

## SERIES 05-35 24 VAC HOT SURFACE IGNITION SYSTEM

**This hot surface ignition system provides a fast, safe, efficient, and reliable way of igniting your gas burner application. A single 24 volt power source is all that is required – for the hot surface element, gas valve, and thermostat control.**

### FAST, SAFE, EFFICIENT, AND RELIABLE OPERATION

The efficiency of a single power source is only the beginning. Ignitor heat-up time is a fast 4 seconds nominal. Flame sensing is achieved through the patented technique of using the hot surface element as the sensor. However, if required, a separate sensing probe can be supplied. All models utilize the principle of flame rectification to monitor the burner flame. In addition, a self diagnostic circuit checks the valve control and the flame rectification circuit before the ignition sequence is initiated.

### COMPACT SIZE – EASY TO MOUNT

The electronic module measures only 3.23 × 4.23 × 1.59 in (82.1 × 107.5 × 39.7 mm) and weighs approximately 5.1 oz (145 g). It is not position-sensitive and may be mounted vertically or horizontally using #8 hardware. Connections may be made easily with quick connect connectors.

### AGENCY CERTIFIED

The 05-35 is an interrupted-type ignition system that conforms to ANSI Z21.20. This system is certified by the American Gas Association for use with natural, manufactured, and LP gas-air mixtures. It is also certified by the Canadian Gas Association and is a UL recognized component.

### PRINCIPLE OF OPERATION

The Series 05-35 system combines a hot surface ignitor element with a flame detector. The hot surface ignitor is an electrically heated element which thermally ignites the gas.



Upon a call for heat, the hot surface element is energized from a nominal 24 VAC source and is allowed to reach ignition temperature. The gas valve is then also powered with 24 VAC establishing the flame at the burner. The system then switches the element from the ignition mode to the sensing mode to monitor the continued presence of the flame.

If the flame is not established during the trial-for-ignition period, the system goes into lockout. If an established flame is extinguished for any reason, the system closes the gas valve and reactivates the hot surface element as an ignitor, initiating a new trial-for-ignition sequence.

### Multi-Try Models

These models provide for three complete ignition sequences before going into lockout. If the flame is established on any of the three tries, the system will then monitor the flame for the duration of the duty cycle.

### Prepurge Models

The system provides an optional purge period of 15 seconds (nominal) to clear the combustion chamber of any residual gases before the ignitor heat-up period of each try for ignition. This feature is available on both single- and three-try models.

## SERIES 05-35

### MOUNTING

The Series 05-35 system module is not position-sensitive and may be mounted vertically or horizontally using #8 hardware.

### WIRING

#### WARNINGS:

*The Series 05-35 System operates in the presence of combustible and toxic gas. Failure to observe the following warnings could result in property damage, personal injury, or even death from fire, explosion, and/or toxicity.*

1. Wiring and initial operation must be done by a qualified person.
2. Before wiring system, shut off gas supply and remove power.
3. Do not reapply power until all wiring is connected and system is properly grounded.
4. Perform "Initial Operation" before turning on gas supply.

Connect wiring to the system using the following wiring diagrams: Figure 1 for local sensing systems and Figure 2 for remote sensing systems. The 24 volt supply must have a VA rating sufficient to power the module, valve, and hot surface element.

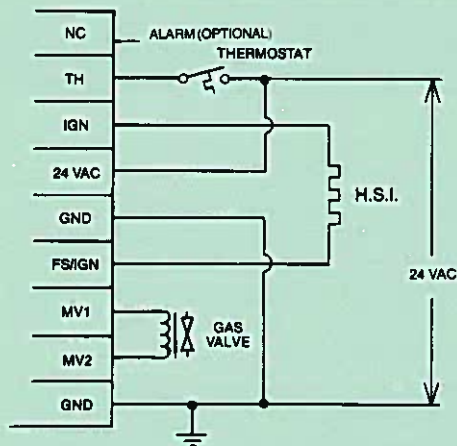


Figure 1: Wiring Diagram – Local Sensing System

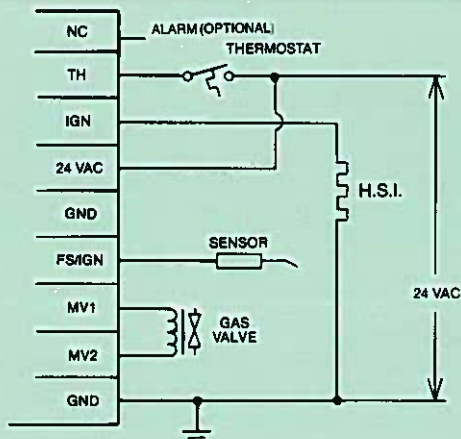


Figure 2: Wiring Diagram – Remote Sensing System

### HOT SURFACE ELEMENT

Proper location of the hot surface element is important to achieve optimum system performance for both ignition and flame sensing. See Figure 3.

