

SERIES 05-38

120 VAC DIRECT SPARK IGNITION SYSTEM

This 120 VAC direct spark ignition system provides an efficient and reliable way of igniting your gas burner application. Its wide selection of features makes it the most versatile system available.

VERSATILE TO MEET YOUR SPECIFIC NEEDS

Depending on the model selected, flame sensing is achieved through the ignition electrode or a separate local or remote flame sensing electrode. The system is available in single or multiple trial-for-ignition versions. Also selectable are a 15- or 30-second prepurge period and the length of the trial-for-ignition period. And the system module may be ordered with or without its fire retardent plastic case.

AGENCY CERTIFIED

The 05-38 system is certified by the American Gas Association as conforming to ANSI Z21.20. It is also certified by the Canadian Gas Association and is a UL recognized component.

COMPACT SIZE – EASY TO MOUNT

The electronic module (including enclosure) measures only 5.69 × 3.94 × 1.87 in (144.4 × 99.9 × 47.5 mm) and weighs approximately 5.1 oz (145 g). It is not position sensitive and may be mounted vertically or horizontally using standard hardware. All connections are made with standard ¼ inch quick connects.

INNOVATIVE DESIGN FOR SAFE AND EFFICIENT OPERATION

Flame sensing is achieved through the technique of using the high voltage spark electrode as the sensor or through a separate local or remote sensing probe. All models use the principle of flame rectification to monitor the burner flame. In addition, a patented* self-monitoring safety circuit provides a type of protection not found in other ignition systems.

*U.S. Patent 4,455,589

PRINCIPLE OF OPERATION

The Series 05-38 system is designed to operate on standard 120 VAC line voltage. To ignite the burner, it is only necessary to set the thermostat to call for heat. When power is supplied to the appliance, the control system opens the main gas burner solenoid valve and provides ignition spark. Sparking ceases as soon as a



constant flame is present. If the flame is not established during the trial-for-ignition period, the system provides automatic shutdown by de-energizing the gas solenoid valve and going into lockout. The multiple trial-for-ignition model, however, provides for three complete ignition sequences before going into lockout.

Once the flame is successfully established, electronic flame sensing circuitry (flame rectification) monitors the continued presence of the burner flame. If an established flame is extinguished for any reason, the system will retry for ignition before going into lockout. The number of retries depends on the model selected. Reset after lockout is accomplished by adjusting the thermostat to a setting below ambient temperature for five seconds and then returning to the desired temperature setting.

Models with the optional 15- or 30-second (nominal) purge period allow the combustion chamber to clear itself of any residual gases before each try for ignition. Models without the prepurge option have less than a 1.0 second delay before a single try for ignition.

MOUNTING

The series 05-38 system is not position sensitive and may be mounted vertically or horizontally using standard hardware: #6 for the model with integral mounting standoffs and #8 for the one with an enclosure.

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WIRING

WARNINGS:

The Series 05-38 System uses voltages of shock hazard potential and operates in the presence of combustible gas. Failure to observe the following warnings could result in shock, fire, or explosion causing severe injury or death.

1. Wiring and initial operation must be done by a qualified technician.
2. Before wiring system, manually 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 system using wiring diagrams as follows: Figure 1 for a single spark and sense system, Figure 2 for a system using a local sensing probe, and Figure 3 for a remote sensing probe.

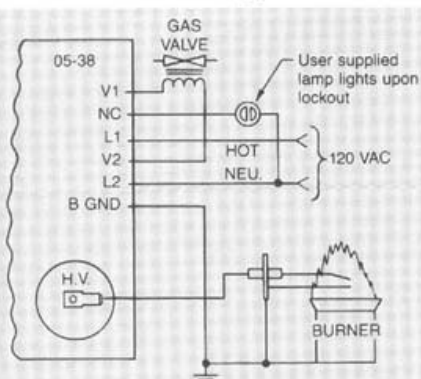


Figure 1: System with Single Spark & Sense

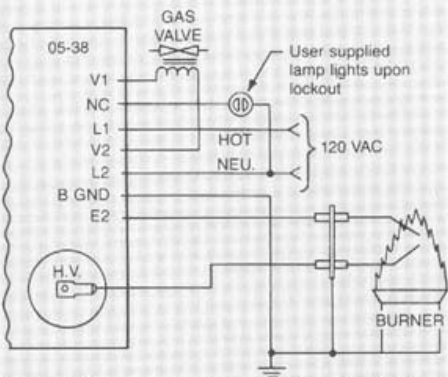


Figure 2: System with Local Sensing Probe

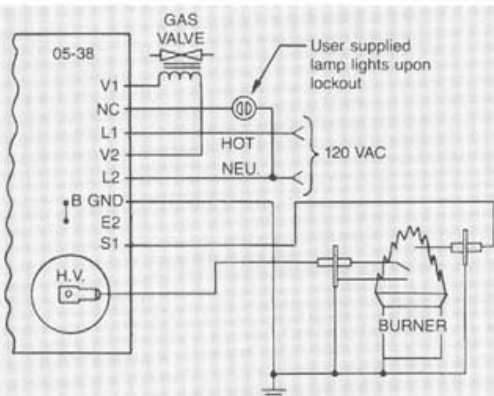


Figure 3: System with Remote Sensing Probe

PROPER ELECTRODE LOCATION

Proper location of the electrode assembly is important for optimum system performance. It is recommended that electrode assembly be mounted temporarily using clamps or other suitable means so that the system can be checked before permanently mounting the assembly. The electrode assembly should be located so that the tips are inside the flame envelope and about 1/2 inch (1 cm) above the base of the flame. See Figure 4.

