

CE Compliant VHE Upwind Heater (July 2019 Onwards) Installation and Operation

Models:

VHE-18 and VHE-24

Owner's Manual - Original Instructions

PNEG-012ECX

Version: 1.0

Date: 08-20-19



PNEG-012ECX

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

VHE Upwind Heaters

Models

VHE-24-LN

VHE-18-LN

Heaters are vapor fuel only, using LPG or Natural Gas, with gross calorific values as stated in tables [on Page 21](#) of this manual.

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

- EN746-2:2010
- EN60204:2006

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:

Name:

Position:

Date:

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Safety Guidelines

Safety guidelines are general-to-specific safety rules that must be followed at all times. This manual is written to help you understand safe operating procedures and problems that can be encountered by the operator and other personnel when using this equipment. Read and save these instructions.

As owner or operator, you are responsible for understanding the requirements, hazards, and precautions that exist and to inform others as required. Unqualified persons must stay out of the work area at all times.

Alterations must not be made to the equipment. Alterations can produce dangerous situations resulting in **SERIOUS INJURY** or **DEATH**.

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

When necessary, you must consider the installation location relative to electrical, fuel and water utilities.

Personnel operating or working around equipment must read this manual. This manual must be delivered with equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

ST-0001-4

Cautionary Symbols Definitions

Cautionary symbols appear in this manual and on product decals. The symbols alert the user of potential safety hazards, prohibited activities and mandatory actions. To help you recognize this information, we use the symbols that are defined below.



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, **can result in serious injury or death.**



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



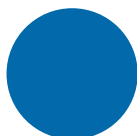
This symbol is used to address practices not related to personal injury.



This symbol indicates a general hazard.



This symbol indicates a prohibited activity.



This symbol indicates a mandatory action.

ST-0005-2

Safety Cautions

Use Personal Protective Equipment

- Use appropriate personal protective equipment:

Eye Protection



Respiratory Protection



Foot Protection



Hearing Protection



Head Protection



Fall Protection



Hand Protection



- Wear clothing appropriate to the job.
- Remove all jewelry.
- Tie long hair up and back.

ST-0004-1

Follow Safety Instructions

- **Warning:** If the information in the manual is not followed exactly, a fire or explosion can result, causing property damage, personal injury or loss of life.
- 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.
- If you do not understand any part of this manual or need assistance, contact your dealer.
- Retain these instructions for future reference.



ST-0025-3

For Your Safety

- If you smell gas:
 1. Do not try to light any appliance.
 2. Extinguish any open flames.
 3. Do not touch any electrical switch.
 4. Immediately call your gas supplier. Follow the gas supplier's instructions.
 5. If you cannot reach your gas supplier, call the fire department.
- The use and storage of gasoline and other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.
- Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment. Installation and service must be performed by a qualified installer, service agency or the gas supplier.



ST-0024-1

Maintain Equipment and Work Area

- Understand service procedures before doing work.
- Keep area clean and dry.
- Do not service equipment while it is operating. Disconnect and lock-out power and fuel supply before entering equipment or before performing maintenance.
- Keep your equipment in proper working condition. Replace worn or broken parts immediately.
- Depressurize the fuel train before disassembling for service.
- Allow the fan to operate for 20 minutes with the burner off to purge products of combustion and to cool the components before entering.
- Check regularly for any developing gas plumbing leaks. Do not operate the dryer if any gas leak is detected. Shut down and repair before further operation.



ST-0030-2

1. Safety

Handle and Use Equipment Properly

- Equipment is intended for the use of grain drying only. Any other use is a misuse of this equipment.
- The operating instructions in this manual pertain to the common cereal grains as indicated. When drying any other grain, contact GSI for additional recommendations.
- On LP fired units, set pressure regulator to avoid excessive gas pressure applied to the burner during ignition and operation. Do not exceed maximum recommended drying temperatures.
- Equipment has sharp edges that can cause serious injury. To avoid injury, handle sharp edges with caution and use proper protective clothing and equipment at all times.
- All guards must be in place before and during operation. Images of guards removed in this manual are for illustration purposes only.
- Use caution when working around high-speed fans, gas burners, augers and auxiliary conveyors which can start automatically.
- Keep hands, feet and clothing away from moving parts.
- Do not bypass any safety device or interlock.
- Do not enter the dryer or bin while it is operating.
- Do not operate in an area where combustible material will be drawn into the dryer.



ST-0029-2

Install and Operate Electrical Equipment Properly

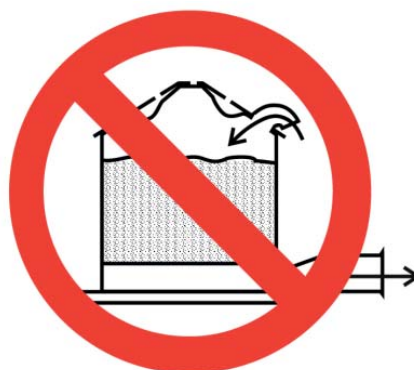
- Electrical controls must be installed by a qualified electrician and must meet the standards set by the National Electric Code, Canadian Electrical Code, and all local and state codes.
- Lock-out power source before making adjustments, cleaning, or maintaining equipment.
- Heater must be interlocked with an appropriately sized fan and a thermostat must be installed for safe operation.



ST-0026-2

Prevent Roof Damage Due to Vacuum Pressure

- Roof damage can result from excessive vacuum or internal pressure from fans or other air moving systems. The manufacturer does not warrant this type of roof damage.
- Adequate ventilation or “makeup air” devices must be provided for all powered air handling systems.
- The manufacturer does not recommend the use of downward flow systems (suction).
- Severe roof damage can result from any blockage of air passages.
- Operating fans during high humidity or cold weather conditions can cause air exhaust or intake ports to freeze.



ST-0028-2

Exercise Caution When Drying Flammable Grains

- Be aware that some grains are highly flammable including but not limited to rapeseed, canola, linseed, sunflower and milo.
- All grain and seed must be whole (minimal cracking or crushing), clean and dust free before drying.
- Avoid dust and chaff from being drawn into the fan and heater.
- To reduce risk of fire, keep the fan, heater, drying plenum and ducts clean at all times.
- In the event of a fire (or suspected fire):
 1. Shut down the entire dryer.
 2. Turn off the fuel at the tank or supply valve.
 3. Shut off and lock electrical power.
 4. Evacuate the area.
 5. Call the fire department.



ST-0032-1

Correct Use



The heater shall be used ONLY.

1. When coupled to a drying fan of similar diameter, delivering airflow in the range stated in Heater Dimension tables on [Page 21](#) 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, (example) 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.

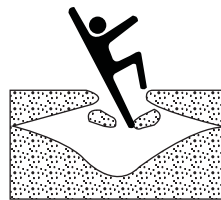
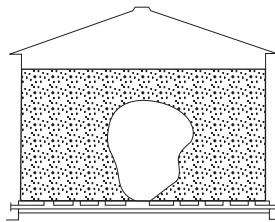
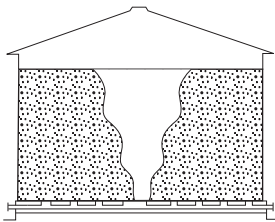
Hazards present at any time may include:



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.

The safety decals on your equipment are safety indicators which must be carefully read and understood by all personnel involved in the installation, operation, service and maintenance of the equipment.

To replace a damaged or missing decal, contact us to receive a free replacement.

GSI Decals

1004 E. Illinois St.
Assumption, IL. 62510
Phone: 1-217-226-4421

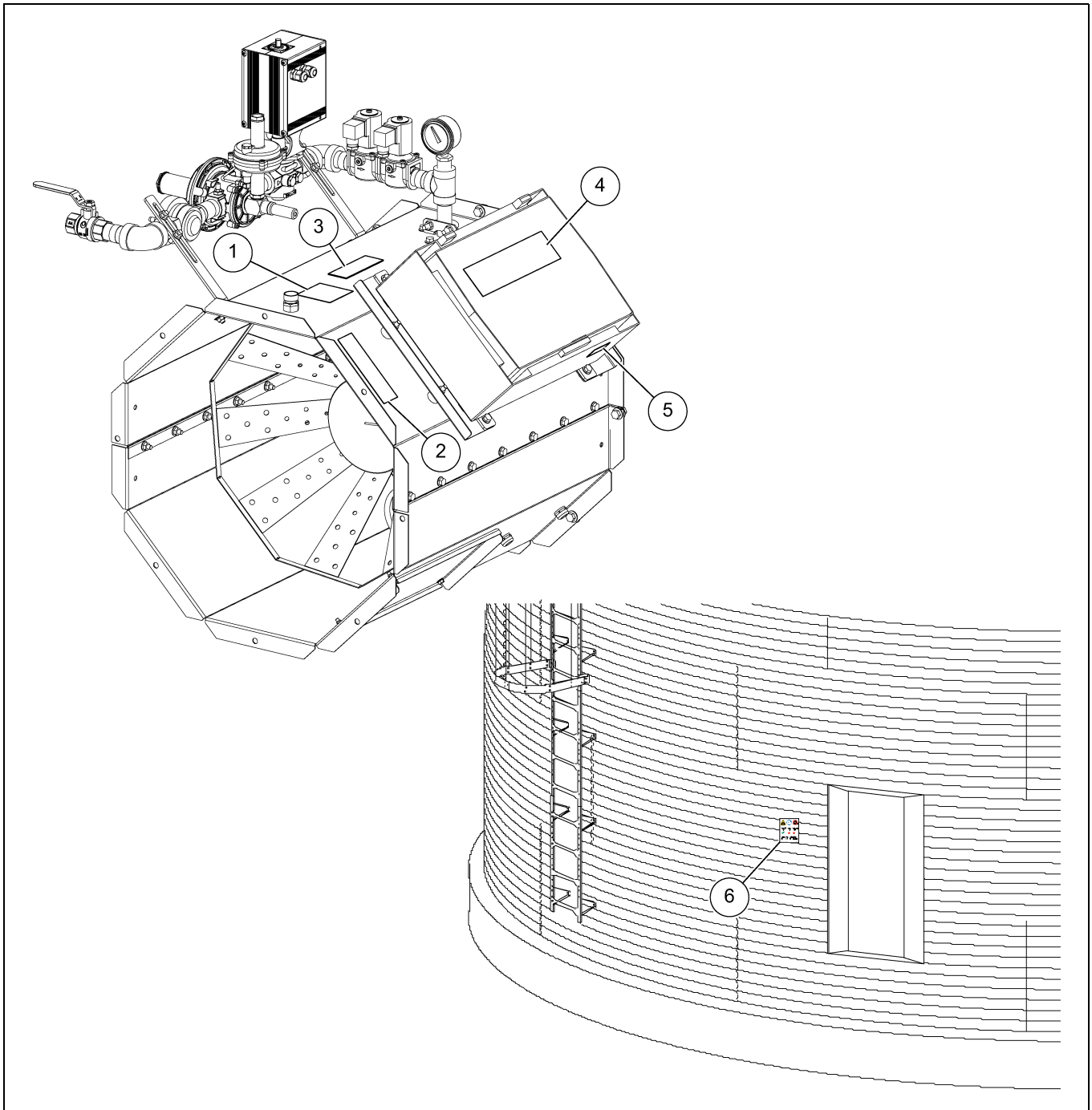
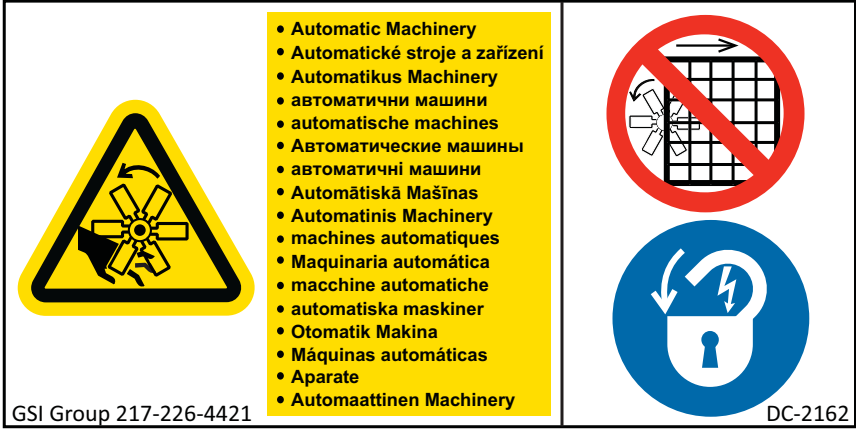
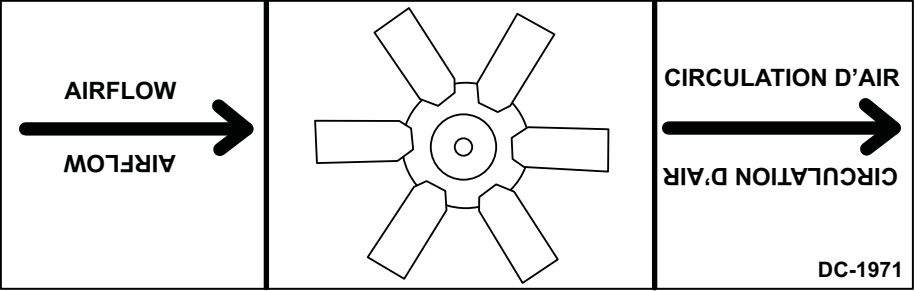






Figure 2A

Locations	Decal #	Decals			
1	DC-2162	 <p>GSI Group 217-226-4421</p> <p>DC-2162</p>			
2	DC-1971	 <p>DC-1971</p>			
3	DC-2165	 <p>GSI Group 217-226-4421</p> <p>DC-2165</p>			
4	DC-1702 (on Lid)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; padding: 5px;"> <p style="text-align: center; background-color: #0056b3; color: white; margin: 0;">NOTICE</p> <p>Thermostat must be installed for operation.</p> <p>Failure to do so may damage equipment and cause fire.</p> <p style="font-size: small; margin-top: 5px;">GSI Group 217-226-4421</p> </td> <td style="width: 33%; padding: 5px; text-align: center;">  </td> <td style="width: 33%; padding: 5px;"> <p style="text-align: center; background-color: #0056b3; color: white; margin: 0;">NOTICE</p> <p>Le thermostat doit être installé pour fonctionner.</p> <p>Omettre cette installation peut endommager l'équipement et provoquer un feu.</p> <p style="font-size: small; margin-top: 5px; text-align: right;">DC-1702</p> </td> </tr> </table>	<p style="text-align: center; background-color: #0056b3; color: white; margin: 0;">NOTICE</p> <p>Thermostat must be installed for operation.</p> <p>Failure to do so may damage equipment and cause fire.</p> <p style="font-size: small; margin-top: 5px;">GSI Group 217-226-4421</p>		<p style="text-align: center; background-color: #0056b3; color: white; margin: 0;">NOTICE</p> <p>Le thermostat doit être installé pour fonctionner.</p> <p>Omettre cette installation peut endommager l'équipement et provoquer un feu.</p> <p style="font-size: small; margin-top: 5px; text-align: right;">DC-1702</p>
<p style="text-align: center; background-color: #0056b3; color: white; margin: 0;">NOTICE</p> <p>Thermostat must be installed for operation.</p> <p>Failure to do so may damage equipment and cause fire.</p> <p style="font-size: small; margin-top: 5px;">GSI Group 217-226-4421</p>		<p style="text-align: center; background-color: #0056b3; color: white; margin: 0;">NOTICE</p> <p>Le thermostat doit être installé pour fonctionner.</p> <p>Omettre cette installation peut endommager l'équipement et provoquer un feu.</p> <p style="font-size: small; margin-top: 5px; text-align: right;">DC-1702</p>			

2. Safety Decals

Locations	Decal #	Decals
5	DC-2163 (Inside Control)	<p>GSI Group 217-226-4421 DC-2163</p>
6	DC-2215 (Also at Eaves Hatch)	<p>GSI Group 217-226-4421 DC-2215</p>
N/S	DC-2306	<p>GSI Group Inc. 217-226-4421 DC-2306</p>

Rating Plate

CE Rating plate must be fitted as shown in *Figure 2B*.

