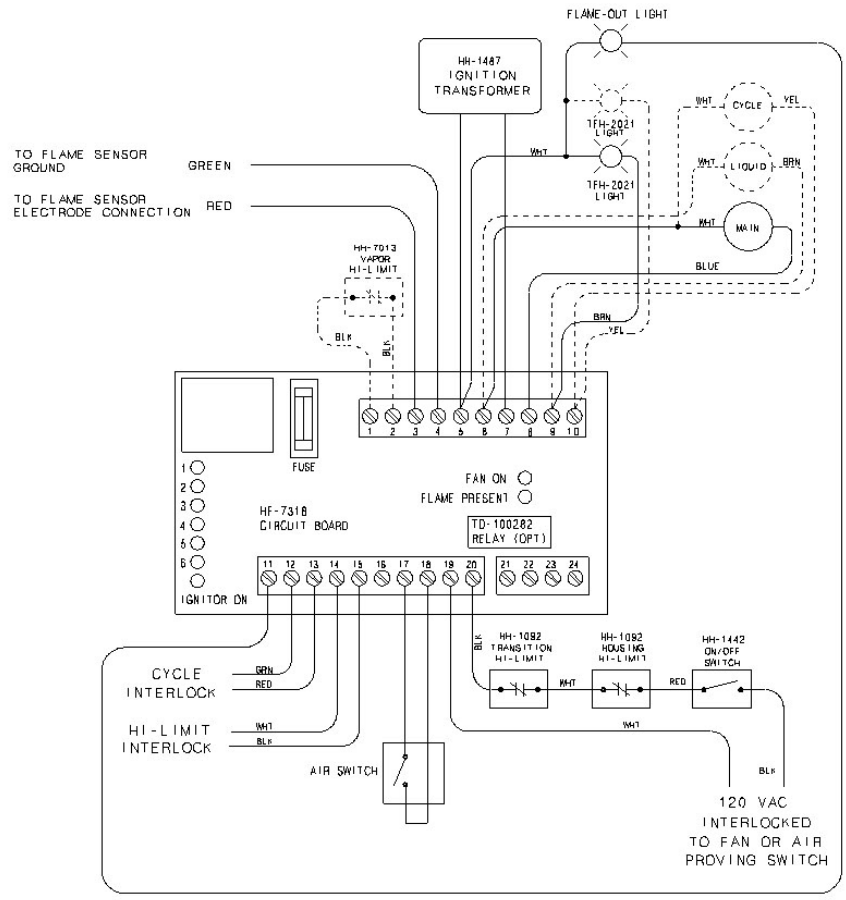


Figure 6C *460 Volt Fan Control Box*

DELUXE HEATER 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

Cycling 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.

High-Low 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 indicating 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 editing 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 high 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.

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. **One (1) turn of the T-handle equals approximately 7°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 HP-15 HP Units BTUs per Gauge Pressure (PSI) Propane Models (Approximate)

High-Temperature 10 HP-15 HP 7/32" (0.219") 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 HP-15 HP High-Temperature Propane Units Only)

Fan Model	Static Pressure	Heat Rise (°F)						
		60	80	100	120	140	160	180
10 HP	2"	2	4	6	8	10	13	
	4"	1	3	5	6	8	11	14
	6"	1	1	3	5	6	8	10
15 HP	2"	3	6	9	12	15		
	4"	3	5	7	10	13		
	6"	2	3	5	6	9	11	14

10 HP-15 HP Units BTUs per Gauge Pressure (PSI) Natural Gas Models (Approximate)

High-Temperature 10 HP-15 HP 11/32" (0.344") 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 HP-15 HP High-Temperature Natural Gas Units Only)

Fan Model	Static Pressure	Heat Rise (°F)						
		60	80	100	120	140	160	180
10 HP	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
15 HP	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 HP-40 HP Units BTUs per Gauge Pressure (PSI) Propane Models (Approximate)

High-Temperature 20 HP-40 HP 5/16" (0.313") 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 HP-40 HP High-Temperature Propane Units Only)

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

20 HP-40 HP Units BTUs per Gauge Pressure (PSI) Natural Gas Models (Approximate)

High-Temperature 20 HP-40 HP 15/32" (0.469") 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 HP-40 HP High-Temperature Natural Gas Units Only)

Fan Model	Static Pressure	Heat Rise (°F)						
		60	80	100	120	140	160	180
20 HP	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
25 HP	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
30 HP	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
40 HP	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		

Low-Temperature Units BTUs per Gauge Pressure (PSI) Propane Models (Approximate)

Low-Temperature all HP 7/64" (0.109") Orifice
Operating Pressure (PSI)

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

Low-Temperature Units BTUs per Gauge Pressure (PSI) Natural Gas Models (Approximate)

Low-Temperature all HP 5/32" (0.156") Orifice
Operating Pressure (PSI)

	1	2	3	4	5	6	7
All Models	177840	251712	308256	355680	397632	435936	470592

Adjusting the Vaporizer

1. Vaporizer should be adjusted so the vapor pipetrain runs warm to the touch (100°F-120°F).
2. Loosen 5/16" bolt on adjustment bracket.
3. Swivel vaporizer away from flame if running too hot, closer to flame if too cold.
4. Move vaporizer only 1" at a time and allow a few minutes for temperature to equalize.
5. Tighten 5/16" bolt and watch heater run for several minutes to verify adjustment.

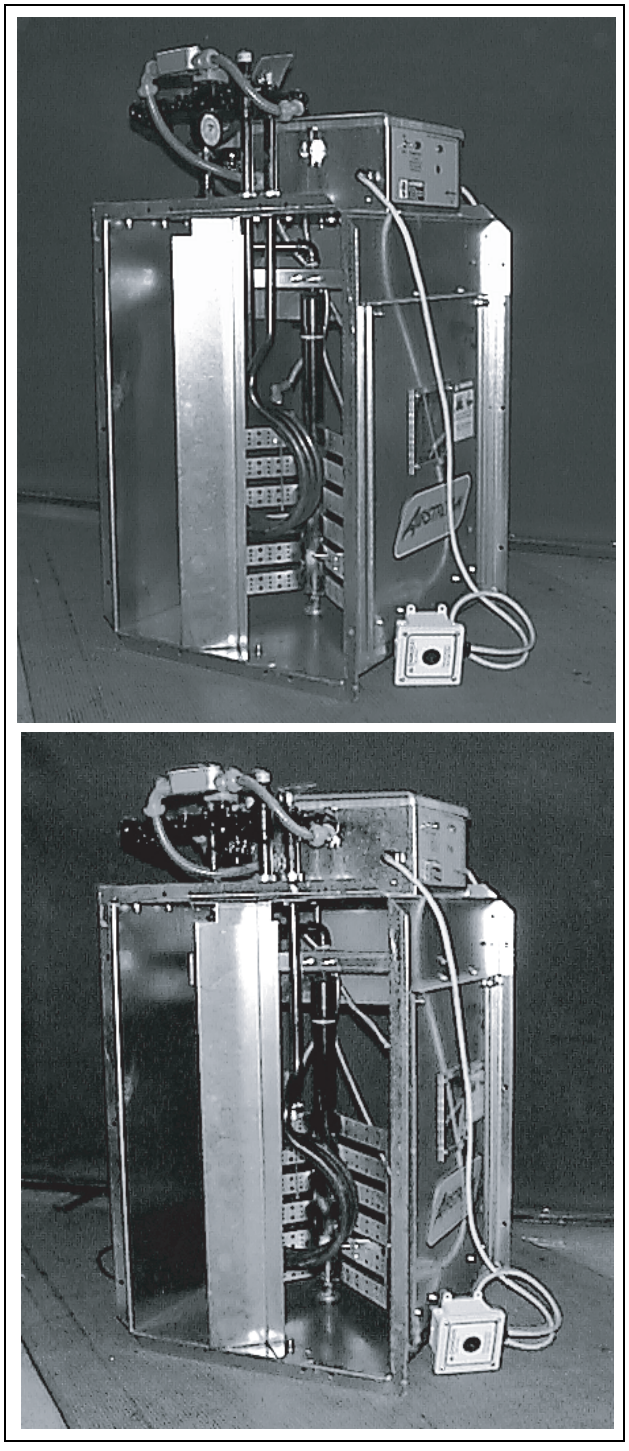
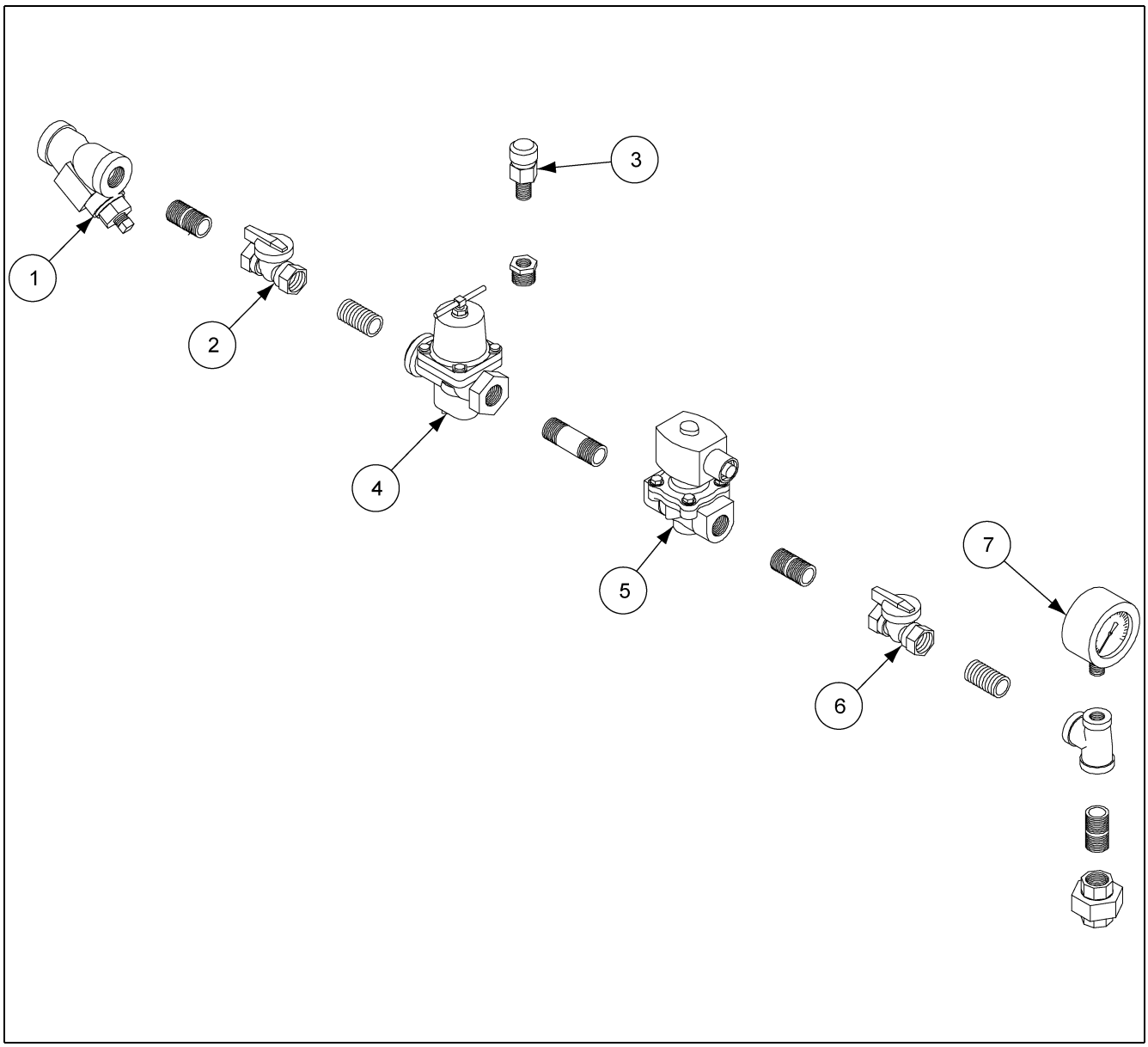


