



## Pilot Burners/Thermocouples

### Applications

This document is intended to aid the appliance engineer or authorized service contractor in making a standing pilot application. Pilot burners are manufactured with a variety of tips and mounting configurations. Representative types of mounting with standard pilots are illustrated in Figure 1. Dimensions shown are approximate and may vary, provided the requirements of good ignition are met. See *Good Practice Rules*.

### Good Practice Rules

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

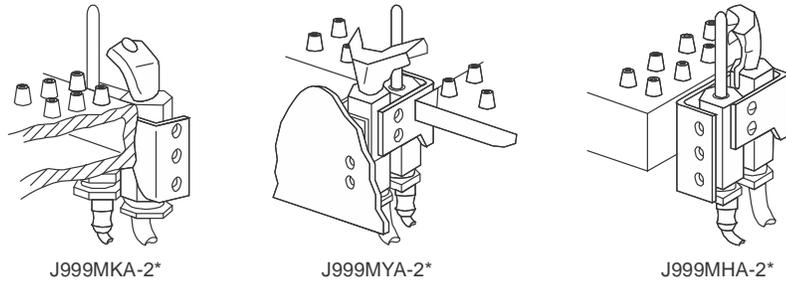
- Locate the pilot so that it can be reached easily for lighting.
- Locate the pilot in a position that has a fixed relation to the main burner (see Figure 1).
- Locate the pilot burner in a position that will receive incoming air and not products of combustion from the main burner. The pilot should be located where it will not be affected by an excessive draft of incoming air.
- Locate the pilot burner in such a position that it does not receive the full force of igniting or extinguishing puffs from the main burner.
- Locate the pilot burner in a position that will allow ready removal for cleaning.

### After Installation

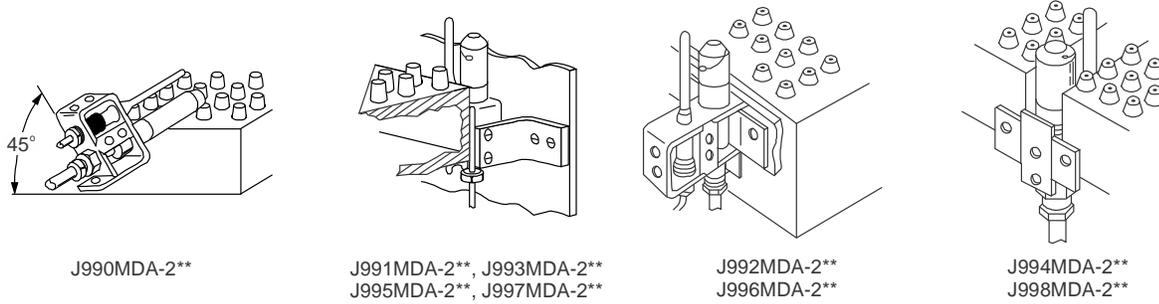
When the pilot burner has been installed, carefully make the following observations and tests:

1. Ensure the main burner flames do not impinge on any part of the pilot burner.
2. Ensure the pilot burner will ignite the main burner under all pilot burner conditions that maintain the safety shutoff device (BASO®) in the On position. (See the *Safety Turn Down Test* section.)
3. Ensure the pilot burner will not be smothered out or snuffed out:
  - 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.
4. To ensure proper operation, the pilot flame must produce a satisfactory millivoltage as described in the *Thermocouple Output Test* section.

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



\* Mount pilot ignition port 3/8 in. (9.53 mm) above and 1/4 in. (6.35 mm) away from the center of nearest burner port.



\*\* Mount pilot ignition port 1/4 in. (6.35 mm) above and 1/4 in. (6.35 mm) away from the center of nearest burner port.

**Figure 1: Pilot Location**

**Thermocouple Output Test**

When the pilot is applied properly, the thermocouple will produce an open circuit millivoltage as shown in Table 1. Normal operating voltages, as shown, must be obtained to give trouble-free performance. Perform the following tests with the Y99AB Test Kit.

**Instructions for Testing BASO Pilot Burners with K14, K15, K16, K17 and K19 Thermocouples**

Attach the proper junction terminal of the millivoltmeter to the thermocouple lead and measure the open circuit voltage. Allow at least five minutes for each meter reading. For specifications, see Table 1.

**Table 1: Thermocouple Output Table**

Thermocouple		mV Range	
Lead Type	Turn Down	Normal	Not Less Than
K14	4 mV	20-28	15
K15	4 mV	20-28	15
K16	4 mV	25-35	17
K17	4 mV	30-40	25
K19	4 mV	25-35	17

**Safety Turn Down Test**

**WARNING: Risk of Explosion or Fire.**  
 Avoid accumulation of unburned gas and resulting personal injury or property damage by making sure the main burner lights under all pilot burner flame conditions that maintain the BASO in the On position. Follow the procedure below to assure the location of the pilot with respect to the main burner is acceptable.

