



CE Compliant Downwind Centrifugal Heater Installation and Operation

Model #: _____

Serial #: _____

Owner's Manual - Original Instructions

PNEG-1901CE

Date: 08-07-13

G S I G R O U P



PNEG-1901CE



**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

Downstream Heaters

Models

CHE-10-VNC	CHE-25-VNC
CHE-10-VNH	CHE-25-VNH
CHE-15-VNC	CHE-30-VNC
CHE-15-VNH	CHE-30-VNH
CHE-20-VNC	CHE-40-VNC
CHE-20-VNH	CHE-40-VNH

Heaters are vapor fuel only, using LPG or Natural Gas, with gross calorific values as stated in tables on Page 18 of this manual.

Meet the Essential Requirements of the Machinery Directive 2006/42/EC and have 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: 08-07-13

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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.



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



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



CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE is used to address practices not related to personal injury.

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.

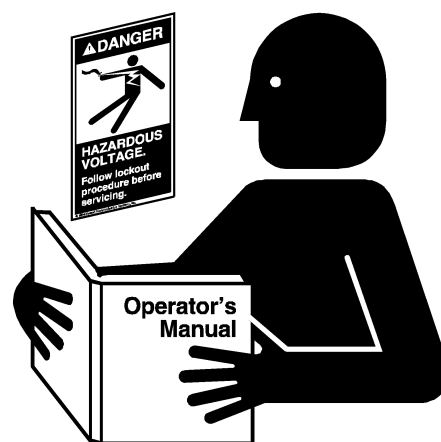
Follow Safety Instructions

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.



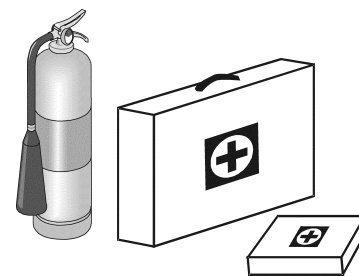
Read and Understand Manual

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.

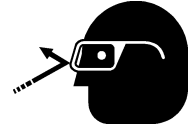
Wear steel-toed boots to help protect your feet from falling debris. Tuck in any loose or dangling shoestrings.

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, 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.

1. Safety

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.



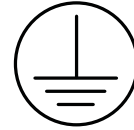
- a. Stops all equipment immediately when pressed.
- b. Must remain engaged until manually disengaged.
- c. Equipment shall not immediately re-start when the emergency stop is re-set.

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.

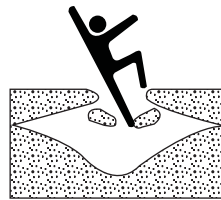
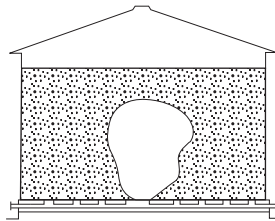
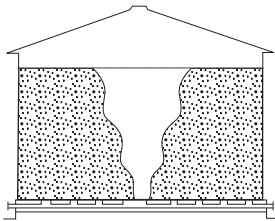
Hazards present at any time may include:



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

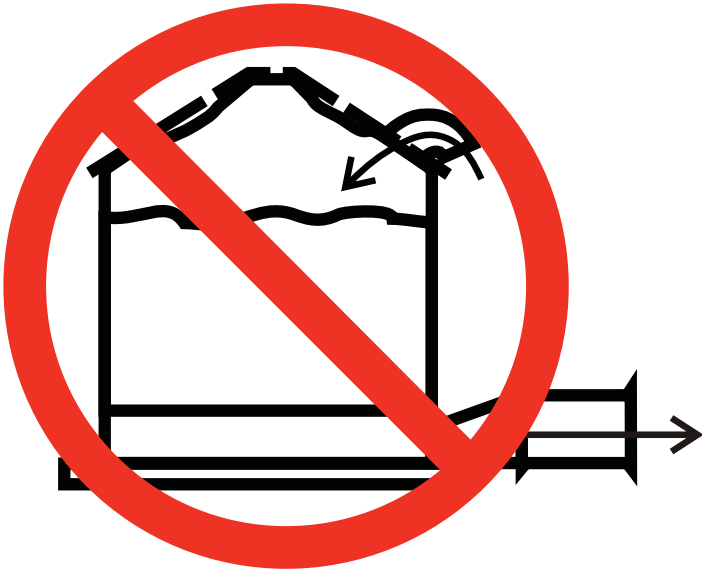
Safety decals are available in non-English versions. Please request LPAK-0004-** if these were not delivered with the equipment.

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



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.

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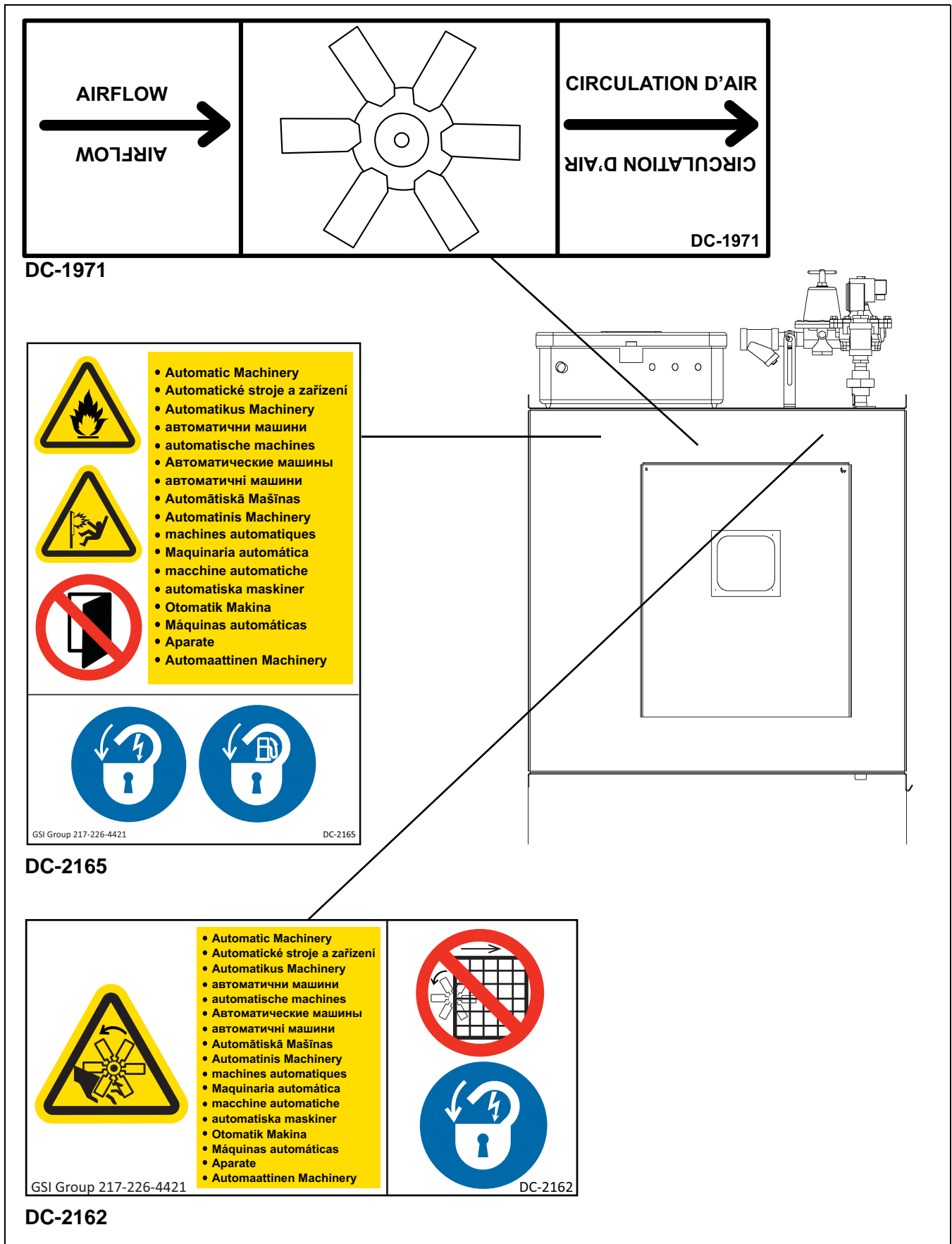


Figure 2A

2. Safety Decals

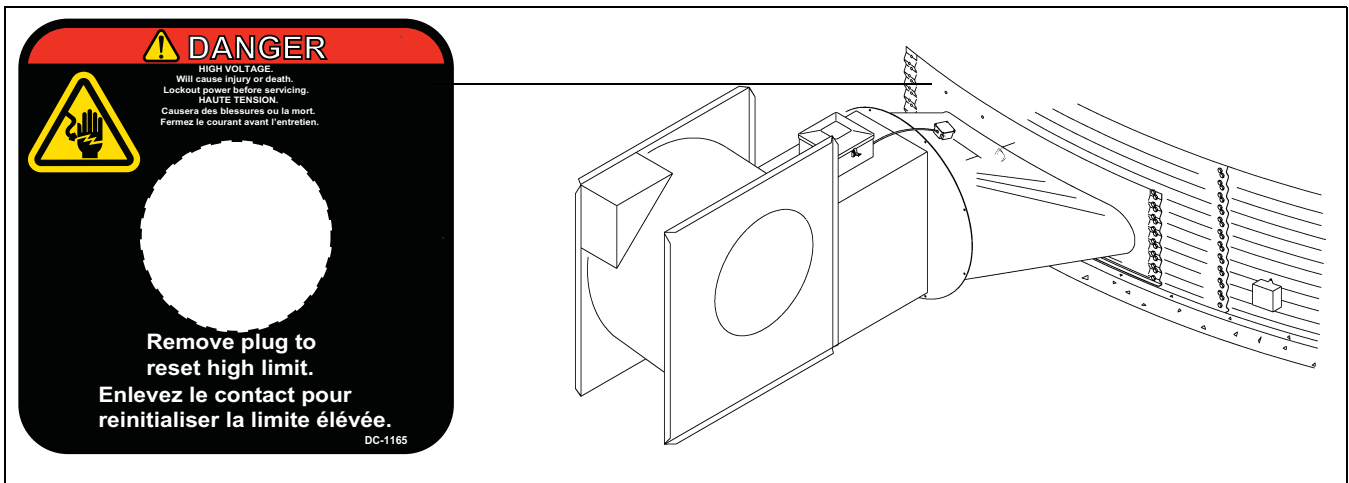


Figure 2B

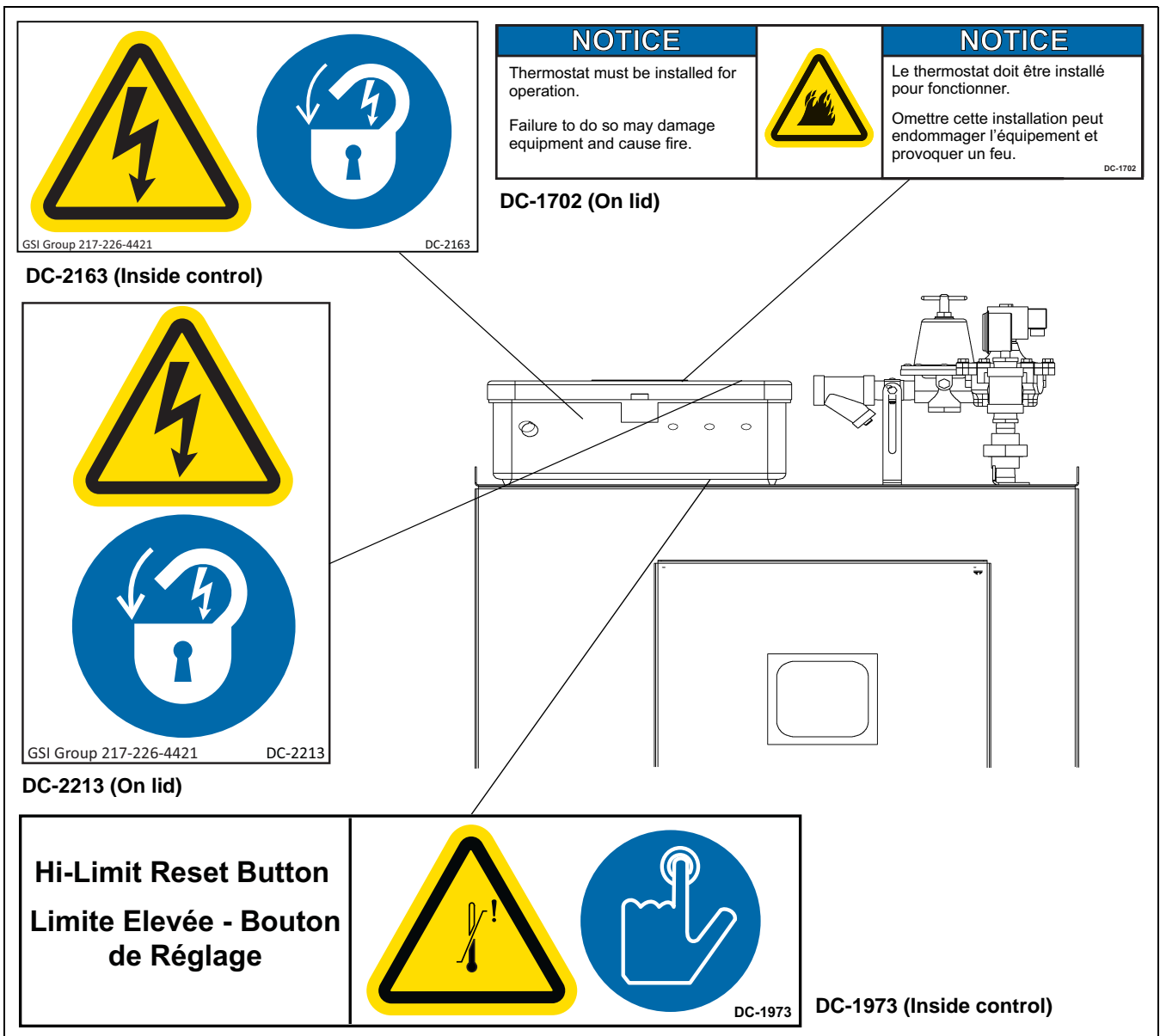


Figure 2C

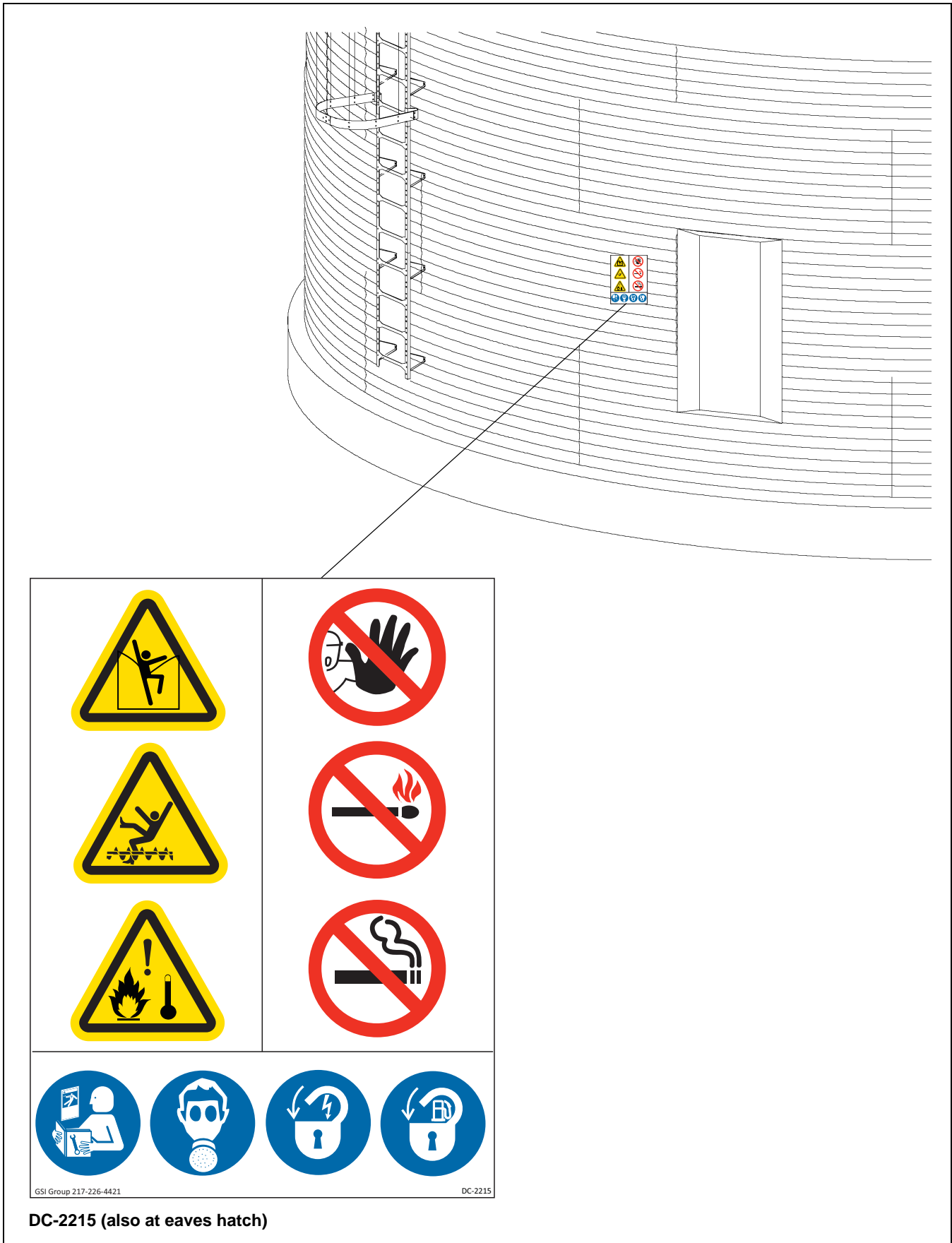
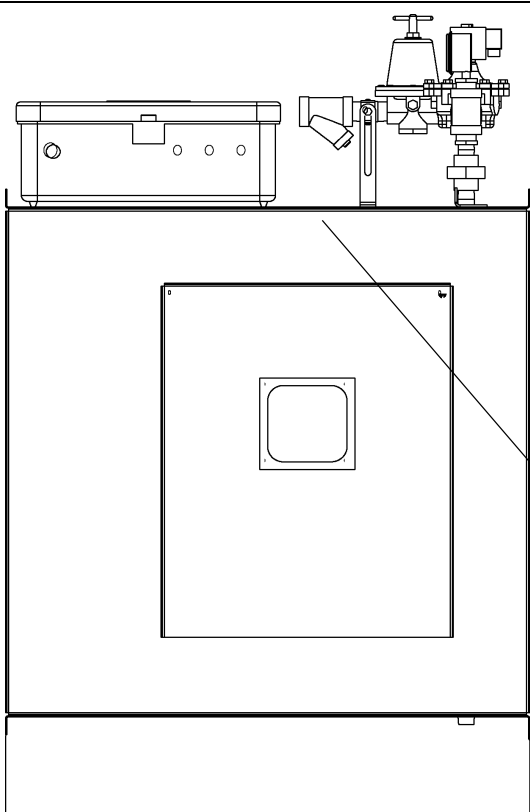


Figure 2D

2. Safety Decals

Rating Plate

CE Rating plate must be fitted as shown:








The GSI Group LLC		DOWN WIND HEATER	
1004 E Illinois St. Assumption. IL USA +1 217 226 4429			
SN #		123456789	
Model	Modelo	VHE-18-VNC	
Natural Gas			
G25			
38.6 MJ/m ³		512 kW	1185 kW
70 - 150 kPa			
Orifice	Ø	6.3 mm	2.5 mm
Pressure	Presión del suministro de combustible	48 kPa	48 kPa
Flow		38.3 m ³ /h	82.4 m ³ /h
Propane			
G31			
93.9 MJ/m ³		379 kW	884 kW
70 - 150 kPa			
Orifice	Ø	6.3 mm	9.5 mm
Pressure	Presión del suministro de combustible	20.5 kPa	28.5 kPa
Flow		14.5 m ³ /h	33.9 m ³ /h
Airflow		Min	Max
		12.2 m ³ /s	15.5 m ³ /s
Electrical supply			
Alimentación eléctrica			
	EN746-2:1996	220 - 240VAC	
	14 January 2013	1 - 50 hz	
		2.0 A	

