



24 VAC Universal Intermittent Pilot Ignition Control

QUICK REFERENCE GUIDE

The C610U Universal Intermittent Pilot Ignition (IPI) control module is designed for indirect burner ignition appliances. The microprocessor based design allows for safety monitoring and precise timing of operation sequences. A diagnostic LED provides the operator with feedback on the operating state of the ignition and provides diagnostic feedback in the event of an error condition. C610U Series Ignition Controls can be used in OEM appliances or as replacements for other flame rectification type IPI controls, including those manufactured by Honeywell, Robertshaw, ICM, Fenwal, and Johnson Controls.

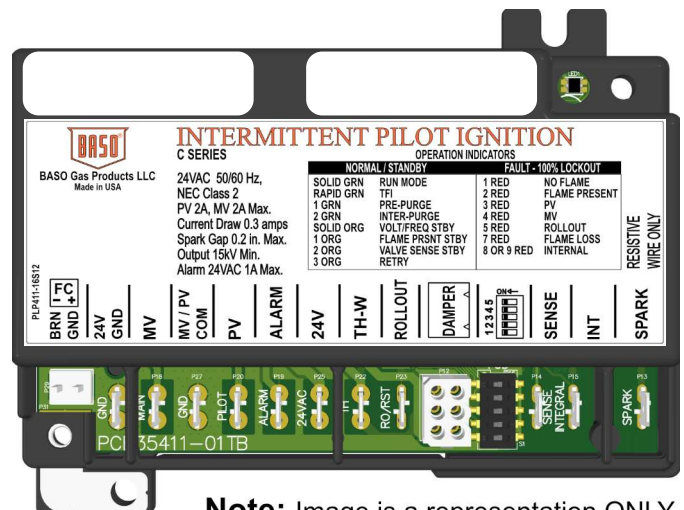
The following is an overview of the C610U Series Ignition Control and is intended for use by Certified Service Technicians only.

APPLICATIONS

- Commercial Cooking
- Gas Furnaces
- Boilers
- Water Heaters
- Other Gas-Fired Appliances

FEATURES

- Dual Microprocessor Based Design
- System Diagnostics
- 32 Selectable Preset Timings
- Universal Flame Sensing (Local/Internal or Remote/External)
- Flame Current Test Header
- 4 Mounting Hole Positions, 2 for Direct Mounting to NEC 4-in Junction Box
- Built-in Burner Ground
- Voltage/Frequency Monitoring



Note: Image is a representation ONLY. Actual ignition control models may differ.

AGENCY CERTIFICATIONS



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



EN298:2022
File: 704826



AS 4625:2008 (R2016)
File: 9320

TECHNICAL SPECIFICATIONS

Input Voltage	24 VAC (18-30 VAC) 50/60 Hz
Input Current	0.3 A nominal + valves
Gas Valve Contact Rating	2 A Pilot and 2 A Main @ 24 VAC
Alarm Output	1 A @ 24 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	15kV High voltage spark, capacitive discharge
Maximum Spark Gap	0.2 in. (5.1 mm)
High Voltage Cable	48 in. (1219 mm) max., rated 15kV min. (Resistive recommended)
Flame Sense Cable	48 in. (1219 mm) max. (Shielded recommended)
Spark	30 sparks/second
Humidity	0% to 95% RH (non-condensing)
Gas Types	Natural, LP, or Manufactured
Trials Before 100% Shutoff / Recycle Attempts *,***	1 - 9 trials or Continuous
Trial for Ignition Time / Safety Time *	4, 8, 15, 30, 50, 60, 90, 120, 240 seconds, or Continuous
Pre-Purge Time *,**	0, 4, 15, 30, or 45 seconds
Inter-Purge Time *	0, 15, 300, or 360 seconds
Retry (Automatic Reset) *,***	0, 5, or 60 minutes
Lockout Recovery	Power cycle

* For custom timings, contact BASO Gas Products

** Pre-Purge Time cannot exceed Inter-Purge Time on CE, UKCA, or AGA approved models

*** Automatic reset, Continuous trials are not allowed on CE, UKCA, or AGA approved models

 WARNING	Read Quick Reference Guide completely before use. This ignition control must be wired in accordance with all local, national, and regional electrical codes.
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 WARNING	Operation outside specifications may result in failure of the ignition control and other equipment with a potential risk of personal injury.
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 WARNING	EMC emission requirements for the burner control system need to be verified after incorporation into the end use appliance.
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**WARNING**

The voltages used and generated by this product have shock hazard potential. Wiring and initial operation checks must be performed by a qualified service technician.

