

The logo for AGI Grain Guard, featuring the letters 'AGI' in a bold, italicized font followed by a stylized graphic of three curved lines representing grain, and then the words 'GRAIN GUARD' in a larger, bold, italicized font. The entire logo is white and set against a solid green rectangular background.

**AGI  GRAIN GUARD**

# Low Temperature Heaters

Troubleshooting Guide

# There are three generations of Grain Guard Low Temperature Heaters

PRE 2010	2010 - 2014	2015 - CURRENT
GG 914-60	GGG-8300	GGH-8350
GG 914-100	GGG-8301	GGH-8351
GG 18-60	GGG-8302	GGH-8352
GG 24-100	GGG-8302	GGH-8353
	GGG-8303	GGH-8354
	GGG-8304	GGH-8355

# TROUBLESHOOTING

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

2015-CURRENT

\*\*\* IF YOU HAVE THE OLDER STYLE OF HEATER (PRE 2015), SKIP TO SLIDE #16

# DO YOU HAVE THE CORRECT FAN/HEATER COMBINATION FOR YOUR BIN SIZE?

- If you have the current heater (model number starting with GGH), it is critical that you have the correct fan/heater combination based on the size of your bin and the type of crop you are trying to dry. If you do not have the proper heater/fan combination, it will be difficult, if not impossible, to get your heater to function properly.

This is because the new heaters have an air differential switch that will not close and allow current through the switch, unless there is a minimum amount of air flow.

Heater/Fan Combinations		14/15/16'
GGH-8350	9" x 14" 60K BTU	
	3Hp Full Centrifugal	20 (16)

XX	Maximum bin wall height (ft) for heater/fan combination
(XX)	Maximum bin wall height (ft) to achieve 1 cfm/bushel airflow

Airflow needed for drying

	Optimum heater performance in these applications
	Acceptable heater performance in these applications
	Heater operation not recommended in these applications

\*\*\* The next few frames contain charts that will help you determine what fan/heater combination you will require based on your bin size and the crop that will be in the bin

# WHEAT HEATER/FAN COMBINATION COMPARISONS

HEATER/FAN COMBO	BIN DIAMETER							
	14/15/16'	18/19'	21/22'	24/25'	27'	30'	33'	36'
GGH-8350 9"x14" 60K BTU								
3HP full centrifugal	20 (16)	30 (13)	30 (10)	30 (10)	Not Recommended	----	----	----
GGH-8351 9"x14" 1100K BTU								
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)	----	----	----
GGH-8352 18" RND 60K BTU								
3HP 18" Inline Centrifugal	15 (12)	18 (12)	22 (10)	30 (10)	Not Recommended	----	----	----
GGH-8353 24" RND 100K BTU								
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)	----	----	----
GGH-8354 12" x 17" 200K BTU								
10 HP Full Centrifugal	----	Not Recommended	Not Recommended	30 (15)	30 (12)	30 (11)	30 (9)	30 (8)
GGH-8355 28" RND 200K BTU								
10HP 28" Inline Centrifugal	----	30 (20)	30 (18)	30 (16)	30 (15)	30 (13)	30 (11)	30 (9)

# CANOLA HEATER/FAN COMBINATION COMPARISONS

HEATER/FAN COMBO	BIN DIAMETER							
	14/15/16'	18/19'	21/22'	24/25'	27'	30'	33'	36'
GGH-8350 9"x 14" 60K BTU								
3HP Full Centrifugal	Not Recommended	12 (10)	18 (10)	22 (9)	27 (7)	----	----	----
GGH-8351 9"x 14" 100K BTU								
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)	----	----	----
GGH-8352 18" RND 100K BTU								
3HP 18" Inline Centrifugal	Not Recommended	Not Recommended	Not Recommended	12 (8)	12 (6)	----	----	----
GGH-8353 24" RND 100K BTU								
5HP 24" Inline Centrifugal	Not Recommended	----	----	----				
7HP 24" Inline Centrifugal	Not Recommended	Not Recommended	Not Recommended	Not Recommended	12 (10)	----	----	----
GGH-8354 12"x17" 200K BTU								
10HP Full Centrifugal	----	Not Recommended	Not Recommended	Not Recommended	30 (12)	30 (10)	30 (9)	30 (7)
GGH-8355 28" RND 200K BTU								
10HP 28" Inline Centrifugal	----	27 (16)	30 (15)	30 (14)	30 (13)	30 (12)	30 (10)	30 (9)