Figure 2E

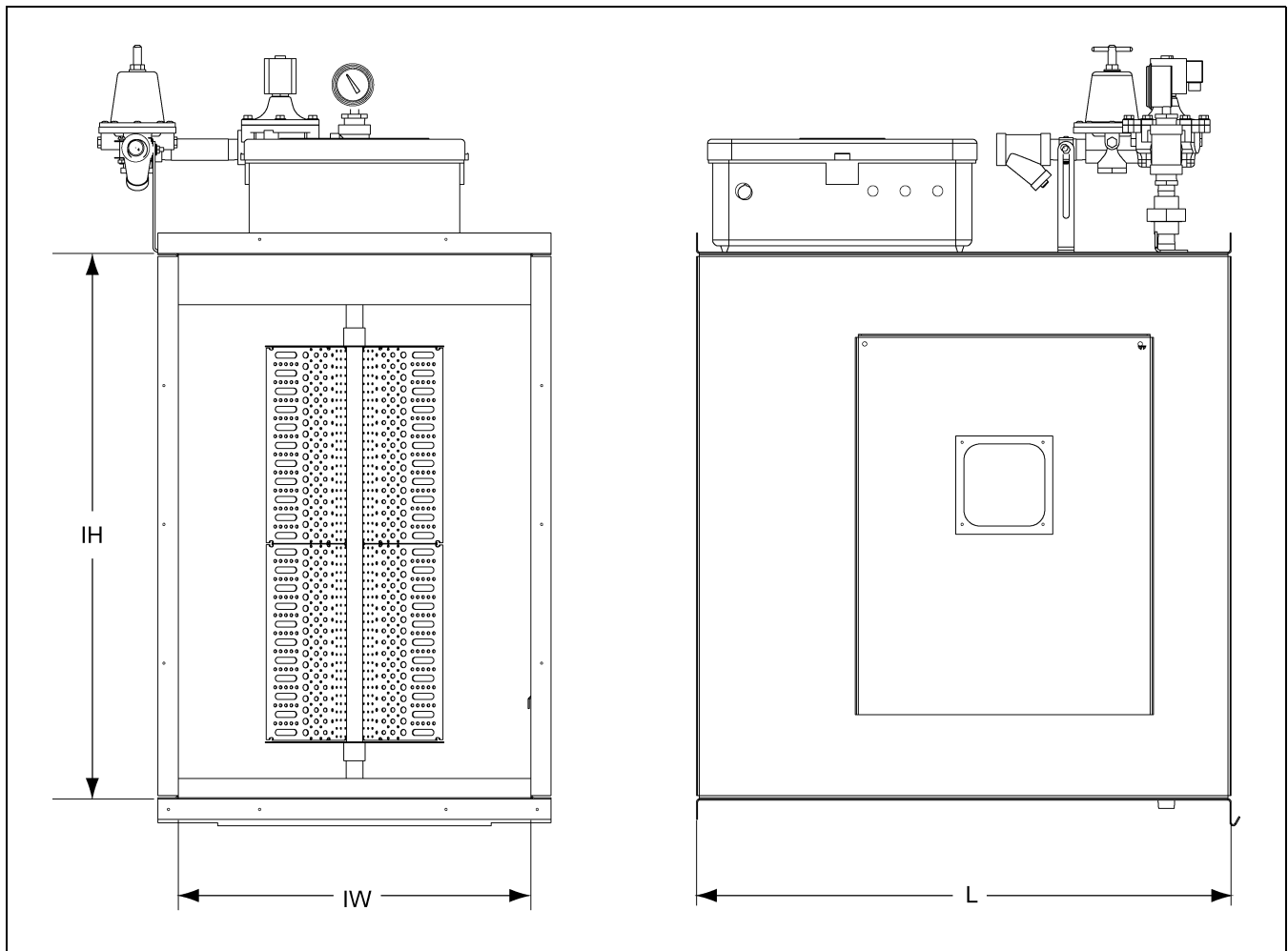


Figure 3A

Heater Dimensions (mm)

	IH	IW	L
CHE-10***	768	495	838
CHE-15***	768	495	838
CHE-20***	768	495	838
CHE-25***	845	552	838
CHE-30***	845	552	838
CHE-40***	845	602	838

3. Specifications

Specification for Propane

LP Vapor Models	Calorific Value = 93.9 MJ/m ³					
Fan Model	CHE-10-VN*	CHE-15-VN*	CHE-20-VN*	CHE-25-VN*	CHE-30-VN*	CHE-40-VN*
Minimum Operating Pressure (mBar)	50	50	50	50	50	50
Maximum Operating Pressure (mBar)	205	210	210	205	210	205
Minimum Supply Line (")	1/2	3/4	3/4	3/4	1	1
Medium Temp Orifice (mm)	7.0	7.8	8.7	9.6	10.1	11.1
Medium Temp kW Rating at Maximum Pressure	469.0	591.0	739.0	884.0	996.0	1196.0
Medium Temp Fuel Flow at Maximum Pressure (m ³ /h)	18.0	22.7	28.4	33.9	38.2	45.9
Low Temp Orifice (mm)	4.6	5.1	5.7	6.3	6.6	7.3
Low Temp kW Rating at Maximum Pressure	201.0	253.0	317.0	379.0	427.0	512.0
Low Temp Fuel Flow at Maximum Pressure (m ³ /h)	7.7	9.7	12.2	14.5	16.4	19.6

Specification for Natural Gas

Natural Gas	Calorific Value = 38.3 MJ/m ³					
Fan Model	CHE-10-VN*	CHE-15-VN*	CHE-20-VN*	CHE-25-VN*	CHE-30-VN*	CHE-40-VN*
Minimum Operating Pressure (mBar)	70	70	70	70	70	70
Maximum Operating Pressure (mBar)	480	480	480	480	480	480
Minimum Supply Line (")	3/4	1	1-1/4	1-1/4	1-1/2	1-1/2
Medium Temp Orifice (mm)	7.0	7.8	8.7	9.6	10.1	11.1
Medium Temp kW Rating at Maximum Pressure	469.0	591.0	739.0	884.0	996.0	1196.0
Medium Temp Fuel Flow at Maximum Pressure (m ³ /h)	43.7	55.1	68.9	82.4	92.9	111.5
Low Temp Orifice (mm)	4.6	5.1	5.7	6.3	6.6	7.3
Low Temp kW Rating at Maximum Pressure	201.0	253.0	317.0	379.0	427.0	512.0
Low Temp Fuel Flow at Maximum Pressure (m ³ /h)	18.7	23.6	29.6	35.3	39.8	47.7

Airflow Requirements

Fan Model	CHE-10-VN*	CHE-15-VN*	CHE-20-VN*	CHE-25-VN*	CHE-30-VN*	CHE-40-VN*
Maximum Airflow (m ³ /s)	7.6	8.6	11.2	11.3	13.3	15.5
Minimum Airflow (m ³ /s)	3.7	5.2	7.5	8.4	9.5	12.2

Orifice Selection

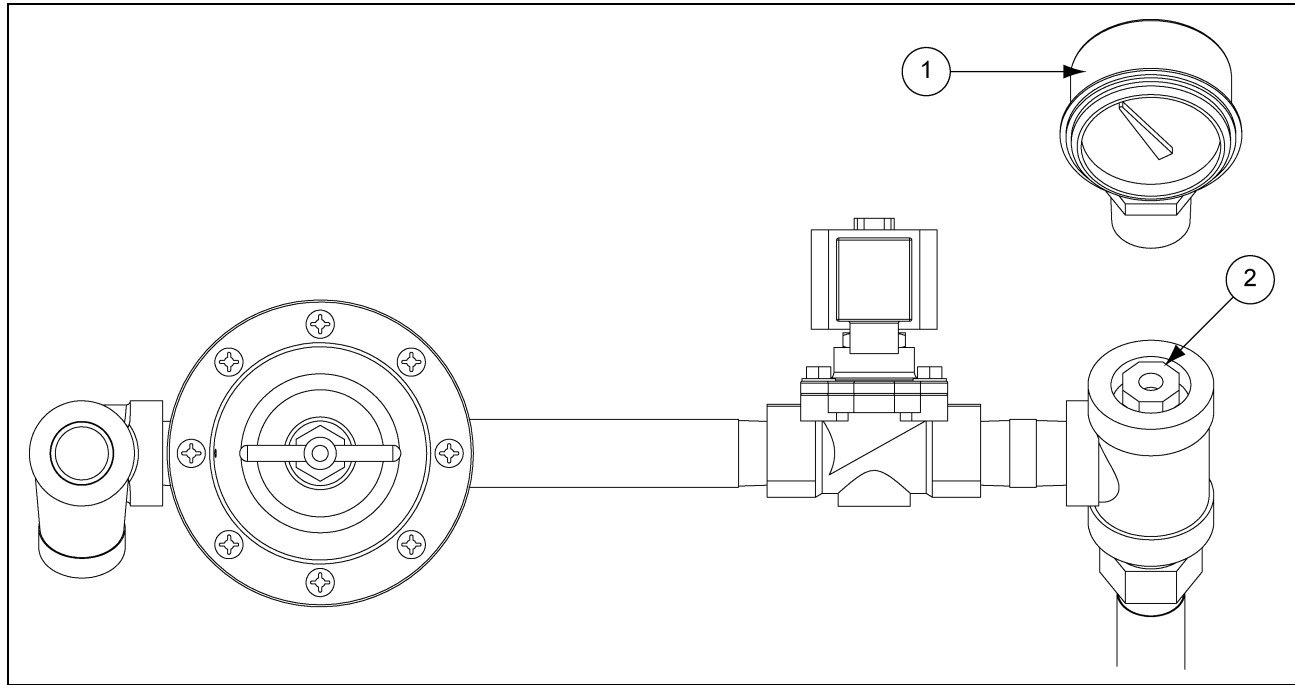


Figure 4A Burner Orifice Locations

Ref #	Description
1	Reducer Bushing with Presuure Gauge
2	Primary Orifice

Burner Orifice Selection

Fuel	Heat Output (See Tables on Page 18.)	CHE-10	CHE-15	CHE-20	CHE-25	CHE-30	CHE-40
Natural Gas	High	7.0 mm	7.8 mm	8.7 mm	9.6 mm	10.1 mm	11.1 mm
	Low	4.6 mm	5.1 mm	5.7 mm	6.3 mm	6.6 mm	7.3 mm
LPG Vapor	High	7.0 mm	7.8 mm	8.7 mm	9.6 mm	10.1 mm	11.1 mm
	Low	4.6 mm	5.1 mm	5.7 mm	6.3 mm	6.6 mm	7.3 mm