### INITIAL OPERATION

1. Check installation. Mount and position hot surface element per Figure 3.
2. With gas supply manually shut off, apply power to appliance and cycle thermostat above room temperature.
3. Ensure that hot surface element "glows" during heat-up period and trial-for-ignition period (see Specifications section). In three try for ignition version, ignitor will automatically recycle three times, then lockout.
4. Set thermostat to lowest setting.
5. Wait 15 seconds, then manually open gas supply and advance thermostat above room temperature to recycle system.
6. Check that ignition occurred. The hot surface element "glow" should diminish once flame has been established. At this stage, ignitor acts as the sensing element.
7. If system ignites but fails to "hold-in", check for proper grounding. Also check element position per Figure 3.

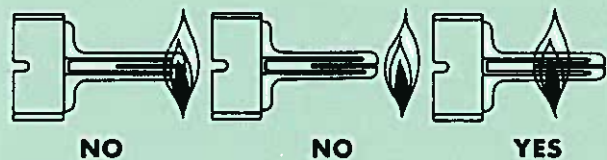


Figure 3: Hot Surface Element Location

### SAFETY CHECKS

1. Manually shut off gas supply. Apply power to appliance and cycle thermostat above room temperature. After system locks out, check that there is no voltage across the gas valve terminals with a suitable voltmeter. Next, set thermostat to its lowest setting.

# SERIES 05-35

## SAFETY CHECKS (Continued)

2. Wait 15 seconds, then manually open the gas supply and reactivate system by advancing thermostat to a setting above room temperature. The hot surface element should glow brightly during heat-up period, then diminish after flame has been established.

While system is operating, manually shut off gas supply. Following a short delay, hot surface element will re-energize and glow brightly. The ignition control will continue to cycle for the specified number of trial-for-ignition periods and then lockout. Check again that there is no voltage across valve terminals after lockout.

## SERVICE CHECKS

Symptom	Cause/Cure
1. Dead	A. Check for 24 VAC from thermostat to ground. B. Check system wiring. C. Check thermostat, transformer, circuit breaker, etc.
2. Hot surface element does not heat but unit cycles.	A. No 24 VAC input to element. B. Check system wiring. C. Check for broken or cracked hot surface element.
3. Hot surface element heats up but "0" voltage at valve during tries for ignition.	A. Check wiring between valve and module. B. Check valve ground.
4. Hot surface element heats, 24 volts to valve, flame established but does not hold-in.	A. Check system ground. B. Hot surface element improperly located. C. Check all wiring connections. D. Burner out of adjustment.
5. Hot surface element heats, 24 volts to valve but system fails to ignite.	A. Gas supply off. B. Check gas valve. C. Burner out of adjustment. D. Hot surface element incorrectly located.

## REPAIRS

**WARNING:** The Fenwal Series 05-35 Hot Surface Ignition System module is not repairable. Any modifications or repairs to it will invalidate the Fenwal standard warranty, as well as agency certifications 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.

## SPECIFICATIONS

### Size

3.23 × 4.23 × 1.59 in (82.1 × 107.5 × 39.7 mm)

### Weight

Approximately 5.1 oz (145 g)

### Input Voltage

24 VAC, 50/60 Hz (Operating Range 20-28 VAC)

### Input Current Drain

80 mA, does not include valve power

### Valve Contact Rating

24 VAC, 1.0 A maximum, inrush 2 A maximum

### Ignitor Heat-Up Time

4 seconds nominal (3 - 5 seconds)

### Ignitor Contact Rating

24 VAC, 5 A maximum

### Ambient Temperature Limits

-40 and +160°F (-40 and +70°C)

### System Check Circuit

Checks valve control circuit and flame rectification circuit before ignition sequence is initiated.

### Tries for Ignition

Available in one- or three-try versions.