# Peas & Corn Heater/Fan Combination Comparisons

HEATER/FAN COMBO	BIN DIAMETER							
	14/15/16'	18/19'	21/22'	24/25'	27'	30'	33'	36'
GGH-8350 9"x14" 60K BTU								
3HP Full Centrifugal	40 (20)	40 (16)	40 (12)	40 (10)	40 (8)	----	----	----
GGH-8351 9"x14" 100K BTU								
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)	----	----	----
GGH-8352 18" RND 60K BTU								
3HP 18" Inline Centrifugal	35 (18)	35 (14)	35 (12)	35 (10)	35 (8)	----	----	----
GGH-8353 24" RND 100K BTU								
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)	----	----	----
GGH-8354 12"x17" 200K BTU								
10HP Full Centrifugal	----	40 (26)	40 (22)	40 (18)	40 (15)	40 (12)	40 (10)	40 (8)
GGH-8355 28" RND 200K BTU								
10HP 28" Inline Centrifugal	----	40 (27)	40 (24)	40 (20)	40 (17)	40 (14)	40 (12)	40 (9)

# Troubleshooting Scenarios

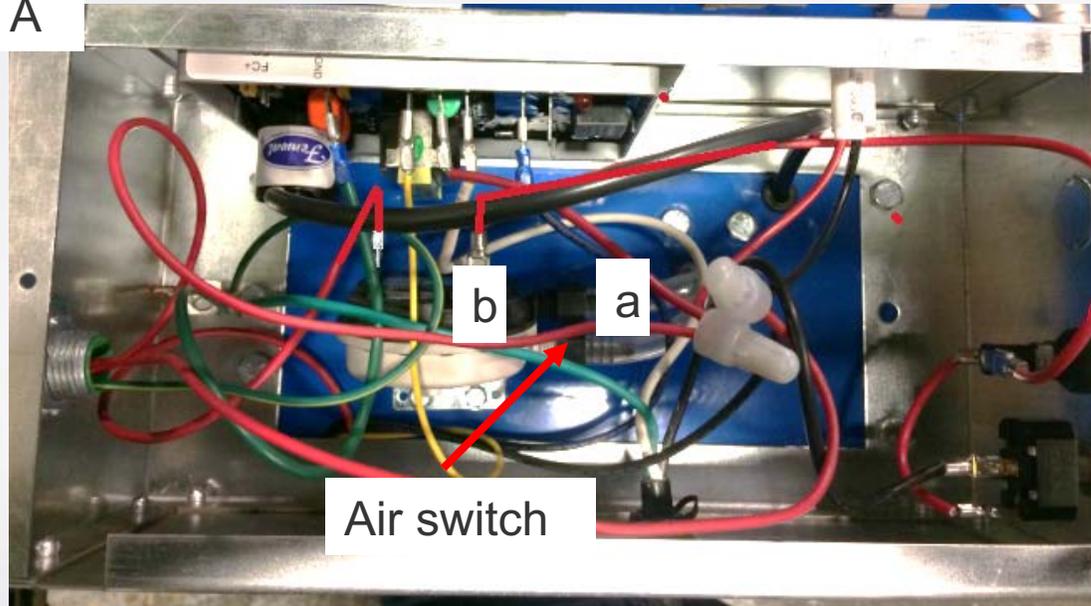
- The next couple of frames will feature some heater problems and the best troubleshooting scenarios



- HEATER DOES NOT START, RED LIGHT DOES NOT COME ON, HEATER APPEARS DEAD

1. Check to make sure you are getting power. Check voltage across the fuse and the on-off switch. If no voltage present, check your power cord, fuse, or power source.
2. If Voltage is present, check voltage across the air switch (see Fig. A)
  - Check Voltage between "a" and "b"

Fig. A



If voltage is present at "a" but not "b", you either have too much static pressure and the switch does not have enough airflow to close (see fan heater combination charts), or the switch is defective