4. Installation

Orifice Installation



Figure 4B

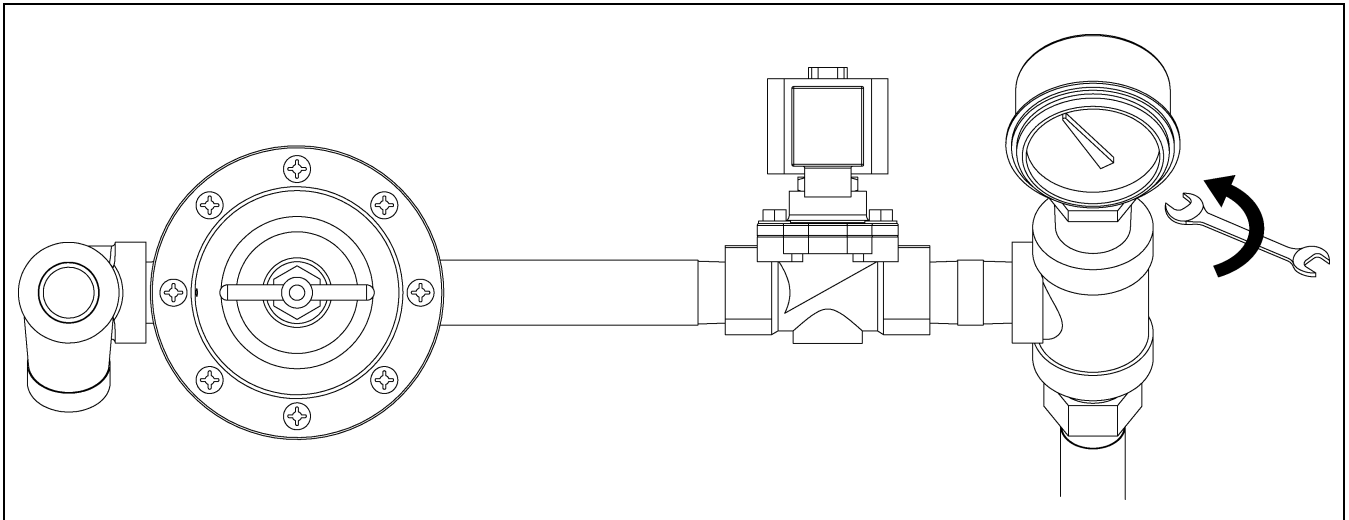


Figure 4C

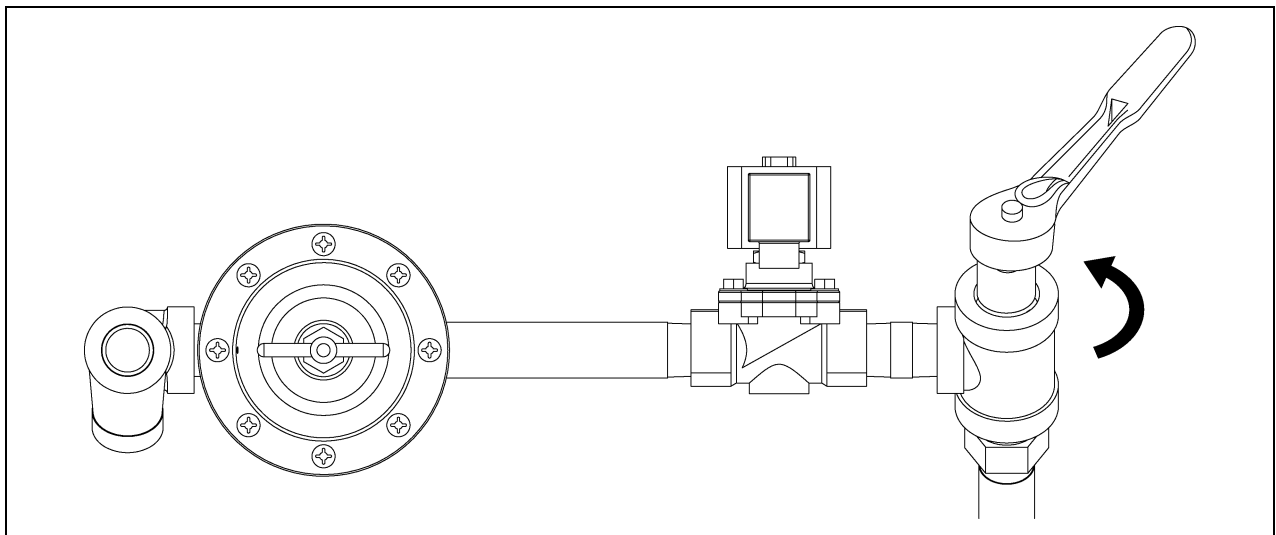


Figure 4D

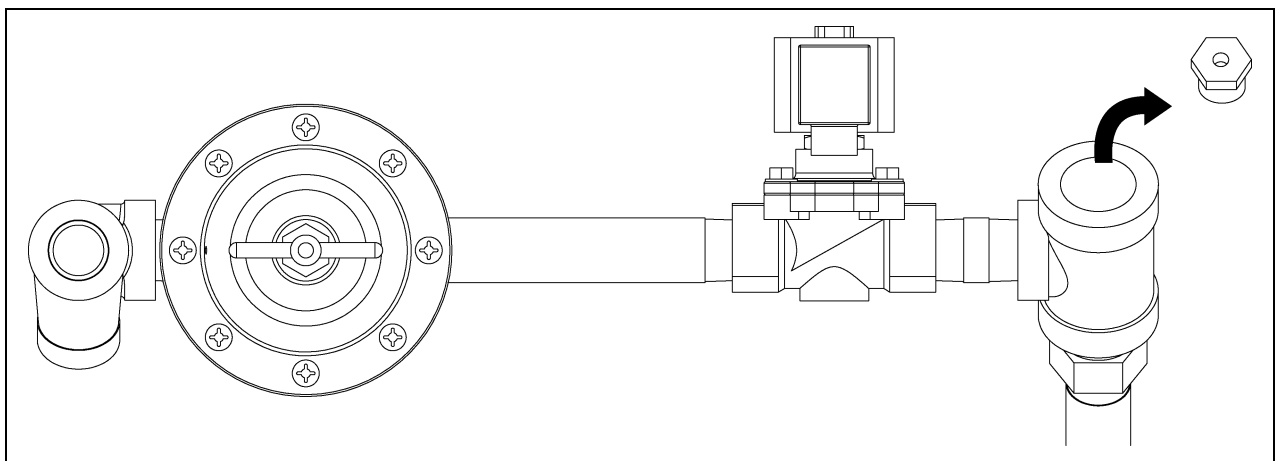


Figure 4E

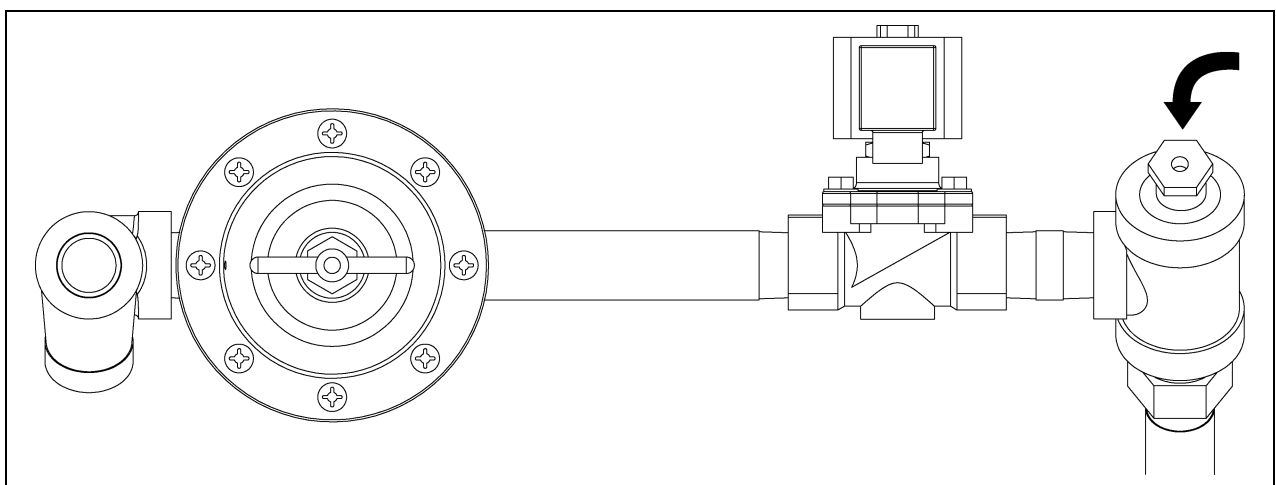


Figure 4F

4. Installation

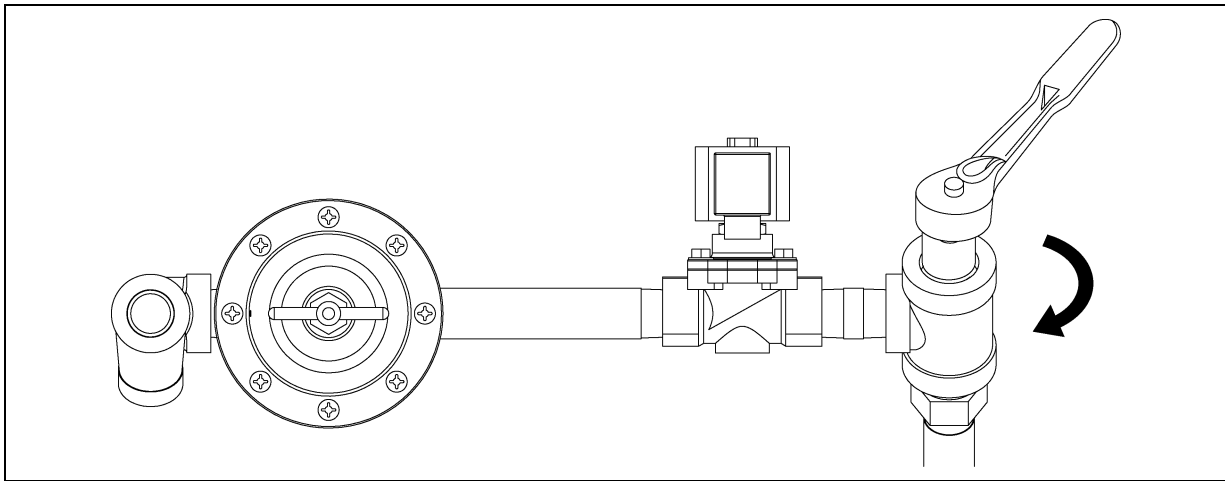


Figure 4G

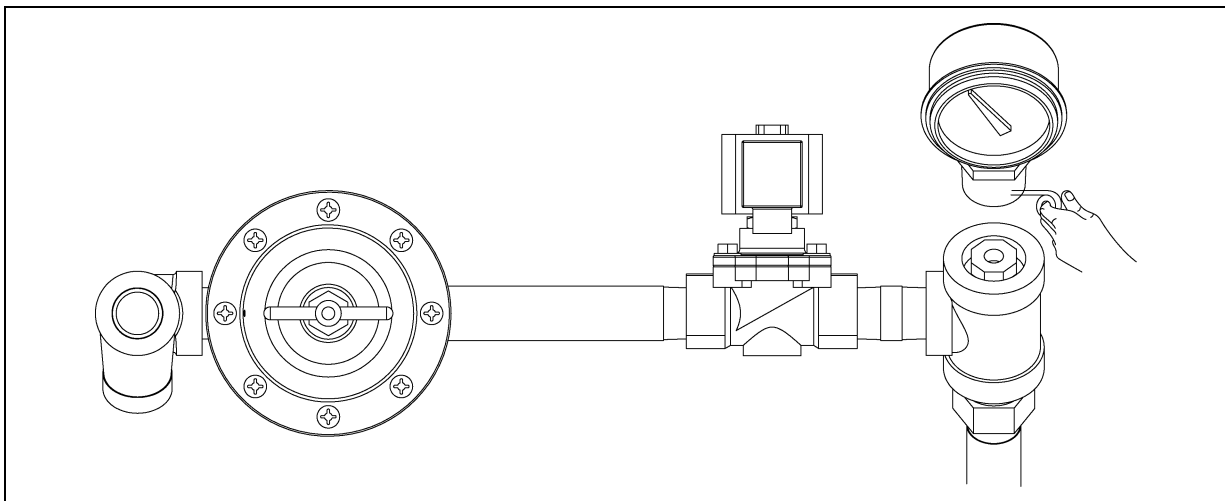


Figure 4H

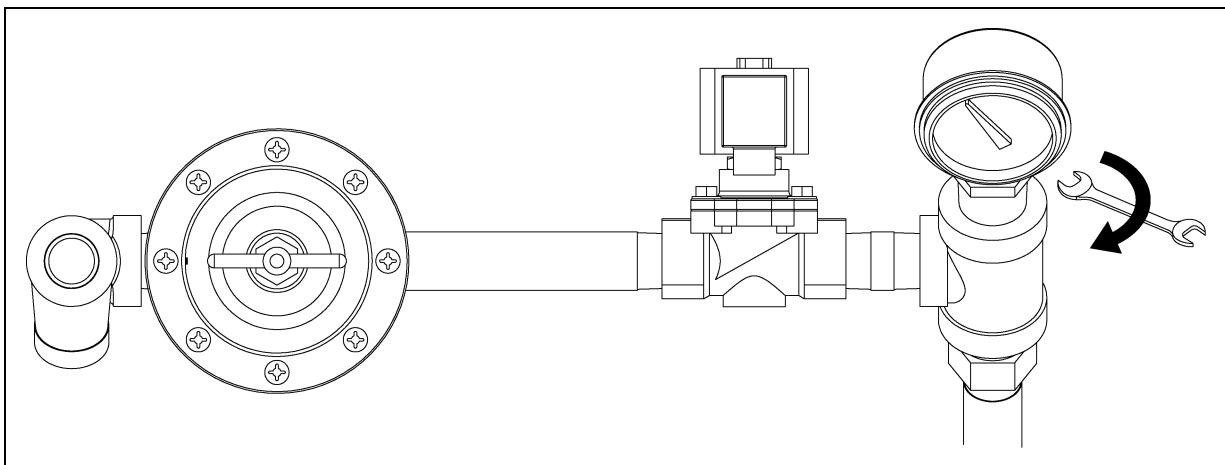


Figure 4I



Check for leaks.

Fit Heater to Bin

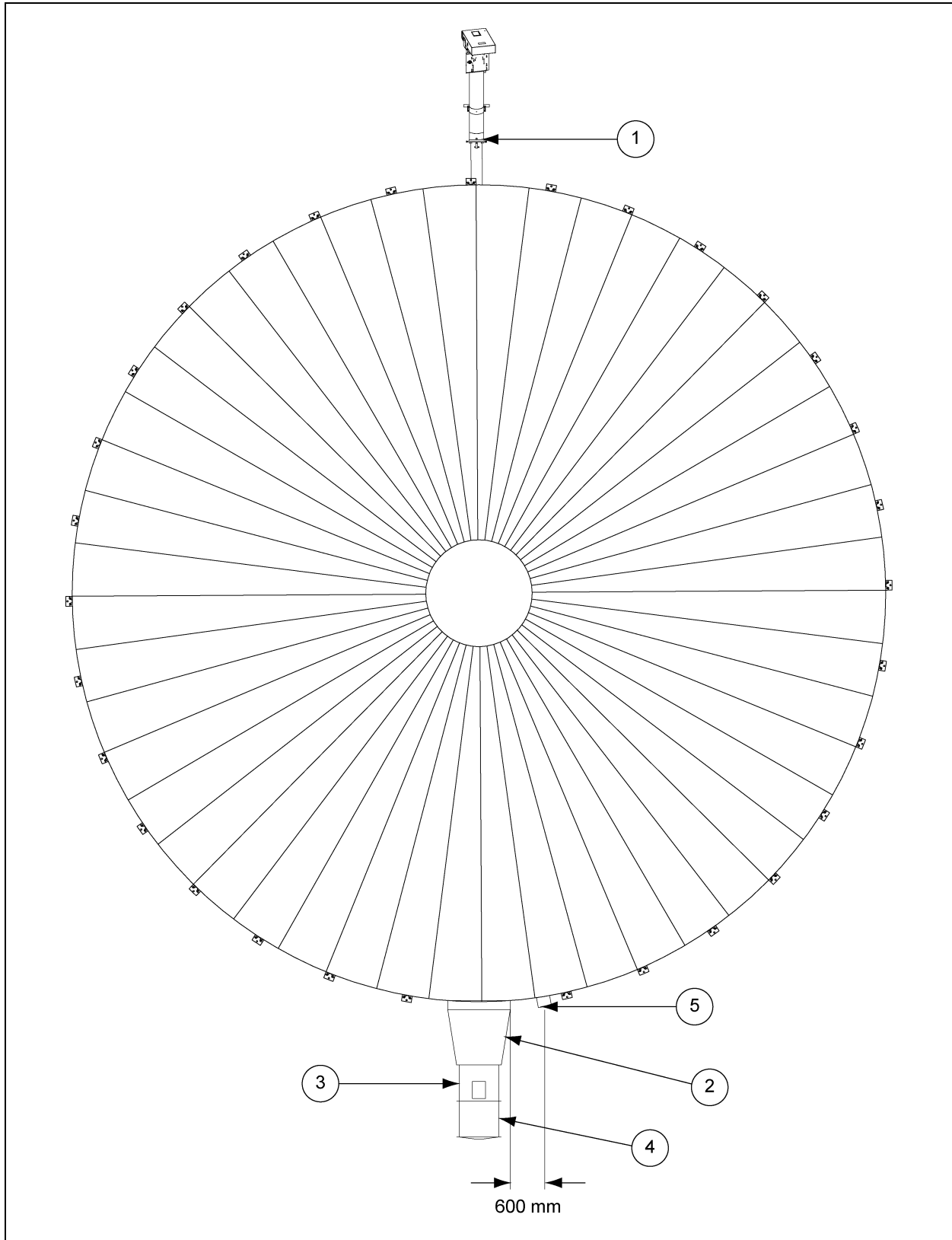


Figure 4J Single Heater Installation

NOTE: Orientation of fan relative to unload must be as shown. See table on [Page 24](#).

4. Installation

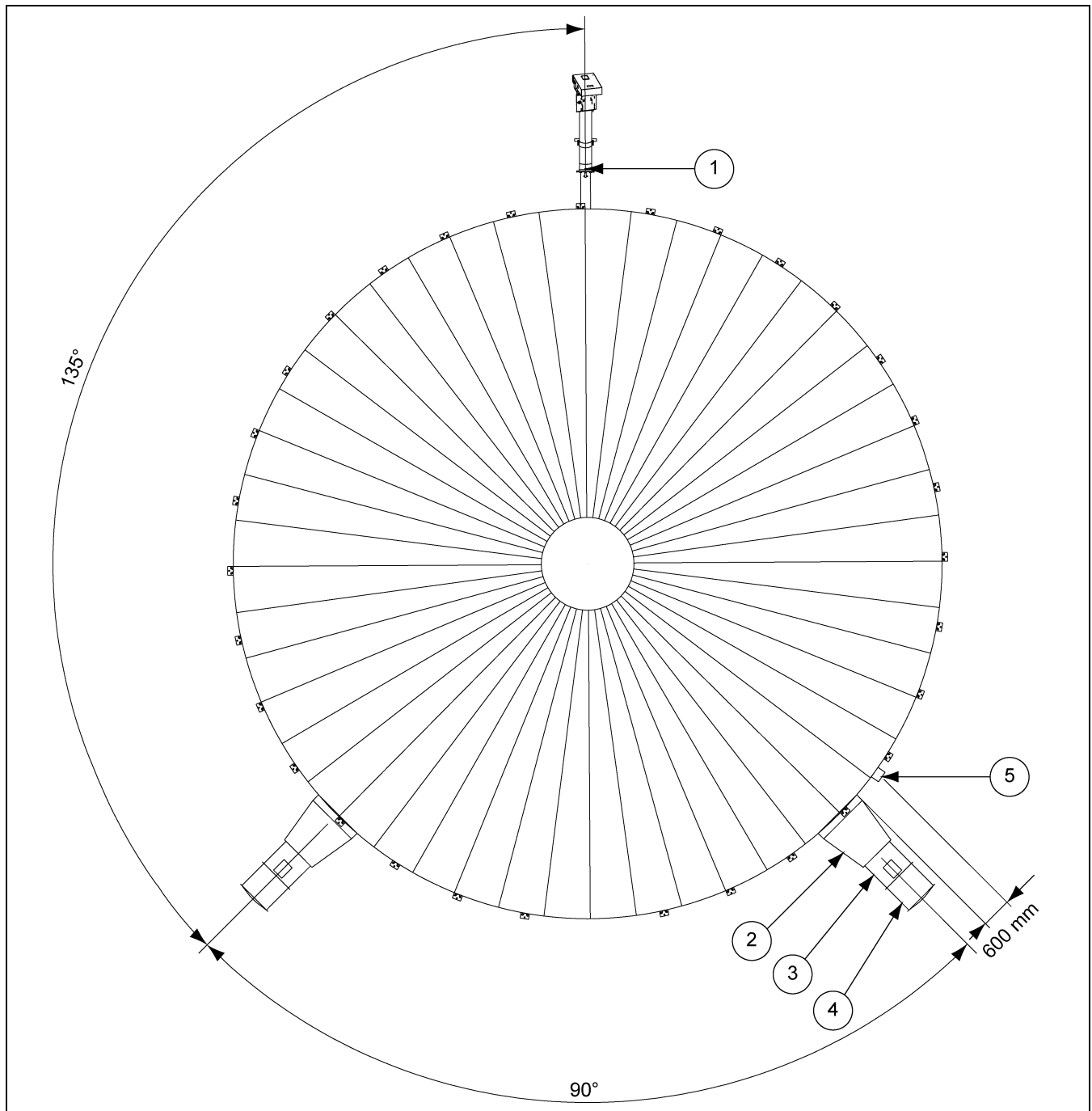


Figure 4K Master and Slave Heater Installation

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

Recommended Installation Components

1	Unload Auger	-					
2	Transition Duct	TR-7048		TR-6207		TR-6958	
3	Heater	CHE-10	CHE-15	CHE-20	CHE-25	CHE-30	CHE-40
4	Centrifugal Fan	CF30-10-*G	CF30-15-*G	CF33-20-*G	CF33-25-*G	CF36-30-*G	CF36-40-*G
5	Plenum Thermostat/High-Limit	HF-7513					

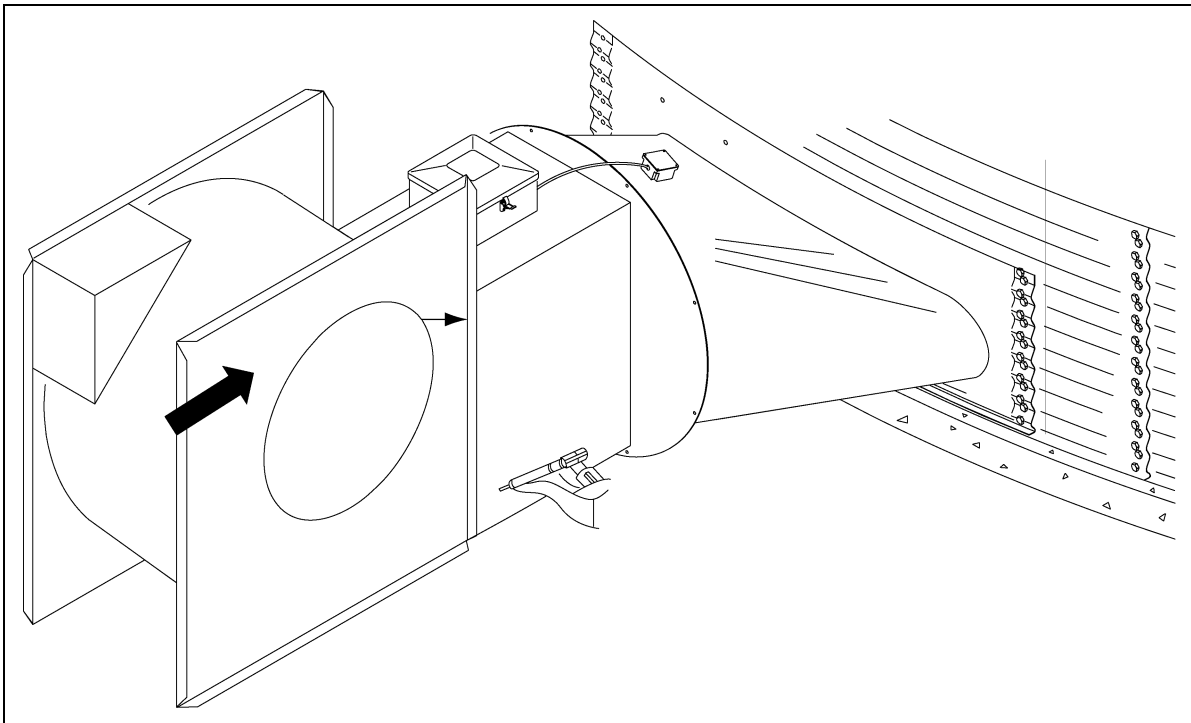


Figure 4L

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



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



Figure 4M Transition High-Limit

4. Installation

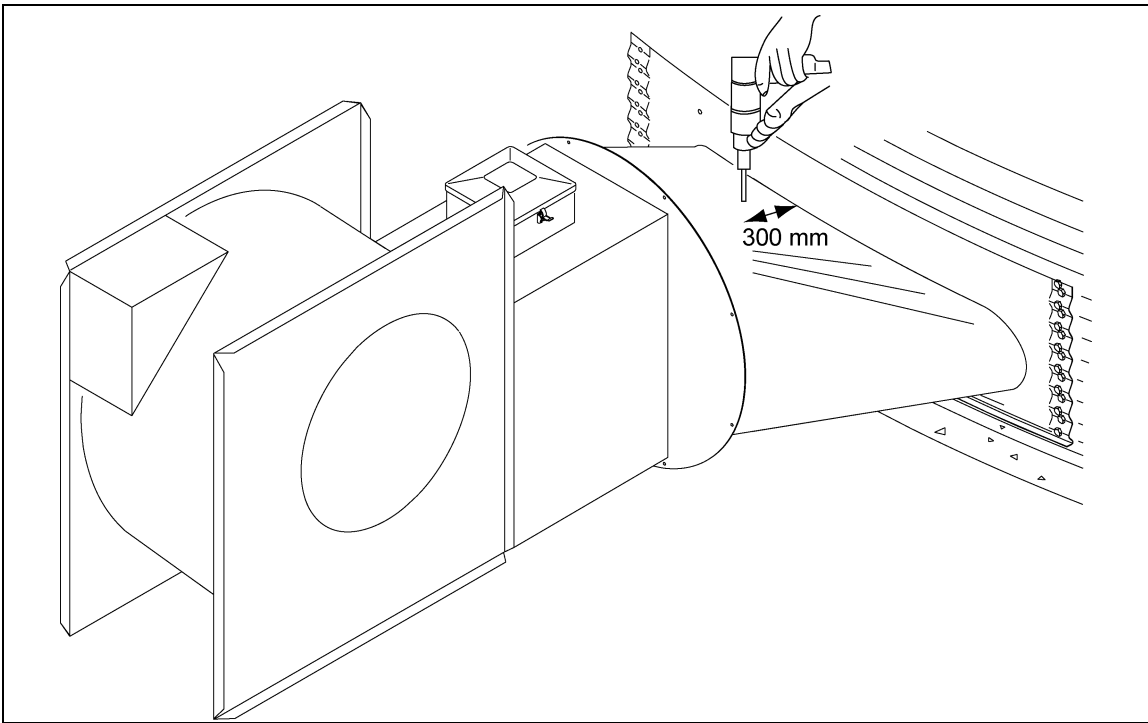


Figure 4N Cut 22 mm Ø Hole

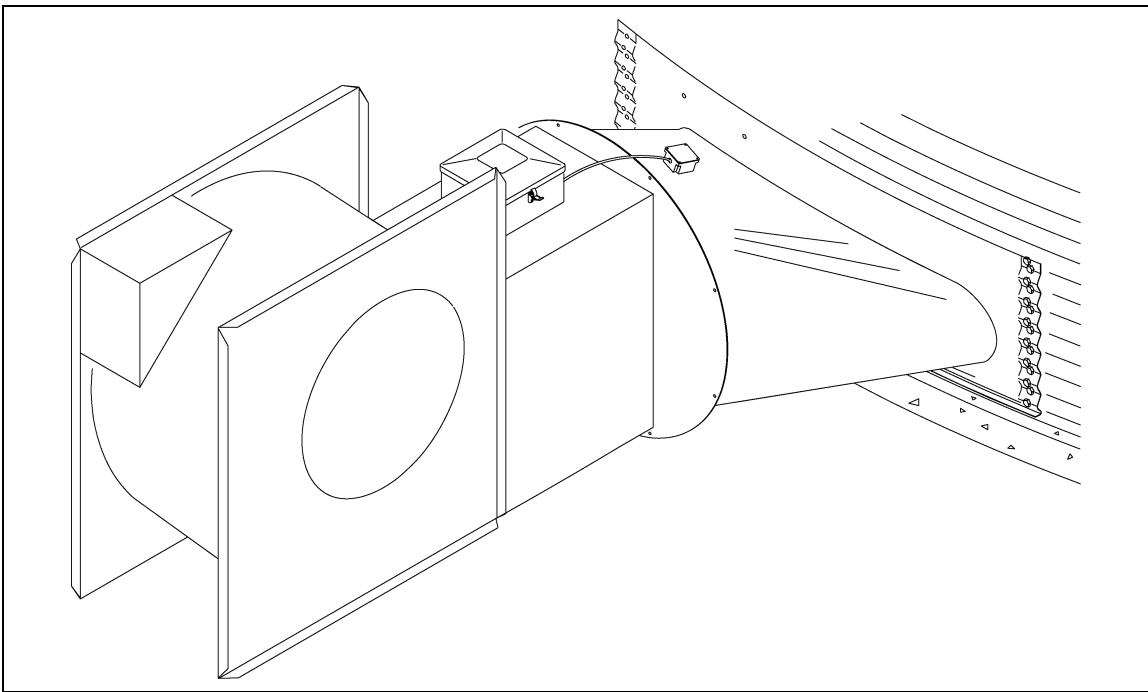
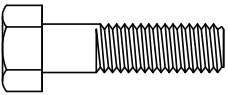


Figure 4O Fit High-Limit on Duct (Use Fitting Kit HF-7860)

		
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.

