Easy Radiant "Works"

TECHNICAL SUPPORT: 1-800-403-3279

SERVICE BULLETIN #4 (v 1.80405)

AB2017 HOT SURFACE IGNITION MODULE – OVERVIEW

WARNING

Installation of this ignition control module may only be performed by a qualified and licensed service technician. Improper installation, wiring, or alteration of this device can result in property damage, injury, and/or death.

OVERVIEW

The AB2017 Hot Surface Ignition Module is a multi-function, field configurable control package designed for installation in any Easy Radiant Works hot surface ignition radiant tube heater, single or 2 stage, single or dual flame sensing. The AB2017 is certified as a direct replacement for the following Hot Surface Ignition control packages:

FENWAL: 05-31, 05-32, 05-246
HONEYWELL : S89G, S89H, S8921D, SV9510M2420, SV9510M2347, SV9510M2354
SYNETEK: DH21260K, DH21390C, DH2104D

When replacing SV95 series SmartValve controls, a replacement 24V valve will also need to be installed. Replacement valve part #'s as follows: P-1406 for LP single stage, P-1405 for NG single stage.

The AB2017 is certified as a direct replacement for all legacy HSI control packages on the following Easy Radiant Works radiant tube heaters with single or 2 stage operation:

1250 / 750 Series	Middleman – EZM-X
Cyclops – CY-X	EZ Duzzit – ED-X
Spartan – SH-X	Heatwave – GH-X
Comfortzone – EZ-X	PPRTH – PPRTH-X

FLAME SENSORS

Older units that flame sense through the igniter, and do not have an existing independent flame sensor, will need to have a flame sensor installed. Flame sensors with a 18" (P-1090) and 30" (P-1091) wire lead are available.

See page 10 of this document for instructions on flame sensor installation and proper placement.

24V RELAYS

Older units that contain an independent 24V relay require that relay to be removed for use with this ignition control module. The AB2017 has an integrated 24V relay that replaces the independent relay.

See following wiring diagram for details.

SPARK IGNITION

This module **cannot** be used in models that contain a DSI (direct spark) control package. All DSI controls have been discontinued and there is no replacement available.

Affected users will need to replace the entire burner assembly, or send the existing DSI burner to the factory for retrofit and re-certification with an HSI ignition control package. This conversion cannot be carried out in the field.

Please call **1-800-403-3279** for details on the DSI to HSI conversion program.

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AB2017 HOT SURFACE IGNITION MODULE – SPECIFICATIONS

ELECTRICAL

24VAC controlled
For 120 VAC surface igniter up to 6A (Norton 201/271/601 or equivalent)
For 120VAC inducer blower up to 2A
For single or 2 stage 24VAC gas valve
For local (single rod) or remote (dual rod) rectification type.
For multifunction, field configurable for single stage, or 2-stage or dual flame sensing.
Ambient Operating Temperature: -22F to 158F
-30C to 70C
Easy plug-in wiring molded connectors.
For Natural Gas or Liquid Propane

INCLUDED COMPONENTS

- AB2017 Ignition Control Module
- Mounting fasteners
- Instruction manual
- Label (Figure 1)
  This label shall be located on enclosure provided that it is readily visible by opening a door or removing a cover after installation
- Wiring harness assembly

GENERAL

Sensing: Independent flame sensor required
Prepurge: 30 Seconds
Postpurge: None

The AB2017 Universal Hot Surface Ignition Module has up to 3 ignition trials per call for heat. Each trial consists of:

- Test air proving switch open up to 30 seconds
- Turn on inducer motor
- Test air proving switch closed up to 30 seconds
- Ignition element preheat for 17 seconds
- Turn on gas up to 9 seconds. Flame sense response time 1.5 sec maximum
- 10 second purge if flame sense fail
- If the unit fails to send flame for 3 trials, a 20 minute lockout will commence.
  If the unit fails to sense correct air switch condition for 3 trials, a 20 minute lockout will commence.

