

# GRAIN GUARD

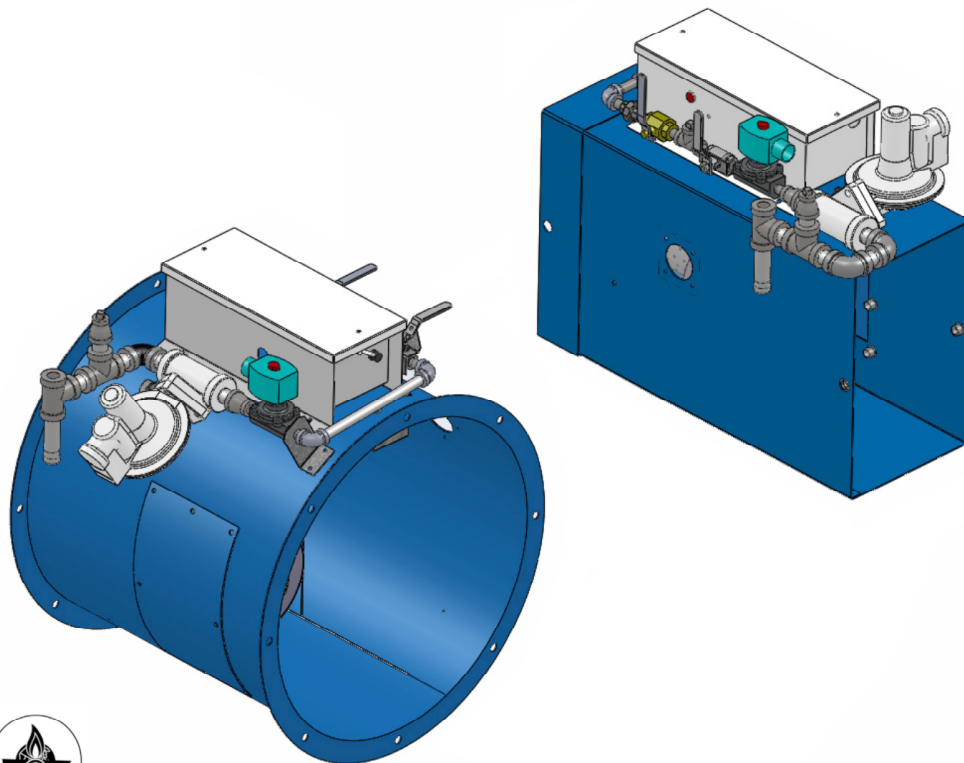
## Supplemental Heater

### Propane and Natural Gas Installation, Operation, and Parts Manual

This manual applies to:

GGH-8350, GGH-8351, GGH-8352, GGH-8353, GGH-8354, GGH-8355

Original Instructions



Read this manual before using product. Failure to follow instructions and safety precautions can result in serious injury, death, or property damage. Keep manual for future reference.


Part Number: GNA-1411 R6

Revised: June 2017



**WARNING:** If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- Do not store or use gasoline or other flammable vapours and liquids in the vicinity of this or any other appliance.
- **WHAT TO DO IF YOU SMELL GAS**
  - Do not try to light any appliance.
  - Extinguish any open flames.
  - Do not touch any electrical switch.
  - Immediately call your gas supplier. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

 **WARNING:** 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.

### FOR YOUR SAFETY

The use and storage of gasoline and other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.







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# 1. Introduction

Thank you for purchasing a Grain Guard Supplemental Heater. This equipment will allow safe and efficient operation when you read and follow all of the instructions contained in this manual. With proper care, your supplemental heater will provide you with many years of trouble-free operation.

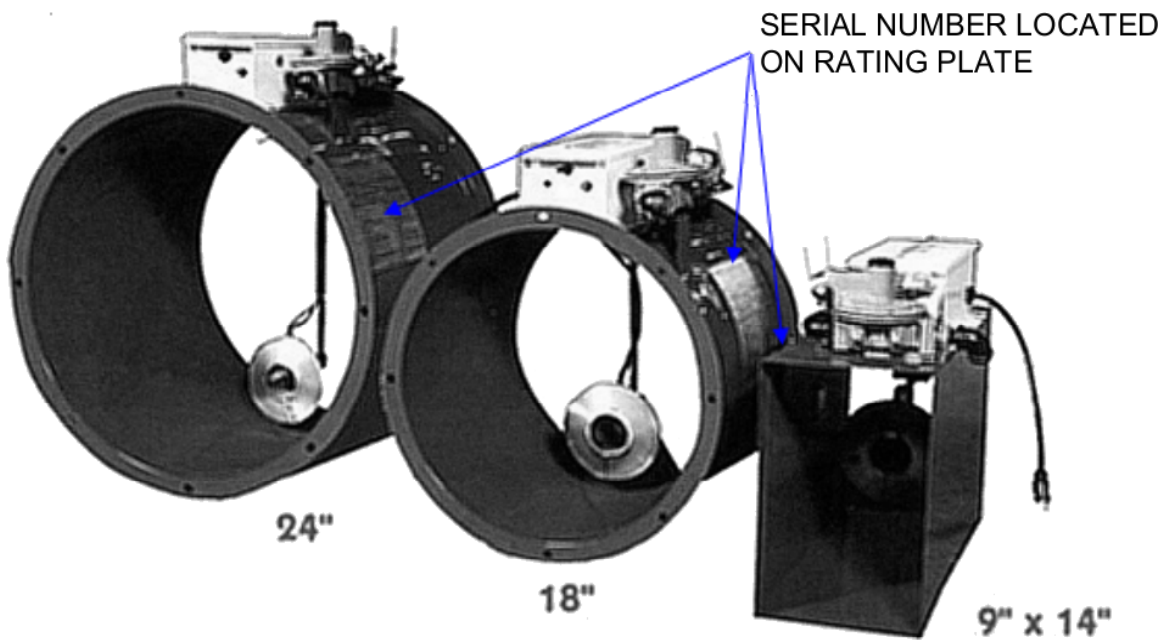
Keep this manual handy for frequent reference and to review with new personnel. A sign-off form is provided on the inside front cover for your convenience. If any information in this manual is not understood or if you need additional information, please contact your local distributor or dealer for assistance.

This manual should be regarded as part of the equipment. Suppliers of both new and second-hand equipment are advised to retain documentary evidence that this manual was provided with the equipment.

## 1.1. Serial Number Location

Always give your dealer the serial number on your supplemental heater (shown below) when ordering parts or requesting service or other information. Please record this information in the table below for easy reference.

<b>Model Number</b>	
<b>Serial Number</b>	
<b>Date Received</b>	



## 1.2. Intended Use

The supplemental heater is designed solely for use in the intended agricultural use as listed below. Use in any other way is considered as contrary to the intended use. Compliance with and strict adherence to the conditions of operation and maintenance as specified by the manufacturer, also constitute essential elements of the intended use.

The supplemental heater should be operated, maintained, serviced, and repaired only by persons who are familiar with its particular characteristics and who are acquainted with the relevant safety procedures.

Accident prevention regulations and all other generally recognized regulations on safety and occupational medicine must be observed at all times.

Any modifications made to the supplemental heater may relieve the manufacturer of liability for any resulting damage or injury.

**Intended use for the supplemental heater:**

- A Grain Guard upstream fan to harvest in damper conditions and aid in natural air drying.

Use in any other way is considered as contrary to the intended use and is not covered by the warranty. For proper bin and heater combination, see [Section 1.2.2 – Heater/Fan to Bin Sizing Charts on page 8](#).

### ***1.2.1 Misuse***

Do not use the supplemental heater for:

- applications other than low temperature heater for drying farm crops.



### 1.2.2 Heater/Fan to Bin Sizing Charts

The heater must be sized for your application, use the following tables to ensure correct sizing prior to installation.

XX	Maximum bin wall height (ft) for heater/fan combination		Optimum heater performance in these applications
(XX)	Maximum bin wall height (ft) to achieve 1 cfm/bushel airflow		Acceptable heater performance in these applications
			Heater operation not recommended in these applications

WHEAT									
Heater/Fan Combinations		Bin Diameter							
		14/15/16'	18/19'	21/22'	24/25'	27'	30'	33'	36'
<b>GGH-8350</b>	<b>9" x 14" 60K BTU</b>								
	3Hp Full Centrifugal	20 (16)	30 (13)	30 (10)	30 (10)	Not Recommended	—	—	—
<b>GGH-8351</b>	<b>9" x 14" 100K BTU</b>								
	5Hp Full Centrifugal	22 (18)	32 (16)	36 (14)	36 (11)	36 (10)	—	—	—
	7.5Hp Full Centrifugal	20 (18)	30 (18)	36 (14)	36 (13)	36 (12)	—	—	—
<b>GGH-8352</b>	<b>18" RND 60K BTU</b>								
	3Hp 18" Inline Centrifugal	15 (12)	18 (12)	22 (10)	30 (10)	Not Recommended	—	—	—
<b>GGH-8353</b>	<b>24" RND 100K BTU</b>								
	5Hp 24" Inline Centrifugal	Not Recommended	16 (12)	18 (14)	24 (12)	28 (10)	—	—	—
	7Hp 24" Inline Centrifugal	Not Recommended	18 (14)	20 (16)	28 (14)	32 (12)	—	—	—
<b>GGH-8354</b>	<b>12" x 17" 200K BTU</b>								
	10Hp Full Centrifugal	—	Not Recommended	Not Recommended	30 (15)	30 (12)	30 (11)	30 (9)	30 (8)
<b>GGH-8355</b>	<b>28" RND 200K BTU</b>								
	10Hp 28" Inline Centrifugal	—	30 (20)	30 (18)	30 (16)	30 (15)	30 (13)	30 (11)	30 (9)

CANOLA									
Heater/Fan Combinations		Bin Diameter							
		14/15/16'	18/19'	21/22'	24/25'	27'	30'	33'	36'
<b>GGH-8350 9" x 14" 60K BTU</b>									
	3Hp Full Centrifugal	Not Recommended	12 (10)	18 (10)	22 (9)	27 (7)	—	—	—
<b>GGH-8351 9" x 14" 100K BTU</b>									
	5Hp Full Centrifugal	12 (12)	18 (12)	16 (11)	20 (10)	25 (8)	—	—	—
	7.5Hp Full Centrifugal	Not Recommended	13 (12)	16 (12)	24 (10)	24 (10)	—	—	—
<b>GGH-8352 18" RND 60K BTU</b>									
	3Hp 18" Inline Centrifugal	Not Recommended	Not Recommended	Not Recommended	12 (8)	12 (6)	—	—	—
<b>GGH-8353 24" RND 100K BTU</b>									
	5Hp 24" Inline Centrifugal	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended	—	—	—
	7Hp 24" Inline Centrifugal	Not Recommended	Not Recommended	Not Recommended	Not Recommended	12 (10)	—	—	—
<b>GGH-8354 12" x 17" 200K BTU</b>									
	10Hp Full Centrifugal	—	Not Recommended	Not Recommended	Not Recommended	30 (12)	30 (10)	30 (9)	30 (7)
<b>GGH-8355 28" RND 200K BTU</b>									
	10Hp 28" Inline Centrifugal	—	27 (16)	30 (15)	30 (14)	30 (13)	30 (12)	30 (10)	30 (9)

PEAS/CORN									
Heater/Fan Combinations		Bin Diameter							
		14/15/16'	18/19'	21/22'	24/25'	27'	30'	33'	36'
<b>GGH-8350 9" x 14" 60K BTU</b>									
	3Hp Full Centrifugal	40 (20)	40 (16)	40 (12)	40 (10)	40 (8)	—	—	—
<b>GGH-8351 9" x 14" 100K BTU</b>									
	5Hp Full Centrifugal	40 (24)	40 (20)	40 (15)	40 (12)	40 (10)	—	—	—
	7.5Hp Full Centrifugal	40 (24)	40 (22)	40 (18)	40 (14)	40 (12)	—	—	—
<b>GGH-8352 18" RND 60K BTU</b>									
	3Hp 18" Inline Centrifugal	35 (18)	35 (14)	35 (12)	35 (10)	35 (8)	—	—	—
<b>GGH-8353 24" RND 100K BTU</b>									
	5Hp 24" Inline Centrifugal	24 (24)	36 (20)	40 (16)	40 (14)	40 (12)	—	—	—
	7Hp 24" Inline Centrifugal	26 (25)	35 (24)	35 (20)	40 (16)	40 (14)	—	—	—
<b>GGH-8354 12" x 17" 200K BTU</b>									
	10Hp Full Centrifugal	—	40 (26)	40 (22)	40 (18)	40 (15)	40 (12)	40 (10)	40 (8)
<b>GGH-8355 28" RND 200K BTU</b>									
	10Hp 28" Inline Centrifugal	—	40 (27)	40 (24)	40 (20)	40 (17)	40 (14)	40 (12)	40 (9)



# 2. Safety

## 2.1. Safety Alert Symbol and Signal Words



This safety alert symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury or death, carefully read the message that follows, and inform others.