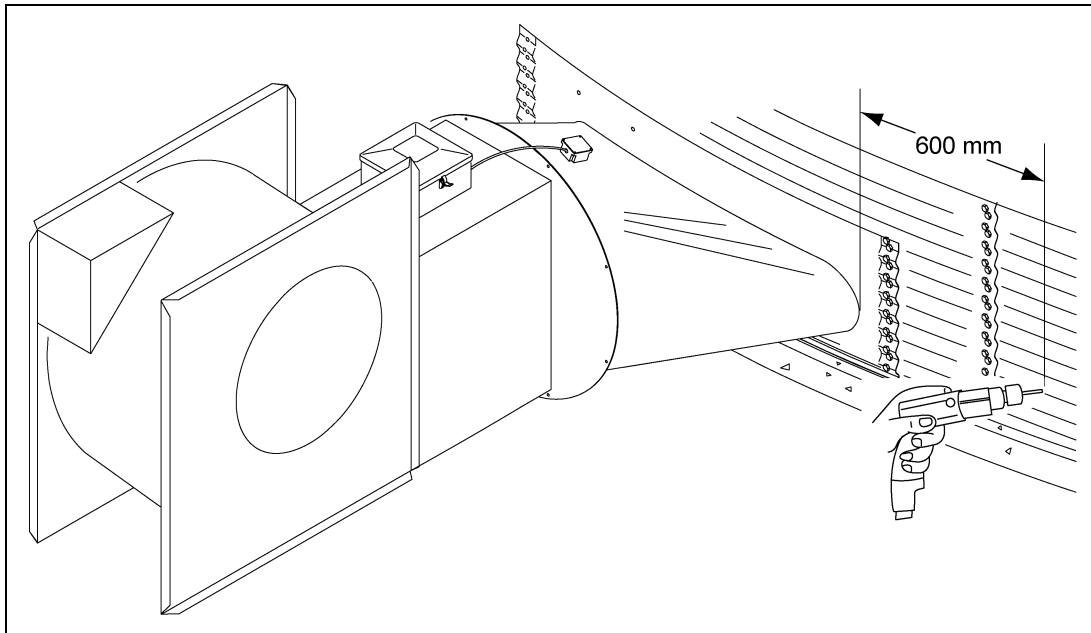
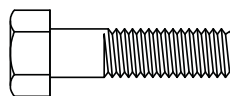


Figure 4P Cut 22 mm Ø Hole



Figure 4Q Fit Plenum Thermostat/High-Limit



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

Electrical Installation



Figure 4R 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 5A on Page 35.

CE Heater Control Schematic

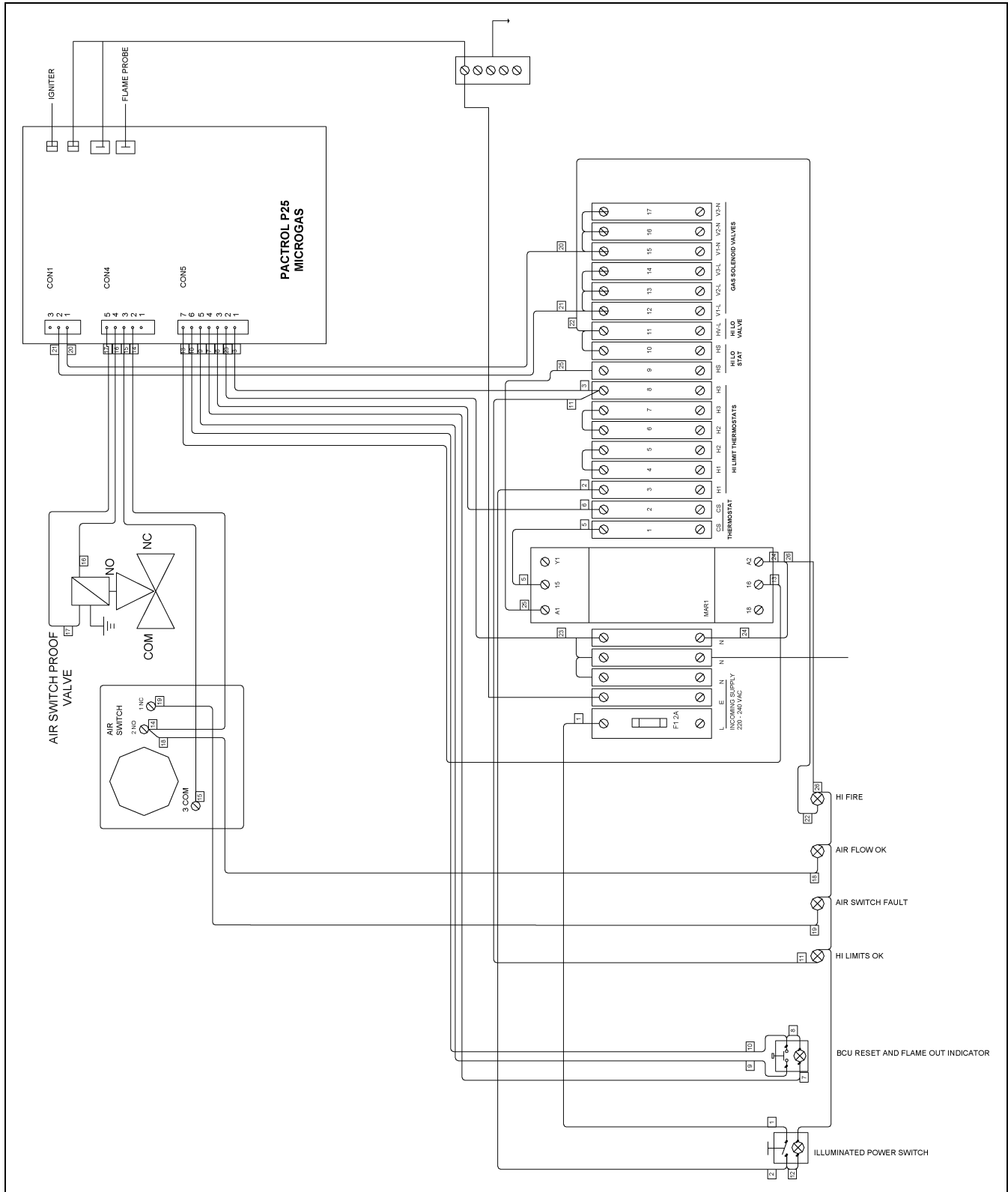


Figure 4S CE Heater Control Schematic

CE Heater Control Connections

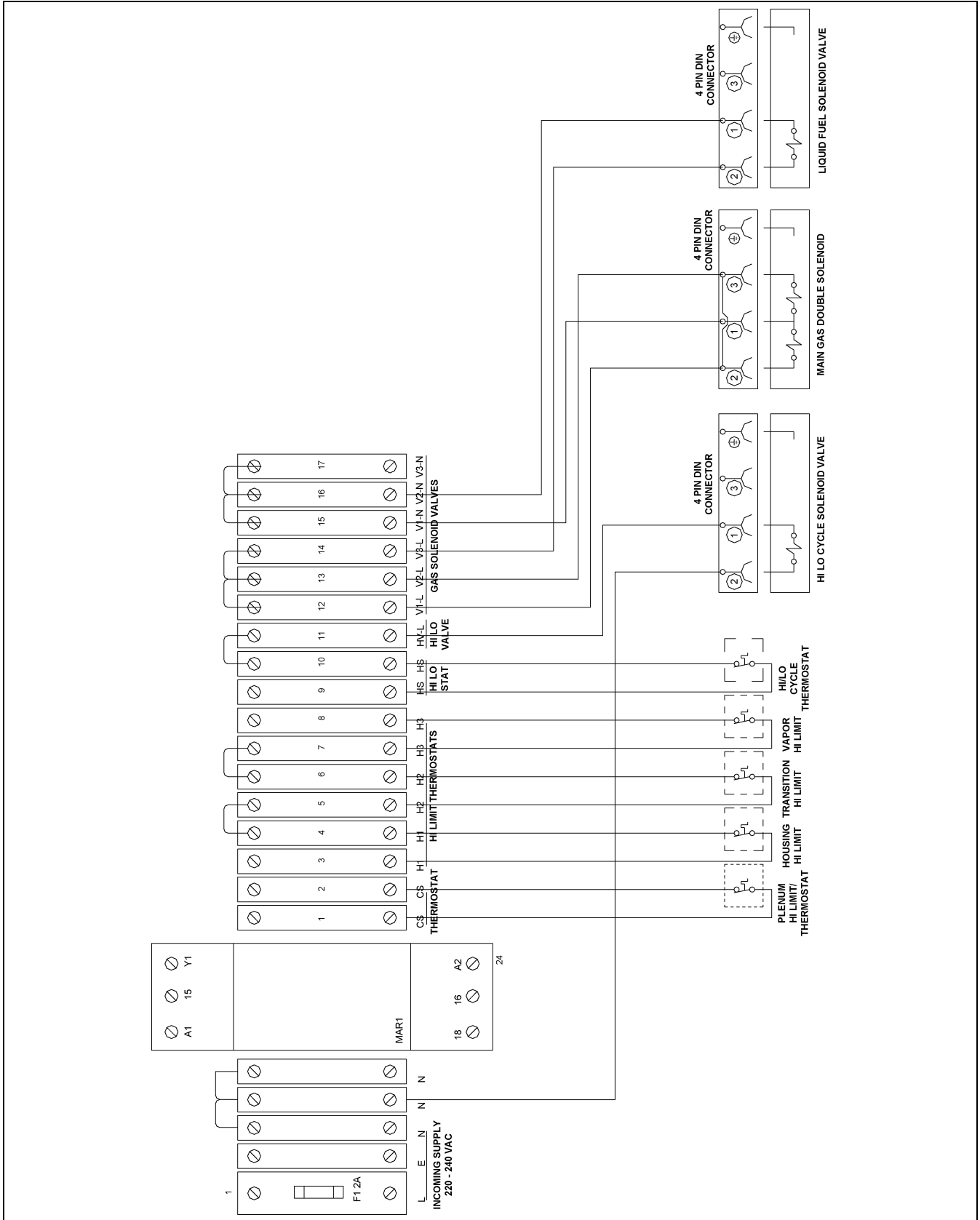


Figure 4T CE Heater Control Connections

Modulating Valve Installation (Optional)