CERTIFICATION:

Intertek ETL #5011011
cETLus Recognized Component
Conforms to: UL STD 60730-2.5
ANSI STD Z21.20
Certified To: CSA CSTD C22.2
#60730-2-5

Figure 1

A copy of this label is supplied with the AB2017 control. The supplied label must be installed on burner housing, ensuring that it is readily visible by opening a door or removing a cover after installation.

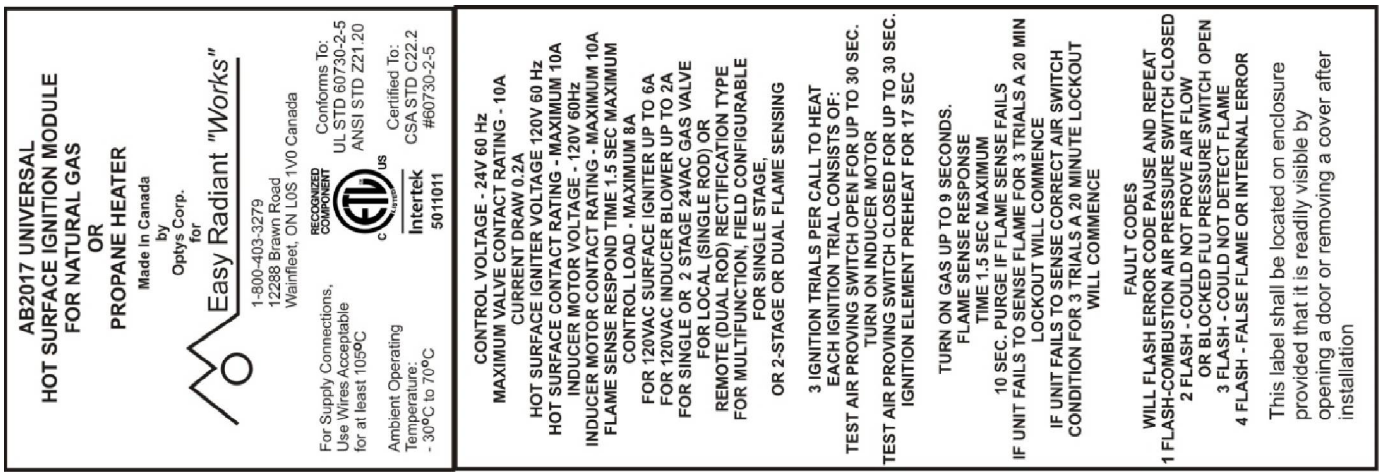
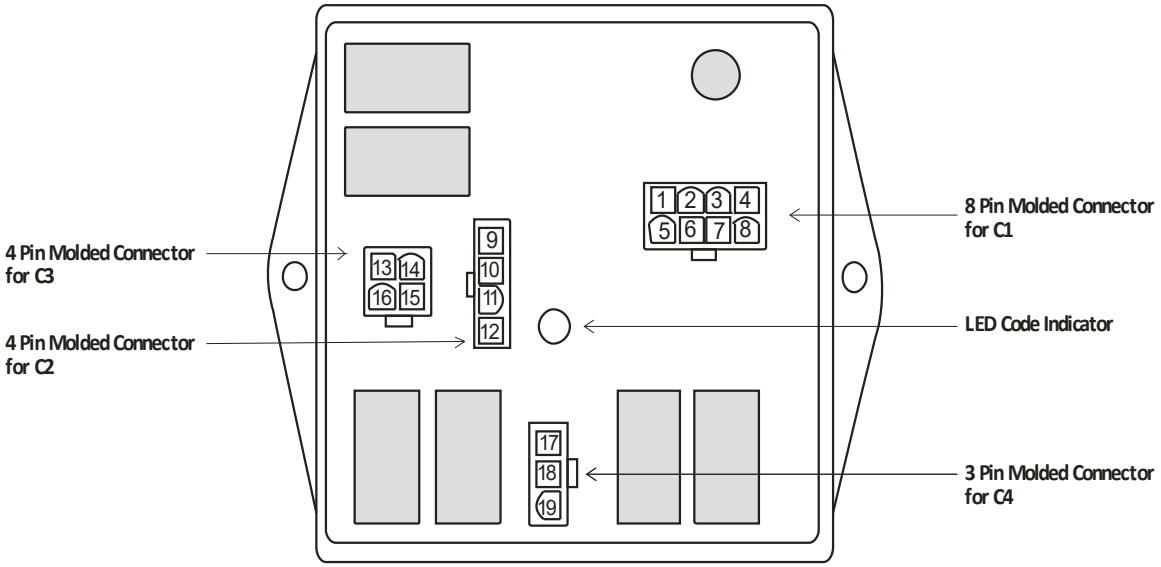


