

CE Compliant Vane Axial Heater Installation and Operation

Model #: _____

Serial #: _____

Owner's Manual - Original Instructions

PNEG-012CE

Date: 07-04-14

G S I G R O U P



PNEG-012CE

GSI GROUP



**CE Declaration of Incorporation
EC MACHINERY DIRECTIVE
2006/42/EC**

1004 East Illinois Street, Assumption, IL, 62510, USA

+1 217 226 4429

The GSI Group declares that the machine, parts or equipment

Vane Axial Upstream Heaters

Models

VHE-18-VNC	VHE-26-VNC
VHE-18-VNH	VHE-26-VNH
VHE-24-VNC	VHE-28-VNC
VHE-24-VNH	VHE-28-VNH

Heaters are vapour fuel only, using LPG or Natural Gas, with gross calorific values as stated in tables [on Pages 17 and 18](#) of this manual.

Meets the Essential Requirements of the Machinery Directive 2006/42/EC and has been constructed to meet the requirements of the following standards:

- EN746-2:1996

The equipment above must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of all relevant Directives, or until these components have been assembled in the manner recommended in the manufacturers instructions.

Signed: *F. G. Ward*

Name: Frank Ward Director Hennock International Limited On behalf The GSI Group

Date: 07-04-14

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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.



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



This symbol indicates a potentially hazardous situation which, if not avoided, **may result in serious injury or death**.



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



This symbol indicates a potentially hazardous situation which, if not avoided, **may result in property damage**.

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 that 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.

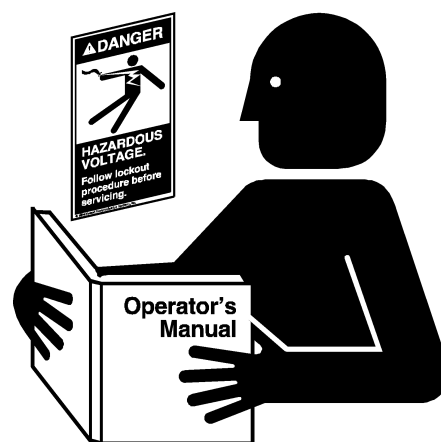
Follow Safety Instructions

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.



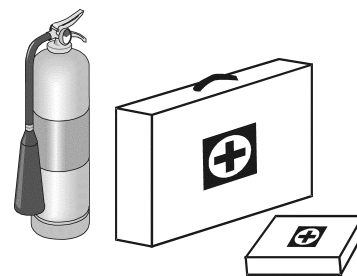
Read and Understand Manual

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

1. Safety

Wear Protective Clothing

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

Remove all jewelry.

Tie long hair up and back.

Wear safety glasses at all times to protect eyes from debris.

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

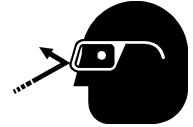
Wear steel-toed boots to help protect your feet from falling debris. Tuck in any loose or dangling shoestrings.

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

Wear a 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-Toed Boots



Respirator



Hard Hat



Fall Protection



Correct Use



The heater shall be used ONLY.

1. When coupled to a drying fan of similar diameter, delivering air flow in the range stated in [Heater Dimension Table on Page 17](#) or on the heater rating plate.
2. When connected directly to a transition duct, delivering the air into the ventilation system of a grain bin/store/dryer.
3. For drying whole agricultural grains.
4. When fitted with a temperature control system, including over temperature limiting thermostats, as described in this manual.
5. With fuel specified on the rating plate.
6. With adequate air exhaust facility on the bin/store/dryer.



It shall NOT be used:

1. With any safety features by-passed.
2. For domestic or commercial heating.
3. In any potentially explosive area.
4. By an untrained person or any one less than 18 years old.
5. Where there is risk of flammable materials being drawn into or exposed to the flame.
6. If it has been modified in any way.
7. With covers or guards removed or loose.
8. Unless the commissioning sheet (in this manual) has been filled in and signed of by the installing engineer.



In addition:

1. All electrical installation must be carried out by a qualified electrical engineer.
2. All gas installation must be carried out by a qualified gas engineer.
3. The entire installation shall meet the full requirements of all EU Directives, EU standards and local codes and laws.
4. The heater shall never be lit manually.

Electrical Safety



Equipment shall include:

1. Fuse protected main power supply.



- a. The electrical supply should include earth leakage protection, (eg) Residual Current Device (RCD) or Residual Current Circuit Breaker (RCCB), to provide automatic disconnection in the event of a fault.

2. Lockable main safety disconnect.



- a. Disconnects all electrical power.

3. Lockable motor service disconnect.



- a. Adjacent to each heater.
- b. Disconnects all power to the heater.

4. Emergency stops.



- a. Stops all equipment immediately when pressed.
- b. Must remain engaged until manually disengaged.
- c. Equipment shall not immediately re-start when the emergency stop is re-set.

5. Door safety interlocks - Where doors provide access to dangerous machinery and/or atmosphere.



- a. Immediately stops and prevents re-start of all equipment when the door is open.
- b. Equipment shall not immediately re-start when the door is closed.
- c. Safety switches shall be SIL3 in accordance with IEC62061:2005.
- d. Safety circuits should be Category 3 in accordance with EN954-1:1997 or PLc in accordance with ISO 13849-1:2006.

6. The electrical supply must include a properly designed protective earth system (PE), with connection to all exposed conductive parts.



7. All motors shall be connected to protective earth at the terminal provided.
8. The control system shall include.

- a. Short circuit protection.



- b. Equipment shall not immediately re-start following re-establishment of power.

9. All electrical design, installation and testing must be carried out by a qualified electrical engineer, in accordance with EU Directives and Standards, local laws and codes.

Flammable Fuel Safety

This equipment requires a correctly designed fuel supply, including:

1. Primary pressure regulation.
2. Over/under pressure protection.
3. Excess flow protection.
4. Lockable shut off valve.

Fuel supply shall be in accordance with local laws, regulations and codes and shall be approved by authorities having jurisdiction.

1. Safety

Possible Hazards Inside Grain Bins

The inside of a grain bin, no matter what size, is a dangerous location. Grain bins should be kept **locked shut** at all times.



NEVER allow a child or untrained, inexperienced person to enter a grain bin.

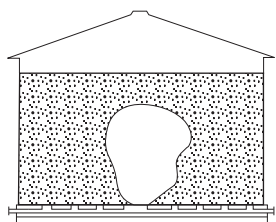
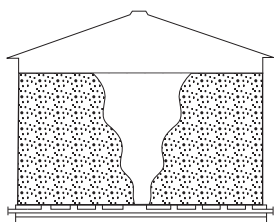
Hazards present at any time may include:



Mass flow of grain when filling or emptying which could draw you in and cause suffocation/burial.



Bridged, crusted or capped grain which could collapse if you stand on it. It is recommended **NEVER** to walk on the surface of the stored material.



If grain has stopped flowing, become bridged, capped or crusted, the **only safe way** to remedy this is from the outside of the bin.



Exposed machinery such as fans, augers and conveyors with which you could become entangled.



It is a recommended **additional** safety measure to fit grain bin doors and hatches with electrical interlock switches, to stop all equipment if the door or hatch is opened. However this does not override the need to lock out power before entering.



Hazardous substances such as dust, mould spores, vapors and gases or low oxygen levels which could cause respiratory problems.



High temperature combustible material.



Precautions to Reduce Risk of Fire

Combustion equipment presents a risk of fire. To reduce this, follow this procedure at least every 20 working days. Protective equipment required for this task shall be determined by risk assessment.

1. Do not smoke or use naked flames.



2. Shut down and purge heater, plenum and connected areas.



3. Lock out electrical supply.



4. Lock out fuel supply.



5. Open access panels and check for build-up of dust or other combustible debris.
6. Using an industrial vacuum cleaner, clean the plenum. **Do not use compressed air.**
7. If fitted, open plenum clean-out doors and blow out excess dust and chaff.
8. Check inside other dryer accesses and clean as required.
9. Check all personnel are out of the dryer, close and lock all accesses before re-starting drying.
10. This procedure may be carried out more regularly in conditions of extreme dust and dirt.

Exercise great caution when drying highly flammable grains and seeds. For example rapeseed, canola, linseed, sunflower and milo.


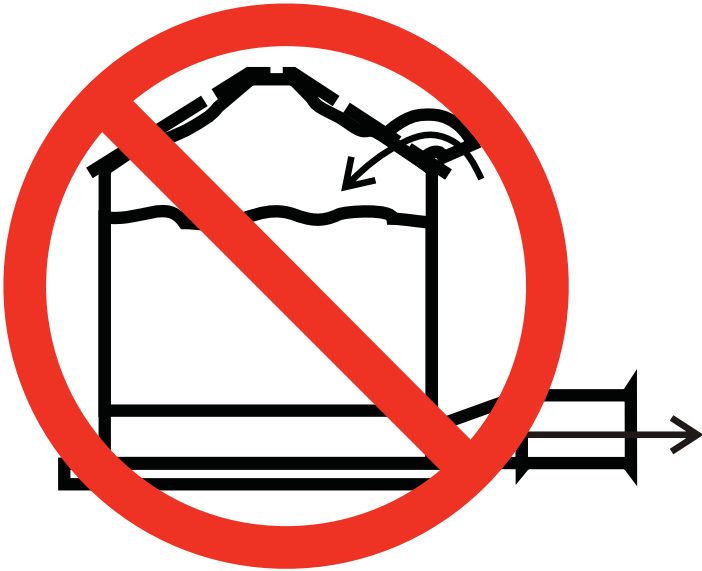
1. All grain and seed must be whole (minimal cracked or crushed), clean and dust free.
2. Dry at low temperatures (< 40°C).
3. Avoid dust and chaff being drawn into the fan and heater.
4. Keep the fan, heater, drying plenum and ducts clean at all times.
5. In the event of a fire (or suspected fire).
 - Shut down the entire dryer.
 - Turn OFF fuel at the tank or supply valve.
 - Shut off and lock electrical power.
 - Evacuate the area.
 - Call the fire department.

2. Safety Decals

Safety decals are available in non-English versions. Please request LPAK-0004-** if these were not delivered with the equipment.

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.

 CAUTION

<p>Excessive vacuum (or pressure) may damage roof. Use positive aeration system. Make sure all roof vents are open and unobstructed. Start roof fans when supply fans are started. Do not operate when conditions exist that may cause roof vent icing.</p>
<p>GSI Group, Inc. 217-226-4421 DC-969</p>

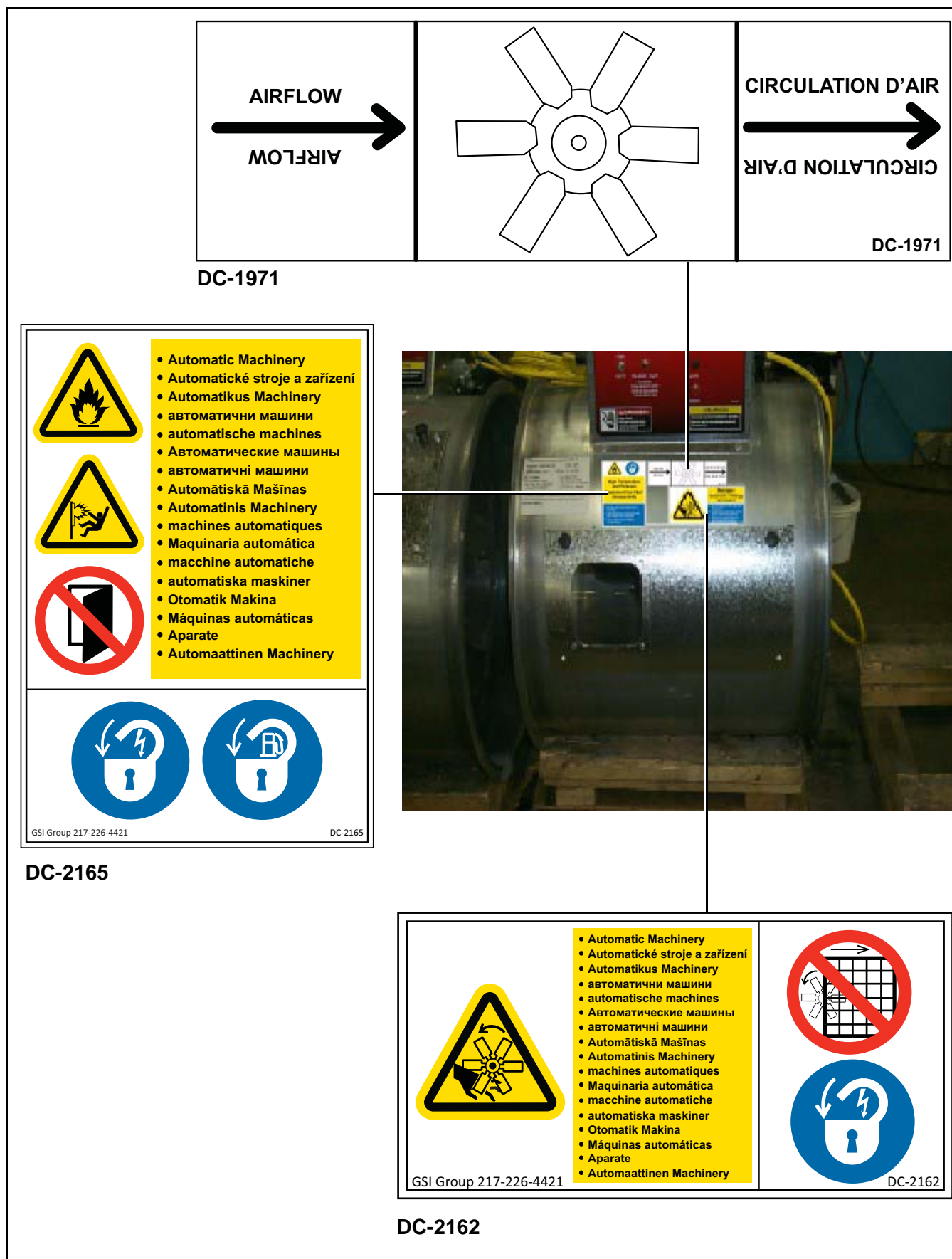


Figure 2A

2. Safety Decals

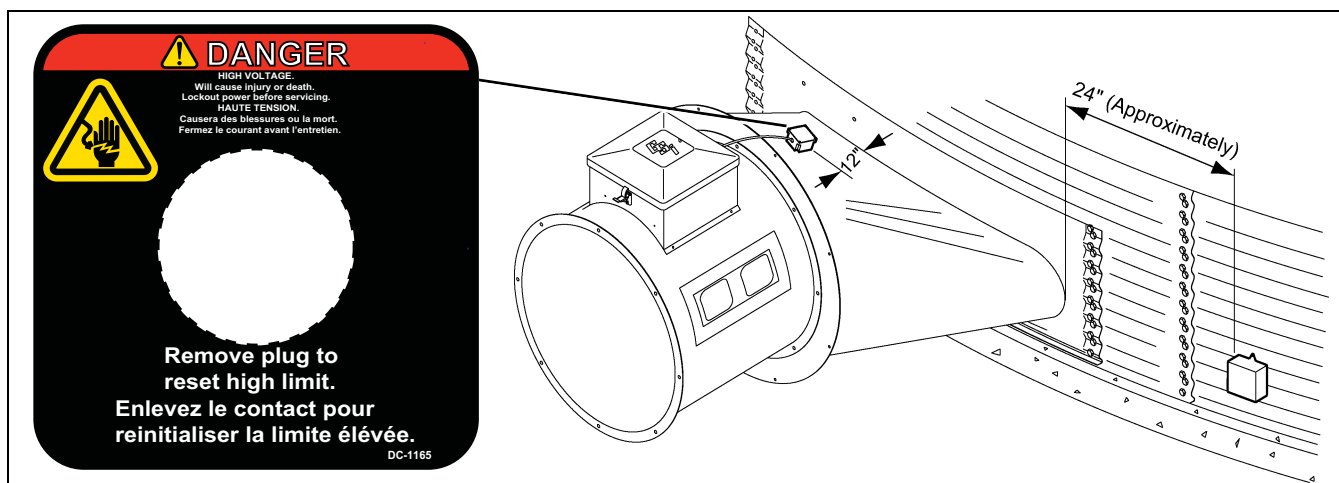


Figure 2B

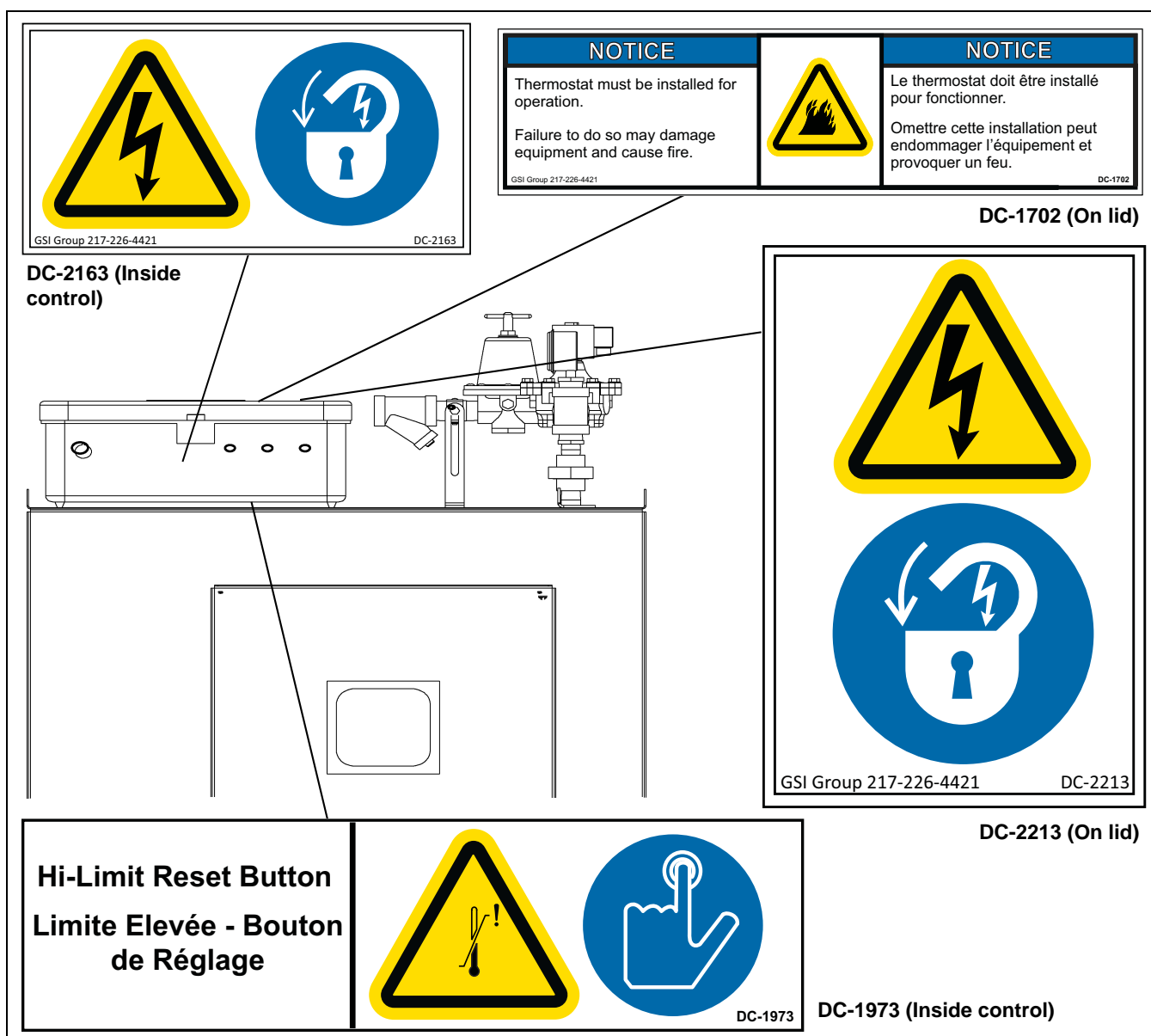


Figure 2C

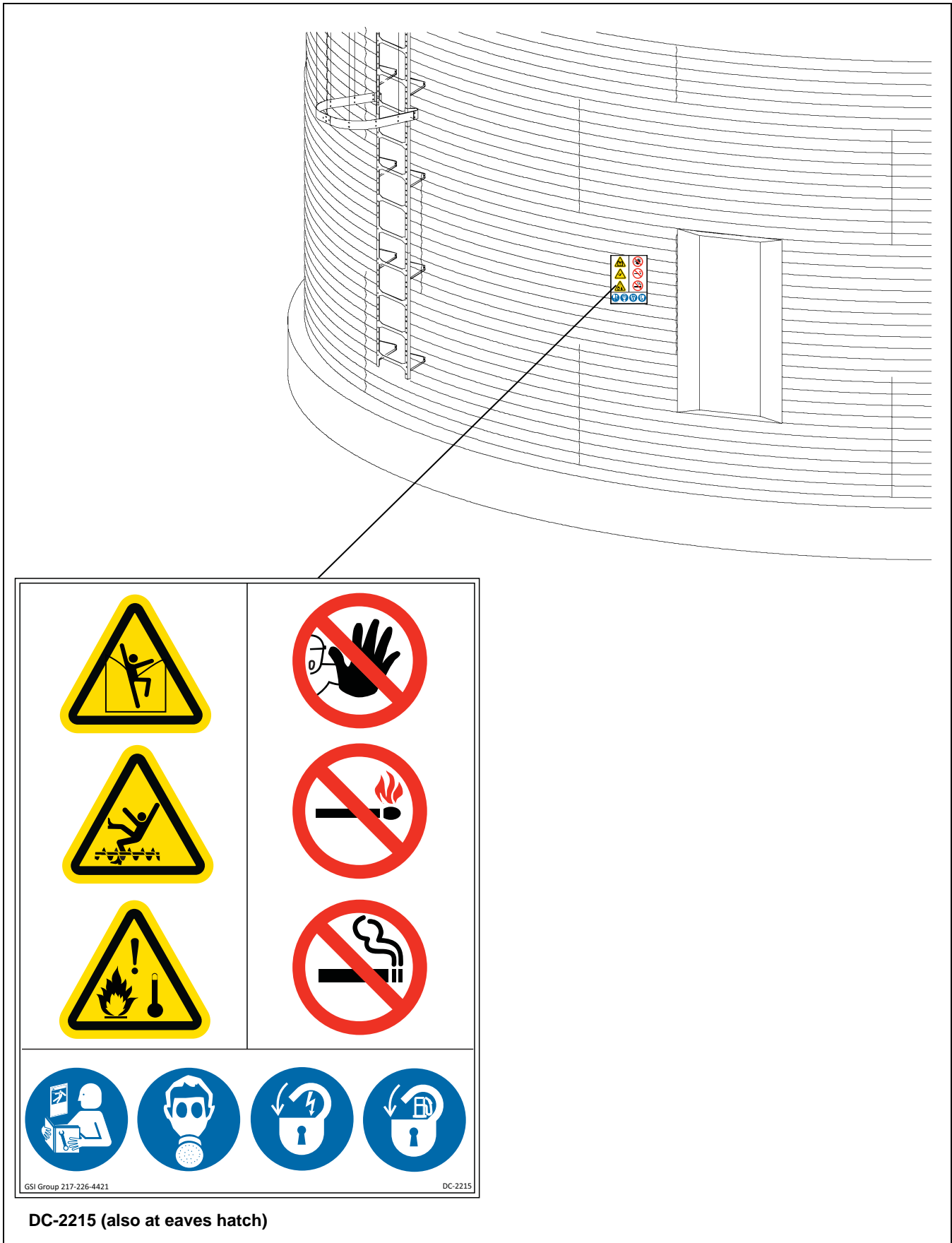


Figure 2D

Rating Plate

CE Rating plate must be fitted as shown in [Figure 2E](#).








