



## Q15HAA-1 MIZER™ Retrofit Spark Ignition System

### Installation

#### Parts Included

The retrofit package includes:

- G600AX-3 spark ignition control
- G96JGA-3 gas valve
- Y75RJ-1 retrofit sensing probe kit
- 1/8 inch NPT to 1/4 inch cc pilot tap adapter
- four 1/4 inch female quick disconnects
- Flame rectification extension
- spacers and cone shaped nut
- 48823-2 reducer bushing
- WRE38A-611 sensing probe cable
- 43283-2 compression fitting
- retrofit package installation instructions and a pressure sensitive lighting instruction sticker

#### Special Tools Needed

The following tools may be needed.

- manometer
- DC microammeter and AC voltmeter
- assorted pipe nipples and fittings
- On/Off toggle switch with wire leads and clips

#### Remove the Existing Gas Valve

**IMPORTANT:** Only qualified personnel should install or service Johnson Controls products. These instructions are a guide for such personnel. Carefully follow all instructions in this document and all instructions for the appliance.

**IMPORTANT:** Make all gas installations in accordance with applicable local, national, and regional regulations.



**CAUTION: Risk of Electric Shock.**

Disconnect power supply before making electrical connections to avoid electric shock.



**WARNING: Risk of Explosion or Fire.**

Shut off the gas supply at the main manual shutoff valve before installing or servicing the Q15HAA-1. Failure to shut off the gas supply can result in the release of gas during installation or servicing, which can lead to an explosion or fire, and may result in severe personal injury or death.



**WARNING: Risk of Explosion, Fire, or Electric Shock.** Label all wires before they are disconnected when replacing or servicing the Q15HAA-1. Wiring errors can cause improper or dangerous operation and may result in an explosion, fire, or electric shock leading to severe personal injury or death.

All installations must comply with local codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1, and the National Electrical Code (NEC), ANSI/NFPA 70.

To remove the existing gas valve.

1. Set the thermostat at its lowest setting.
2. Turn off the power to the appliance.
3. Turn off the gas at the main manual shutoff valve.
4. Remove the thermocouple from the gas valve.
5. Disconnect the pilot tubing from the gas valve. Disconnect all wires from the existing gas valve.
6. Carefully remove the old gas valve from the manifold.

## Install the Sensing Probe and Cable

To install the sensing probe and cable:

1. Remove the thermocouple from the existing pilot burner. The pilot burner should be left on its mounting bracket if you can conveniently reach it. If not, it may be necessary to partially pull out the manifold for easy access. In some extreme cases, it may be necessary to remove the pilot. If it becomes necessary to replace the pilot burner, it must be replaced with an identical model and positioned using the original mounting.
2. Place the threaded end of the sensing probe assembly into the thermocouple hole in the pilot.
3. Check the position of the spark gap. The spark gap should be 0.1 in. (2.5 mm) nominal.

**Note:** Position the spark gap in the pilot gas stream. Raise or lower the spark gap by adding or removing the spacers provided between the pilot and sensing probe assembly.

4. Screw the cone shaped nut onto the probe. The small end fits into the threaded thermocouple hole to center the sensing probe and secure it in place.
5. Depending upon the appliance, the flame sensing probe may be mounted in a number of positions. Select the position providing the most clearance from metal surfaces and the main burner flame.
6. Install the sensing probe cable onto the spade connector of the sensor.
7. If the pilot burner was removed, reinstall the pilot on its bracket in the furnace using the original mounting.

## Mounting

**IMPORTANT:** Verify that the valve is installed only in applications where the specified maximum ambient (surface) temperature and maximum operating pressures do not exceed the limits in the *Technical Specifications* section.

To install the Q15HAA-1 ignition system:

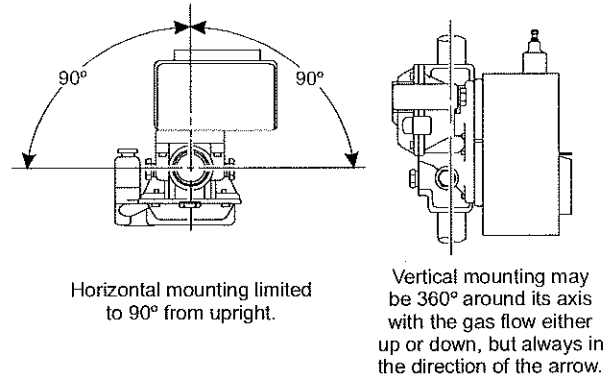
1. Compare the voltage on the valve with the power source voltage to ensure the correct unit is being installed. For valves with 25 volt coils, use an NEC, Class 2 transformer.  
**Note:** The transformer must be mounted to a grounded metal enclosure.

2. When installing the ignition system on the manifold, ensure that the gas flows through the valve body in the direction indicated by the arrow on the valve body. If the ignition system is installed with the gas flow in the opposite direction of the arrow, leakage can occur.

**IMPORTANT:** Do not use a wrench on any surface other than the casting flats provided at the inlet and outlet ends of the valve body. The Q15HAA-1 may be damaged in the mounting process if a wrench is used on any other surface. Using a wrench incorrectly may void the warranty.

3. Mount the Q15HAA-1 ignition system on a horizontal manifold with the ignition control pointed up (vertical) or in a position not exceeding 90° from vertical manifold in any position around its axis (Figure 1).