**CAUTION**

Label all wires prior to disconnection when servicing the ignition control. Wiring errors may cause improper and dangerous operation. A functional checkout should always be performed after modifying wiring.

WIRING CONNECTIONS

LABEL	TERMINAL TYPE	DESCRIPTION
FC - +	2 Pin Connector	Flame current test pins for measuring microamps with DMM using μ A setting
BRN GND	Mounting Tab (lower left)	Burner/Equipment ground connection *
24V GND	1/4" Male Quick Connect	Common side (return) of transformer connection
MV	1/4" Male Quick Connect	Main gas valve connection
MV/PV COM	1/4" Male Quick Connect	Gas valve common connection (ground)
PV	1/4" Male Quick Connect	Pilot gas valve connection
ALARM ***	1/4" Male Quick Connect	Alarm signal connection
24V	1/4" Male Quick Connect	24 VAC power connection (No connection on C610U Ignition)
TH-W ***	1/4" Male Quick Connect	24 VAC power connection for damper option
ROLLOUT or RESET ***	1/4" Male Quick Connect	Rollout or reset switch connection
DAMPER ***	6 Pin Keyed Plug	Vent damper connection. Leave the Vent Damper Jumper Plug installed if not a vent damper system.
DIPSWITCH	5 Position Dipswitch	Dipswitch to select between 32 typically preferred settings
SENSE	1/4" Male Quick Connect	Flame sensor connection (dual rod, remote/external) **
INT	1/4" Male Quick Connect	Flame sensor connection (single rod, local/internal) **
SPARK	1/4" Male Quick Connect	High voltage sparking electrode connection

* If the existing system has a burner ground wire it needs to be connected to the burner ground mounting tab on the ignition with a No. 6 or No. 8 machine screw to ensure a proper burner ground.

** For dual rod (Remote/External) flame sensing, connect the flame sense wire from the burner/igniter to the sense terminal. Remove the jumper wire if present. For single rod (Local/Internal) flame sensing, there will be no terminal/connection required. Leave the jumper wire if present.

*** Some terminals are optional features and will not be populated on all ignition controls.

SPARK CABLE: The spark 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 remote flame sense probe is used, the sense wire should be separated from the Spark cable by a **minimum** of 6.25mm (1/4"). The Spark and Sense wire should be isolated from any pipe, other wiring, or accessories.

DO NOT WRAP OR TIE FLAME SENSE CABLE TO SPARK CABLE. Doing so may interfere with the proper operation of the ignition control.

WIRING CONNECTIONS (CONT.)