Figure 8A *Vaporizer Coil Adjustment Positions*

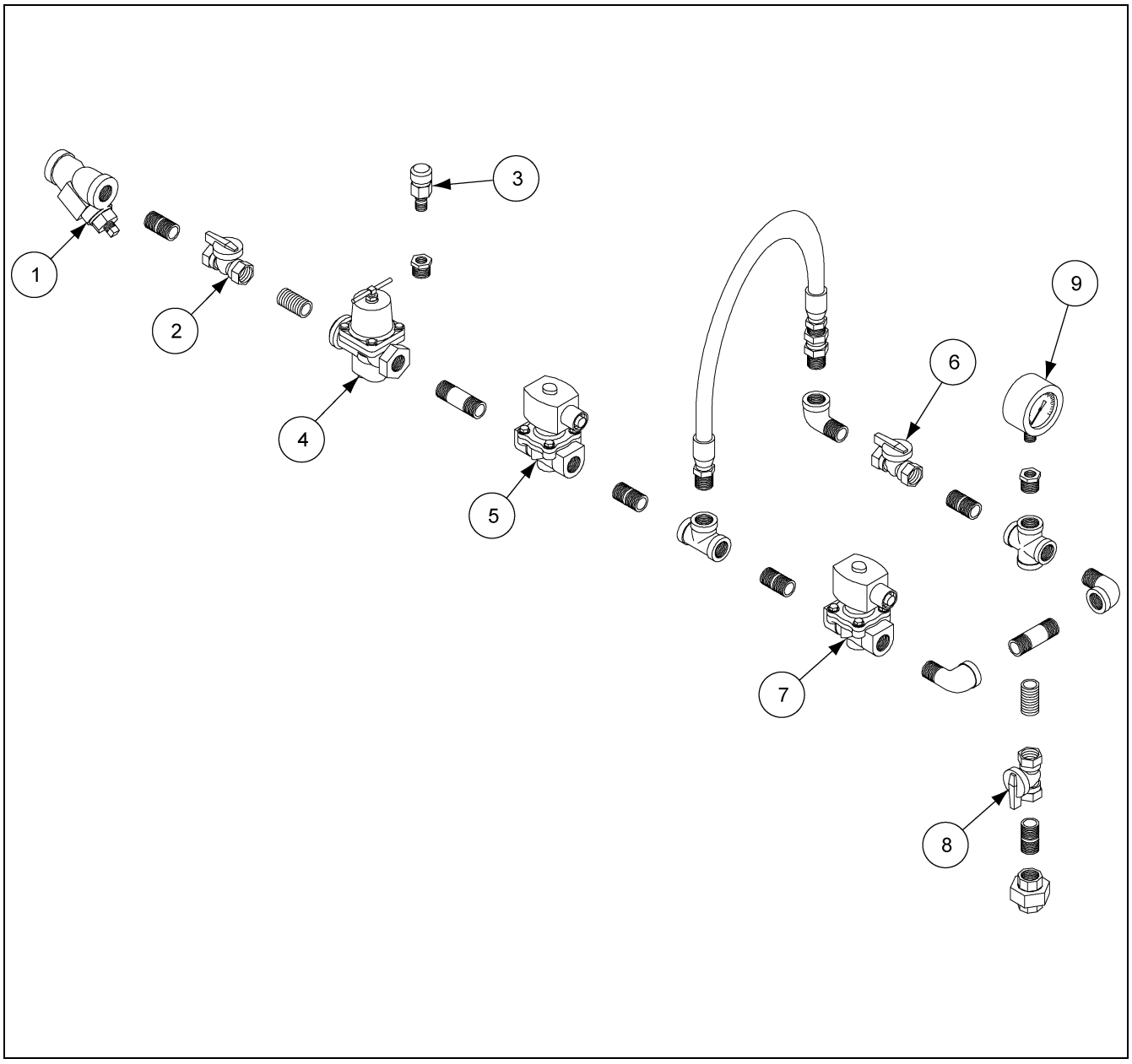
1. DW Propane Vapor High-Fire Pipetrain Components
2. DW Propane Vapor High-Low Fire Pipetrain Components
3. DW Propane Vapor Modulating Pipetrain Components
4. DW NG High-Fire Pipetrain Components
5. DW NG High-Low Fire Pipetrain Components
6. DW NG Modulating Pipetrain Components
7. DW LP High-Fire Pipetrain Components
8. DW LP High-Low Pipetrain Components
9. DW LP Modulating Pipetrain Components
10. 40 HP DW High-Temperature Heater Parts
11. 40 HP DW Low-Temperature Heater Parts
12. DW Gas Heater Control Box Parts
13. DW Propane Vapor Pipetrain Parts
14. DW Propane Vapor High-Low Pipetrain Parts