**Signal Words:** Note the use of the signal words **DANGER**, **WARNING**, **CAUTION**, and **NOTICE** with the safety messages. The appropriate signal word for each message has been selected using the definitions below as a guideline.

**DANGER** Indicates an imminently hazardous situation that, if not avoided, will result in serious injury or death.

**WARNING** Indicates a hazardous situation that, if not avoided, could result in serious injury or death.

**CAUTION** Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.

**NOTICE** Indicates a potentially hazardous situation that, if not avoided, may result in property damage.

## 2.2. General Safety

The safety information in the safety section of this manual applies to all safety practices. Specific safety information (such as Operation Safety), can be found in the appropriate section.

**YOU** are responsible for the **SAFE** use and maintenance of your supplemental heater. **YOU** must ensure that you and anyone else who is going to work around the supplemental heater understands all procedures and related **SAFETY** information contained in this manual.

Remember, **YOU** are the key to safety. Good safety practices not only protect you, but also the people around you. Make these practices a working part of your safety program. All accidents can be avoided.

- It is the supplemental heater owner, operator, and maintenance personnel's responsibility to read and understand **ALL** safety instructions, safety decals, and manuals and follow them when assembling, operating, or maintaining the equipment.
- Owners must give instructions and review the information initially and annually with all personnel before allowing them to operate the supplemental heater. Untrained users/operators expose themselves and bystanders to possible serious injury or death.
- The supplemental heater is not intended to be used by children.
- Use the supplemental heater for its intended purposes only.
- Do not modify the supplemental heater in any way without written permission from the manufacturer. Unauthorized modification may impair the function and/or safety, and could affect the life of the supplemental heater. Any unauthorized modification of the supplemental heater will void the warranty.



## 2.3. Heater Safety

**WARNING** Do not store or use gasoline or other flammable vapours and liquids in the vicinity of this or any other appliance.

### WHAT TO DO IF YOU SMELL GAS:

- Turn off gas at source if possible.
- Do not try to light or relight any appliance.
- Extinguish any flames and remove any sources of ignition from the vicinity of the heater.
- Do not touch any electrical switch.
- Evacuate all personnel from the vicinity of the source of the smell.
- Immediately call your gas supplier. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.



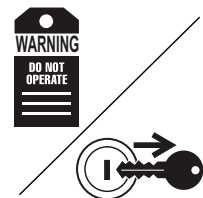
**WARNING** The use and storage of gasoline and other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.

## 2.4. Lockout/Tagout Safety

Inspect the power source(s) before using and know how to shut down in an emergency. Whenever you service or adjust your equipment, make sure you shut down your power source and gas supply and follow lockout and tagout procedures to prevent inadvertent start-up and hazardous energy release. Know the procedure(s) that applies to your equipment from the following power sources.

For example:

- De-energize, block, and dissipate all sources of hazardous energy.
- Lock out and tag out all forms of hazardous energy.
- Ensure that only 1 key exists for each assigned lock, and that you are the only one that holds that key.
- After verifying all energy sources are de-energized, service or maintenance may be performed.
- Ensure that all personnel are clear before turning on power to equipment. For more information on occupational safety practices, contact your local health and safety organization.



## 2.5. Personal Protective Equipment

The following Personal Protective Equipment (PPE) should be worn when operating or maintaining the equipment.

### Work Gloves

- Wear work gloves to protect your hands from sharp and rough edges.



## 2.6. Safety Equipment

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The following safety equipment should be kept on site:

### Fire Extinguisher

- Provide a fire extinguisher for use in case of an accident. Store in a highly visible and accessible place.



### First-Aid Kit

- Have a properly-stocked first-aid kit available for use should the need arise, and know how to use it.



## 2.7. Safety Decals

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- Keep safety decals clean and legible at all times.
- Replace safety decals that are missing or have become illegible. See decal location figures that follow.
- Replaced parts must display the same decal(s) as the original part.
- Replacement safety decals are available **free of charge** from your distributor, dealer, or factory.

### 2.7.1 Decal Installation/Replacement

1. Decal area must be clean and dry, with a temperature above 50°F (10°C).
2. Decide on the exact position before you remove the backing paper.
3. Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
4. Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place.
5. Small air pockets can be pierced with a pin and smoothed out using the sign backing paper.

### 2.7.2 Safety Decal Locations and Details

Replicas of the safety decals that are attached to the supplemental heater and their messages are shown in the figure(s) that follow. Safe operation and use of the supplemental heater requires that you familiarize yourself with the various safety decals and the areas or particular functions that the decals apply to, as well as the safety precautions that must be taken to avoid serious injury, death, or damage.



Figure 1. Safety Decal Locations (GGH-8350, GGH-8351, and GGH-8354 Heaters)

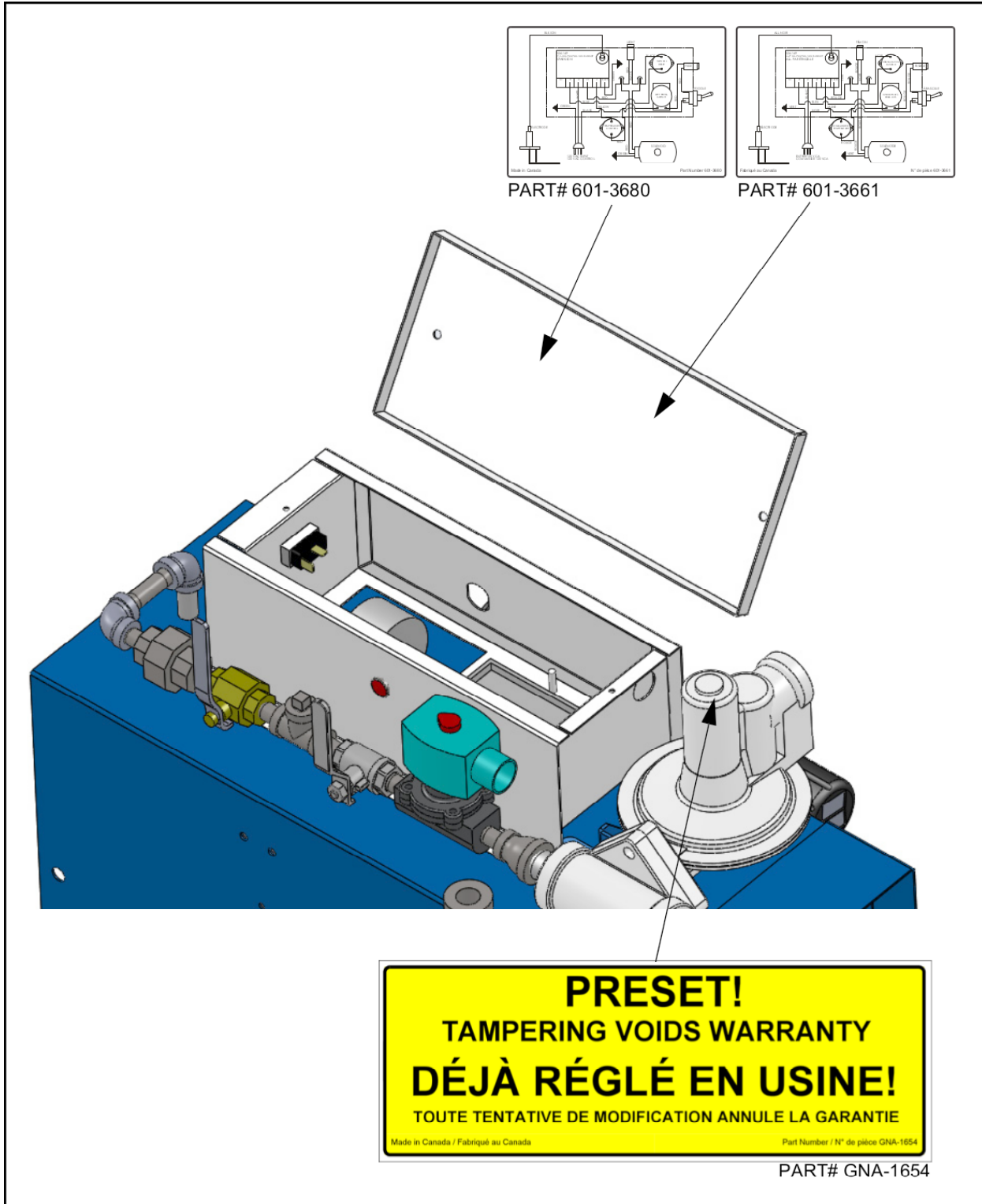


Figure 2. Safety Decal Locations (GGH-8350, GGH-8351, and GGH-8354 Heaters)

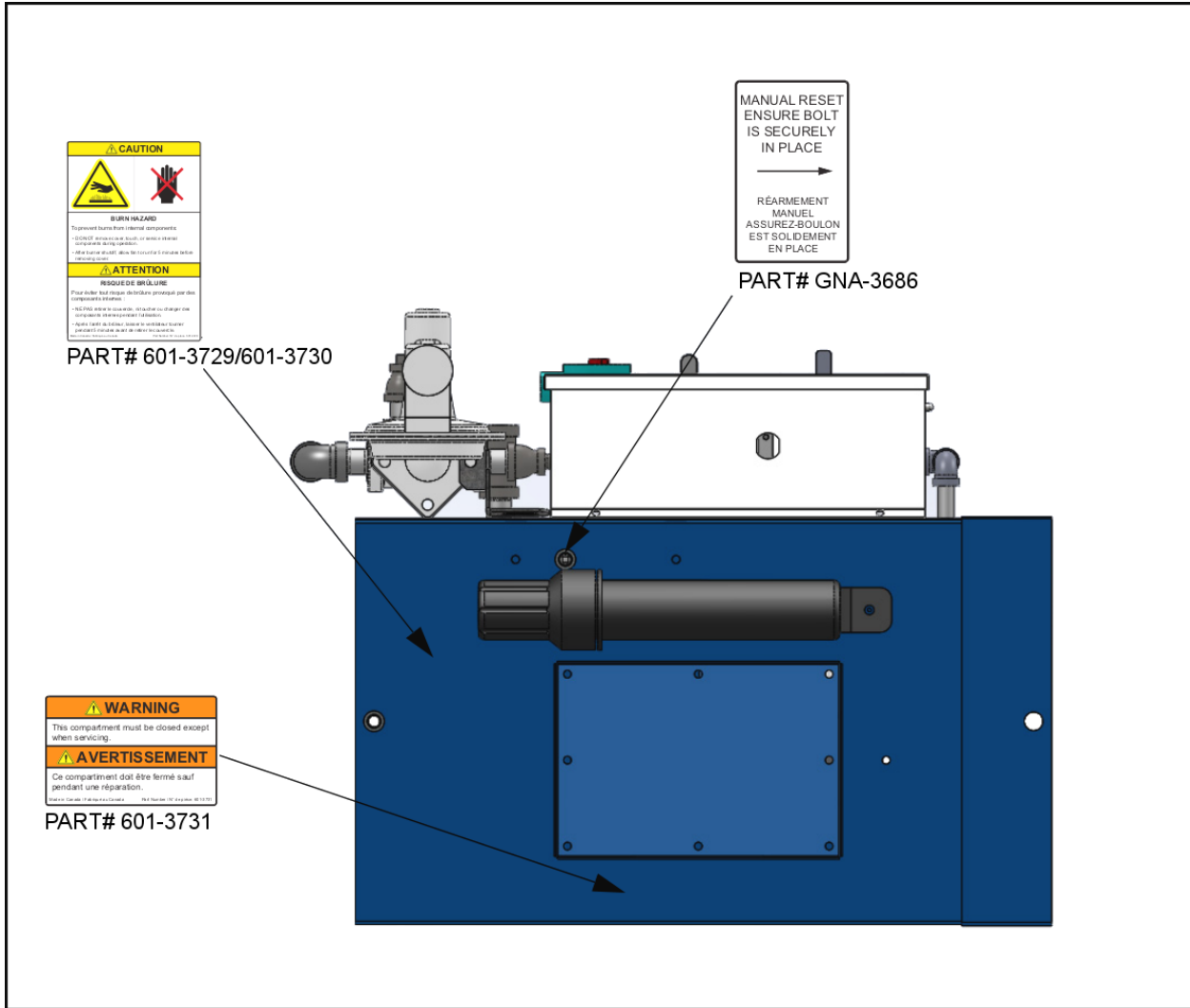


Figure 3. Safety Decal Locations (GGH-8350, GGH-8351, and GGH-8354 Heaters)