The GSI Group LLC		VANE AXIAL HEATER	
1004 E Illinois St. Assumption. IL USA +1 217 226 4429			
SN #		123456789	
Model	Modelo	VHE-18-VNC	
Natural Gas <div>CH₄ 38.6 MJ/m³ 70 - 150 kPa</div>			
		73 kW	410 kW
Orifice	Ø	4.3 mm	NA mm
Pressure	Presión del suministro de combustible	11 kPa	8.6 kPa
Flow		6.8 m3/h	38.2 m3/h
Propane <div>C₃H₈ 93.9 MJ/m³ 70 - 150 kPa</div>			
		73 kW	410 kW
Orifice	Ø	4.3 mm	8.7 mm
Pressure	Presión del suministro de combustible	5.2 kPa	12.8 kPa
Flow		2.8 m3/h	15.7 m3/h
Airflow		Min	Max
		1.5 m3/s	3.26 m3/s
Electrical supply			
Alimentación eléctrica			
<div></div> <div>EN746-2:1996 14 January 2013</div>		220 - 240VAC	
		1 - 50 hz	
		2.0 A	

Figure 2E

Heater Specifications

Heater Dimensions (mm)

Heater Diameter Model	VHE-18	VHE-24	VHE-26	VHE-28
Inside Diameter (mm)	465	616	642	715
Bolt Circle Diameter (mm)	494	654	711	752
Length (mm)	559	572	565	641
Weight (kg)	38	59	61	62

LP Vapor Models

Propane Vapor	Gross CV = 93.87 MJ/m ³			
Supply Pressure	Maximum 1500 mBar		Minimum 700 mBar	
Heater Model	VHE-18	VHE-24	VHE-26	VHE-28
High Heat				
Nominal Gross Input (kW)	410	616	792	880
Primary Orifice (mm)	8.7	8.7	8.7	8.7
Secondary Orifice (mm)	10	10	10	10
Gauge Setting (mBar)	128	265	405	480
Maximum Gas Flow (m3/h)	15.7	23.6	30.4	33.7
Low Heat				
Nominal Gross Input (kW)	73	103	117	147
Primary Orifice (mm)	4.3	4.3	4.3	4.3
Secondary Orifice (mm)	10	10	10	10
Gauge Setting (mBar)	52	100	130	190
Maximum Gas Flow (m3/h)	2.8	4.0	4.5	5.6

3. Specifications

Natural Gas Models

Propane Vapor	Gross CV = 38.63 MJ/m ³			
Supply Pressure	Maximum 1500 mBar		Minimum 700 mBar	
Heater Model	VHE-18	VHE-24	VHE-26	VHE-28
High Heat				
Nominal Gross Input (kW)	410	616	792	880
Primary Orifice (mm)				
Secondary Orifice (mm)	10	10	10	10
Gauge Setting (mBar)	86	195	322	397
Maximum Gas Flow (m ³ /h)	38.2	57.4	73.8	82.0
Low Heat				
Nominal Gross Input (kW)	73	103	117	147
Primary Orifice (mm)	4.3	4.3	4.3	4.3
Secondary Orifice (mm)	10	10	10	10
Gauge Setting (mBar)	110	200	250	350
Maximum Gas Flow (m ³ /h)	6.8	9.6	10.9	13.7

Airflow Requirements

Heater Model	VHE-18	VHE-24	VHE-26	VHE-28
Maximum Airflow (m ³ /s)	3.26	9.1	10.5	12.7
Minimum Airflow (m ³ /s)	1.5	4.5	5.0	6.1

Orifice Selection

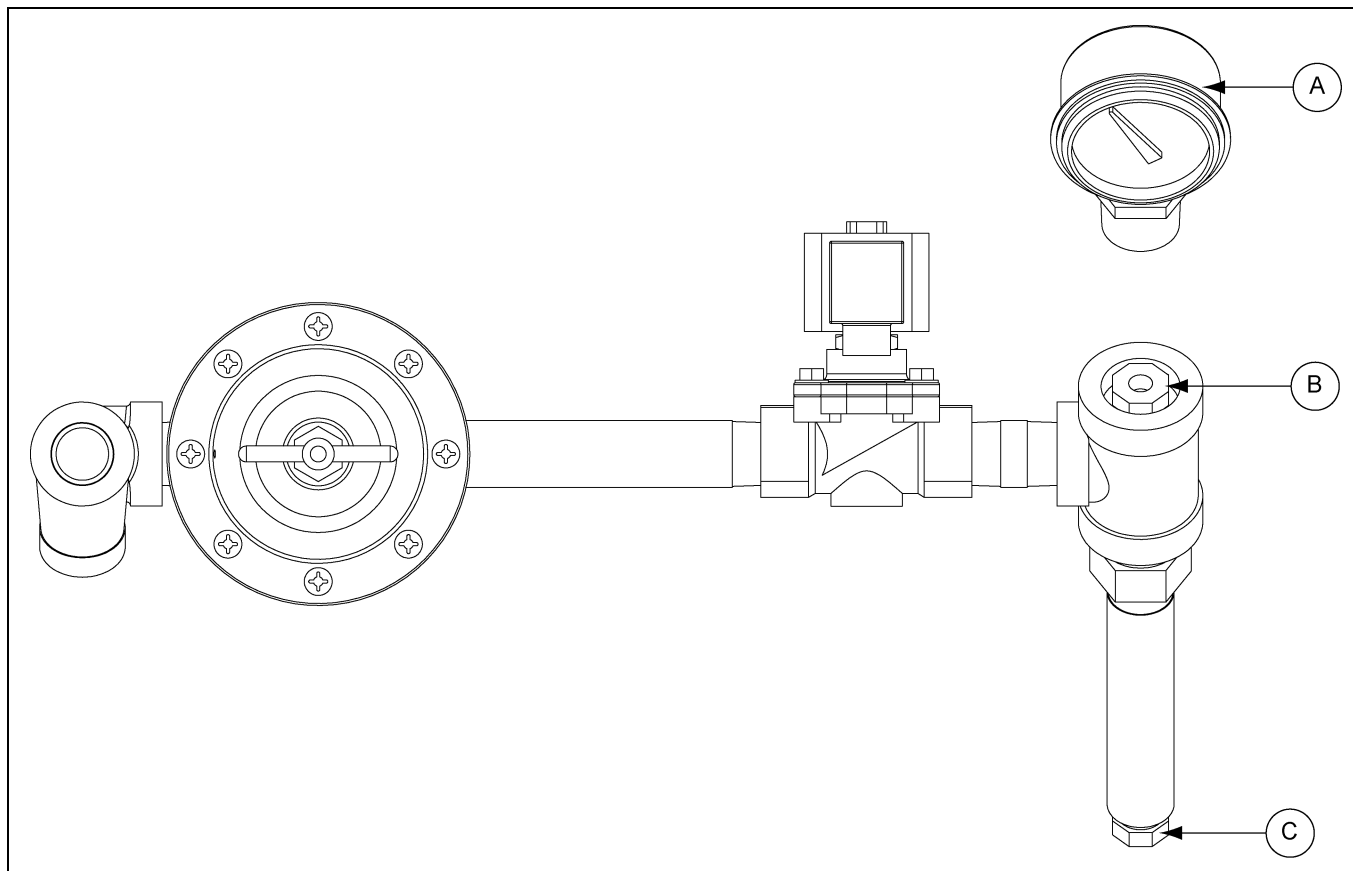


Figure 4A Burner Orifice Locations

Ref #	Description
A	Reducer Bushing with Pressure Gauge
B	Upper Primary Orifice
C	Lower Secondary Orifice

Burner Orifice Selection

Ref #	Description	Fuel	Heat Output (See Tables on Pages 17 and 18.)	VHE-18	VHE-24	VHE-26	VHE-28
B	Upper Primary Orifice	Natural Gas	High	NA	NA	NA	NA
			Low	4.3 mm	4.3 mm	4.3 mm	4.3 mm
		LPG Vapor	High	8.7 mm	8.7 mm	8.7 mm	8.7 mm
			Low	4.3 mm	4.3 mm	4.3 mm	4.3 mm
C	Lower Secondary Orifice	Natural Gas	ALL	10 mm	10 mm	10 mm	10 mm
		LPG Vapor	ALL	10 mm	10 mm	10 mm	10 mm