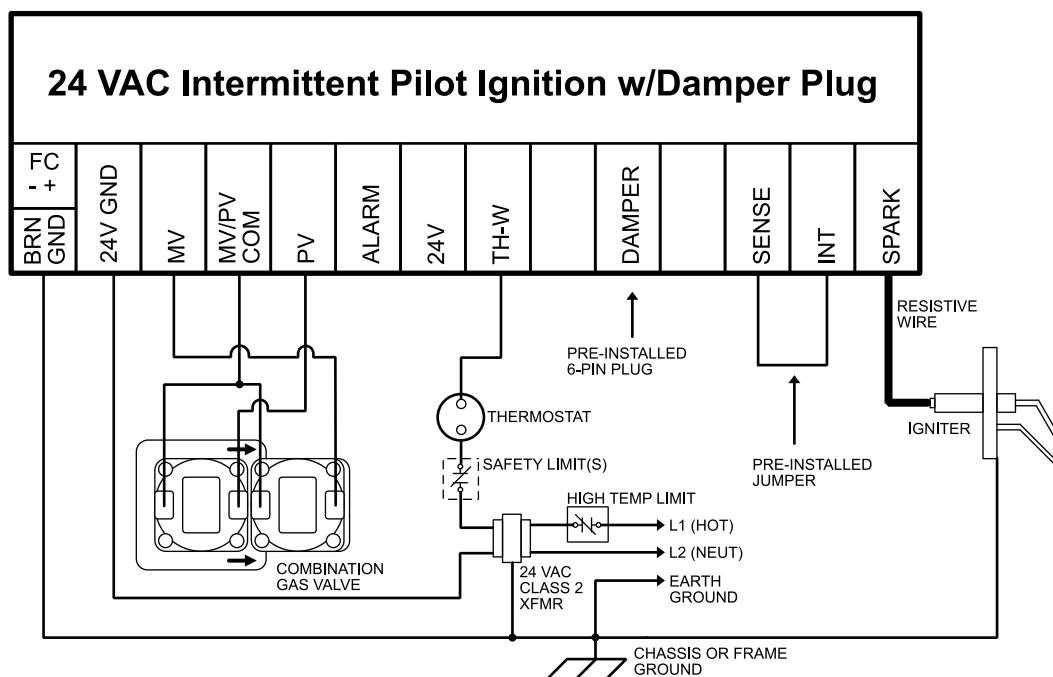


Figure 1: Wiring for 1 Rod Flame Sense used for Local (Internal) Sense with Wiring for a Damper Plug

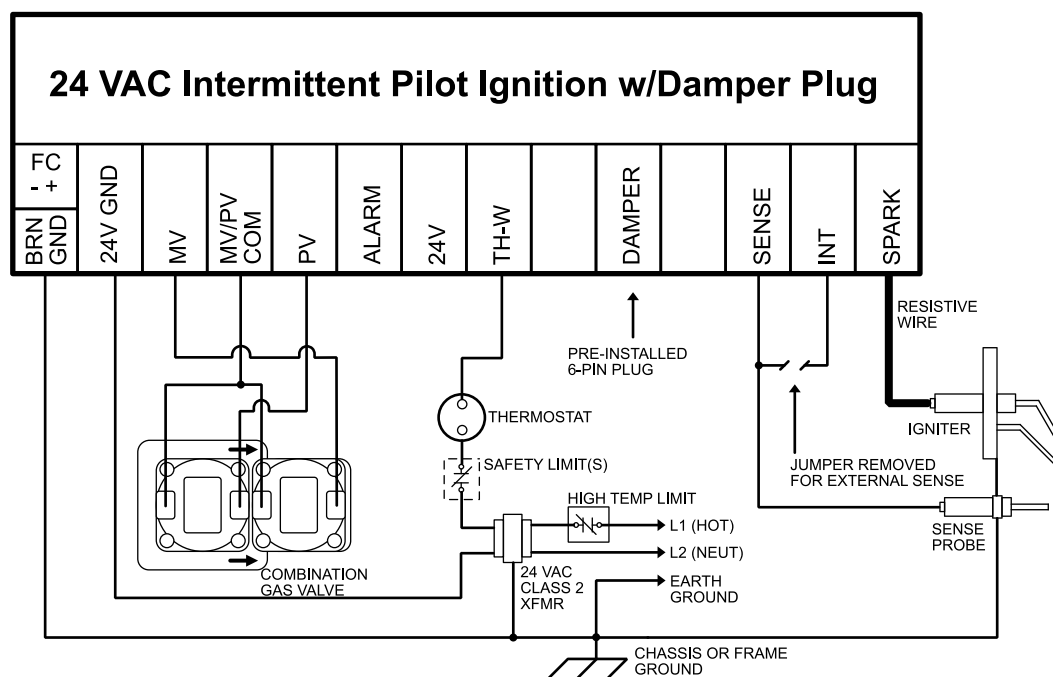


Figure 2: Wiring for 2 Rod Flame Sense used for Remote (External) Sense with Wiring for a Damper Plug

Dipswitch (S1) Settings

When replacing an existing ignition control with the C610U, refer to the dipswitch timing table below for the correct dipswitch settings. For a complete list of the controls the C610U replaces, see the *Replacement Part Numbers* section.

