120 VAC Intermittent Pilot Gas Ignition Control

Quick Reference Guide

The Intermittent Pilot Gas Ignition module is designed for indirect burner ignition and supervision. It can be used in new applications or replaces many popular flame rectification type of intermittent pilot ignition (IPI) modules, including those manufactured by Honeywell, Robertshaw, ICM, Fenwal, and Johnson Controls.

The following is an overview of the control, and is intended to only be used by Certified Service Technicians.

APPLICATION

- Gas Furnaces
- Boilers
- Water Heaters
- Commercial Cooking

FEATURES

- 120 VAC microprocessor based IPI control
- System diagnostics
- Flame sensing (Local/Internal or Remote/External)
- Full time flame sensing
- Flame sense test pins
- 4 mounting hole positions, 2 that match Honeywell and Fenwal
- Built-in burner ground
- Voltage/Frequency monitoring

Input Voltage	Control: 120 VAC (102-138 VAC) 50/60 Hz
Input Current	0.3 A maximum + valves
Gas Valve Contact Rating	0.5 A Pilot and 0.5 A Main @ 120 VAC, 1 A Max.
Alarm Output	0.2 A @ 120 VAC
Operating Temperature	-40 to 176°F (-40 to 80°C)
Flame Detection Means	Flame Rectification
Flame Detection Type	Local/Internal or Remote/External
Minimum Flame Current	0.07 microamperes
Flame Failure Response Time	1.0 second maximum
Ignition Source	High voltage spark, capacitive discharge
Maximum Spark Gap	0.2 in. (5.1 mm)
High Voltage Cable	48 in. (1,219 mm) max., rated 15kV min. (Resistive recommended)
Flame Sense Cable	48 in. (1,219 mm) max. (Shielded recommended)
Spark	60 sparks/second
Humidity	0% to 95% RH (non-condensing)
Gas Types	Natural, LP, or Manufactured
Trials Before 100% Shutoff*	Preset 1, 3, 5, 9, Cont.
Trial for Ignition Time*	Preset 4, 8, 11, 21, 30, 60, 90, 120 seconds, Cont.
Pre-Purge Time*	Preset 0, 4, 15, 30 seconds
Inter-Purge Time*	Preset 0, 10, 15, 30, 60, 90, 240, 300 seconds
Retry Delay Period*	Prest 0, 5, or 60 minutes
Lockout Recovery	Power cycle/Thermostat (TH-W) cycle

*For Custom timings, contact BASO Gas Products.
**Retry is not available in CE ignitions.

Agency Certifications

c UL us	UL 60370-1, UL 60730-2-5	File: M2926 Software conforms to UL60730 Requirement Component Recognized System (US & Canada)

WIRING

TABLE 1: Typical Wiring Connections

Label	Terminal Type	Description
BRN GND	Mounting Tab	Burner Ground connection*
FC - +	2 pin	Flame Current measuring for microammeter probes in µAmp DC
N 120 V	1/4“ male QC	Common (Neutral) connection
MV	1/4“ male QC	Main Valve connection
MV/PV COM	1/4“ male QC	Gas Valve common terminal
PV	1/4“ male QC	Pilot Valve connection
ALM	1/4“ male QC	Alarm Signal
L 120 V	1/4“ male QC	120 V Power connection
RO	1/4“ male QC	Roll-out connection
DIP SWITCH S1	N/A	Not applicable on fixed-timing ignitions.
SENSE	1/4“ male QC	For dual rod (remote/external) flame sensing, connect the flame sense wire from the burner/igniter to this terminal.
INT	1/4“ male QC	For single rod (local/internal) sensing, there will be no connection.
SPARK	1/4“ male QC	High voltage sparking electrode

*If the existing system uses a burner ground wire with a quick connect terminal, this must be cut off and replaced with the ring lug terminal provided. This should then be connected to the burner ground mounting tab.