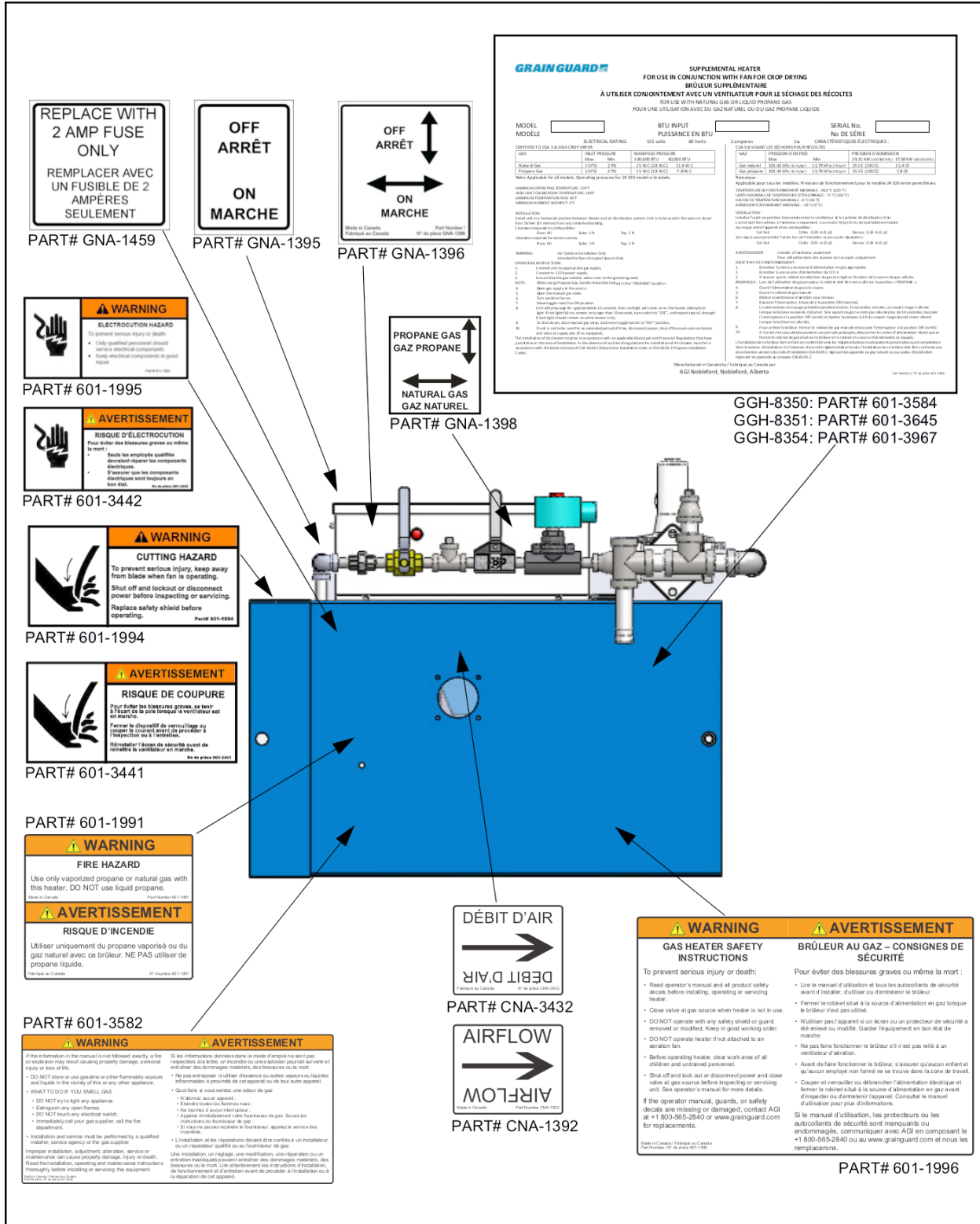


Figure 4. Safety Decal Locations (GGH-8352, GGH-8353, and GGH-8355 Heaters)

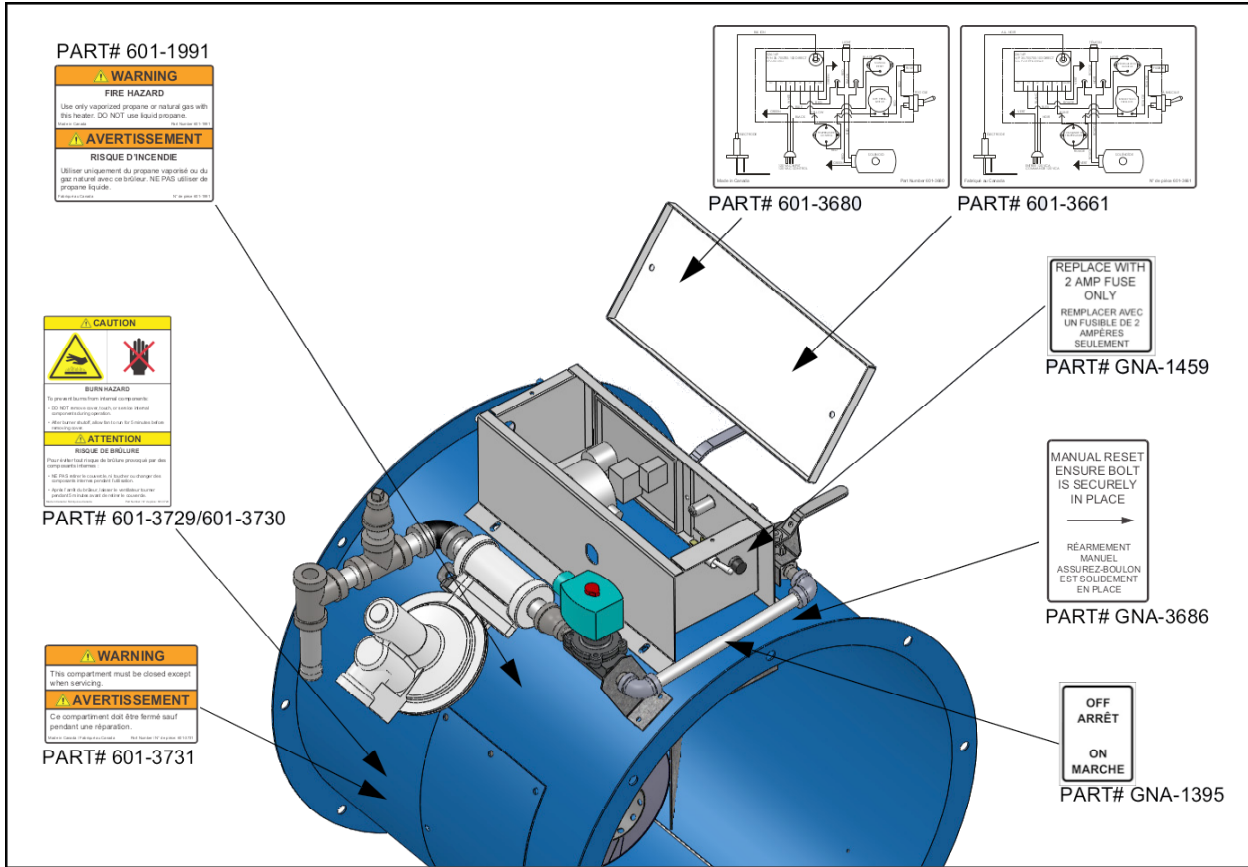


Figure 5. Safety Decal Locations (GGH-8352 Heater)

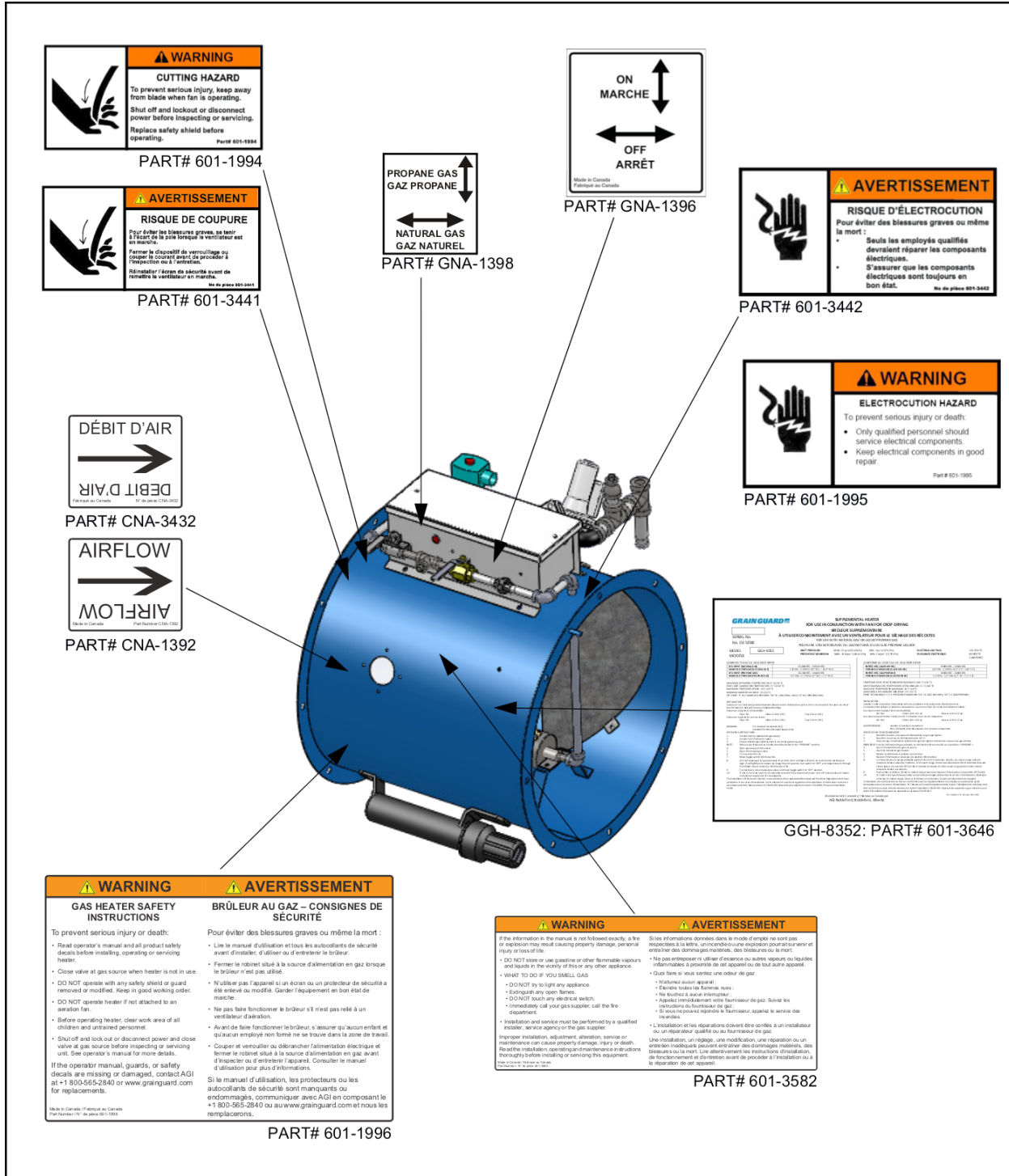
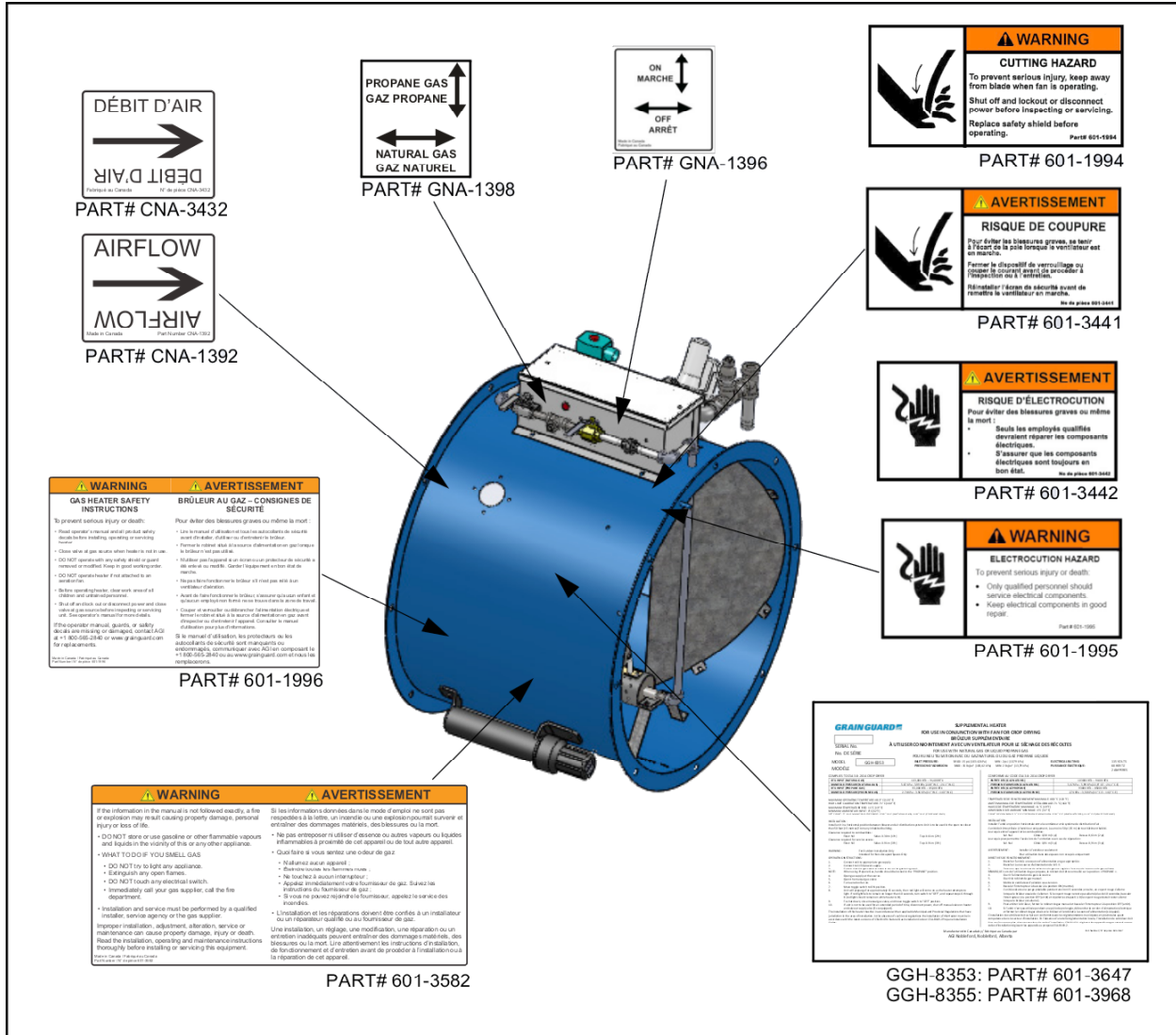