DW Propane Vapor High-Fire Pipetrain Components



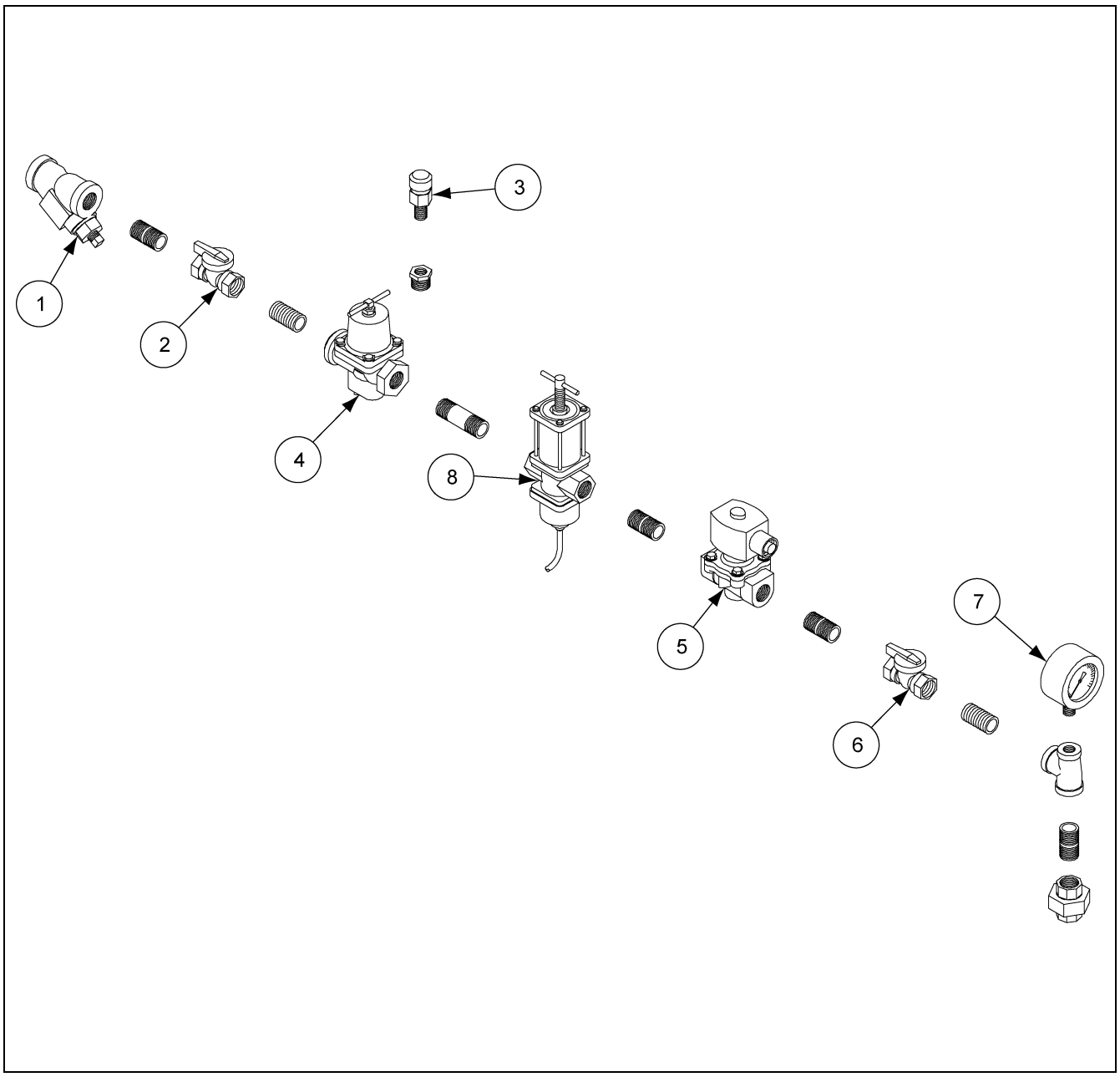
Ref #	Part #	Description
1	HH-1251	Strainer 1/2" Y 250# WOG SCH 80 Black
2	TFC-0030	Valve 1/2" NPT Ball, Bronze
3	THH-4111	Valve 1/4" NPT 50 PSI Relief
4	TFC-0023	Regulator 1/2" NPT 0-30 PSI
5	TFC-0032	Valve 1/2" NPT Solenoid
6	TFC-0030	Valve 1/2" Firing
7	HH-2984	Gauge 0-30# Pressure LP

DW Propane Vapor High-Low Fire Pipetrain Components



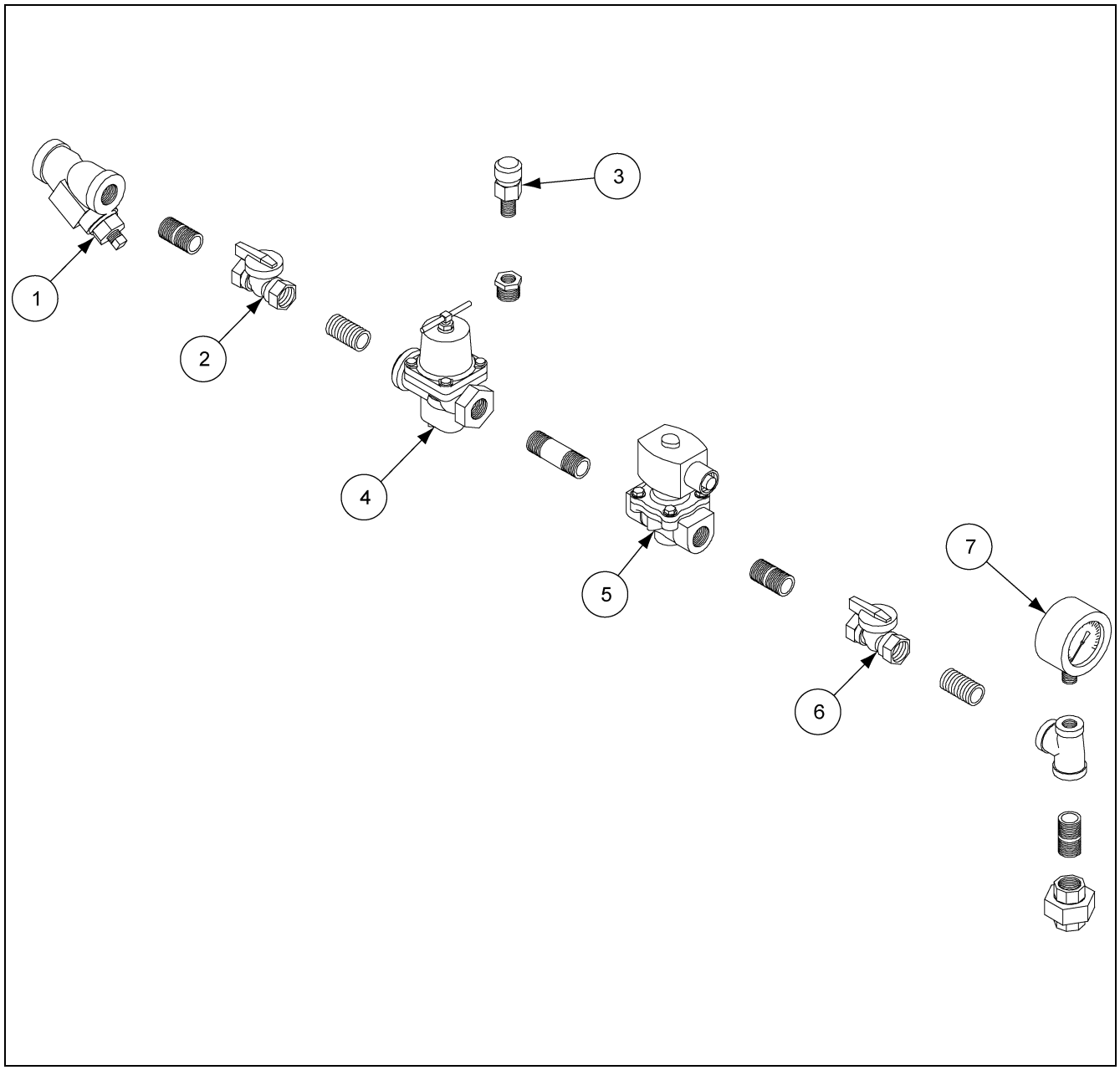
Ref #	Part #	Description
1	HH-1251	Strainer 1/2" Y 250# WOG SCH 80 Black
2, 6	TFC-0030	Valve 1/2" NPT Ball, Bronze
3	THH-4111	Valve 1/4" NPT 50 PSI Relief
4	TFC-0023	Regulator 1/2" NPT 0-30 PSI
5, 7	TFC-0032	Valve 1/2" NPT Solenoid
8	TFC-0030	Valve 1/2" Firing
9	HH-2984	Gauge 0-30# Pressure LP

