



E Series CE/AGA Approved Intermittent Pilot Ignition Control

Application

The E Series CE/AGA Approved Intermittent Pilot Ignition Control is a safety control designed for indirect burner ignition and supervision, for use with all gases and applicable to gas-fired appliances.

The E Series is a microprocessor based ignition control. The microprocessor provides reliable software control of all timings and operates a diagnostic Light-Emitting Diode (LED). It provides ignition sequence, flame monitoring, and safety shutoff for boilers, furnaces and other gas-fired heating appliances.

Installation

IMPORTANT: Only qualified personnel should install or service BASO Gas Products®. These instructions are a guide for such personnel. Carefully follow all instructions for the appliance.

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



WARNING: Risk of Explosion or Fire.

Do not install the control in an area that is exposed to water (for example, dripping, spraying, rain). Do not use the control if it has been exposed to water. Exposure to water may cause malfunction and can lead to an explosion or fire and may result in severe personal injury or death.

IMPORTANT: This control is approved for use with noise suppression (resistive) spark wires. If the application has copper wire, it must be replaced.

Instructions for installing the pilot burner/igniter-sensor are typically provided by the appliance manufacturer. It is important to follow those instructions. If such information is not included, refer to the *Mounting* section.

Mounting



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 control. 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.

IMPORTANT: Do not mount the control where it can be exposed to direct infrared radiation from the main burner or to temperatures in excess of the maximum product temperature rating.

Replacement Instructions

Mark wires to existing control. Disconnect the wires and remove the existing control.

The control is not position sensitive. It may be mounted horizontally or vertically with two #6 sheet metal or machine screws.

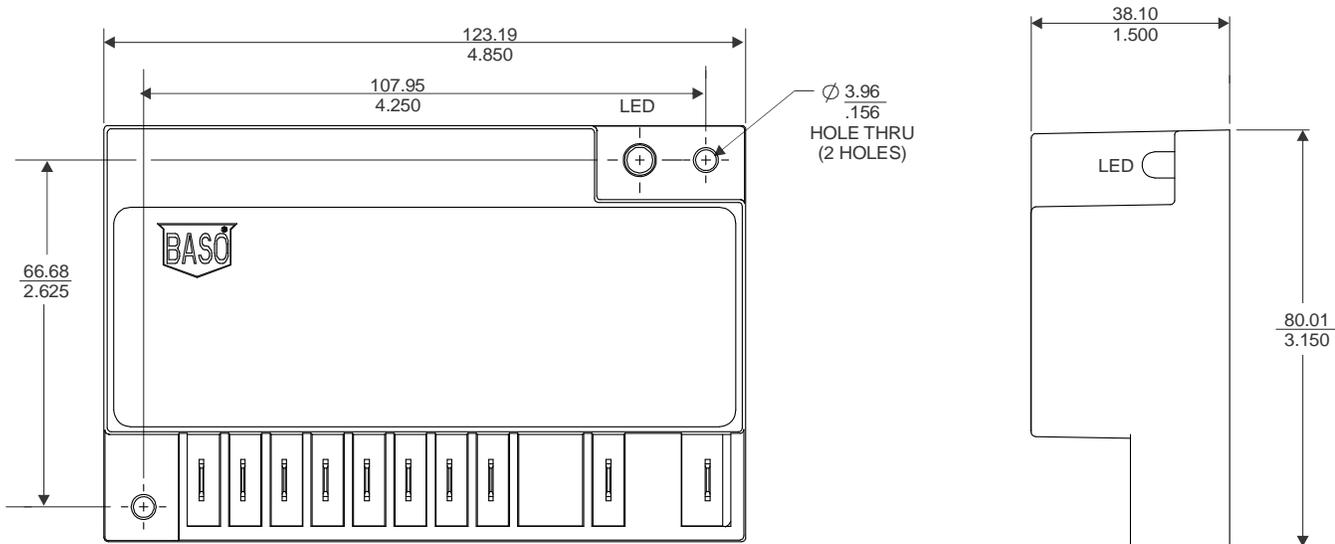


Figure 1: Dimensions (mm/in.)