Figure 2



C1	**PIN 1**	**Red**	**Loop to Pin 5**
	PIN 2	**Yellow**	**Common on combustion switch**
	PIN 3	**Yellow**	**Common on blocked flue switch**
	PIN 4	**Red**	**24V Controller return**
	PIN 5	**Red**	**Loop to Pin 1**
	PIN 6	**Green**	**Ground to burner**
	PIN 7	**Red**	**24 Volt to controller or W1 2-stage controller**
	PIN 8	**Blue**	**W2 return from 2-stage controller ONLY (7"wire)**
C2	**PIN 9**	**Black**	**Igniter**
	PIN 10	**Orange**	**Flame sensor** **IMPORTANT: 10 and 12 Loop together for units with single flame sensor. For EZM dual flame sense, 10 and 12 lead to individual flame sensors.**
	PIN 11	**White**	**Igniter neutral**
	PIN 12	**Orange**	**Flame sensor no. 2 (for dual flame sense, Middleman)** **IMPORTANT: 10 and 12 Loop together for units with single flame sensor. For EZM dual flame sense, 10 and 12 lead to individual flame sensors.**
C3	**PIN 13**	**Brown**	**Inducer motor**
	PIN 14	**Black**	**Line 1 120V**
	PIN 15	**White**	**Line 2 neutral**
	PIN 16	**White**	**Inducer motor neutral**
C4	**PIN 17**	**Green**	**Valve common**
	PIN 18	**Blue**	**Valve 2-stage ONLY (18" wire)**
	PIN 19	**Red**	**Valve**

REPAIRS:

The Easy Radiant "Works"AB2017 hot surface ignition module in not intended for field service or adjustment, and is non-repairable. Any modification or repair to this gas ignition module will invalidate Easy Radiant "Works" warranty as well as agency certification and may create hazardous conditions that could result in property damage, personal injury or even death from fire, explosion and/or toxic gases. Faulty units should be replaced with a new unit.

Tools required:

Drill, drill bit 13/64, wrench, screw driver.

The AB2017 control is not position sensitive. The control may be mounted on any surface and securely fastened using two #8-32 machine or sheet metals screws and nuts.

PERFORM PREINSTALLATION SAFETY INSPECTION:

The ignition system control must be replaced in the event of any physical damage, tampering, bent terminals, missing or broken parts, stripped threads, or evidence of exposure.

REMOVE OLD MODULE:

Disconnect power supply before doing any work on the unit to prevent electrical shock or equipment damage. If a new gas control is to be installed, turn off gas supply before starting installation. Conduct Gas Leak Test. **Document and tag all existing wiring leads prior to disconnecting wiring.** Disconnect wiring from the old module. Remove the old module from its mounting location. Drill new holes a required. Fasten securely with two no. 8-32 machine or sheet metal screws and nuts

MOUNT AB2017 MODULE:

Mount the AB2017 module in the same location as the old module. Protect the module from exposure to water, moisture, corrosive chemicals and excessive dust and grease.