3. Check for power on Terminal L1 of DSI module.
  - There should be voltage present here but not V1
  - If spark does not come on in 15 seconds after the toggle switch has been turned on, or if the solenoid valve does not click on, then circuit board is defective and needs replacing.
4. Check voltage across the red light. If voltage is present, then light is defective and needs replacing.
5. Check the hi limit switches (not visible in control box, located in rectangular box below control box in heater chamber).
  - First reset manual reset button on hi limit (see page 16 in manual for location) 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 and has either overheated and tripped out. Let the fan run for a few minutes to cool switch, reset button and retest. If there still no power on both sides of switch, then replace limit switch.

6. Check voltage going to the solenoid valve.
  - If there is power going to the valve (at terminal V1 or DSI module) and hi limit switch is good, but the valve is not snapping open, then the valve is defective and needs replacement (this can only be done by a qualified gas fitter or the AGI Nobleford service center).

- RED LIGHT COMES ON, BUT FLAME DOES NOT IGNITE

1. Check to see if the ignitor in front of the burner is sparking by looking through the observation window. If you see a spark, open the control box, start the heater again, slide the ignition wire off the coil tower and hold it 3/16" from the coil terminal and see if it sparks across the gap (see Fig. B)

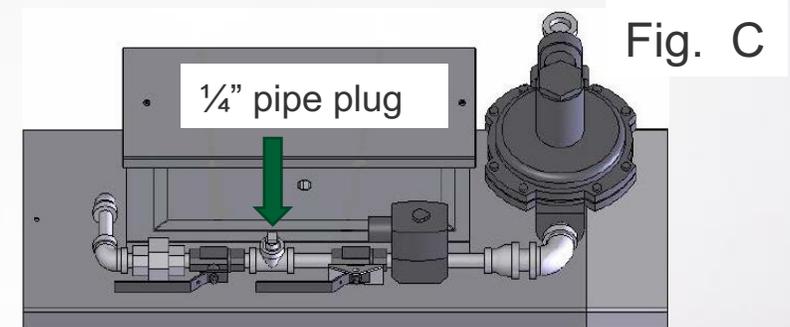
Fig. B



Slide the ignition wire off of the coil tower and hold it 3/16" from the coil terminal

2. If spark exists, check to make sure fuel is getting to the burner by removing the 1/4" pipe plug located between the fuel selector and the on/off valve (see Fig. C). There should be a steady flow of gas.

If there is no flow of gas detected, the red light is on, the ignitor is sparking, and the solenoid switch has opened (you will hear a loud "click" at the same time the red light goes on), go to step 3 to troubleshoot why the fuel is being restricted.



- FUEL NOT GETTING TO THE BURNER ASSEMBLY

1. Inlet pressure is not within the specified range.

- Whether using propane or natural gas, your inlet pressure going into the heater must be a **maximum 15 psi** and a **minimum 4 psi** (min. 5 psi if you have the GGH-8354 or GGH-8355)

2. Blockage in the regulator or valve train

- Drawing liquid propane into the heater's regulator, either by drawing propane from the bottom of the tank (ALWAYS draw from the top of the tank) or letting the propane bottle get less than 20% full before refiling can cause restriction
- Ensure that the regulator on the propane tank is a **first stage regulator** (a regulator that is designed to work with a second stage regulator, and not by itself). Make sure it is not a single stage regulator (a regulator that is designed to work with direct tank pressure).

3. Too much air flow for flame to ignite

- Block off air intake 3—50% and try to light. If heater lights, then the airflow may be too high. Put more grain in the bin, use a smaller fan, or continue to restrict airflow as needed to maintain a good flame (see next slide for example of a good and bad flame).

- HEATER LIGHTS BUT STOPS IN LESS THAN 8 SECONDS

1. **Too much air:** Take a look at the flame through the viewing window. If the flame is small, very blue, and burning mostly inside the burner body, this is an indication that there is too much air

This is an example of what a good flame should look like



Poor flame (too much air)

Restrict the airflow of your fan until the flame looks like the example of a “good flame”

2. **Not enough air:** Take a look at the flame through the viewing window. If the flame has yellowish/orange tongues and is burning quite a bit further out of the burner body, this is an indication that there is not enough air.