Wiring



WARNING: Risk of Explosion or Fire.

Locate all safety, limit, and operating controls in series with the thermostat terminal (TH) 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 2 and 3 for wiring diagrams. All wiring should be in accordance with the National Electrical Code (NEC) and all other local codes and regulations.

Check the voltage rating marked on the control and make sure it is suited to the application. Use a Class 2 transformer capable of providing 24 VAC under maximum load, including valves. A transformer having excessive primary impedance due to poor coupling affects the ignition potential.

Controls with universal flame sense are supplied with a jumper wire between SENSE and INTERN terminals and is ready for internal (one rod) flame sense. With the jumper in, flame is sensed through the high voltage spark wire. For external (two rod) flame sense, the jumper must be removed and discarded and the sense electrode is wired to the SENSE terminal.

Spark Cable

The cable must be noise suppression (resistive) type rated for at least 15kV and must not be in continuous contact with a metal surface. If a separate flame sense probe is used, the sense wire should be separated from the high voltage wire by a minimum of 6.35 mm (1/4 in.).



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.

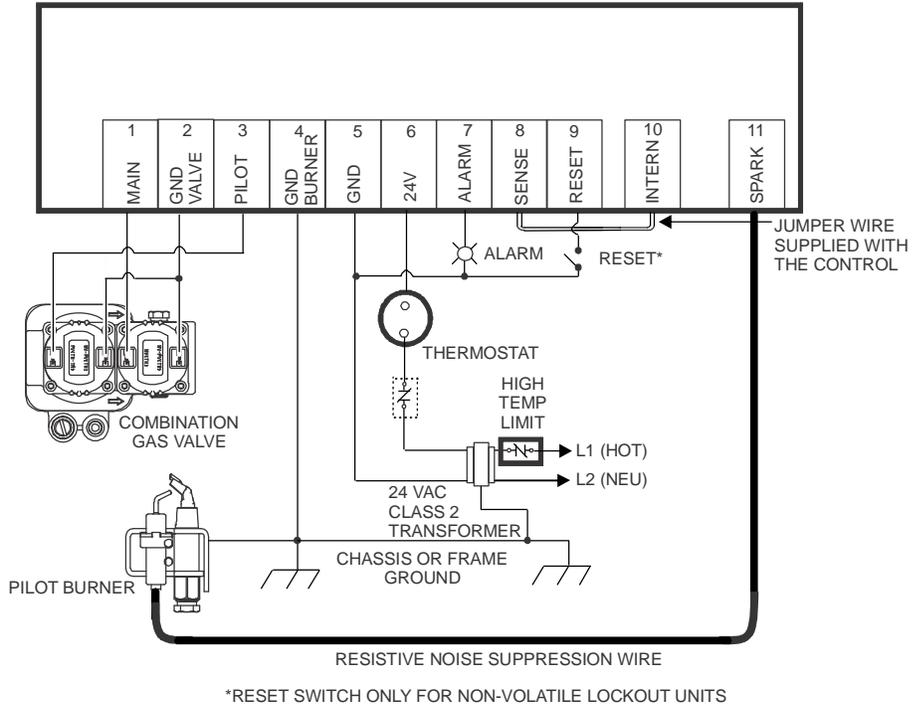


Figure 2: Wiring for 1 Rod Flame Sense used for Internal Sense

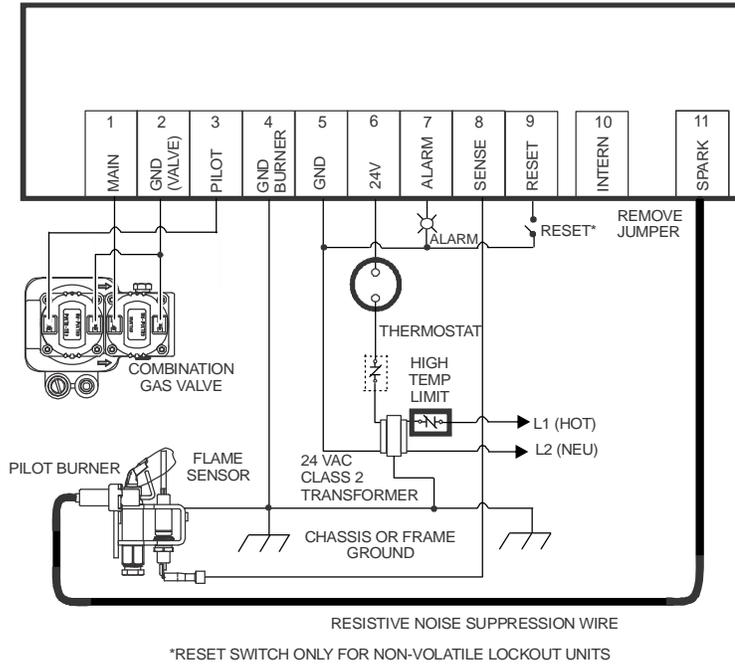


Figure 3: Wiring for 2 Rod Flame Sense used for External Sense

Setup and Adjustments

Checkout



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.

Make sure all components function properly by performing the following test.

1. Before starting the appliance, perform a safety inspection of piping, burners and venting. Check for water leaks, etc. Check all wiring for proper connections. Be sure the system is properly grounded, including ground connection to the pilot burner.
2. With the gas and thermostat off, turn on power to the appliance.
3. Turn the thermostat to a high setting and verify that the control goes through the operating sequence to a shutoff condition.
Note: The burner does not light because the gas is off.
4. Turn off the thermostat.
5. Turn on the gas and purge gas lines of all air.
6. Check for gas leaks on all pipe joints upstream of the gas valve with a soap solution.
7. Turn the thermostat to the highest setting and verify successful ignition and a normal run condition for at least 5 minutes. If the appliance fails to run, see the *Troubleshooting* section.
8. Check for gas leaks on all pipe joints downstream of the gas valve with a soap solution.
9. Turn the thermostat down for at least 30 seconds and then back up again. Verify successful ignition at least five times.