CAUTIONS:

1. Ceramic insulators should not be in or close to the flame.
2. Electrode assemblies should not be adjusted or disassembled. Electrodes should have a gap spacing of 0.125 ± 0.031 in (3.12 ± 0.81 mm). If this spacing is not correct, the assembly must be replaced. Electrodes are NOT field adjustable.
3. Exceeding the temperature limits can cause nuisance lockouts and premature electrode failure.

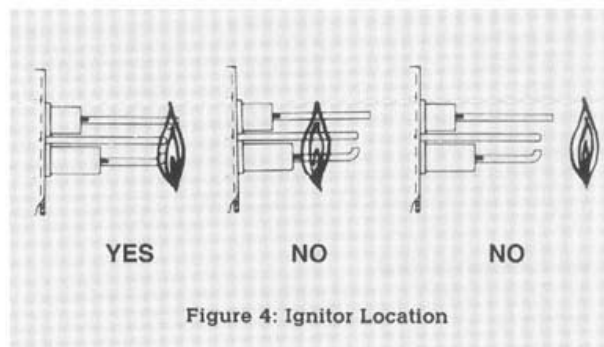


Figure 4: Ignitor Location

INITIAL OPERATION

1. Check installation, electrode mounting, and electrode gap per previous sections.
2. With gas supply manually shut off, apply power to system and advance thermostat above ambient temperature.
3. Ensure that a spark is being produced at electrode during trial-for-ignition period. System should lock out after the period. In three try for ignition version, system will automatically recycle two additional times, then lock out.
4. Reset thermostat to below ambient temperature.
5. Wait 5 seconds, then manually open gas supply and advance thermostat above ambient temperature to recycle system.
6. Check that ignition occurred. Sparking should cease a few seconds after flame has been established.
7. If system ignites but fails to "hold-in", check input voltage. Also check that system is properly grounded.
8. For multiple unit installations, ensure that all units are powered by a common supply voltage and that all are correctly polarized and grounded.

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SAFETY CHECKS

1. Manually shut off gas supply. Apply power to system and advance thermostat above ambient temperature. After system locks out, check that there is no voltage across Terminals V1 and V2 with a suitable voltmeter. Next, set thermostat to its lowest setting.
2. Wait 5 seconds, then manually open gas supply and reactivate system by advancing thermostat above ambient temperature. Sparking should occur after the purge period and cease when flame is established. While system is operating, manually shut off gas supply. Sparking should promptly reoccur when flame is extinguished. Sparking should continue during specified number of trial-for-ignition periods and then lock out. Check again that there is no voltage across Terminals V1 and V2.

SERVICE CHECKS

Flame current is the current which passes through the flame from the sensor to ground. The minimum flame current necessary to keep the system from lockout is one microamp. To measure flame current, DISCONNECT INPUT VOLTAGE, then insert an analog DC microammeter in series with the sensor electrode and wire per Figure 5, 6, or 7. Meter should read $1 \mu\text{A}$ or higher. If meter reads below "0" on scale, meter leads are reversed. Disconnect power and reconnect meter leads for proper polarity.

CAUTION: When monitoring flame current on a single spark and sense or local sense model, use a $1.5 \mu\text{F}$ bypass capacitor to protect the meter from damage. See Figures 5 and 6.

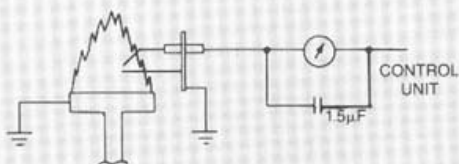


Figure 5: System with Single Spark and Sense

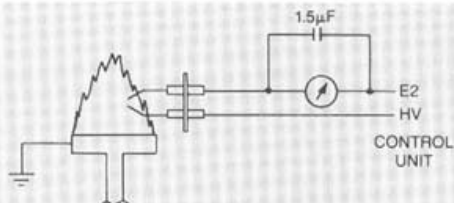


Figure 6: System with Local Sensing Probe

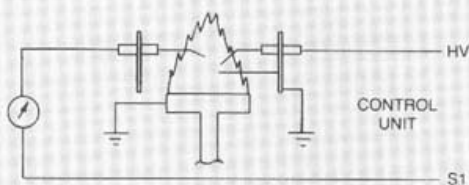


Figure 7: System with Remote Sensing Probe

REPAIRS

WARNING: The Fenwal Series 05-38 Direct Spark 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 CAUSE 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

With Enclosure: $5.69 \times 3.94 \times 1.87$ in
($144.4 \times 99.9 \times 47.5$ mm)
Without Enclosure: $5.50 \times 3.75 \times 2.00$ in
($139.7 \times 95.3 \times 50.8$ mm)

Weight (with enclosure)

Approximately 5.1 oz (145 g)

Input Voltage 120 VAC +10%, -15%, 50/60 Hz

Input Current Drain

90 mA RMS maximum (270 mA peak) while sparking. Does not include valve power.