DW Propane Vapor Modulating Pipetrain Components



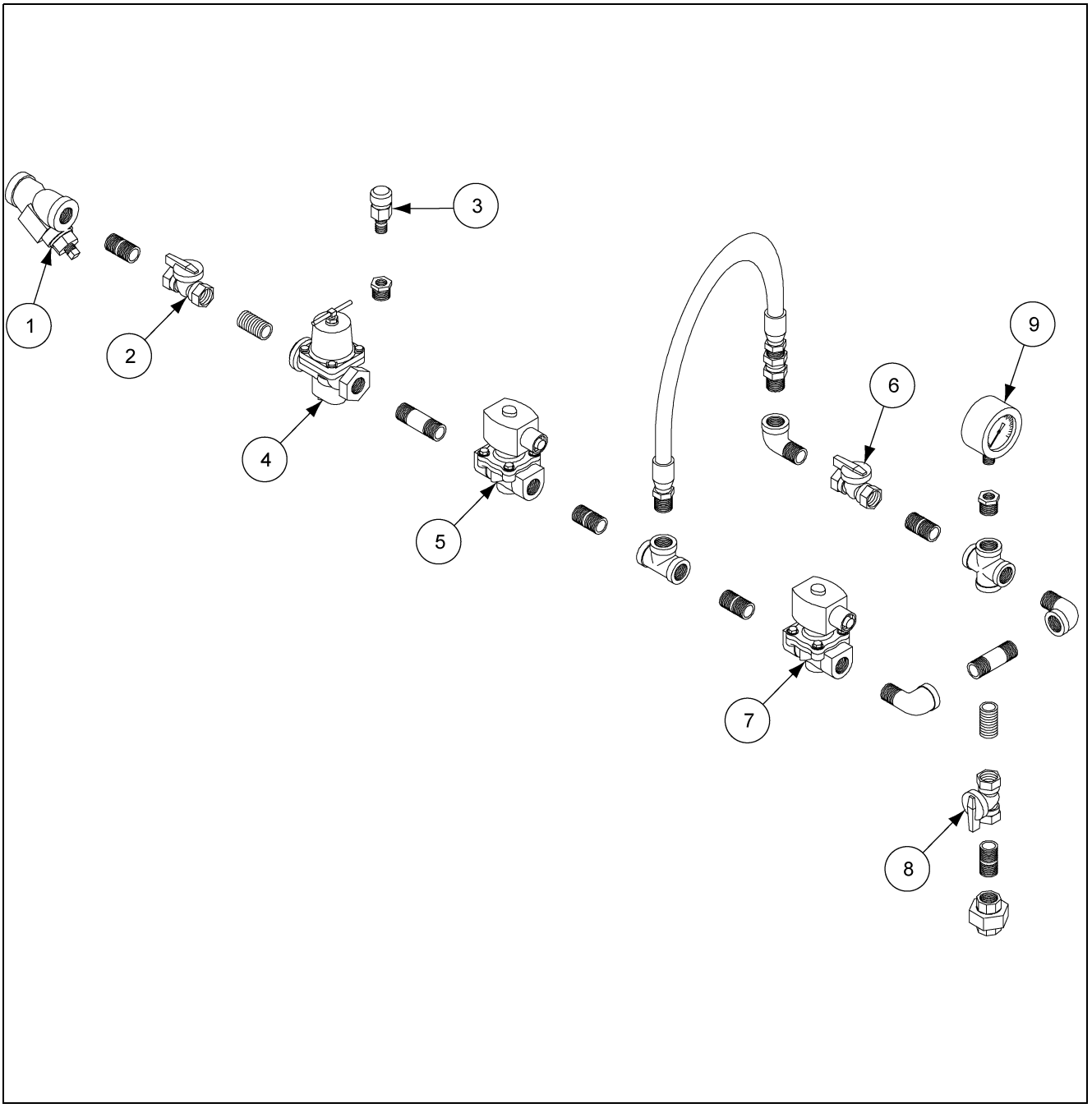
Ref #	Part #	Description
1	HH-1251	Strainer 1/2" Y 250# WOG SCH 80 Black
2	TFC-0030	Valve 1/2" NPT Ball, Bronze
3	THH-4111	Valve 1/4" NPT 50 PSI Relief
4	TFC-0023	Regulator 1/2" NPT 0-30 PSI
5	TFC-0032	Valve 1/2" NPT Solenoid
6	TFC-0030	Valve 1/2" Firing
7	HH-2984	Gauge 0-30# Pressure LP
8	HH-2653	Valve Modulating

DW NG High-Fire Pipetrain Components



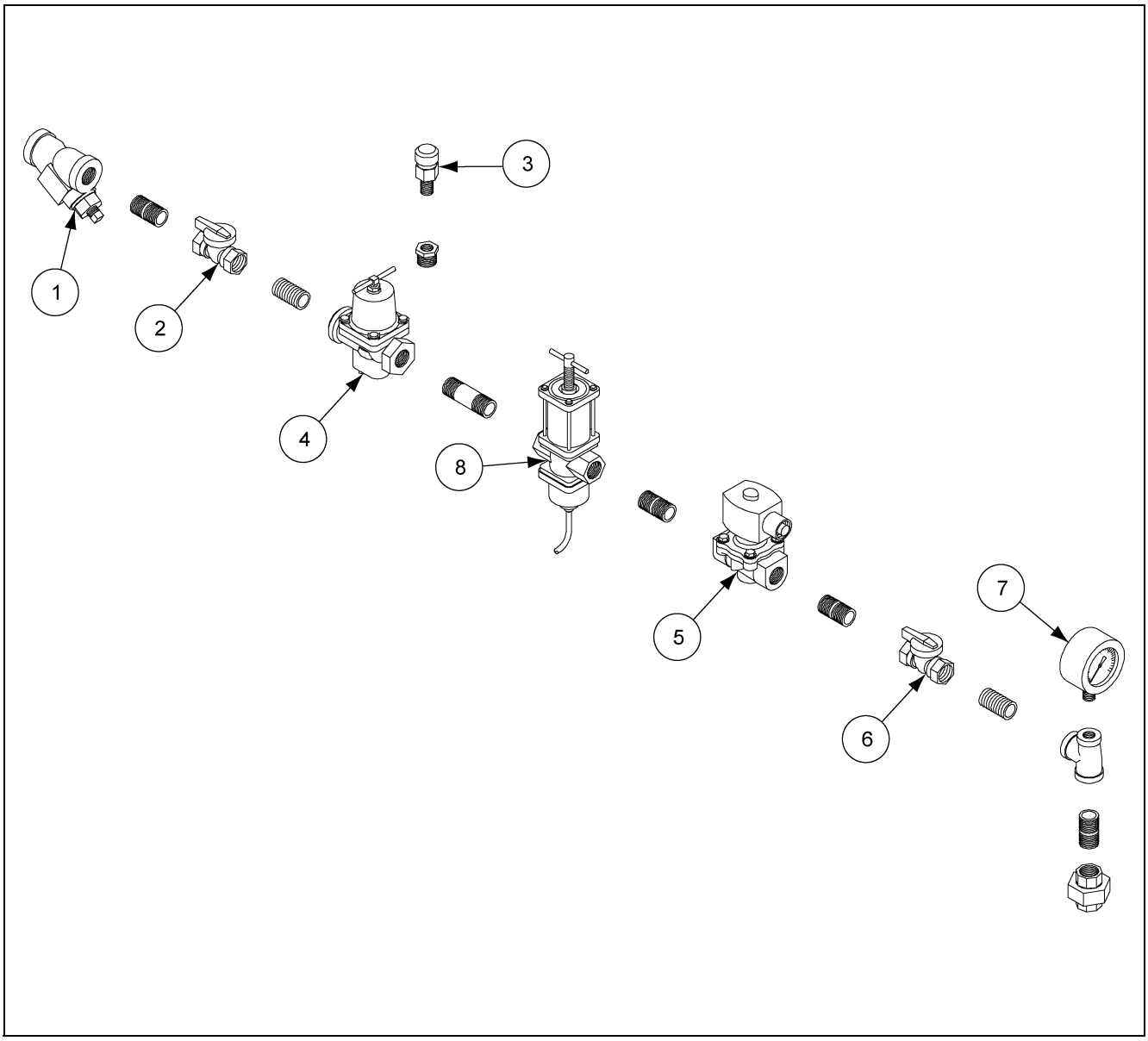
Ref #	Part #	Description
1	D67-0008	Strainer 3/4" Y 250# WOG SCH 80 Black
2	TFC-0051	Valve 3/4" NPT Ball, Bronze
3	THH-4111	Valve 1/4" NPT 50 PSI Relief
4	TFC-0020	Regulator 3/4"
5	TFC-0081	Valve 3/4" NPT Solenoid
6	TFC-0051	Valve 3/4" Firing
7	D08-0022	Gauge 0-15# Pressure