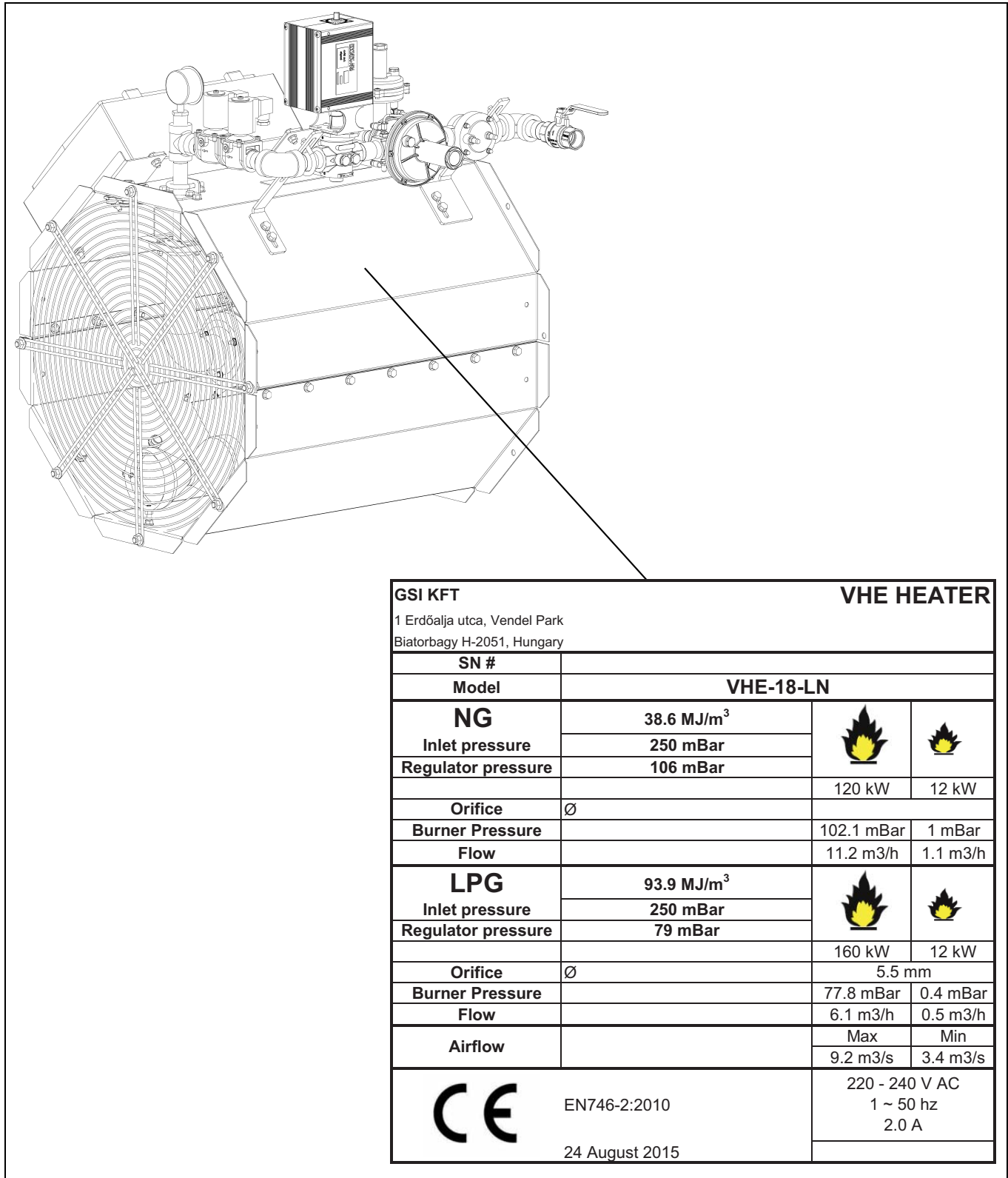


Figure 2B

3. Specifications

Heater Specifications

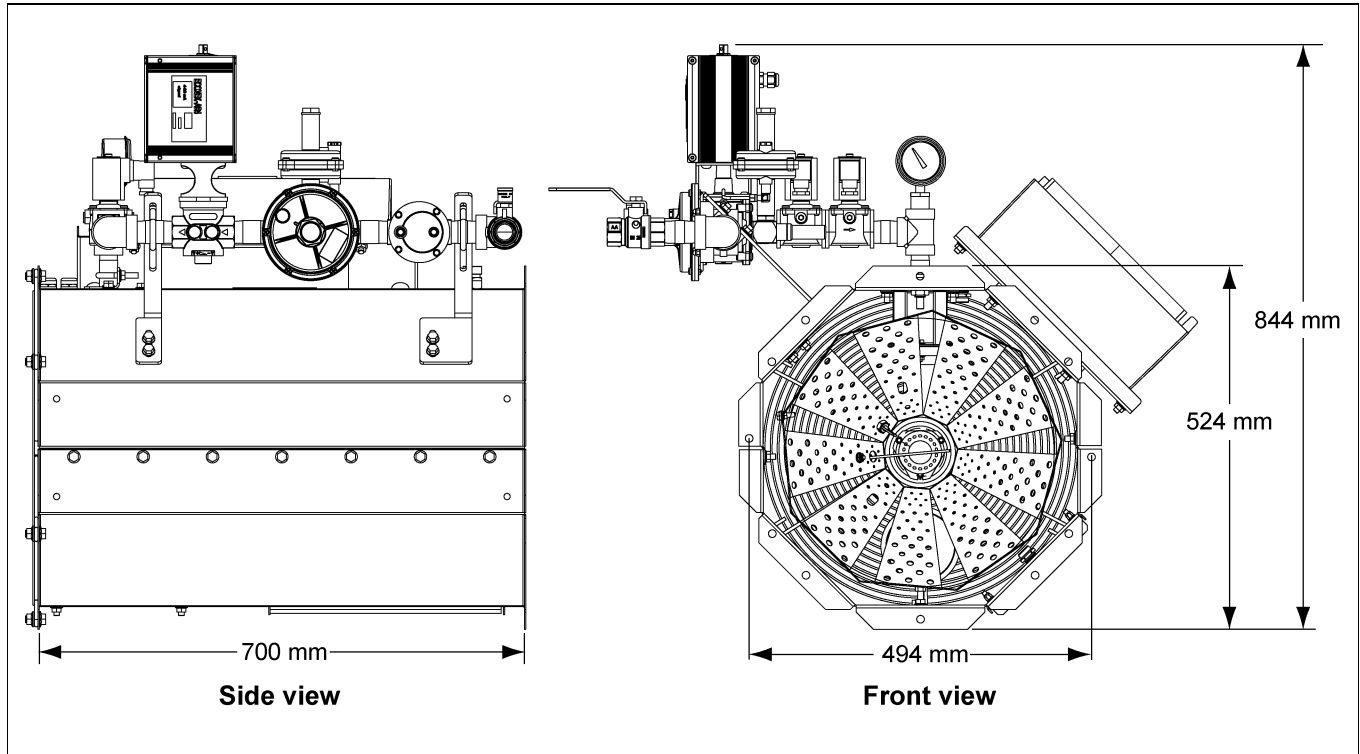


Figure 3A Heater Dimensions (VHE-18-LN)

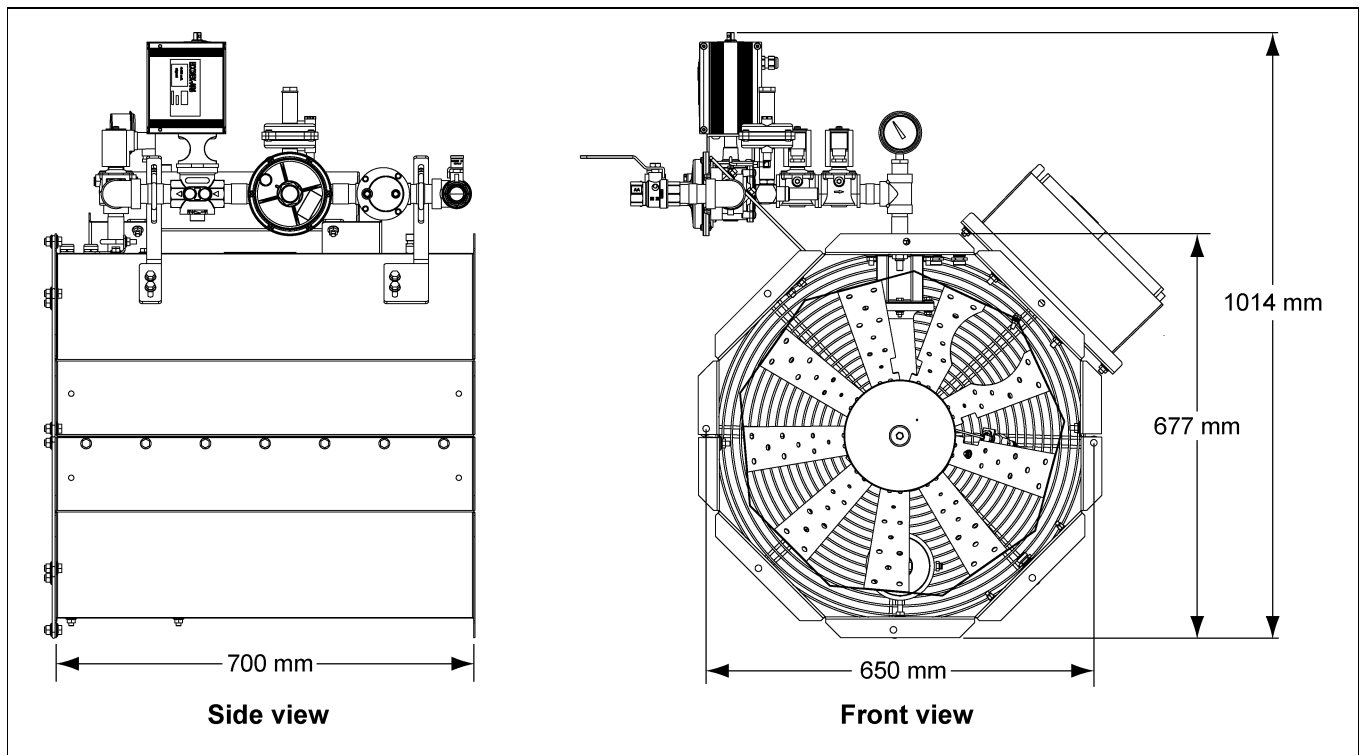


Figure 3B Heater Dimensions (VHE-24-LN)

LPG Vapor Models

LPG	Supply Pressure (mBar)	Regulator Pressure (mBar)	Burner Orifice (mm)	Maximum Heat (kW)	Minimum Heat (kW)	Maximum Burner Pressure (mBar)	Minimum Burner Pressure (mBar)	Maximum Flow Rate (m ³ /h)	Minimum Flow Rate (m ³ /h)
VHE-18	1000	80	5.5	160.0	13.0	77.8	0.5	6.1	0.5
VHE-24	1000	60	7.5	256.3	24.0	57.7	0.6	9.8	0.9
VHE-24-HT	1000	100	11.0	640.0	80.0	77.8	1.2	24.5	3.1

LP Vapor Models (Gross calorific value = 93.9 MJ/m³)

Natural Gas Models

NG	Supply Pressure (mBar)	Regulator Pressure (mBar)	Burner Orifice (mm)	Maximum Heat (kW)	Minimum Heat (kW)	Maximum Burner Pressure (mBar)	Minimum Burner Pressure (mBar)	Maximum Flow Rate (m ³ /h)	Minimum Flow Rate (m ³ /h)
VHE-18	1000	120	5.5	130.0	13.0	119.8	1.2	12.1	1.2
VHE-24	1000	140	7.5	256.3	20.0	134.7	1.5	23.9	2.5
VHE-24-HT	1000	130	14.0	640.0	80.0	69.2	1.1	59.6	7.5

Natural Gas Models (Gross calorific value = 38.6 MJ/m³)

Airflow Requirements

Heater Model	Maximum Airflow (m ³ /s)	Minimum Airflow (m ³ /s)	Air Switch Setting (mBar)
VHE-18-LN	9.0	3.0	1.0
VHE-24-LN	15.0	6.0	1.0