Ensure that ambient temperature at the module is within the specified range.

After installation is complete, ensure module and appliance operation as specified in these instructions.

WIRING THE AB2017 MODULE:

For units with existing molded connector harnesses, the existing harness must be disconnected and discarded unless replacing an existing AB2017 module. Connect wire leads from the supplied harness to the corresponding wire leads to each individual appliance component. Refer to appliance wiring diagram, supplied AB2017 wiring diagram, and wiring lead outline on page

IMPORTANT: Block C2 - Single/Dual Flame Sensing

The C2 harness (4 block, 1 Black wire, 1 White wire and 2 Orange wires) that is supplied with the control module must be used.

For single flame sense installations, wire leads 10 and 12 (orange) must be looped and connected with wire nuts to yellow flame sense lead.

For EZM dual flame sense, orange wires 10 and 12 lead to individual flame sensors. For EZM dual flame sense, wires 9 (black) and 11 (white) for igniter control must be connected to supply both appliance igniters. Refer to wiring diagram.

AB2017 HOT SURFACE IGNITION MODULE – ERROR CODES

LED STATUS	INDICATES	CHECK/REPAIR
OFF	No power to system control.	1. Line voltage input connectors on module. 2. Low voltage 24V and COM connection on module. 3. System wiring harness in good condition and securely connected at both ends. 4. Electrical supply is live and functioning properly.
STEADY ON	Normal Operation. LED is solidly lit when unit is powered, unless some normal abnormal event has occurred.	Not applicable.
1 FLASH	Combustion intake airflow proving switch stuck closed at call for heat.	1. Combustion intake airflow proving switch stuck closed. 2. Combustion intake airflow proving switch mis-wired or jumpered. 3. Combustion intake airflow proving switch operation, tubing, and wiring.
2 FLASHES	Airflow proving switch circuit remained open for 30 seconds after blower energized.	1. Airflow proving switch stuck open. 2. Combustion airflow proving switch mis-wired or jumpered. 3. Blocked flue airflow proving switch stuck open during ignition sequence due to malfunction, blockage, or mis-wiring. 4. Obstructions or restrictions in appliance air intake system that prevent proper combustion air flow. 5. Airflow proving switch operation, tubing, and wiring.
3 FLASHES	Ignition trial lockout. Appliance has failed ignition trial 3 consecutive times. System will reset after 20 minute delay, then initiate a new ignition sequence if the call for heat is still present.	1. Gas supply off or at too low pressure to operate appliance. 2. Damaged or broken HSI element. 3. Line voltage HOT connector not connected to module, or electrical supply failure. 4. Appliance not properly earth grounded. 5. Flame sense rod contaminated or in incorrect position. 6. HSI element located in incorrect position. 7. Hot surface element or flame sense rod wiring in good condition and properly connected. 8. 3 consecutive ignition failures for any cause.
4 FLASHES	Flame sensed out of sequence or internal fault. Module self diagnostics have detected a critical fault in module programming/operation.	Replace ignition module.

IF	AND	CHECK / REPAIR
Combustion air blower does not energize.	1 Flash code does not come on 30 seconds after call for heat starts.	1. Combustion air blower wiring, combustion intake airflow proving switch wiring. 2. Combustion air blower.
Combustion air blower does not energize.	1 Flash code does come on 30 seconds after call for heat starts.	1. Airflow proving switch stuck closed. 2. Airflow proving switch mis-wired or jumpered.
Combustion air blower energized.	2 Flash code does not come on after 30 seconds.	Wait for pre-purge time to expire.
2 Flash code comes on 30 seconds after combustion air blower is energized.	Combustions air blower turns off.	1. Airflow proving switch stuck in open position. 2. Airflow proving switch tubing and wiring. 3. Obstruction or restrictions in appliance air intake or exhaust flue system that prevent proper combustion air flow.
30 second prepurge time has expired.	HSI Element does not glow red within 10 to 15 seconds.	1. Broken or damaged HSI element. 2. Broken or damaged HSI element lead wires. 3. Failure to power HSI element. 4. Check voltage on HSI lead to verify module is sending correct output.
HSI elements is glowing red	No other observable control system action.	1. Flame sensor moisture detected. Wait for HSI element to warm/dry flame sensor. Ignition sequence will commence when no moisture is detected on flame sensor.