IMPORTANT:

The control timing configuration is *permanently* locked and cannot be reset by changing the dipswitch settings after **10 consecutive power cycles with the same settings**.

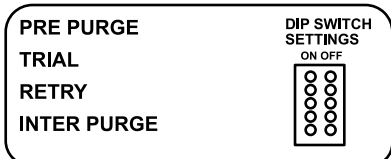
FACTORY DEFAULT S1 DIPSWITCH SETTING



All switch settings are defaulted from the factory to the "ON" position. Refer to the dipswitch timing table below for the desired timing configuration.

The default timings are printed on the label located on the front of the ignition.

TIMING CONFIGURATION LABEL



Select the desired timing configuration. Write in the configuration values and mark the dipswitch settings on the label with a permanent marker. Adhere the label to the front of the control for future reference.

SEL	Timing Configuration					Dipswitch (S1) Settings				
	# of Trials	Pre-Purge (sec)	TFI (sec)	Inter-Purge (sec)	Retry Time (min)	SW1	SW2	SW3	SW4	SW5
0	1	0	4	0	5	OFF	OFF	OFF	OFF	OFF
1	1	30	4	0	5	OFF	OFF	OFF	OFF	ON
2	1	0	15	0	5	OFF	OFF	OFF	ON	OFF
3	1	30	15	0	5	OFF	OFF	OFF	ON	ON
4	1	0	30	0	5	OFF	OFF	ON	OFF	OFF
5	1	30	30	0	5	OFF	OFF	ON	OFF	ON
6	1	0	90	0	5	OFF	OFF	ON	ON	OFF
7	1	30	90	0	5	OFF	OFF	ON	ON	ON
8	3	0	60	15	5	OFF	ON	OFF	OFF	OFF
9	3	30	60	15	5	OFF	ON	OFF	OFF	ON
10	3	0	90	15	5	OFF	ON	OFF	ON	OFF
11	3	0	60	300	60	OFF	ON	OFF	ON	ON
12	3	45	60	300	60	OFF	ON	ON	OFF	OFF
13	3	0	90	360	60	OFF	ON	ON	OFF	ON
14	Cont.	0	90	15	none	OFF	ON	ON	ON	OFF
15	Cont.	30	90	15	none	OFF	ON	ON	ON	ON
16*	1	0	4	0	none	ON	OFF	OFF	OFF	OFF
17*	1	4	8	0	none	ON	OFF	OFF	OFF	ON
18*	1	0	15	0	none	ON	OFF	OFF	ON	OFF
19*	1	0	30	0	none	ON	OFF	OFF	ON	ON
20*	1	4	30	0	none	ON	OFF	ON	OFF	OFF
21*	1	15	30	0	none	ON	OFF	ON	OFF	ON
22*	1	0	50	0	none	ON	OFF	ON	ON	OFF
23*	1	4	50	0	none	ON	OFF	ON	ON	ON
24*	1	0	90	0	none	ON	ON	OFF	OFF	OFF
25*	1	0	120	0	none	ON	ON	OFF	OFF	ON
26*	1	4	120	0	none	ON	ON	OFF	ON	OFF
27*	1	0	240	0	none	ON	ON	OFF	ON	ON
28*	9	0	90	15	none	ON	ON	ON	OFF	OFF
29*	9	15	90	15	none	ON	ON	ON	OFF	ON
30*	9	30	90	15	none	ON	ON	ON	ON	OFF
31*	-	-	-	-	-	ON	ON	ON	ON	ON

*Approved CE timing configurations



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 may be subjected to these types of environments, use a NEMA 4 rated enclosure to protect the ignition control.