Orifice Installation



Figure 4B

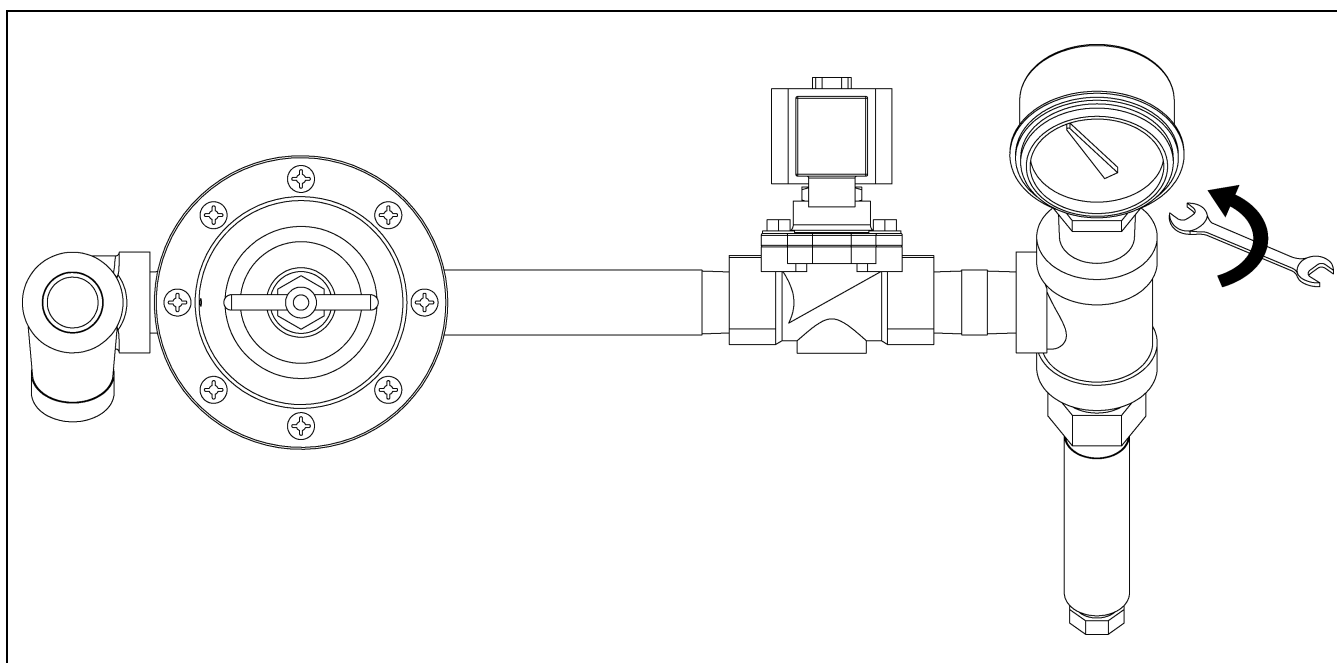


Figure 4C

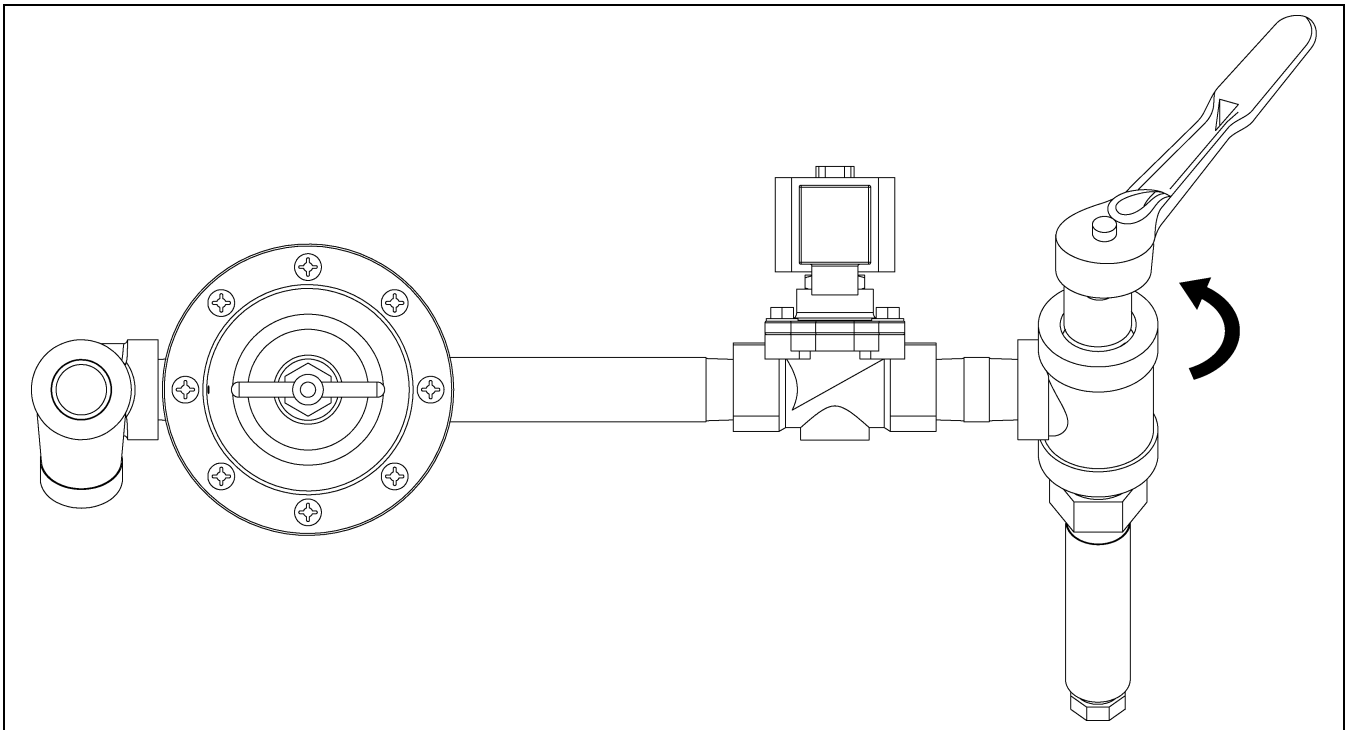


Figure 4D

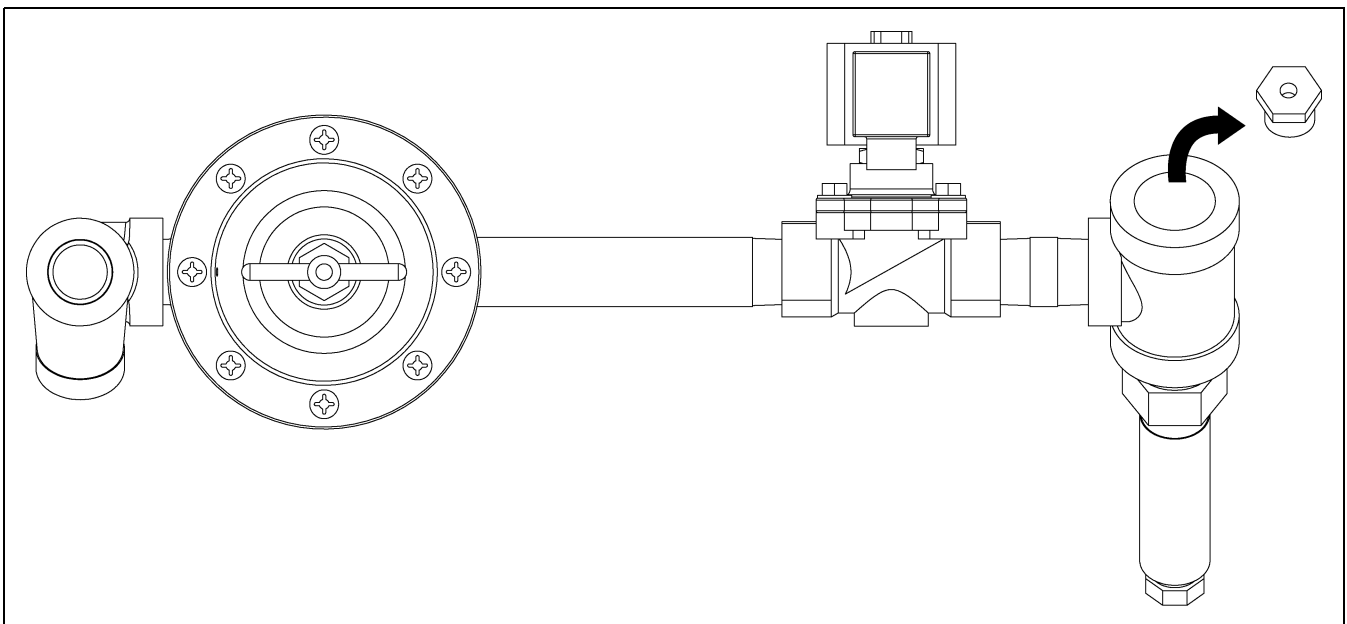


Figure 4E

4. Installation

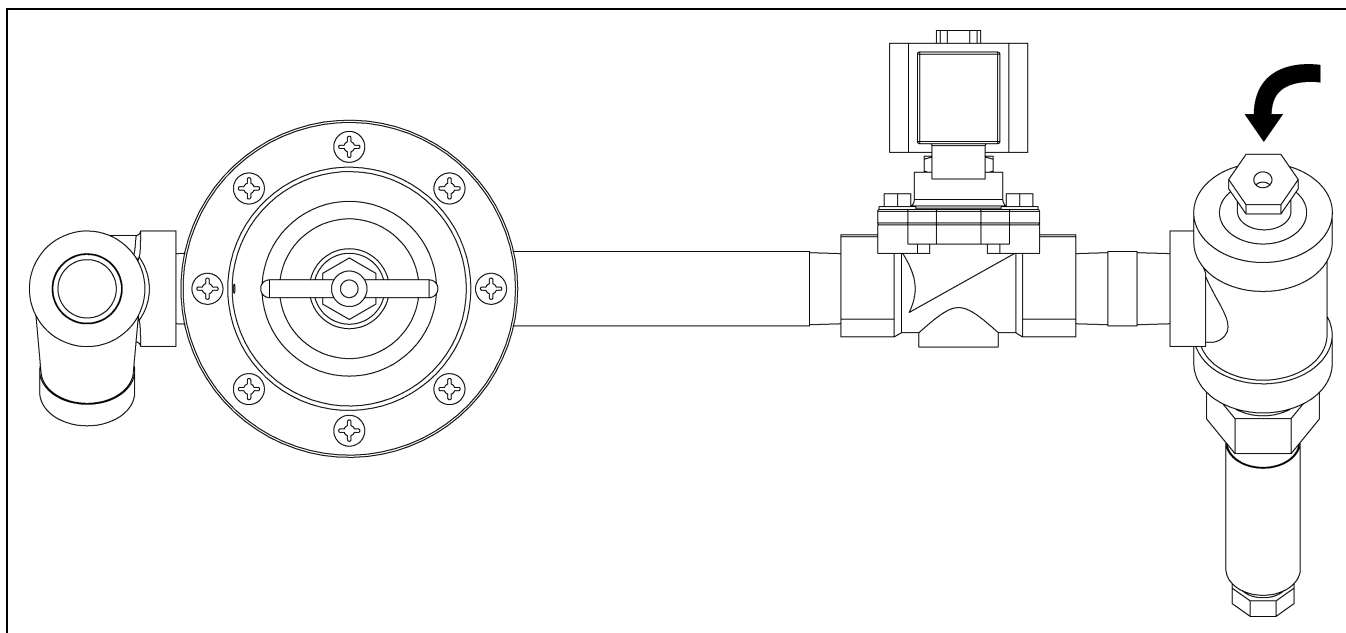


Figure 4F

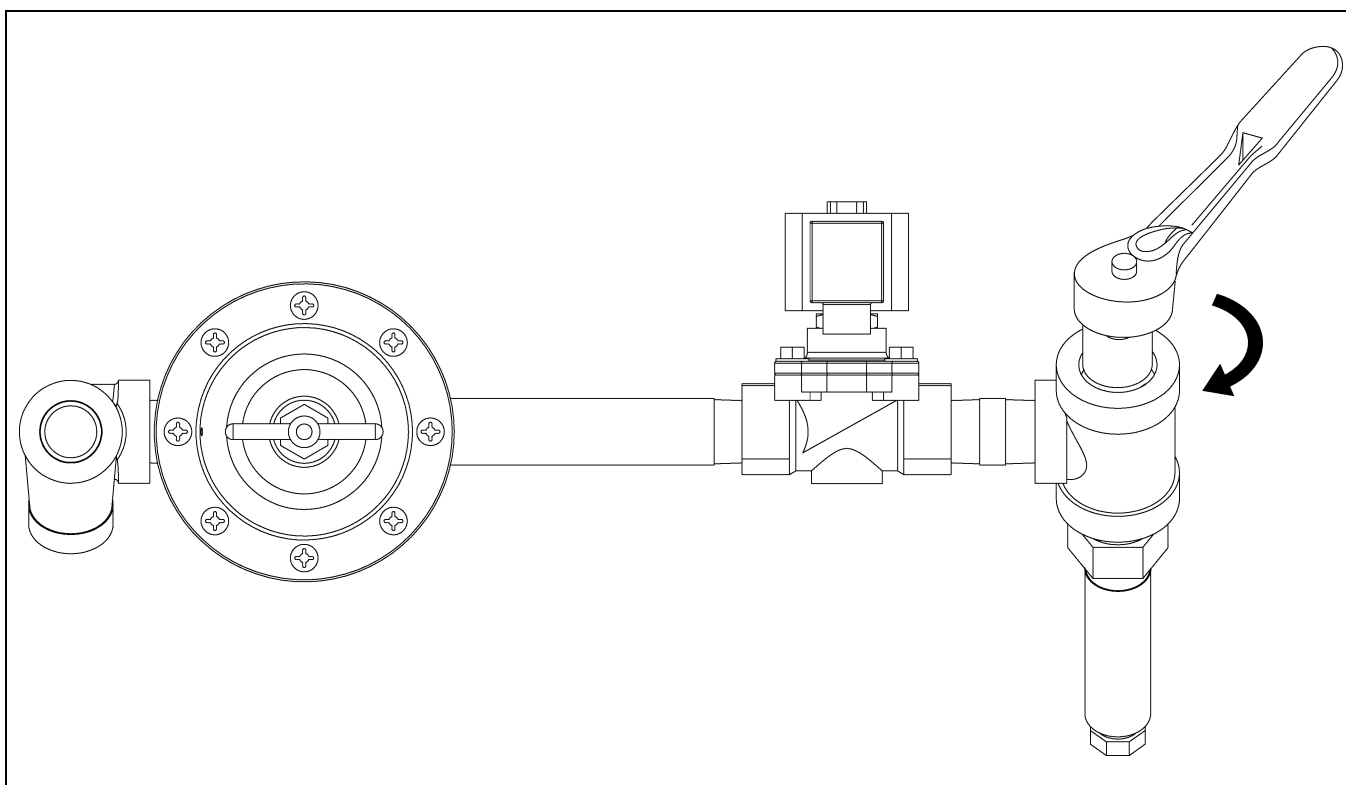


Figure 4G

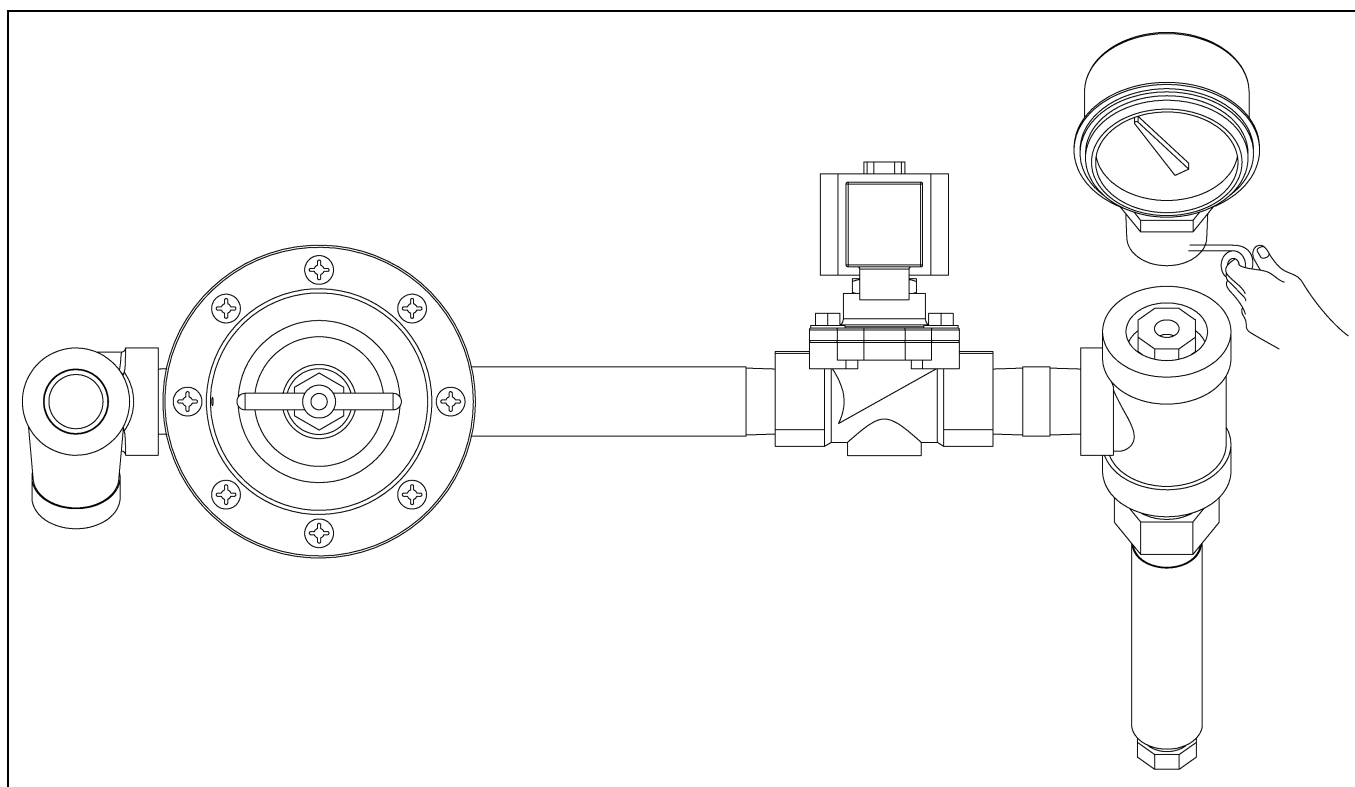


Figure 4H

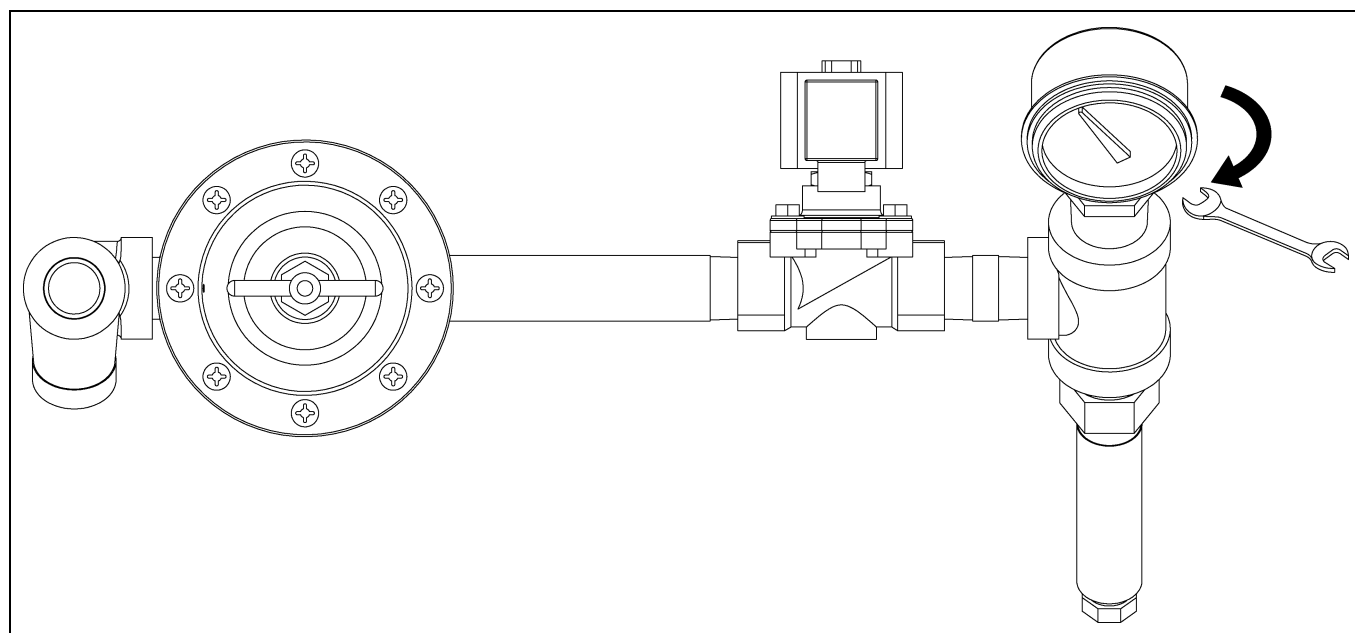


Figure 4I



Check for leaks.

Fit Heater to Bin

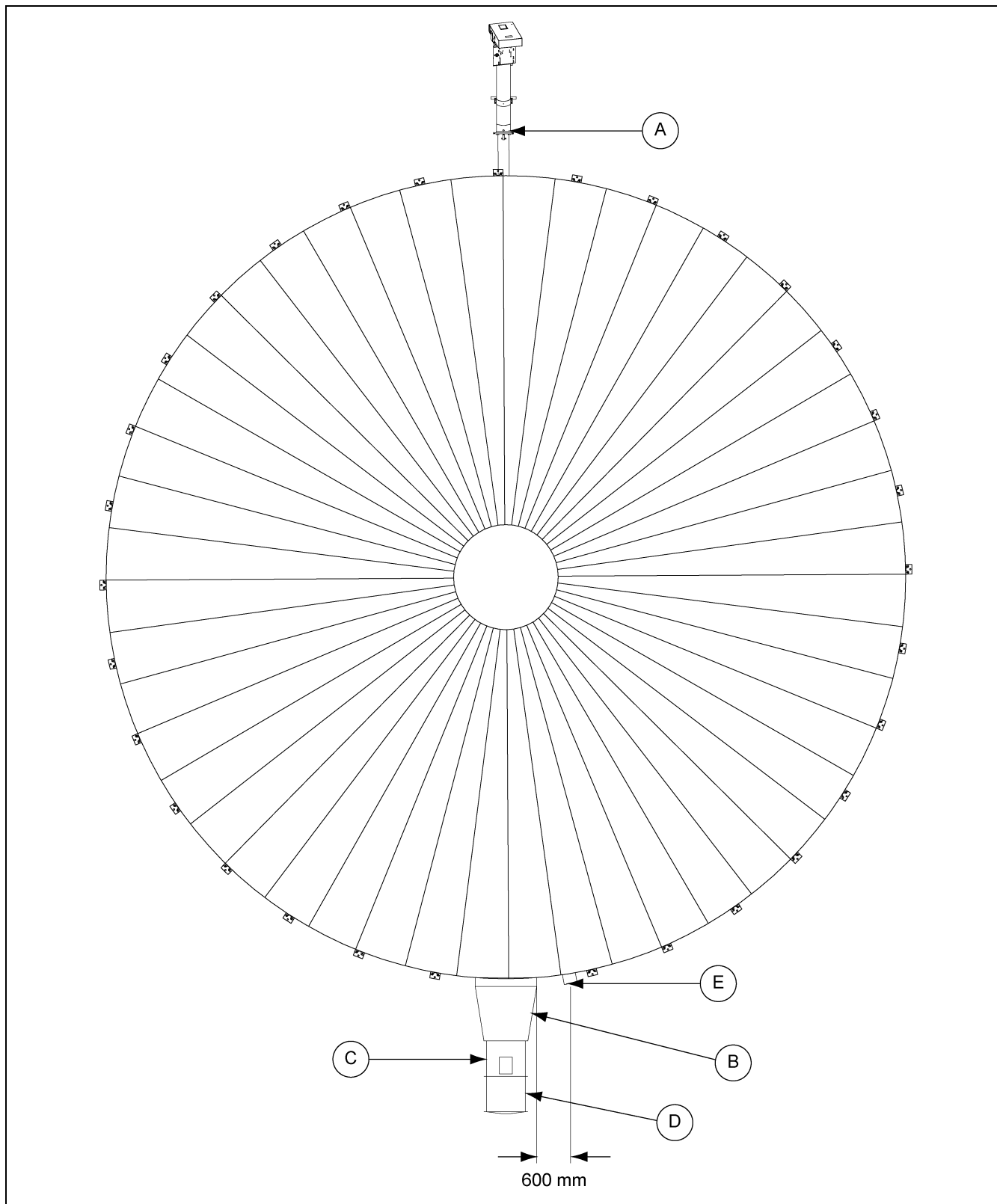


Figure 4J Single Heater Installation

NOTE: Orientation of fan relative to unload must be as shown.

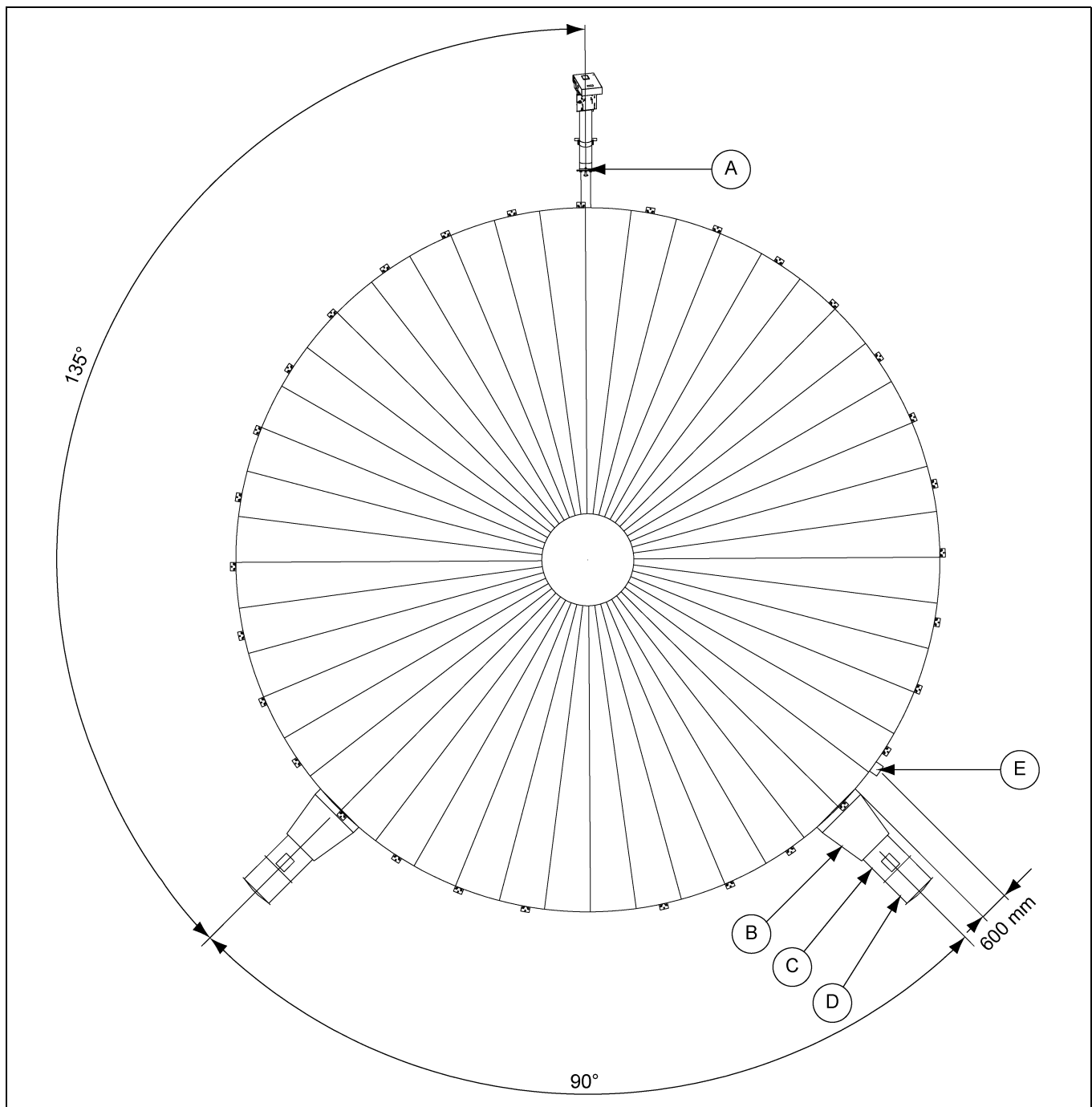


Figure 4K Master and Slave Heater Installation

NOTE: Orientation of fan relative to unload must be as shown.

Recommended Installation Components

Ref #	Description	18"	24"	26"	28"
A	Unload Auger	-			
B	Transition Duct	TR-4734	TR-7048		
	Face Plate	TR-4725	TR-7036	TR-7037	TR-7038
C	Vane Axial Heater	VHE-18	VHE-24	VHE-26	VHE-28
D	Vane Axial Fan	AF-1.5-*G / AF-3-*G	AF-7-*G / AF-10-*G		AG-158-*G
E	Plenum Thermostat and High-Limit	HF-7513			

4. Installation

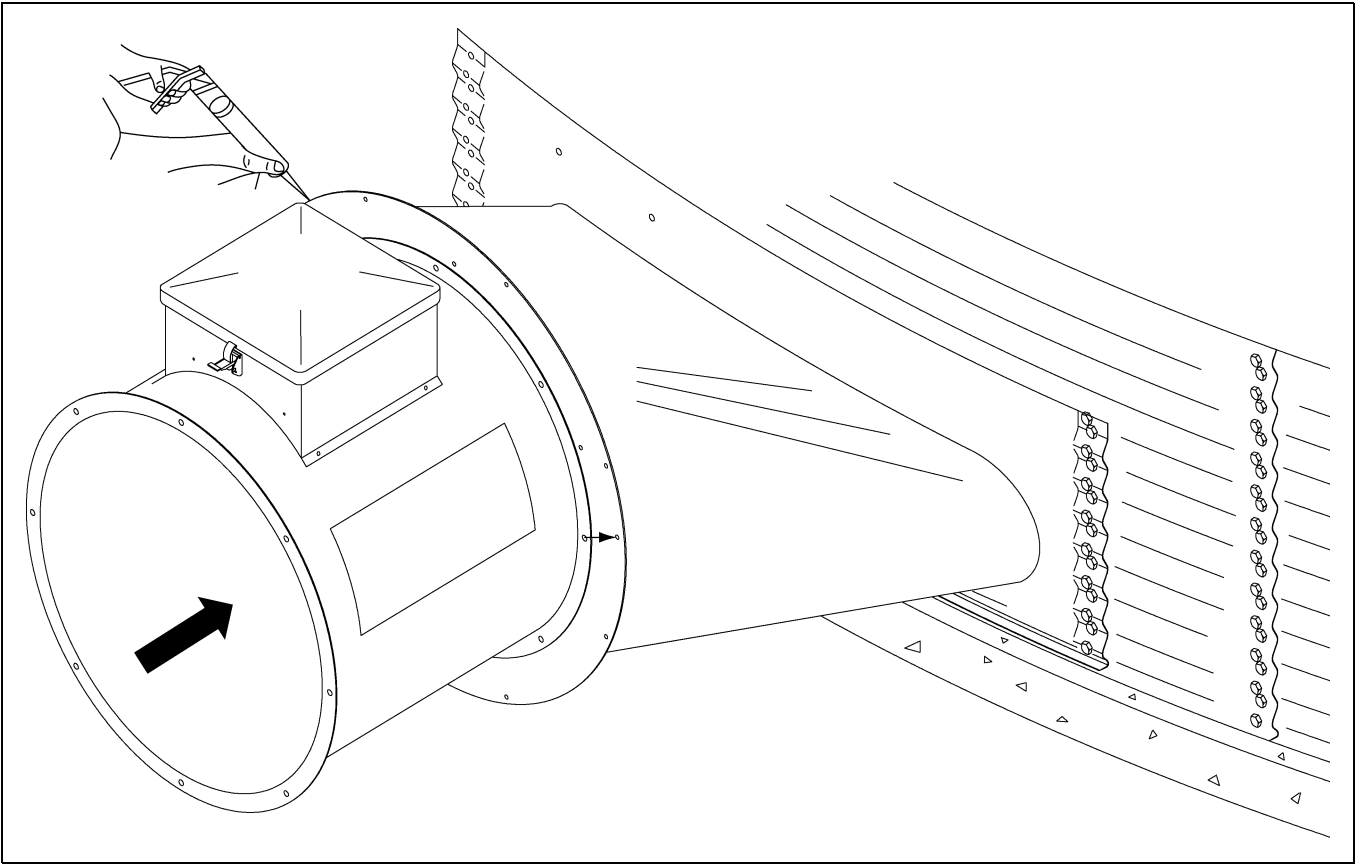
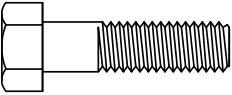
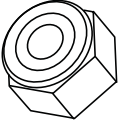
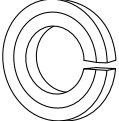
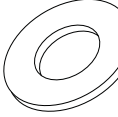


Figure 4L Fit Heater to Transition Face Plate

Type					Qty
VHE-18	M8 x 30 mm	M8	8 mm	8 mm	6
VHE-24 - VHE-28	M8 x 30 mm	M8	8 mm	8 mm	8