AB2017 HOT SURFACE IGNITION MODULE – NORMAL SEQUENCE OF OPERATION

1. The heater is energized by means of a thermostat or switch.

2. When 24 volts is applied to the module, the module will energize the blower and close the air switch.

3. The current flows and energizes the igniter and reaches ignition temperature. No gas flows until the valve is energized and opened.

4. Air pressure generated by the blower will cause the normally open combustion pressure switch to close. The combustion pressure switch is set to allow the normal rate of combustion air to flow into the combustion chamber. Any restriction or blockage will cause the pressure switch to open and shut down the entire system.

5. The current passes through the blocked flue pressure switch, which is normally closed. Any blockage or restriction will cause the pressure switch to open and shut down the entire system.

6. After 17 seconds, the valve is energized and opened. Gas flows through the burner and is ignited.

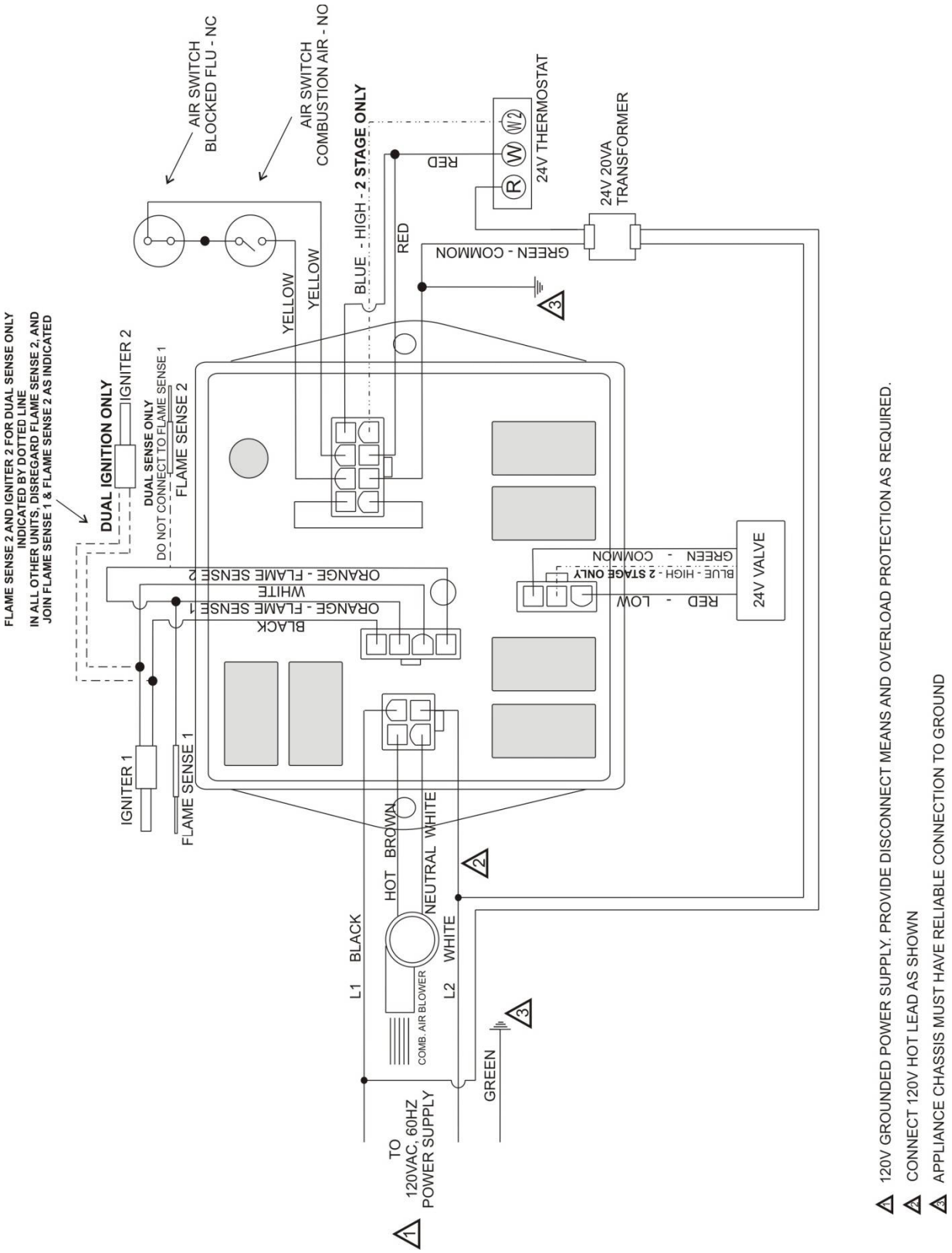
7. The power is removed from the igniter. The flame sensor is utilized. As long as a flame is present, the valve is held open. If the flame is lost, the control acts to close the valve within one second and a new trial sequence to start up is initiated.

