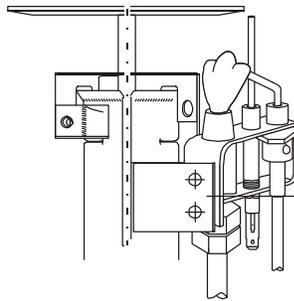




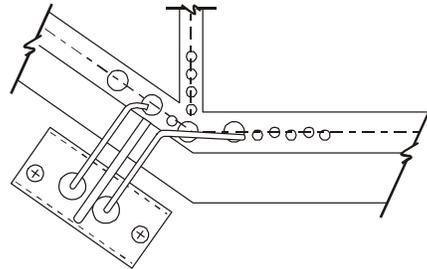
Pilot Burner and Direct Spark Ignition (DSI) Applications with Flame Rectification Sensing

Application

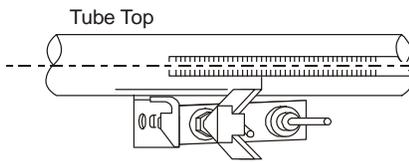
This document is intended to aid the appliance engineer or authorized service contractor in an intermittent ignition pilot or Direct Spark Ignition (DSI) application. Pilot burners are manufactured with a variety of tips and mounting configurations. Representative types of mounting with standard pilots and Y58 electrodes are illustrated in Figure 1.



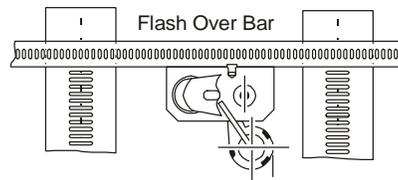
J()DKW Pilot Burner



Y58KD Spark/Sensor Assembly (DSI)



J()LYW Pilot Burner



J()EKW Pilot Burner

Figure 1: Mounting Position Examples for Pilot Burners

Good Practice Rules

The following are good practice rules for governing the location of the pilot or DSI assembly:

- Locate the pilot or DSI assembly in a position that has a fixed relation to the main burner.
- Locate the pilot burner in a position that will receive incoming atmospheric air and not products of combustion from the main burner. The pilot should be located where it will not be affected by an excessive draft of incoming air.
- Locate the pilot burner or DSI assembly in such a position that it does not receive the full force of igniting puffs from the main burner.
- Locate the pilot burner or DSI assembly in a position that will allow ready removal for cleaning.

After Installation

When the pilot burner or DSI assembly has been installed, carefully make the following observations and tests:

1. Ensure the pilot gas readily ignites and that the pilot flame is sensed, i.e., main valve is energized (pilot application). Ensure main burner gas readily ignites and is sensed, i.e., main valve is energized prior to lockout (DSI application).
2. Ensure the main burner flames do not impinge on any part of the pilot burner or any part of the DSI assembly, except the electrodes.
3.
 - a. Ensure the pilot burner will ignite the main burner under all pilot burner conditions that energize the main valve relay. (See the *Safety Turn Down Test* section.)
 - b. Ensure the DSI assembly will ignite the main burner under various pressure and voltage conditions if the main valve is energized. (See the *Delayed Ignition Test* section.)

4. Ensure the pilot burner remains lit and the pilot or DSI assembly does not cycle the main valve:
 - when the main burner is ignited from a cold start
 - when the main burner is ignited with the appliance at the maximum temperature conditions of operation
 - with normal variation in air adjustments of the main burner
 - with rapid Off and On operation of the main burner with the combustion chamber cold
 - with rapid Off and On operation of the main burner with the combustion chamber hot
 - with continued operation of the main burner
5. To ensure proper operation, the pilot or DSI assembly must produce a satisfactory microamperage. See Table 1.

Note: When a pilot is to be applied to an appliance already in the field, obtain the appliance manufacturers' recommendations for the correct pilot specification and location dimensions for the particular model appliance.

**Flame Sensor
Output Test**

When the pilot or DSI assembly is applied properly, the flame sensor will produce a microamperage as shown in Table 1. Minimum operating microamperage, as shown, must be obtained to give trouble free performance.

**Instructions for
Testing Pilot
Burners with
Flame
Rectification
Sensors**

Perform the following test with the Y99AU-2 ignition control service kit. (Can be purchased from your BASO Gas Products authorized distributor.)

1. Plug Y99AU-3 Signal Transducer into meter. Observe correct polarity.
2. Set function selector switch to DC voltage position. The signal transducer makes it possible to check DC current by reading the DC voltage scale and using a conversion of 1 DC volt equaling 1 DC microampere.
3. Turn off supply voltage to control.
4. Disconnect the flame sensor cable from Terminal 4 on ignition control.
5. Connect the male 1/4 inch spade connector (-) to flame sensor cable. Connect the female 1/4 inch spade connector (+) to Terminal 4. See Figure 2.