**Note:** Additional piping may be required if face-to-face dimensions are not the same.



**Figure 1: Q15HAA-1 Mounting Positions**

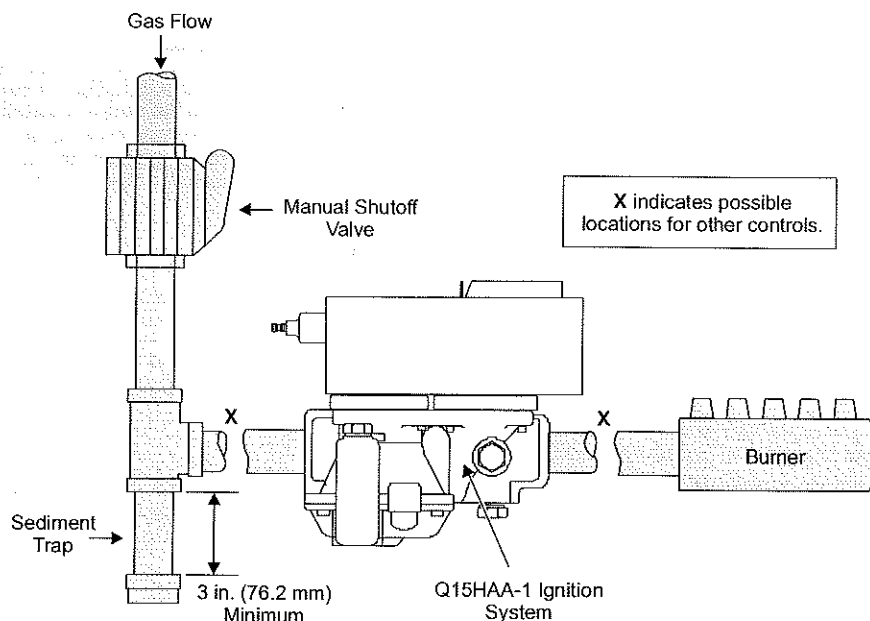
4. Mount the ignition system to the pipework. Use an approved pipe joint sealing compound on the male threads before assembling. Remove excess compound after mounting the ignition system to the pipework. Threads of the pipe and nipples must be smooth and free of tears and burrs. Steam clean all piping to remove foreign substances such as cutting oil or thread chips. A sediment trap must be installed in accordance with the National Fuel Gas Code (ANS Z223.1). See Figure 2.

If the Q15HAA-1 cannot be rotated on the manifold, remove the ignition control as follows.

- a. Disconnect the valve leads wires from Terminals 1 and 3 on the ignition control.
  - b. Remove the two screws holding the ignition control to the valve and plate assembly.
  - c. Carefully lift the ignition control from the valve body.
  - d. Complete the valve installation and replace the ignition control on the valve assembly.
  - e. Reconnect the pilot valve lead to Terminal 1 on the ignition control
  - f. Reconnect the main valve lead to Terminal 3 on the ignition control
5. Connect the pilot tubing to the valve assembly with the 1/8 in. NPT to 1/4 in. cc adapter, if needed.

6. Check for leakage.
- a. Shut off the gas at the main manual shutoff valve and open the pressure connection between the manual shutoff valve and the Q15HAA-1 valve.
  - b. Connect air tubing with a maximum pressure of 1-1/2 times the valve's maximum operating pressure (as indicated on the valve) to the opened pressure connection.
  - c. Paint all valve body connections with a rich soap and water solution.
- If bubbles occur, this indicates a leak. To stop a leak, tighten joints and connections. Replace the part if the leak cannot be stopped.
- If bubbles do not occur, remove the air tubing and close the pressure connection.
7. Perform the *Checkout* section before leaving the installation.

**! WARNING: Risk of Explosion or Fire.**  
Verify that there are no gas leaks by testing with appropriate equipment. Never use a match or lighter to test for the presence of gas. Failure to test properly can lead to an explosion or fire and may result in severe personal injury or death.



**Figure 2: Typical Installation of a Q15HAA-1**

## Wiring



### **WARNING: Risk of Explosion or Fire.**

Locate all safety, limit, and operating controls in series with the thermostat terminal (THS2) on the ignition control. Improper installation may cause gas leaks, which can lead to an explosion or fire and may result in severe personal injury or death.