Poor flame (not enough air)

Remove some grain from the bin or use a bigger fan if your flame looks like the example of a “good flame”

**3. Burner needs to be cleaned:** This is the most common reason for poor flame and nuisance shutdowns. The burner has 9 small holes in the back of the burner body where the fuel flows into the burner. If all or even some the holes are plugged, the system will not get enough fuel and it will often light but then shut down.

- Use a small drill bit or pipe cleaner to clean the burner holes



Clean all 9 small holes

Use an emery cloth or steel wool to clean the flame sensor (electrode assy).



- HEATER LIGHTS, RUNS FOR 8 SECONDS, THEN SHUTS OFF

1. This is usually an indication that the polarity of the power supply (extended cord) is not correct and reversed.
2. If you have confirmed that the polarity of the power supply is correct, and during the 8 seconds that the heater is running, the flame is a good flame ( see previous two pages on flame appearance), the problem may be the flame sensor and it should be changed.

- HEATER LIGHTS, RUNS FOR OVER 30 SECONDS, THEN SHUTS OFF

1. **Too much air:** If the flame is small and burning inside the burner body, the heater may shut down either because the fuel/air mixture is not correct/changes or the flame is too cold and the flame sensor shuts it off. Either way, if the heater is not displaying a good flame, nuisance shutdowns should be expected.

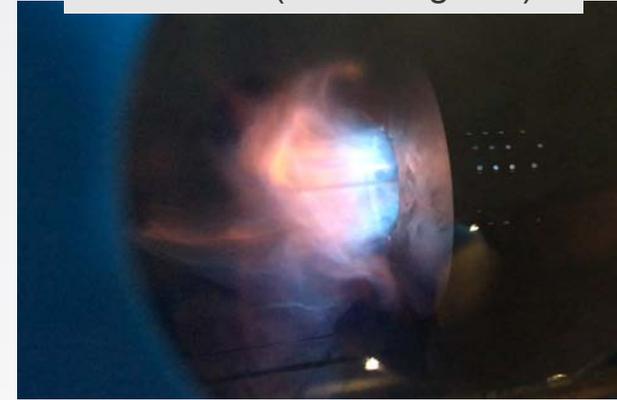


2. **Not enough air:** If the flame has yellowish/orange tongues and is burning quite a bit further out of the burner body, this is an indication that there is not enough air. The heater may shut down because the fuel/air mixture is not correct. If the heater is not displaying a good flame, nuisance shutdowns should be expected.

Good flame



Poor flame (not enough air)



3. **Poor Ground:** Ensure the heater has good continuity through the ground wire either through the power cord or the heater itself (see below)



#### 4. Burner needs to be cleaned:

- Use a small drill bit or pipe cleaner to clean the burner holes

#### 5. Fuel is being restricted because of the frost in the valve train/fittings or improper fuel pressure.

- If the heater is being used in conditions that are warmer in the day and colder at night and you find that heat is running fine during the day but shutting down at night, the valve train, hoses, or fittings supplying the burner with propane may be frosting up enough to restrict the flow of fuel below the minimum 4 psi required during the night.
- Inlet pressure is not within the specified range.
- This low temperature heating system is not designed to be effective below freezing. Using the heater in below freezing temperatures can cause frost to develop in the valve train and also create excessive condensation on the inside roof of the bin.

**\*\*\* Remember:** Optimal grain drying begins at 10°C. With air temperatures less than 10°C, the air is too cool and can only hold a small amount of moisture; therefore, moisture removal from grain will be very slow. Since the low temperature heater raises the ambient temperature 10-12°C, running it below the freezing limits the effectiveness of the heater.