DW NG High-Low Fire Pipetrain Components



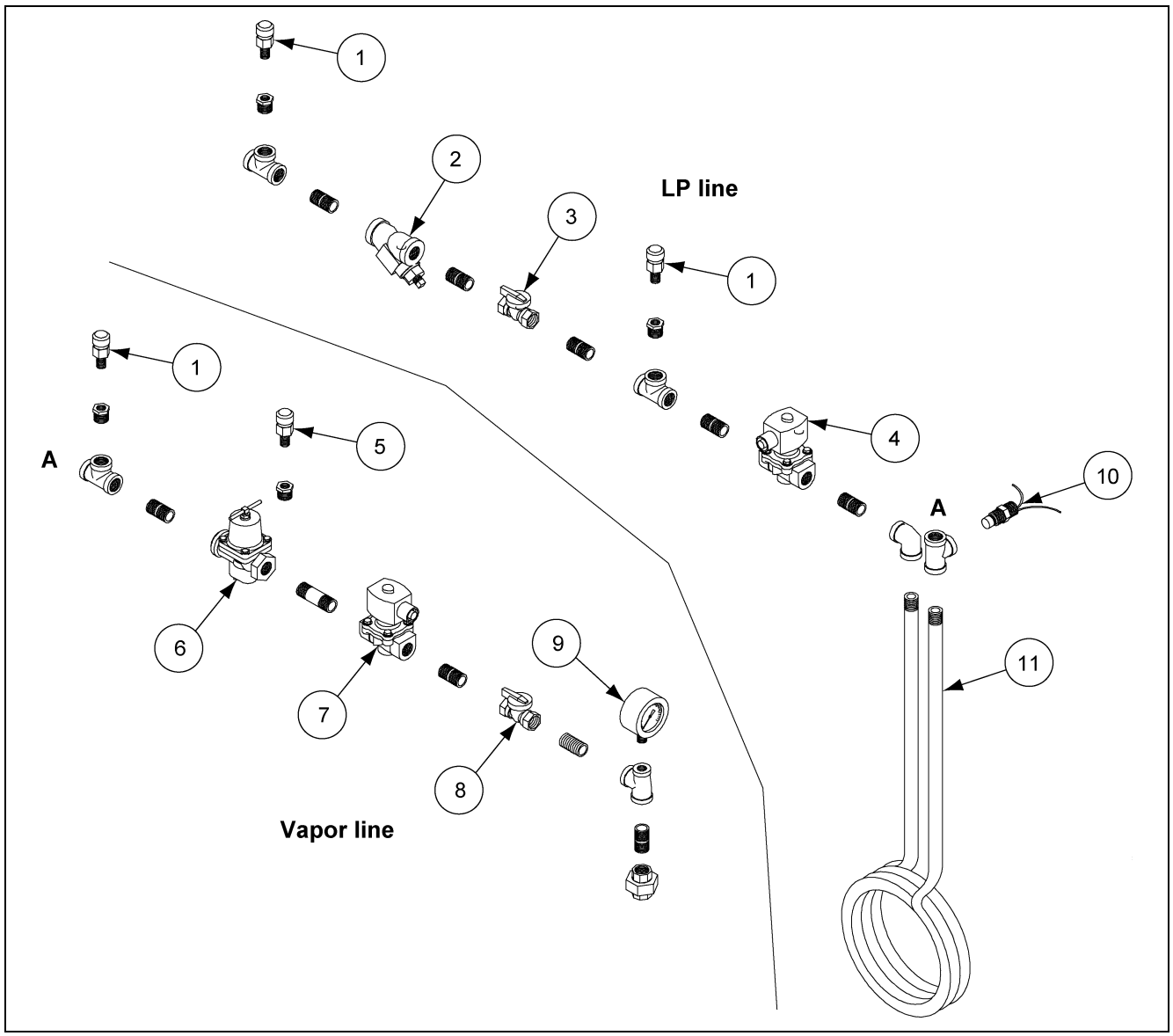
Ref #	Part #	Description
1	D67-0008	Strainer 3/4" Y 250# WOG SCH 80 Black
2, 6	TFC-0051	Valve 3/4" NPT Ball, Bronze
3	THH-4111	Valve 1/4" NPT 50 PSI Relief
4	TFC-0020	Regulator 3/4"
5, 7	TFC-0081	Valve 3/4" NPT Solenoid
8	TFC-0051	Valve 3/4" Firing
9	D08-0022	Gauge 0-15# Pressure

DW NG Modulating Pipetrain Components



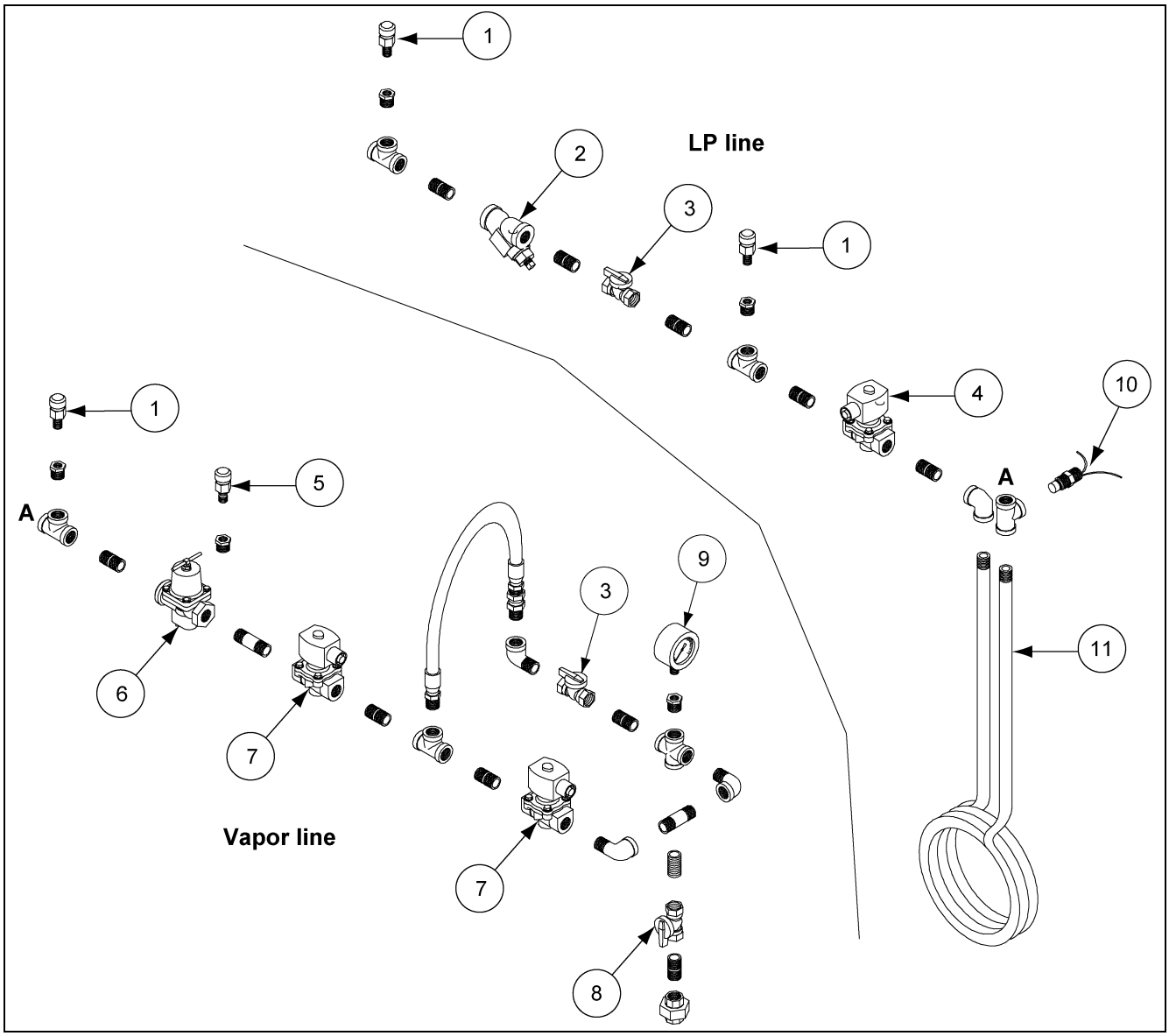
Ref #	Part #	Description
1	D67-0008	Strainer 3/4" Y 250# WOG SCH 80 Black
2	TFC-0051	Valve 3/4" NPT Ball, Bronze
3	THH-4111	Valve 1/4" NPT 50 PSI Relief
4	TFC-0020	Regulator 3/4"
5	TFC-0081	Valve 3/4" NPT Solenoid
6	TFC-0051	Valve 3/4" Firing
7	D08-0022	Gauge 0-15# Pressure
8	HH-2653	Valve Modulating