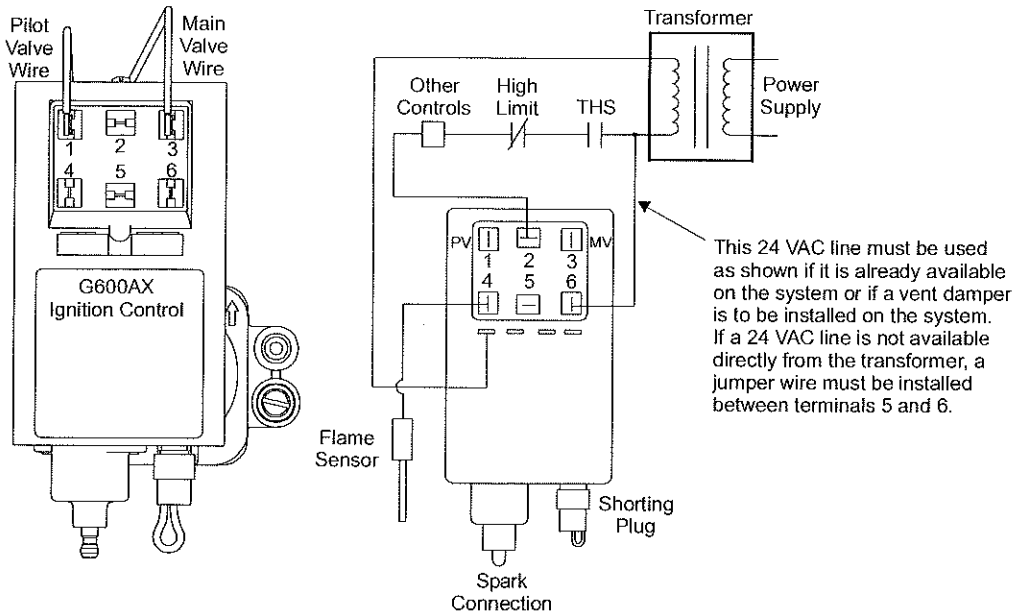
Refer to Figure 3 for wiring diagram. All wiring should be in accordance with the NEC and all other local codes and regulations. The high voltage spark transformer cable must not be in continuous contact with a metal surface. Use standoff insulators. Ensure that the flame sensor wire and the high voltage spark transformer cable are separated from one another a minimum of 1/4 in. (6.35 mm) and are not wrapped around any pipe, other wiring, or accessories.

Check the voltage rating marked on the control and make sure it is suited to the application. Use an NEC Class 2 transformer to provide 25 VAC under maximum load, including valves. A transformer having excessive primary impedance due to poor coupling affects the ignition potential.



### **WARNING: Risk of Electric Shock.**

Before applying power to the control, connect the high voltage cable to the spark transformer terminal and spark electrode (pilot burner assembly). Verify the ground wire is attached to the pilot burner and the control ground terminal strip. Failure to follow this procedure can cause electric shock and may result in severe personal injury or death.



**Figure 3 Wiring Diagram**

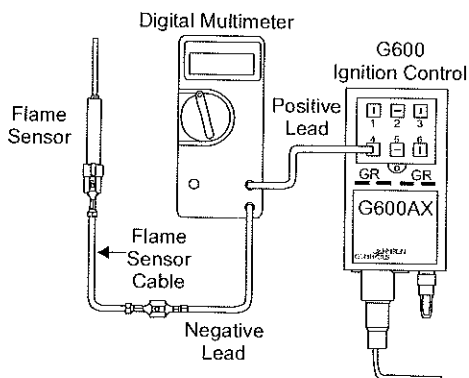
## Setup and Adjustments

### Commissioning

#### Electrical and Mechanical Checkout Procedure

After the Q15HAA-1 installation is complete, perform the following procedures to ensure the installation is correct. While performing the following procedure, keep the high voltage cable and the sensing probe cable away from hot surfaces.

1. Measure the output current in the probe circuit using a DC microammeter. Connect the microammeter leads between the sensing probe cable and Terminal 4 on the ignition control. Connect the positive lead to Terminal 4 and the negative lead to the sensing probe cable (Figure 4).



**Figure 4: Wiring Diagram for Flame Sensing Current Measurement**

2. Remove the main valve lead from Terminal 3 on the ignition control. Attach the on/off toggle switch between the ungrounded post of the transformer and Terminal 2 on the ignition control. The toggle switch serves as the thermostat for testing procedures. Make sure the thermostat contacts are open.
3. Open the main manual shutoff valve to turn on the gas supply.
4. Restore power to the furnace or boiler and flip the toggle switch to the On or closed position. The pilot valve opens and a spark jumps the spark gap at the pilot.
5. Test for leaks at the pilot tubing connections with a soap solution. In a few seconds, the spark lights the pilot after the air is bled from the pilot gas line.

**Note:** Once the pilot flame is lit, the microammeter shows a reading from the flame sensing probe. The current reading should be at least 0.2 microampere. If the reading is less than 0.2 microampere, turn off the electrical power and adjust the pilot assembly by adding spacers between the pilot bracket and the sensing probe assembly. No more than 1/2 in. of the flame sensor tip should be in the pilot flame. If this does not correct the current reading, it may be necessary to increase the pilot burner orifice size. Recheck until the reading is satisfactory.

6. Flip the toggle switch to the Off or open position.
7. Reconnect the main valve lead to Terminal 3 on the ignition control.
8. Flip the toggle switch to the On or closed position. The pilot should light and immediately thereafter, the main burner should light.
9. Check the outlet pressure reading by removing the pressure tap plug and connecting a manometer. Compare it with the furnace or boiler specifications. It may be necessary to adjust the pressure regulator to the rating indicated (see the *Regulator Adjustment* section).

#### Turndown Test Procedure

With the toggle switch still connected, perform the following turndown test to assure main burner ignition under conditions that permits the main valve to open.

1. Slowly close the manual shutoff valve until the pilot flame is just sufficient to maintain operation of the main burner.
2. Cycle the main burner off and on with the toggle switch. Perform this test with the furnace or boiler burner cold and hot.
3. If the furnace or boiler cycles without igniting the main burner in four seconds, ensure the pilot is properly located and correct for the application.
4. Completely open the main manual shutoff valve.
5. If unstable burner lighting occurs, causing the ignition control to chatter on and off during startup, install the flame rectification extension as follows.
  - a. Place the flame rectification extension onto the flame sensing probe.
  - b. Position the extension over the main burner so it extends into the flame.
  - c. Secure the extension in place by tightening the extension rod into the sleeve.