Valve Relay Contact Rating

2.5 A (Inrush 5.0 A maximum)

Prepurge

None, 15 or 30 seconds depending on model. Without prepurge there is less than 1.0 second delay before single try for ignition.

Ambient Temperature Limits

-40 and +155°F (-40 and +65°C)

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.

Tries for Ignition

Available in one- or three-try versions.

Trial-for-Ignition Periods

3.3, 4.7, 6.8, 10.0, or 12.0 seconds, depending on model.

Flame Failure Retry

When loss of flame occurs after the initial try for ignition, the control system provides one retry on single-try models and two retries on three-try models.

Flame Current 1 microamp minimum

Flame Failure Response Time Within 0.8 second

Spark Rate 60 sparks per second (synchronous)

Types of Gas Natural, LP, or manufactured

Connections $\frac{1}{4}$ inch quick connect

Sensor

Single spark and sense using high voltage spark electrode as the sensing element or remote or local sensing using a separate sensing element.

Enclosure (Optional)

Gray Noryl fire retardant plastic

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.

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HOW TO ORDER

- Order Series 05-38 Direct Spark Ignition System module by Catalog Number selecting: Method of flame sensing, Number of tries for ignition, Mounting/Enclosure configuration, Prepurge period, and Trial-for-ignition (TFI) time.

05 - 38 4 X X X - X 5 X

120 VAC Direct Spark Ignition System Module _____

Safety Check Circuit _____

Method of Flame Sensing _____

2 = Local Sense

4 = Remote Sense

6 = Single Spark and Sense

Tries for Ignition _____

0 = Single Try-for-Ignition

4 = Three Tries-for-Ignition

Mounting/Enclosure Configuration _____

0 = Integral Mounting Standoffs

1 = Fire Retardant Plastic Enclosure

Prepurge Period _____

1 = 15 Second Prepurge

2 = 30 Second Prepurge

7 = No Prepurge

Trial-For-Ignition (TFI) Time _____

0 = 3.3 Seconds

1 = 4.7 Seconds

3 = 6.8 Seconds

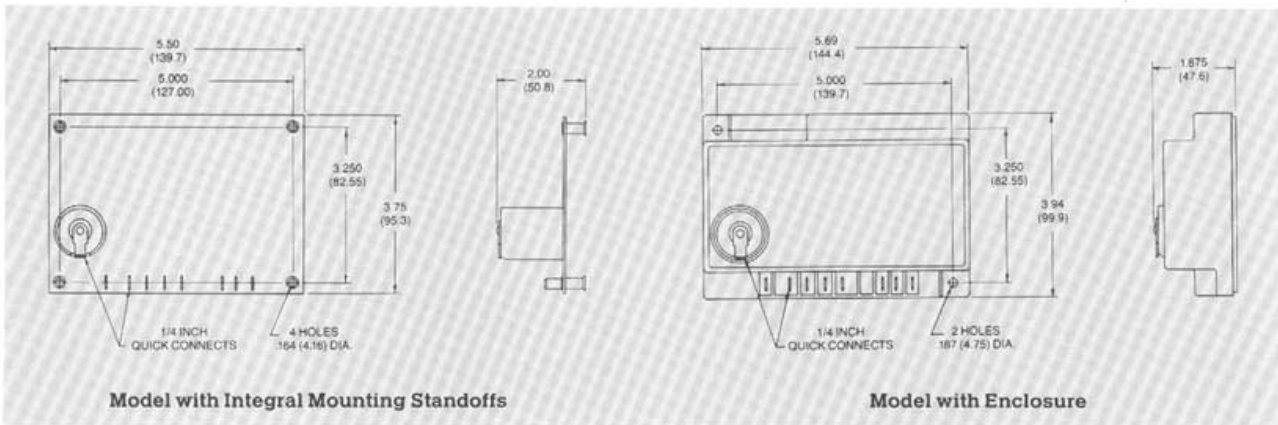
5 = 10.0 Seconds

6 = 12.0 Seconds

- Order Electrode by consulting Fenwal.

- Order high voltage cable assembly (1/4 inch quick connect both ends) by specifying Catalog Number 05-125948-1XX where XX indicates length in inches (up to 48 inches).

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.

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