# TROUBLESHOOTING

- **PRE 2010:** GG 914-60; GG 914-100; GG 18-60; GG 24-100

&

- **2010 TO 2014:** GGG-8300; GGG-8301; GGG-8302; GGG-8303; GGG-8304



## DO YOU HAVE THE CORRECT FAN/HEATER COMBINATION

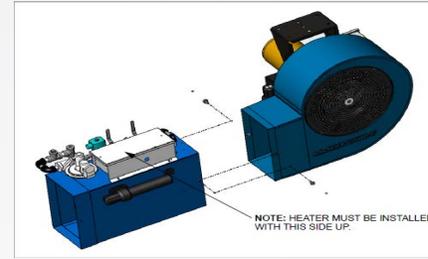
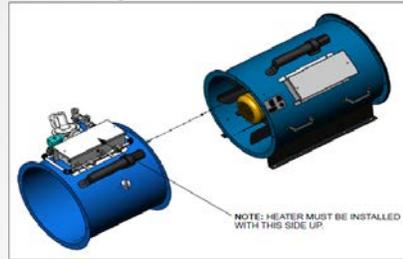
It is very important that you have the proper heater with the proper size and style of fan. Miss matched pairs is not recommended as it will likely result in nuisance shutdowns or the system will not work at all.

60,000 btu heaters are designed to go with a 3 HP fans

100,000 btu heaters are designed to go with a 5 or 7 HP fan

Inline fans **MUST** be paired up with round fans

High speed full centrifugal fans **MUST** be paired up with the 9x14 square heaters



## DO YOU HAVE GRAIN IN YOUR BIN?

Unlike the current style of heater (model number starting with GGH), all pre-2015 heater models (starting with GGG or GG), have a static pressure or back pressure switch instead of an air differential switch. The static pressure switch will not close and let current through the switch unless there is a minimum of 1" of static pressure (back pressure).

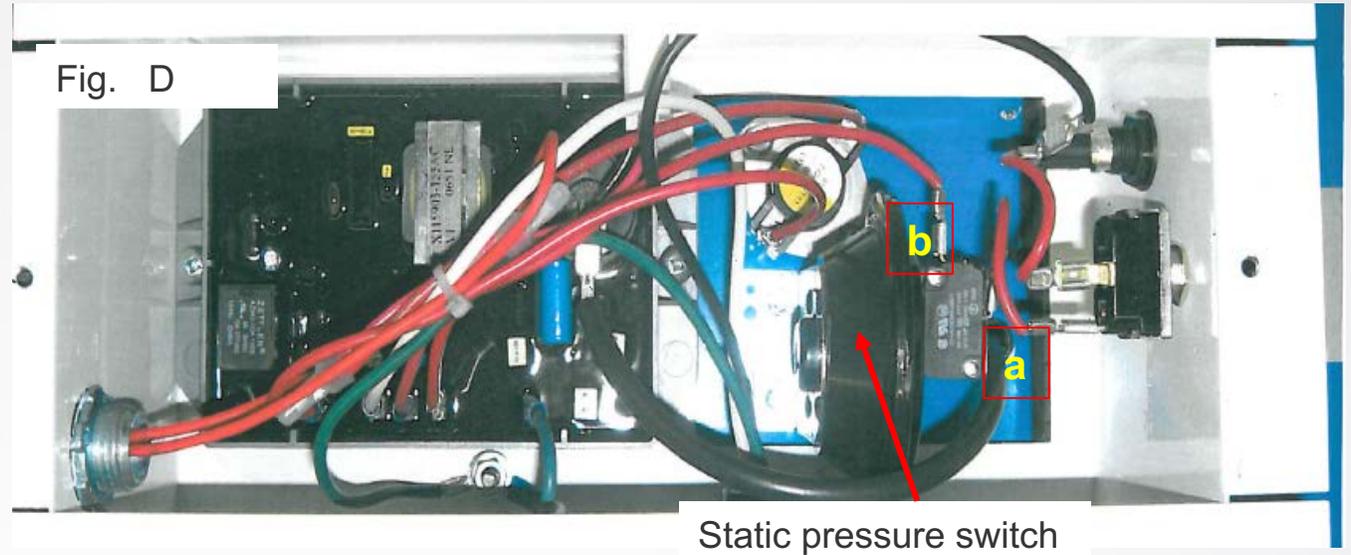
This older style of heater will not work if there is no, or very little grain in the bin

- HEATER DOES NOT START. RED LIGHT DOES NOT COME ON, HEATER APPEARS DEAD

1. Check to make sure you are getting power. Check voltage across the fuse and then the off switch. If no voltage is present, check your power cord, fuse, or power source.
2. If voltage is present, check voltage across the air switch (see Fig. D)