DW LP High-Fire Pipetrain Components



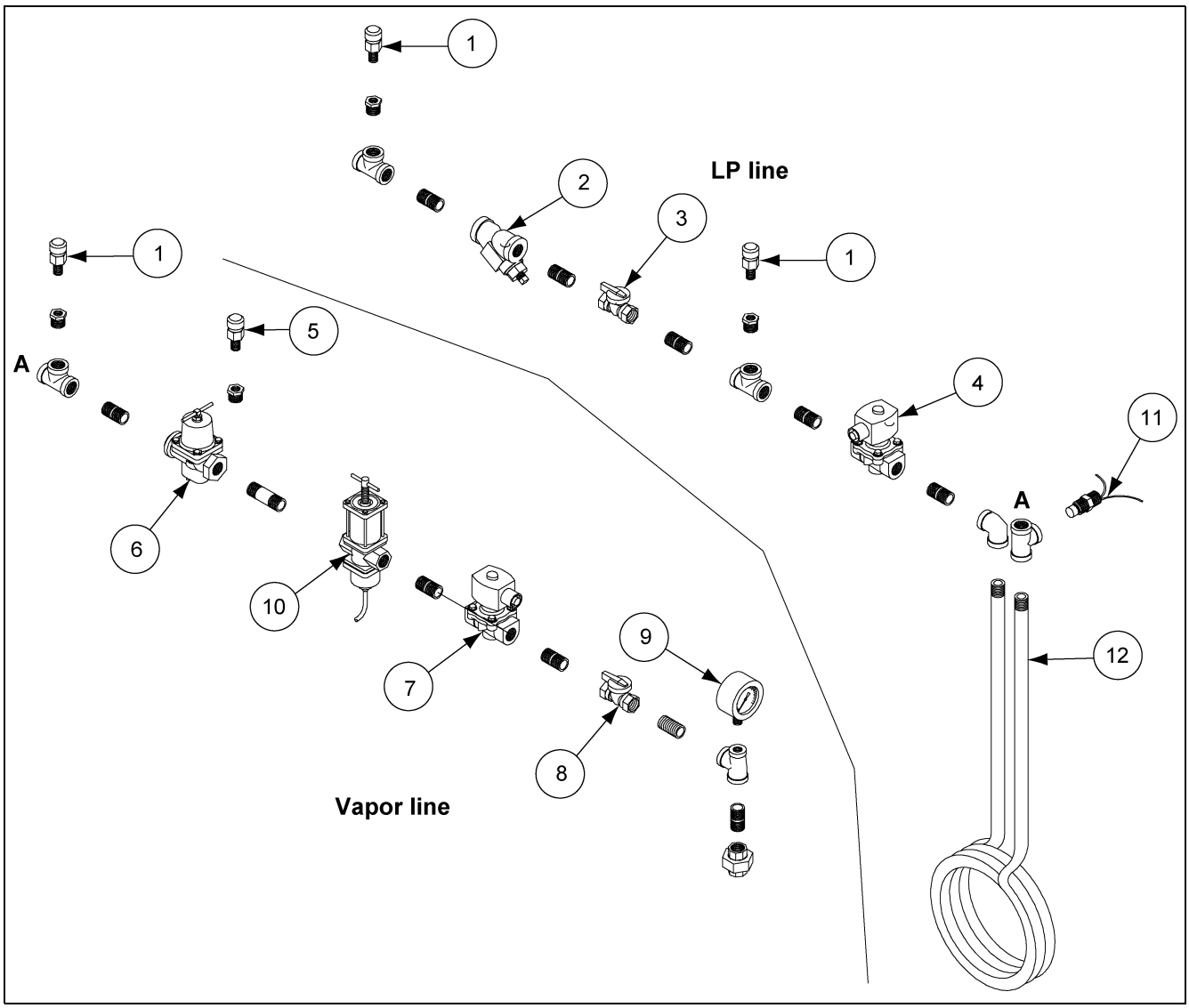
Ref #	Part #	Description
1	TFC-0027	Valve 1/4" NPT 250 PSI Relief
2	HH-1251	Strainer 1/2" Y 250# WOG SCH 80 Black
3	TFC-0030	Valve 1/2" NPT Ball, Bronze
4	TFC-0092	Valve 1/2" NPT Solenoid LP Gas
5	THH-4111	Valve 1/4" NPT 50 PSI Relief
6	TFC-0023	Regulator 1/2" NPT 0-30 PSI
7	TFC-0032	Valve 1/2" NPT Solenoid
8	TFC-0030	Valve 1/2" Firing
9	HH-2984	Gauge 0-30# Pressure LP
10	HH-7013	200° Vapor High-Limit
11	CD-0197	Vaporizer Coil

DW LP High-Low Pipetrain Components



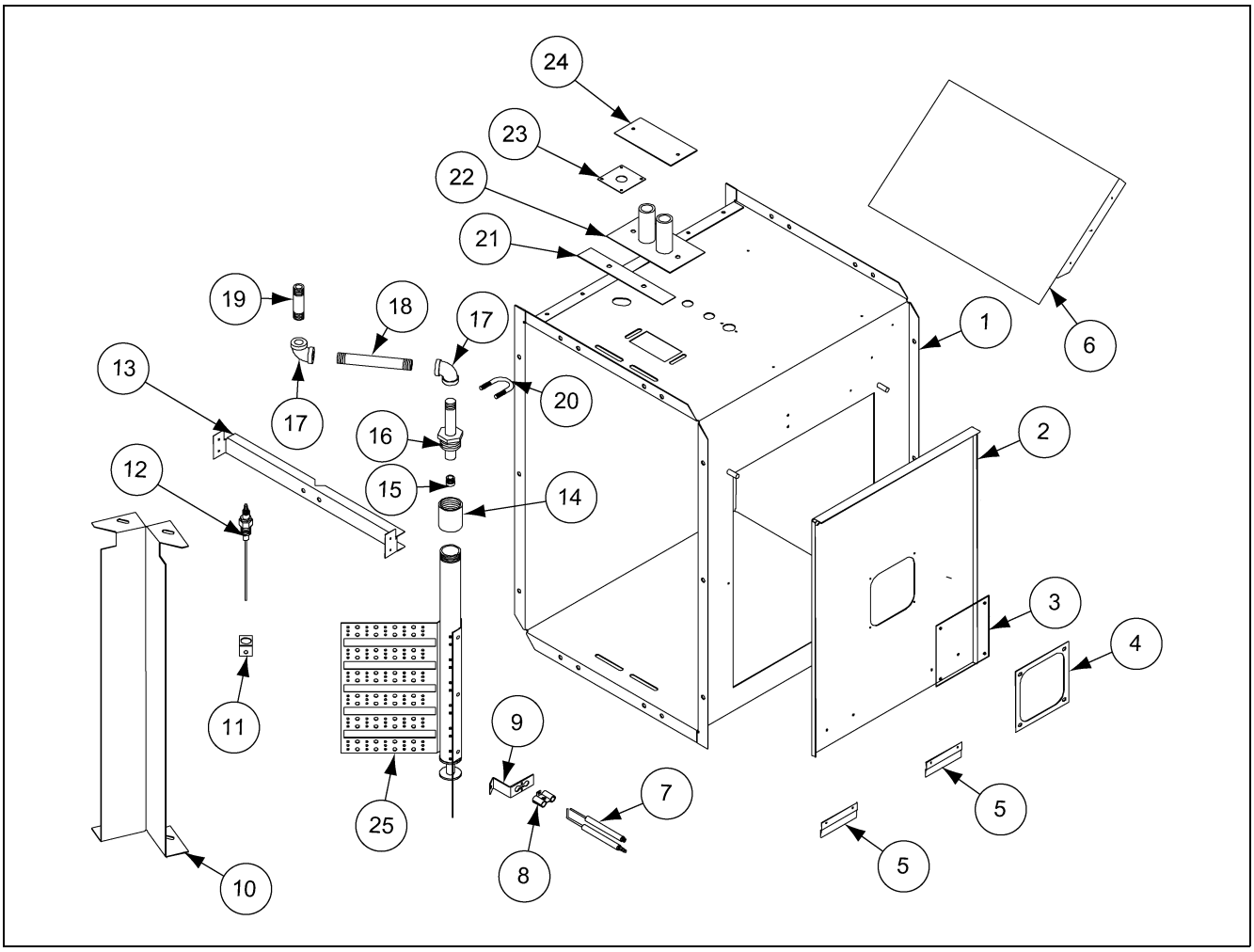
Ref #	Part #	Description
1	TFC-0027	Valve 1/4" NPT 250 PSI Relief
2	HH-1251	Strainer 1/2" Y 250# WOG SCH 80 Black
3	TFC-0030	Valve 1/2" NPT Ball, Bronze
4	TFC-0092	Valve 1/2" NPT Solenoid LP Gas
5	THH-4111	Valve 1/4" NPT 50 PSI Relief
6	TFC-0023	Regulator 1/2" NPT 0-30 PSI
7	TFC-0032	Valve 1/2" NPT Solenoid
8	TFC-0030	Valve 1/2" Firing
9	HH-2984	Gauge 0-30# Pressure LP
10	HH-7013	200° Vapor High-Limit
11	CD-0197	Vaporizer Coil

DW LP Modulating Pipetrain Components



Ref #	Part #	Description
1	TFC-0027	Valve 1/4" NPT 250 PSI Relief
2	HH-1251	Strainer 1/2" Y 250# WOG SCH 80 Black
3	TFC-0030	Valve 1/2" NPT Ball, Bronze
4	TFC-0092	Valve 1/2" NPT Solenoid LP Gas
5	THH-4111	Valve 1/4" NPT 50 PSI Relief
6	TFC-0023	Regulator 1/2" NPT 0-30 PSI
7	TFC-0032	Valve 1/2" NPT Solenoid
8	TFC-0030	Valve 1/2" Firing
9	HH-2984	Gauge 0-30# Pressure LP
10	HH-2653	Modulating Valve
11	HH-7013	200° Vapor High-Limit
12	CD-0197	Vaporizer Coil