Figure 6. Safety Decal Locations (GGH-8353 and GGH-8355 Heaters)





# 3. Installation



Before continuing, ensure you have completely read and understood this manual's Safety section, in addition to the safety information in the section(s) below.

## 3.1. Installation Safety

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### DANGER

- All installation and servicing operations are to be carried out by a qualified gas technician.
- The equipment shall be installed in accordance with the *Natural Gas and Propane Installation Code, CSA B149.1* and the *Propane Storage and Handling Code, CSA B149.2*, or applicable provincial regulations, which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before installations are made.

### WARNING

- Do not take chances with safety. The components can be large, heavy, and hard to handle. Always use the proper tools, rated lifting equipment, and lifting points for the job.
- Always have two or more people installing the supplemental heater.
- Make sure you have sufficient lighting for the work area.
- Tighten all fasteners according to their specifications. Do not replace or substitute bolts, nuts, or other hardware that is of lesser quality than the hardware supplied by the manufacturer.

## 3.2. Check Shipment

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Inspect the supplemental heater and accessories on receipt to ensure that all items have arrived and that none are damaged.

Report missing or damaged parts immediately to ensure that proper credit is received from Grain Guard or your distributor/dealer, and to ensure that any missing parts can be shipped quickly to avoid holding up the installation.

### **Important**

Do not use damaged components.



### 3.3. Location Requirements

The location of the heater, vent, and gas container must be considered.

#### Heater

Location of the heater:

Flat Bottom Bins	Ensure the heater is level with the fan and that both are adequately supported.
Hopper Bottom Bins	Ensure there is adequate support for both the heater and the fan.

When installing the heater, the following general requirements apply:

- The heater must be installed on a non-combustible level surface.
- The heater must be located as close to the bin as possible (leave a minimum of 3' (0.91 m) on all sides for routine servicing and inspection).
- Provide adequate drainage to protect the heater from water damage.
- The heater and fan should be positioned opposite of the unload auger. If there are multiple fans and heaters being used, they should be opposite of the unload auger and no further than 90° apart.

#### Vent

Ensure that the vent of the gas heater regulator terminates properly according to the requirements listed in [Table 1 on page 20](#).

**Table 1. Venting Requirements of Regulators**

	Natural Gas (ANSI Z21.20/CSA 6.22 Certified Overpressure Protection Device)	Natural Gas	Propane
Building opening (includes air intakes less than 8 inches in diameter or of equivalent area)	1 ft (0.3 m)	3 ft (1m)	3 ft (1 m)
Appliance vent outlet	1 ft (0.3 m)	3 ft (1 m)	3 ft (1 m)
Moisture exhaust duct (includes gas or electric dryer termination)	3 ft (1 m)	3 ft (1 m)	3 ft (1 m)
Mechanical air intake	3 ft (1 m)	10 ft (3 m)	10 ft (3 m)
Appliance air intake	1 ft (0.3 m)	3 ft (1 m)	10 ft (3 m)
Source of ignition	1 ft (0.3 m)	3 ft (1 m)	10 ft (3 m)

#### Gas Containers

Ensure that there is no LP-gas container (liquid propane) closer than 6' (1.83 m) from the heater. Keep other combustible materials at least 1' (0.3 m) from the sides and 2' (0.61 m) from the top of the heater.



**⚠ WARNING** When using a stationary tank, DO NOT connect gas supply line to the bottom of the tank as this will supply liquid propane which cannot be used in this heater. Delivering liquid propane to the heater may result in serious personal injury and property damage and will void the warranty of the heater. Connect the gas supply line to the top outlet of the tank to ensure that the heater is drawing vaporized propane.

## 3.4. Install the Heater

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This section describes the installation of the heater between the fan and grain bin duct.

Before installing:

- Ensure that the fan has adequate capacity for the heater and grain bin size. See [Section 1.2.2 – Heater/Fan to Bin Sizing Charts on page 8](#).
- Ensure that the fan intake is at least 12" (305 mm) above ground to prevent it from drawing debris into the fan and heater.

### Heater Orientation

Install the heater in a horizontal position with the burner end closest to the fan and the control box is facing upwards in a 12 o'clock position.

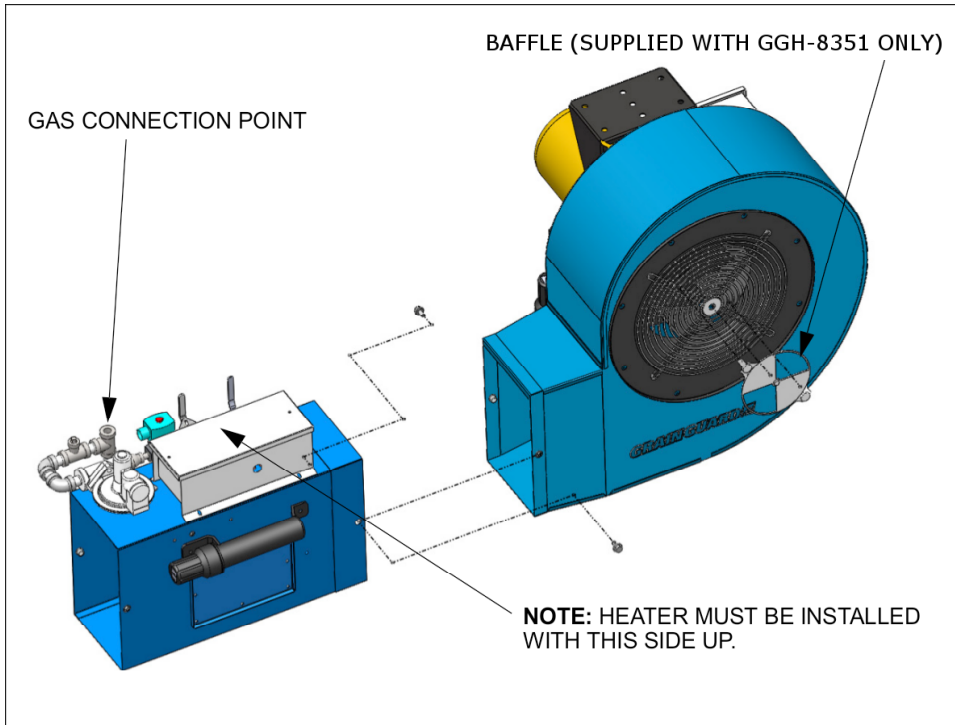
**⚠ WARNING** Failure to install the heater and fan in the proper orientation will result in failure of safety devices located in the heater unit. This may result in serious personal injury and property damage and will void the warranty of the heater.

### Install the Rectangular Heater (9" x 14" or 12" x 17")

1. Slip the un-collared end of the heater unit into the air inlet on the bin. Fasten them together with the supplied 3/8" bolts.
2. Slip the fan into the collared end of the heater until the bolt holes line up. Fasten them together with the supplied 3/8" bolts.
- ➔ 3. **For GGH-8351 with Natural Gas:** Attach the baffle to the fan grill with push pins if poor performance is experienced. See [Section 6. – Troubleshooting on page 33](#) for instructions.



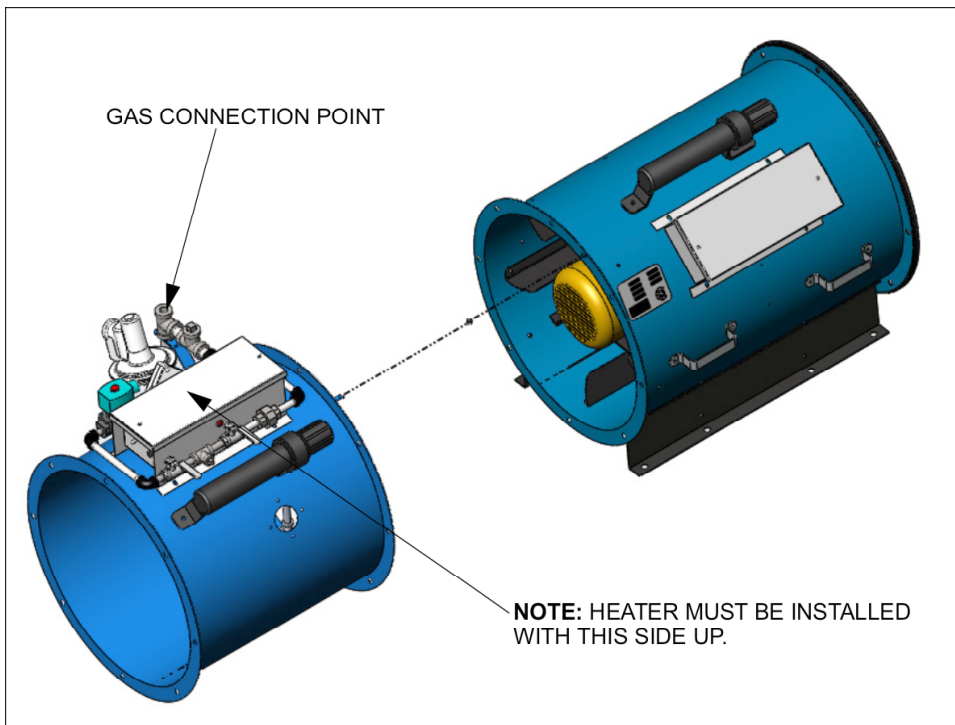
**Figure 7. Installing Rectangular Heater (9" x 14" or 12" x 17")**



**Install the Round Heater (18", 24" or 28")**

1. Align the 1/4" alignment pin on the heater body to the 1/4" alignment hole on the fan body. See [Figure 8](#).
2. Bolt the heater to the flanged inlet of the bin air inlet using 3/8" bolts and locknuts.

**Figure 8. Installing Round Heater (18", 24" or 28")**



## 3.5. Connect the Gas Supply

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This procedure describes how to connect propane or natural gas to the heater, test for piping system pressure, and test for gas leaks.

### Connecting the Gas Hose

1. Ensure that the gas pressure at the inlet of the heater is within the specified range. Refer to the dryer rating plate for determining the gas supply pressure.

#### Note

The heater will not run on gas that is supplied under 4 psi (27.58 KPa).

2. Connect the gas hose.
  - a. Use 1/4" gas hose assembly to connect to a propane cylinder.
  - b. Use 3/8" gas hose assembly to connect to a natural gas supply.
3. Inspect the hose assembly and ensure that it is protected from traffic.

#### Important

If there is excessive abrasion, wear, or if the hose is cut, it must be replaced.

4. Connect the hose to the female 1/2" NPT port in the heater. Do not attach the gas hose to any other port on the heater.