10. Return the thermostat to a normal temperature setting before leaving the installation.



WARNING:
The control module can not be serviced by user. If any faults are detected, the control module must be replaced. If control module has been opened or any attempts to repair are done, the warranty is void.

Operation

Operating Mode Definitions

The following definitions describe the E Series operating conditions.

- **Waiting Time (Prepurge):** The initial delay between the start signal and the safety time to allow ventilation of the combustion chamber and flue passages to displace any unburned gas and/or products of combustion.
- **Safety Time (Trial for Ignition):** The time between energizing the pilot gas valve and de-energizing the pilot gas valve if the flame signal is not detected.
- **100% Shutoff:** Pilot gas did not ignite within the safety time (trial-for ignition time) or the amount of trials. The control de-energizes the spark circuit and gas valve, and enters into lockout.
- **Retrial:** Failing an ignition attempt, the control enters the inter-waiting time (retry) and then starts another safety time (models with optional retrials).
- **Running Position (Run):** The main valve and pilot valve remain energized and the spark is de-energized. The appliance is in normal operation under the supervision of the ignition control and its flame detector device.
- **Flame Loss Response (Inter-Purge):** The loss of proven flame. The main and pilot valves are turned off (de-energized) and the control waits the recycle (Inter-Purge) time before another spark sequence is started. For controls without recycle (Inter-Purge) time the main valve is turned off (de-energized) and pilot is turned on (energized) and a spark sequence recurs within 2.0 seconds.
- **Volatile Lockout (Lockout):** The safety shutdown of the system where a startup sequence can **only** begin after the thermostat contacts or main power is cycled (off, then on) to reset lockout.
- **Non-Volatile Lockout (Lockout):** The safety shutdown of the system where a startup sequence can only begin after the operation of the external reset switch to reset lockout.
- **Recycle (Inter-Purge):** If shutoff occurs, the control delays for a specific recycle delay period before beginning another trial for ignition (models with recycle only).
- **Inter-Waiting Time (Retry):** Period between trials for ignition when both the gas valve and spark is deactivated to allow unburned gas to escape before the next trial. Inter-Waiting (Retry) occurs between unsuccessful trials on a multi-trial control.
- **Alarm Output:** The alarm output uses the normally closed contact on the safety relay. It will turn on if flame fails to light in the safety time or a fault is detected in the control. The output will also be on for a half second on power up until the safety relay turns on.