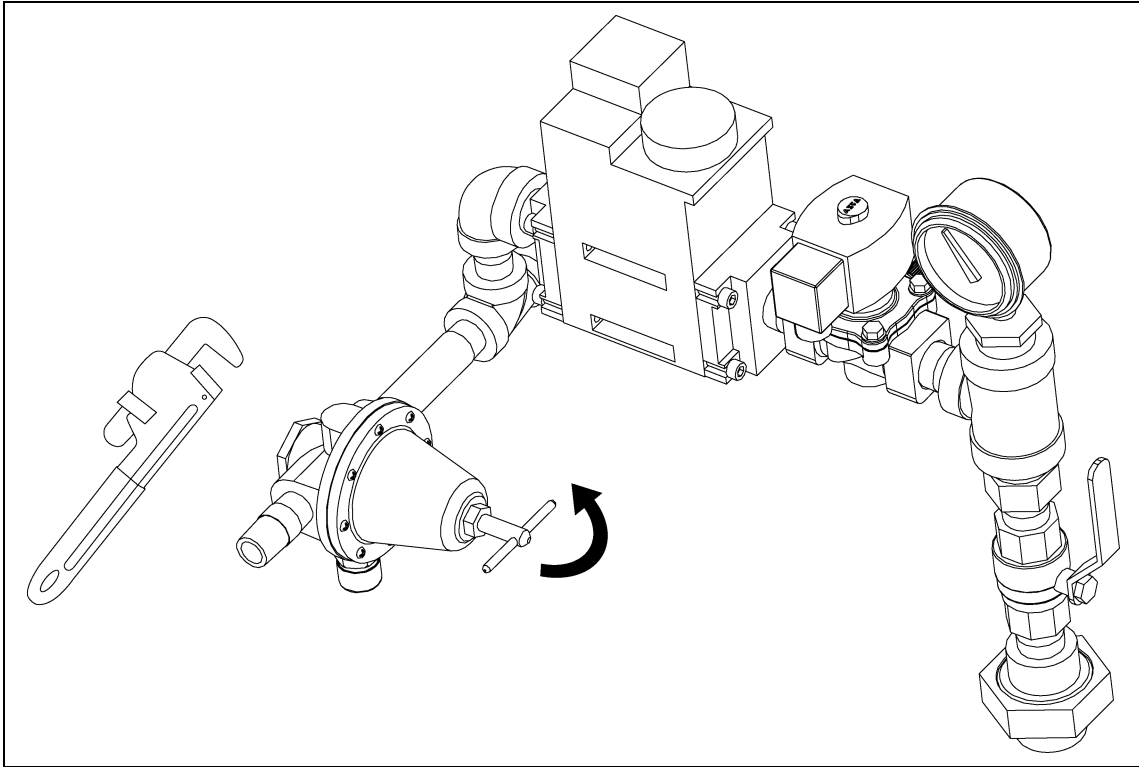


Figure 4U

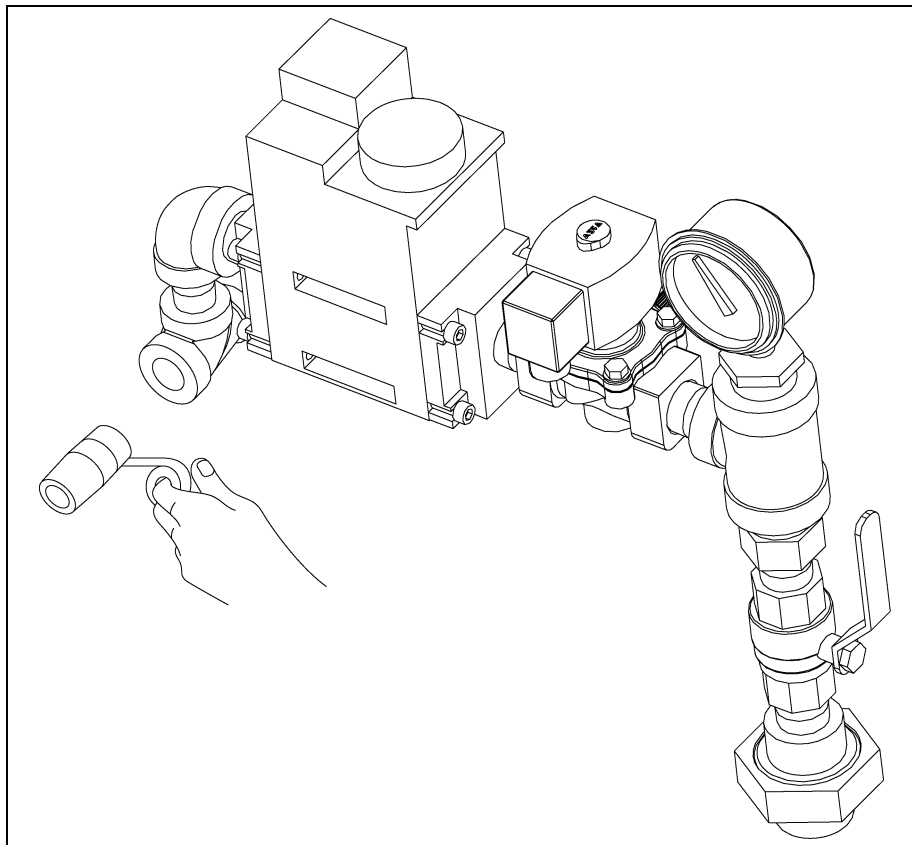


Figure 4V

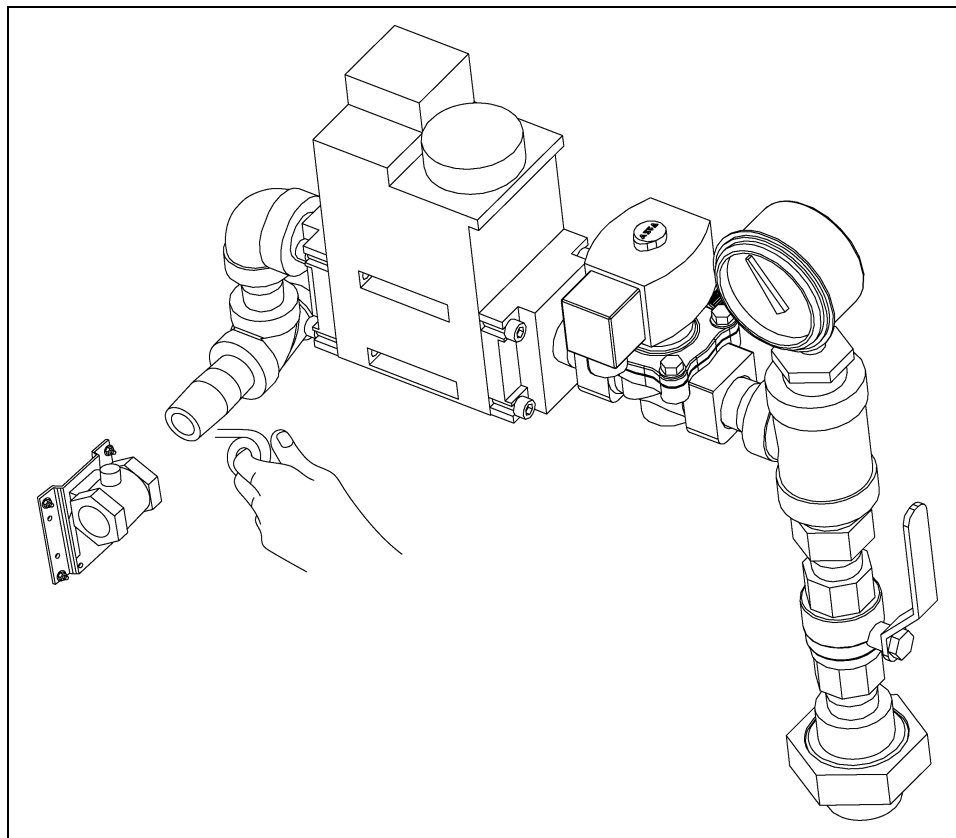


Figure 4W

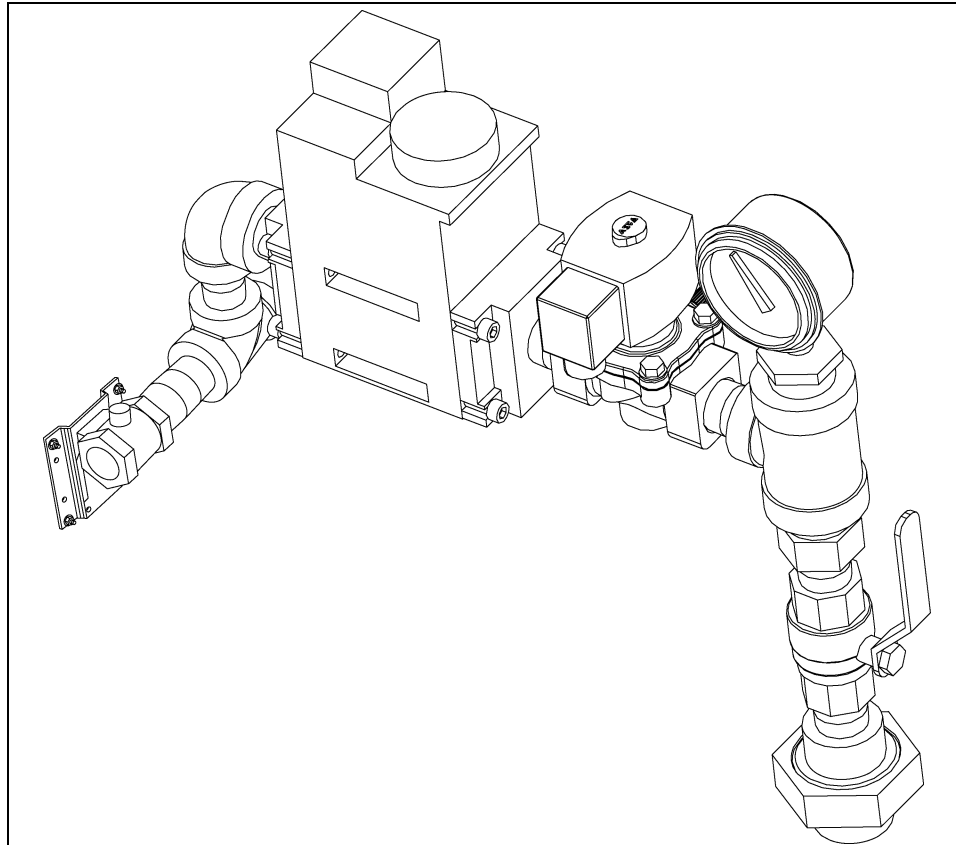


Figure 4X

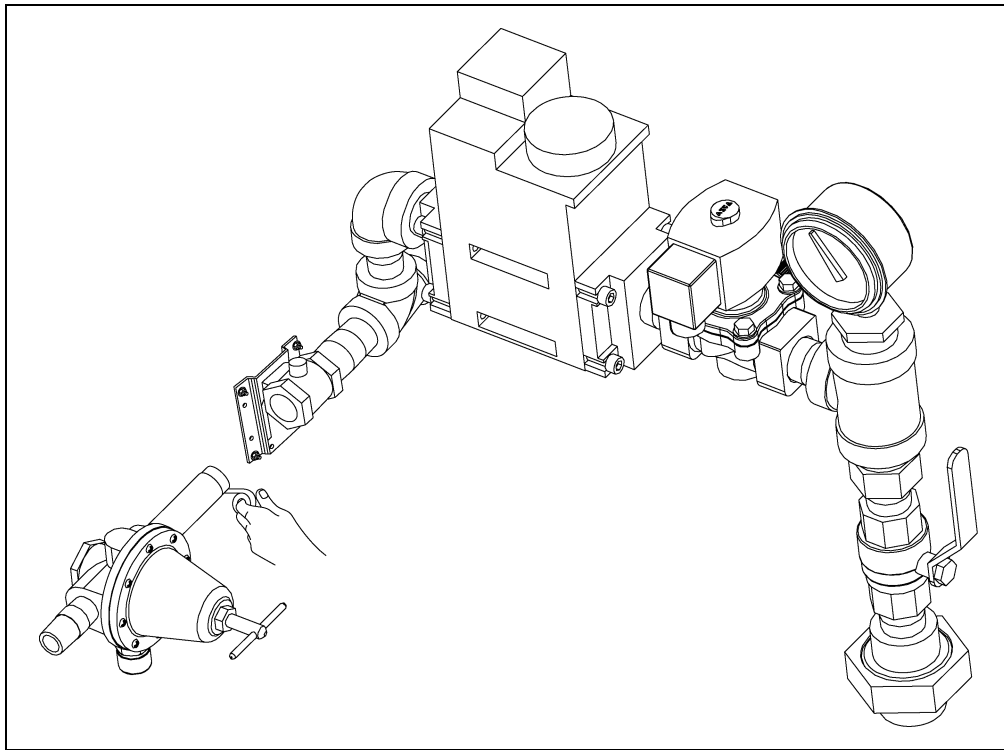


Figure 4Y

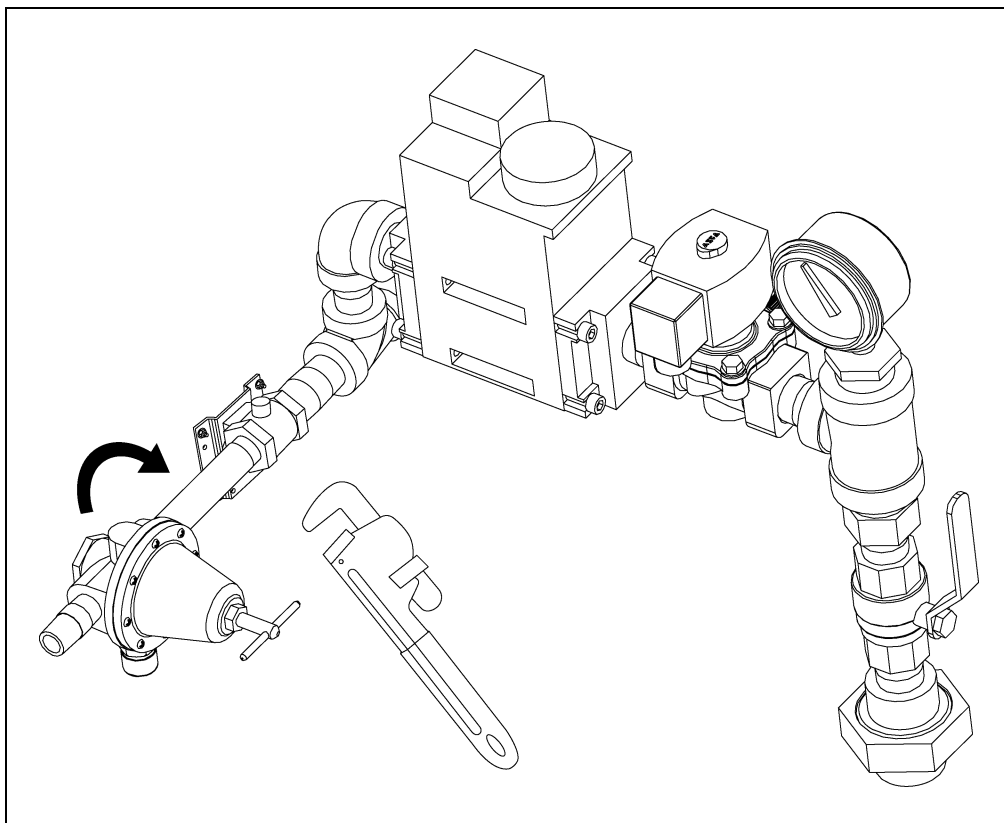


Figure 4Z



Check for leaks.

4. Installation

Connect Fuel Supply

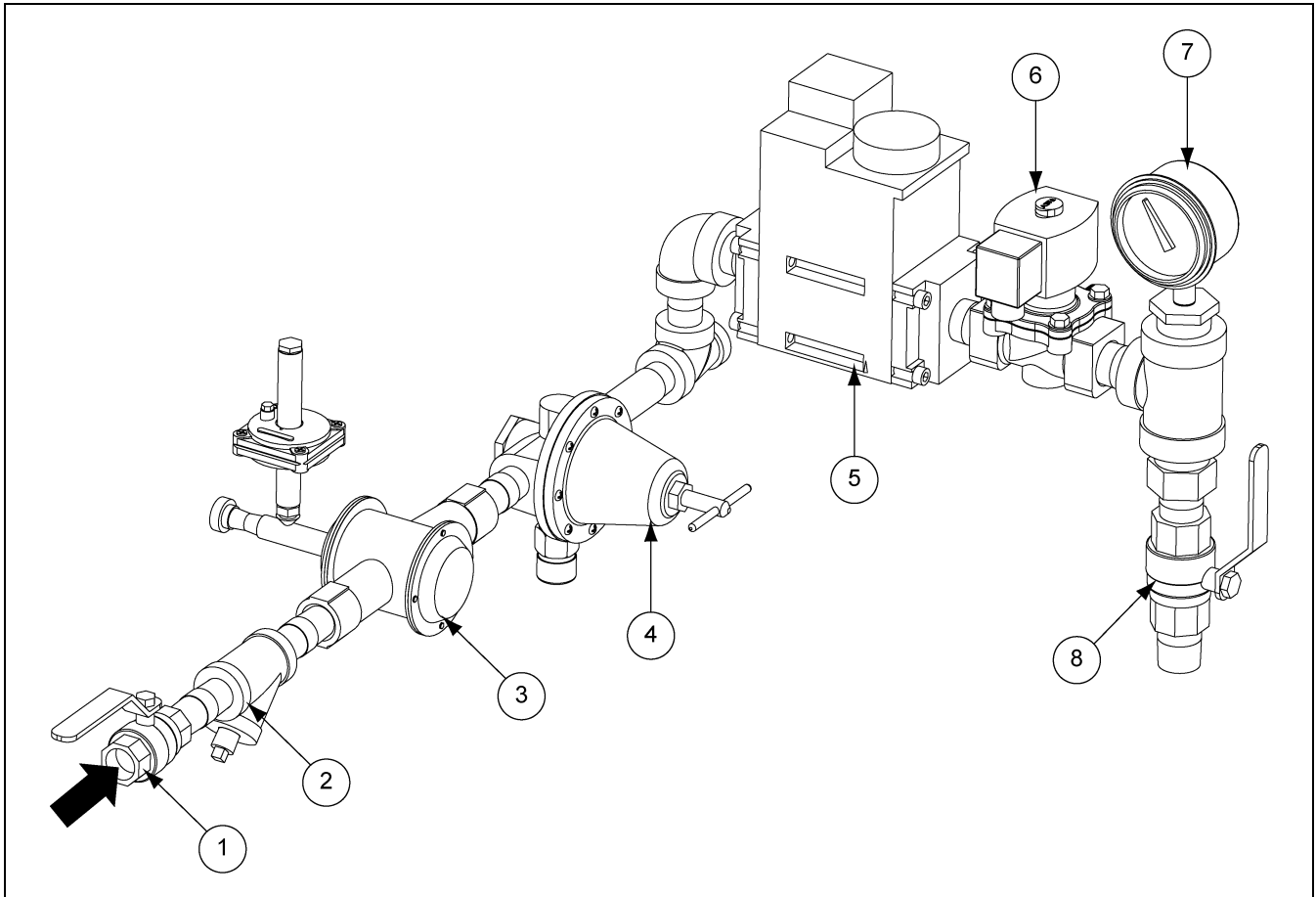


Figure 4AA CE Vapor Fuel Train (High-Low)

Ref #	Description
1	Fuel Connection (Manual Isolation Valve)
2	Strainer
3	Over-Pressure Safety Valve
4	Pressure Regulator
5	Double Safety Solenoid Valve
6	High/Low Cycle Valve
7	Pressure Gauge
8	Test Valve

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

Set Over-Pressure Safety Valve

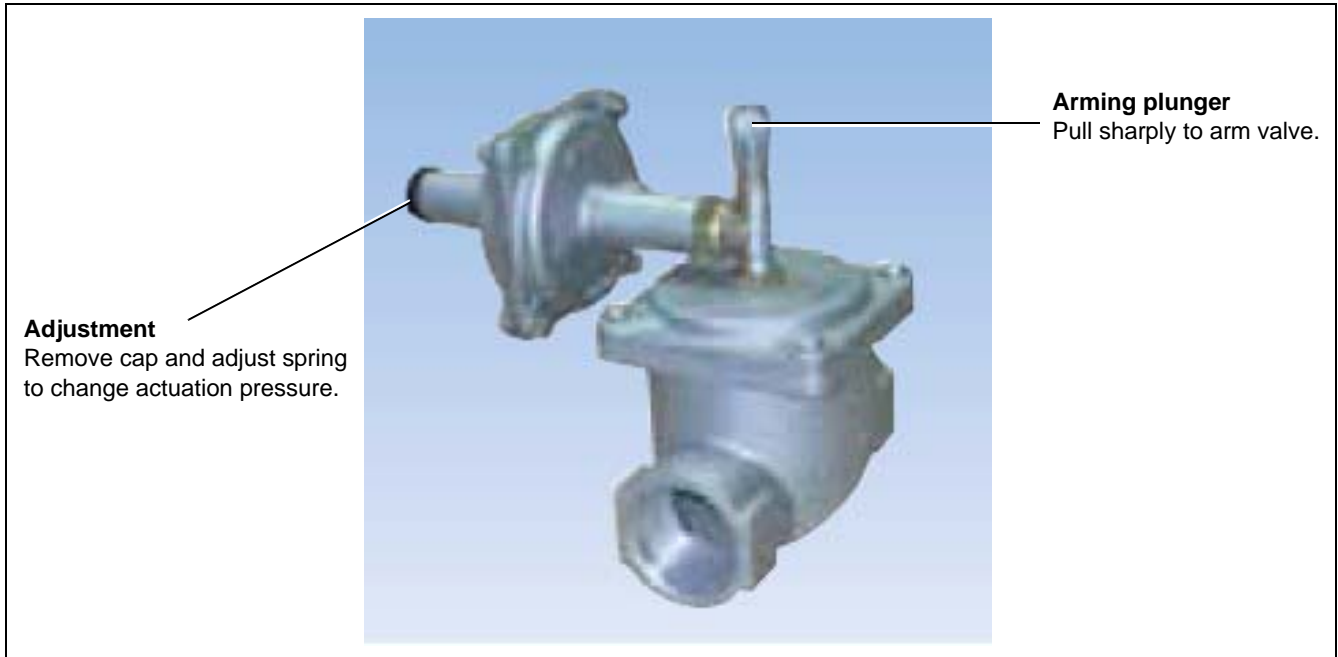


Figure 5A Over Pressure Safety Valve

Setting procedure for 500 mBar max pressure.