#### WARNING

When connecting unit for use with propane gas, arrange the cylinders so that they remain upright and there is no chance of tipping over. Should the cylinder(s) tip over, it will be supplying propane to the heater in the liquid state and may result in serious personal injury and property damage and will void the warranty of the heater.

### Pressure Testing of Piping System

1. Any testing of the gas supply piping system is to be carried out by a qualified gas technician.
2. During any system test at test pressures in excess of 1/2 psi (3.5 KPa), the dryer and its individual shutoff valve must be disconnected from the gas supply piping system.
3. During any system test at test pressures equal to or less than 1/2 psi (3.5 KPa), the dryer must be isolated from the gas supply piping system by closing its individual manual shutoff valve.
4. The gas supply piping system must have an emergency shut off valve within the immediate vicinity of the heater in case of fire or explosion.

#### NOTICE

Ensure that the person who maintains this heater is certified to work with electrical and gas equipment, and has read and understands the instructions contained in this manual.

### Testing for Gas Leaks

After installation, open the gas supply to the heater and check all hose connections for gas leaks by applying a mild soap and water solution to the connections. Turn off gas supply after checking.


## 3.6. Connect to Electrical Supply

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1. Connect the heater to an adequate 115 V electrical supply (as specified on the rating plate).
2. Ensure that 115 V electrical supply is connected to an electrical disconnect switch having 120 Volt and 15 amp ratings that is installed in accordance with the Canadian Electrical Code, Part 1, CSA22.1.



3. For protection against shock hazard, the supply cord must be plugged directly into a grounded, 3-wire extension cord (if required). This cord must be plugged into a grounded 3-prong receptacle. The extension cord should be a minimum of 14-3.

 **WARNING** This unit is for outdoor installation only.

# 4. Operation



Before continuing, ensure you have completely read and understood this manual's Safety section, in addition to the safety information in the section(s) below.

## 4.1. Operation Safety

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**WARNING**

- Ensure the heater is connected to the appropriate gas supply and the gas selector valve is properly set.
- The area around the heater should be kept clear and free from combustible materials and other flammable liquids.
- Ensure the fan inlet is not plugged with any foreign material.
- Always operate with guards, covers, and shields in place.
- Ensure maintenance has been performed and is up to date.
- When heater is not in use, shut off gas valve on heater and at gas source.

## 4.2. Start-Up and Break-In

---

1. Open all roof vents and ensure that they are not obstructed.

**NOTICE**

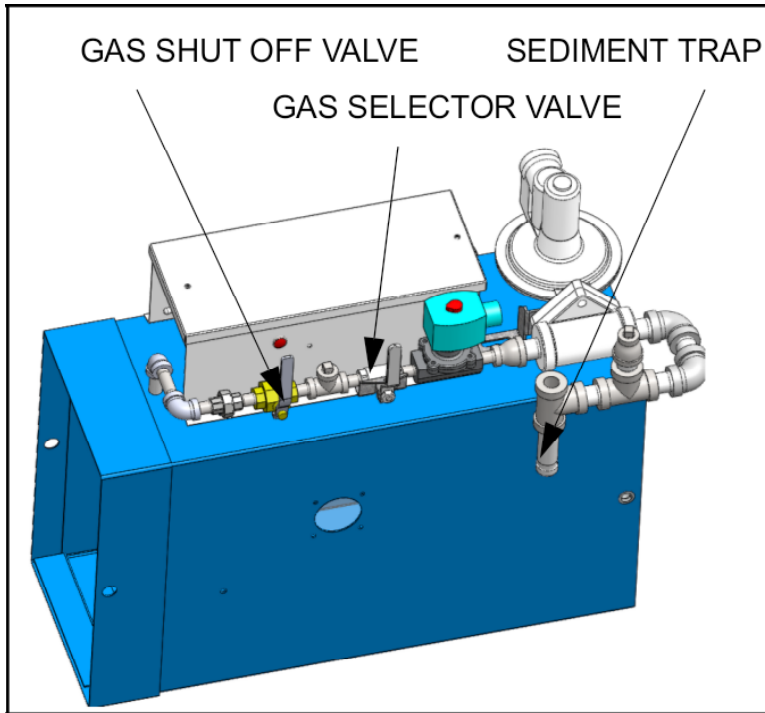
If there is a chance of the roof vents freezing, do not operate the heater.

2. Check the fan inlet and make sure there are no obstructions.
3. Connect the heater to appropriate gas supply (propane or natural gas).
4. Connect the heater to 115 V, 15 A power supply.
5. Set the gas selector valve to the gas being used. This conversion should be done before the fan is started.

**WARNING**

When using propane, gas selector valve must be at the PROPANE position. Failure to heed will cause the heater to overfire and may cause personal injury, damage to the heater unit and/or damage grain stored in bin.



**Figure 9. Gas Valve**

6. Open gas supply at the source (propane cylinder valve or natural gas supply line valve).

**Important**

Do not use heater if propane is below 20% full. Low propane levels could create carboning in heater.

7. Open the manual gas valve.
8. Turn the fan on.
9. Move the heater toggle switch to ON position.
10. The heater will pre-purge for 15 seconds, then red light will come on as the heater attempts to light. If red light fails to remain on longer than 8 seconds, turn switch to OFF position and repeat from [Step 8](#) (red light should remain on while heater is lit).
11. During initial heater startup, qualified gas service personnel must perform a gas leak check to verify the gas tightness of the heater's components and piping under normal operating conditions.

**Note**

If heater fails to light and/or function properly, see [Section 6. – Troubleshooting on page 33](#).

**NOTICE**

The heater is designed to cease operations at static pressures beyond design limit where poor combustion occurs. Refer to 1.2.2 Heater/Fan to Bin Sizing Charts, page 8 to determine the proper bin and heater combination.

## 4.3. Flame Inspection

---

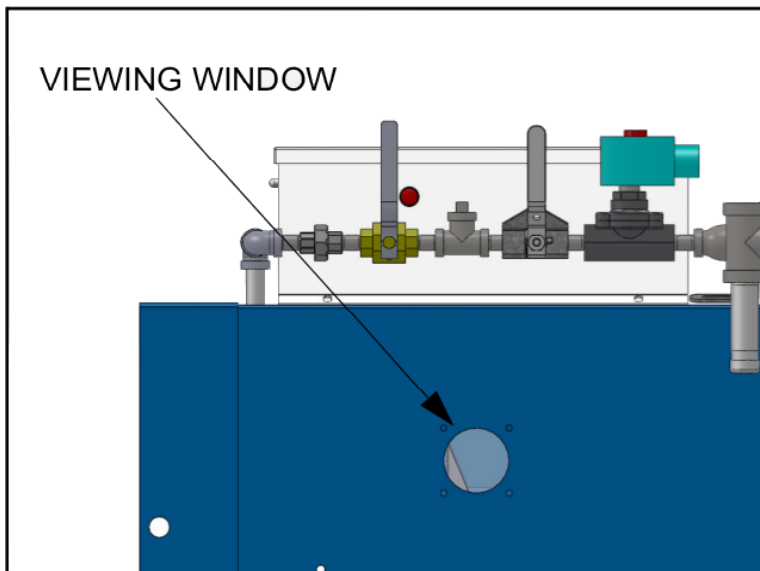
This heater uses a burner that must be functioning correctly in order for the heater to produce the specified BTUs.

Inspect the flame through the viewing window on the side of the heater. The flame should look blue with an orange tip approximately 2" (51 mm) to 2-1/2" (63.5 mm) long.

- If the flame is all blue and short, than the airflow is too high. Either:
  - add more grain to the bin to increase the static pressure (lower air flow), or
  - use a smaller fan with less air flow.
- If the flame is yellowish and long, then airflow is too low.
  - ensure that there aren't any restrictions in air flow, and
  - the valves are set correctly.

If the problem remains, either remove grain from the bin to increase air flow or use a larger fan.

**Figure 10. Viewing Window**

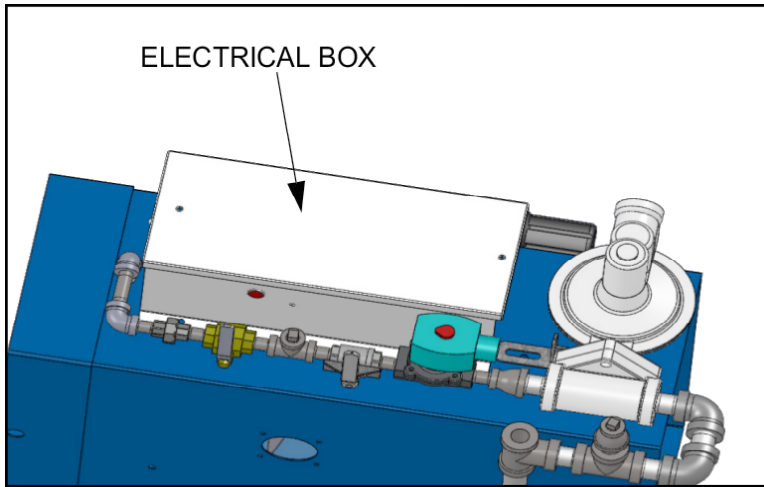


## 4.4. Electrical Box

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All electrical components are in the electrical box on the top of the heater (see figure below).

**Figure 11. Electrical Box**



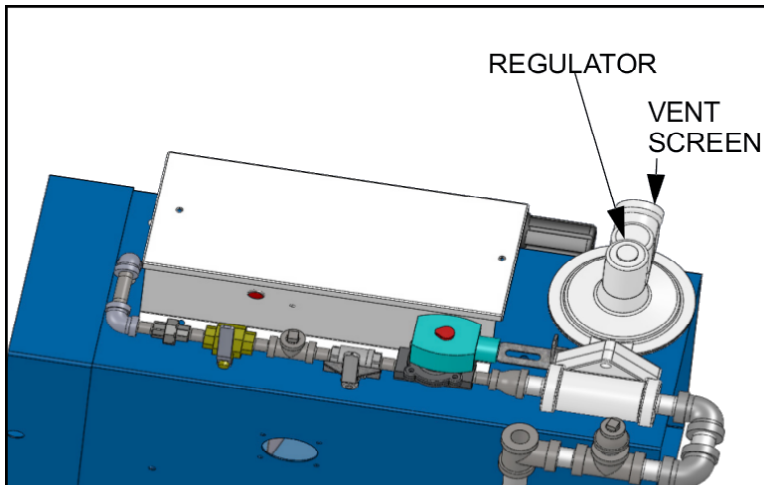
## 4.5. Pressure Regulator

---

This heater contains a pressure regulator on top of the unit.

- The regulator is preset at the factory and does not require any adjustment of any kind.
- Ensure vent screen is clear at all times.

**Figure 12. Pressure Regulator**



### **Important**

Any tampering with the regulator voids the warranty.



## 4.6. Shutdown

---

1. Close the gas shut off valve.
2. Move the toggle switch to the OFF position.

## 4.7. Storage Instructions

---

If the heater is not to be used for an extended period of time:

1. Close the propane/natural gas valve at tank/hydrant.
2. Allow the heater unit to run until the flame burns out. This purges the gas out of the heater plumbing and supply lines.
3. Close the gas valve on the heater to OFF.
4. Turn off and unplug the heater.
5. Allow the fan to operate for at least 2 minutes to cool the heater down.
6. Shut off the fan.
7. Storage area:
  - Outside storage— cover the heater with a tarp or other protective cover.
  - Inside storage — ensure the heater is placed in a dry and safe location and away from anything that may damage it.



# 5. Maintenance



Before continuing, ensure you have completely read and understood this manual's Safety section, in addition to the safety information in the section(s) below.

## 5.1. Maintenance Safety

---

### WARNING

- Keep components in good condition. Follow the maintenance procedures.
- Ensure the service area is clean, dry, and has sufficient lighting.
- Do not modify any components without written authorization from the manufacturer. Modification can be dangerous and result in serious injuries.
- Lock out power source and shut off gas valves.
- All gas components, connections, and appliances are to be serviced or maintained by a qualified gas technician.
- After maintenance is complete, replace all guards, service doors, and/or covers.
- Use only genuine Grain Guard replacement parts or equivalent. Use of unauthorized parts will void warranty. If in doubt, contact Grain Guard or your local dealer.



## 5.2. Yearly Maintenance

---

The following maintenance should be performed before the heater is used at the beginning of each season.

1. Remove the heater from the fan and bin. Refer to the applicable heater installation instructions in the [Section 3.4. – Install the Heater on page 21](#). Follow these instructions in reverse order to remove the heater.
2. Check burner orifices to ensure that they are not plugged with foreign material. If necessary, remove material and use a small wire brush or pipe cleaners to clean the ports in the burner housing.
3. Examine electrode gap and ensure it is 3/16" (4.8 mm). Adjust if necessary. Replace electrode if corroded.

### WARNING

Replacement of components is to be carried out by authorized AGI personnel only.