**Turn Down Test with the Use of the Y99AB Test Kit**

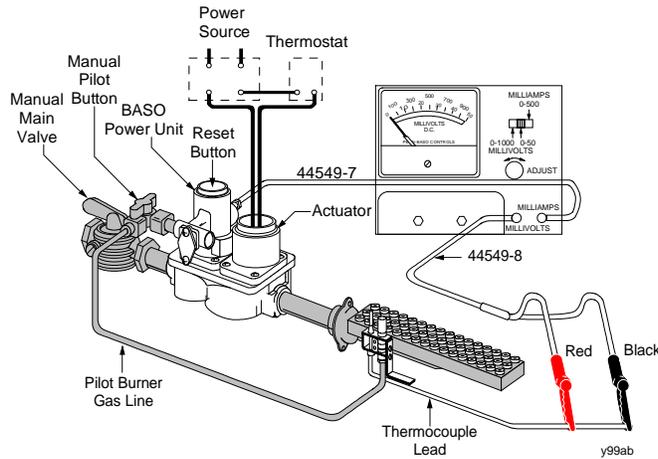
To perform the turn down test with the Y99AB Test Kit (purchasable from your BASO Gas Products authorized wholesaler):

1. Disconnect the thermocouple from the BASO safety shutoff device and connect it to the test kit (see Figure 2). Hold the BASO in the open position during this test using battery power from the test kit.

Figure 2: Using the Y99AB for the Turn Down Test

2. Reduce the flame on the pilot through the use of the "B" valve to the point where the open circuit millivoltage reading is not more than 4 millivolts.

- Cycle the main burner On and Off at least three times. The main burner must ignite each time within four seconds.



**Figure 2: Using the Y99AB for the Turn Down Test**

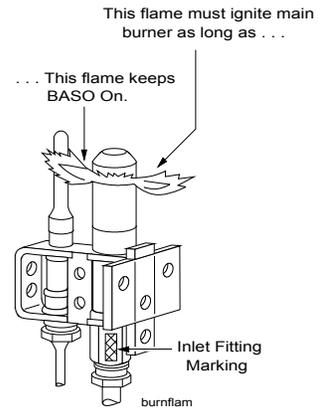
### Turn Down Test without Instruments

If you cannot secure ignition of the main burner when the millivoltage reading is 4 millivolts, the pilot has been located improperly with respect to the main burner. Relocate the pilot; repeat Steps 2 and 3.

If you do not have the Y99AB Test Kit, perform the turn down test using the following steps:

- Reduce the flame on the pilot, through the use of the "B" valve to a point where the pilot flame does not impinge on the thermocouple (see Figure 3).
- Cycle the main burner On and Off at least three times. The main burner must ignite each time within four seconds.
- Wait at least three minutes for the BASO to drop out. (Main burner flame will go out.)

- If the BASO does not drop out, reduce the pilot flame further and repeat Steps 2 and 3.
- If you cannot secure ignition of the main burner when the pilot flame has been reduced to the pilot at which the BASO drops out, the pilot has been located too far from the main burner and must be moved closer. Repeat Steps 2, 3, and 4.



**Figure 3: Turn Down Test without Instruments**

Observe the pilot flame under the various test conditions and ensure it appears stable at all times. Use a millivolt 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.

## Technical Specifications

<b>Product</b>	J Series BASSO Replacement Pilot Burners	
<b>Materials</b>	Mounting Bracket	Plated Steel
	Pilot Tip	430 Stainless
	Pilot Body	Plated Steel
	Inlet Tip	Aluminum
	Inlet Body	Brass
<b>Maximum Temperature</b>	Mounting Bracket	825°F (441°C)
	Pilot Tip	1500°F (816°C),(D Tip 1350°F (732°C)
	Pilot Body	825°F (441°C)
	Inlet Tip	635°F (335°C)
	Inlet Body	750°F (399°C)
<b>Agency Listings</b>	None	
<b>Specification Standards</b>	ANSI Z21.20	
	CAN 1-6.4	
	CAN/CSA-C22.2 No. 199-M89	

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 J Series Pilot Burners/Y90 Series Inlet Fittings Product Bulletin (BASO-PB-PILOTS/Y90) for necessary information on operating and performance specifications for this product.

## Technical Specifications

<b>Product</b>	K Series Thermocouples	
<b>Types of Gas</b>	Natural, Liquefied Petroleum (LP), Manufactured, Mixed, or LP Gas-Air Mixture	
<b>Maximum Temperature</b>	Hot Junction	1400°F (K14), 1500°F (K15, K16) and 1300°F (K17, K19)
	Cold Junction	850°F
	Copper Tube	640°F
	Termination	300°F
	Inlet Body	Brass
<b>Storage Temperature</b>	-40 to 176°F (-40 to 80°C)	
<b>Packaging</b>	Bulk pack supplied to original equipment manufacturer, (individual pack optional)	
<b>Bulk Pack Quantity</b>	100	
<b>Bulk Pack Weight</b>	Varies due to the different lengths of leads	
<b>Agency Listings</b>	CSA Certificate Number 229521-1656071	
<b>Specification Standards</b>	ANSI Z21.20	
	CAN 1-6.4	
	CAN/CSA-C22.2 No. 199-M89	

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