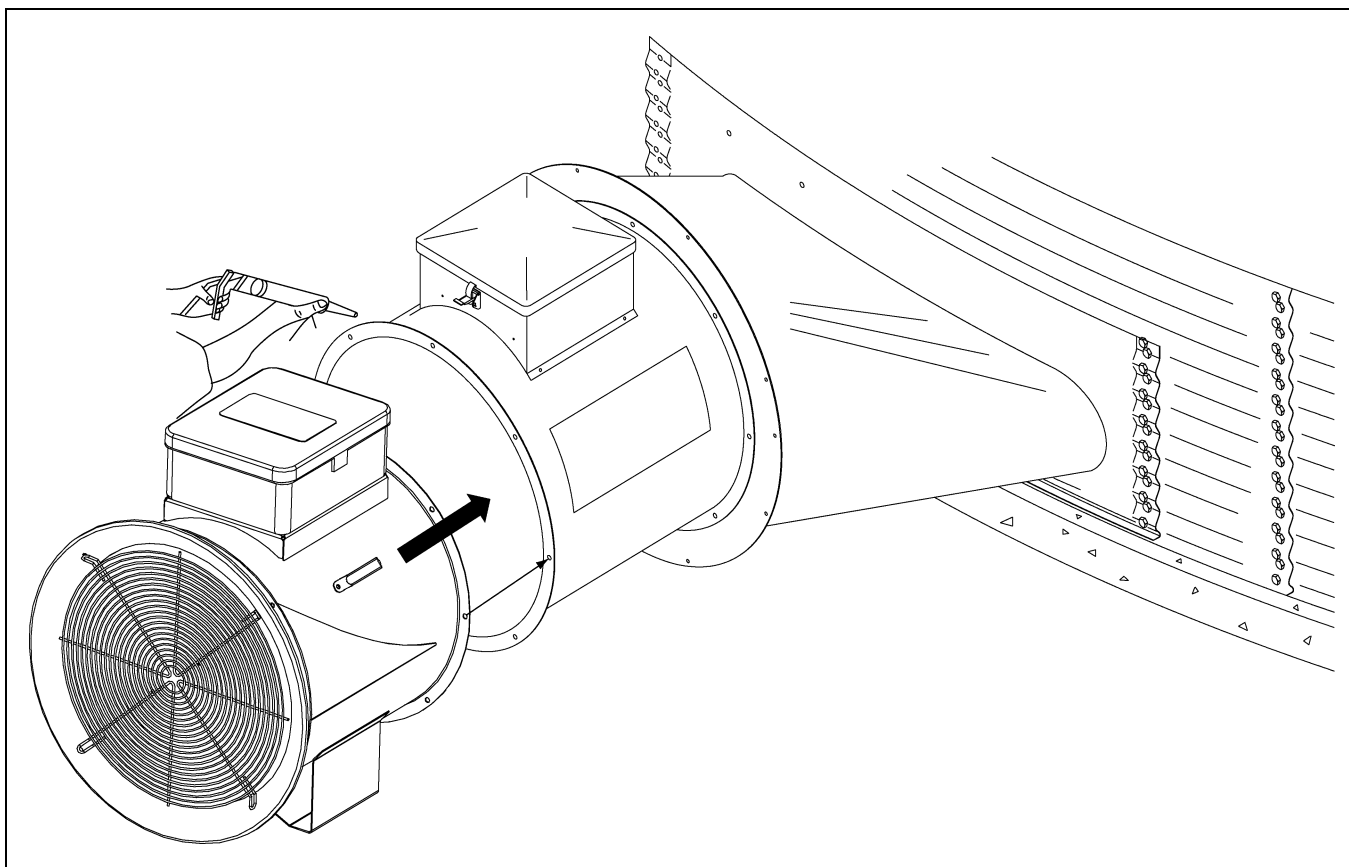
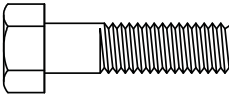
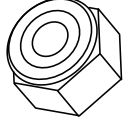
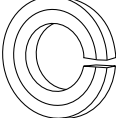
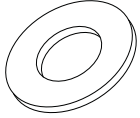


Figure 4M *Fit Fan to Heater*

Type					Qty
VHE-18	M8 x 30 mm	M8	8 mm	8 mm	6
VHE-24 - VHE-28	M8 x 30 mm	M8	8 mm	8 mm	8

Fit Transition High-Limit HF-7200 (120°C)



Risk of fire. Transition high-limit must be fitted.



Figure 4N Transition High-Limit

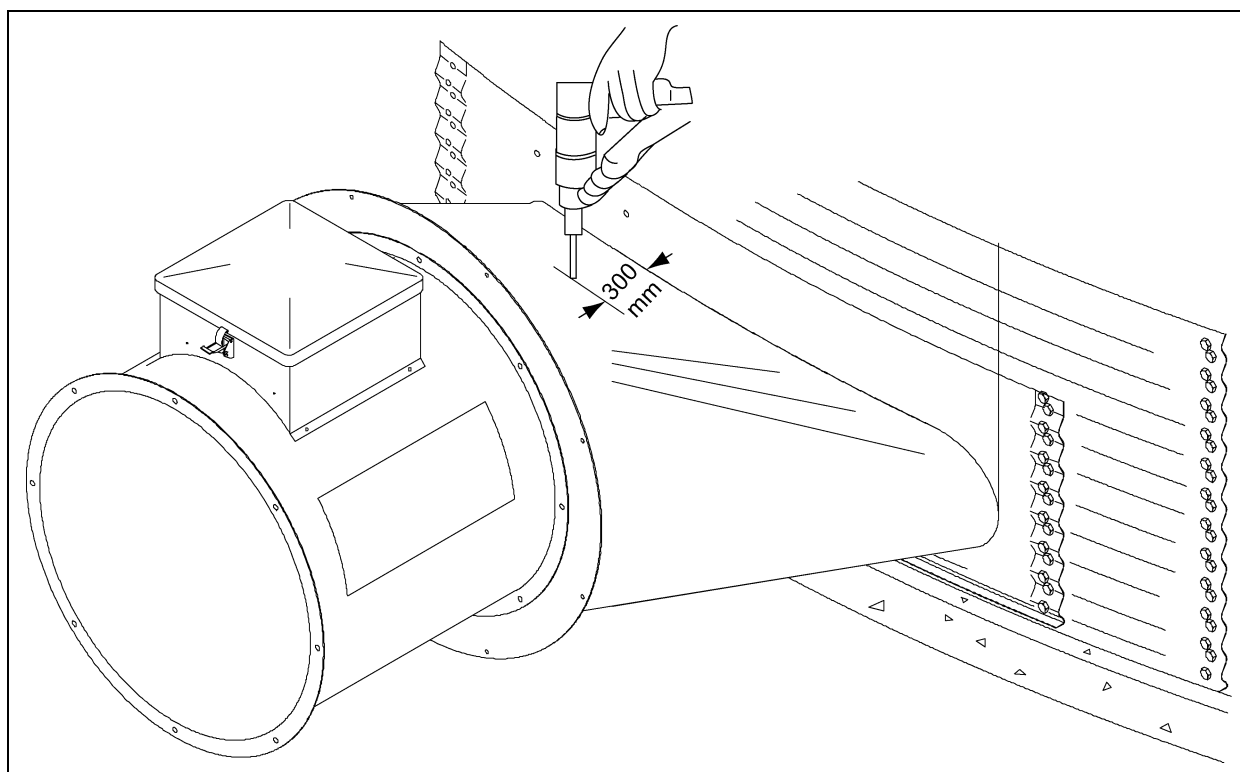


Figure 4O Cut 22 mm Ø Hole

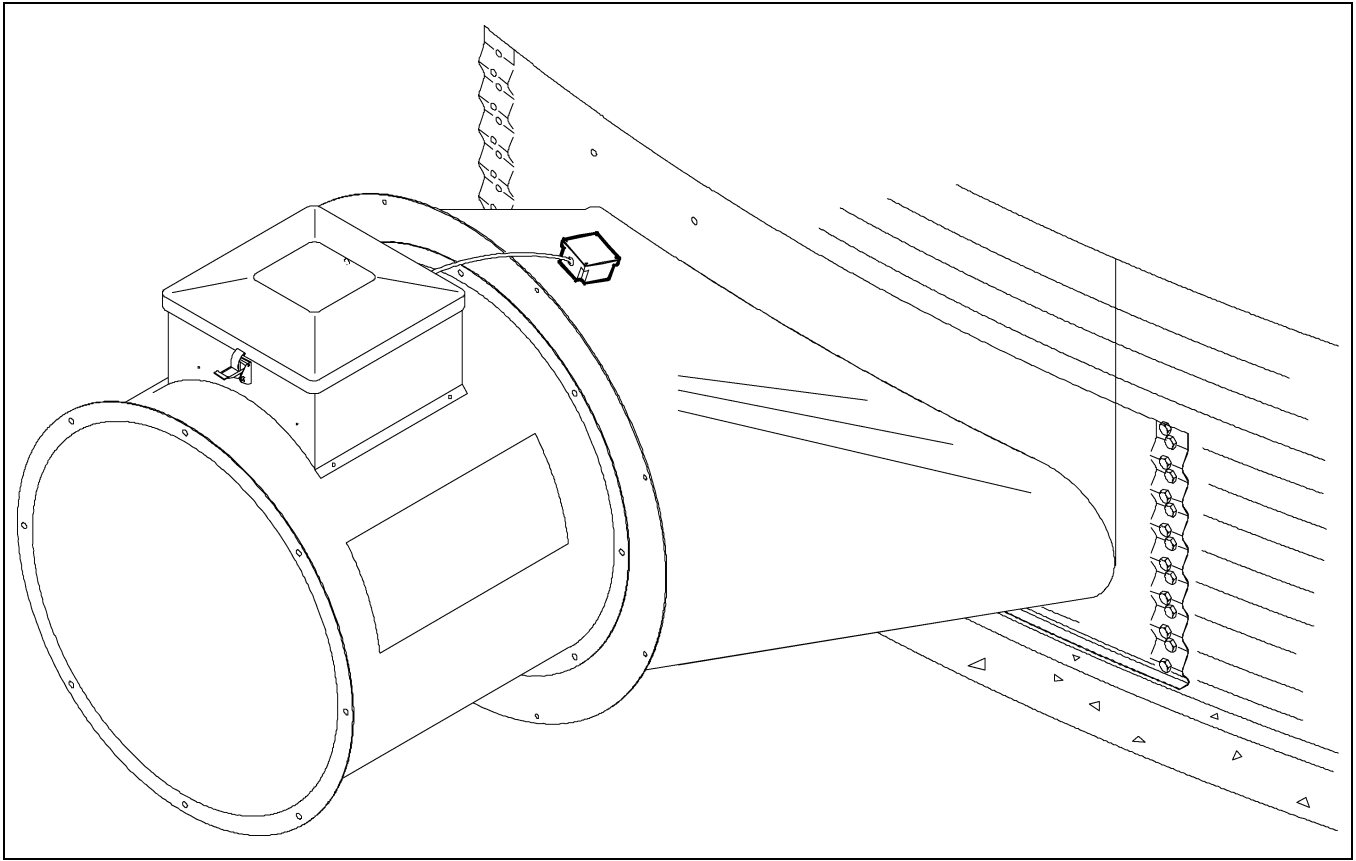
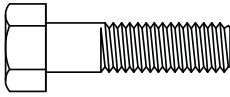




Figure 4P Fit High-Limit On Duct (Use Fitting Kit HF-7860)

		
Part #	Description	Qty
S-280	Self-Drilling Screw #10-16 x 5/8"	4

Fit Plenum Thermostat/High-Limit



Risk of fire.

Temperature control thermostat high-limit must be fitted.

Where high/low cycling or modulating controls are to be used a separate plenum high-limit must be fitted.

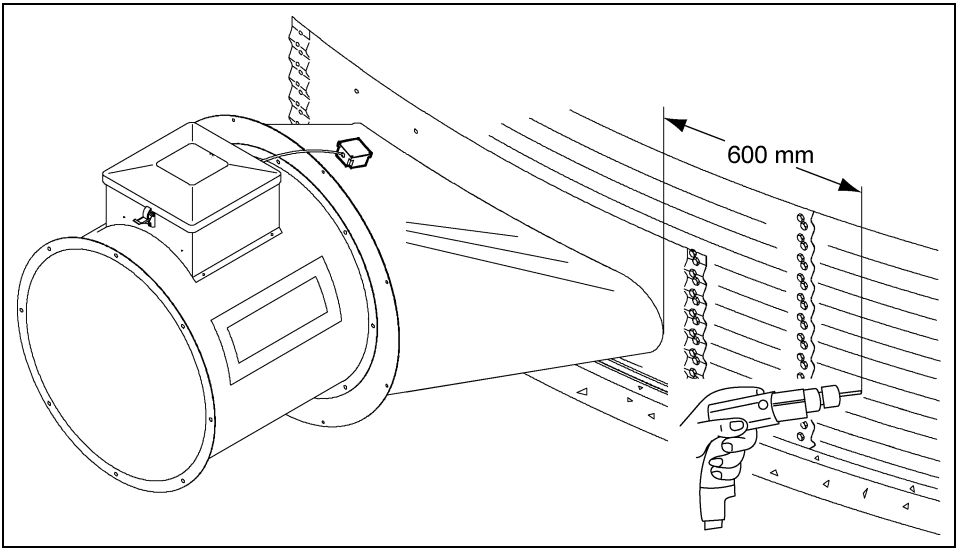
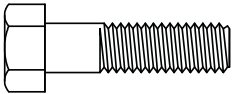


Figure 4Q Cut 22 mm Ø Hole



Figure 4R Fit Plenum Thermostat/High-Limit

		
Part #	Description	Qty
S-280	Self-Drilling Screw #10-16 x 5/8"	6/8

Electrical Installation



Figure 4S *Fit Plenum Thermostat/High-Limit*



Power to VHE heaters must be 220-240 VAC interlock power supply with fan starter.

Make connections to:

1. Plenum thermostat/high-limit (terminals 1 and 2).
2. High/low cycle thermostat if used (terminals 9 and 10).
3. Power supply (terminals L, N and earth).

See Figure 4U on Page 33.

CE Heater Control Schematic

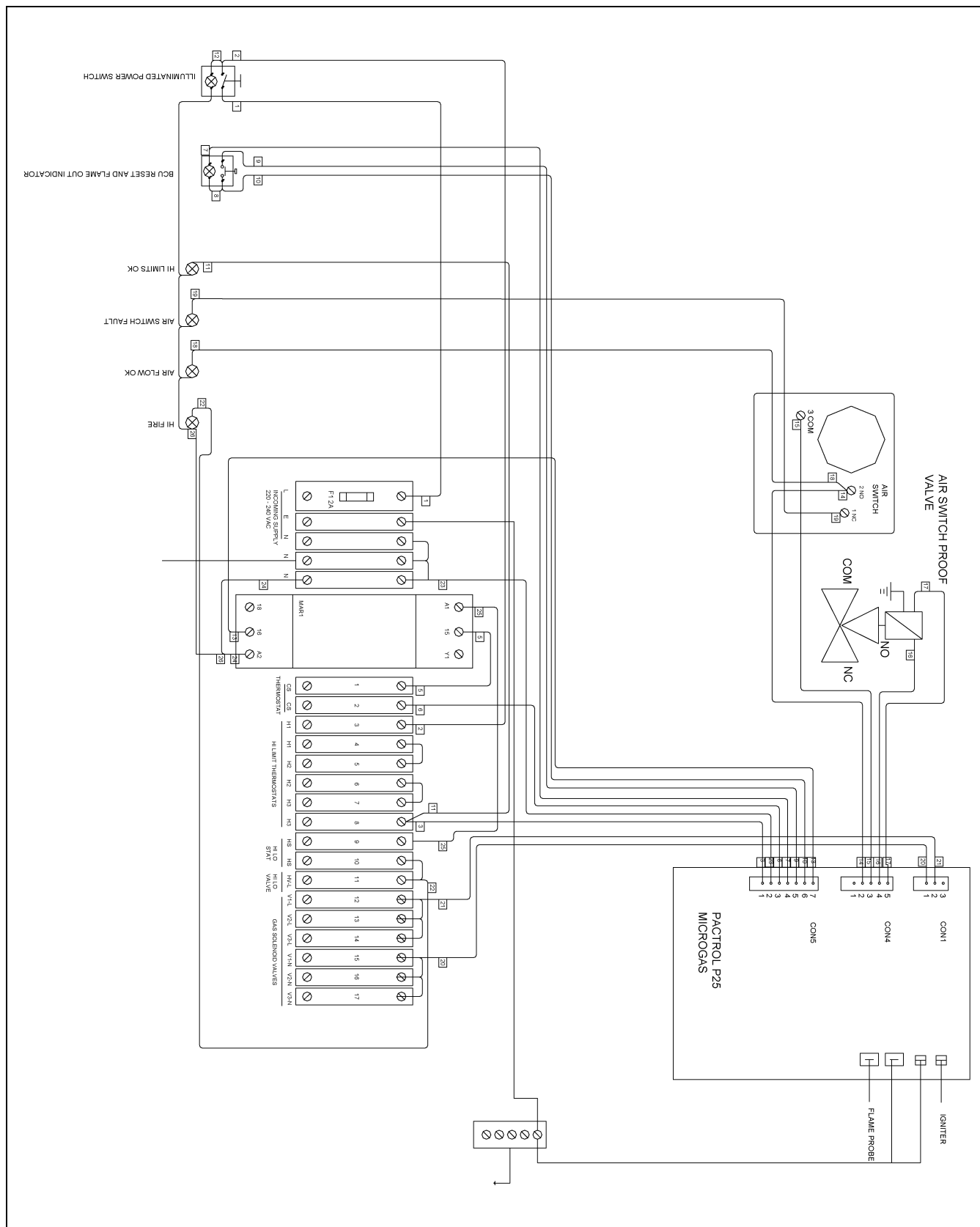


Figure 4T *CE Heater Control Schematic*

CE Heater Control Connections

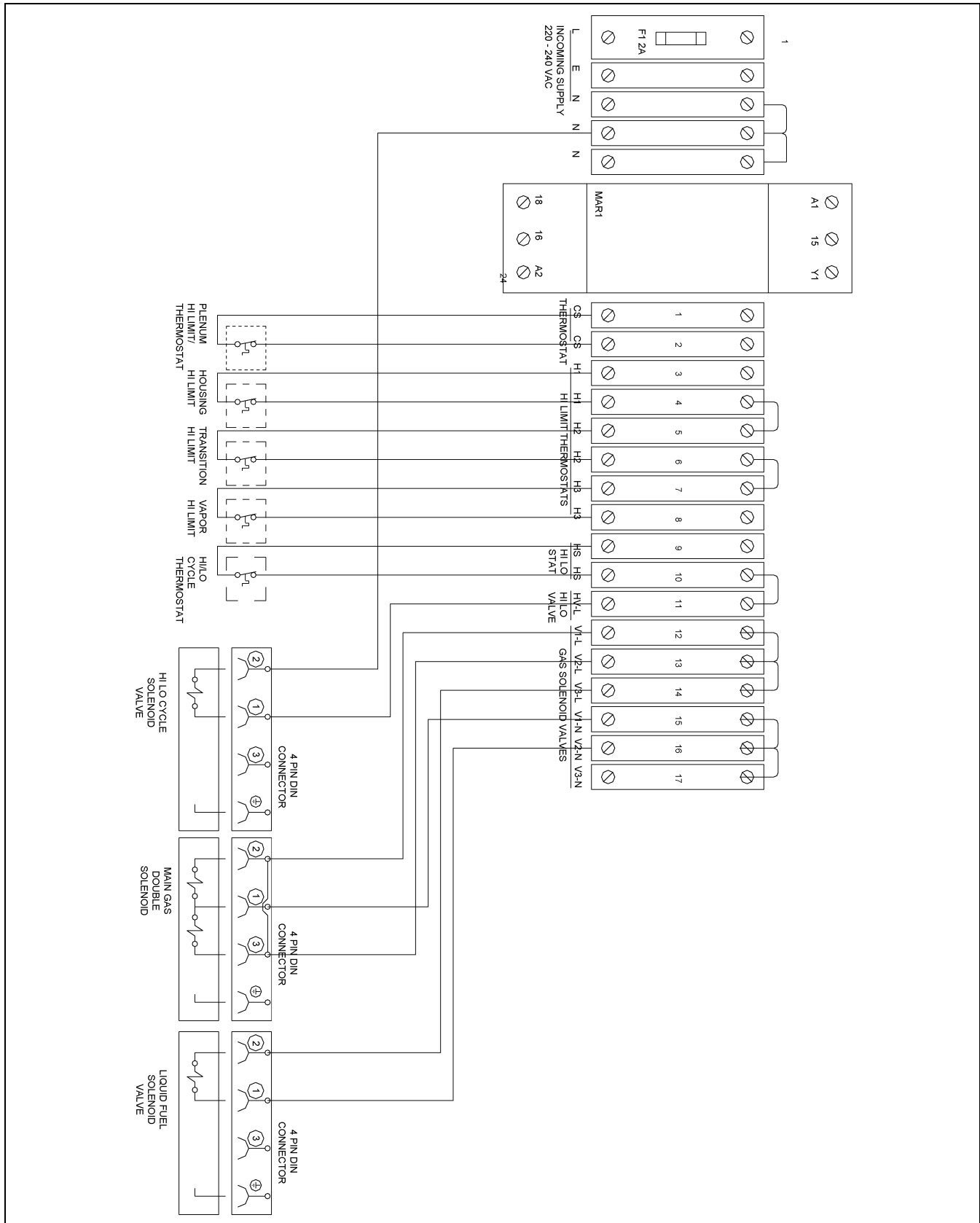


Figure 4U CE Heater Control Connections

Modulating Valve Installation (Optional)