### Trial-For-Ignition Periods

1.5, 3.0, 5.0, 7.0, 10.0, or 15.0 seconds, depending on model.

### Prepurge

None or 15 seconds, depending on model.

### Retry for Ignition

Loss of flame will result in one retry for ignition. (Two retries on three-trial-for-ignition model.)

### Alarm Circuit

Normally closed contacts included on all models for lockout indication. 24 VAC 1.0 A max.

### Flame Current

.75 microamp minimum

### Flame Failure Response Time

Within 0.8 second

### Moisture Resistance

Each module is conformal coated to operate to 90% R.H. However, care must be taken to protect module from direct exposure to water.

Specifications subject to change without notice.

**WARNING:** Operation outside specifications could result in failure of the Fenwal product and other equipment with injury to people and property.



# SERIES 05-35

## HOW TO ORDER

Order Series 05-35 Hot Surface Ignition System module by catalog number selecting:

Number of tries for ignition

Prepurge period

Type of connector

Trial-for-ignition (TFI) time

**05-3562XX-X5X**

24 VAC Hot Surface Ignition System Module

Tries for Ignition

2 = Single Try for Ignition

6 = Three Tries for Ignition

Connectors

5 = All 1/4 inch Quick Connects

6 = 1/4 inch Quick Connects and AMP MATE-N-LOK Connectors

Prepurge Period

0 = No Prepurge

1 = 15 Second Prepurge

Trial-For-Ignition (TFI) Time

0 = 1.5 Seconds

1 = 3.0 Seconds

2 = 5.0 Seconds

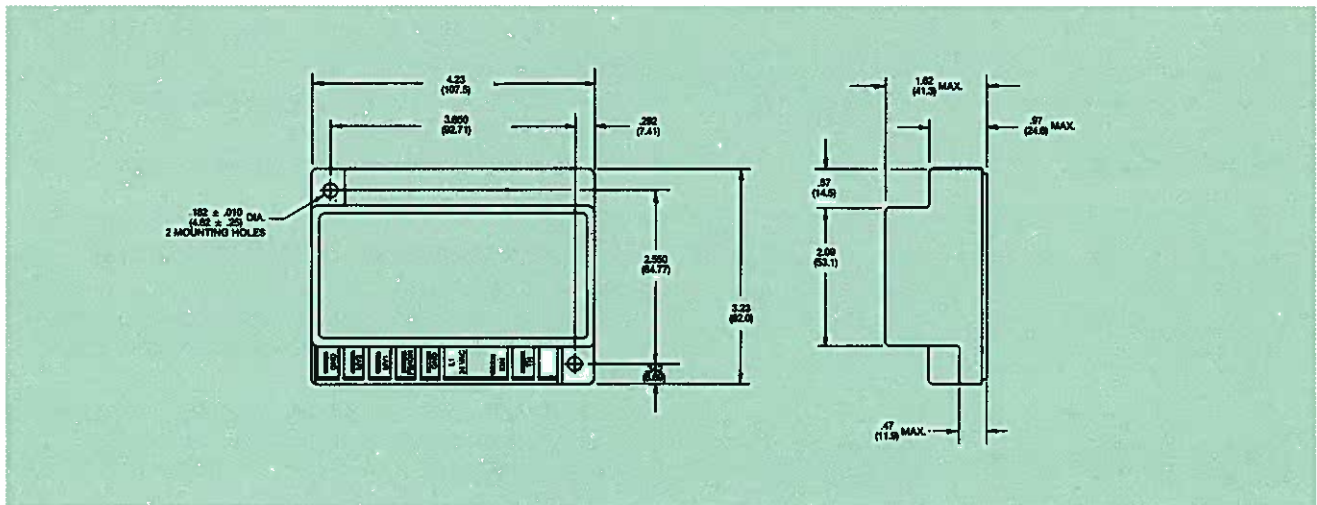
3 = 7.0 Seconds

4 = 10.0 Seconds

5 = 15.0 Seconds

**Example:** 05-356265-153 = Series 05-35 Hot Surface Ignition System Module, three tries for ignition, all 1/4 inch quick connects, 15 second prepurge, and 7.0 second trial-for-ignition period.

## OUTLINE DIMENSIONS



This literature is provided for informational purposes only. Actual performance is based on proper application of the product by a qualified professional. Nothing herein shall constitute a warranty, expressed or implied, including any warranty of merchantability of fitness for a particular purpose.