**Note:** The flame rectification extension detects the main burner flame and the G600 ignition control allows continued operation until a stabilized pilot is maintained.

6. Ensure the thermostat contacts are open and remove the toggle switch.
7. Remove the microammeter and reconnect the sensor probe lead to Terminal 4 on the ignition control.
8. Shut off the gas supply at the main manual shutoff valve, disconnect the manometer, and replace the pressure tap plug.

**Note:** The thermostat heat anticipator setting should be set for 0.3 ampere (current draw of the Q15HAA-1 gas valve). When using an automatic vent damper, add the current draw of the vent damper to the 0.3 ampere of the gas valve. The transformer should be checked to make sure it has sufficient capacity to operate the additional load.

9. Reopen the main manual shutoff valve.
10. Perform the *Checkout* section before leaving the installation.

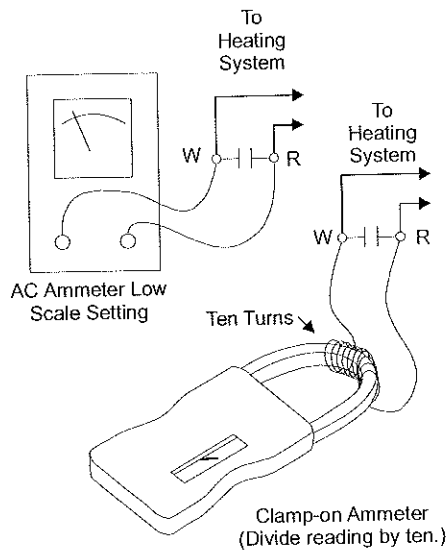
#### Thermostat Heat Anticipator Settings

The anticipator setting is normally equal to the ignition system current, plus that of the pilot and main valve.

Due to variations in appliance wiring and valves, it is advisable to measure the actual current draw of the heating system at the thermostat location. Measuring this current can be accomplished by opening the thermostat contacts (lowering the setpoint) and installing an AC ammeter across the terminals, or by using a clamp-on ammeter with a 10-turn multiplier attached to the terminals (Figure 5).



**WARNING: Risk of Personal Injury.**  
Do not take a current draw measurement unless the appliance is in the run condition. Measuring the current with an ammeter will energize the system. This may cause the appliance to proceed to the run condition unexpectedly, and may result in severe personal injury or death.



**Figure 5: Measuring the Thermostat Current**

#### Regulator Adjustment



**WARNING: Risk of Explosion or Fire.**

Do not adjust the minimum flow rate of the valve below the minimum safe working rate of the appliance. This may cause gas leaks, which can lead to an explosion or fire, and may result in severe personal injury or death.


**IMPORTANT:** Refer to and follow any specific instructions issued by the appliance manufacturer with regards to servicing their equipment.

The pressure regulator is adjustable and has been factory set at 3.5 in. W.C. (8.75 mbar). If a different setting is desired, follow these instructions.

1. Shut off all gas to the appliance.
2. Turn the thermostat to the lowest setting or Off position.
3. Remove the pressure tap plug at the valve outlet or in the manifold pipe downstream of the valve.
4. Install a manometer or pressure gauge suitable for measuring the desired orifice pressure.

5. Remove the seal screw at the end of the regulator stack.
  6. Turn the gas on and place the thermostat at the highest setting to cycle the ignition system.
  7. Allow the system to stabilize. Adjust the screw in the regulator stack to the desired reading on the manometer. (Turn clockwise to increase the outlet pressure and counterclockwise to reduce the outlet pressure.)
  8. Reinstall the seal screw, which incorporates the proper size hole for venting to the atmosphere. (It may be necessary to cycle the valve several times to verify the desired outlet pressure.)
  9. Turn off the gas supply and place the thermostat at the lowest setting.
  10. Remove the manometer and reinstall the pressure tap plug.
  11. Turn the gas on and check for leaks at the pressure tap plug with a soap solution.
  12. Set the thermostat to the desired setting before leaving the site.
6. Turn the thermostat to the highest setting and verify successful ignition and a normal run condition for at least three minutes. If the appliance fails to run, see the *Troubleshooting* section.
  7. Check for leaks on all pipe joints and connections downstream of the gas valve with a soap solution.
  8. Turn the thermostat down for at least 30 seconds and then back up again. Verify successful ignition at least three times.
  9. Return the thermostat to a normal temperature setting before leaving the installation.

### Checkout



**WARNING: Risk of Explosion or Fire.**  
Follow this or an equivalent checkout procedure after installation. Before leaving the installation, verify that the Q15HAA-1 functions properly and that the system has no gas leaks. Gas leaks can lead to an explosion or fire, and may result in severe personal injury or death.

Make sure all components are functioning properly by performing the following test.

1. With the gas and the thermostat off, turn on the power to the appliance.
2. Turn the thermostat to the highest setting and verify that the control goes through the operating sequence. (This G600 will not lockout, but spark indefinitely.)  
**Note:** The burner will not light because the gas is off.
3. Turn off the thermostat.
4. Turn on the gas and purge gas lines of all air.
5. Check for leaks on all pipe joints and connections upstream of the gas valve with a soap solution.

## Operation

### Operating Mode Definitions

The following definitions describe the G600 operating conditions.