8. If ignition is not achieved, or flame is not sensed, then the control closes, the gas valve, and attempts ignition a second time, and if necessary a third time. If ignition is not achieved after the third try, the control goes into lockout for 30 minutes and power must be interrupted before trying again. At this point it is suggested that an authorized service person be contacted to inspect and test the controls.

9. (Two stage configuration only) Unit will operate in low fire until thermostat applies 24V power to second stage. Unit will fire in high fire

10. The heater should continue to function until power is interrupted either by the thermostat being satisfied or manually disconnected.

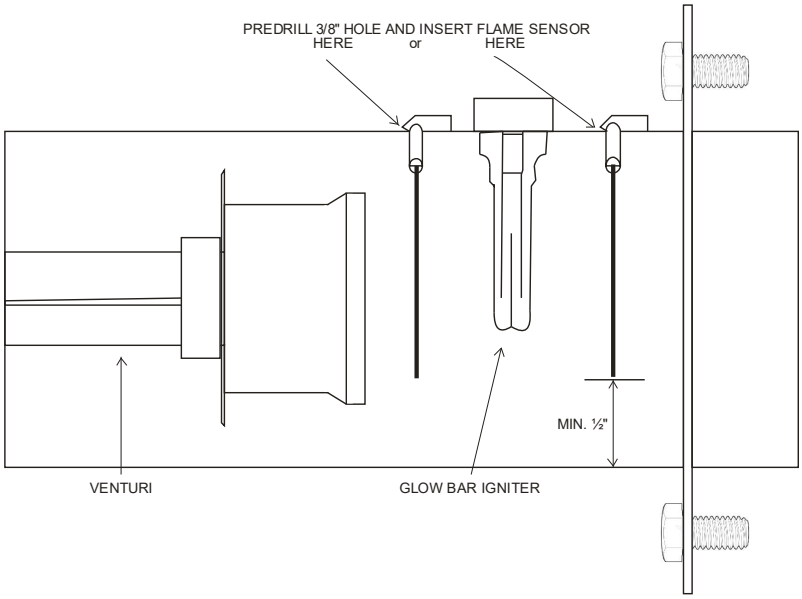
AB2017 HOT SURFACE IGNITION MODULE – WIRING DIAGRAM