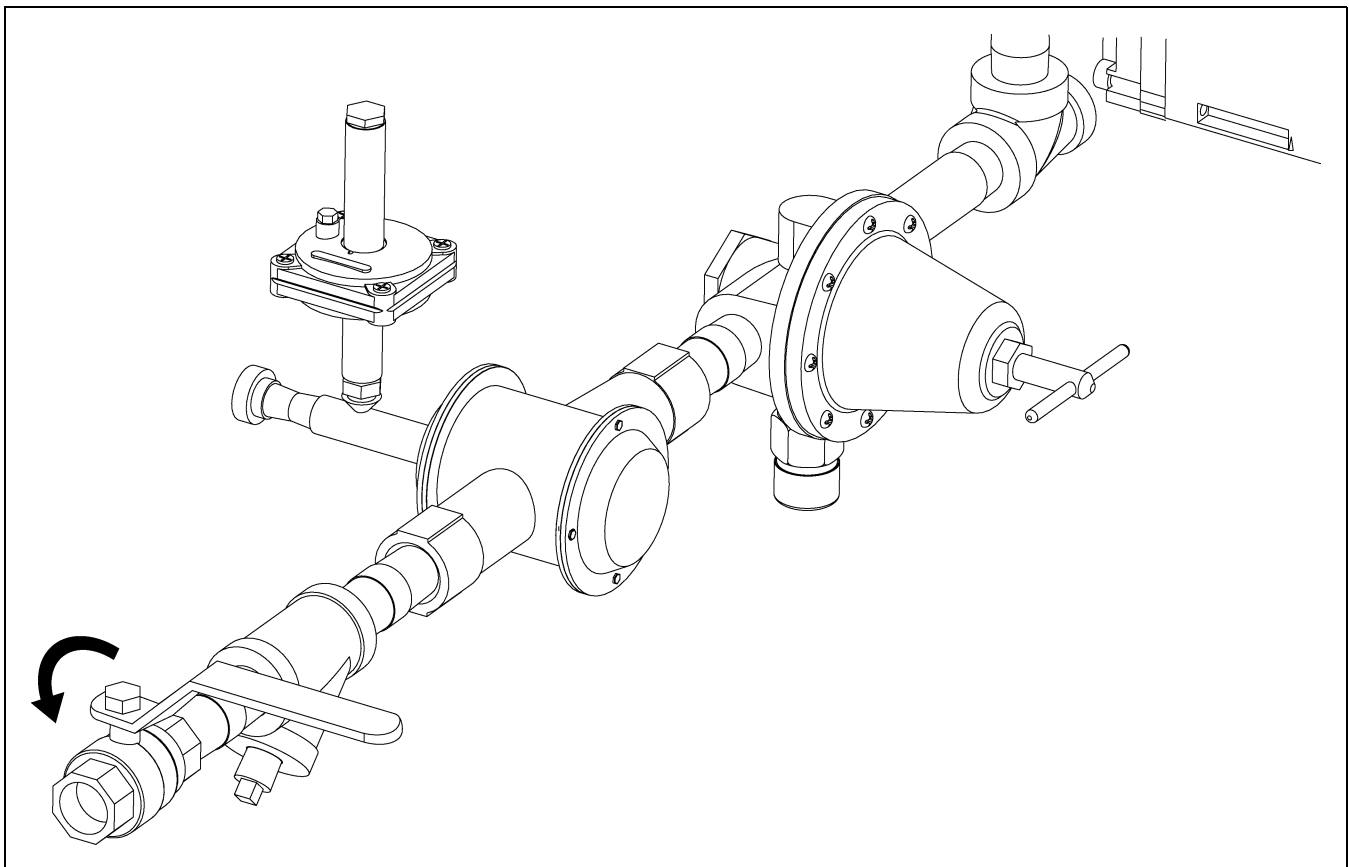


Figure 5B

5. Commissioning Heater

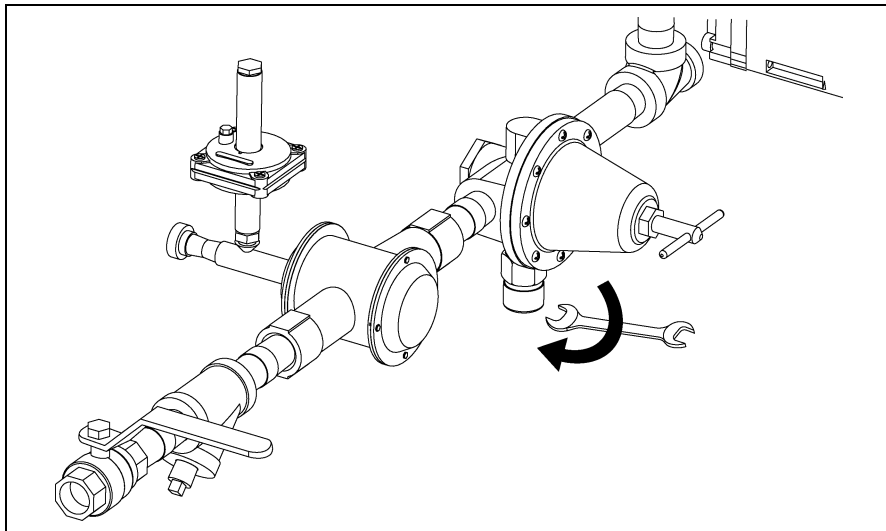


Figure 5C

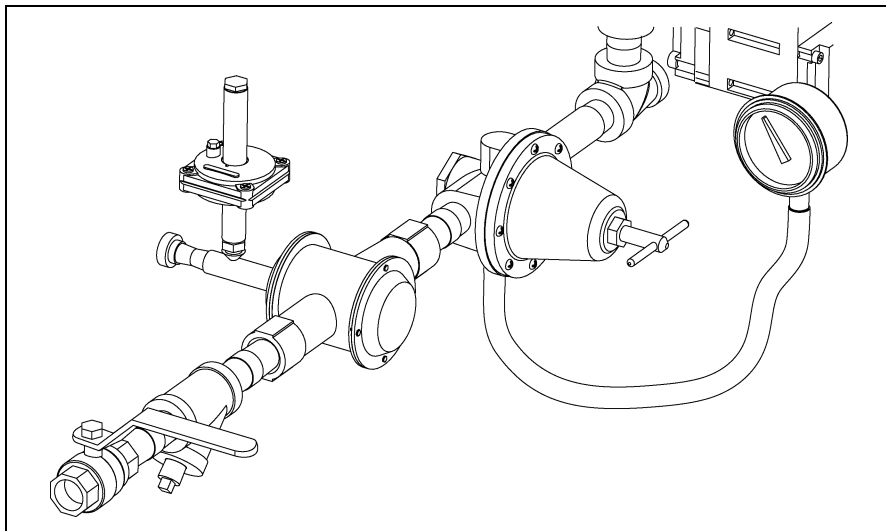


Figure 5D

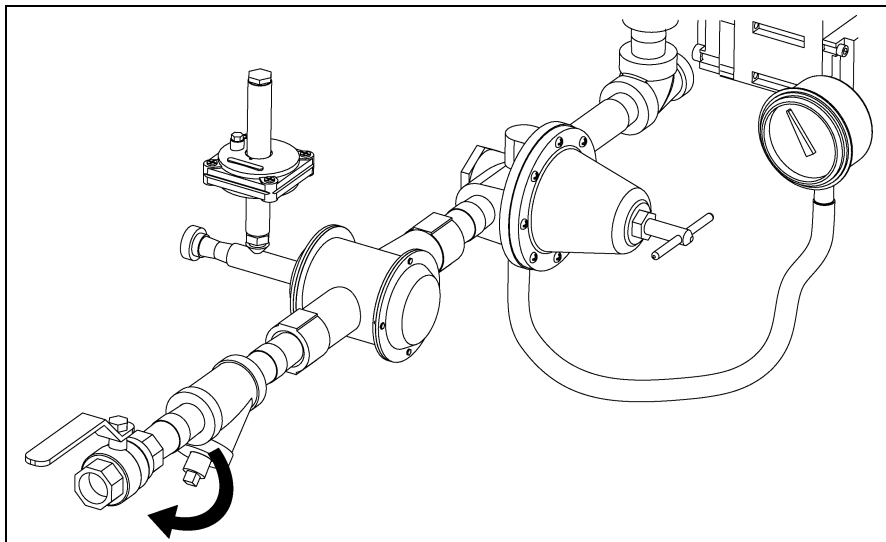


Figure 5E

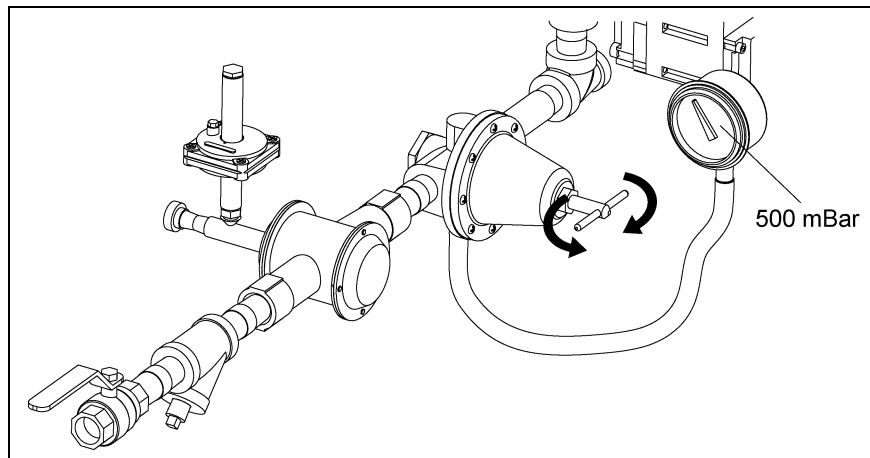


Figure 5F

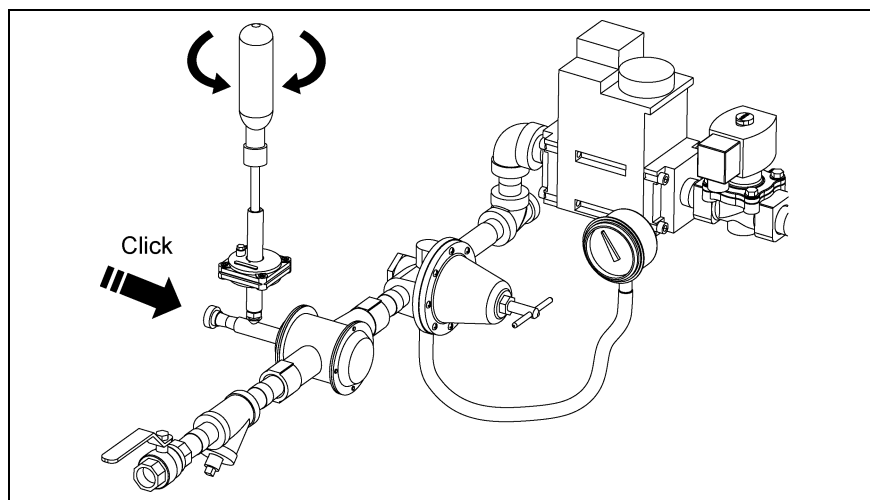


Figure 5G

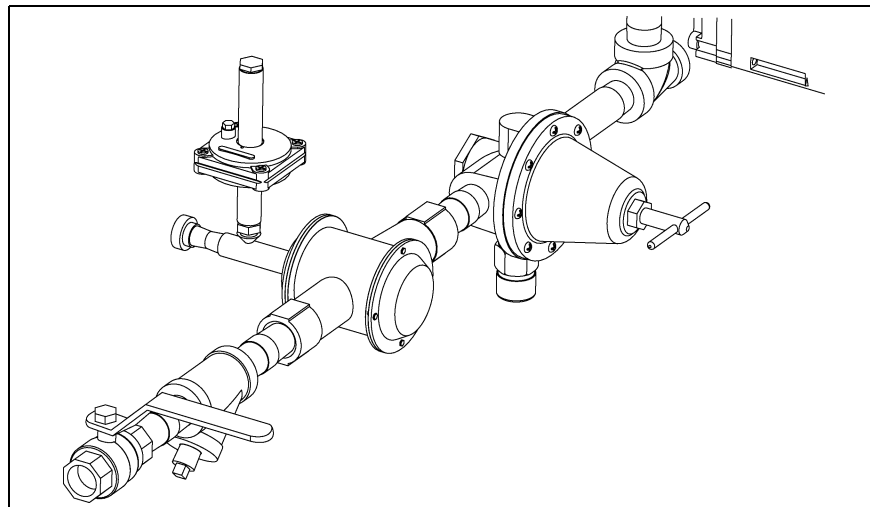


Figure 5H



Check for leaks.

Set Burner High-Fire Pressure

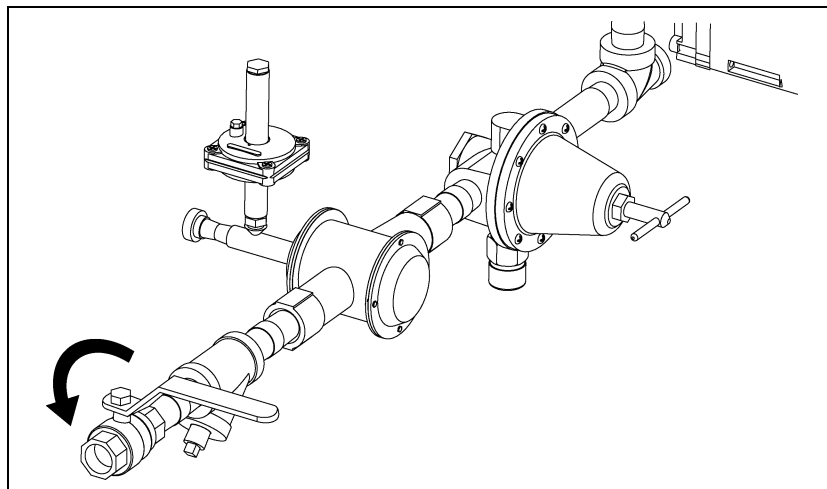


Figure 5I

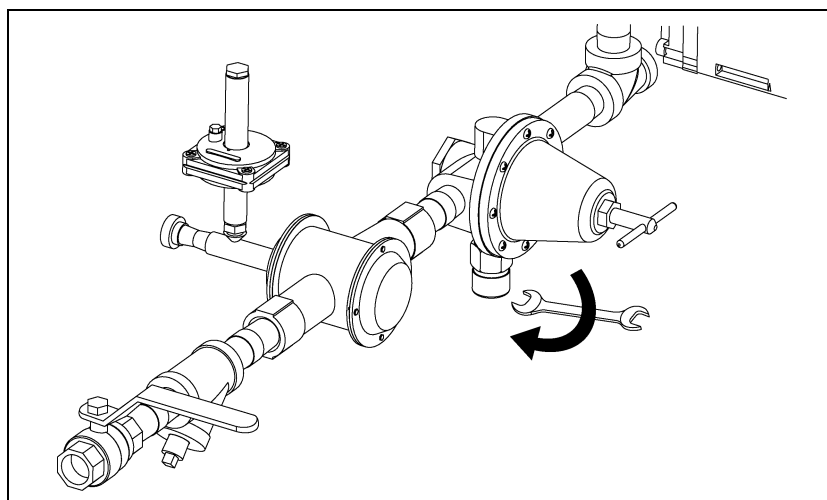


Figure 5J

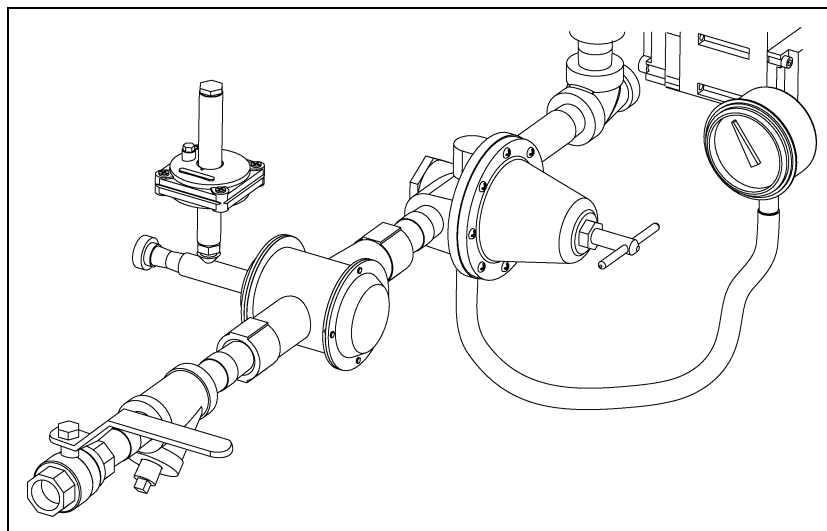


Figure 5K

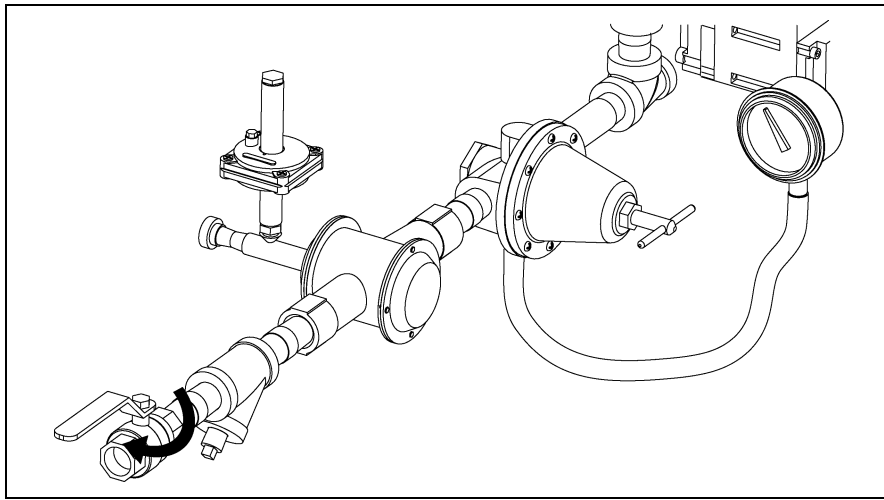


Figure 5L

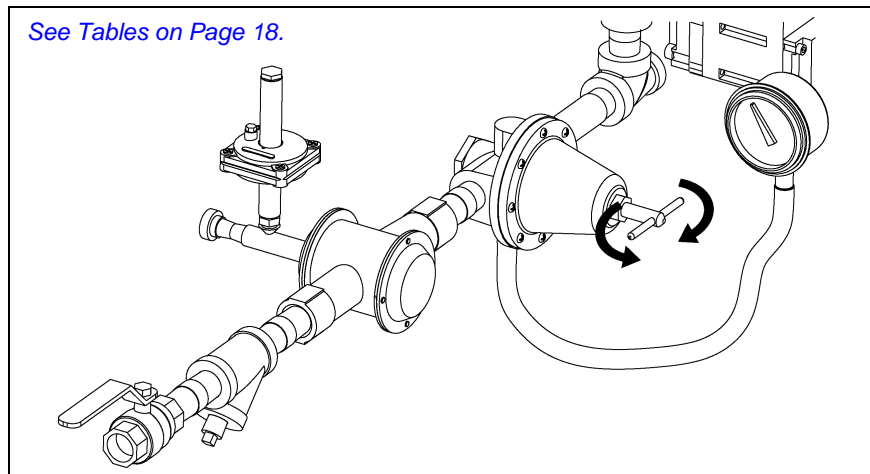


Figure 5M

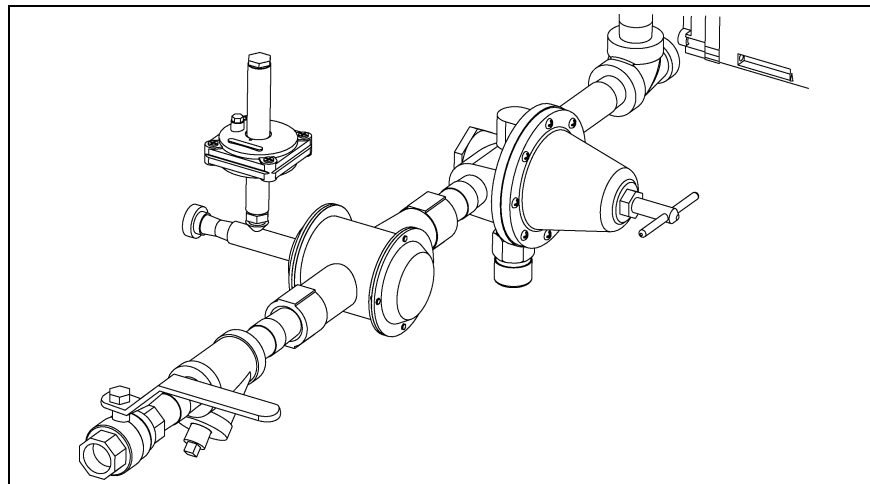


Figure 5N



Check for leaks.

5. Commissioning Heater

Set Air Switch



Figure 50

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.)

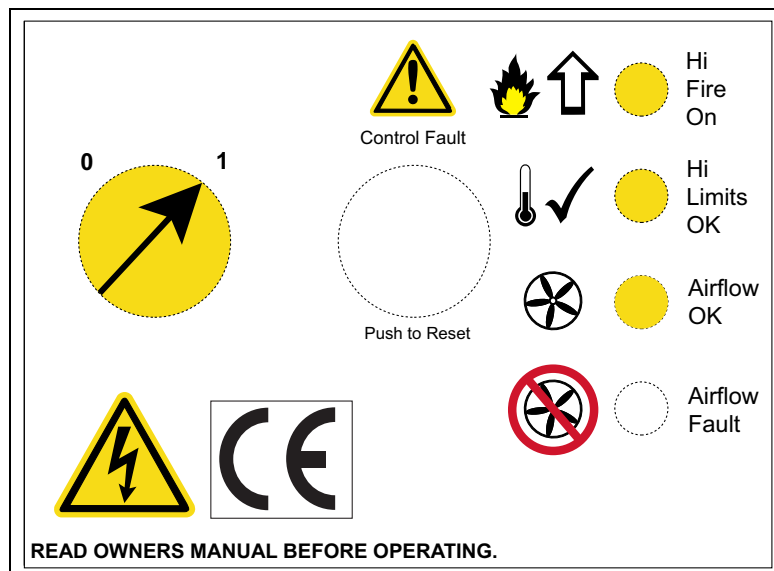


Figure 5P Normal Control Status

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

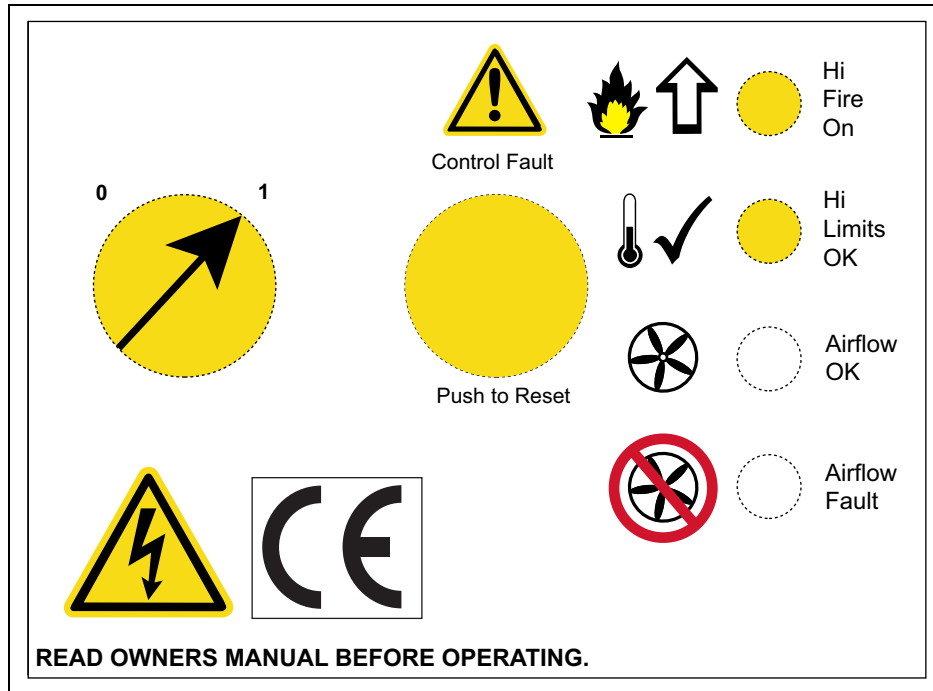


Figure 5Q Burner Lock Out Control Status

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.](#))