- **Trial for Ignition:** Period during which the pilot valve and spark are activated, attempting to ignite gas at the pilot burner. The control attempts to prove flame at the pilot burner within the trial-for-ignition time. Once flame is proven, the main valve is energized.
- **Run:** Main gas valve and pilot valve remain energized and spark is turned off after successful ignition
- **Lockout:** Pilot gas did not ignite within the trial-for-ignition time. Open the thermostat contacts for 30 seconds, then close to restart the sequence of operation.
- **Flameout:** Loss of proven flame.

### Sequence of Operation

Figure 6 illustrates the sequence of operation of the G600 control.

1. **Call for Heat:** The thermostat contacts close, powering Terminal 2 on the G600.
2. **Pilot Flame Checking:** If the G600 detects the presence of pilot flame (from the flame sensor) when there should not be (before the call for heat), the G600 will not operate.
3. **Vent Damper Actuation:** On models electrically interlinked with a vent damper, the G600 powers the vent damper motor. Once the vent damper reaches the open position, the motor stops, and the G600 is allowed to begin the trial for ignition.

4. **Trial for Ignition:** During the trial for ignition, the G600 energizes Terminal 1 and the spark transformer, which opens the pilot valve and activates the spark in an attempt to light the pilot burner. If the G600 detects the presence of the pilot flame within the trial-for-ignition time, it proceeds to the run state. If the G600 does not detect the presence of the pilot within the trial-for-ignition time, the control sparks indefinitely.

5. **Run:** If pilot flame is detected within the trial for ignition, Terminal 3 is energized and the spark transformer is de-energized, which opens the main valve and shuts off the spark. The pilot valve and main valve are kept open throughout the run state. The control remains in the run condition until the call for heat ends or until a flameout occurs.

6. **Flameout:** If, during the run state, the control detects the loss of pilot flame, it will de-energize the main valve within 0.8 second (flame failure response time). The pilot valve is kept open, the spark will be re-established, and another trial for ignition will begin. After the fifth flameout, the control locks out.

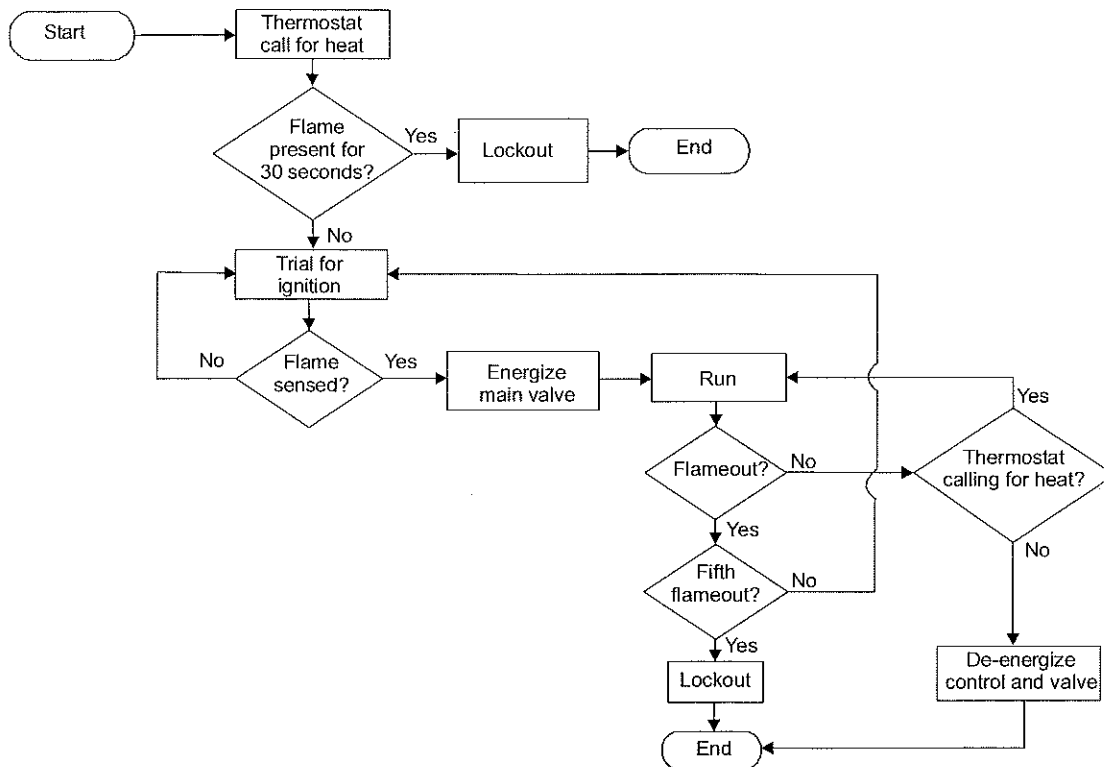


Figure 6: G600 Sequence of Operation

## Troubleshooting

If the system does not function properly, determine the cause using the procedures in this section.

### Preliminary Checks

Before proceeding with troubleshooting the system, check the following:

- Are all mechanical and electrical connections tight?
- Is the system wired correctly?
- Is gas inlet pressure per the manufacturer's specifications?
- Is the system powered?
- Is the thermostat calling for heat?

### Failure Conditions and Corrective Actions

There are three potential system failure conditions.