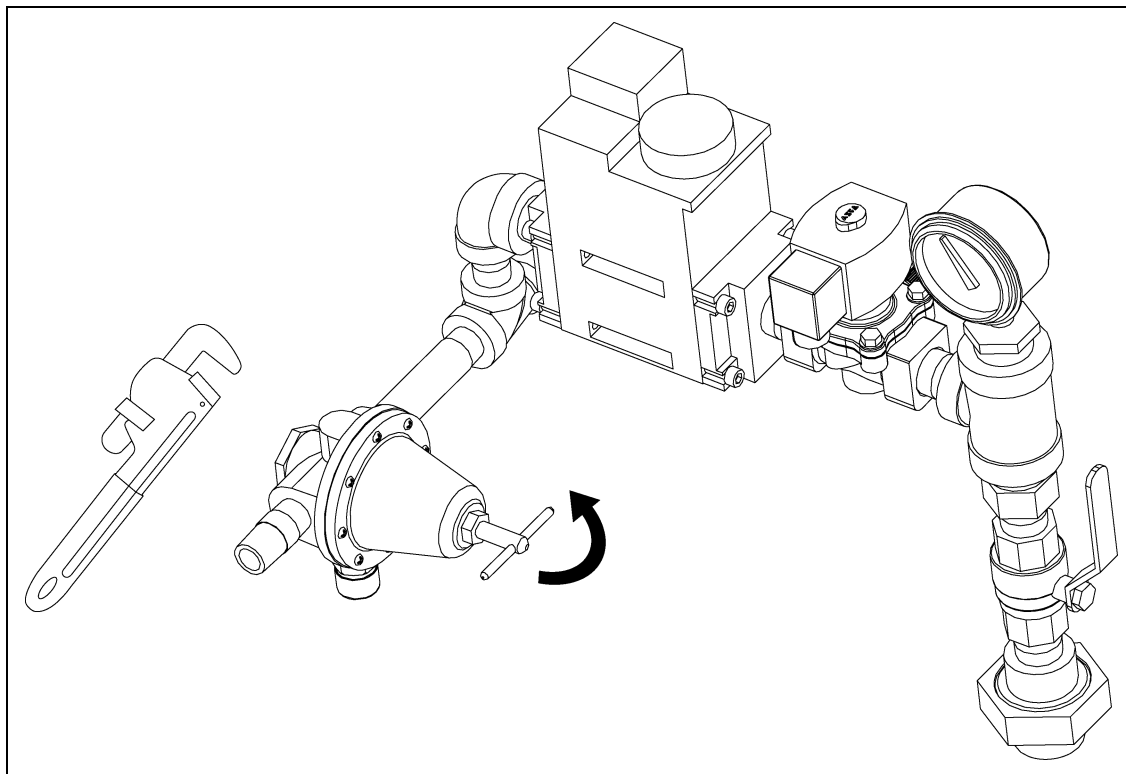


Figure 4V

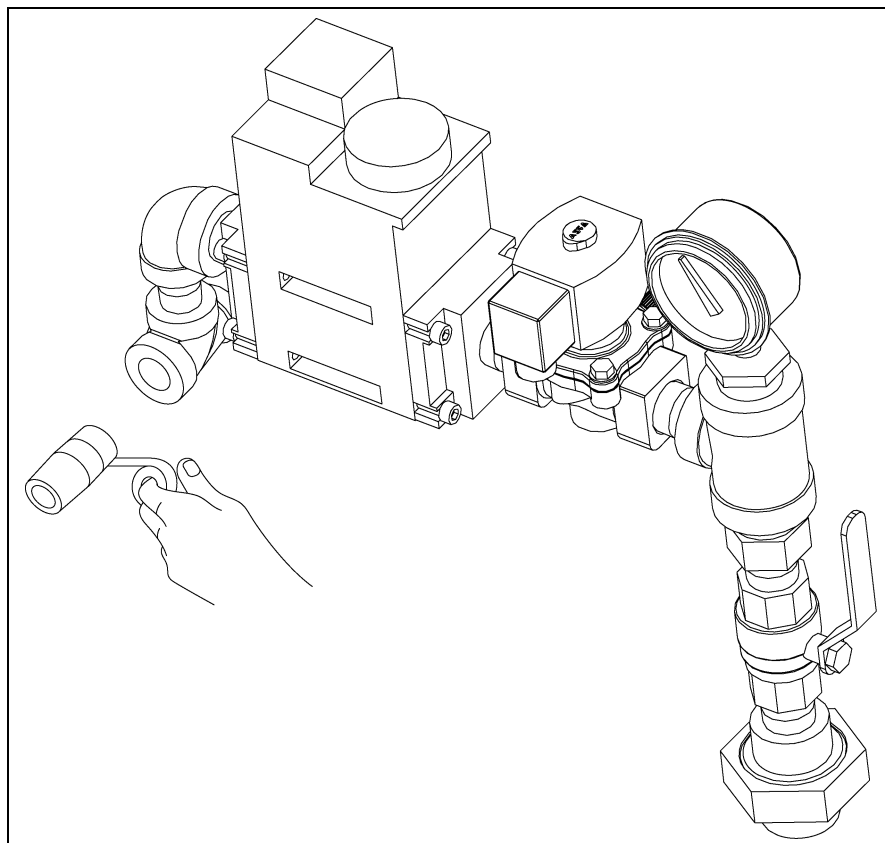


Figure 4W

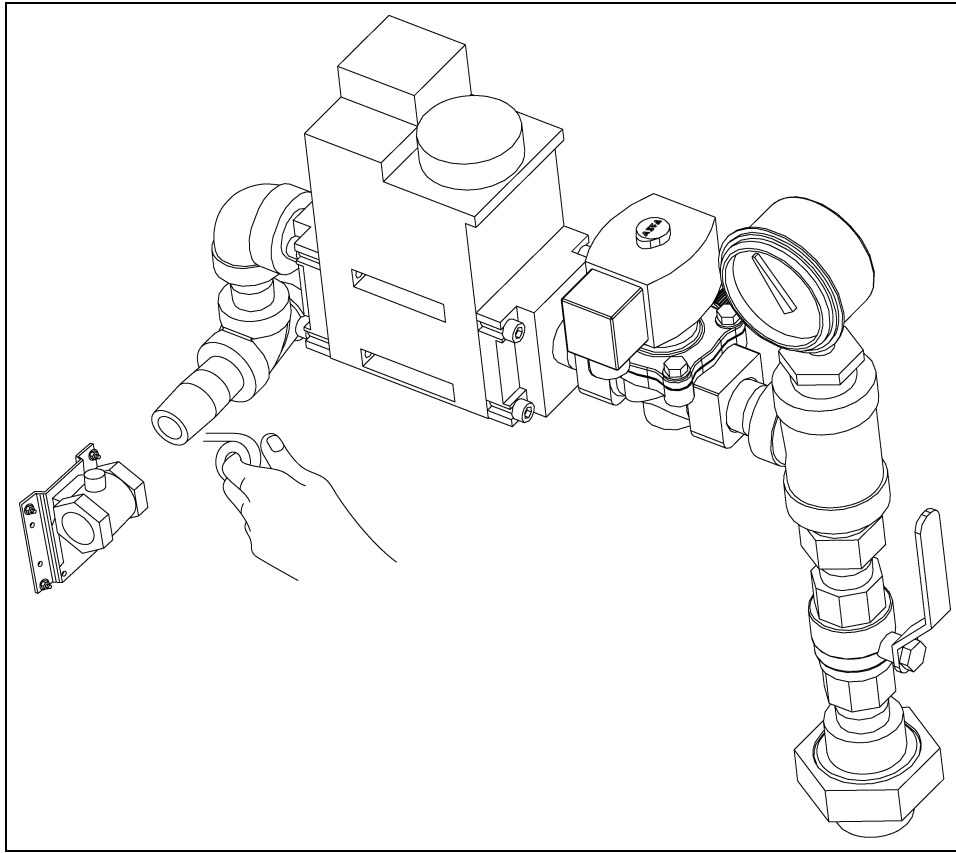


Figure 4X

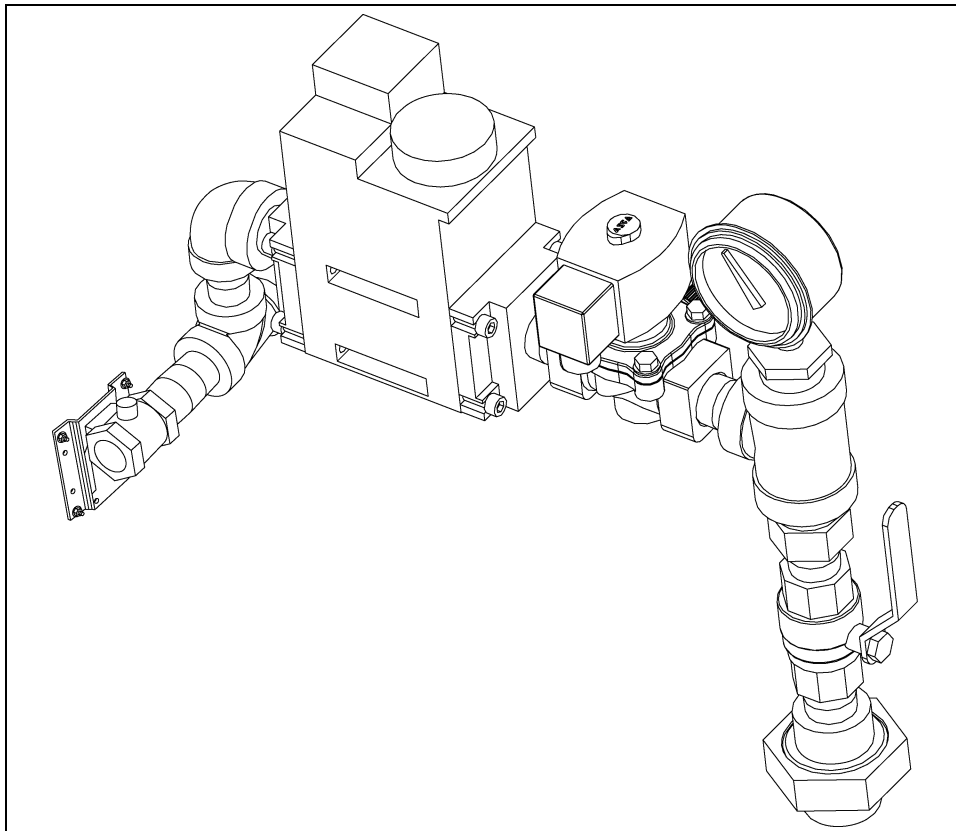


Figure 4Y

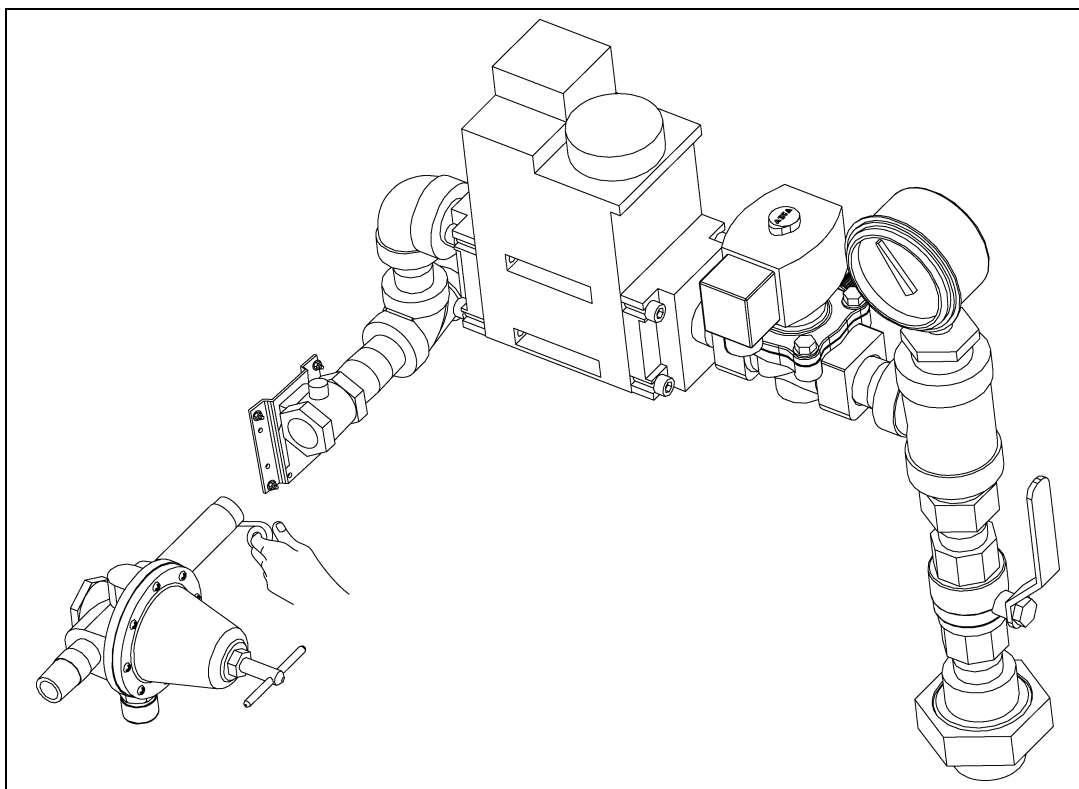


Figure 4Z

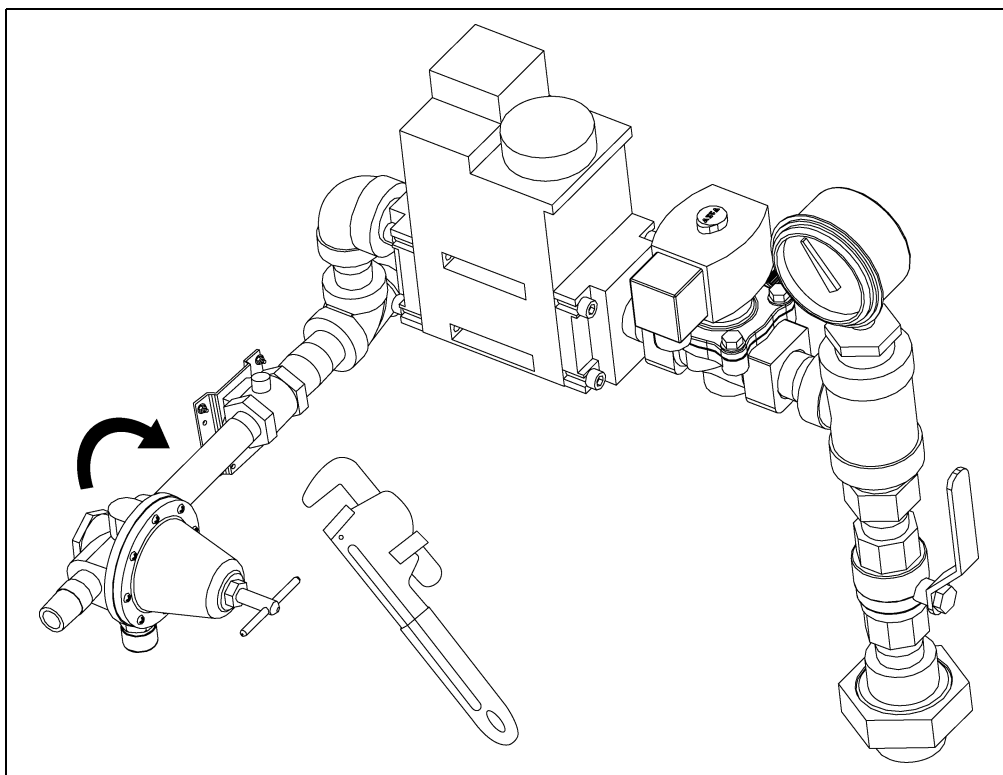


Figure 4AA



Check for leaks.

Connect Fuel Supply

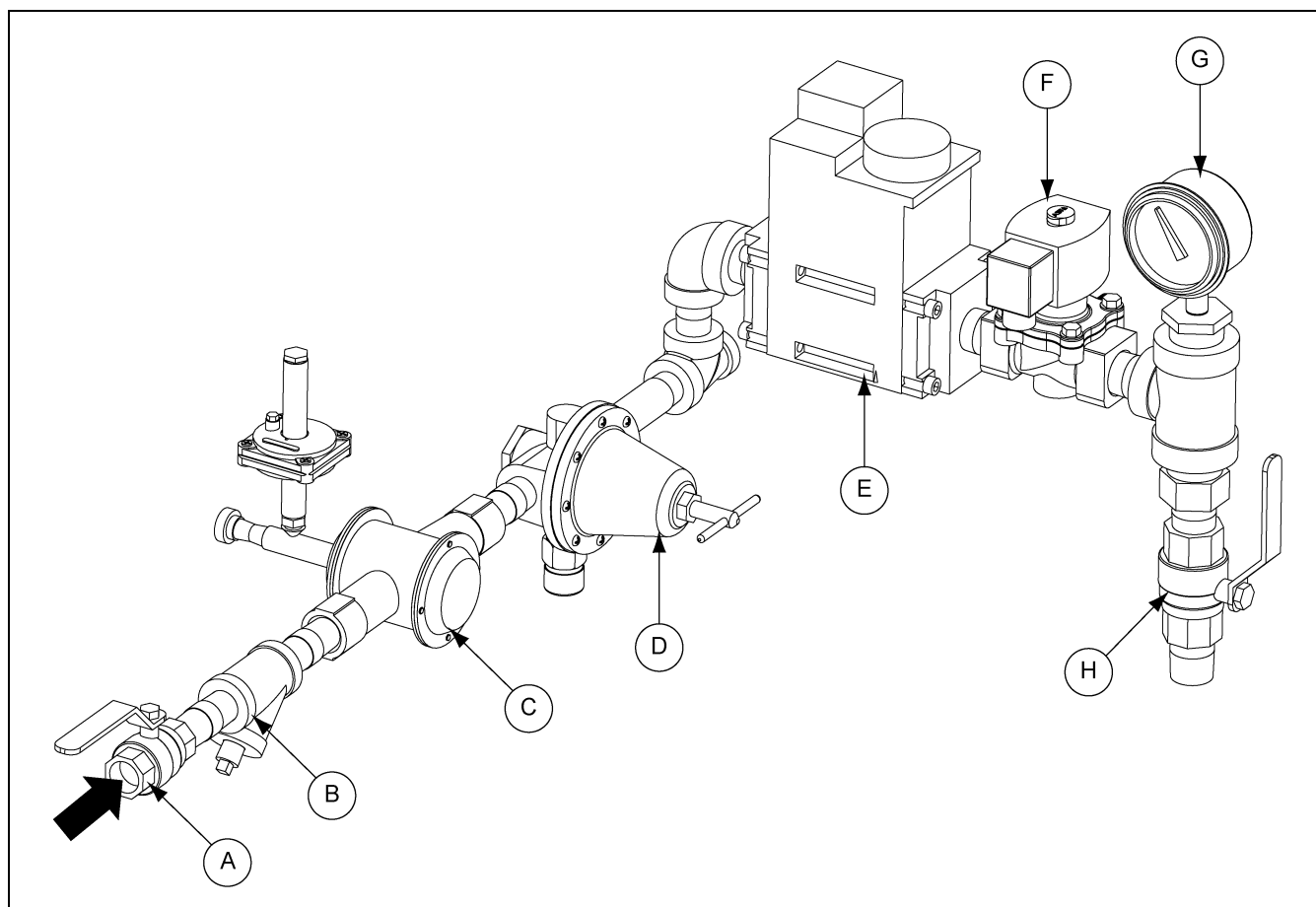


Figure 4AB CE Vapor Fuel Train (High-Low)

Ref #	Description
A	Fuel Connection (Manual Isolation Valve)
B	Strainer
C	Over Pressure Safety Valve
D	Pressure Regulator
E	Double Safety Solenoid Valve
F	High/Low Cycle Valve
G	Pressure Gauge
H	Test Valve

Refer to [Table on Page 17](#) for LPG supply and [Table on Page 18](#) for natural gas flow and pressure settings.

Set Over Pressure Safety Valve

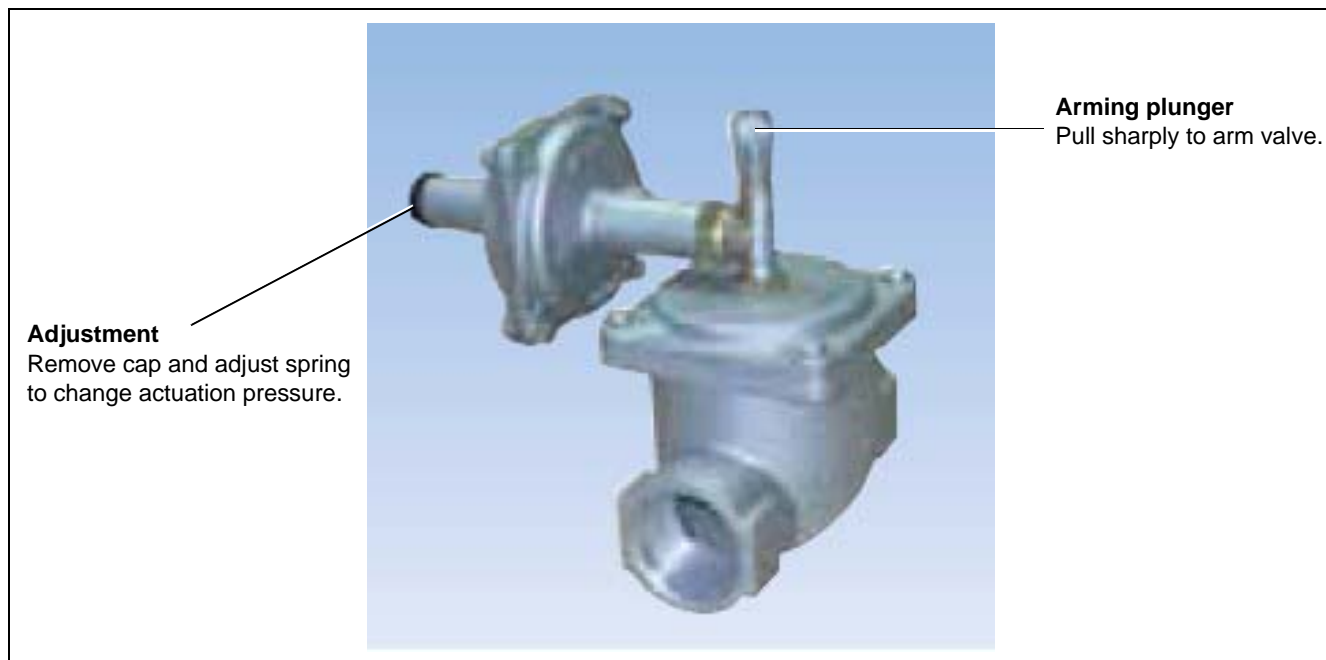


Figure 5A *Over Pressure Safety Valve*

Setting procedure for 500 mBar max pressure.