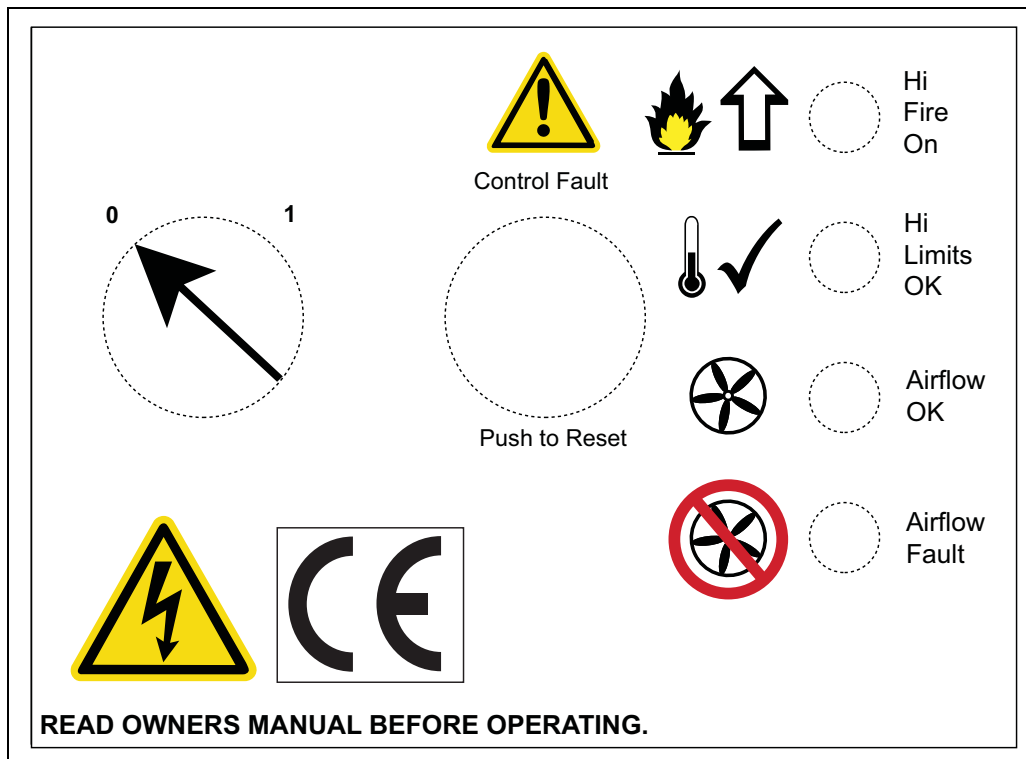


Figure 5R Burner Off Control Status

5. Commissioning Heater

Set Low-Fire Pressure

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

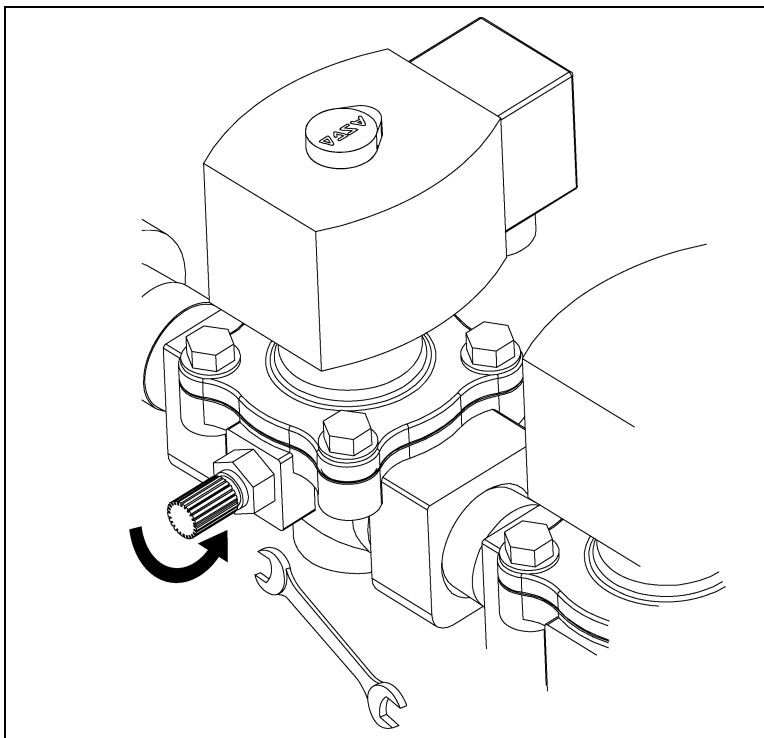


Figure 5S

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

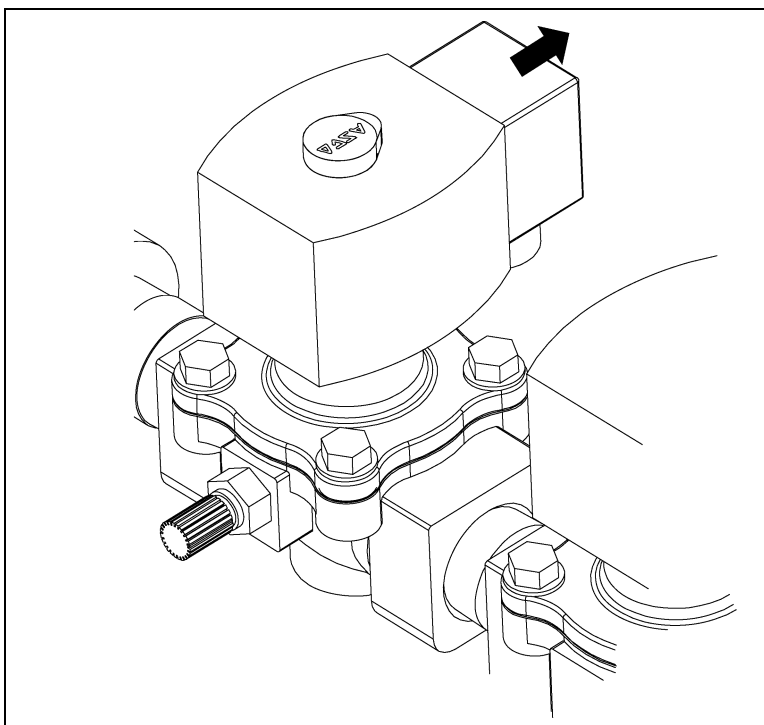


Figure 5T

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

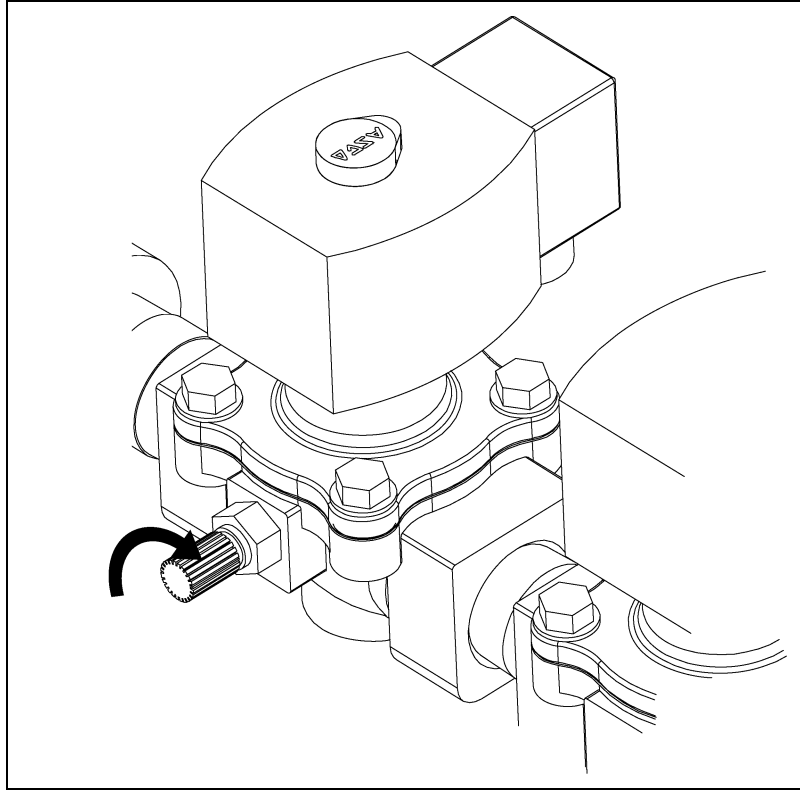


Figure 5U

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

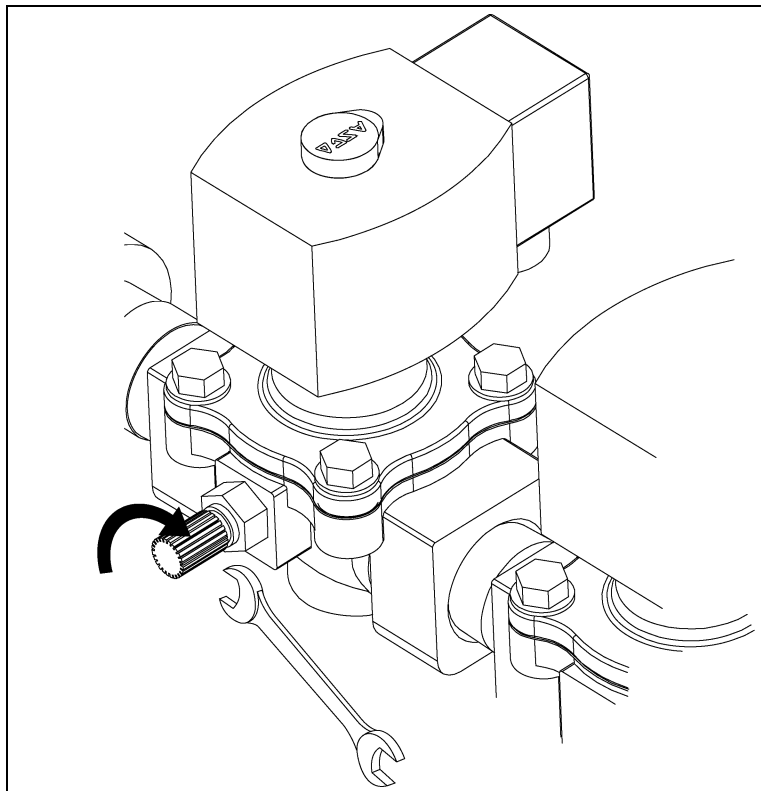


Figure 5V

5. Commissioning Heater

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

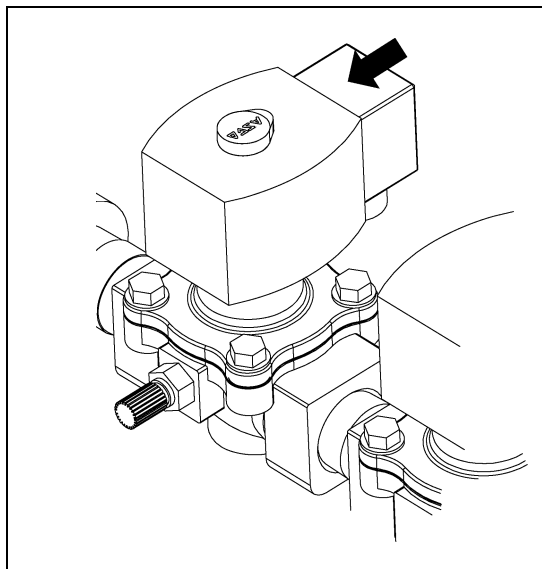


Figure 5W

7. Reduce control temperature to $< 40^{\circ}\text{C}$.

8. Check heater cycles and controls temperature.

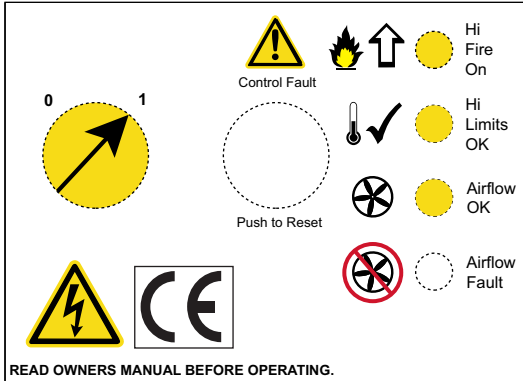
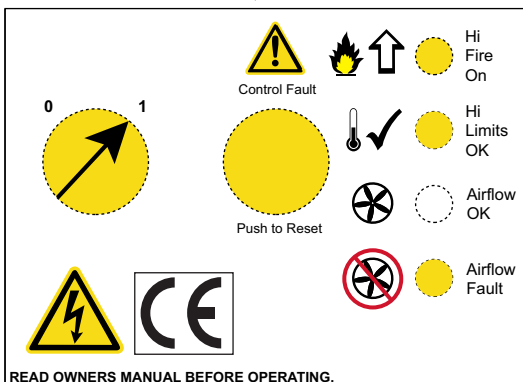
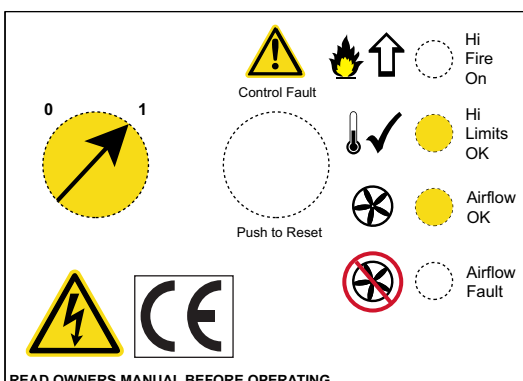
Commissioning Check List

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		

Symptom	Control Status	Remedy
Heater will not light.		<p>No power to control. Check:</p> <ul style="list-style-type: none"> • Control fuse. • Power supply. • Fan starter interlock.
		<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 35.)
		<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 38.)
		<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 40.)

6. Troubleshooting

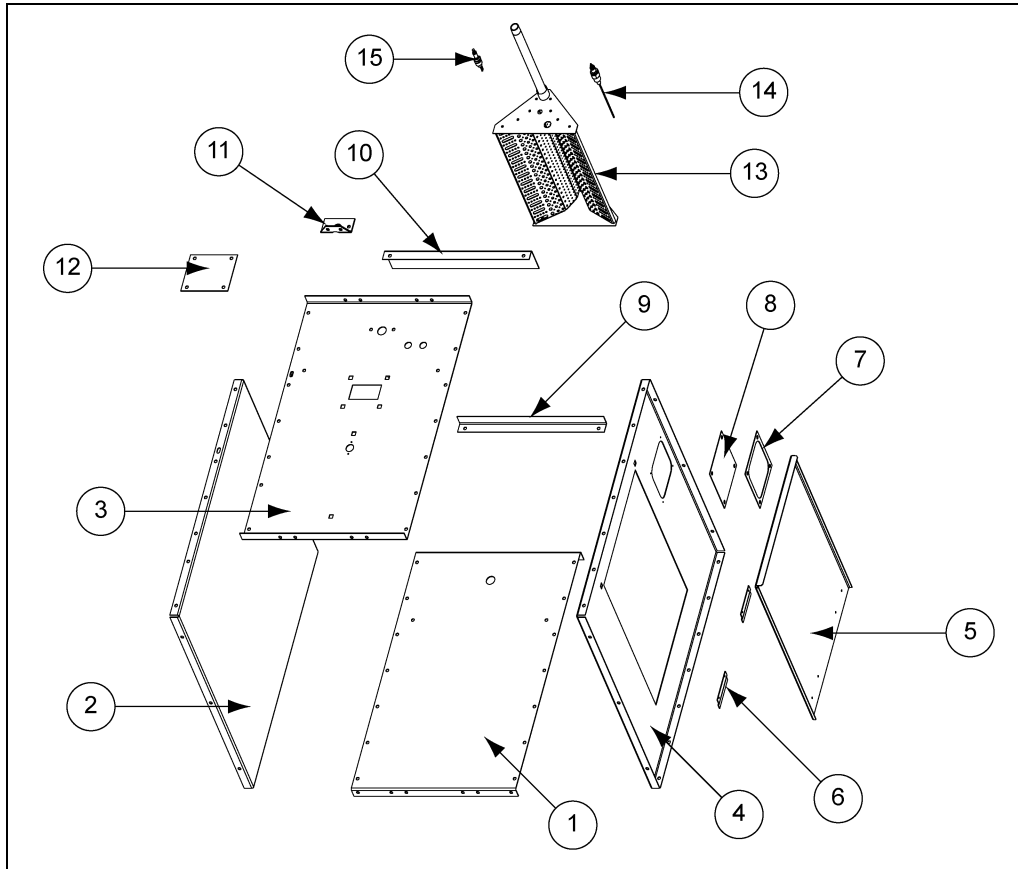
Symptom	Control Status	Remedy
<p>Burner lights and goes out after 4 seconds.</p>	 <p>READ OWNERS MANUAL BEFORE OPERATING.</p>	<p>Flame not sensed. Flame rod fault:</p> <ul style="list-style-type: none"> • Check connections. • Clean flame rod with wire wool. • Adjust flame rod to be fully engulfed in flame.
<p>Gas flows but does not ignite.</p>	 <p>READ OWNERS MANUAL BEFORE OPERATING.</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 lights and goes out after 4 seconds.</p>	 <p>READ OWNERS MANUAL BEFORE OPERATING.</p>	<ul style="list-style-type: none"> • Check low-fire pressure. (See Set Low-Fire Pressure Section on Page 42.) • Adjust flame rod to ensure it is engulfed in low-fire flame.

Symptom	Control Status	Remedy
<p>Burner goes out on high-fire.</p>	<p>The diagram shows a control panel with several indicators. A yellow arrow points from '0' to '1' on a scale. The 'Hi Fire On' indicator (flame icon) is lit. The 'Hi Limits OK' indicator (thermometer icon) is unlit. The 'Airflow OK' indicator (fan icon) is unlit. The 'Airflow Fault' indicator (fan icon with red X) is unlit. The 'Control Fault' indicator (warning triangle) is lit. A 'Push to Reset' button is shown. The diagram includes a warning symbol, a CE mark, and the text 'READ OWNERS MANUAL BEFORE OPERATING.'</p>	<p>Excessive temperature.</p> <ul style="list-style-type: none"> • Check gas pressure. (See Set Burner High-Fire Pressure Section on Page 40.) • Convert to low heat configuration. (See Orifice selection section on Page 19 and Orifice Installation Section on Page 20.)
<p>Other faults.</p>		<ul style="list-style-type: none"> • Contact your dealer or GSI Technical support.

NOTES

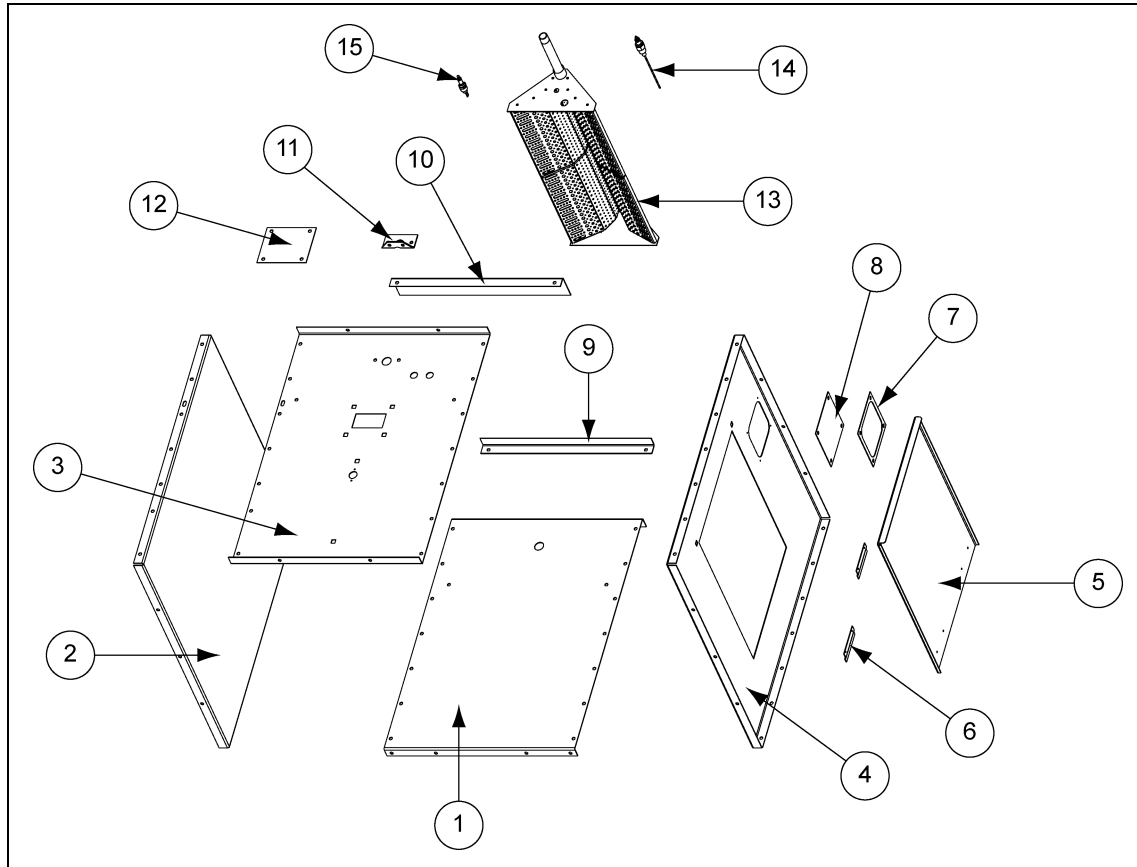
1. Housing Parts (CHE-10 - CHE-15) - [\(See Page 50.\)](#)
2. Housing Parts (CHE-20 - CHE-30) - [\(See Page 51.\)](#)
3. Housing Parts (CHE-40) - [\(See Pages 52-53.\)](#)
4. CE Pipe Train Downwind - High-Low (HF-8185) - [\(See Pages 54-55.\)](#)
5. CE Vapor Pipe Train Downwind Heater (HF-7888) - [\(See Pages 56-57.\)](#)
6. Control Box Sub-Assembly: CE Heater (HF-8367) - [\(See Pages 58-59.\)](#)

Housing Parts (CHE-10 - CHE-15)



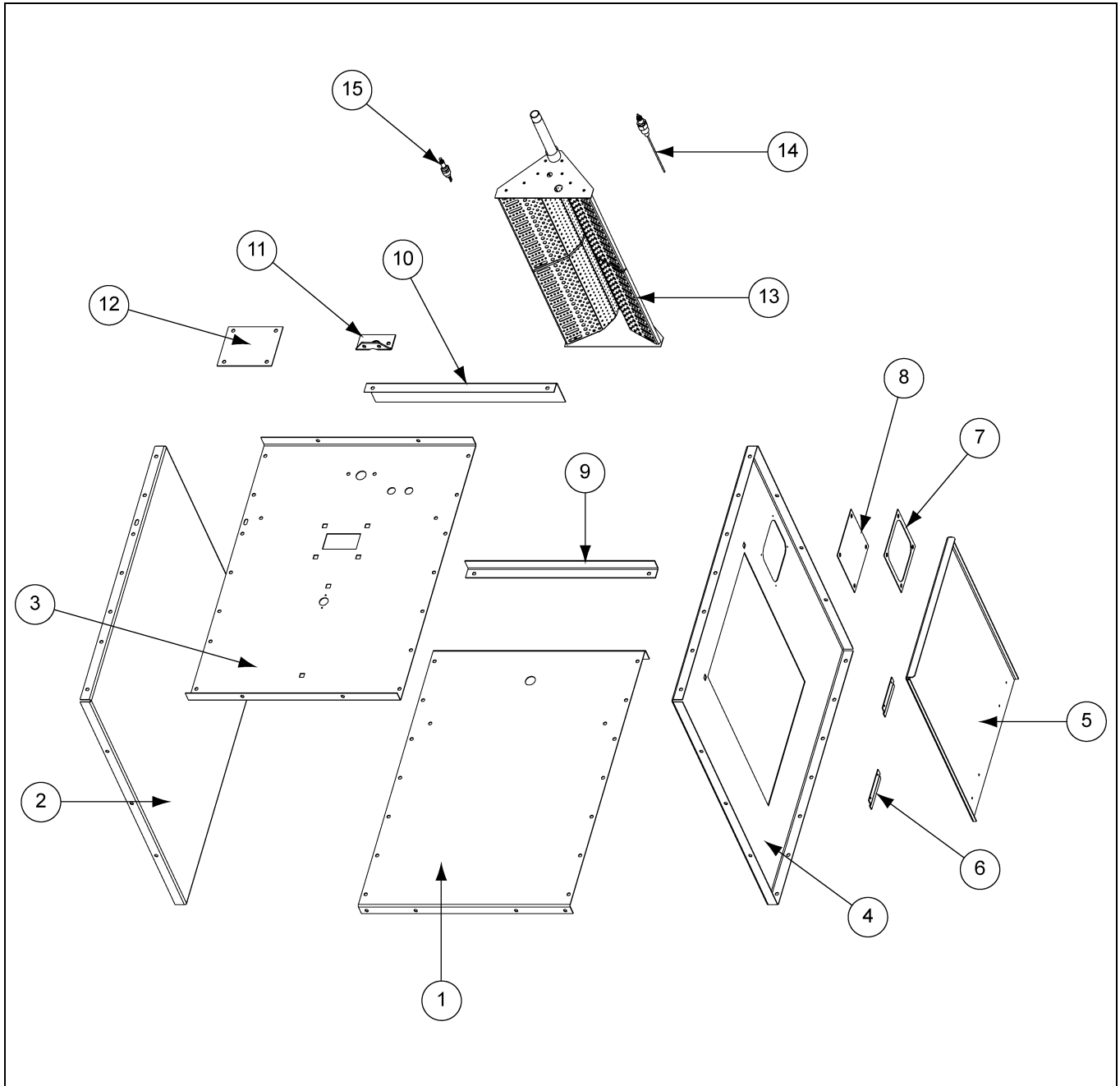
Ref #	Part #	Description
1	HF-7653	DW Housing Bottom: 10-15
2	HF-7654	DW Housing Side: R.H. 10-15
3	HF-7652	DW Housing Top: 10-15
4	HF-7655	DW Housing Side: L.H. 10-15
5	HF-7854	Access Panel DW Heater - Blank
6	HF-7287	Access Panel Bracket - Downwind Heaters
7	HF-7379	Heater Cover Plate 1996<
8	HF-7380	Window Access 0.060" x 6" x 6" Plastic
9	HF-7662	DW Housing Profile Bottom: 10-15
10	HF-7661	DW Housing Profile Top: 10-15
11	401-5369-4	Burner Mounting Bracket - CFDH
12	HF-7796	Cover Plate - DW Vaporizer Hole
13	415-4312-5	Burner Sub-Assembly CFDH27
14	THH-4179	Flame Sensor 6" Long Rod
15	HH-1650	Spark Plug Auburn #1-31