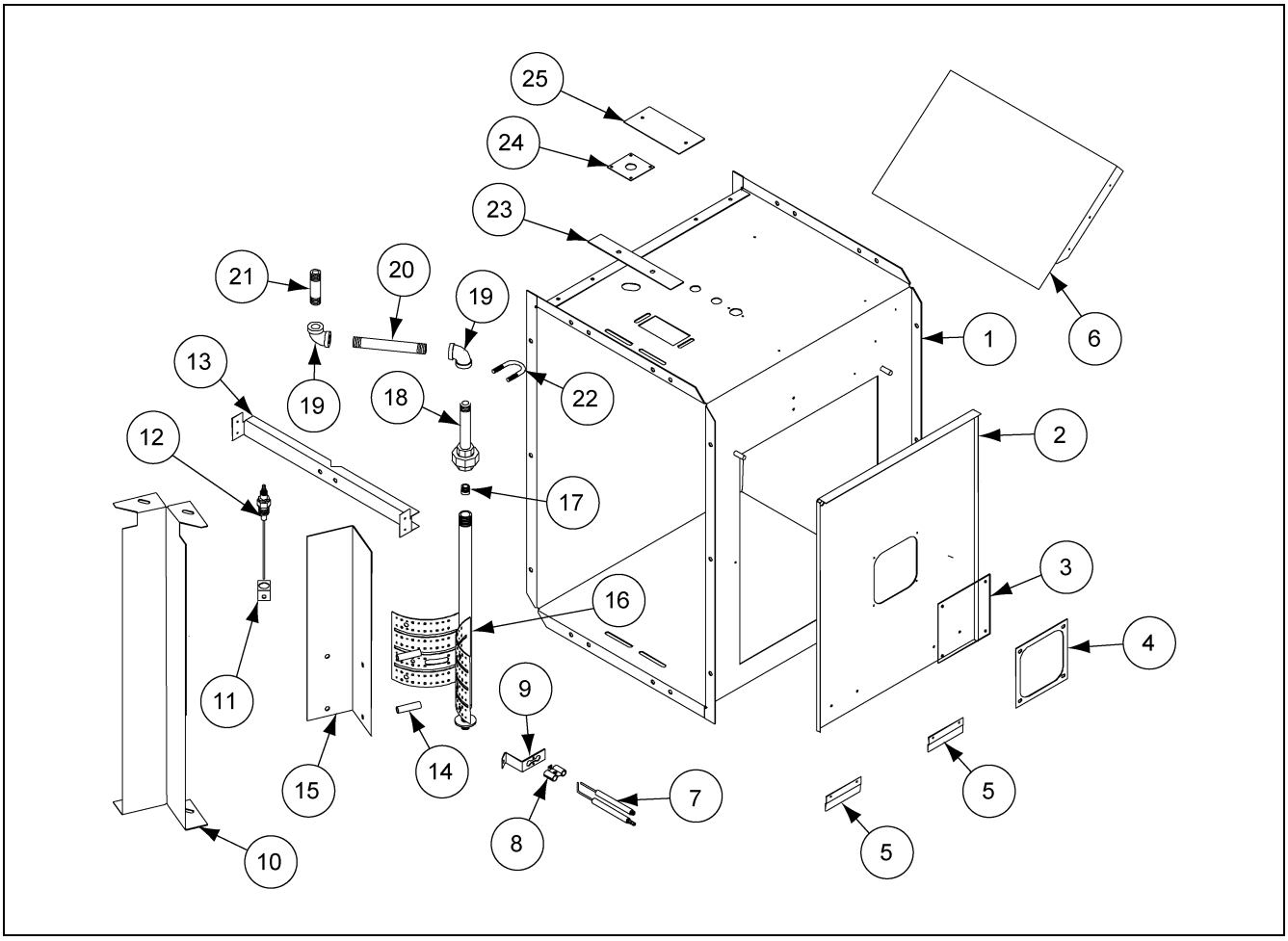
40 HP DW High-Temperature Heater Parts



Ref #	Part #	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	CD-0187	Flame Sensor Bracket (Deluxe, SR 2000)
12	THH-4179	Flame Sensor (Deluxe, SR 2000)
13	HF-7304	40 Burner Brace
14	HH-7035	1-1/4" Coupling

Ref #	Part #	Description
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	High-Fire Burner Assembly
N/S	HF-7261	10 HP-40 HP Spark Plug Wire
N/S	HF-7263	10 HP-40 HP Flame Probe Wire

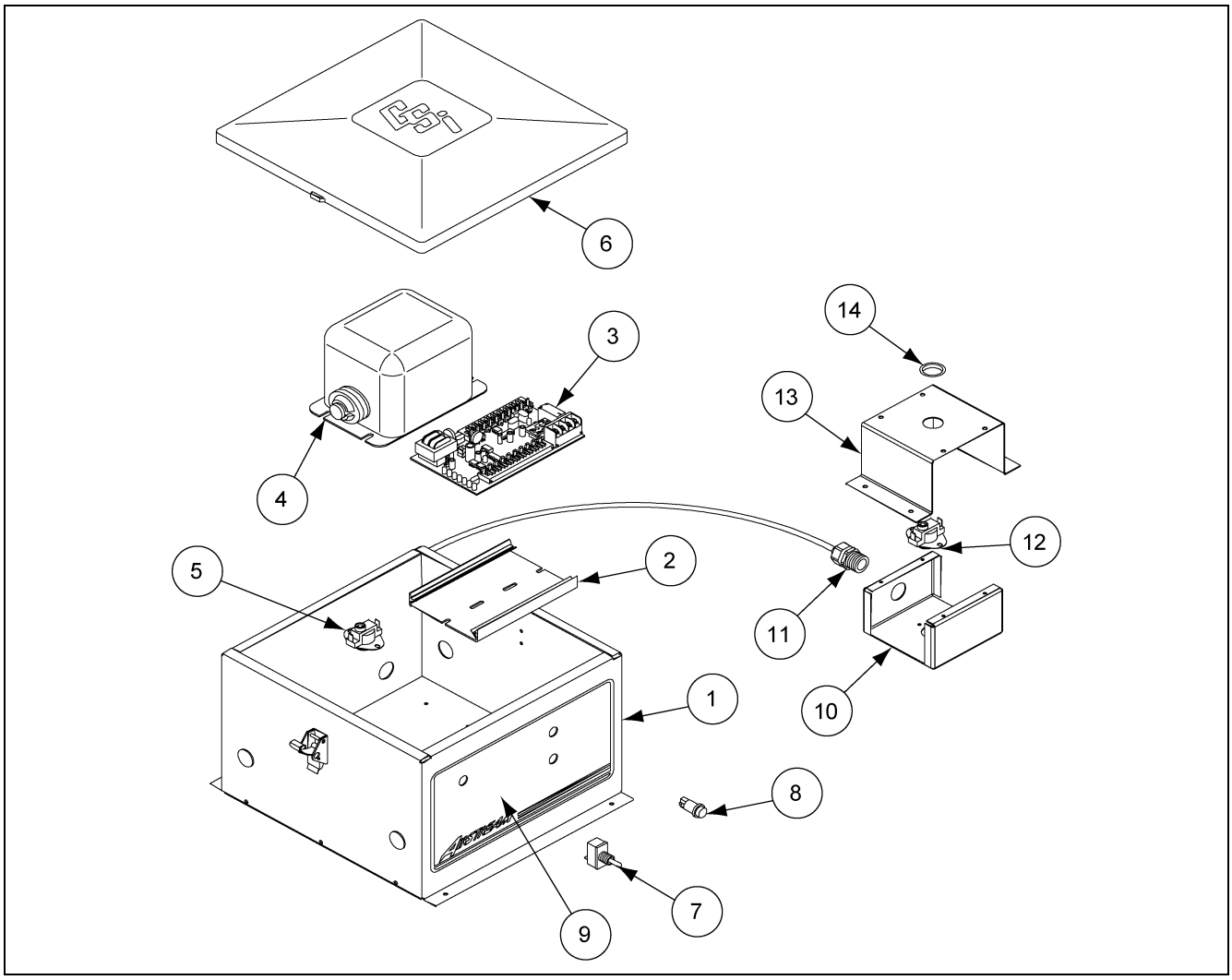
40 HP DW Low-Temperature Heater Parts



Ref #	Part #	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	CD-0187	Flame Sensor Bracket (Deluxe, SR 2000)
12	THH-4179	Flame Sensor (Deluxe, SR 2000)
13	HF-7304	40 Burner Brace
14	HF-7072	Low-Fire Diverter Spacer