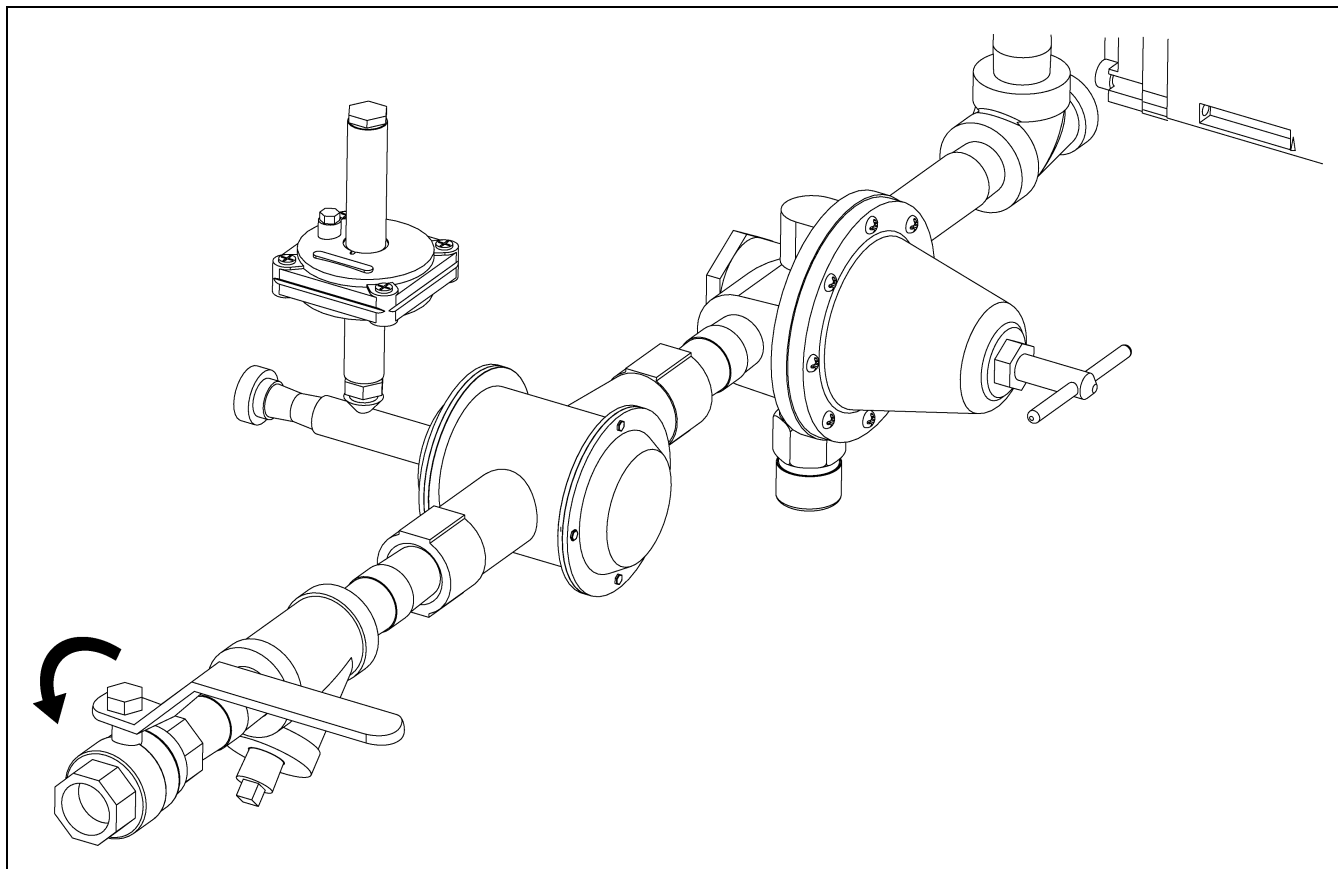


Figure 5B

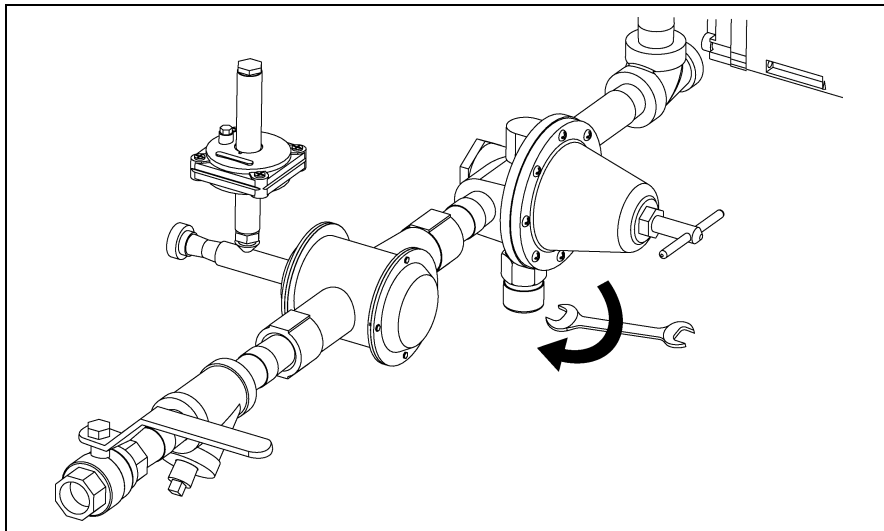


Figure 5C

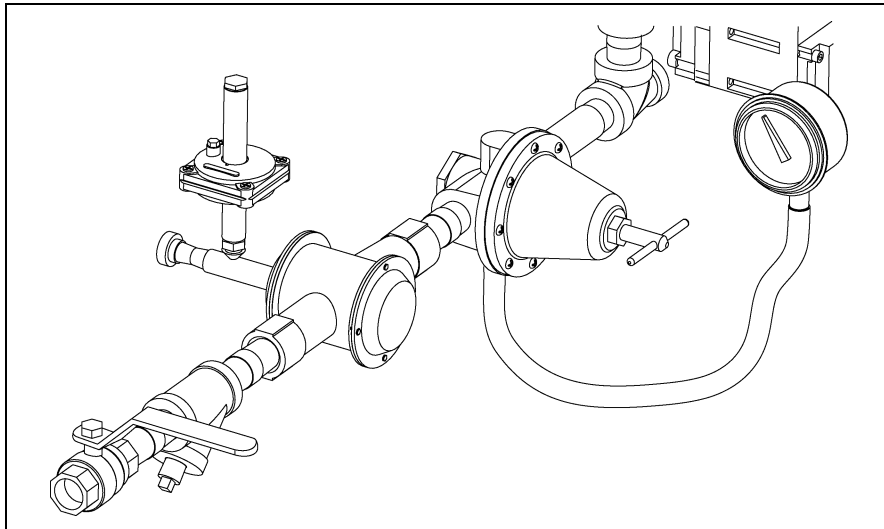


Figure 5D

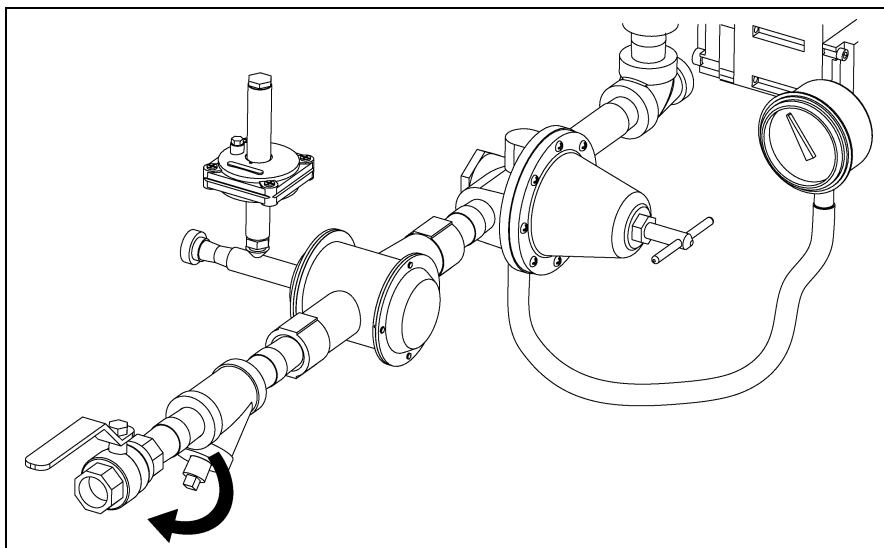


Figure 5E

5. Commissioning Heater

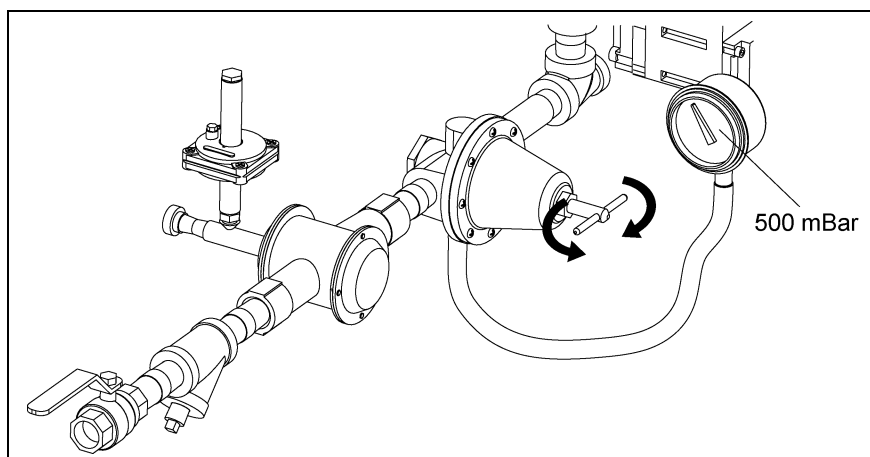


Figure 5F

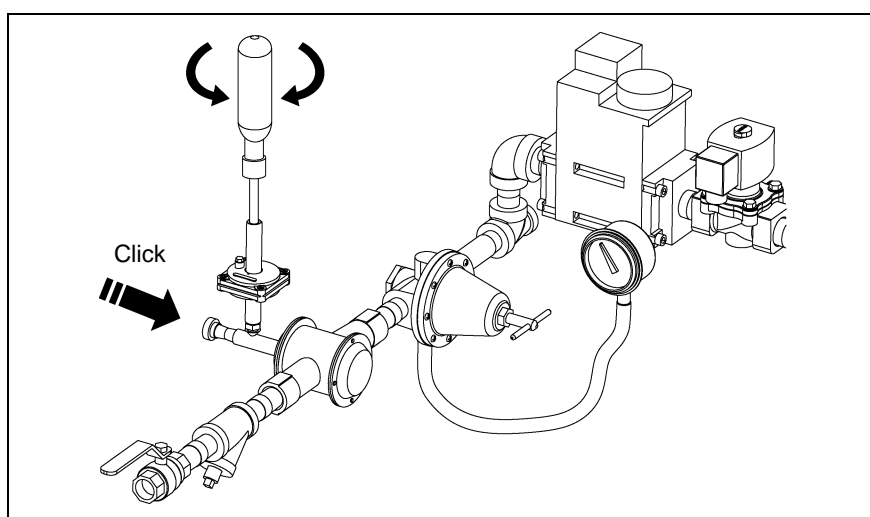


Figure 5G

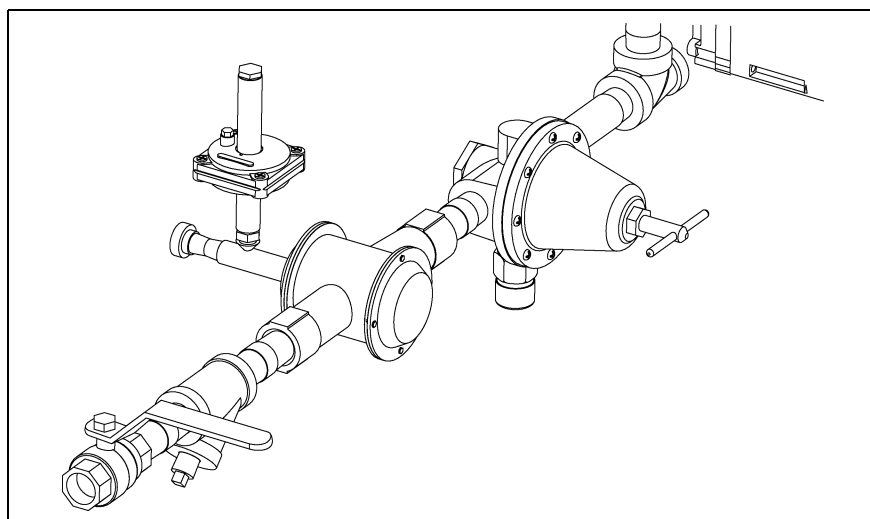


Figure 5H



Check for leaks.

Set Burner High-Fire Pressure

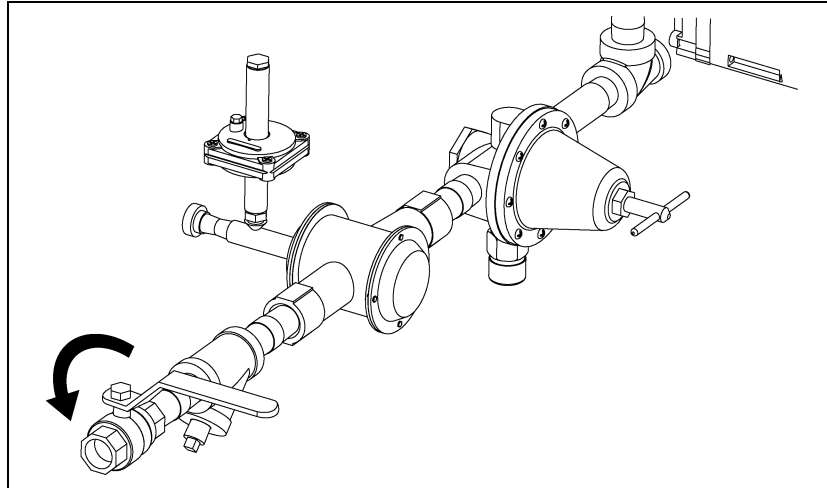


Figure 5I

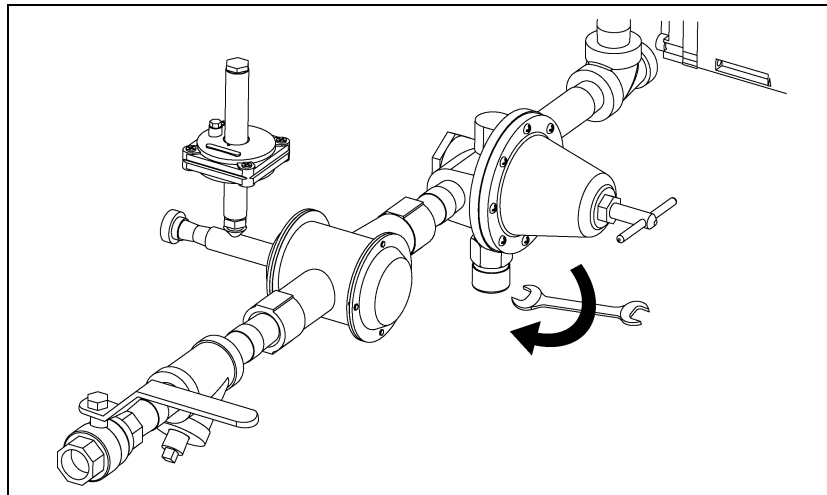


Figure 5J

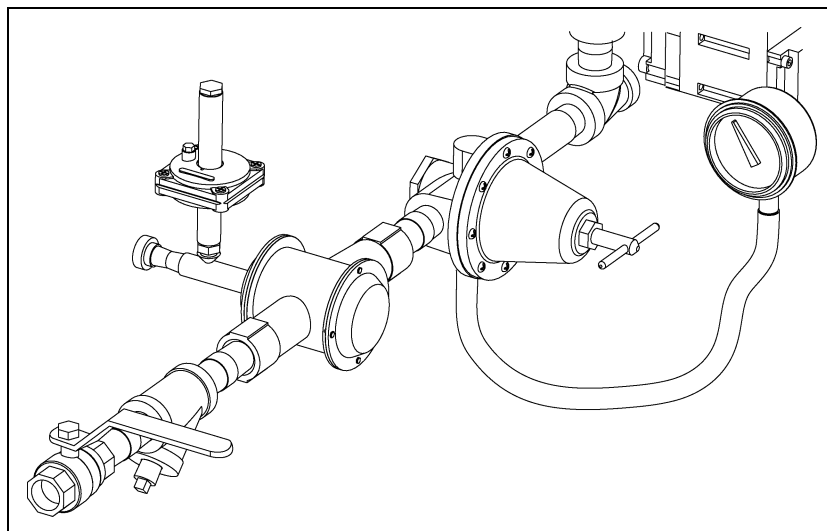


Figure 5K

5. Commissioning Heater

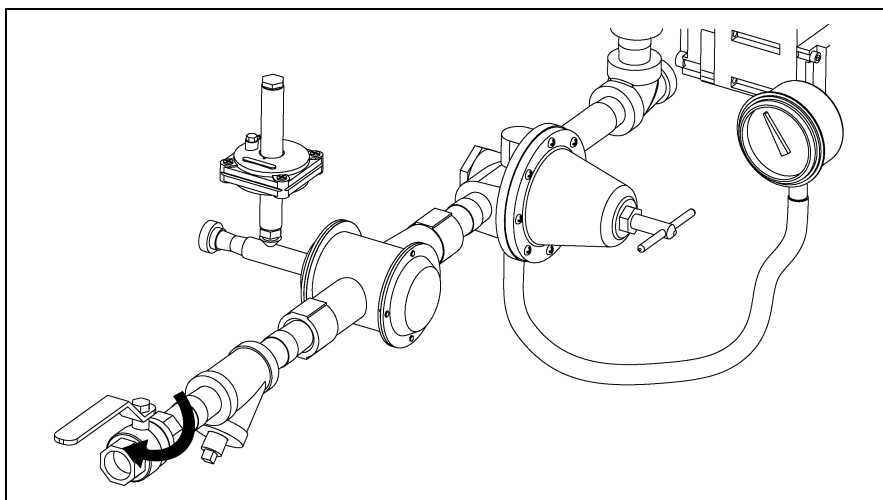


Figure 5L

(See Tables on Pages 17 and 18.)

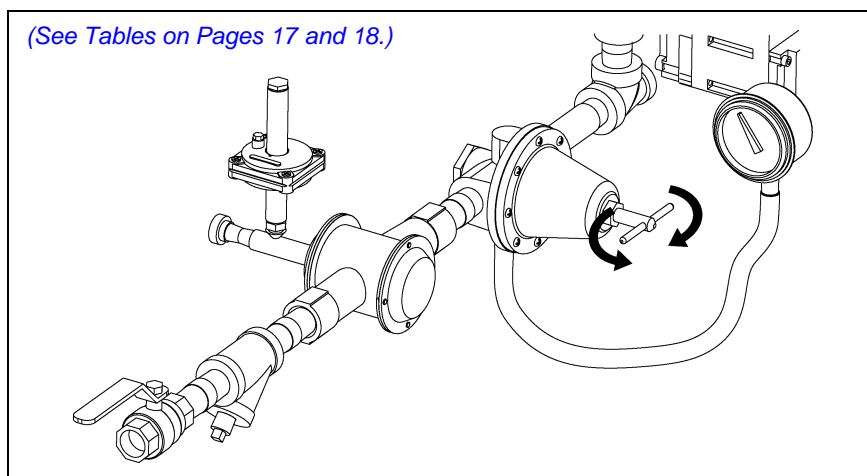


Figure 5M

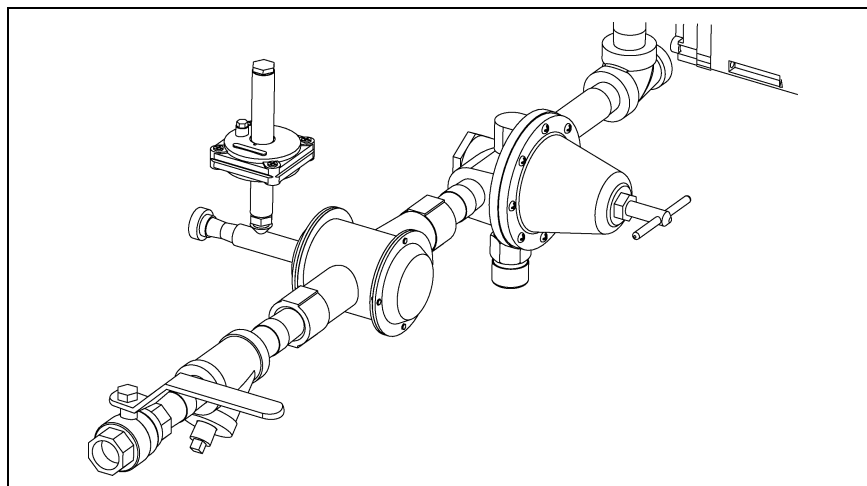


Figure 5N



Check for leaks.

Set Air Switch



Figure 5O

1. Locate air switch inside control box.
2. Remove cover.
3. Rotate dial to lowest setting.
4. Replace cover.

Light Burner

1. Replace all covers.
2. Set thermostat/temperature control to 50°C.
3. Start fan.
4. Switch burner control to ON.
5. Check control indicator lamps for 'normal' status. (See Figure 5P.)