Housing Parts (CHE-20 - CHE-30)



Ref #	Part #	Description
1	HF-7781	DW Housing Bottom: 20-30
2	HF-7783	DW Housing Side: R.H. 20-30/40
3	HF-7780	DW Housing Top: 20-30
4	HF-7784	DW Housing Side: L.H. 20-30/40
5	HF-7854	Access Panel DW Heater - Blank
6	HF-7287	Access Panel Bracket - Downwind Heaters
7	HF-7379	Heater Cover Plate 1996<
8	HF-7380	Window Access 0.060" x 6" x 6" Plastic
9	HF-7786	DW Housing Profile Bottom: 20-30
10	HF-7785	DW Housing Profile Top: 20-30
11	401-5369-4	Burner Mounting Bracket - CFDH
12	HF-7796	Cover Plate - DW Vaporizer Hole
13	415-4434-7	Burner Sub-Assembly CFDH30/33
14	THH-4179	Flame Sensor 6" Long Rod
15	HH-1650	Spark Plug Auburn #I-31

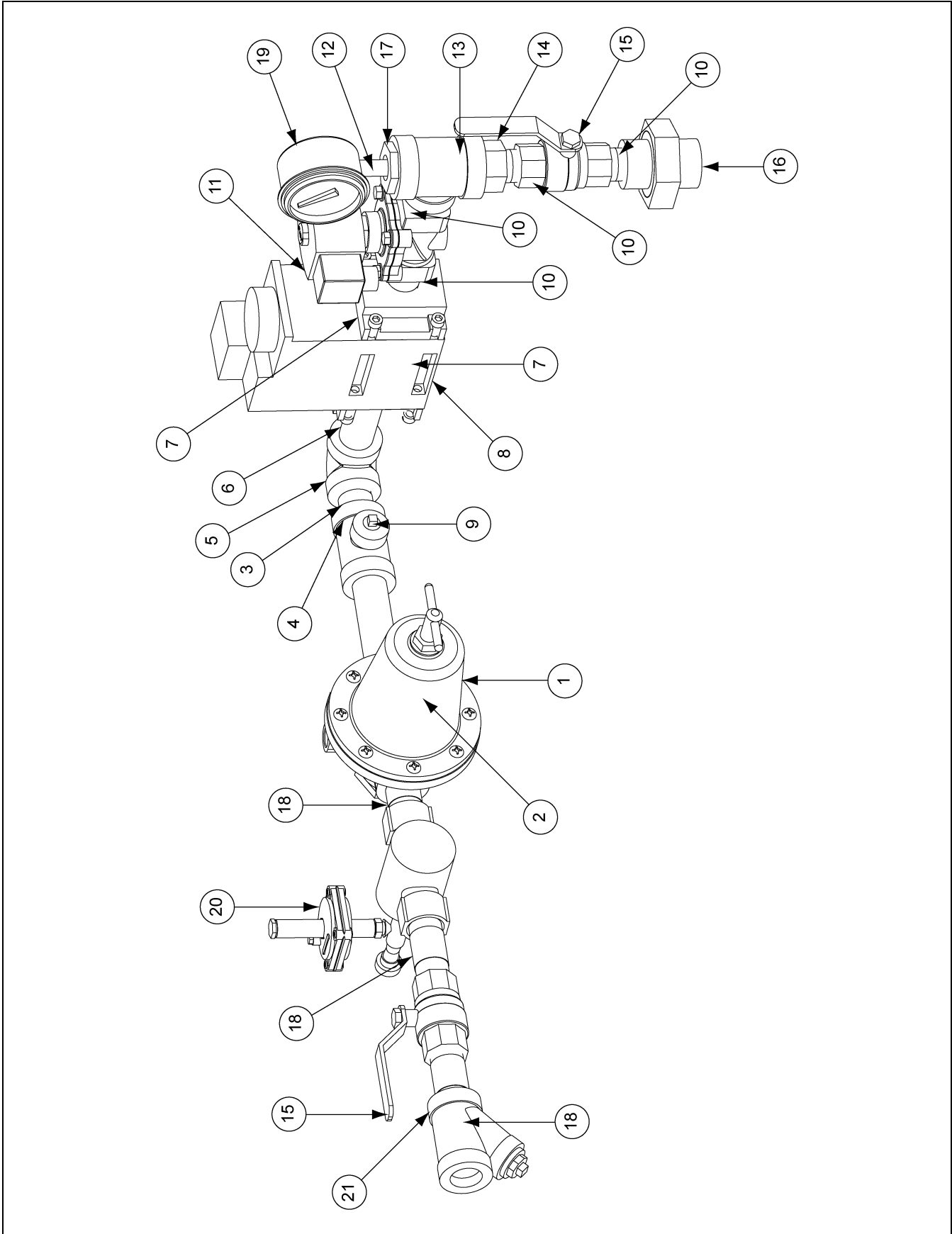
Housing Parts (CHE-40)



Housing Parts (CHE-40) Parts List

Ref #	Part #	Description
1	HF-7803	DW Housing Bottom: 40
2	HF-7783	DW Housing Side: R.H. 20-30/40
3	HF-7802	DW Housing Top: 40
4	HF-7784	DW Housing Side: L.H. 20-30/40
5	HF-7854	Access Panel DW Heater - Blank
6	HF-7287	Access Panel Bracket - Downwind Heaters
7	HF-7379	Heater Cover Plate 1996<
8	HF-7380	Window Access 0.060" x 6" x 6" Plastic
9	HF-7805	DW Housing Profile Bottom: 40
10	HF-7804	DW Housing Profile Top: 40
11	401-5369-4	Burner Mounting Bracket - CFDH
12	HF-7796	Cover Plate - DW Vaporizer Hole
13	415-4434-7	Burner Sub-Assembly CFDH30/33
14	THH-4179	Flame Sensor 6" Long Rod
15	HH-1650	Spark Plug Auburn #I-31

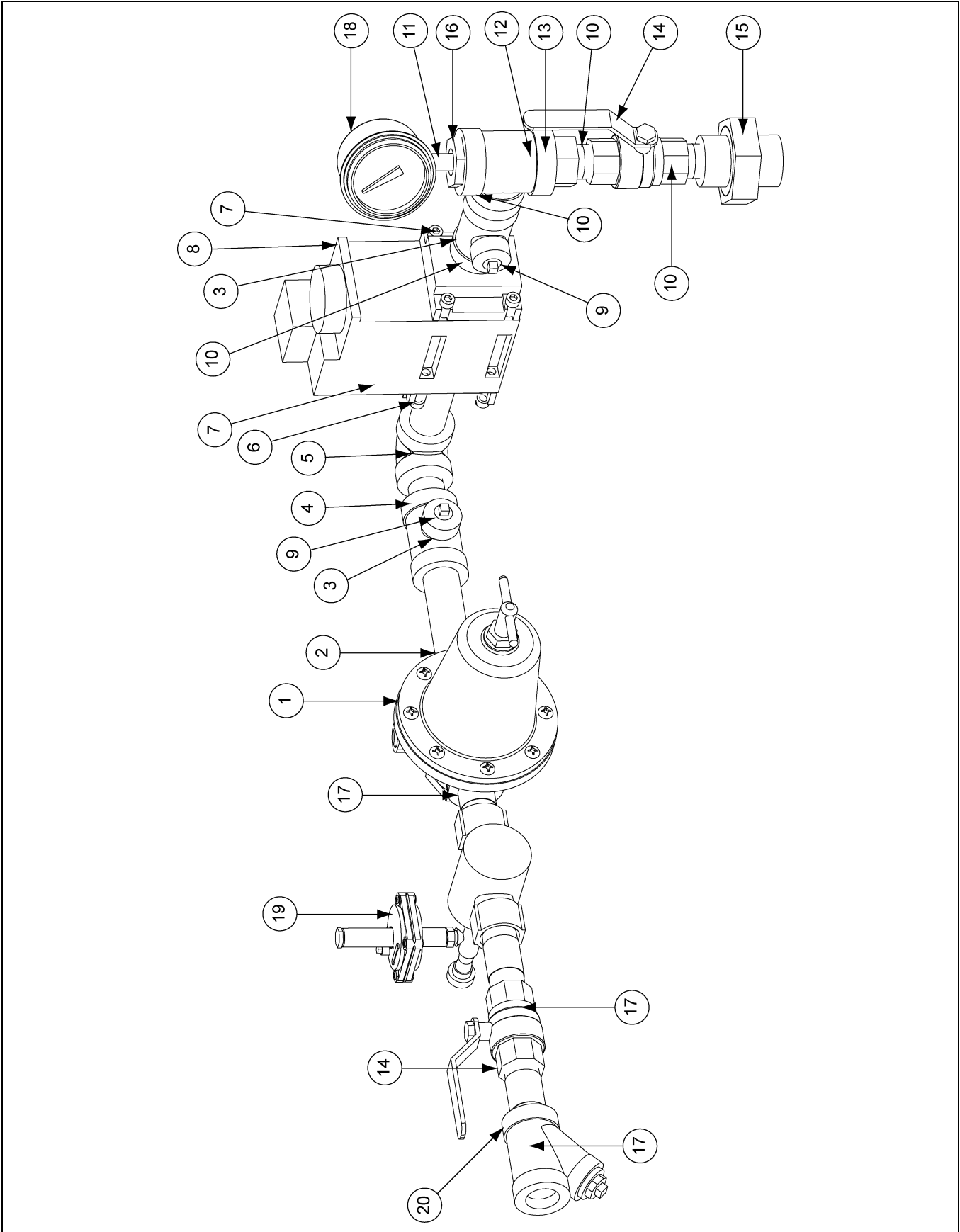
CE Pipe Train Downwind - High-Low (HF-8185)



CE Pipe Train Downwind - High-Low (HF-8185) Parts List

Ref #	Part #	Description
1	TFC-0020	Regulator, LP, 3/4" NPT, 30 PSI
2	HH-7101	Nipple, 3/4" x 6" SCH 40 Black
3	THH-4154	Tee, 3/4" x 3/4" x 1/4" SCH 40 Black
4	THH-4125	Nipple, 3/4" x 2" SCH 40 Black
5	THH-4120	Elbow, 3/4"-90° SCH 40 Black
6	D08-0018	Nipple, 3/4 x 4" SCH 40 Black
7	HF-7885	Flange, 3/4" NPT/DMV 701 VLV
8	HF-8081	Valve, Solenoid 3/4" 240V CE Class A EN161
9	007-1747-0	Plug, Pipe 1/4"
10	THH-4121	Nipple, 3/4" Close SCH 40 Black
11	HF-8083	Valve, Solenoid 3/4" 240V Bypass with Din Connector
12	D08-0017	Tee, 1" x 1" x 3/4" SCH 40 Black
13	406-2433-0	Orifice Plug 1/2" NPT x 0.313"
14	HF-7920	Orifice Holder Heater - 1/2"
15	D58-0002	Valve, 3/4" NPT Ball Shutoff Brass
16	707-1175-9	Union, 3/4" SCH 40 Black
17	THH-4005	Reducer Bushing 1" x 1/2" Hex SCH 40
18	HH-7102	Nipple, 3/4" x 2-3/4" SCH 40 Black
19	TF-1894	Gauge, Pressure 0-1.6 Bar Kroms
20	OPSO_1_INCH	
21	D67-0008	Strainer, 3/4" Y 250# WOG SCH 80 Black, with Plug

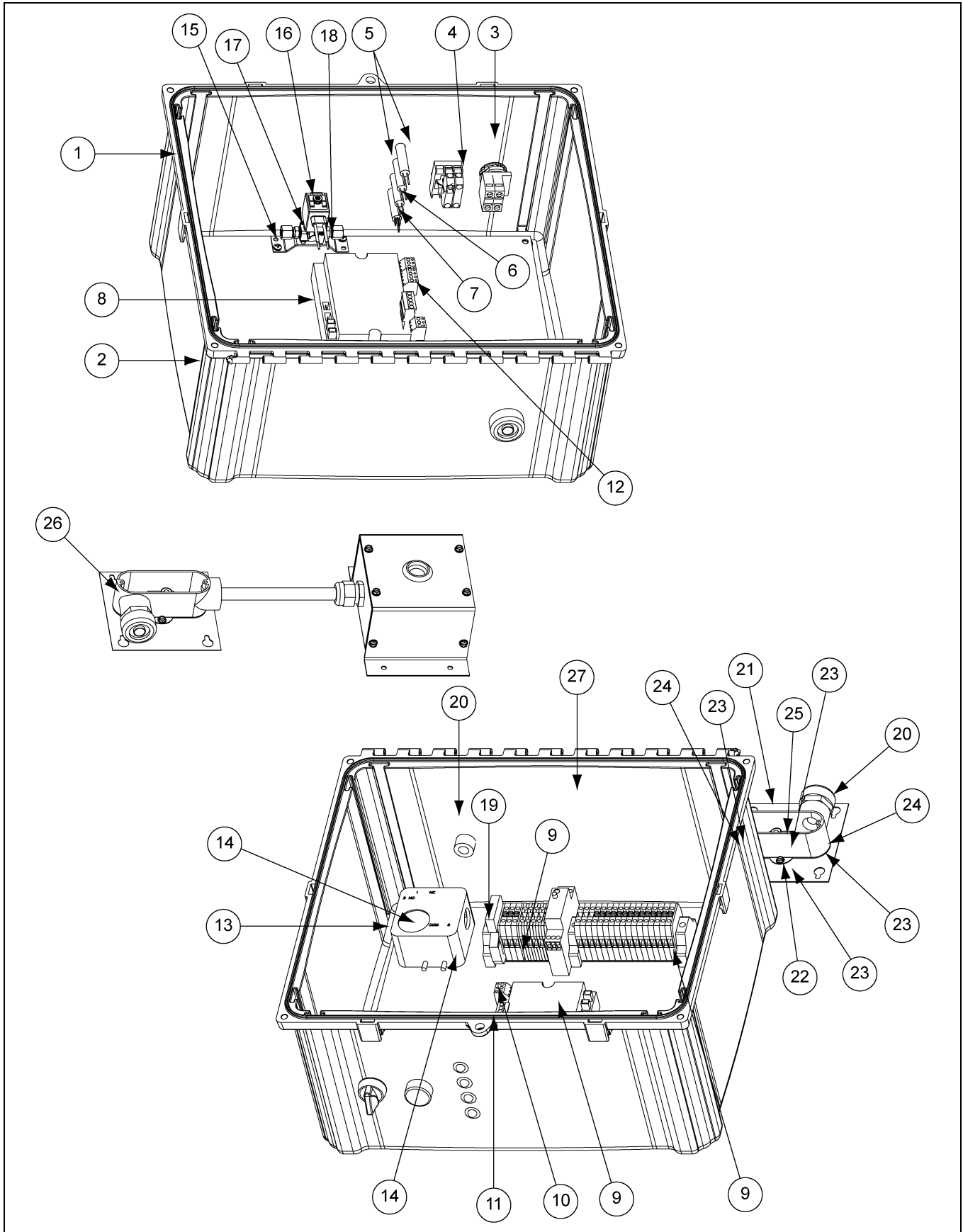
CE Vapor Pipe Train Downwind Heater (HF-7888)



CE Vapor Pipe Train Downwind Heater (HF-7888) Parts List

Ref #	Part #	Description
1	TFC-0020	Regulator, LP, 3/4" NPT, 30 PSI
2	HH-7101	Nipple, 3/4" x 6" SCH 40 Black
3	THH-4154	Tee, 3/4" x 3/4" x 1/4" SCH 40 Black
4	THH-4125	Nipple, 3/4" x 2" SCH 40 Black
5	THH-4120	Elbow, 3/4"-90° SCH 40 Black
6	D08-0018	Nipple, 3/4" x 4" SCH 40 Black
7	HF-7885	Flange, 3/4" NPT/DMV 701 VLV
8	HF-8081	Valve, Solenoid 3/4" 240V CE Class A EN161
9	007-1747-0	Plug, Pipe 1/4"
10	THH-4121	Nipple, 3/4" Close SCH 40 Black
11	D08-0017	Tee, 1" x 1" x 3/4" SCH 40 Black
12	406-2433-0	Orifice Plug 1/2" NPT x 0.313"
13	HF-7920	Orifice Holder Heater - 1/2"
14	D58-0002	Valve, 3/4" NPT Ball Shutoff Brass
15	707-1175-9	Union, 3/4" SCH 40 Black
16	THH-4005	Reducer Bushing 1" x 1/2" Hex SCH 40
17	HH-7102	Nipple, 3/4" x 2-3/4" SCH 40 Black
18	TF-1894	Gauge, Pressure 0-1.6 Bar Kroms
19	OPSO_1_INCH	
20	D67-0008	Strainer, 3/4" Y 250# WOG SCH 80 Black, with Plug

Control Box Sub-Assembly: CE Heater (HF-8367)



Contorl Box Sub-Assembly: CE Heater (HF-8367) Parts List

Ref #	Part #	Description
1	HF-8366	Control Enclosure, CE Heater C-8706
2	HF-8365	Backing Plate, CE Heater C-8706
3	HF-8129	Switch, 2 Pos Selector Assembly: Lighted Clear with Yellow 250 VAC LED
4	HF-8161	Switch, P.B. Assembly: Red Flush Metal with Red 250 VAC LED
5	HF-8130	Lamp, Indicator Green 250V 3/8 with 6" Leads
6	HF-8131	Lamp, Indicator Amber 250V 3/8 with 6" Leads
7	HF-7731	Lamp, Indicator Red 250V 3/8
8	HF-7902	Burner Control, Pactrol 230 VAC 50 Hz
9	090-1705-4	Screw, MS #8-32 x 3/8" Phillips Phsems
10	D03-0188	Plug, 3 Pin for D03-0122
11	E240-1154	Connector, 5 Pin 0.200 PCB Plug
12	E240-1148	Connector, 4 Pin 0.200 PCB Plug
13	056-2245-1	Switch, Air Pressure AA-A2-4-3
14	S-6557	Screw, TCSF #8-32 x 3/4" PHP ZN
15	HF-8166	Bracket, Air Proving Solenoid Mounting - CE Heater
16	HF-8125	Valve, Solenoid 3 Way 230 VAC 50/60 Hz Brass 1/8" NPT Universal
17	S-9474	Screw, MS M3 x 12-1/2 mm PHP ZN
18	HF-7469	Fitting, 1/4" Comp - 1/8" NPT
19	HF-8174	Din Rail Assembly - CE Heater
20	FH-7049	Adapter, Connector PVC 3/8" STR with Nut
21	D01-1473	Housing High-Limit Plate
22	THH-4020	Switch, High-Limit 200°
23	S-8472	Screw, TCSF #8-32 x 3/8" HWHS ZN
24	S-6550	Flat Washer #8 SAE ZN Grade S
25	TFC-0076	Seal, Neoprene Conduit Body
26	THH-4064	Conduit, Unilet Type LRL Conduit box 1/2"
27	HF-7200	250° Bin High-Limit Assembly

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	
Cumberland Feeding/Watering Systems	Feeder System Pan Assemblies	5 Years **	** Warranty prorated from list price: 0 to 3 years - no cost to end-user 3 to 5 years - end-user pays 50%
	Feed Tubes (1-3/4" and 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 and Tower Dryers	2 Years	† Motors, burner components and moving parts not included. Portable dryer screens included. Tower dryer screens not included.
	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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