Troubleshooting

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

Before proceeding with troubleshooting the system, check the following.

Preliminary Checks

- Are you using resistive wire between the module spark (11) and the pilot connection?
- Are all mechanical and electrical connections tight?
- Is the system wired and grounded correctly?
- Is gas inlet pressure per manufacturer's specifications?
- Is the thermostat calling for heat?
- Is the system powered?

Table 1: LED Error Indications

LED Indications During Normal Operation		
Orange once a second		Waiting Time (Prepurge)
Red rapid flashing		Safety Time Spark On (Trial for Ignition)
Steady green		Running Position Flame On (Run)
Orange once every 5 seconds		Inter-Waiting Time Between Cycles (Retry)
Orange once a second		Flame Loss Waiting Time (Inter-Purge)
LED Error Indications		
Red	Green	Error
1	0	Flame did not light in safety time (Trial for Ignition)
1	1	Flame sense circuit stuck on
1	2	Internal fault
1	3	Line frequency or micro clock error
2	1	Pilot valve fault
2	2	Pilot valve relay contact fault
2	3	Main relay fault
2	4	Main valve relay contact fault

Note: More than 2 red blinks indicate micro-memory or software fault.

Technical Specification

Product	EC/AGA Universal Intermittent Pilot Ignition Control	
Ignition Type	Indirect	
Ignition Source	High voltage spark, capacitive discharge	
High Voltage Cable Maximum Length	1,220 mm (48 in.) (Resistive wire recommended, rated for at least 15Kv.)	
Flame Sense Cable Maximum Length	1,220 mm (48 in.)	
Flame Detection Means	Flame Rectification	
Flame Detection Type	Local or Remote	
Minimum Flame Current	0.15 microamperes	
Flame Failure Response Time	2 seconds maximum	
Maximum Spark Gap	5.1 mm (0.2 in.)	
Power Requirements	Control:	24 VAC (+/- 20%), 50/60 Hz
	Operation Current:	0.2 A nominal + valves
Contact Rating	Main Valve:	2 A maximum
	Pilot Valve:	2 A maximum
	Alarm Output	1 A maximum
Wiring Connections	6.35 mm (1/4 in.) male spade	
Burner Rating	117 kW (400,000 Btu/hr)	
Ambient Operating and Storage Temperature	-40 to 77°C (-40 to 176°F)	
Humidity	95% RH noncondensing	
Type of Gas	Natural, Liquefied Petroleum (LP), Manufactured, Mixed or LP Gas-Air Mixture	
Packaging	Bulk pack supplied to original equipment manufacturer (individual pack [-1AAC] or overpack	
Bulk Pack Quantity	25	
Pack Weight	Bulk pack (-1AAD) 6.36 kg (14 lb) Individual pack (-1AAC) .454 kg (1 lb.)	
Agency Listing	EC Certification Number EC-86/10/147 AGA Certification Number 7811	
Specifications Standards	ANSI Standard Z21.20 CAN/CSA-C22.2 No. 199	

The 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. If the product is exposed to water (dripping, spraying, rain, etc.) or other harsh environments, it must be protected. The original equipment manufacturer or end user is responsible for the correct application of BASO products. For questionable applications, please consult BASO Gas Products LLC. BASO Gas Products LLC shall not be liable for damages or product malfunctions resulting from misapplication or misuse of its products