4. Installation

Fan/Heater Location on Silo

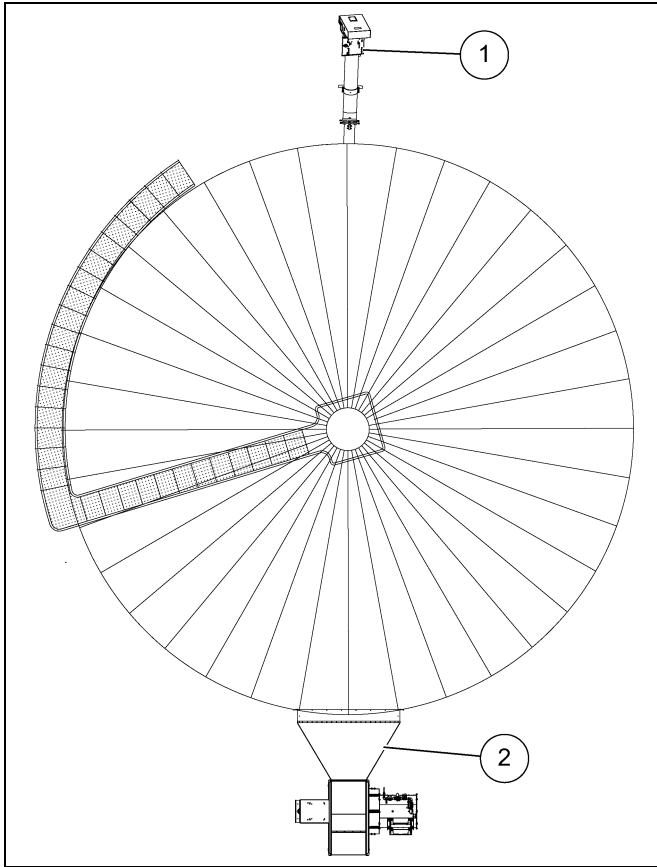


Figure 4A Single Fan/Heater Location

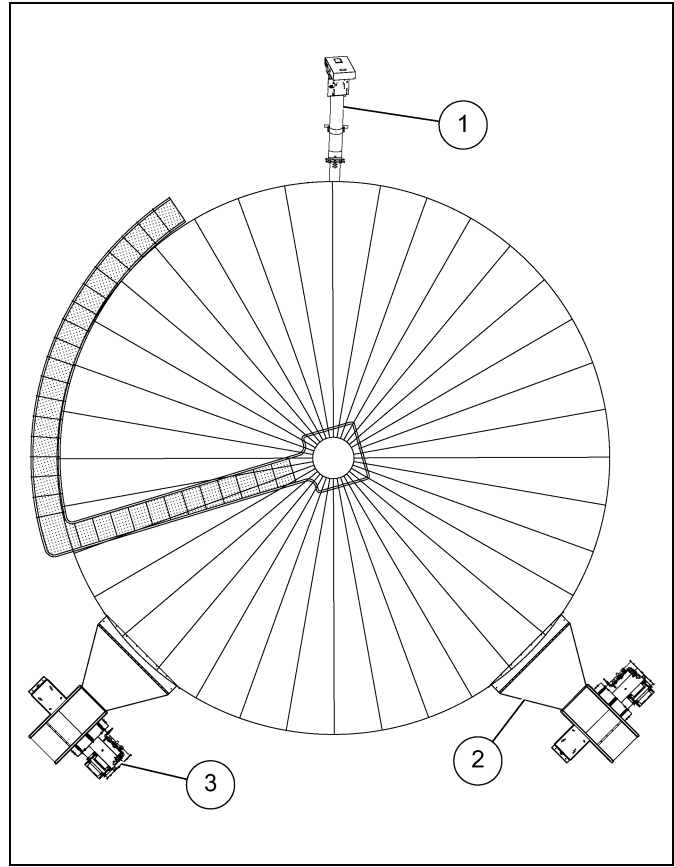


Figure 4B Master Slave Fan/Heater Locations

Ref #	Description
1	Discharge Auger
2	Transition Duct
3	Master Fan/Heater

Fit Heater to Fan

VHE heaters are design to be installed on the inlet side of centrifugal fans.

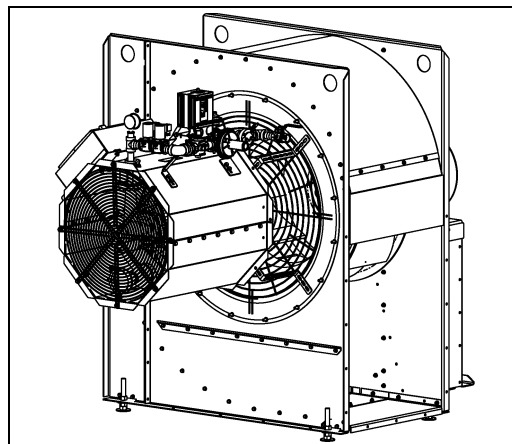


Figure 4C Heater on CF Fan

Attach to Fan Using Brackets (HF-4421M)

1. Pre-assemble mounting brackets (1).
2. Loosen and remove the hardware from fan guard. Do not remove guard.
3. Fit bracket (1) to fan guard bolt. Replace the hardware.
4. Offer heater up to brackets (1) and attach to end flange.
5. Tighten all the hardware (2 and 3).

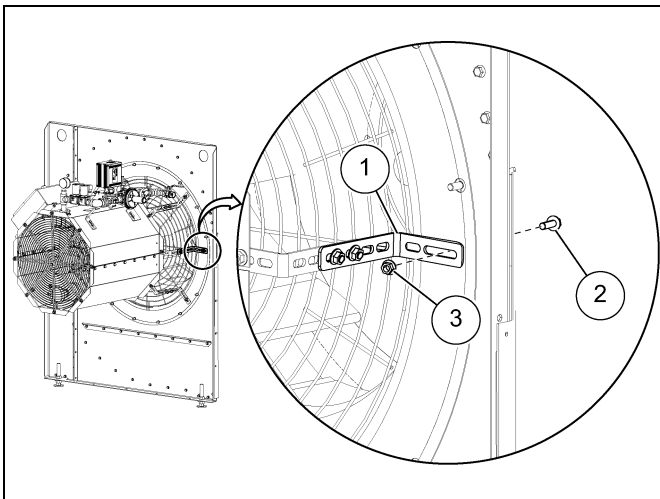


Figure 4D Installing the Mounting Bracket

Ref #	Part #	Description
1	HF-4421M	Mounting Bracket
2	S-FBM10020	M10 Flange Bolt
3	S-FNM10	M10 Flange Nut

Fit Transition High-Limit (HF-8447) (120°C)



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

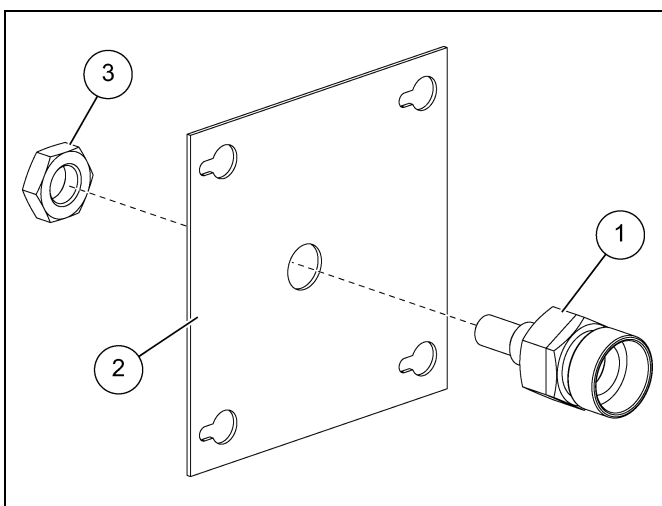


Figure 4E Transition High-Limit (HF-8447) with Mounting Plate (HF-8453M)

Ref #	Part #	Description
1	HF-8447	Thermostat Transition High-Limit
2	HF-8453M	Housing High-Limit Plate
3	S-HNLC14	Jam Nut, Hex M14

4. Installation

1. Cut 30 mm diameter hole centrally on transition duct, 300 mm from bottom. (See Figure 4G.)
2. Apply silicone around hole.
3. Place transition high-limit (1) and attached with self-drilling screws (3) . (See Figure 4F.)

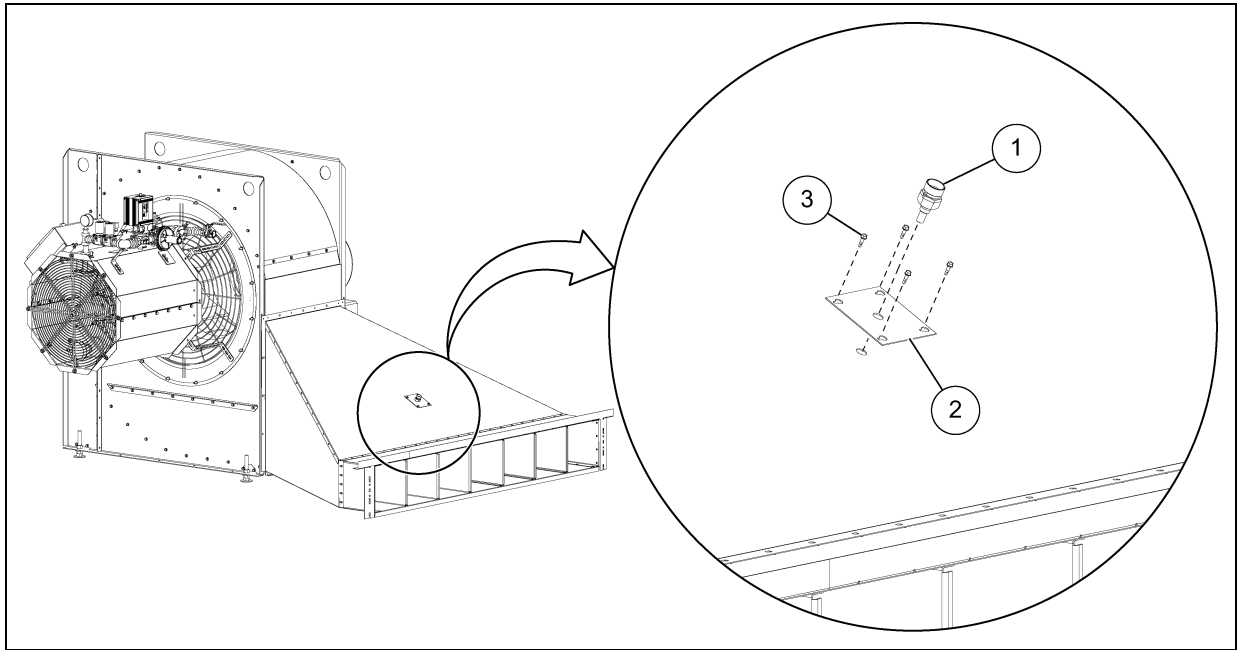


Figure 4F Transition High-Limit

Ref #	Part #	Description
1	HF-8447	Thermostat Transition High-Limit
2	HF-8453M	Housing High-Limit Plate
3	S-SDS04016	M04 x 16 mm Self-Drilling Screw

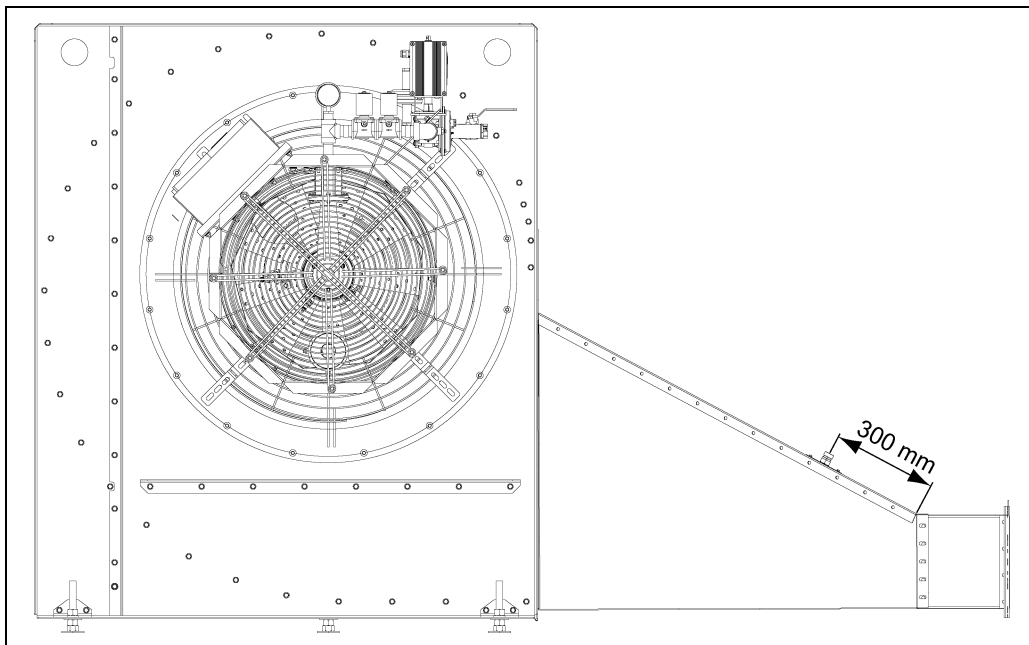


Figure 4G

Fit Plenum Thermostat/High-Limit



Risk of fire.

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

(Housing high-limit (HF-8446) with mounting plate (HF-8453M)).

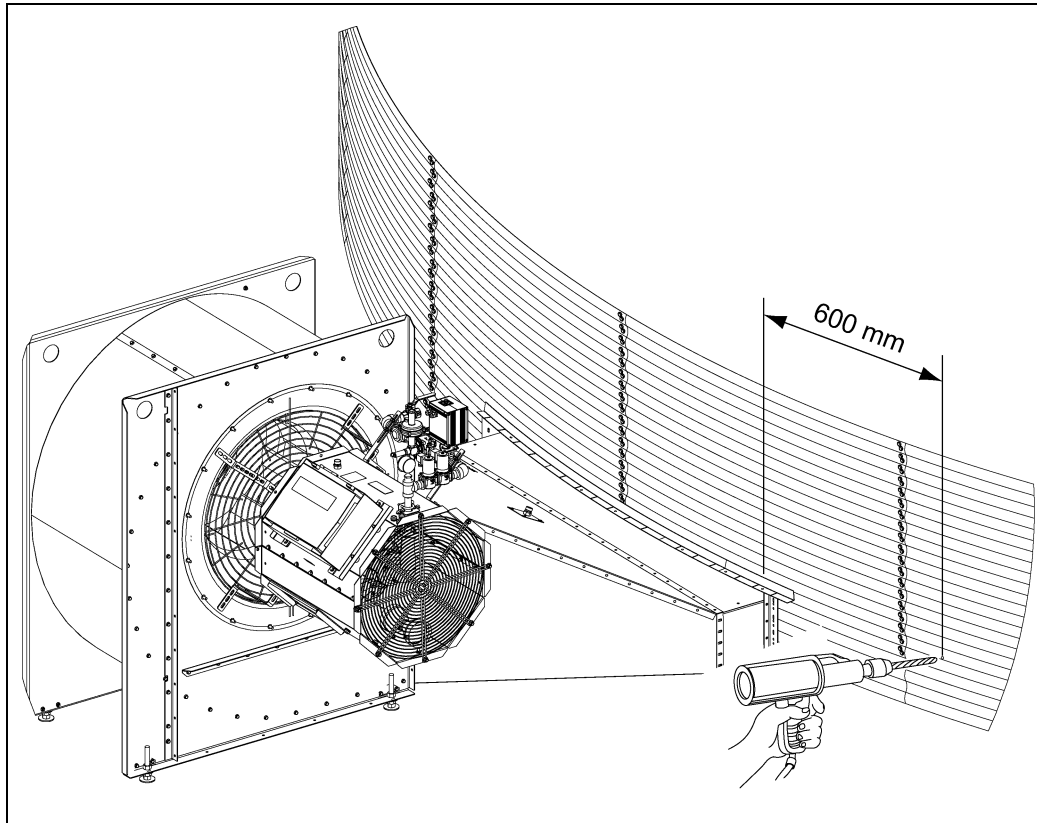


Figure 4H Cut 22 mm Ø Hole

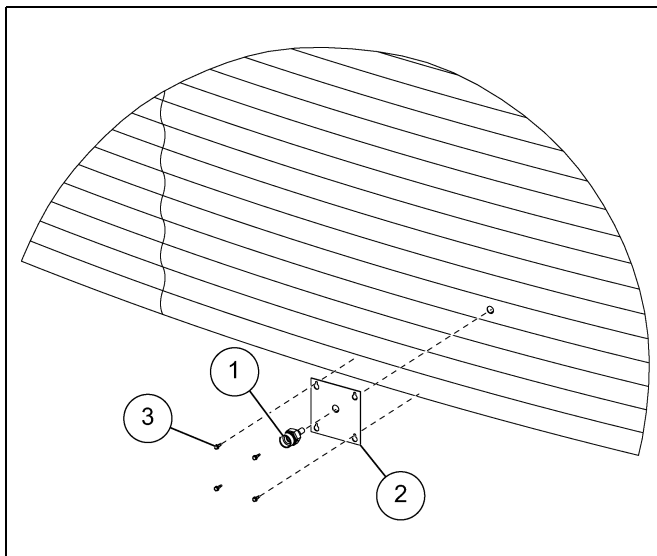


Figure 4I Fit Plenum Thermostat/High-Limit

Ref #	Part #	Description
1	HF-8446	Thermostat Transition High-Limit
2	HF-8453M	Housing High-Limit Plate
3	S-SDS04016	M04 x 16 mm Self-Drilling Screw

Electrical Installation



Figure 4J



Heater power is 220-240 VAC. Interlock heater power to the fan starter.
(Note for star-delta starters this must be to the LINE contactor.)