- No spark, and the system does not work.
- Spark present, but the pilot does not light.
- Pilot Lights, but the main burner does not come on.

Determine the failure condition, then use the respective flowchart on the following pages to troubleshoot the system. Perform the procedures in the *Checkout* section after any servicing.

## Repairs and Replacement



### CAUTION: Risk of Electric Shock.

Disconnect power supply before making electrical connections to avoid electric shock.



### WARNING: Risk of Explosion or Fire.

Shut off the gas supply at the main manual shutoff valve before installing or servicing the Q15HAA-1. Failure to shut off the gas supply can result in the release of gas during installation or servicing, which can lead to an explosion or fire, and may result in severe personal injury or death.



### WARNING: Risk of Explosion, Fire, or

**Electric Shock.** Label all wires before they are disconnected when replacing or servicing the Q15HAA-1. Wiring errors can cause improper or dangerous operation and may result in an explosion, fire, or electric shock leading to severe personal injury or death.

The Q15HAA-1 control is not field repairable. Do not attempt field repairs. Use only an exact or factory-recommended replacement control.

All other accessories, such as flame sensors, electrode assemblies, pilot assemblies, and leads can be obtained through the original equipment manufacturer or a Johnson Controls distributor.

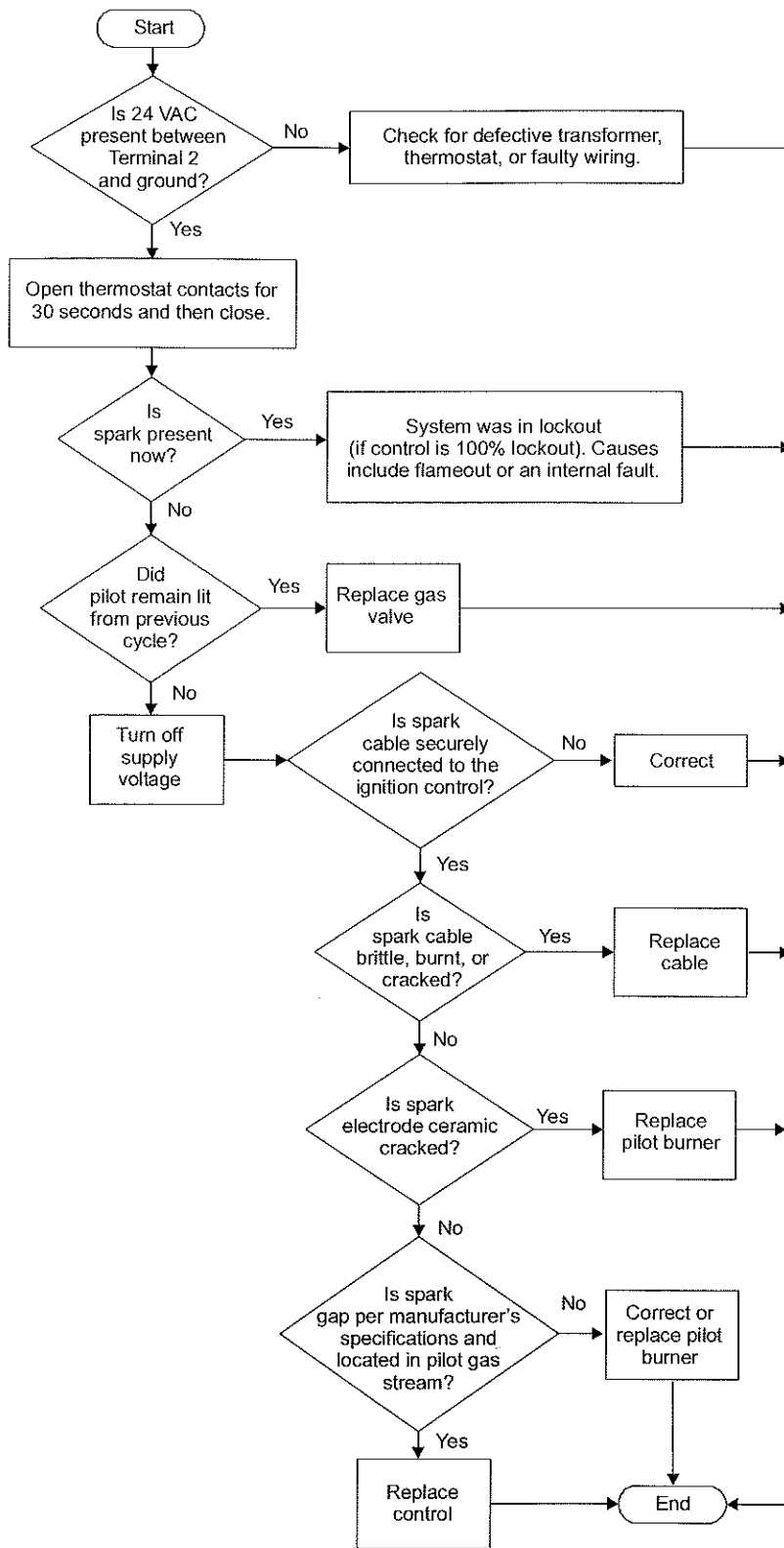
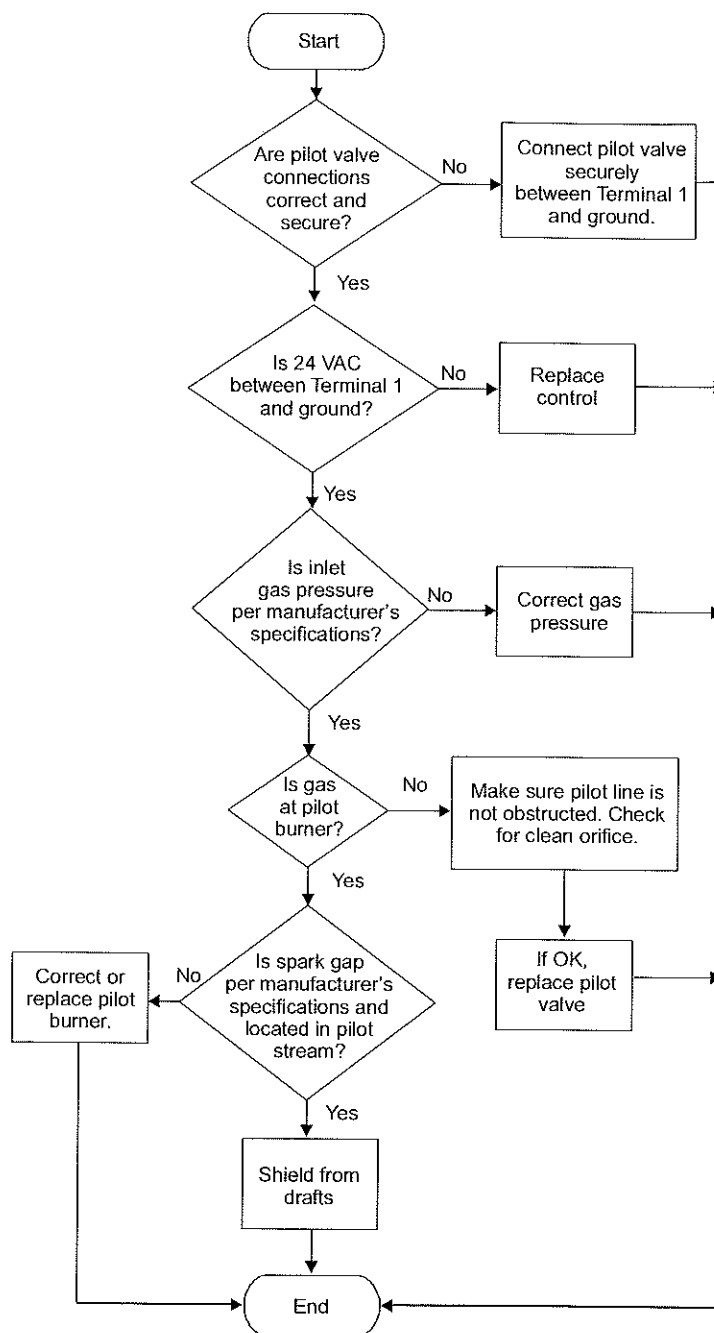