CAUTION

If not properly protected from harsh environments, the control may prematurely fail or malfunction. Temperatures outside of rated temperatures may damage the ignition control or cause it to malfunction. Ensure ambient temperatures around the ignition do not exceed the rated temperature for the ignition control.

LED STATUS AND TROUBLESHOOTING

The ignition control has a multi-colored LED (GREEN, ORANGE, RED) that will flash different colors and codes to indicate the status of the ignition control. The table below lists the various flash codes of the ignition control to aid in troubleshooting the ignition control.

GREEN LED INDICATIONS OF NORMAL OPERATION

FLASH	INDICATION
SOLID GREEN	RUN (Flame, Valve On)
RAPID GREEN	TFI (Trial for Ignition)
1 GREEN	Pre-Purge
2 GREEN	Inter-Purge

ORANGE LED INDICATIONS OF STANDBY ERROR CONDITIONS

FLASH	INDICATION	ERROR TYPE
SOLID ORANGE	LINE VOLTAGE/FREQUENCY	STANDBY
1 ORANGE	FLAME PRESENT	STANDBY
2 ORANGE	VALVE SENSE	STANDBY
3 ORANGE	RETRY	STANDBY

RED LED INDICATIONS OF ERROR CODES

FLASH	INDICATION	ERROR TYPE
1 RED	NO FLAME IN TRIAL TIME	100% LOCKOUT
2 RED	FLAME PRESENT AFTER 30s	100% LOCKOUT
3 RED	PILOT VALVE FAULT	100% LOCKOUT
4 RED	MAIN VALVE FAULT	100% LOCKOUT
5 RED	ROLLOUT SWITCH FAULT	100% LOCKOUT
7 RED	REPETITIVE FLAME LOSS	100% LOCKOUT
8 or 9 RED	INTERNAL CONTROL FAULT	100% LOCKOUT
10 RED	POWER LOSS FAULT	100% LOCKOUT
SOLID RED	RESET TRIGGERED	100% LOCKOUT

NOTE: An LED flash is characterized by 0.5 seconds on followed by 0.5 seconds off. The full flash code is shown and then repeated after a 1 second pause.

TROUBLESHOOTING GUIDE

PROBLEM	POTENTIAL CAUSE(S)
Ignition control does not power up	- Ensure proper 24 VAC wiring connections to ignition control - Faulty thermostat or transformer - Safety limits tripped - Faulty ignition control
Control LED is blinking RED	- Ignition control is in error state. Refer to previous table to determine error code, and refer to the Operational Flow Chart in the installation instructions.
No spark during TFI time	- Faulty spark electrode wiring - Ensure spark gap is set within specified values - Faulty control
Burner does not light during TFI time	- Ensure proper wiring connections to valve - Faulty gas valve - Faulty control
Burner lights but gas valve turns off after TFI time	- Weak flame or flame not in contact with the spark electrode or flame sensor. Ensure the tip of the flame sensor is in the flame. For proper sensing, the rod tip must be 3/8" (10mm) to 1/2" (13mm) in the flame. See the illustration below for proper flame sensor positioning (Figure 2). - Dirty or corroded flame sensor - Ensure proper flame sensor wiring - Poor burner ground