Figure 4K Heater Control Front

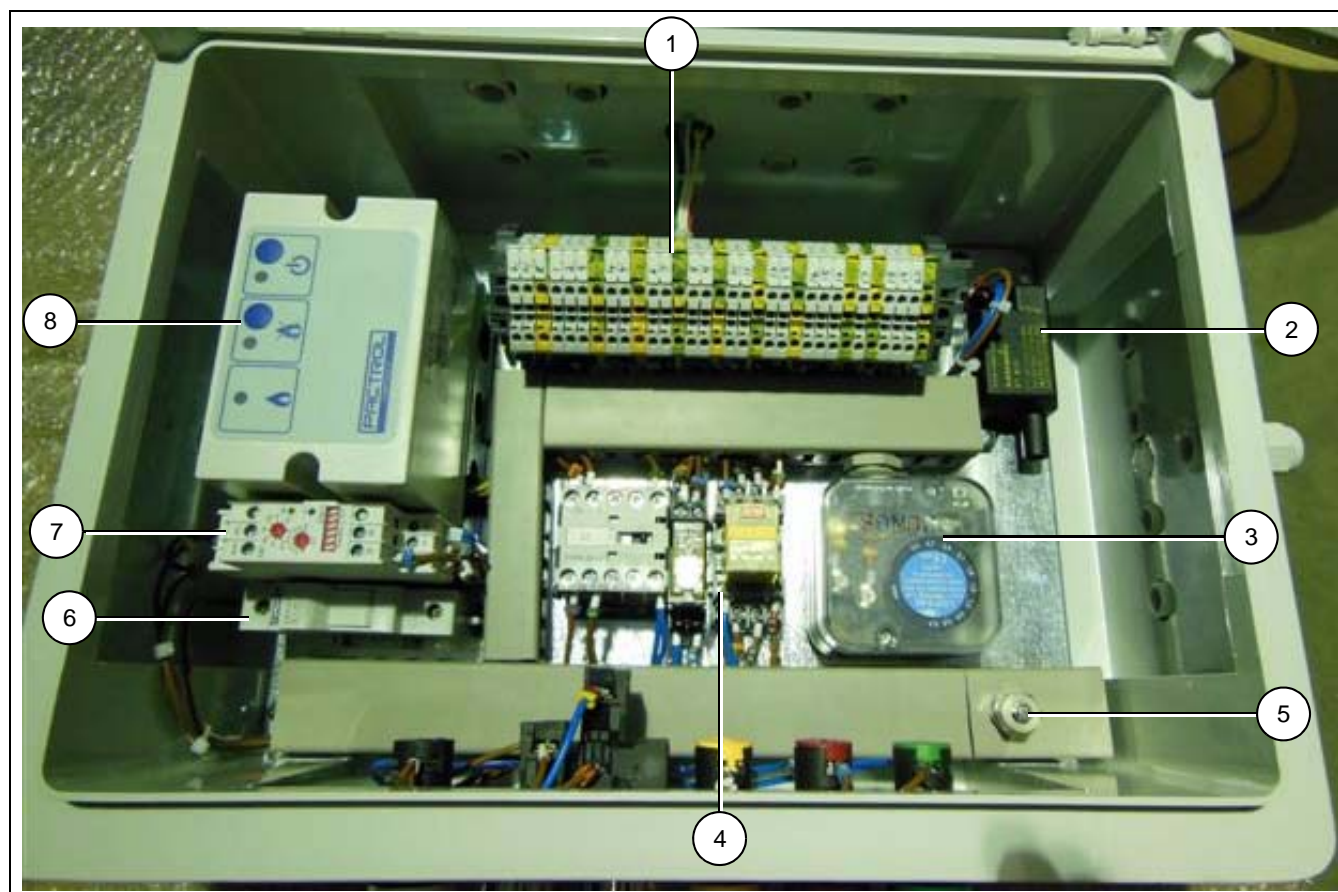


Figure 4L Heater Control Inside

Ref #	Description
1	Terminals
2	HT Ignition Module
3	Air Switch
4	Relays

Ref #	Description
5	Low-Fire Start Potentiometer
6	Supply Fuse 6A
7	Pre-Purge Timer
8	Burner Control

Make connections to:

1. Power supply (terminals L, N and earth).
2. Plenum high-limit (terminals 12 and 13).

Temperature Control Options - High/Low Control Connections

1. High low control option requires a suitable thermostat with additional over heat cut-off (plenum high-limit).
2. Dummy plug (supplied with control) must be fitted to enable high low control.
3. Connect control thermostat to terminals 6 and 7.

4. Installation

Temperature Control Options - GSI BMGB Modulating Control

1. Temperature sensor (HF-8449) or relative humidity sensor (HF-8448) must be fitted.
2. Housing high-limit (HF-8446) with mounting plate (HF-8443) must be fitted adjacent to the control sensor in the bin plenum.
3. Mount heater control (2) adjacent to heater.
4. HF-8444 is used to control heater based on air temperature or relative humidity.
5. Plug sensor into temperature control.
6. Plug control into heater control.



Ref #	Description
1	Control Sensor Plug
2	Heater Control Connection

Figure 4M Modulating Control (HF-8444)

Temperature Control Options - Non-GSI Modulating Control

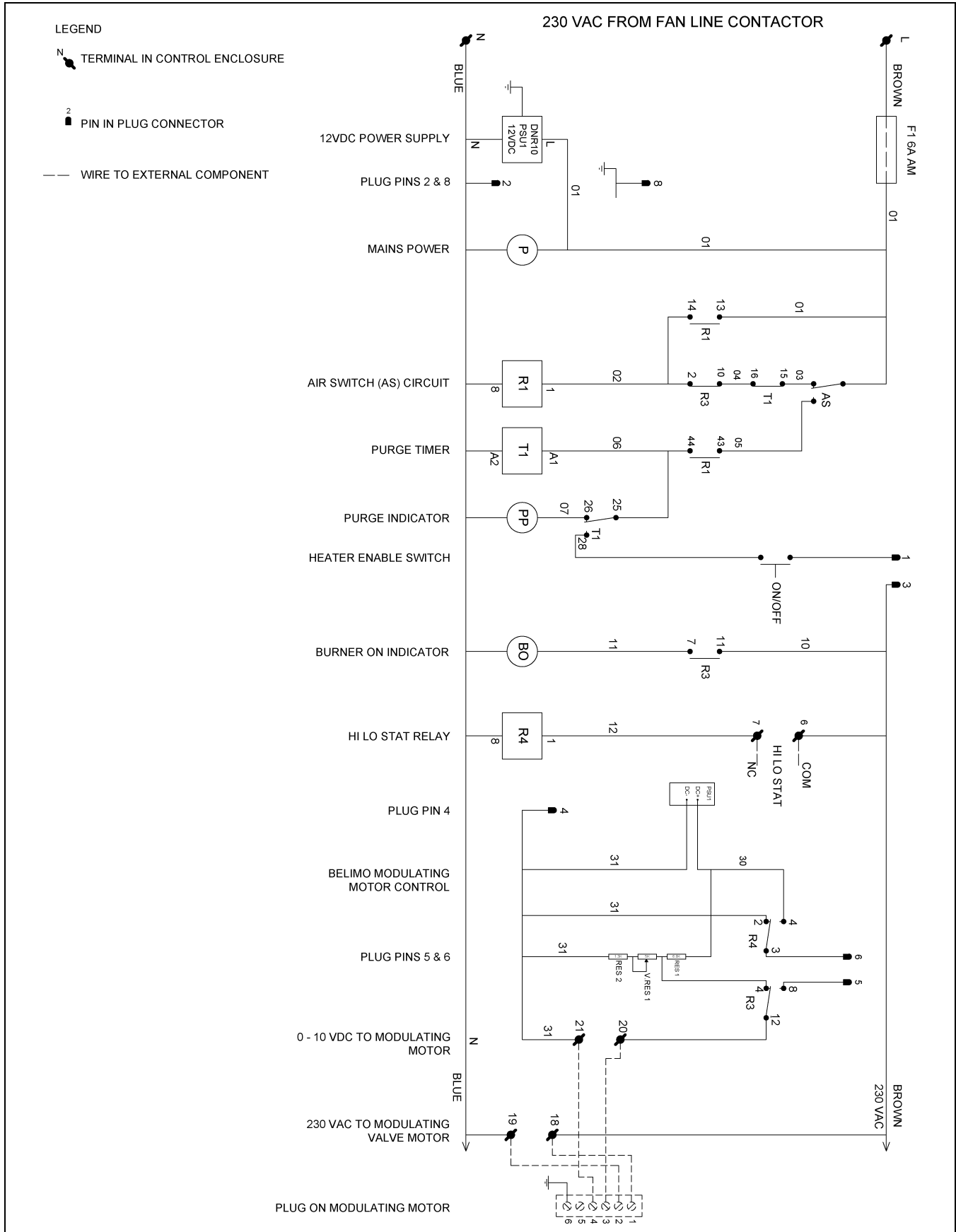
For other make of modulating control, connections will need to be made inside the dummy plug, supplied with the control.

Remove links inside dummy plug between pins 1 and 3, 5 and 6.

Make connections:

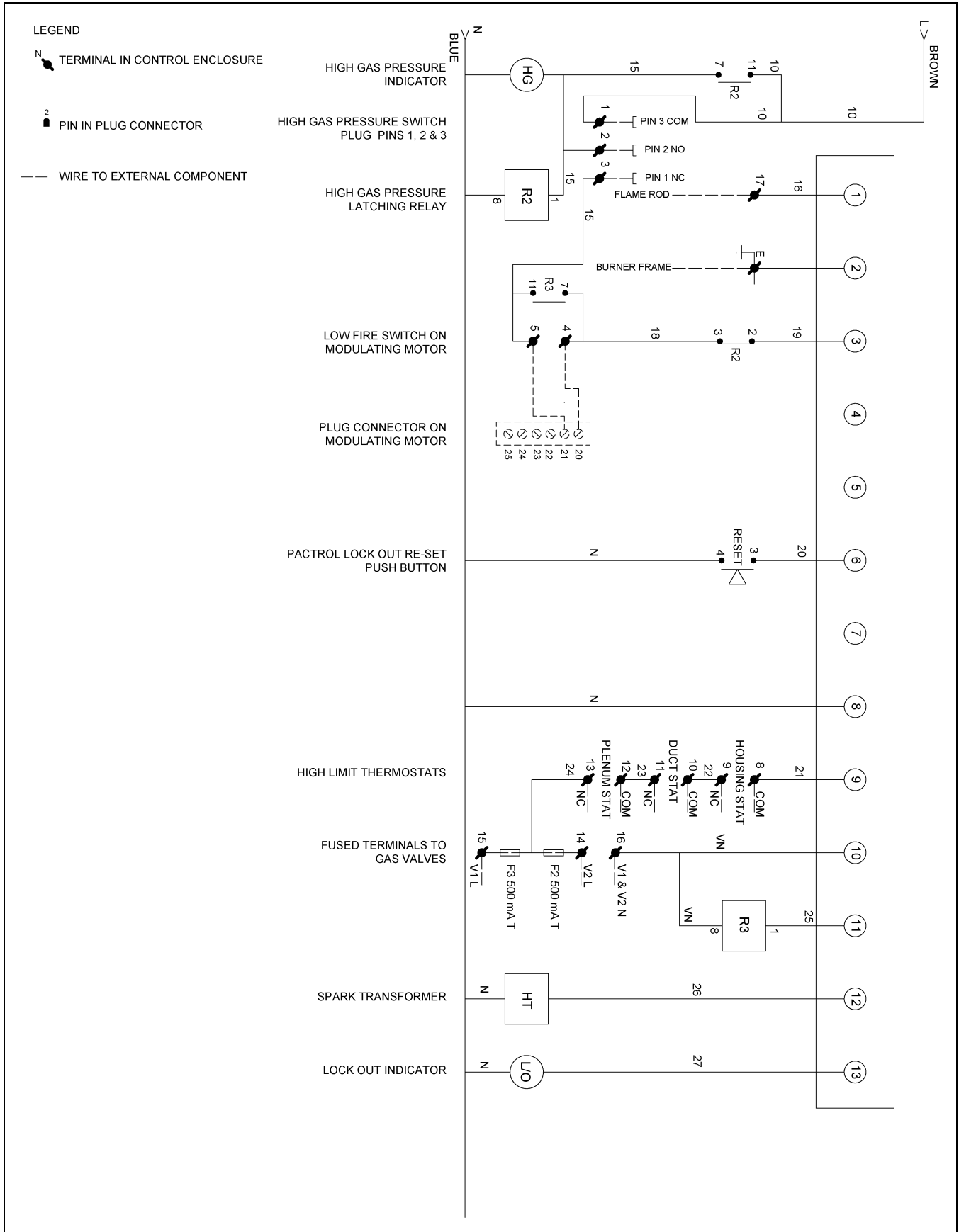
1. Pin 1: 230 VAC to temperature controller.
2. Pin 2: Neutral to temperature controller.
3. Pin 3: Switched 230 VAC back from temperature controller. (Or link pin 1 if no 230 VAC switching in chosen control.)
4. Pin 4: Negative 12 VDC from power supply.
5. Pin 5: 0-10 VDC to modulating valve motor.
6. Pin 6: Positive 12 VDC from power supply.