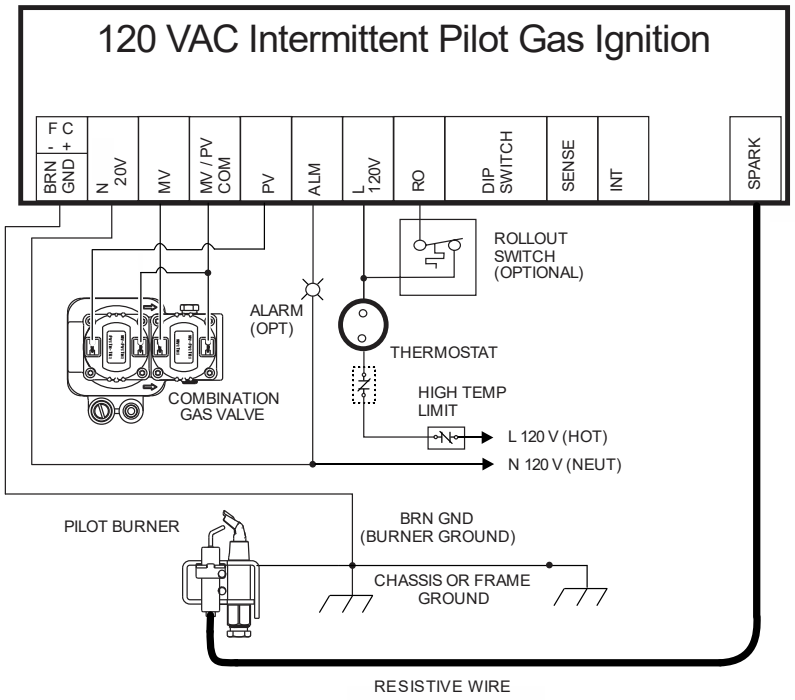

Figure 1: Wiring for 1 Rod Flame Sense used for Local (Internal) Sense

A rollout switch (a normally closed set of contacts) is positioned to detect flames rolling out of the combustion chamber. If rollout occurs, the switch contacts open and the control immediately goes into a lockout condition. The main and pilot valves also close so that the system is not allowed to function.

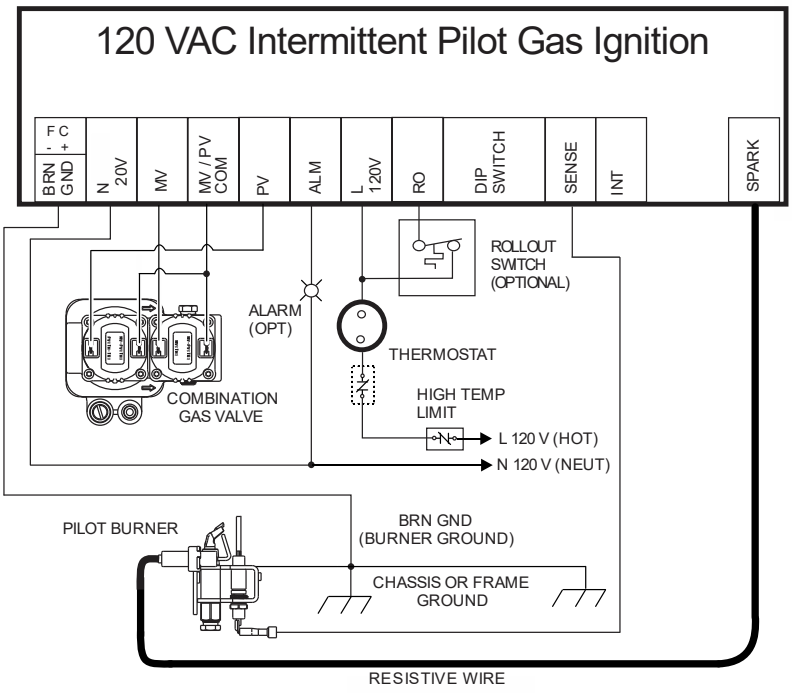

Figure 2: Wiring for 2 Rod Flame Sense used for Remote (External) Sense
See notes on rollout switch on previous page.

Warning: do not install the control in areas that can be exposed to dripping water, steam cleaning, heavy dust, grease, or corrosive chemicals. If the controls can be subjected to this type of environment, use a NEMA 4 rated enclosure to protect the ignition control module.

If not properly protected from the above environment, the control will prematurely fail or malfunction. Excessive high temperatures can damage the ignition control and cause it to malfunction. Make sure the ambient temperature around the ignition does not exceed the rated temperature for the control.

LED STATUS AND TROUBLESHOOTING

The ignition control has a multi-colored (GREEN, ORANGE, and RED) LED which will flash different colors and codes to show status of the ignition and will help troubleshoot the control.

Table 2: GREEN LED Indications of Normal Operation

Flash	Indication
On 1/2 sec, Off 4-1/2 sec	Waiting for "Call for Heat"
On 1/2 sec, Off 1/2 sec	Pre-purge, Inter-purge, Post-purge
On 1/4 sec, Off 1/4 sec	Trial for Ignition (TFI)
On Solid	RUN (Flame, Main valve on)

Table 3: ORANGE LED Indications

Flash	Indication	Error Type
On 1/2 sec, Off 4-1/2 sec	Retry	Standby
On 1/2 sec, Off 1/2 sec	Flame Present	Standby
On 1/2 sec, Off 1/2 sec	Pressure Present	Standby

Table 4: RED LED Indications of ERROR Codes (100% Lockout)

Flash	Indication	Error Type
1 flash	No flame in trial time	100% Lockout
2 flashes	Flame present	100% Lockout
3 flashes	Pilot Valve	100% Lockout
4 flashes	Main valve	100% Lockout
5 flashes	Rollout error	100% Lockout
7 flashes	Repetitive flame loss	100% Lockout
8 or 9 flashes	Internal control	100% Lockout
Solid On	Line voltage/Frequency	Standby

Note: There is a one-second pause after each flash code.