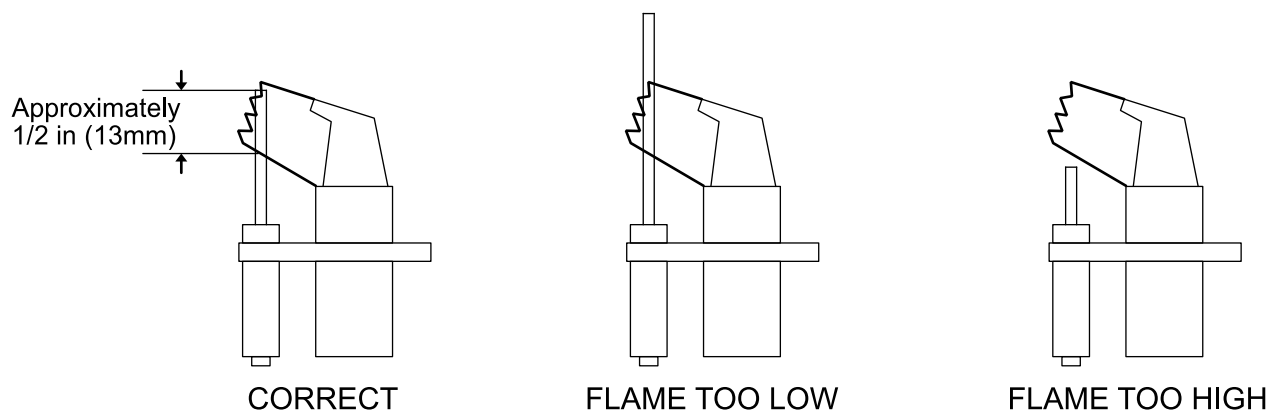


Figure 5: PROPER FLAME SENSOR POSITION

FLAME CURRENT MEASUREMENT

Flame current of the ignition control can be measured using a standard microammeter by touching the meter leads to the 2-pin header on the ignition control labeled FC as shown in the illustration below (Figure 3).

- Flame current must be measured with the flame lit and the main gas flowing.
- Set the meter to DC μA scale.
- Ensure the meter leads are positioned correctly (+ / -).
- The typical flame sense current measurements are in the range of 0.4 to 1.2 μA DC.

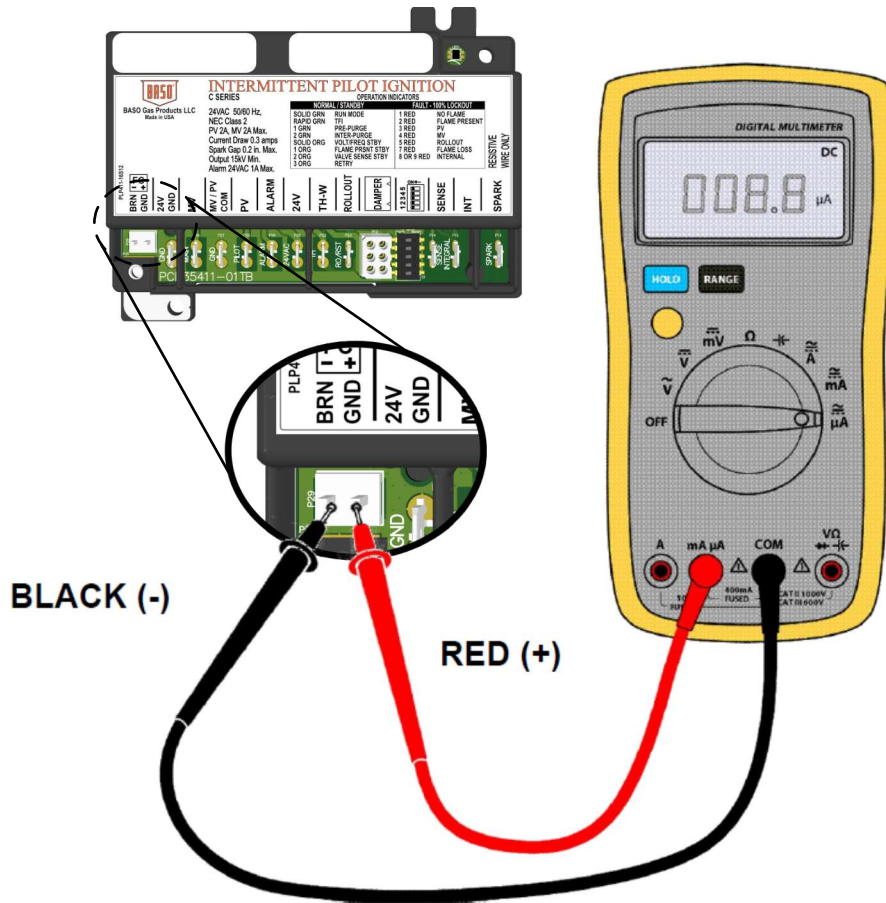


Figure 6: Microammeter Connection

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

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

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