CE Heater Control Schematics



4. Installation

CE Heater Control Schematics (Continued)



Connect Fuel Supply

Fuel is connected at the 1" BSPT inlet to the manual shut off valve.

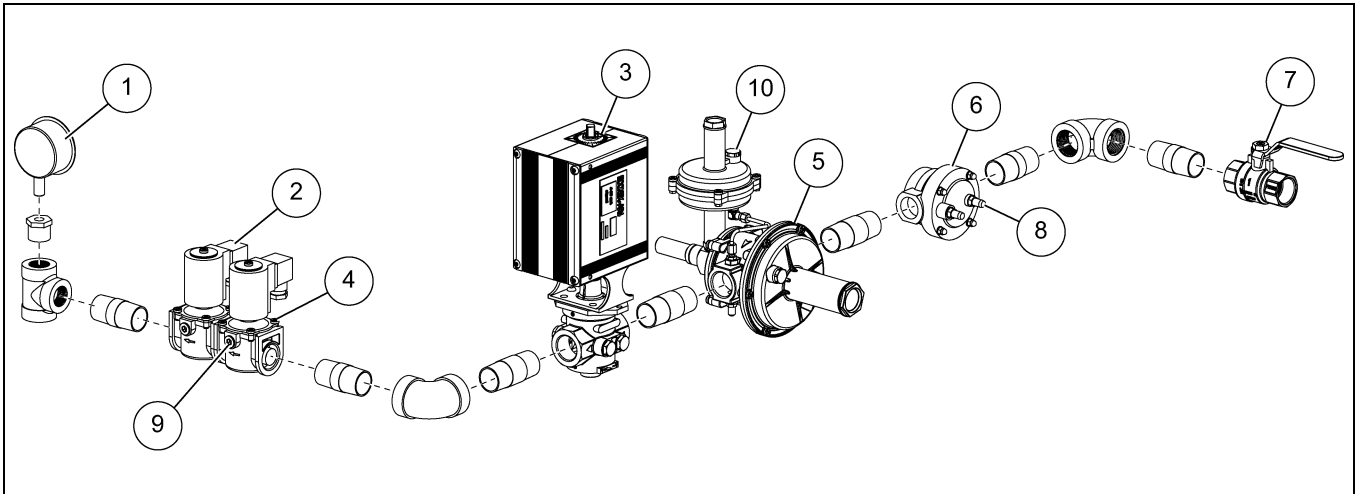


Figure 4N Fuel Train

Ref #	Description
1	Pressure Gauge
2	Safety Shut Off Valves
3	Modulating Valve
4	High Pressure Switch
5	Regulator

Ref #	Description
6	Filter
7	Fuel Connection 1" BSPT Manual Shut Off Valve
8	Pressure Test Point (Incoming)
9	Pressure Test Point (Regulated)
10	Over Pressure Valve

Refer to [Page 21](#) for LPG supply and natural gas flow and pressure settings. See also heater rating plate on [Page 19](#).

Incoming pressure should be 1.0-1.5 bar (natural gas and LPG).

5. Commissioning Heater

A commissioning check sheet is provided with this manual. (See Page 36.) It is recommended to note all the required heater settings from tables on Page 21 and fill these into the sheet before starting the commissioning process.

Set Inlet Pressure

Inlet pressure varies from heater to heater. Refer to Page 21 or the rating plate on the heater for the required pressure.

Pressure may be measured at the test point on the gas filter.

Set Regulator

Refer to Page 21 for the correct outlet pressure for the heater and gas type.

1. Remove cover (1) from regulator adjuster.
2. Screw adjuster out (minimum pressure).
3. Open pressure test point and fit manometer. (See Ref #9 in Figure 4N on Page 31.)
4. Apply pressure via hand bellows to the test point on the filter.
5. Gradually screw in the pressure adjuster until the pressure reads the required setting + 2.5 mBar. (Example for 30 mBar required outlet pressure, set regulator to 32.5 mBar.)
6. Release pressure and re-test.
7. Remove manometer and close test point.

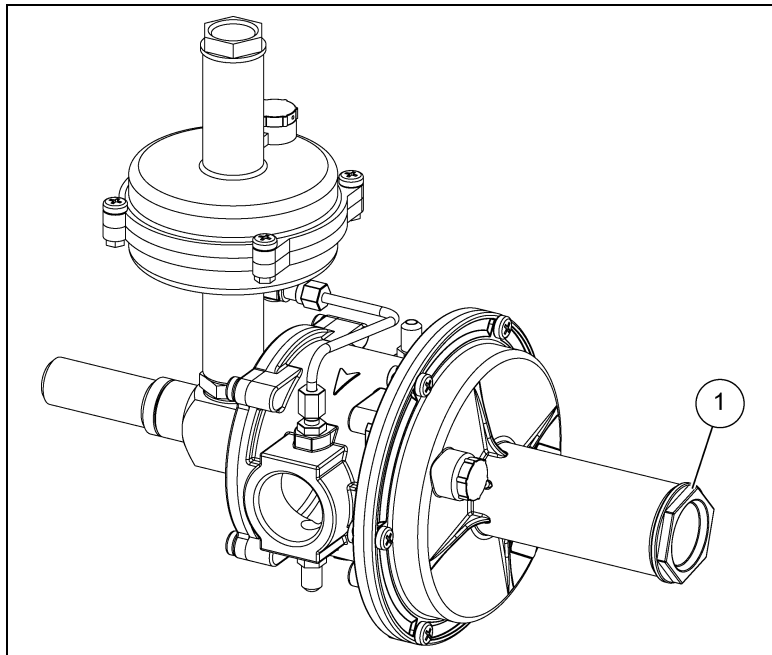


Figure 5A Pressure Regulator

Ref #	Description
1	Regulator Adjuster Cover

Set Over Pressure Safety Valve

NOTE: This procedure is carried out with the valve pressurized to required regulator pressure, and the over pressure spring screwed fully in.

1. Remove adjuster spring cover.
2. Decrease the spring pressure until the valve closes.
3. Un-screw re-set and pull it to ensure the valve is open.
4. Screw the over pressure spring in three full turns.
5. Re-set the over pressure valve and check regulated pressure is still maintained and valve remains open.
6. Re-fit adjuster cover and close test point. (See Ref #9 in [Figure 4N on Page 31.](#))



Figure 5B Over Pressure Safety Valve

Ref #	Description
1	Adjuster Spring Location

5. Commissioning Heater

7. Use hand bellows and electronic manometer to set the over pressure valve.

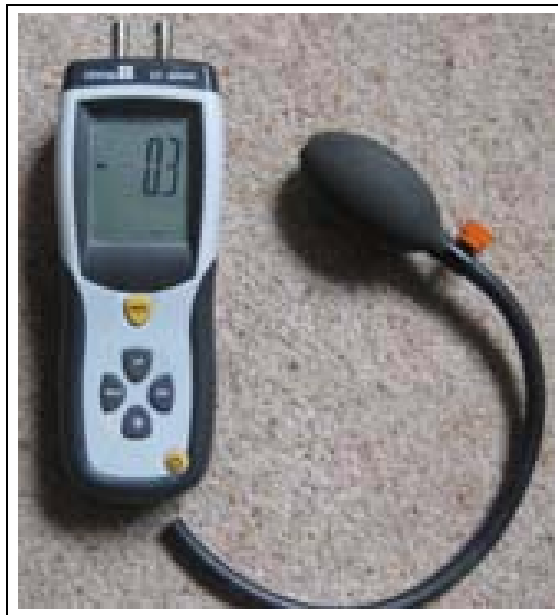


Figure 5C Manometer and Hand Bellows

Set Air Switch

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

Set Purge Timer

When the fan is started, the heater control will follow a prolonged initial purge before the heater can be lit. Once this purge is complete, if the fan is not stopped, the heater will light after only a few seconds following turning the ENABLE switch to ON.

Required purge time is based on the size of silo being dried by the heater. Refer to tables [on Pages 44-46](#) for required purge time settings. Interpolate for bin sizes/fan sizes not given, based on the actual bin size and fan air delivery at 50 N/m² static pressure.

For manual calculation of purge time use:

$$\text{Bin volume (m}^3\text{)} \times 5 / \text{fan airflow (m}^3\text{/min)} = \text{Purge time in minutes}$$

Set High Pressure Switch

1. Locate the gas high pressure switch on the safety shut off valves.
2. Remove the cover.
3. Rotate the setting to the maximum burner pressure + 15 mBar. ([See Page 21.](#))
4. Replace cover

Start Gas Setting

Before attempting to light the burner for the first time, adjust the low-fire by-pass screw to it's maximum (counterclockwise) setting. (See Figure 5D.)

Start gas is factory pre-set, but may require minor adjustment if burner does not light satisfactorily. This is done by turning the potentiometer located on the lower right of the control box. This may require re-setting the low-fire switch on the modulating motor.

Low-Fire Setting

Low-fire is set using the by-pass screw on the bottom of the modulating valve. (See Figure 5D.)



Figure 5D

Ref #	Description
1	Low Fire By-Pass Screw

With burner alight and modulating valve fully closed, adjust the low-fire flame to the setting given on the rating plate, and until a stable flame is achieved.

5. Commissioning Heater

High-Fire Setting

1. Set the control temperature significantly above ambient and light the burner.
2. Wait for the modulating valve to open fully.
3. Note the pressure on the pressure gauge. *(See Figure 4N on Page 31.)*
4. Making sure the modulating valve remains fully open, increase or decrease the regulator pressure until the reading matches that given on the heater rating plate or *Refer to Page 21.*
5. Reduce the temperature control setting so that the modulating valve starts to close, then increase the temperature to make it open fully and re-check the pressure reading.



Do not exceed the maximum pressure given in the tables or on the rating plate.

NOTE: *In certain conditions, it may be necessary to set the high-fire pressure lower than that given in the table or on rating plate. This may be required when:*

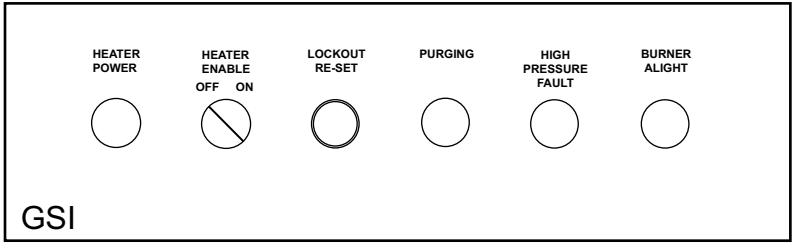
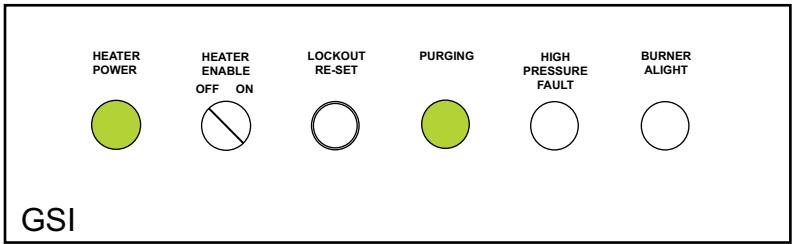
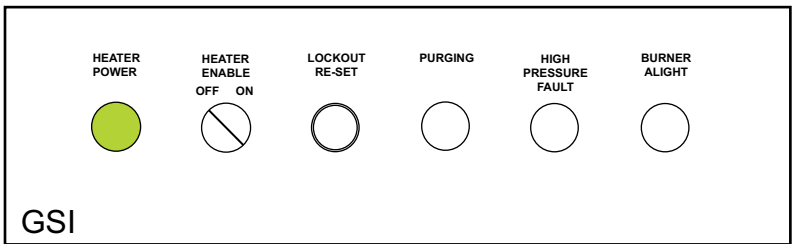
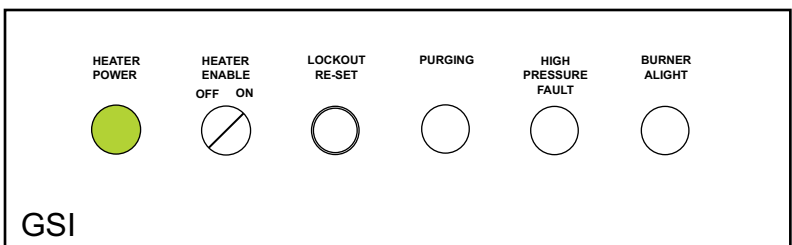
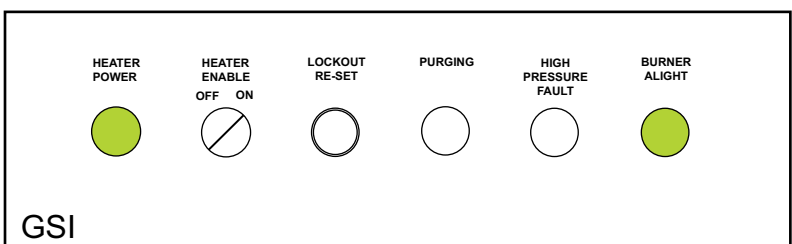
- a. *The heater is being controlled in either high/low or off cycle.*
- b. *High ambient temperatures and/or low drying temperatures.*

Commissioning Check List

Complete commissioning list below.