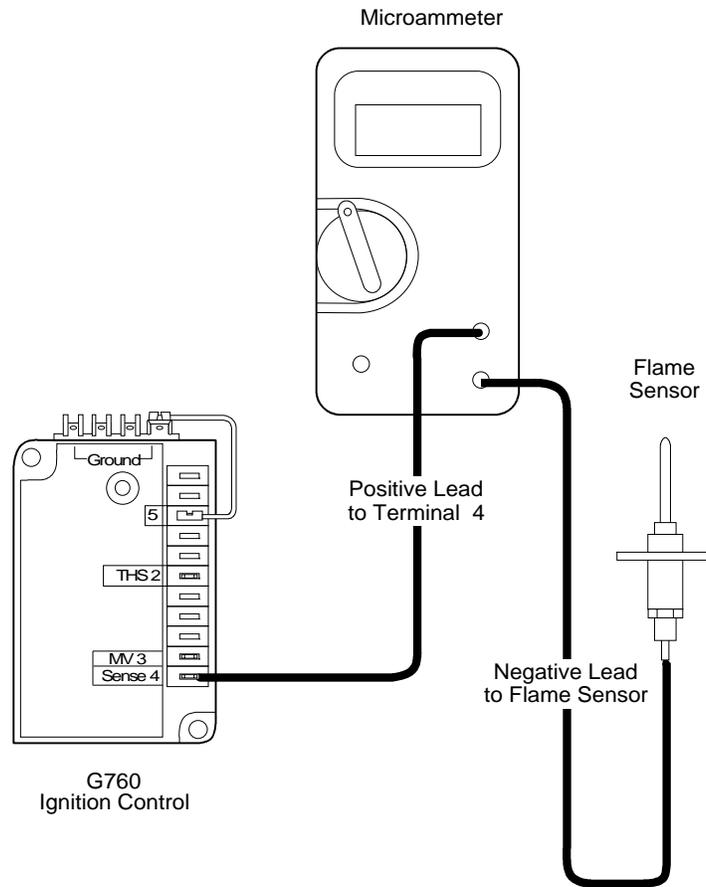


Figure 2: Connection Diagram for Reading Current in Flame Sensing Circuit

6. Disconnect main valve lead from Terminal 3.
7. Turn supply voltage on and close thermostat contacts to cycle system.
8. When pilot lights, read current on meter display (1 DC volt on meter equals 1 microampere). Refer to the appropriate literature for required minimum flame current values of see Table 1.

Note: If signal is less than minimum required, increase amount of flame in contact with flame sensing rod and pilot burner tip by changing orifice, shielding, etc., and repeat test.

9. Open thermostat contacts and turn off supply voltage.
10. Disconnect meter leads.
11. Reconnect flame sensor cable to Terminal 4 and main valve lead to Terminal 3.
12. Turn on supply voltage.

Table 1: Minimum Current Requirements

Product Number	Minimum Flame Sensing Current Required for Relay Pull-In
Original Controls	
G60 (All Models)	0.7 Microamperes DC
G65 (All Models)	0.2 Microamperes DC
G66 (All Models)	0.2 Microamperes DC
G67 (All Models)	0.2 Microamperes DC
G76X (All Models)	0.2 Microamperes DC
G77X (All Models)	0.15 Microamperes DC
Replacement Controls	
CSAs (All Models Except CSA45A-601R and CSA51A-601R)	0.7 Microamperes DC
CSA45A-601R and CSA51A-601R	0.2 Microamperes DC
G600 AX, AY	0.2 Microamperes DC
G600 KX, LX, LY, MX, NX, RX	0.15 Microamperes DC
G670AW	0.2 Microamperes DC
G77X (All Models)	0.15 Microamperes DC

Safety Turn Down Test



WARNING: Fire or Explosion Hazard. Avoid personal injury or property damage by making sure the main burner lights under all pilot burner flame conditions that energize the main valve relay and there is no accumulation of unburned gas. Follow the procedure below to assure the location of the pilot with respect to the main burner is acceptable.

Turn Down Test

To perform the turn down test:

1. Disconnect the main valve wire from Terminal 3 on the ignition control.
2. Reduce the flame on the pilot through the use of a “B” valve to where the main valve relay in the ignition control cycles.
3. Increase the flame on the pilot to where the main valve relay remains constantly energized.
4. Shut off power and reconnect the main valve lead to Terminal 3 on the ignition control.
5. Turn power On and cycle ignition control. With the main valve energized, main burner gas should ignite in 4 seconds or less with no excessive flame flashback or damage to the unit. Conduct test with normal supply pressure to unit.

6. Check to see if you cannot secure ignition of the main burner within 4 seconds. Then the pilot has been located too far from the main burner. Relocate the pilot; repeat Steps 1 through 5.

Observe the pilot flame under the various test conditions and ensure it appears stable at all times. Use a microampere meter to determine the stability of the pilot flame. During the observation, or test of pilot performance, position the doors of the appliance in their normal operating position. Good pilot operation can be affected by many draft conditions, appliance design, and recirculation of combustion products.

Delayed Ignition Test

The DSI assembly application is unsatisfactory if the main burner does not light within the specified lockout time of the ignition control. Listed below is the method of determining if the DSI assembly is located safely with respect to the main burner. Conduct test with normal supply pressure and voltage to the unit.



WARNING: Fire or Explosion Hazard. Avoid personal injury or property damage by making sure main burner gas ignites instantaneously. **This test should only be conducted by qualified personnel.** Control of the main valve and the spark source should be remote from the burner.

To determine if the DSI assembly is located safely:

1. Wire the main valve so it can be powered separately from the ignition control.
2. Short the ignition control spark transformer to ground.
3. Energize the main valve allowing gas to flow to the main burner and delay spark for various intervals up to the maximum lockout time of the ignition control. Be sure to delay the spark a little at a time.
4. Ignition of the main burner gas shall be instantaneous upon energizing the spark. Main burner ignition should not cause excessive flame flashback or damage to the unit.
5. If ignition of the main burner gas is not instantaneous when the spark is energized, the spark gap has been located too far from the main burner. Relocate the DSI assembly; repeat Steps 1 through 4.