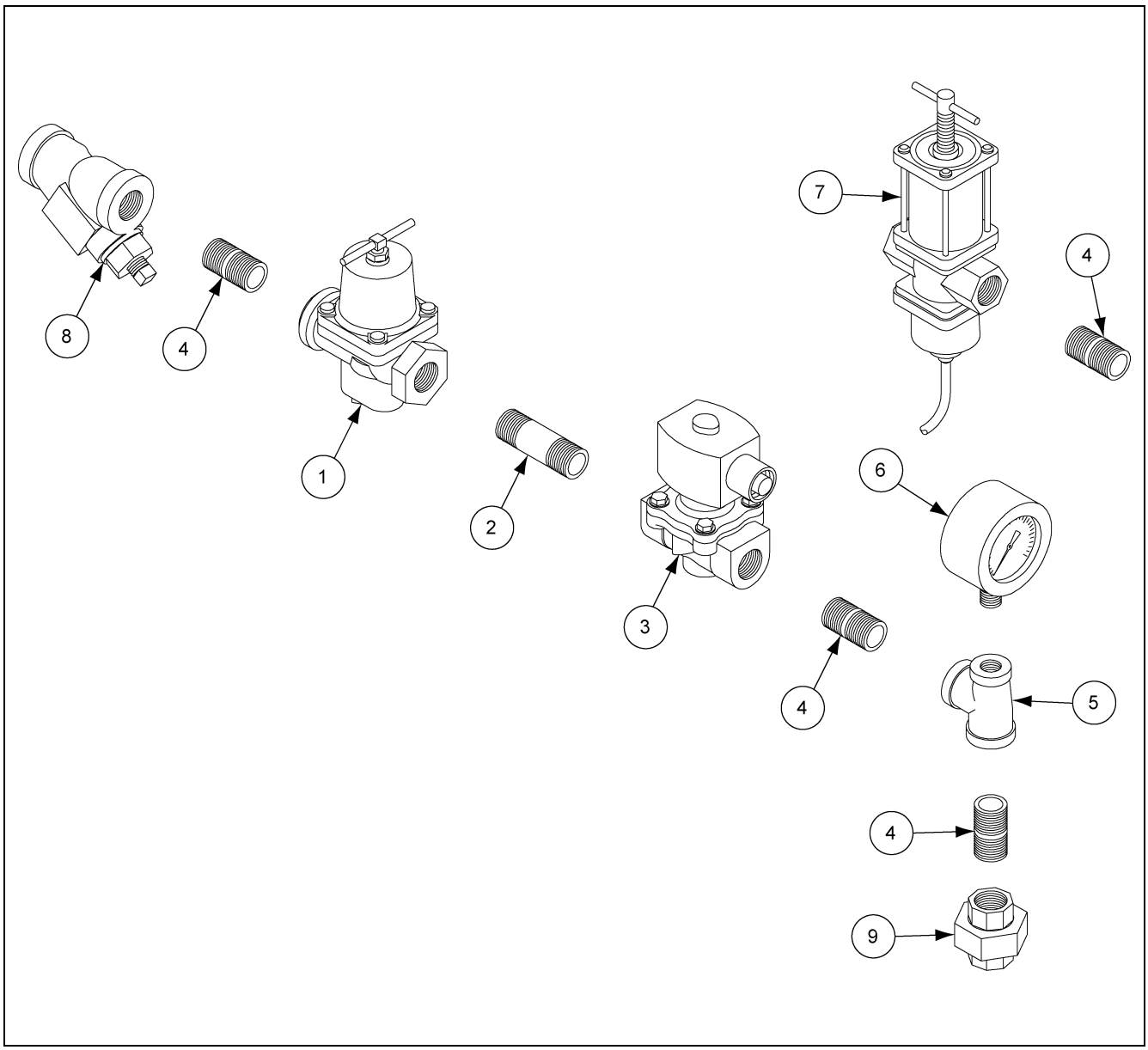
Ref #	Part #	Description
15	HF-7071	Low-Fire Diverter
16	HF-7070	Low-Fire Burner Assembly
17	HF-7035	7/64" Orifice (Propane)
17	HF-7036	5/32" Orifice (Natural Gas)
18	HF-7069	Low-Fire Orifice Weldment
19	THH-4071	1/2" Elbow
20	HH-3854	1/2" x 6" Nipple
21	HH-3670	1/2" x 2-1/2" Nipple
22	S-7259	5/16" U-Bolt
23	HF-7079	Diverter Angle Cover
24	HF-7297	Burner Support Plate
25	HF-7032	Vapor Cover Plate
N/S	HF-7261	10 HP-40 HP Spark Plug Wire
N/S	HF-7263	10 HP-40 HP Flame Probe Wire

DW Gas Heater Control Box Parts



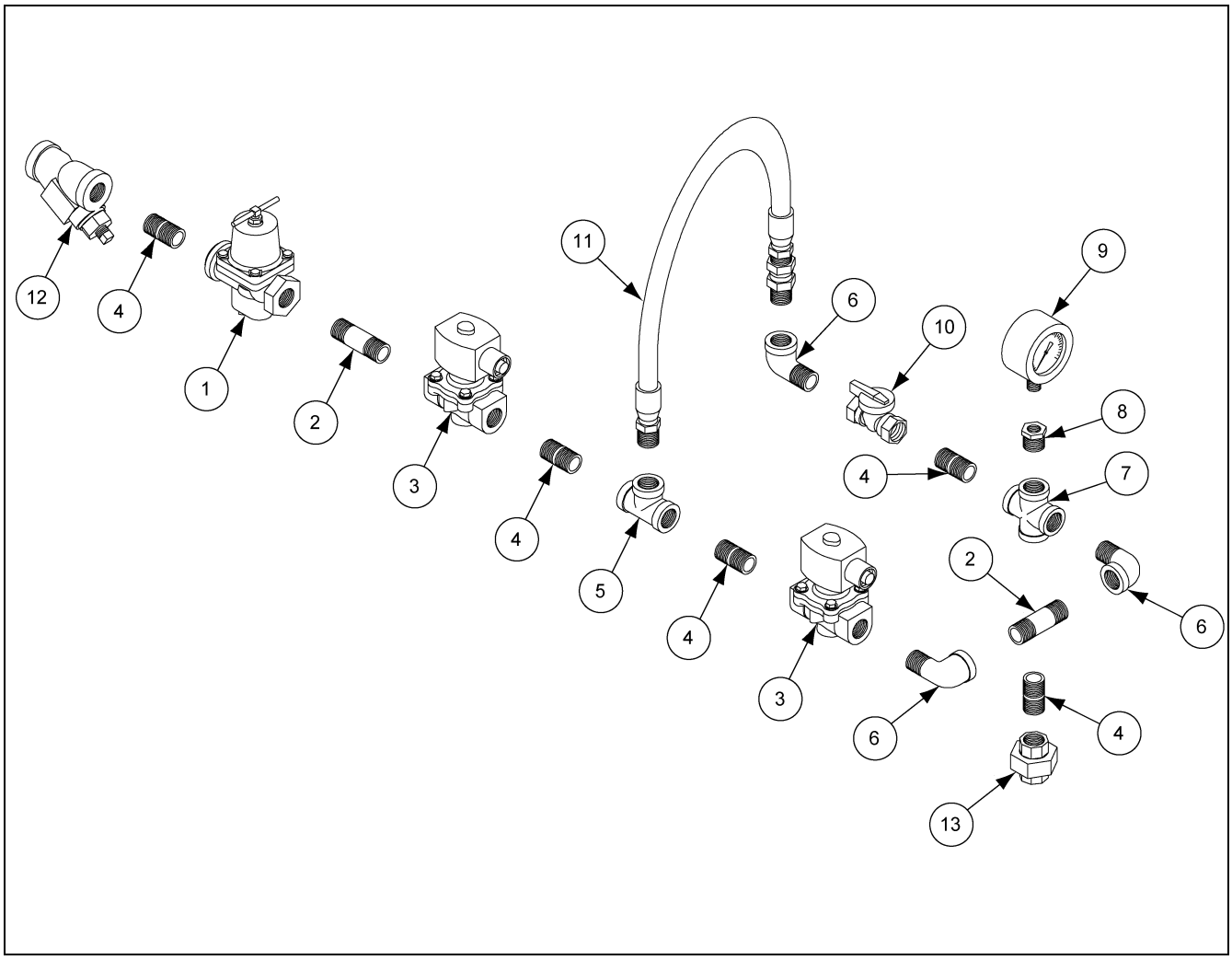
Ref #	Part #	Description
1	HF-7315	Control Box Housing
2	HH-7015	Snap Trak
3	HF-7318	Circuit Board Assembly
4	HH-1487	Ignition Transformer
5	HH-1092	High-Limit Switch 180°
6	F-942	Control Box Lid
7	HH-1442	Toggle Switch
8	TFH-2021	Red Light (110V)
9	DC-1166	Decal Deluxe Heater Front Panel
10	HF-7455	High-Limit Switch Box Bottom
11	FH-1310	Cord Connector
12	HF-7439	High-Limit Switch 250°
13	HF-7454	High-Limit Switch Box Top
14	HF-7414	Recessed Plastic Plug

DW Propane Vapor Pipetrain Parts



Ref #	Part #	Description
1	TFC-0023	1/2" 0-30 PSI Regulator (Deluxe, SR 2000)
2	HH-3670	1/2" x 2-1/2" Nipple
3	TFC-0032	1/2" Solenoid (Deluxe, SR 2000)
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 Propane Vapor High-Low Pipetrain Parts



Ref #	Part #	Description
1	TFC-0023	1/2" 0-30 PSI Regulator (Deluxe, SR 2000)
2	HH-3670	1/2" x 2-1/2" Nipple
3	TFC-0032	1/2" Solenoid (Deluxe, SR 2000)
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

GSI GROUP

Limited Warranty

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

Warranty Extensions: The Limited Warranty period is extended for the following products:

	Product	Warranty Period
AP Fans and Flooring	Performer Series Direct Drive Fan Motor	3 Years
	All Fiberglass Housings	Lifetime
	All Fiberglass Propellers	Lifetime
Cumberland Feeding/Watering Systems	Feeder System Pan Assemblies	5 Years **
	Feed Tubes (1.75" & 2.00")	10 Years *
	Centerless Augers	10 Years *
	Watering Nipples	10 Years *
Grain Systems	Grain Bin Structural Design	5 Years
Grain Systems Farm Fans Zimmerman	Portable & Tower Dryers	2 Years
	Portable & Tower Dryer Frames and Internal Infrastructure †	5 Years

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

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

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

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

Conditions and Limitations:

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

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

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

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

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

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

GSI GROUP

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