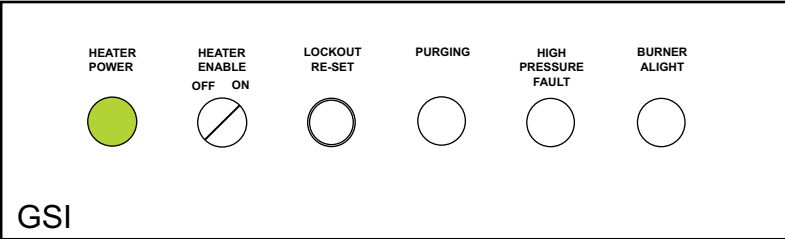
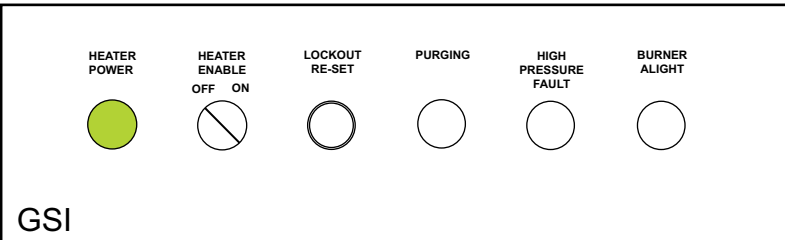
Component	Set Point	Function Pass/Fail	Notes
Check Fuel Supply Shut Off Valve			
Check Main Fuel Supply Pressure			<i>(See Tables on Page 21.)</i>
Set/Test Over Pressure Shut Off (OPSO) Pressure	200 mBar		
Set/Test Main Gas Regulator Pressure			<i>(See Tables on Page 21.)</i>
Set Air Pressure Switch	1 mBar		
Set Pre-Purge Timer			<i>(See Tables on Page 44-46.)</i>
Carry Out Leak Test			
Set Gas High Pressure Switch			<i>(See Tables on Page 21.) + 15 mBar</i>
Set Burner Low Flame Pressure			<i>(See Tables on Page 21.)</i>
Set Start Gas			
Set Burner Low Flame Pressure			<i>(See Tables on Page 21.)</i>
Test Main Gas Manual Shut Off Valve			
Set/Test Plenum Thermostat			
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			

Normal Start-Up Sequence

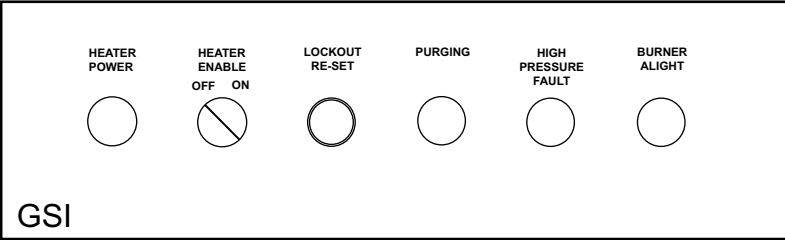
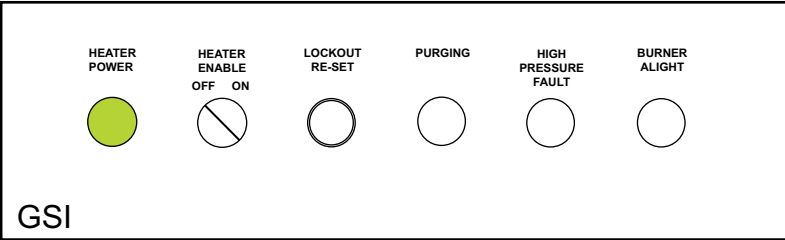
Symptom	Control Display Status
<p>Fan OFF</p>	
<p>Fan started, heater purging</p>	
<p>Purge complete, heater in standby</p>	
<p>Heater enabled</p>	
<p>Burner alight, controlling temperature</p>	

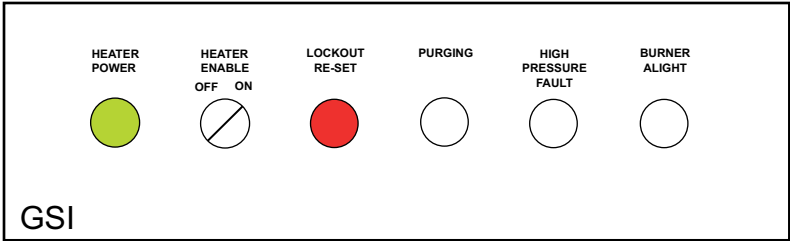
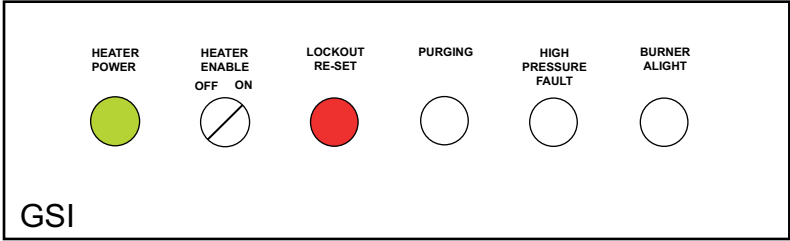
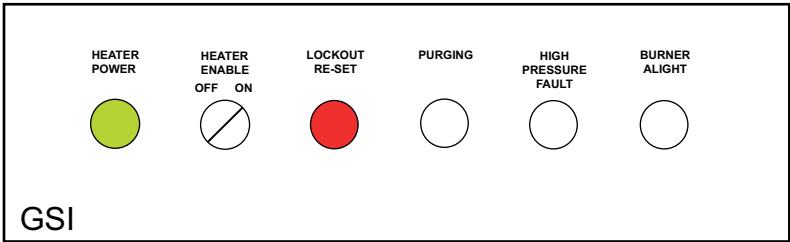
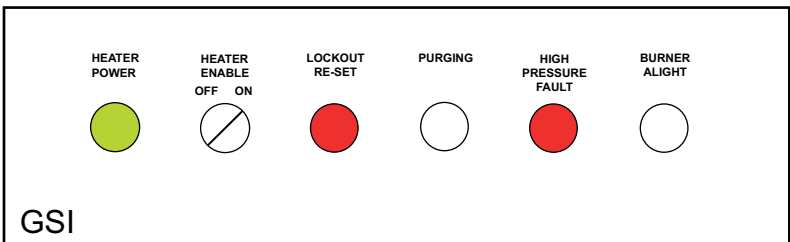


6. Troubleshooting

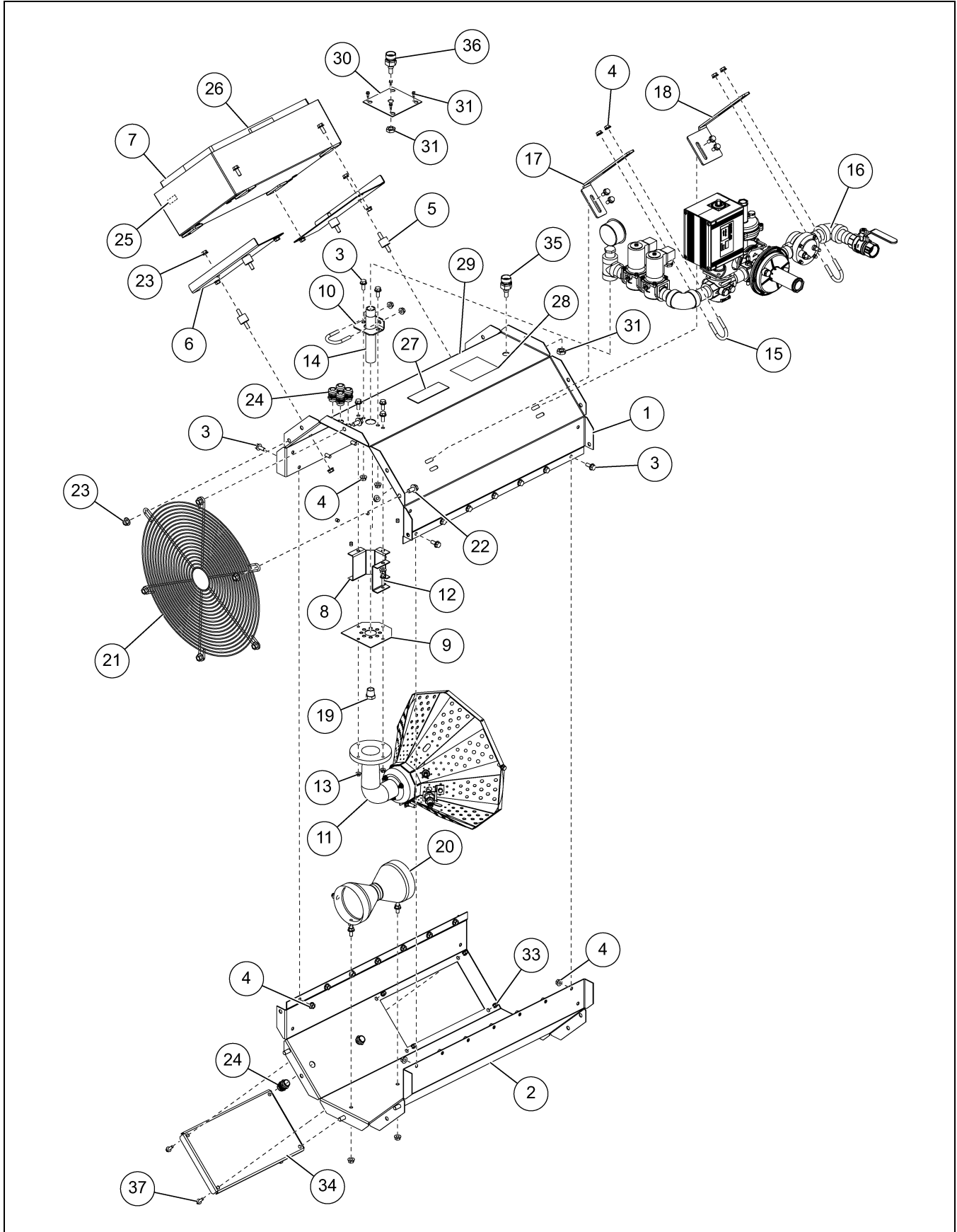
Symptom	Control Display Status
<p>Modulating control has reverted to off-cycle (temperature not coming down below set point) Check modulating control for display status</p>	
<p>Heater stopped, in stand-by mode</p>	

Fault Conditions

Symptom	Control Display Status
<p>Fan ON, no heater power</p> <ul style="list-style-type: none"> • Check heater fuse • Fan interlock fault • Faulty connection 	
<p>Fan started, heater does not go to purge Insufficient airflow</p> <ul style="list-style-type: none"> • Move heater closer to fan inlet • Reduce quantity of grain in bin • Impeded air inlet <ul style="list-style-type: none"> Air switch fault Check air switch setting (1 mBar) Check tube connections to air switch and airflow venturi Clean venturi Replace air switch 	

Symptom	Control Display Status
<p style="text-align: center;">Heater failed to light</p> <ul style="list-style-type: none"> • No gas • Check gas supply • Check over pressure shut off • Check safety shut off valves • Check filter • No spark • Check spark lead • Check spark plug (gap should be 3-5 mm) • Replace ignition module • Low-fire switch did not close • Check modulating valve is driving to low- fire start position • Adjust low-fire switch • Increase low-fire start rate 	<div style="border: 1px solid black; padding: 10px; text-align: center;">  <p style="text-align: center;">GSI</p> </div> <p style="text-align: center;">Press re-set for 3 seconds to attempt re-ignition</p>
<p style="text-align: center;">Heater lit but failed to stay alight</p> <ul style="list-style-type: none"> • No flame signal • Check flame rod connections • Clean flame rod • Reposition flame rod to intercept flame • Replace flame rod 	<div style="border: 1px solid black; padding: 10px; text-align: center;">  <p style="text-align: center;">GSI</p> </div> <p style="text-align: center;">Press re-set for 3 seconds to attempt re-ignition</p>
<p style="text-align: center;">Burner lit, remained alight but then went out</p> <ul style="list-style-type: none"> • Over heat (in transition, heater housing or plenum) • Reduce drying temperature • Increase airflow (reduce amount of grain the bin) 	<div style="border: 1px solid black; padding: 10px; text-align: center;">  <p style="text-align: center;">GSI</p> </div> <p style="text-align: center;">Press re-set for 3 seconds to attempt re-ignition</p>
<p style="text-align: center;">High pressure fault</p> <ul style="list-style-type: none"> • High pressure switch has detected excess pressure going to the burner • Modulating valve out of adjustment – re-set high setting • Pressure regulator out of adjustment, re-set regulated pressure • Pressure switch incorrectly set – re-set 	<div style="border: 1px solid black; padding: 10px; text-align: center;">  <p style="text-align: center;">GSI</p> </div> <p style="text-align: center;">Cycle power, restart and pressure re-set for 3 seconds to attempt re-ignition</p>

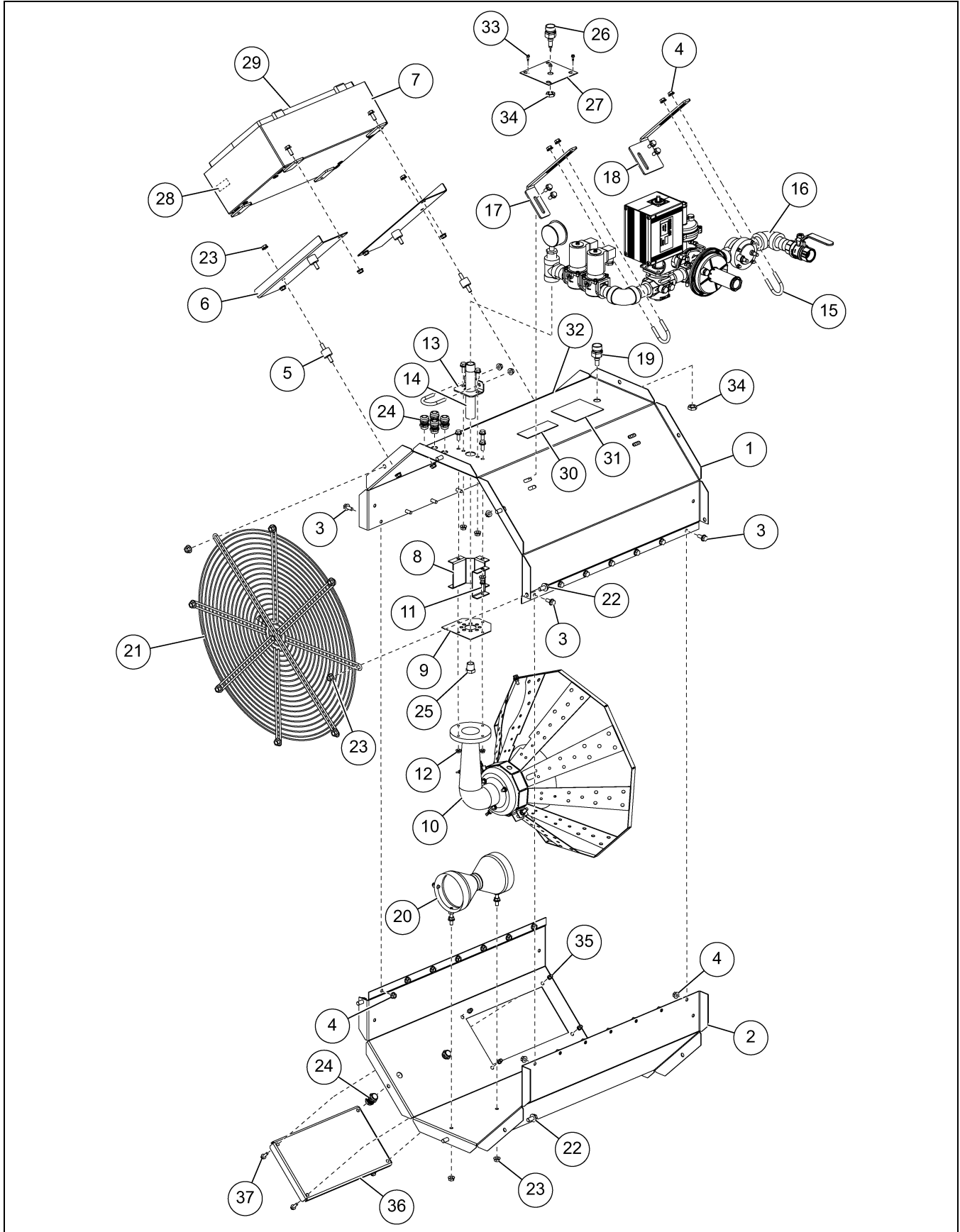
Heater 18" CE Base Model (VHE-18) (July 2019 Onwards)