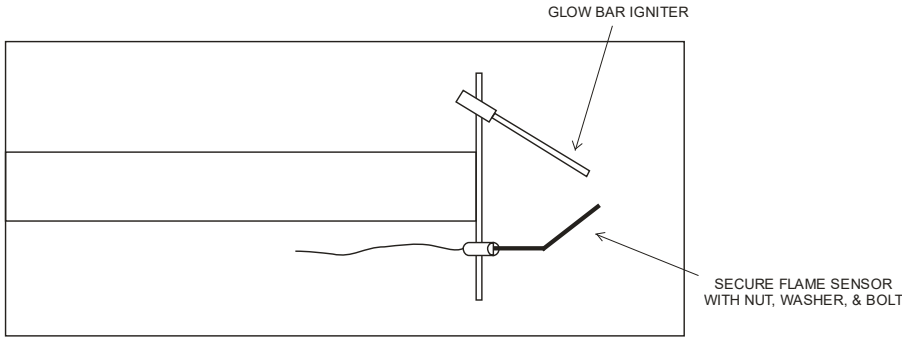
RETROFITTING FLAME SENSORS

For technical assistance please call 1-800-403-3279
Monday - Friday, 8:00 AM - 4:30 PM Eastern Standard Time

BURNER HOUSING
CUTAWAY SIDE VIEW
COMFORTZONE (EZ) AND SPARTAN (SH)



BURNER HOUSING
CUTAWAY SIDE VIEW
EZ DUZZIT (ED)



WARNING: FIRE OR EXPLOSTION HAZARD
CAN CAUSE PEROPERY DAMAGE, SEVERE INJURY OR DEATH.

Do not attempt to take apart the module or to clean it. Improper assembly and cleaning can cause unreliable operation.

Regular preventative maintenance is important in applications that place a heavy load on system controls such as those used in the agricultural industrial industries. Exposure to water, dirt, chemicals and heat can damage the gas control and shut down the control system.

To avoid dangerous accumulation of fuel gas, turn off gas supply at the appliance service valve before starting installation, and perform Gas Leak Test after completion of installation.

IF YOU SMELL GAS:

If you smell gas or suspect a gas leak, turn off gas at manual service valve and evacuate the building. Do not try to light any appliance, do not touch any electrical switch or telephone in the building. Leave the building to call your gas supplier. If you cannot reach your gas supplier, call the fire department.

IMPORTANT:

1. All wiring must comply with applicable electrical codes and ordinances.

2. Assure that the hot surface igniter lead wires are not allowed to rest against grounded metal surfaces.

3. A common ground is required for the AB2017 and the main burner. The 24V (GND) terminal internally grounds one side of the transformer. Be sure that auxiliary controls or limits are not in the grounded leg. In addition, earth-ground the appliance.

4. Make sure the transformer has adequate VA. See Electrical rating. Add together the current draws of all other devices in the control circuit, including the main valve in the gas control. Use a Class II transformer when replacement is required.

5. Never attempt to relocate the 120VAC hot surface igniter or the flame sensing rod from the original position established by the appliance manufacturer.

6. Never attempt to change the appliance flame sensing (single rod or dual rod) from the type originally established by the appliance manufacturer.

7. Be sure the 120 VAC hot surface igniter or the flame sensing rod is replaced in exactly the original position after removal for inspection, service or replacement.

8. Dripping water can cause the control to fail. Never install an appliance where water can drip on the control.

GAS LEAK TEST:

Paint pipe connections upstream of the ignition systems control with a rich soap and water solution. Bubbles indicate a gas leak. If a leak is detected, tighten the pipe connections. Stand clear of the main burner while lighting to prevent injury caused from hidden leaks that could cause flashback in the appliance vestibule. With the burner in operation, paint the pipe joints (including adapters) and the control inlet and outlet with rich soap and water solution. If another leak is detected, replace the part if a leak cannot be stopped. Recheck with soap and water solution.

INITIAL OPERATION:

1. Check installation. Check position of the hot surface element.

2. With the gas supply manually shut off, apply power to the appliance and cycle the thermostat above room temperature.

3. Insure that the hot surface element glows during the heat-up period and trial-for-ignition time.

4. Set the thermostat to the lowest setting.

5. Wait 5 seconds, then manually turn on the gas supply and advance the thermostat above room temperature to recycle the system.