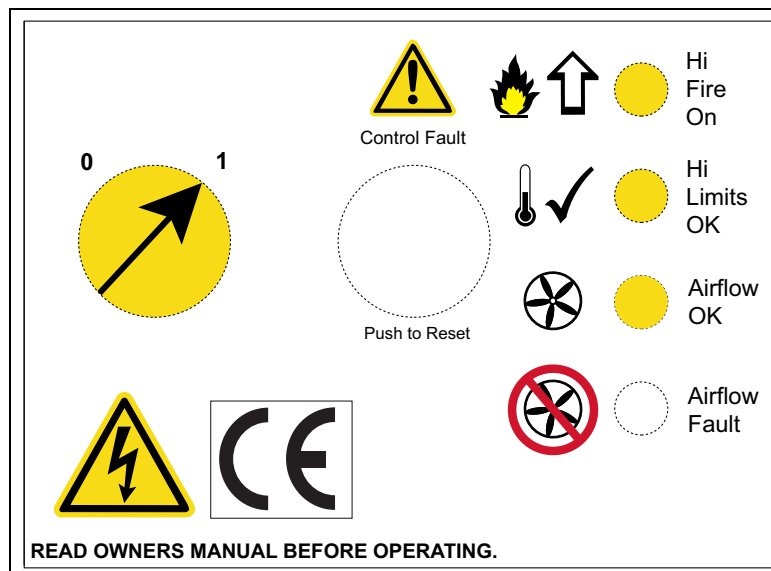


Figure 5P Normal Control Status

5. Commissioning Heater

6. If control is as [Figure 5Q](#), press and hold reset for 3 seconds.

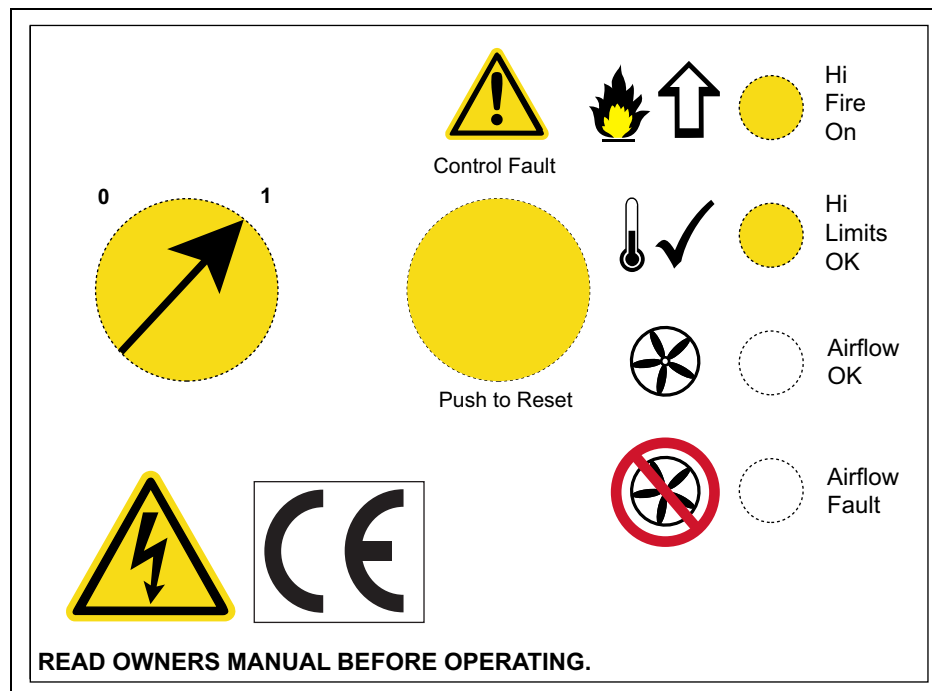


Figure 5Q Burner Lock Out Control Status

7. After 15 seconds burner should attempt to light.

NOTE: It may take more than one attempt to light initially, as air is purged out of the lines.

8. Shut down burner. (See [Figure 5R.](#))

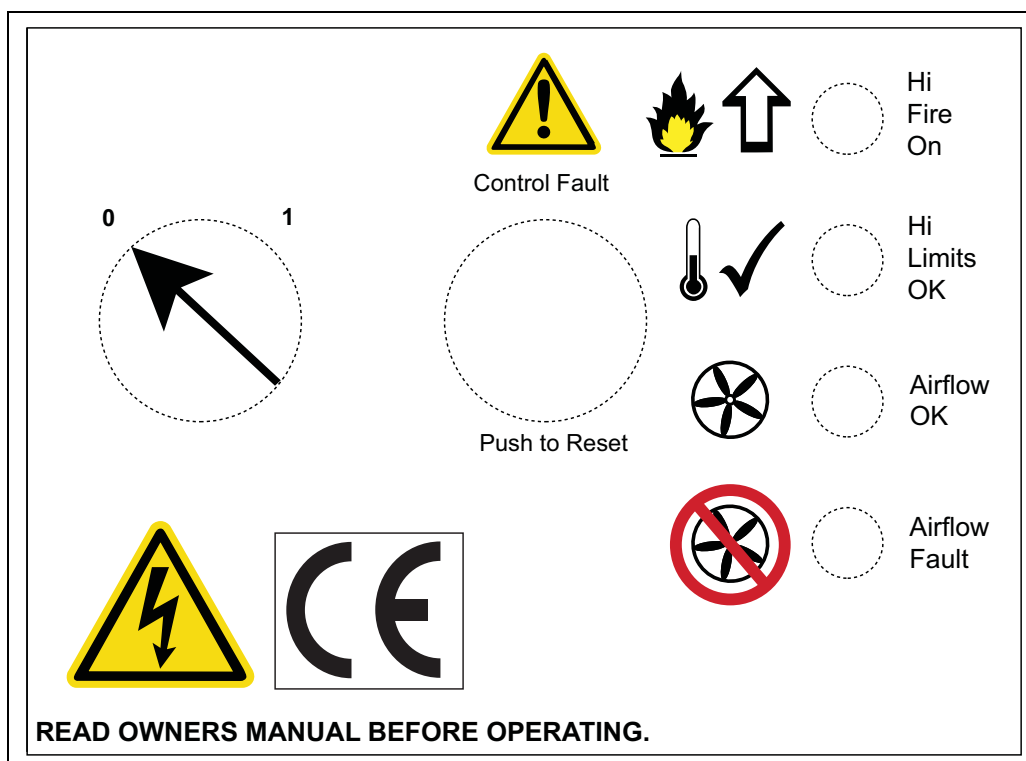


Figure 5R Burner Off Control Status

Set Low-Fire Pressure

1. Light burner.
2. Adjust low-fire setting to maximum. *(See Figure 5S.)*

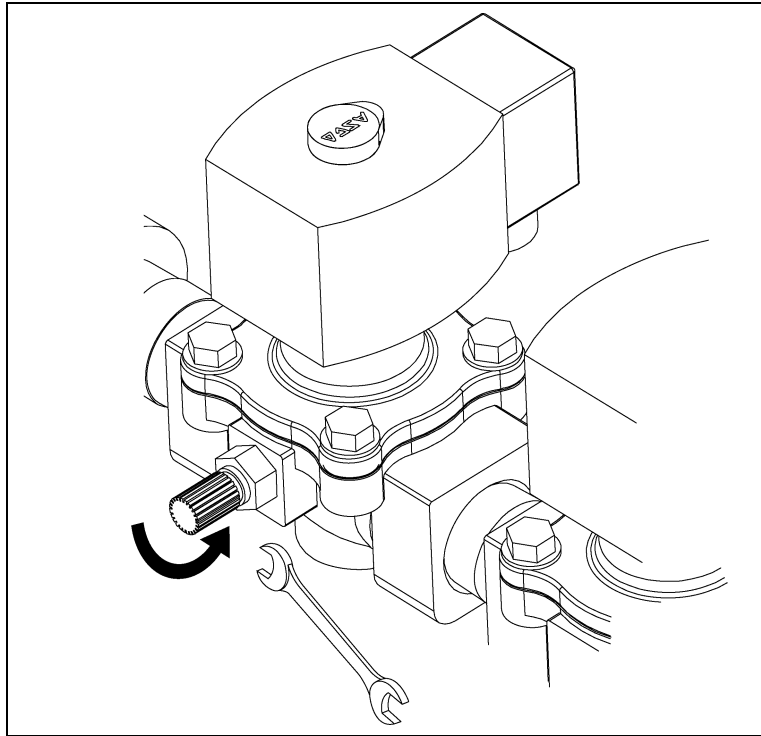


Figure 5S

3. Remove power plug on cycle valve. *(See Figure 5T.)*

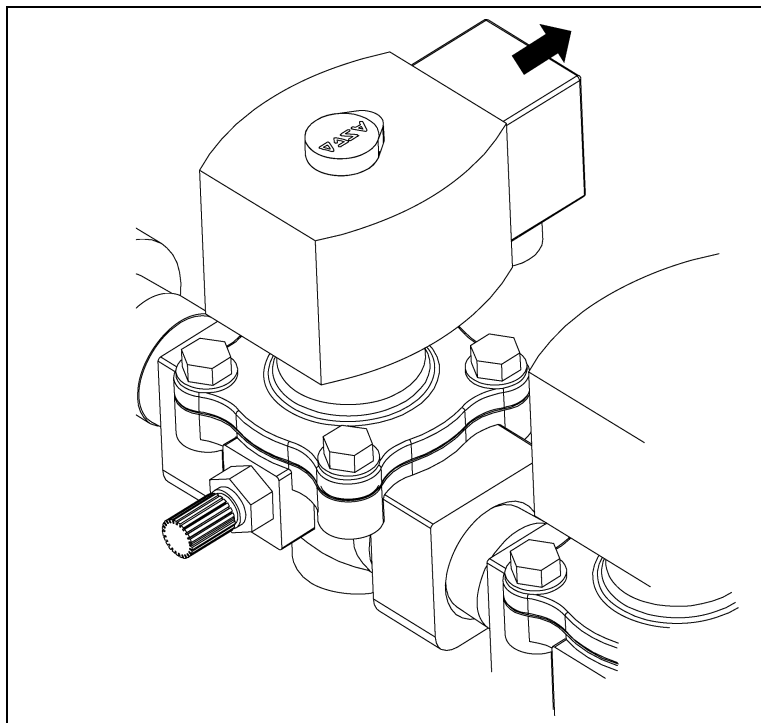


Figure 5T

5. Commissioning Heater

4. Reduce low-fire flame, so that flame is stable and does not 'pop'. (*See Figure 5U.*)

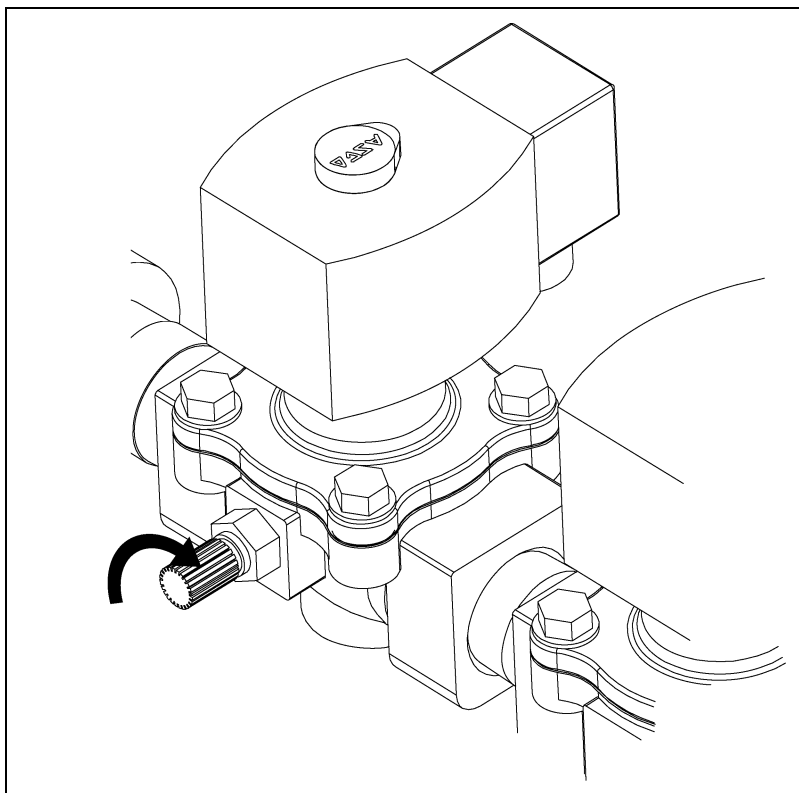


Figure 5U

5. Lock cycle valve adjuster. (*See Figure 5V.*)

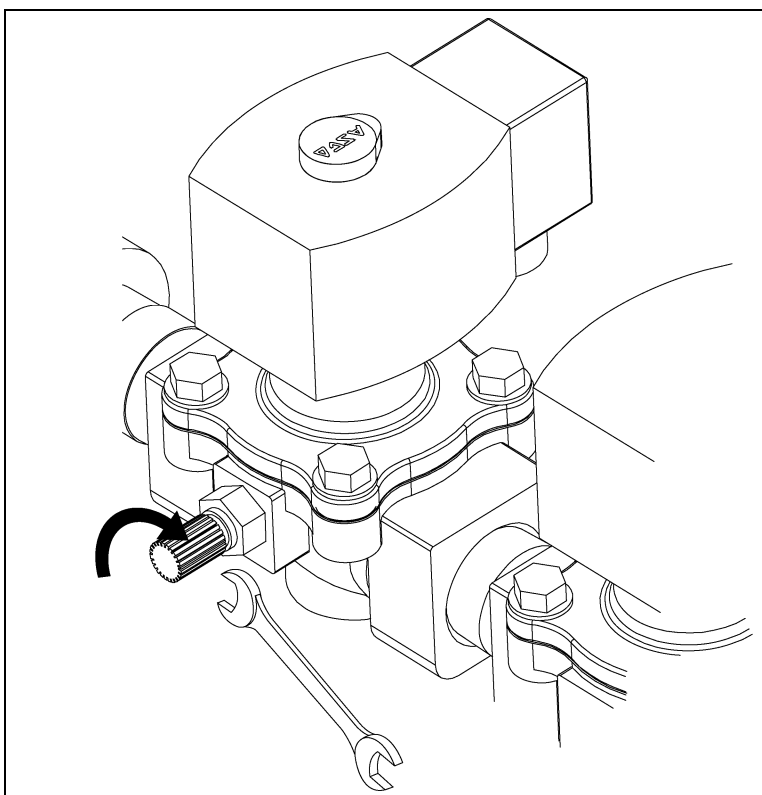


Figure 5V

6. Replace valve power connection. (See Figure 5W.)

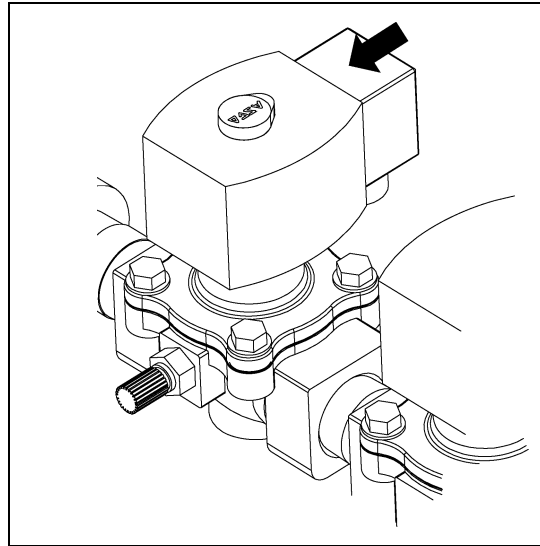


Figure 5W

7. Reduce control temperature to $< 40^{\circ}\text{C}$.
8. Check heater cycles and controls temperature.

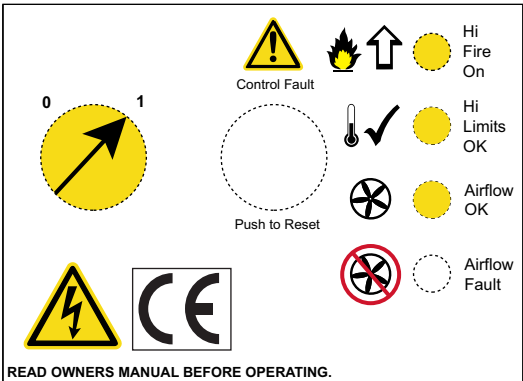
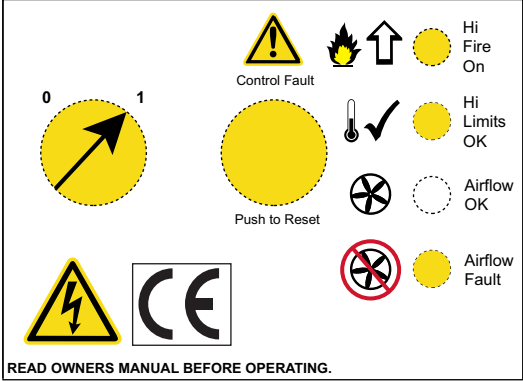
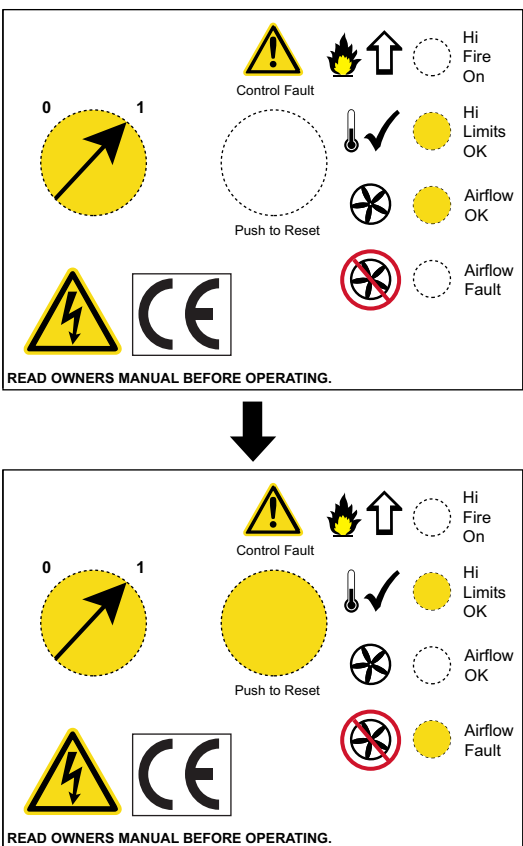
Commissioning Check List

Complete commissioning list below.

Component	Set Point	Function Pass/Fail/NA
Check Fuel Supply Shut Off Valve		
Check Main Fuel Supply Pressure		
Set/Test Main Gas Regulator Pressure		
Set/Test Over Pressure Shut Off (OPSO) Pressure		
Set Burner High Flame Pressure		
Set Burner Low Flame Pressure		
Test Main Gas Manual Shut Off Valve		
Set/Test Plenum Thermostat		
Carry Out Leak Test		
Check Purge Time		
Check Main Flame Ignition		
Check Modulating Valve Operation		
Check Air Switch (Disconnect Air Tubes, Burner Must Shut Down)		
Check Burner Shut Down		

6. Troubleshooting

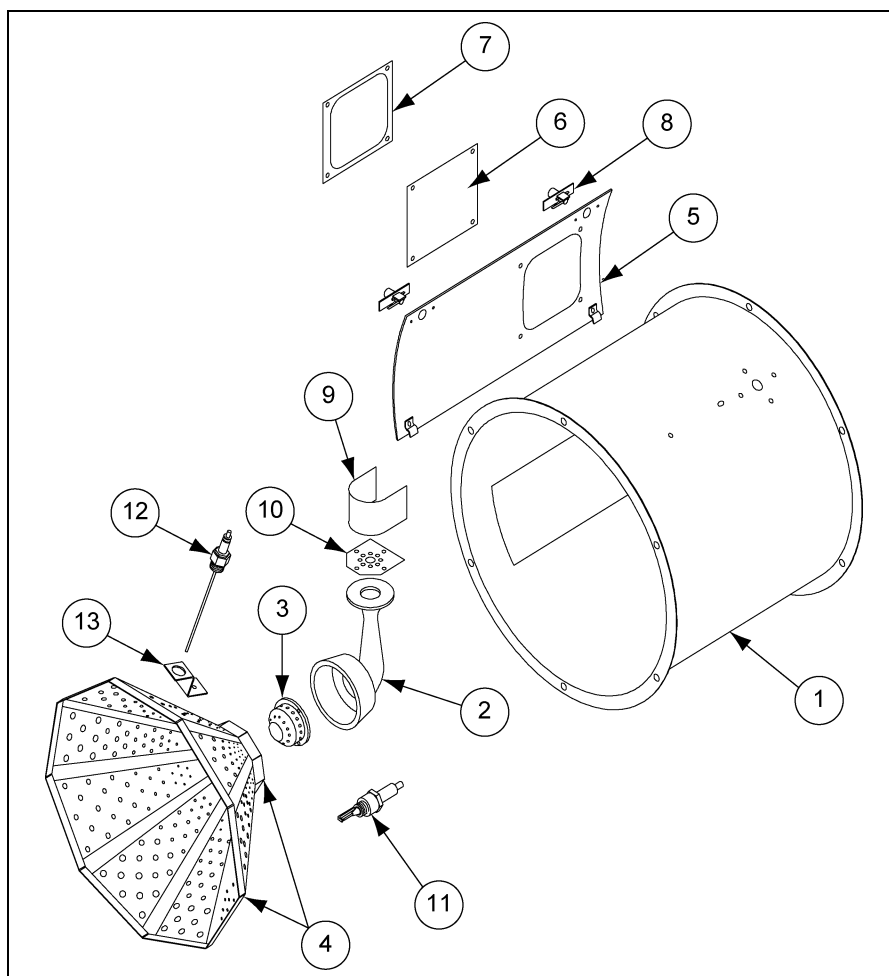
Symptom	Control Status	Remedy
Heater will not light.	<p>Control Fault</p> <p>Hi Fire On</p> <p>Hi Limits OK</p> <p>Airflow OK</p> <p>Airflow Fault</p> <p>READ OWNERS MANUAL BEFORE OPERATING.</p>	<p>No power to control. Check:</p> <ul style="list-style-type: none"> Control fuse. Power supply. Fan starter interlock.
	<p>Control Fault</p> <p>Hi Fire On</p> <p>Hi Limits OK</p> <p>Airflow OK</p> <p>Airflow Fault</p> <p>READ OWNERS MANUAL BEFORE OPERATING.</p>	<p>Burner control locked out. Press and hold re-set for 3 seconds.</p> <p>Check:</p> <ul style="list-style-type: none"> Spark plug connections and gap (3 mm). Flame rod connections and correct placement. Gas supply. Over pressure valve. (See Set Over Pressure Safety Valve Section on Page 38.)
	<p>Control Fault</p> <p>Hi Fire On</p> <p>Hi Limits OK</p> <p>Airflow OK</p> <p>Airflow Fault</p> <p>READ OWNERS MANUAL BEFORE OPERATING.</p>	<p>High-limit thermostat is open:</p> <ul style="list-style-type: none"> TURN OFF POWER. Re-set housing, transition and plenum high-limits. Check for excessive gas pressure. (See Set Burner High-Fire Pressure Section on Page 41.)
	<p>Control Fault</p> <p>Hi Fire On</p> <p>Hi Limits OK</p> <p>Airflow OK</p> <p>Airflow Fault</p> <p>READ OWNERS MANUAL BEFORE OPERATING.</p>	<p>Airflow fault.</p> <ul style="list-style-type: none"> Inadequate airflow - Reduce depth of grain. Check fan speed/inlet/outlet. Blocked air tube - Check and clean. Damaged air tube - Check and replace. Blocked venturi - Check and clean. Check air switch. (See Set Air Switch Section on Page 43.)