TROUBLESHOOTING GUIDE

1. No power up
    - Faulty 120 VAC wiring
    - Thermostat or transformer
    - Faulty control
    - Safety limits
2. Control LED is blinking RED
    - Determine error code, refer to error codes (Table 4), also refer to the troubleshooting flow chart in the installation instructions
3. No spark during Trial for Ignition (TFI) time
    - Faulty spark electrode wiring
    - Spark gap too wide
    - Faulty control
    - Poor burner ground
4. Burner does not light during trial for ignition time
    - Faulty valve wiring
    - Bad gas valve
    - Faulty control
    - Poor burner ground
5. Burner lights but gas valve turns off after TFI
    - Weak flame, flame not in contact with the spark electrode of flame sensor. Check that flame sensor tip is in the flame. For proper sensing, the rod tip must be 3/8” (10mm) to 1/2” (13mm) in the flame. See Figure 3.
    - Dirty or corroded flame sensor
    - Faulty flame sensor wiring
    - Poor burner ground
    -

Note: For more information on BASO ignitions and other products, plus complete installation instructions, please visit us at www.baso.com.

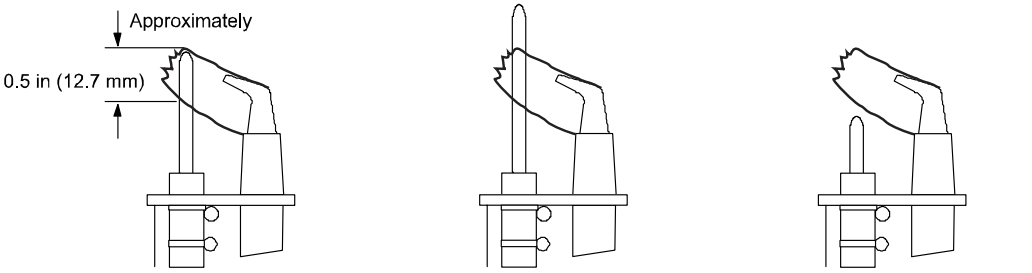

Figure 3: Proper Flame Sensor Position

FLAME CURRENT MEASUREMENT

Flame current of the device can be measured using a standard microammeter by simply touching the meter leads to the 2 PIN labeled FC, as shown in Figure 4.

- Flame current must be measured with pilot valve lit but no main gas flowing.
- Set meter to DC µAmp scale.
- Make sure meter leads are positioned correctly [+/-].
- Recommended Minimum Pilot Only Flame Sense Current of 0.2 to 0.3 µAmp DC.

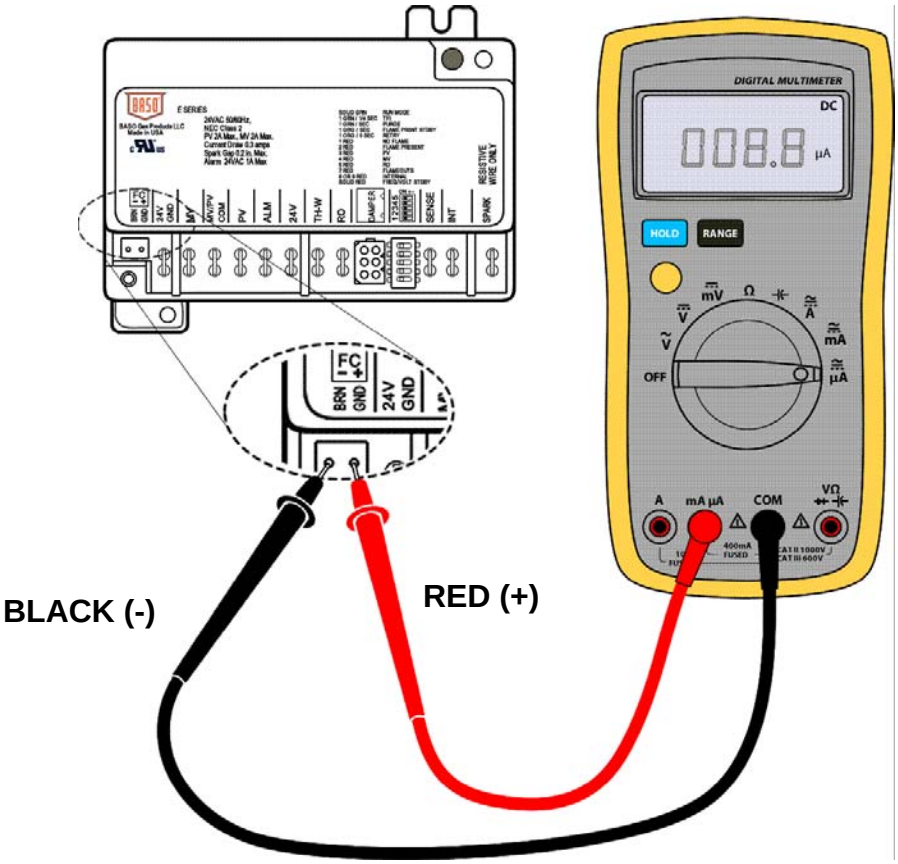

Figure 4: Microammeter Connection

Important: Preventative maintenance programs are an important part of maintaining optimum and safe function of you BASO Products. Any attempt to repair this assembly voids the manufacturer's 2-year warranty. For a replacement control, contact the original equipment manufacturer or nearest BASO Gas Products distributer.