Heater 18" CE Base Model (VHE-18) (July 2019 Onwards) Parts List

Ref #	Part #	Description	Qty
1	VHE-001M	Housing; Wrapper 18" Heater 1	1
2	VHE-002M	Housing; Wrapper 18" Heater 2	1
3	S-FBM08020	DIN6921, Flange Bolt M08 x 20 ZN Class 8.8 Serrated	31
4	S-FNM08	DIN6923, Flange Nut M08 ZN Class 8 Serrated	43
5	S-PR202560M08	Puffer, Rubber, 20mm H, Diameter 25 mm, 60 mm L, M08	4
6	VHE-003M	Control Box Bracket	2
7	HF-8443	Heater Control CE Bin Heaters 230V, 50 Hz	1
8	VHE-004M	Burner Inner Mounting Bracket	1
9	VHE-005M	Collector Plate 24" and 26" Heater	1
10	VHE-006M	Burner Mounting Bracket	1
11	HF-7687-FW	Burner Assembly: 18" Deluxe 04	1
12	S-FBM06025	DIN6921, Flange Bolt M06 x 25 ZN Class 8.8 Serrated	4
13	S-FNM06	DIN6923, Flange Nut M06 ZN Serrated	4
14	HH-7027	Orifice Pipe 3/4" x 6-1/2"	1
15	S-BUM08032	U-Bolt Clamp, Universal, M08-32 mm	3
16	HF-8441-ECX-V-C-L-055	Gas Train 1" Modulating LP/NG Vapor CE Bin Heaters	1
17	VHE-009M-ECX	Gas Train Mounting Bracket ECX	1
18	VHE-009M-ECX-2	Gas Train Mounting Bracket ECX	1
19	HH-7024-055M	Plug Brass 3/4" Pipe - 1/2" NPT Hex, Drilled 5-1/2 mm	1
20	VHE-011M	Venturi Assembly	1
21	F-7179	18" Grill Guard	1
22	S-FBM10020	DIN6921, Flange Bolt M10 x 20 ZN Class 8.8 Serrated	6
23	S-FNM10	DIN6923, Flange Nut M10 ZN Class 8 Serrated	6
24	S-CGM16	Cable Gland, M16 with Nut	6
25	DC-2163	Decal, Danger High Voltage	1
26	DC-1702	Decal, Caution Use Thermostat with Heater	1
27	DC-2165	Decal, Danger High Temperature and Pressure	1
28	DC-2162	Decal, Danger Automatic Fan Blade	1
29	DC-1971	Decal, Air Flow	1
30	HF-8453M	Heater/Transition High-Limit Mounting Plate	1
31	S-HNLC14	DIN936, Jam Nut, Hex M14 YDP Class 8.8	2
32	S-SDS04016	DIN7504K; Screw, Self-Drilling, M04 x 16 mm	4
33	S-RNM06	Rivet Nut M06	4
34	VHE-022M	VHE Heater Inspection Door	1
35	HF-8446	Thermostat Heater Housing High-Limit 90°C CE Bin Heaters	1
36	HF-8447	Thermostat Transition High-Limit 120°C CE Bin Heaters	1
37	S-FBM06020	Flange Bolt M06 x 20 ZN Class 8.8 Serrated	6
N/S	H07-3C-1.5-10	Cable H07-RN-F 3 Core x 1-1/2 mm ²	1
N/S	S-SCFZ-LS/5	Spark Cable Heater Ignition	1
N/S	S-SPEWG-11U	Spark Plug Elbow	1
N/S	S-SPS120	Spark Plug Straight 120 mm H	1
N/S	S-TP0608-2M	Tube; Inside Diameter 6 mm; Outside 8 mm, Nylon, Black, UV Resistant	1

Heater 24" CE Base Model (VHE-24) (July 2019 Onwards)



Heater 24" CE Base Model (VHE-24) (July 2019 Onwards) Parts List

Ref #	Part #	Description	Qty
1	VHE-016M	Housing; Wrapper 24" Heater 1	1
2	VHE-017M	Housing; Wrapper 24" Heater 2	1
3	S-FBM08020	DIN6921, Flange Bolt M08 x 20 ZN Class 8.8 Serrated	27
4	S-FNM08	DIN6923, Flange Nut M08 ZN Class 8 Serrated	43
5	S-PR202560M08	Puffer, Rubber, 20 mm H, Diameter 25 mm, 60 mm L, M08	4
6	VHE-003M	Control Box Bracket	2
7	HF-8443	Heater Control CE Bin Heaters 230V, 50 Hz	1
8	VHE-004M	Burner Inner Mounting Bracket	1
9	VHE-005M	Collector Plate 24" and 26" Heater	1
10	HF-7689	Burner Assembly: 24"-26"	1
11	S-FBM06025	DIN6921, Flange Bolt M06 x 25 ZN Class 8.8 Serrated	4
12	S-FNM06	DIN6923, Flange Nut M06 ZN Serrated	4
13	VHE-006M	Burner Mounting Bracket	1
14	HH-7027	Orifice Pipe 3/4" x 6-1/2"	1
15	S-BUM08032	U-Bolt Clamp, Universal, M8-32 mm	3
16	HF-8441-ECX-V-C-L-075	Gas Train 1" Modulating LP/NG Vapor CE Bin Heaters	1
17	VHE-009M-ECX	Gas Train Mounting Bracket ECX	1
18	VHE-009M-ECX-2	Gas Train Mounting Bracket ECX	1
19	HF-8446	Thermostat Housing High-Limit 80°C CE Bin Heaters	1
20	VHE-011M	Venturi Assembly	1
21	F-7182	Grill Guard: 24" Painted ILC	1
22	S-FBM10020	DIN6921, Flange Bolt M10 x 20 ZN Class 8.8 Serrated	8
23	S-FNM10	DIN6923, Flange Nut M10 ZN Class 8 Serrated	8
24	S-CGM16	Cable Gland, M16 with Nut	6
25	HH-7024-07M	Plug Brass 3/4" Pipe - 1/2" NPT Hex, Drilled 7 mm	1
26	HF-8447	Thermostat Transition High-Limit 110°C CE Bin Heaters	1
27	HF-8453M	Heater/Transition High-Limit Mounting Plate	1
28	DC-2163	Decal, Danger High Voltage	1
29	DC-1702	Decal, Caution Use Thermostat with Heater	1
30	DC-2165	Decal, Danger High Temperature and Pressure	1
31	DC-2162	Decal, Danger Automatic Fan Blade	1
32	DC-1971	Decal, Air Flow	1
33	S-SDS04016	DIN7504K; Screw, Self-Drilling, M04 x 16 mm	4
34	S-HNLC14	DIN936, Jam Nut, Hex M14 YDP Class 8.8	2
35	S-RNM06	Rivet Nut M06	4
36	VHE-022M	VHE Heater Inspection Door	1
37	S-FBM06020	Flange Bolt M06 x 20 ZN Class 8.8 Serrated	6
N/S	H07-3C-1.5-10	Cable H07-RN-F 3 Core x 1-1/2 mm ²	1
N/S	S-SCFZ-LS/5	Spark Cable Heater Ignition	1
N/S	S-SPEWG-11U	Spark Plug Elbow	1
N/S	S-SPS120	Spark Plug Straight 120 mm H	1
N/S	S-TP0608-2M	Tube; Inside Diameter 6 mm; Outside 8 mm, Nylon, Black, UV Resistant	1

8. Purge Times

Purge Times for GSI CF-10 Fan

Fan	Airflow (m ³ /s)	Purge Time in Minutes											
CF-10	5.69	Bin Height (m)											
Bin Diameter (m)	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00
5.00	0.80	0.92	1.03	1.15	1.26	1.38	1.49	1.61	1.72	1.84	1.95	2.07	2.18
5.50	0.98	1.12	1.26	1.40	1.54	1.68	1.82	1.96	2.10	2.23	2.37	2.41	2.65
6.00	1.18	1.35	1.52	1.68	1.85	2.01	2.18	2.34	2.51	2.68	2.84	3.01	3.17
6.50	1.41	1.60	1.80	1.99	2.19	2.38	2.58	2.77	2.96	3.16	3.35	3.55	3.74
7.00	1.66	1.88	2.11	2.33	2.56	2.78	3.01	3.23	3.46	3.68	3.91	4.14	4.36
7.50	1.93	2.18	2.44	2.70	2.96	3.22	3.48	3.74	4.00	4.25	4.51	4.77	5.03
8.00	2.22	2.51	2.81	3.10	3.40	3.69	3.99	4.28	4.57	4.87	5.16	5.46	5.75
8.50	2.54	2.87	3.20	3.53	3.87	4.20	4.53	4.86	5.20	5.53	5.86	6.19	6.53
9.00	2.88	3.25	3.63	4.00	4.37	4.74	5.12	5.49	5.86	6.23	6.61	6.98	7.35
9.50	3.25	3.67	4.08	4.50	4.91	5.33	5.74	6.16	6.57	6.99	7.40	7.82	8.23
10.00	3.65	4.11	4.57	5.03	5.49	5.95	6.41	6.87	7.33	7.79	8.25	8.71	9.17
10.50	4.07	4.57	5.08	5.59	6.10	6.60	7.11	7.62	8.12	8.63	9.14	9.65	10.15
11.00	4.52	5.07	5.63	6.19	6.74	7.30	7.86	8.41	8.97	9.53	10.08	10.64	11.20
11.50	5.00	5.60	6.21	6.82	7.43	8.04	8.65	9.25	9.86	10.47	11.08	11.69	12.30
12.00	5.50	6.17	6.83	7.49	8.15	8.82	9.48	10.14	10.80	11.47	12.13	12.79	13.45
12.50	6.04	6.76	7.48	8.20	8.92	9.64	10.35	11.07	11.79	12.51	13.23	13.95	14.67
13.00	6.61	7.39	8.16	8.94	9.72	10.50	11.27	12.05	12.83	13.61	14.38	15.16	15.94
13.50	7.21	8.05	8.88	9.72	10.56	11.40	12.24	13.08	13.91	14.75	15.59	16.43	17.27
14.00	7.84	8.74	9.64	10.54	11.45	12.35	13.25	14.15	15.05	15.95	16.85	17.76	18.66
14.50	8.50	9.47	10.44	11.40	12.37	13.34	14.30	15.27	16.24	17.21	18.17	19.14	20.11
15.00	9.20	10.23	11.27	12.30	13.34	14.37	15.41	16.44	17.48	18.51	19.55	20.58	21.62

Purge Times for GSI CF-15 Fan

Fan	Airflow (m ³ /s)	Purge Time in Minutes											
CF-15	7.18	Bin Height (m)											
Bin Diameter (m)	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00
5.00	0.63	0.73	0.82	0.91	1.00	1.09	1.18	1.27	1.36	1.46	1.55	1.64	1.73
5.50	0.78	0.89	1.00	1.11	1.22	1.33	1.44	1.55	1.66	1.77	1.88	1.99	2.10
6.00	0.94	1.07	1.20	1.33	1.46	1.60	1.73	1.86	1.99	2.12	2.25	2.38	2.51
6.50	1.12	1.27	1.43	1.58	1.73	1.89	2.04	2.20	2.35	2.50	2.66	2.81	2.97
7.00	1.31	1.49	1.67	1.85	2.03	2.21	2.38	2.56	2.74	2.92	3.10	3.28	3.46
7.50	1.53	1.73	1.94	2.14	2.35	2.55	2.76	2.96	3.17	3.37	3.58	3.78	3.99
8.00	1.76	1.99	2.23	2.46	2.69	2.93	3.16	3.39	3.63	3.86	4.09	4.33	4.56
8.50	2.01	2.28	2.54	2.80	3.07	3.33	3.59	3.86	4.12	4.38	4.65	4.91	5.17
9.00	2.28	2.58	2.87	3.17	3.47	3.76	4.06	4.35	4.65	4.94	5.24	5.53	5.83
9.50	2.58	2.91	3.23	3.56	3.89	4.22	4.55	4.88	5.21	5.54	5.87	6.20	6.53
10.00	2.89	3.25	3.62	3.98	4.35	4.71	5.08	5.44	5.81	6.17	6.54	6.90	7.27
10.50	3.22	3.63	4.03	4.43	4.83	5.23	5.64	6.04	6.44	6.84	7.25	7.65	8.05
11.00	3.58	4.02	4.46	4.91	5.35	5.79	6.23	6.67	7.11	7.55	7.99	8.44	8.88
11.50	3.96	4.44	4.93	5.41	5.89	6.37	6.85	7.34	7.82	8.30	8.78	9.27	9.75
12.00	4.36	4.89	5.41	5.94	6.46	6.99	7.51	8.04	8.56	9.09	9.61	10.14	10.66
12.50	4.79	5.36	5.93	6.50	7.07	7.64	8.21	8.78	9.35	9.92	10.49	11.06	11.63
13.00	5.24	5.86	6.47	7.09	7.70	8.32	8.94	9.55	10.17	10.79	11.40	12.02	12.64
13.50	5.71	6.38	7.04	7.71	8.37	9.04	9.70	10.37	11.03	11.70	12.36	13.03	13.69
14.00	6.21	6.93	7.64	8.36	9.07	9.79	10.50	11.22	11.93	12.65	13.36	14.08	14.79
14.50	6.74	7.51	8.27	9.04	9.81	10.57	11.34	12.11	12.87	13.64	14.41	15.17	15.94
15.00	7.29	8.11	8.93	9.75	10.57	11.39	12.21	13.04	13.86	14.68	15.50	16.32	17.14