Symptom	Control Status	Remedy
<p>Burner lights and goes out after 4 seconds.</p>	 <p>Control panel diagram showing: Control Fault (yellow triangle with exclamation mark), Hi Fire On (flame icon, up arrow, yellow circle), Hi Limits OK (thermometer icon, checkmark, yellow circle), Airflow OK (fan icon, yellow circle), and Airflow Fault (fan icon with red X, white circle). A 'Push to Reset' button is shown. Safety warnings (lightning bolt and CE) and the text 'READ OWNERS MANUAL BEFORE OPERATING.' are at the bottom.</p>	<p>Flame not sensed. Flame rod fault:</p> <ul style="list-style-type: none"> • Check connections. • Clean flame rod with wire wool. • Adjust flame rod to be fully engulfed in flame.
<p>Gas flows but does not ignite.</p>	 <p>Control panel diagram showing: Control Fault (yellow triangle with exclamation mark), Hi Fire On (flame icon, up arrow, yellow circle), Hi Limits OK (thermometer icon, checkmark, yellow circle), Airflow OK (fan icon, white circle), and Airflow Fault (fan icon with red X, yellow circle). A 'Push to Reset' button is shown. Safety warnings (lightning bolt and CE) and the text 'READ OWNERS MANUAL BEFORE OPERATING.' are at the bottom.</p>	<p>Spark problems:</p> <ul style="list-style-type: none"> • Check connections. • Check gap (3 mm). • Clean spark plug. • Re-position spark plug to optional location on burner. • Excessive airflow. Bin may be too empty.
<p>Burner goes out on low-fire.</p>	 <p>Control panel diagram showing: Control Fault (yellow triangle with exclamation mark), Hi Fire On (flame icon, up arrow, white circle), Hi Limits OK (thermometer icon, checkmark, yellow circle), Airflow OK (fan icon, yellow circle), and Airflow Fault (fan icon with red X, white circle). A 'Push to Reset' button is shown. Safety warnings (lightning bolt and CE) and the text 'READ OWNERS MANUAL BEFORE OPERATING.' are at the bottom.</p>	<ul style="list-style-type: none"> • Check low-fire pressure. (See Set Low-Fire Pressure Section on Page 45.) • Adjust flame rod to ensure it is engulfed in low-fire flame.

6. Troubleshooting

Symptom	Control Status	Remedy
Burner goes out on high-fire.	<div><p>The diagram shows a control panel with a rotary switch between positions 0 and 1. A 'Control Fault' indicator (yellow triangle with exclamation mark) is lit. A 'Hi Fire On' indicator (flame icon) is lit. A 'Hi Limits OK' indicator (thermometer icon) is lit. An 'Airflow OK' indicator (fan icon) is lit. An 'Airflow Fault' indicator (fan icon with red X) is not lit. A 'Push to Reset' button is shown. A yellow lightning bolt warning symbol and a CE mark are also present. Below the panel, it says 'READ OWNERS MANUAL BEFORE OPERATING.' A large downward arrow points to a second, identical diagram.</p></div>	<p>Excessive temperature.</p> <ul style="list-style-type: none">• Check gas pressure. (See Set Burner High-Fire Pressure Section on Page 43.)• Convert to low heat configuration. (See Orifice selection section on Page 19 and Orifice Installation Section on Page 20.)
Other faults.		<ul style="list-style-type: none">• Contact your dealer or GSI Technical support.

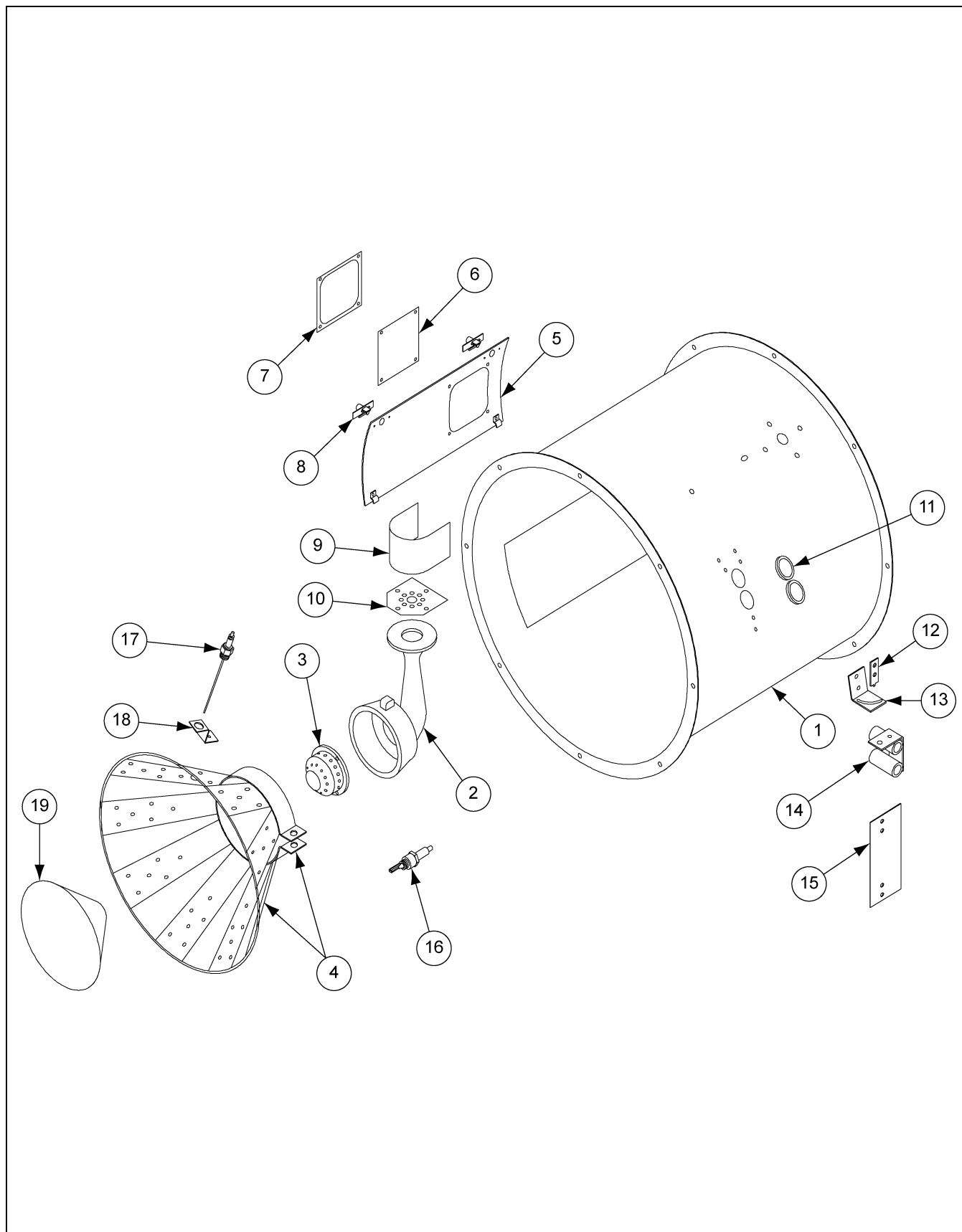
18" Gas Heater Parts



18" Gas Heater Parts List

Ref #	Part #	Description
1	HF-6785	Wrapper, 18" Heater: Gas
2	HH-3933	Burner Gun Machined 18"
3	HH-4410	Flame Spreader (Low Temperature)
4	HF-7588	18" Diverter Weldment
5	HF-6062-18	Access Panel (Deluxe)
6	HF-7380	Plastic View Window
7	HF-7379	Heater Cover Plate
8	TFH-2046	Access Panel Latch
9	HF-983	Collector (18"/24")
10	HF-978	Collector Plate (18"/24"/26")
11	HH-1650	Igniter, I-31 Type 048-1002-4
12	THH-4179	Rod, Flame Sensor 6" Long
13	CD-0187	Flame Sensor Bracket
N/S	053-1004-0	Spark Plug Nut
N/S	HF-7262	Flame Probe Wire Assembly
N/S	HF-7260	Ignition Wire Assembly 20"

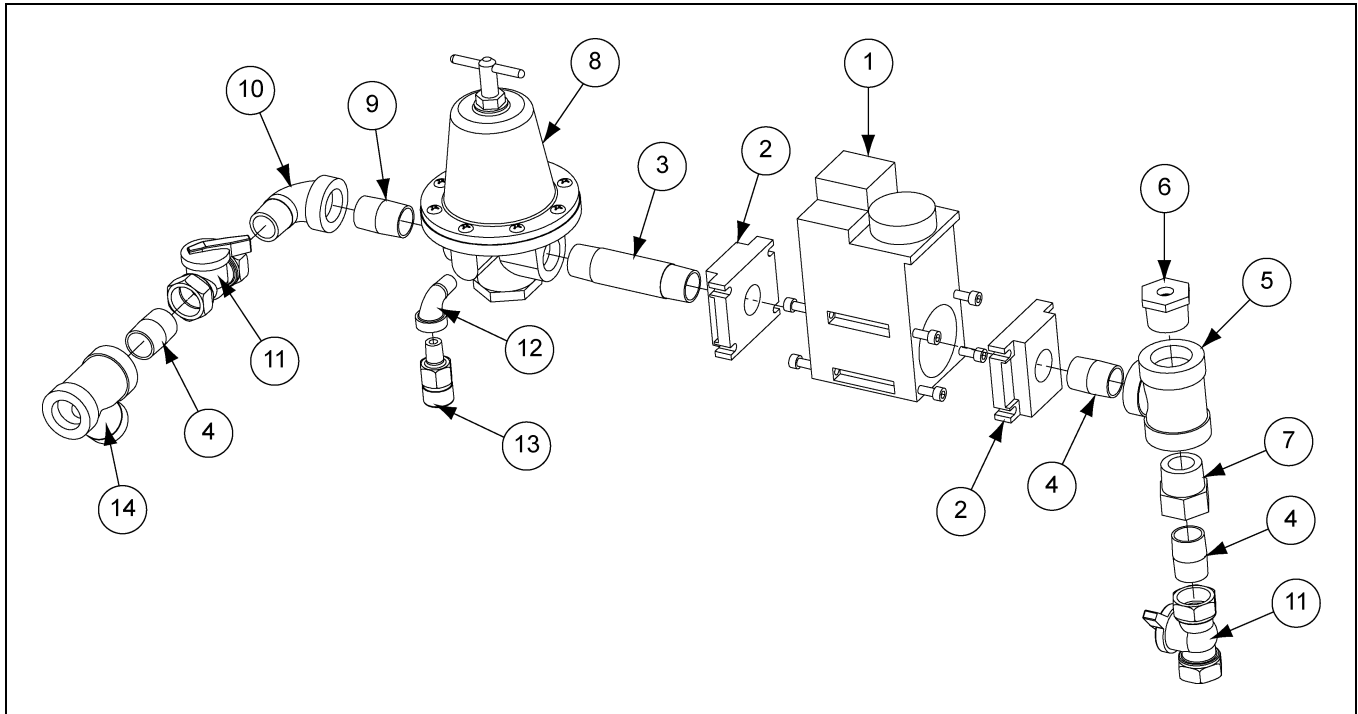
24", 26" and 28" Gas Heater Parts



24", 26" and 28" Gas Heater Parts List

Ref #	Part #			Description
	24"	26"	28"	
1	HF-6175	HF-6176	HF-6060	Wrapper, 26" Heater: Gas
2	HH-3934	HH-3934	HH-3934	Burner Gun Machined
3	HF-6757	HF-6757	HF-6757	Flame Spreader (Low Temperature)
4	HF-992	HF-992	HF-992	Flame Diverter Weldment
5	HF-7381-24	HF-7381-26	HF-7381-28	Heater Access Panel (Standard)
5	HF-6065-24	HF-6065-26	HF-6065-28	Heater Access Panel (Deluxe)
6	HF-7380	HF-7380	HF-7380	Plastic View Window
7	HF-7379	HF-7379	HF-7379	Heater Cover Plate
8	TFH-2046	TFH-2046	TFH-2046	Access Panel Latch
9	HF-983	HF-986	HF-7517	Burner Collector
10	HF-978	HF-978	HF-978	Burner Collector Plate
11	HH-7016	HH-7016	HH-7016	Rubber Grommet - LP Model Only
12	HF-7056	HF-7056	HF-7056	Pivot Bracket - LP Model Only
13	HF-7057	HF-7057	HF-7057	Adjustment Bracket - LP Model Only
14	HF-7060	HF-7060	HF-7060	Vaporizer Support Weldment
15	THF-3237	THF-3237	THF-3237	Vaporizer Cover - Vapor/NG Only
16	HH-1650	HH-1650	HH-1650	Igniter
17	THH-4179	THH-4179	THH-4179	Flame Sensor (Deluxe)
17	HH-1097	HH-1097	HH-1097	Flame Probe (Standard)
18	CD-0187	CD-0187	CD-0187	Flame Sensor Bracket (Deluxe)
18	HF-4485	HF-4485	HF-4485	Flame Probe Bracket (Standard)
19	HH-7054	HH-7054	HH-7054	Burner Cone
N/S	053-1004-0	053-1004-0	053-1004-0	Spark Plug Nut
N/S	HF-7262	HF-7262	HF-7262	Flame Sensor Wire Assembly (Deluxe)
N/S	HH-5430	HH-5430	HH-5430	Flame Probe Wire Assembly (Standard)
N/S	HF-7260	HF-7260	HF-7260	Spark Plug Wire Assembly

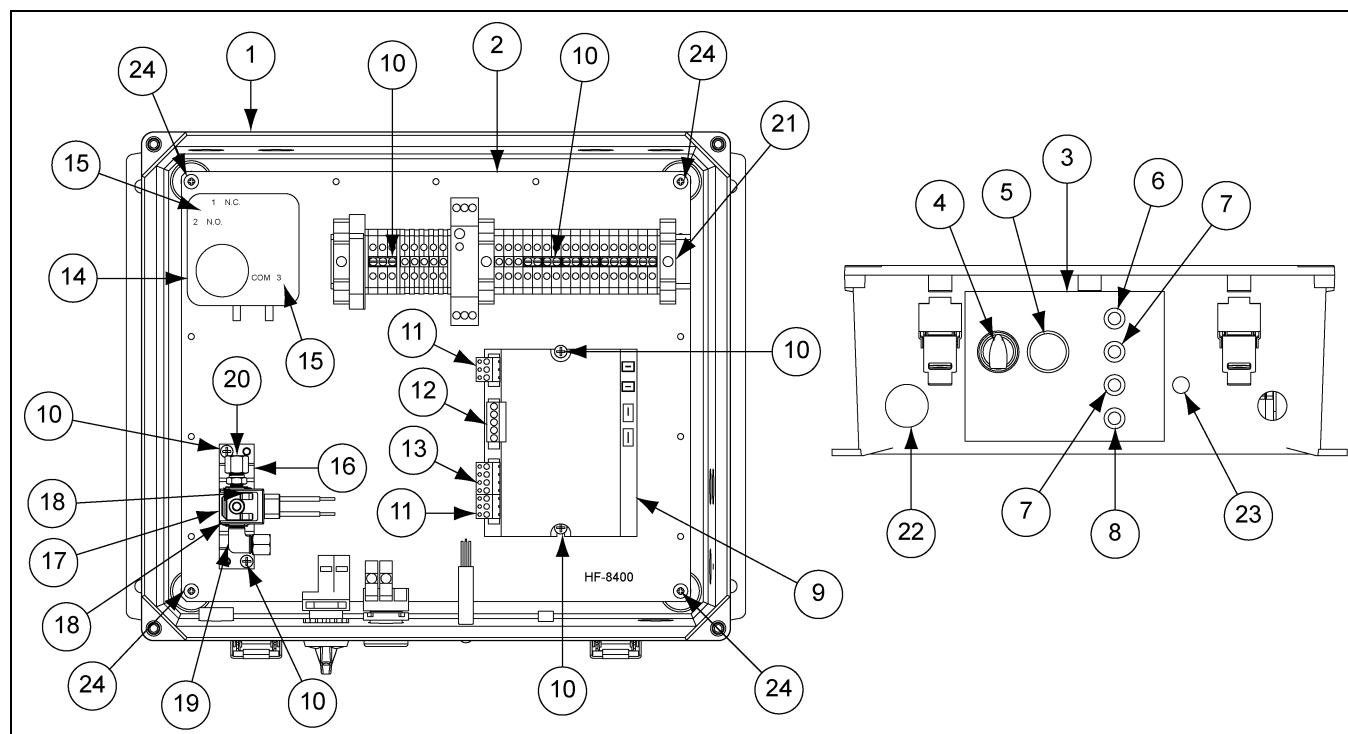
CE Vapor Pipe Train (HF-7703-CE)



CE Vapor Pipe Train (HF-7703-CE) Parts List

Ref #	Part #	Description	Qty
1	HF-8081	Valve, Solenoid 3/4" 240V CE	1
2	HF-7885	Flange, 3/4" NPT/DMV 701 Valve	2
3	D08-0018	Nipple, 3/4" x 4" SCH 40 Balck	1
4	THH-4121	Nipple, 3/4" Close SCH 40 Black	3
5	D08-0017	Tee, 1" x 1" x 3/4" SCH 40 Black	1
6	THH-4001	Reducer Bushing 1" x 1/4" Hex SCH 40 Black	1
7	HF-7920	Orifice Holder-Heater - 1/2"	1
8	TFC-0020	Regulator, LP, 3/4" NPT, 30 PSI	1
9	007-1248-9	Nipple, 3/4" x 1-1/2" SCH 40 Black	1
10	THH-4066	Elbow, 3/4"-90° Street SCH 40 Black	1
11	TFC-0051	Valve, 3/4" NPT Bronze Ball	2
12	007-1158-0	Elbow, Street 1/4"-90° SCH 80 Black	1
13	THH-4111	Valve, 1/4" NPT 50 PSI Relief	1
14	D67-0008	Strainer, 3/4" Y 250# WOG SCH 80 Black, with Plug	1
N/S	DC-1912	Decal, Heater Orifice Location	1

CE Heater Control Box (HF-8367)



CE Heater Control Box (HF-8367) Parts List

Ref #	Part #	Description	Qty
1	C-8838	Enclosure, Heater Nonmetallic 14 x 12 x 7 NEMA 4 x VVNC RVJ	1
2	HF-8400	Backing Plate, CE Heater Cont C-8838	1
3	DC-1886	Decal, CE Heater Control	1
4	HF-8129	Switch, 2 Pos Selector with Yellow 250VAC Led	1
5	HF-8161	Switch P.B. Red FL	1
6	HF-8130	Lamp, Indicator Green 250V 3/8 W/6" Leads	1
7	HF-8131	Lamp, Indicator Amber 250V 3/8 W/6" Leads	2
8	HF-7731	Lamp, Indicator Red 250V 3/8"	1
9	HF-7902	Control Assembly, Gas Heater	1
10	090-1705-4	Phillips Phsems #8-32 x 3/88	6
11	D03-0188	Con 3 Pin 0.200 PCB Plug	2
12	E240-1154	Con 5 Pin 0.200 PCB Plug	1
13	E240-1148	Con 4 Pin 0.200 PCB Plug	1
14	056-2245-1	Switch, Air Pressure AA-A2-4-3	1
15	S-8686	Screw, TCSF #6-32 x 3/8 PHP ZN	2
16	HF-8166	Bracket, Solenoid Mounting CE Heater	1
17	HF-8125	Solenoid Valve 3 Way 230 VAC 50/60 Hz 1/8" NPT	1
18	S-9474	Screw, MS M3-0.5 x 12 mm PHP ZN	2
19	D03-0649	Elbow, 1/4" CMP x 1/8" NPT Brass	1
20	HF-7469	Fitting, 1/4" Comp-1/8" NPT	1
21	HF-8174	Din Rail Assembly for CE Heater	1
22	HH-7203	Plug, Hole 0.875D 0.063-0.250T C2070	1
23	048-1042-0	Hole Plug 3/8"	1
24	S-8976	Screw, MS #10-32 x 3/8" PHP ZN Grade 2	4

NOTES

GSI Group, LLC 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	* 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%
	All Fiberglass Housings	Lifetime	
	All Fiberglass Propellers	Lifetime	
AP and Cumberland	Flex-Flo/Pan Feeding System Motors	2 Years	** Warranty prorated from list price: 0 to 3 years - no cost to end-user 3 to 5 years - end-user pays 50%
Cumberland Feeding/Watering Systems	Feeder System Pan Assemblies	5 Years **	
	Feed Tubes (1-3/4" and 2.00")	10 Years *	
	Centerless Augers	10 Years *	
	Watering Nipples	10 Years *	† Motors, burner components and moving parts not included. Portable dryer screens included. Tower dryer screens not included.
Grain Systems	Grain Bin Structural Design	5 Years	
Grain Systems Farm Fans Zimmerman	Portable and Tower Dryers	2 Years	
	Portable and Tower Dryer Frames and Internal Infrastructure †	5 Years	

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 (12th) month from the date of purchase and continuing until the sixtieth (60th) 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.

G S I G R O U P



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GSI is a worldwide brand of AGCO Corporation.