Check voltage between “a” and “b”

If voltage is present at “a” but not “b”, you either do not have enough static pressure (bin is empty) and the switch does not have enough back pressure to close, or the switch is defective



3. If there is voltage at “b” (Fig. D) then test for 120V at L1 on your control board. If there is voltage at L1 but not V1, the control board is defective and must be replaced

- RED LIGHT COMES ON, BUT FLAME DOES NOT IGNITE

1. Check if the ignitor in front of the burner is sparking by looking through the observation window. If you cannot see a spark, open the control box and slide the ignition wire off of the coil tower and hold it 3/16" from the coil terminal and see if it sparks across the gap (see Fig. B)



Fig. B

slide the ignition wire off of the coil tower and hold it 3/16" from the coil terminal

2. If spark exists, check to make sure fuel is getting to the burner by removing the 1/4" pipe plug located between the fuel selector valve and on/off valve (see Fig. C). There should be a steady flow of gas.

If there is no flow of gas detected, and the red light is on, the ignitor is sparking, and the solenoid switch has opened (you will hear a load "click" at the same time the red light goes on), go to step 3 to troubleshoot why the fuel is being restricted.

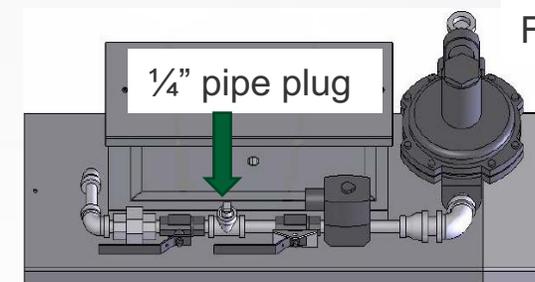


Fig. C

### 3. Fuel not getting to the burner assembly

- Inlet pressure is not within the specified range.
  - If the heater is a GG style (i.e. GG-914-60) from the series pre-2010, the inlet pressure should be:
    - For natural gas** – maximum 100 psi minimum 2 psi
    - For propane** – direct bottle pressure (no regulator between the bottle and the heater)
  - If the heater is a GGG style (i.e. GGG-8302) from the series 2010 to 2014, the inlet pressure should be:
    - For natural gas** – maximum 15 psi minimum 2 psi
    - For propane** – maximum 50 psi minimum 2 psi
- Blockage in the regulator or valve train
  - Drawing liquid propane into the heater's regulator, either by drawing propane from the bottom of the tank (ALWAYS draw from the top of the tank) or letting the propane bottle get less than 20% full before refiling can cause restriction
- Too much air flow for flame to ignite
  - Block off air intake 30-50% and try to light. If the heater lights, then the airflow may be too high. Put more in the bin or use a smaller fan

- HEATER LIGHTS BUT STOPS IN LESS THAN 8 SECONDS

1. **Too much air:** Take a look at the flame through the viewing window. If the flame is small, very blue, and burning mostly inside the burner body, this is an indication that there is too much air

This is an example of what a good flame should look like



Restrict the airflow of your fan until the flame looks like the flame on the left

Poor flame (too much air)



2. **Not enough air:** Take a look at the flame through the viewing window. If the flame has yellowish/orange tongues and is burning a bit further out the burner body, that is an indication that there is not enough air.

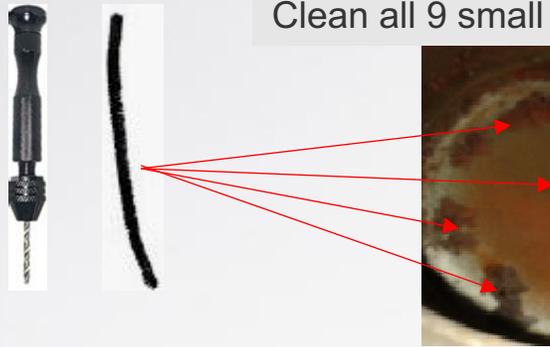
Poor flame (not enough air)