Purge Times for GSI CF-20 Fan

Fan	Airflow (m ³ /s)	Purge Time in Minutes											
CF-20	8.97	Bin Height (m)											
Bin Diameter (m)	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00
5.00	0.51	0.58	0.65	0.73	0.80	0.87	0.95	1.02	1.09	1.16	1.24	1.31	1.38
5.50	0.62	0.71	0.80	0.89	0.98	1.06	1.15	1.24	1.33	1.42	1.51	1.59	1.68
6.00	0.75	0.86	0.96	1.07	1.17	1.28	1.38	1.49	1.59	1.70	1.80	1.91	2.01
6.50	0.89	1.02	1.14	1.26	1.39	1.51	1.63	1.76	1.88	2.00	2.13	2.25	2.37
7.00	1.05	1.19	1.34	1.48	1.62	1.77	1.91	2.05	2.19	2.34	2.48	2.62	2.77
7.50	1.22	1.39	1.55	1.71	1.88	2.04	2.21	2.37	2.53	2.70	2.86	3.03	3.19
8.00	1.41	1.59	1.78	1.97	2.15	2.34	2.53	2.71	2.90	3.09	3.27	3.46	3.65
8.50	1.61	1.82	2.03	2.24	2.45	2.66	2.87	3.08	3.30	3.51	3.72	3.93	4.14
9.00	1.83	2.06	2.30	2.54	2.77	3.01	3.24	3.48	3.72	3.95	4.19	4.43	4.66
9.50	2.06	2.32	2.59	2.85	3.11	3.38	3.64	3.90	4.17	4.43	4.69	4.96	5.22
10.00	2.31	2.60	2.90	3.19	3.48	3.77	4.06	4.35	4.65	4.94	5.23	5.52	5.81
10.50	2.58	2.90	3.22	3.54	3.87	4.19	4.51	4.83	5.15	5.47	5.80	6.12	6.44
11.00	2.87	3.22	3.57	3.92	4.28	4.63	4.98	5.34	5.69	6.04	6.40	6.75	7.10
11.50	3.17	3.55	3.94	4.33	4.71	5.10	5.48	5.87	6.26	6.64	7.03	7.41	7.80
12.00	3.49	3.91	4.33	4.75	5.17	5.59	6.01	6.43	6.85	7.27	7.69	8.11	8.53
12.50	3.83	4.29	4.74	5.20	5.65	6.11	6.57	7.02	7.48	7.93	8.39	8.85	9.30
13.00	4.19	4.68	5.18	5.67	6.16	6.66	7.15	7.64	8.14	8.63	9.12	9.62	10.11
13.50	4.57	5.10	5.63	6.17	6.70	7.23	7.76	8.29	8.82	9.36	9.89	10.42	10.95
14.00	4.97	5.54	6.11	6.69	7.26	7.83	8.40	8.97	9.55	10.12	10.69	11.26	11.83
14.50	5.39	6.01	6.62	7.23	7.85	8.46	9.07	9.69	10.30	10.91	11.53	12.14	12.75
15.00	5.83	6.49	7.15	7.80	8.46	9.12	9.77	10.43	11.08	11.74	12.40	13.05	13.71

Purge Times for GSI CF-25 Fan

Fan	Airflow (m ³ /s)	Purge Time in Minutes											
CF-25	10.75	Bin Height (m)											
Bin Diameter (m)	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00
5.00	0.42	0.48	0.55	0.61	0.67	0.73	0.79	0.85	0.91	0.97	1.03	1.09	1.16
5.50	0.52	0.59	0.67	0.74	0.82	0.89	0.96	1.04	1.11	1.18	1.26	1.33	1.40
6.00	0.63	0.72	0.80	0.89	0.98	1.07	1.15	1.24	1.33	1.42	1.50	1.59	1.68
6.50	0.75	0.85	0.95	1.06	1.16	1.26	1.36	1.47	1.57	1.67	1.78	1.88	1.98
7.00	0.88	1.00	1.12	1.24	1.35	1.47	1.59	1.71	1.83	1.95	2.07	2.19	2.31
7.50	1.02	1.16	1.29	1.43	1.57	1.71	1.84	1.98	2.12	2.25	2.39	2.53	2.66
8.00	1.18	1.33	1.49	1.64	1.80	1.96	2.11	2.27	2.42	2.58	2.74	2.89	3.05
8.50	1.34	1.52	1.70	1.87	2.05	2.22	2.40	2.58	2.75	2.93	3.10	3.28	3.46
9.00	1.53	1.72	1.92	2.12	2.32	2.51	2.71	2.91	3.10	3.30	3.50	3.70	3.89
9.50	1.72	1.94	2.16	2.38	2.60	2.82	3.04	3.26	3.48	3.70	3.92	4.14	4.36
10.00	1.93	2.17	2.42	2.66	2.91	3.15	3.39	3.64	3.88	4.12	4.37	4.61	4.85
10.50	2.15	2.42	2.69	2.96	3.23	3.50	3.77	4.03	4.30	4.57	4.84	5.11	5.38
11.00	2.39	2.69	2.98	3.28	3.57	3.87	4.16	4.46	4.75	5.05	5.34	5.64	5.93
11.50	2.65	2.97	3.29	3.61	3.94	4.26	4.58	4.90	5.22	5.55	5.87	6.19	6.51
12.00	2.92	3.27	3.62	3.97	4.32	4.67	5.02	5.37	5.72	6.07	6.42	6.77	7.13
12.50	3.20	3.58	3.96	4.34	4.72	5.10	5.48	5.86	6.25	6.63	7.01	7.39	7.77
13.00	3.50	3.91	4.32	4.74	5.15	5.56	5.97	6.38	6.79	7.21	7.62	8.03	8.44
13.50	3.82	4.26	4.71	5.15	5.59	6.04	6.48	6.93	7.37	7.81	8.26	8.70	9.15
14.00	4.15	4.63	5.11	5.58	6.06	6.54	7.02	7.49	7.97	8.45	8.93	9.40	9.88
14.50	4.50	5.02	5.53	6.04	6.55	7.06	7.58	8.09	8.60	9.11	9.63	10.14	10.65
15.00	4.87	5.42	5.97	6.52	7.06	7.61	8.16	8.71	9.26	9.81	10.35	10.90	11.45

8. Purge Times

Purge Times for GSI CF-30 Fan

Fan	Airflow (m ³ /s)	Purge Time in Minutes											
CF-30	12.09	Bin Height (m)											
Bin Diameter (m)	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00
5.00	0.38	0.43	0.49	0.54	0.59	0.65	0.70	0.76	0.81	0.86	0.92	0.97	1.03
5.50	0.46	0.53	0.59	0.66	0.72	0.79	0.86	0.92	0.99	1.05	1.12	1.18	1.25
6.00	0.56	0.64	0.71	0.79	0.87	0.95	1.03	1.10	1.18	1.26	1.34	1.42	1.49
6.50	0.66	0.75	0.85	0.94	1.03	1.12	1.21	1.30	1.40	1.49	1.58	1.67	1.76
7.00	0.78	0.89	0.99	1.10	1.20	1.31	1.42	1.52	1.63	1.73	1.84	1.95	2.05
7.50	0.91	1.03	1.15	1.27	1.39	1.52	1.64	1.76	1.88	2.00	2.12	2.25	2.37
8.00	1.04	1.18	1.32	1.46	1.60	1.74	1.88	2.01	2.15	2.29	2.43	2.57	2.71
8.50	1.19	1.35	1.51	1.66	1.82	1.98	2.13	2.29	2.45	2.60	2.76	2.92	3.07
9.00	1.36	1.53	1.71	1.88	2.06	2.23	2.41	2.58	2.76	2.93	3.11	3.29	3.46
9.50	1.53	1.73	1.92	2.12	2.31	2.51	2.70	2.90	3.09	3.29	3.48	3.68	3.87
10.00	1.72	1.93	2.15	2.37	2.58	2.80	3.01	3.23	3.45	3.66	3.88	4.10	4.31
10.50	1.91	2.15	2.39	2.63	2.87	3.11	3.35	3.59	3.82	4.06	4.30	4.54	4.78
11.00	2.13	2.39	2.65	2.91	3.17	3.44	3.70	3.96	4.22	4.48	4.75	5.01	5.27
11.50	2.35	2.64	2.92	3.21	3.50	3.78	4.07	4.36	4.64	4.93	5.22	5.50	5.79
12.00	2.59	2.90	3.21	3.53	3.84	4.15	4.46	4.77	5.09	5.40	5.71	6.02	6.33
12.50	2.84	3.18	3.52	3.86	4.20	4.54	4.87	5.21	5.55	5.89	6.23	6.57	6.90
13.00	3.11	3.48	3.84	4.21	4.57	4.94	5.31	5.67	6.04	6.40	6.77	7.14	7.50
13.50	3.39	3.79	4.18	4.58	4.97	5.37	5.76	6.16	6.55	6.94	7.34	7.73	8.13
14.00	3.69	4.11	4.54	4.96	5.39	5.81	6.24	6.66	7.08	7.51	7.93	8.36	8.78
14.50	4.00	4.46	4.91	5.37	5.82	6.28	6.73	7.19	7.64	8.10	8.55	9.01	9.46
15.00	4.33	4.82	5.30	5.79	6.28	6.77	7.25	7.74	8.23	8.71	9.20	9.69	10.18

Purge Times for GSI CF-40 Fan

Fan	Airflow (m ³ /s)	Purge Time in Minutes											
CF-40	14.52	Bin Height (m)											
Bin Diameter (m)	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00
5.00	0.31	0.36	0.40	0.45	0.49	0.54	0.58	0.63	0.67	0.72	0.76	0.81	0.85
5.50	0.38	0.44	0.49	0.55	0.60	0.66	0.71	0.77	0.82	0.88	0.93	0.98	1.04
6.00	0.46	0.53	0.59	0.66	0.72	0.79	0.85	0.92	0.98	1.05	1.11	1.18	1.24
6.50	0.55	0.63	0.70	0.78	0.86	0.93	1.01	1.09	1.16	1.24	1.31	1.39	1.47
7.00	0.65	0.74	0.83	0.91	1.00	1.09	1.18	1.27	1.36	1.44	1.53	1.62	1.71
7.50	0.75	0.86	0.96	1.06	1.16	1.26	1.36	1.46	1.57	1.67	1.77	1.87	1.97
8.00	0.87	0.99	1.10	1.22	1.33	1.45	1.56	1.68	1.79	1.91	2.02	2.14	2.25
8.50	0.99	1.12	1.25	1.39	1.52	1.65	1.78	1.91	2.04	2.17	2.30	2.43	2.56
9.00	1.13	1.27	1.42	1.57	1.71	1.86	2.01	2.15	2.30	2.44	2.59	2.74	2.88
9.50	1.27	1.44	1.60	1.76	1.92	2.09	2.25	2.41	2.57	2.74	2.90	3.06	3.23
10.00	1.43	1.61	1.79	1.97	2.15	2.33	2.51	2.69	2.87	3.05	3.23	3.41	3.59
10.50	1.59	1.79	1.99	2.19	2.39	2.59	2.79	2.99	3.18	3.38	3.58	3.78	3.98
11.00	1.77	1.99	2.21	2.42	2.64	2.86	3.08	3.30	3.52	3.73	3.95	4.17	4.39
11.50	1.96	2.20	2.43	2.67	2.91	3.15	3.39	3.63	3.87	4.10	4.34	4.58	4.82
12.00	2.16	2.42	2.68	2.94	3.20	3.45	3.71	3.97	4.23	4.49	4.75	5.01	5.27
12.50	2.37	2.65	2.93	3.21	3.49	3.78	4.06	4.34	4.62	4.90	5.18	5.47	5.75
13.00	2.59	2.89	3.20	3.50	3.81	4.11	4.42	4.72	5.03	5.33	5.64	5.94	6.25
13.50	2.82	3.15	3.48	3.81	4.14	4.47	4.80	5.12	5.45	5.78	6.11	6.44	6.77
14.00	3.07	3.43	3.78	4.13	4.48	4.84	5.19	5.54	5.90	6.25	6.60	6.96	7.31
14.50	3.33	3.71	4.09	4.47	4.85	5.23	5.61	5.98	6.36	6.74	7.12	7.50	7.88
15.00	3.60	4.01	4.42	4.82	5.23	5.63	6.04	6.44	6.85	7.25	7.66	8.07	8.47

Limited Warranty - EME Grain Products

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 from the date of shipment (or, if shipped by vessel, 14 months from the date of arrival at the port of discharge). If, in GSI's sole judgment, a product is found to have a defect in materials and/or workmanship, GSI will, at its own option and expense, repair or replace the product or refund the purchase price. This Limited Warranty is subject to extension and other terms as set forth below.

Warranty Enhancements:

The warranty period for the following products is enhanced as shown below and is in lieu of (and not in addition to) the above stated warranty period. (Warranty Period is from date of shipment.)

	Product	Warranty Period
Storage	Grain Bin Structural Design	5 Years
	• Roof, doors, platforms and walk arounds	
	• Flooring (when installed using GSI specified floor support system for that floor)	
Conditioning	Dryer Structural Design - (Tower, Portable and TopDry)	5 Years
	• Includes (frame, portable dryer screens, ladders, access doors and platforms)	2 Years
	All other Dryer parts including:	
• Electrical (controls, sensors, switches and internal wiring)	2 Years	
Material Handling	Bullseye Controllers	2 Years
	Bucket Elevators Structural Design	5 Years
	Towers Structural Design	5 Years
	Catwalks Structural Design	5 Years
	Accessories (stairs, ladders and platforms) Structural Design	5 Years

Conditions and Limitations:

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE LIMITED WARRANTY DESCRIPTION SET FORTH HEREIN; SPECIFICALLY, GSI DISCLAIMS ANY AND ALL OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE IN CONNECTION WITH: (I) ANY 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.

The sole and exclusive remedy for any claimant is set forth in this Limited Warranty and shall not exceed the amount paid for the product purchased. This Warranty only covers the value of the warranted parts and equipment, and does not cover labor charges for removing or installing defective parts, shipping charges with respect to such parts, any applicable sales or other taxes, or any other charges or expenses not specified in this Warranty. GSI shall not be liable for any other direct, indirect, incidental or consequential damages, including, without limitation, loss of anticipated profits or benefits. Expenses incurred by or on behalf of a claimant without prior written authorization from the GSI warranty department shall not be reimbursed. 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. Prior to installation, the end-user bears all responsibility to comply with federal, state and local codes which apply to the location and installation of the products.

This Limited Warranty extends solely to products sold by GSI and does not cover any parts, components or materials used in conjunction with the product, that are not sold by GSI. GSI assumes no responsibility for claims resulting from construction defects, unauthorized modifications, corrosion or other cosmetic issues caused by storage, application or environmental conditions. Modifications to products not specifically delineated in the manual accompanying the product at initial sale will void all warranties. 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.

Notice Procedure:

In order to make a valid warranty claim a written notice of the claim must be submitted, using the RMA form, within 60 days of discovery of a warrantable nonconformance. The RMA form is found on the OneGSI portal.

Service Parts:

GSI warrants, subject to all other conditions described in this Warranty, Service Parts which it manufactures for a period of 12 months from the date of purchase unless specified in Enhancements above.

(Limited Warranty - N.A. Grain Products_ revised 19 October 2018)

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.



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