6. Check that ignition has been accomplished. The element glow will diminish once flame has been established. At this stage the control is sensing the presence of flame.

7. If the system ignites but fails to hold-in, check for proper grounding of the 24 VAC circuit and 120V polarity.

8. While the system is operating, manually shut off the gas supply. The gas valve will de-energize immediately, and following a short delay, the element will be re-energized and glow brightly.

IGNITION SYSTEMS CHECKS

1. Check igniter wire harness. Make sure ignition wire does not touch any metal surfaces and the connection to the module and igniter-sensor are clean and tight.

2. Ignition wire provides good electrical continuity.

3. Check ignition system grounding. A common ground is required for the module, igniter, flame sensor and main burner.

4. Check for good metal-to-metal contact between the igniter bracket and the main burner.

5. Check the ground lead from the GND (BURNER) terminal on the module to the main burner ground. Make sure connections are clean and tight. If the wire is damaged or deteriorated, replace it. If flame sensor or bracket is bent out of position, restore to correct position.

7. Replace igniter and sensor with identical unit if insulator is cracked.

8. Make sure burner flame is capable of providing a good rectification signal.

9. Make sure electrical connections are clean and tight.

MAINTENANCE REQUIREMENTS IN SEVERE ENVIRONMENTS:

Regular preventative maintenance is important in any application, especially so in agricultural and industrial applications.

In many such applications, the equipment operates 100,000 – 200,000 cycles per year. Such heavy cycling can wear out the gas control.

Exposure to water, dirt, chemicals, and heat can damage the module or the gas control and shut down the control system.

PLAN FOR FREQUENT MAINTENANCE:

Determine the maintenance frequency individually for each application. Appliances that are used seasonally should be checked before shutdown and again before next use. Where the cost of an unexpected shutdown would be high, the system should be checked more often. Dusty, wet or corrosive environments, and excessive heat, can cause the gas control to deteriorate more rapidly, and the system should be check more often.

For ordering control, refer to:

ERW part no. P-1046 AB2017 control (no harness) for direct replacement of existing AB2017 only

ERW part no. P-1047 AB2017 control includes wiring harness for all single stage, single flame sense and dual flame sense (Middleman EZM-X)

ERW part no. P-1048 AB2017 control includes wiring harness for 2-stage. (7” blue wire C1 pin 7 and 18” blue wire for C4 pin 18.)

For wiring harness only, refer to:

ERW part no. P-1291 Wiring Harness 4 Pos Straight male block C2

ERW part no. P-1292 Wiring Harness 4 Pos 2 over 2 male block C3

ERW part no. P-1293 Wiring Harness 8 Pos 4 over 4 male block C1

ERW part no. P-1295 Wiring Harness 3 Pos Straight Block Male C4

WARRANTY

Easy Radiant Works AB2017 control is covered by an 18 month guarantee to the original user against defects in materials and workmanship under normal use for a period of 18 months from date of purchase. Any part that is determined to be defective in material or workmanship during the warranty period, and returned to Easy Radiant Works, shipping costs prepaid, will be, as the exclusive remedy, repaired or replaced at the discretion of Easy Radiant Works. For warranty claim procedures see "Prompt Disposition of Warranty Claims" below.

To the extent allowable under applicable law, Easy Radiant Works liability for consequential or incidental damages is expressly disclaimed. Easy Radiant Works liability in all events is limited to and shall not exceed the purchase price paid.

Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary among jurisdictions. While Easy Radiant Works attempts to assure that its products comply with these many codes, it cannot guarantee compliance, or cannot be responsible for how the product is installed or used. Before purchase or use of a product, review the product applications, and all applicable national and local codes and regulations, and ensure that the product and installation will comply with them.