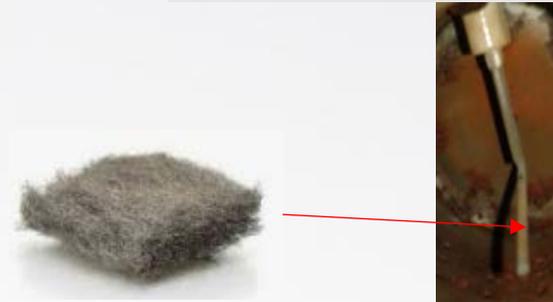
Remove some grain from the bin or use a bigger fan if your flame looks like the example of a “good flame”

### 3. Burner needs to be cleaned:

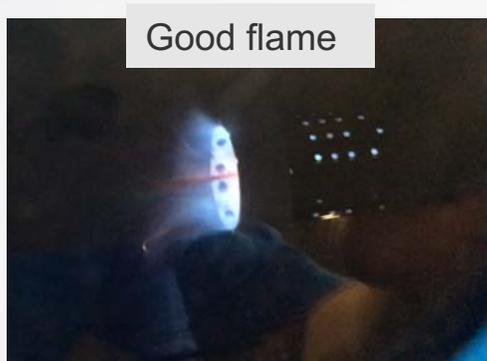
- This is the most common reason for a poor flame and nuisance shutdowns. The burner has 9 small holes in the back of the burner body where the fuel flows into the burner. If all or even some of the holes are plugged, the system will not get enough fuel and it will often light but then go off.
- Use a small drill bit or pipe cleaner to clean the burner holes



Use an emery cloth or steel wool to clean the flame sensor (electrode assy).



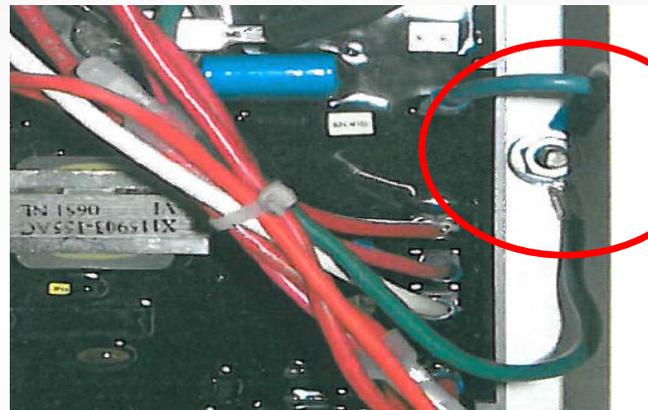
- HEATER LIGHTS, RUNS FOR 8 SECONDS, THEN SHUTS OFF
  1. This is usually an indication that the polarity of the power supply (extension cord) is not correct and reversed.
  2. If you have confirmed that the polarity of the power supply is correct, during the 8 seconds that the heater is running, the flame is a good flame ( see previous two pages on flame appearance), the problem may be the flame sensor and it should be changed.
- HEATER LIGHTS, RUNS FOR OVER 30 SECONDS, THEN SHUTS OFF
  1. **Too much air:** If the flame is small and burning inside the burner body, the heater may shut down either because the fuel/air mixture is not correct/changes, or the flame is too cold and the flame sensor shuts it off. Either way, if the heater is not displaying a good flame, nuisance shutdowns should be expected.



**2. Not enough air:** If the flame has yellowish/orange tongues and is burning quite a bit further out of the burner body, this is an indication that there is not enough air. The heater may shut down because the fuel/air mixture is not correct. If the heater is not displaying a good flame, nuisance shutdowns should be expected



**3. Poor Ground:** Ensure the heater has good continuity through the ground wire either through the power cord or the heater itself (see below)



#### 4. Burner needs to be cleaned

- Use a small drill bit or pipe cleaner to clean the burner holes
- If the heater is being used in conditions that are warmer in the day and colder at night and you find that the heater is running fine during the day but shutting down at night, the valve train, hoses or fittings supplying the burner with propane may be frosting up enough to restrict the flow of fuel below the minimum 4 psi required during the night.
- This low temperature heating system is not designed to be effective below freezing. Using the heater in below freezing temperatures can cause frost to develop in the valve train and also excessive condensation on the inside roof of the bin.

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