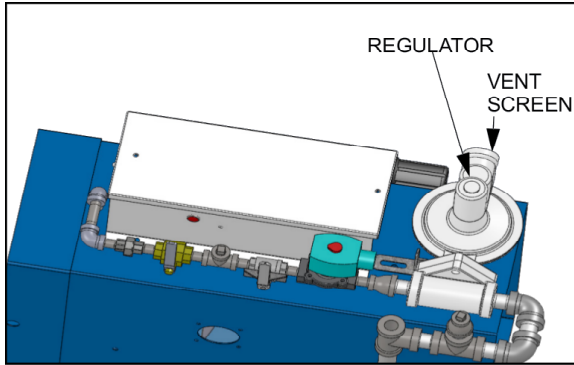
4. Check all plumbing joints for leaks. Use a mixture of water and mild soap and spray on the joints. If bubbling occurs, a leak exists and the fitting needs to be tightened or replaced by a qualified gas technician.
5. Check all electrical wires and connections outside the control box. Replace if required.
6. Check sediment trap for debris and/or oil by unscrewing the cap on the end of the trap and removing any debris that has accumulated. If a large amount of debris and/or oil is discovered, remove the cap and trap from valve train and wash with Varsol or similar cleaning solution. Ensure that the trap is completely dry and reattached to the valve train before operating heater. **DO NOT USE COMPRESSED AIR WHILE CONNECTED TO THE HEATER.** Doing so will damage the regulator and the heater will not function.

## 5.3. Pressure Regulator

**WARNING** Death or serious injury due to fire or explosion could result from an improperly connected replacement pressure regulator.

Regulator must be replaced at the factory or replaced by a qualified gas technician approved by AGI Nobleford.

**Figure 13. Pressure Regulator**



**Important**

Any tampering with the regulator voids the warranty.

Ensure vent screen is clear at all times.

## 5.4. Solenoid Valve

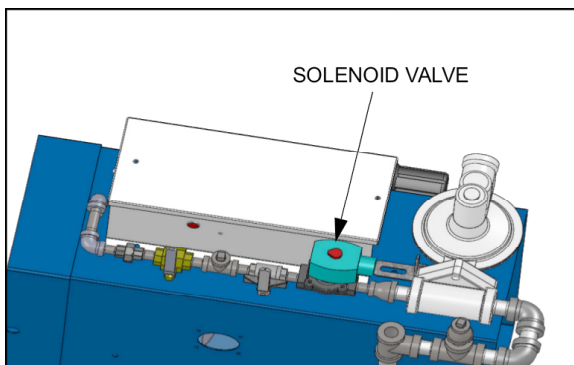
**WARNING** Death or serious injury due to fire or explosion could result from an improperly connected replacement solenoid valve.

Solenoid valve must be replaced at the factory or replaced by a qualified gas technician approved by AGI Nobleford.

**Important**

Any tampering with the solenoid valve voids the warranty.

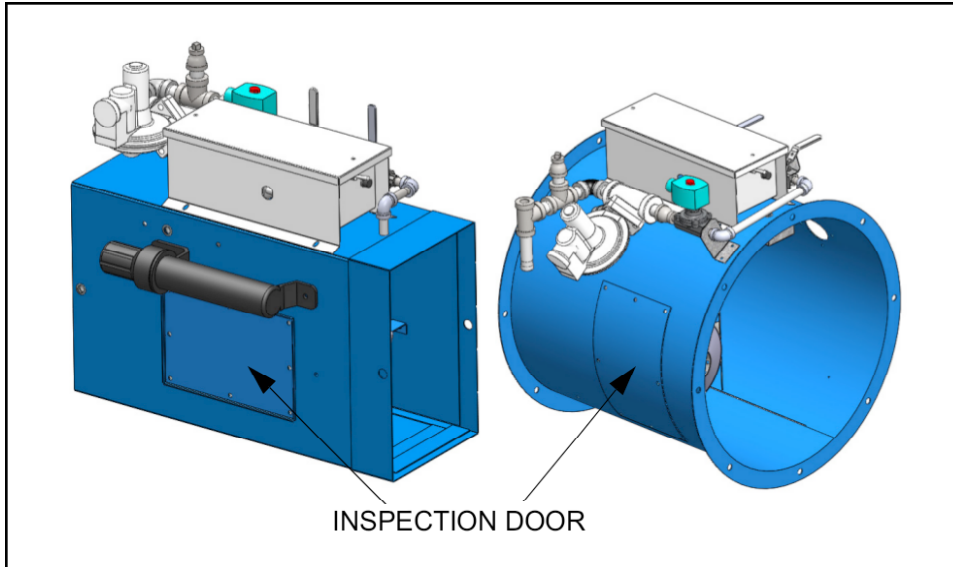
**Figure 14. Solenoid Valve**



## 5.5. Inspection Door

The inspection door can be removed by unscrewing eight 1/4" hex bolts located on the side of the heater opposite the operating controls. It can be used to check internal burner components.

**Figure 15. Inspection Door**



**⚠ WARNING** Do not operate the heater with this cover removed. Failure to do so will result in serious personal injury to yourself or others.

**⚠ CAUTION** Ensure internal components are cool before performing any maintenance on internal components. Failure to do so may result in personal injury.

# 6. Troubleshooting



Before continuing, ensure you have completely read and understood this manual's Safety section, in addition to the safety information in the section(s) below.



Shut down and lock out all power sources before diagnosing any of the causes or attempting any of the solutions below.

In the following section, we have listed some causes and solutions to some of the problems you may encounter.

If you encounter a problem that is difficult to solve, even after having read through this section, please contact your local dealer or distributor. Before you contact them, please have this operation manual and the serial number from your machine ready.

## General Troubleshooting

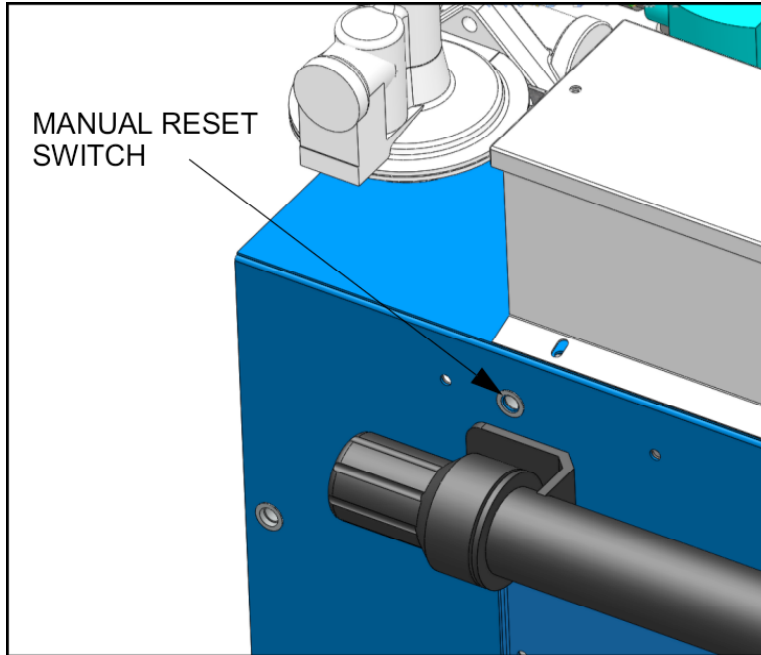
1. Ensure that the bin is filled with the proper amount of grain according to the [Section 1.2.2 – Heater/Fan to Bin Sizing Charts on page 8](#).
2. Move toggle switch to ON position.
3. Wait until the red light comes on (approximately 15 Seconds). The solenoid valve clicks open and the ignitor inside the burner should start to spark. This will continue for 8 seconds.
4. If no spark is seen or an attempt at ignition is made within 30 seconds, reset the system::
  - a. toggle switch to OFF position
  - b. remove the cap screw located on the heater housing just below the on/off switch
  - c. insert a screwdriver into the hole and press lightly

### Note

If a slight popping sound is heard then hi limit has been reset, if no sound is heard, then switch is already reset.

- d. replace cap screw and try starting heater again



**Figure 16. Manual Reset Switch**

5. Should heater still not light refer to [Heater Diagnostic on page 34](#).

### Heater Diagnostic

1. Check the 2 amp fuse.
  - Replace if necessary.
2. Check for voltage across the toggle switch.
  - If no voltage present at the downstream side of the switch, then replace the switch.
3. Check for voltage across the air switch.
  - If there is no voltage at the downstream side of the switch then the switch is not closing. This may be caused by a defective air switch or a lack of airflow across the switch. A lack of airflow would be caused by too much static pressure in the bin where the burner is operating under unfavorable conditions.

#### Note

Heater will not function at high static pressures where flame becomes unstable and burns inefficiently. It is very important to size heater to fan and bin backpressure for optimum performance and minimize nuisance shutdowns. Please refer to [Section 1.2.2 – Heater/Fan to Bin Sizing Charts on page 8](#).

4. Check for power on terminal L1 of DSI module.
  - There should be voltage present here but not on V1.
  - If spark does not come on 15 seconds after the toggle switch has been turned on, or if the solenoid valve does click loudly, then the circuit board is defective and needs replacing.
5. Check the voltage across the red light.
  - If voltage is present then light is defective and needs replacing.

6. Check the hi limit switches (not visible in control box, located in rectangular box below control box in heater chamber).

- Manual reset switch (location shown in [Figure 16 on page 34](#)) first reset manual reset button on Hi limit. If there is power at the V1 terminal of the DSI (blue wire), but no power at the black wire going to the red light then switch is open. The switch is either open or has overheated and tripped out. Let fan run for 2 minutes to cool switch, reset button and retest. If there is still no power on both sides of switch then replace limit switch.

**Note**

This test can also be performed with an ohmmeter by checking for resistance by placing ohmmeter leads on the blue wire at V1 and on black wire going to the red light. If there is continuity then switch is good. If there is no continuity then switch is open and needs replacing.

- Auto reset switch (switch with no reset button). If there is power at the V1 terminal of the DSI (blue wire), but no power at the black wire going to the red light then switch is open. The switch is either open or has overheated and tripped out. Let fan run for 2 minutes to cool switch, reset button and retest. If there is still no power on both sides of switch then replace the limit switch.

**Note**

This test can also be performed with an ohmmeter by checking for resistance by placing ohmmeter leads on the blue wire at V1 and on black wire going to the red light. If there is continuity then switch is good. If there is no continuity then switch is open and needs replacing.

7. Check voltage going to solenoid valve.

- If there power going to the valve (at terminal V1 of the DSI module) and hi limit is good (black and blue wires, [Step 6](#)) but the valve is not snapping open, then valve is defective and needs replacement.
- If valve is opening and spark is present, then there is a problem with the gas supply.
- Check to see if the gas shut off valves are all open or if hose is pinched off.

HEATER DOES NOT START	
Cause	Solution
Burnt out fuse	<ul style="list-style-type: none"> <li>• Check and replace with 2 amp fuse if required.</li> </ul>
Too much Grain Depth in Bin	<ul style="list-style-type: none"> <li>• Adjust grain depth in the bin according to <a href="#">Section 1.2.2 – Heater/Fan to Bin Sizing Charts on page 8</a>.</li> </ul>
Defective start switch	<ul style="list-style-type: none"> <li>• Check for voltage across leads.</li> </ul>
Defective air switch	<ul style="list-style-type: none"> <li>• Test for voltage across leads, if no voltage when running then replace air switch.</li> </ul>
Defective DSI module	<ul style="list-style-type: none"> <li>• Test for in-going power at L1 (yellow wire) on DSI module. If voltage is present but there is no spark produced or voltage at V1, then module is defective.</li> </ul>



<b>RED LIGHT COMES ON, BUT FLAME DOES NOT IGNITE</b>	
Cause	Solution
No spark	<ul style="list-style-type: none"> <li>Check for spark during the ignition cycle by sliding ignition wire terminal off the coil tower on the DSI module and holding it 3/16" from coil terminal. If spark does not arc across gap, DSI module should be replaced.</li> </ul>
Faulty solenoid	<ul style="list-style-type: none"> <li>Check for 120V between terminals V1 &amp; V2 on DSI module, when red light comes on, if there is power present then solenoid is faulty.</li> </ul>
Insufficient gas supply	<ul style="list-style-type: none"> <li>With propane, ensure that the regulator on the tank is supplying gas within the specified range for the heater.</li> <li>Ensure that the regulator on the propane tank is a first stage regulator not a single stage regulator (a regulator that is designed to operate with a second stage regulator, and not by itself). Use of a single stage regulator with a second stage regulator could result in a restriction of the gas flow.</li> <li>With Natural Gas, ensure that the supply pressure to the heater is over 4 psi (27.58 KPa). The minimum size of the gas supply hose/pipe should be 3/8".</li> <li>Check for gas supply by removing 1/4" pipe plug that is located upstream of the pressure regulator. There should be a steady flow of gas if supply tank valve is open. If not correct problem in hose/pipe going back to supply. If gas is present here, then, next check for gas flow at the 1/4" pipe plug that is located downstream from the regulator. If there is no gas flow here when heater is trying to light, then there could be blockage or restriction within any of the components on the valve train. Valve train must be checked and restriction must be removed.</li> </ul>
Incorrect air supply	<ul style="list-style-type: none"> <li>Block off air intake 30 to 50% and try to light; if heater lights then the airflow may be too high. Correct by adding more grain to the bin or using a smaller fan. Please refer to <a href="#">Section 1.2.2 – Heater/Fan to Bin Sizing Charts on page 8</a>.</li> <li>On models GGH-8351 with natural gas, the heater is supplied with an adjustable baffle to limit air supply should the heater have problems lighting. Install baffle on inlet of fan as shown in <a href="#">Figure 7 on page 22</a>. Adjust the opening of the baffle until unit lights consistently, then tighten the bolts to secure baffle position.</li> </ul>