Figure 7: No Spark, and the System Does Not Work



**Figure 8: Spark is Present, But the Pilot Does Not Light**

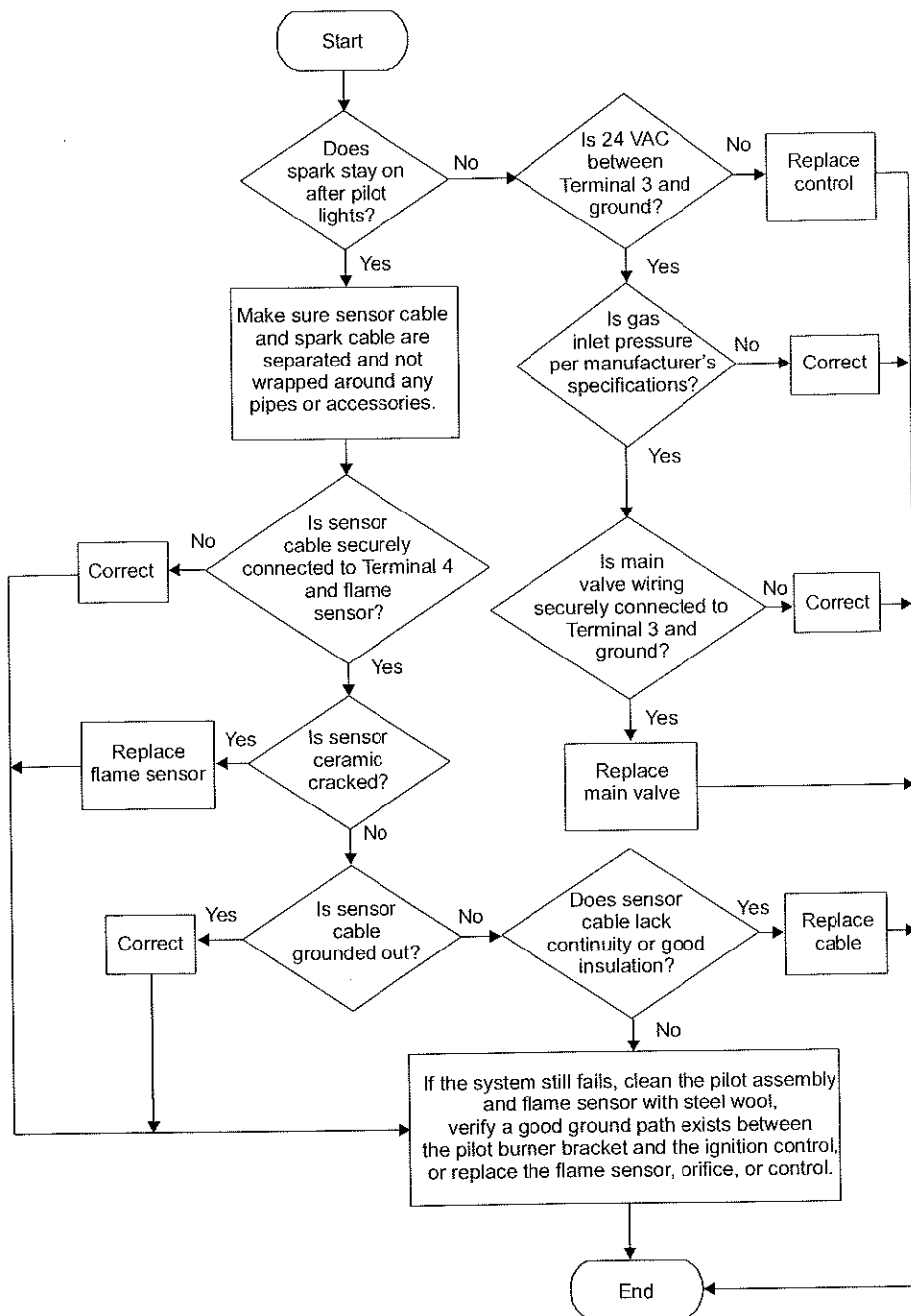


Figure 9: Pilot Lights, But the Main Burner Does Not Come On

## Technical Specifications

<b>Product</b>	G600AX-3 Intermittent Pilot Ignition Control	
<b>Ignition Type</b>	Indirect	
<b>Ignition Source</b>	High voltage spark, capacitive discharge	
<b>Maximum High Voltage/Flame Sense Cable Length</b>	48 in. (1,220 mm)	
<b>Flame Detection Means</b>	Flame rectification	
<b>Flame Detection Type</b>	Remote	
<b>Minimum Flame Current</b>	0.2 microamperes DC	
<b>Flame Failure Response Time</b>	0.8 second maximum	
<b>Spark Gap</b>	0.1 in. (2.5 mm) nominal	
<b>Trial-for-Ignition Time</b>	Infinite (Non-100% Lockout)	
<b>Wiring Connections</b>	Terminal Board	
<b>Spark Connection</b>	Rajah	
<b>Power Requirements</b>	Control:	24 VAC at 60 Hz
	Operation Current:	0.15A nominal +valves
<b>Contact Rating</b>	Main Valve:	2 A continuous, 5 A inrush
	Pilot Valve:	2 A continuous, 5 A inrush
<b>Ambient Operating and Storage Temperature</b>	-20 to 150°F (-29 to 66°C)	
<b>Humidity Rating</b>	95% RH noncondensing	
<b>Type of Gas</b>	Natural	
<b>Agency Listing</b>	CSA (AGA/CGA) Certificate Number 164933-1064436	
<b>Specification Standard</b>	ANSI Z21.20	

*Performance specifications are nominal and conform to acceptable industry standards. All agency certification of BASO products is performed under dry and controlled indoor environmental conditions. Use of BASO products beyond these conditions is not recommended and may void the warranty. Product must be protected if exposed to water (dripping, spraying, rain, etc.) or other harsh environments. The original equipment manufacturer or end user is responsible for the correct application of BASO products. Consult BASO Gas Products LLC for questionable applications. BASO Gas Products LLC shall not be liable for damages or product malfunctions resulting from misapplication or misuse of its products.*

## Technical Specifications

Product	G96JGA-3 Gas Valve
Maximum Operating Pressure	0.5 psi (35 mbar)
Permissible Ambient (Surface) Temperature	-20 to 150°F (-29 to 66°C)
Valve Body	Aluminum
Electrical Rating	24 VAC, 60 Hz, 0.3 ampere draw
Regulator Adjustment Range	3 to 6 in. W.C. (7.5 to 15 mbar)
Inlet Pipe Size	1/2 in. NPT
Outlet Pipe Size	3/4 in. NPT
Wiring Connections	8.5 in. (216 mm) lead wires
Type of Gas	Natural
Agency Listing	CSA (AGA/CGA) Certification Number 229521-1656041
Specification Standard	ANSI Z21.78, CSA 6.20

*Performance specifications are nominal and conform to acceptable industry standards. All agency certification of BASO products is performed under dry and controlled indoor environmental conditions. Use of BASO products beyond these conditions is not recommended and may void the warranty. Product must be protected if exposed to water (dripping, spraying, rain, etc.) or other harsh environments. The original equipment manufacturer or end user is responsible for the correct application of BASO products. Consult BASO Gas Products LLC for questionable applications. BASO Gas Products LLC shall not be liable for damages or product malfunctions resulting from misapplication or misuse of its products.*

Refer to the G96 Series BASOTROL Dual Operator Valve Product Bulletin (BASO-PB-G96) for necessary information on operating and performance specifications for this product.



BASO Gas Products LLC

1007 South 12th Street  
PO Box 170  
Watertown, WI 53094  
1-877-227-6427 (1-877-BASOGAS)

www.baso.com  
Published in U.S.A.