<b>HEATER LIGHTS BUT STOPS IN LESS THAN 8 SECONDS</b>	
Cause	Solution
Too much air	<ul style="list-style-type: none"> <li>If flame is very blue and burning inside the round burner body, restrict air flow until the tips of the flame extend approximately 2" (51 mm) out of the burner, and the tips start to turn an orangey color. If the flame gets too long and turns an orange/yellow color then remove grain from the bin or use a larger fan.</li> </ul>



<b>HEATER LIGHTS BUT STOPS IN LESS THAN 8 SECONDS</b>	
Not enough air	<ul style="list-style-type: none"> <li>If the flame has yellowish tongues and is burning a long way outside of the burner then remove some grain from the bin or use a larger fan.</li> </ul>
Gas supply insufficient	<ul style="list-style-type: none"> <li>With propane, ensure that the regulator on the tank is supplying gas within the specified range, and that the gas is being drawn off the top of the tank.</li> <li>With natural gas ensure that the supply pressure to the heater is over 4 psi (27.58 KPa).</li> <li>Check for frost on any fittings.</li> <li>Check for gas supply by removing 1/4" pipe plug that is located upstream of the pressure regulator. There should be a steady flow of gas if supply tank valve is open. If not, correct problem in hose/pipe going back to supply. If gas is present here, then, next check for gas flow at the 1/4" pipe plug that is located downstream from the regulator. If there is no gas flow here when heater is trying to light, then there could be blockage or restriction within any of the components on the valve train. Valve train must be checked and restriction must be removed.</li> </ul>

<b>HEATER LIGHTS AND RUNS ONLY 8 SECONDS</b>	
Cause	Solution
Reversed polarity	<ul style="list-style-type: none"> <li>The DSI module is polarity sensitive. Ensure polarity of power supply is correct. If the polarity is not correct then correct problem by switching the black and white 120V wires either at the receptacle or the extension cord if it is not correct.</li> </ul>

<b>HEATER RUNS FOR OVER 30 SECONDS AND THEN GOES OUT</b>	
Cause	Solution
Too much air	<ul style="list-style-type: none"> <li>If flame is very blue and burning inside the round burner body, restrict air flow until the tips of the flame extend approximately 2" (51 mm) out of the burner, and the tips start to turn an orangey color. If the flame gets too long and turns an orange/yellow color then remove grain from the bin or use a larger fan.</li> </ul>
Not enough air	<ul style="list-style-type: none"> <li>If the flame has yellowish tongues and is burning a long way outside of the burner then remove some grain from the bin or use a larger fan.</li> </ul>



<b>HEATER RUNS FOR OVER 30 SECONDS AND THEN GOES OUT</b>	
Poor ground	<ul style="list-style-type: none"> <li>• Ensure that heater has good continuity through the ground wire; if not correct the grounding.</li> </ul>
Gas supply insufficient	<ul style="list-style-type: none"> <li>• With propane, ensure that the regulator on the tank is supplying gas within the specified range, and that the gas is being drawn off the top of the tank.</li> <li>• With natural gas, ensure that the supply pressure to the heater is over 4 psi (27.58 KPa).</li> <li>• Check for frost on any fittings.</li> <li>• Check for gas supply by removing 1/4" pipe plug that is located upstream of the pressure regulator. There should be a steady flow of gas if supply tank valve is open. If not, correct problem in hose/pipe going back to supply. If gas is present here, then next check for gas flow at the 1/4" pipe plug that is located downstream from the regulator. If there is no gas flow here when heater is trying to light, then there could be blockage or restriction within any of the components on the valve train. Valve train must be checked and restriction must be removed.</li> </ul>

# 7. Specifications

The design of this heater meets the minimum standard outlined in CSA 3.8-2014 for gas fired equipment for drying farm crops.

Gases: natural or vaporized propane gas

Electrical Rating: 115 volts, 60 Hz, 1 Ph<sup>1</sup>, less than 3 amps

Input Rating:

Heater Model	Dimension	Gas	BTU Range (KW Range)
GGH-8350	9" x 14" (228.6 mm x 355.6 mm)	Natural Gas	66,000 BTU - 36,500 BTU (19.34 KW - 10.70 KW)
		Propane	64,000 BTU - 31,000 BTU (18.76 KW - 9.09 KW)
GGH-8351	9" x 14" (228.6 mm x 355.6 mm)	Natural Gas	111,000 BTU - 81,700 BTU (32.53 KW - 23.94 KW)
		Propane	115,000 BTU - 88,000 BTU (33.70 KW - 25.79 KW)
GGH-8352	Diameter: 18" (457.2 mm)	Natural Gas	65,800 BTU - 50,500 BTU (19.28 KW - 14.80 KW)
		Propane	66,300 BTU - 44,000 BTU (19.43 KW - 12.90 KW)
GGH-8353	Diameter: 24" (609.6 mm)	Natural Gas	103,000 BTU - 91,400 BTU (30.19 KW - 26.79 KW)
		Propane	93,000 BTU - 85,000 BTU (27.26 KW - 24.91 KW)
GGH-8354	12" x 17" (304.8 mm x 431.8 mm)	Natural Gas	220,000 BTU - 195,000 BTU (64.48 KW - 57.15 KW)
		Propane	215,000 BTU - 185,000 BTU (63.01 KW - 54.22 KW)
GGH-8355	Diameter: 28" (711.2 mm)	Natural Gas	215,000 BTU - 195,000 BTU (63.01 KW - 57.14 KW)
		Propane	214,000 BTU - 184,000 BTU (62.72 KW - 53.93 KW)

<sup>1</sup> Ph = single phase power



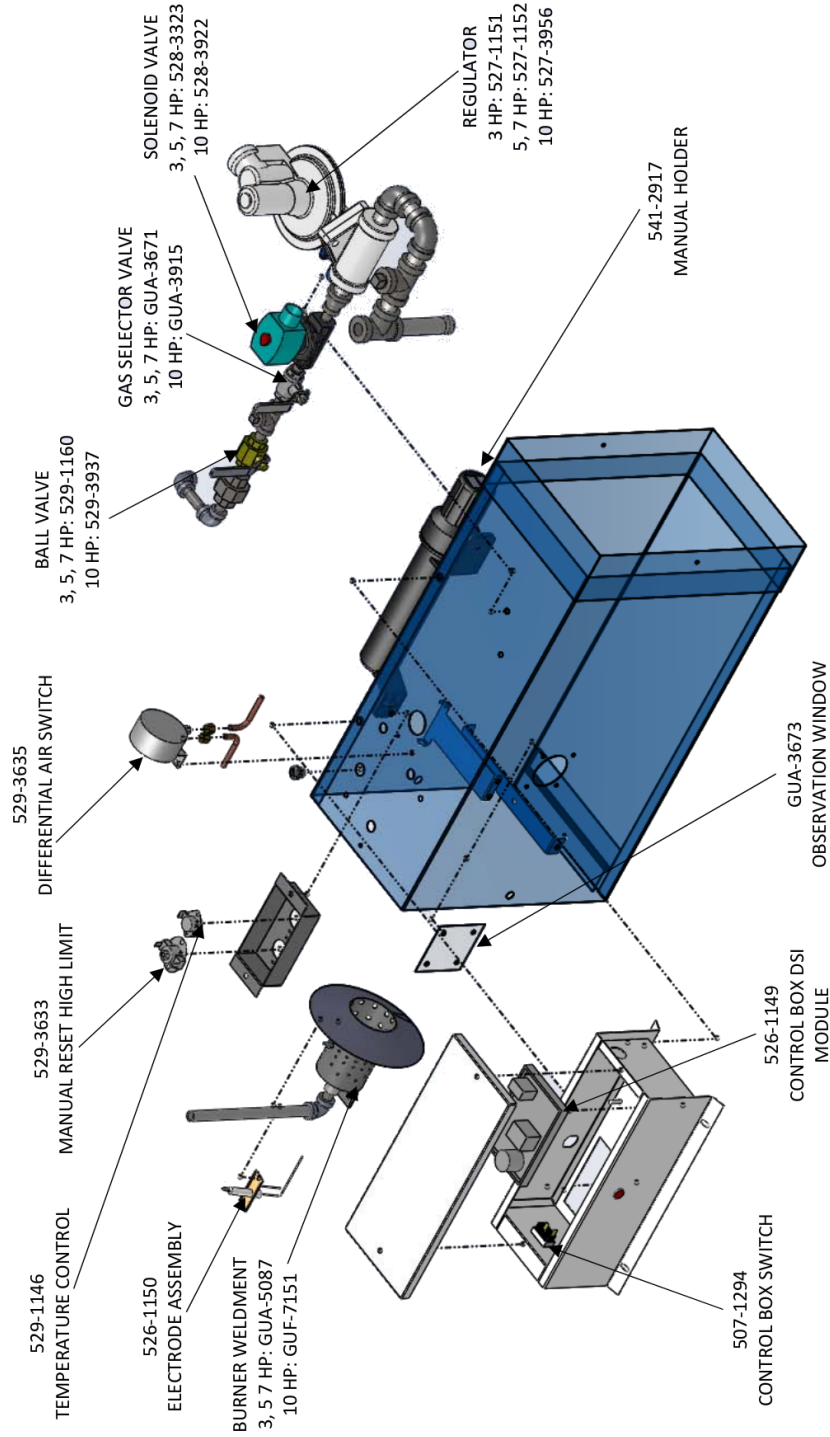
Gas Supply	Inlet Pressure (psi)		Manifold Pressure <sup>a</sup>					
	Max	Min	GGH-8350	GGH-8352	GGH-8351	GGH-8353	GGH-8354	GGH-8355
Natural Gas	15	4	9.8" W.C - 10.9" W.C (2.44 KPa - 2.71 KPa )	9.2" W.C - 10.0" W.C (2.29 KPa - 2.49 KPa)	21.0" W.C - 23.0" W.C (5.23 KPa - 5.72 KPa)	22.8" W.C - 24.1" W.C (5.67 KPa - 5.99 KPa)	—	—
		5	—	—	—	—	55" W.C - 56.2" W.C (13.69 KPa - 13.98 KPa)	49.87" W.C (12.41 KPa)
Propane Gas	15	4	4.3" W.C - 9" W.C (1.07 KPa - 2.24 KPa)	4.7" W.C - 7.1" W.C (1.17 KPa - -1.77 KPa)	9.5" W.C - 16.4" W.C (2.36 KPa - 4.08 KPa)	11" W.C - 14.3" W.C (2.74 KPa - -3.56 KPa)	—	—
		5	—	—	—	—	25" W.C - 31.5" W.C (6.21 KPa - 7.84 KPa)	23" W.C - 28.35" W.C (5.72 KPa - 7.05 KPa)

<sup>a</sup>Refer to rating plate for specific set points of each heater. Set points determined at 5" W.C (1.24 KPa) back pressure for the GGH-8351 and 3" W.C (0.75 KPa) back pressure for all other models. W.C = inches of water column (27" W.C = 1 psi = 6.72 KPa)

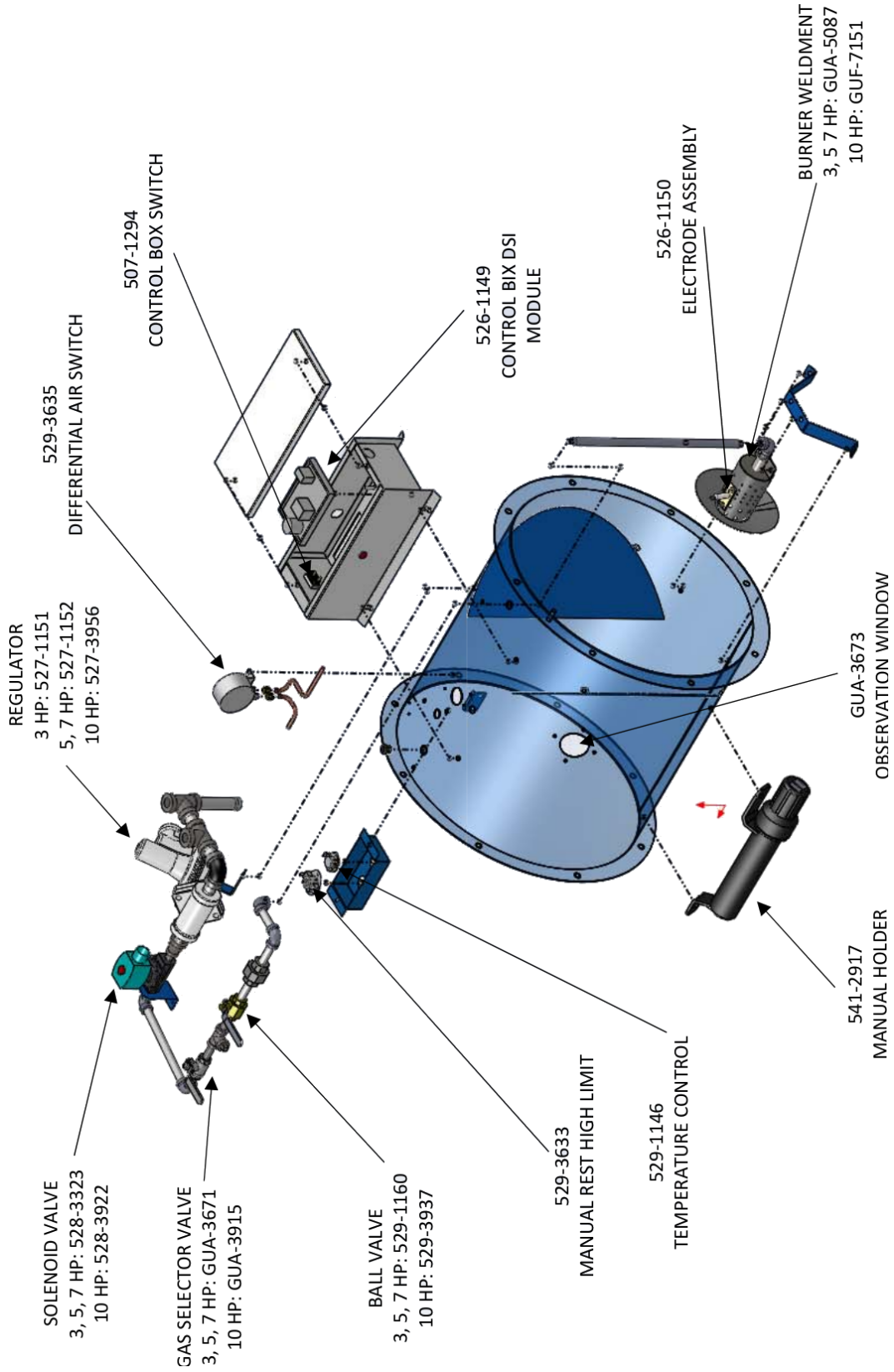
# 8. Appendix

## 8.1. Heater Parts List

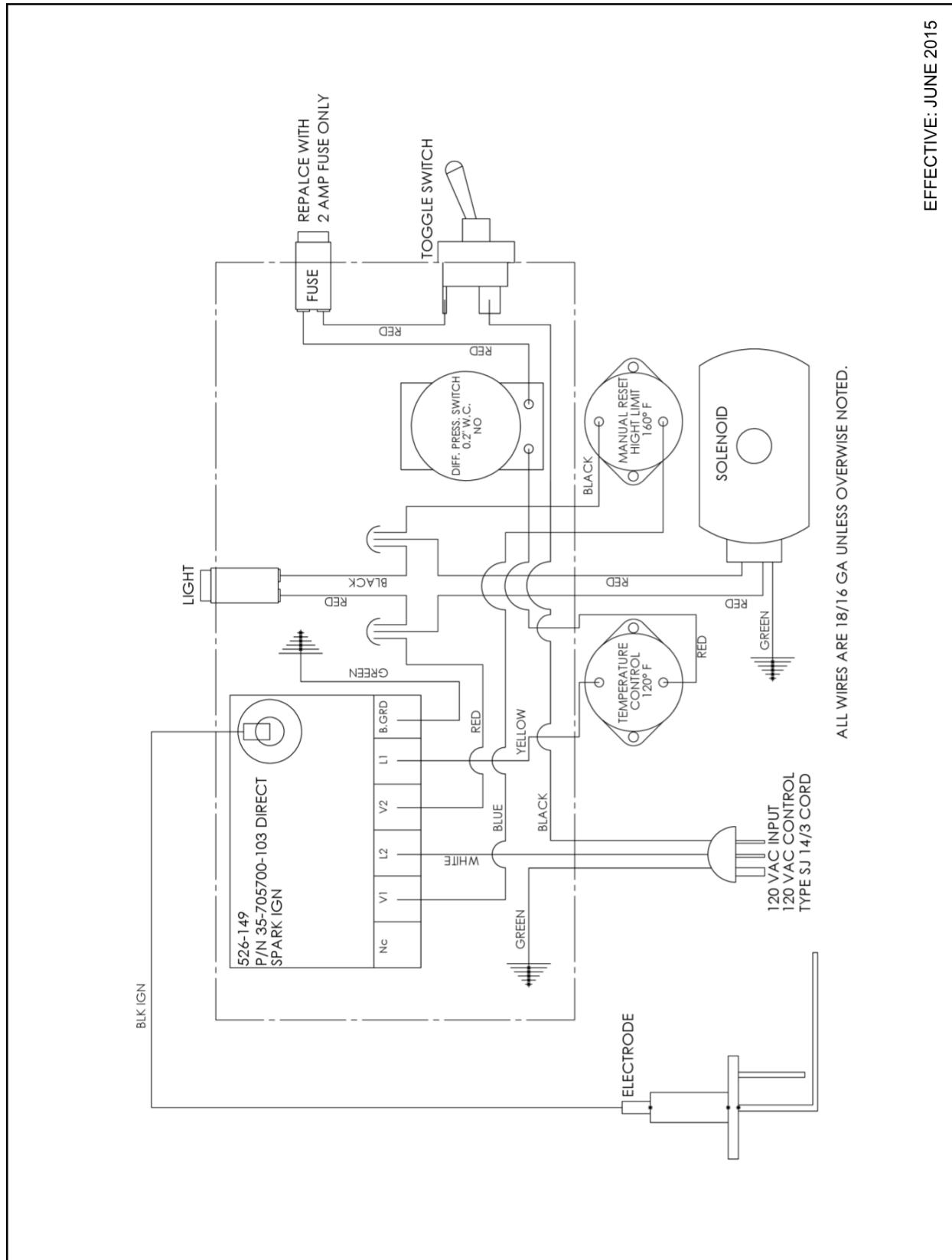
### GGH-8350, GGH-8351, and GGH-8354 Models



GGH-8352, GGH-8353, and GGH-8355 Models



## 8.2. Electrical Schematic (For All Models)



### 8.3. Approximate Temperature Rise

**Table 2. Natural Gas**

Fan / Heater	Static Pressure, "W.C. (KPa)												
	1 (0.25)	2 (0.50)	3 (0.75)	4 (0.99)	5 (1.24)	6 (1.49)	7 (1.74)	8 (1.99)	9 (2.24)	10 (2.49)	11 (2.74)	12 (2.99)	13 (3.23)
3 HP FC / GGH-8350	10 17	10 17	9 17	9 16	9 15	8 14	7 13	6 12	—	—	—	—	—
5 HP FC / GGH-8351	12 22	12 22	12 21	13 23	14 25	14 25	14 25	15 26	16 29	—	—	—	—
7.5 HP FC / GGH-8351	10 18	10 18	10 18	10 19	11 19	11 20	11 20	11 21	12 21	13 23	14 26	—	—
10 HP FC / GGH-8354	17 31	18 32	19 34	21 38	23 42	25 44	26 46	28 50	29 53	30 55	34 61	37 67	39 71
3 HP Inline / GGH-8352	8 15	9 16	9 16	9 17	10 18	—	—	—	—	—	—	—	—
5 HP Inline / GGH-8353	9 17	10 18	10 18	11 19	11 20	12 22	—	—	—	—	—	—	—
7 HP Inline / GGH-8353	8 14	8 14	8 15	9 15	9 16	9 17	10 18	11* 20	—	—	—	—	—
10 HP IL / GGH-8355	16 28	14 25	15 28	16 29	17 31	16 29	18 32	20 36	21 38	22 40	25 44	—	—

**Note**

The top number is the temperature rise in Celsius. The bottom number is the temperature rise in Fahrenheit.

Discharge Temperature = Ambient Temperature + Temperature Rise

\*At 7.6" W.C (1.89 KPa)



**Table 3. Propane**

Fan / Heater	Static Pressure, "W.C. (KPa)												
	1 (0.25)	2 (0.50)	3 (0.75)	4 (0.99)	5 (1.24)	6 (1.49)	7 (1.74)	8 (1.99)	9 (2.24)	10 (2.49)	11 (2.74)	12 (2.99)	13 (3.23)
3 HP FC / GGH-8350	8 15	9 16	9 16	8 14	8 14	7 13	6 12	6 10	—	—	—	—	—
5 HP FC / GGH-8351	11 21	11 20	12 21	13 23	14 24	14 25	14 26	15 27	16 29	—	—	—	—
7.5 HP FC / GGH-8351	11 19	10 19	10 19	10 19	11 20	11 21	12 21	12 22	11 20	12 22	14 25	—	—
10 HP FC / GGH-8354	22 40	23 41	23 42	25 45	25 45	27 49	28 50	29 53	31 56	32 58	31 56	33 59	35 63
3 HP Inline / GGH-8352	8 15	9 16	8 15	8 15	9 16	—	—	—	—	—	—	—	—
5 HP Inline / GGH-8353	8 15	9 16	9 16	10 17	10 18	10 18	—	—	—	—	—	—	—
7 HP Inline / GGH-8353	7 13	7 13	7 13	8 14	8 15	9 16	9 17	10* 18	—	—	—	—	—
10 HP IL / GGH-8355	15 28	16 28	16 28	17 31	18 33	19 35	20 37	21 38	22 40	24 44	27 49	—	—

**Note**

The top number is the temperature rise in Celsius. The bottom number is the temperature rise in Fahrenheit.

Discharge Temperature = Ambient Temperature + Temperature Rise

\*At 7.6" W.C (1.89 KPa)



## 8.4. Contact Information

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Name of Dealer:	
Name of Representative:	
Address:	
Telephone Number:	

Name of Installation Contractor:	
Address:	
Telephone Number:	

Name of Service Contractor:	
Address:	
Telephone Number:	



# 9. Warranty

Except as expressly provided in this agreement, AGI Nobleford (hereinafter called the Manufacturer) excludes all express or implied warranties, conditions, and obligations of the Manufacturer, whether statutory or otherwise, concerning the quality of the units or their fitness for any purpose.

Under no circumstances will the Manufacturer be liable for any kind of special, consequential, indirect, or incidental damages resulting from the use of its products, nor shall the Manufacturer's liability ever exceed the selling price of the product.

The Manufacturer warrants their products as follows:

1. Goods free from defect: The unit shall be free from defects in materials and workmanship and shall operate properly in accordance with industry standards when employed in normal usage, provided the unit has been properly installed for a period of: one (1) year from the original date of purchase.
2. The warranty does not include:
  - Routine replacement of parts due to normal wear and tear arising from use.
  - Any defect attributable in whole or in part to misuse or improper installation.
  - Any damage or defect attributable to repair of the unit outside the Manufacturer's facilities or those of an authorized dealer, or the installation of unapproved parts on the unit in the Manufacturer's judgment to affect its performance or reliability, or which has been subject to misuse, negligence, or accident.
  - Any damage attributable to accident or to lightning, power surge, brownout, leaking, damage, or connection to a power source having a greater rating than that specified in the unit specifications.
3. Repair or Replacement: Where any part of the unit fails during normal usage during the warranty period specified, the Manufacturer, or authorized dealer of the Manufacturer, shall repair or replace the defective part of the unit with a new or factory reconditioned part, such replacement or repair to be made without charge for parts or labor, F.O.B. the Manufacturer.
4. Warranties shall not apply to any product made by the Manufacturer that has not been operated in accordance with the Manufacturer's printed instructions or shall have been operated beyond the rated capacity of the product or a use not intended.
5. The Manufacturer reserves the right to make design or specification changes at any time, without contingent obligation to purchasers of products already sold.



# **GRAIN GUARD**

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Web: [www.grainguard.com](http://www.grainguard.com)

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