

Q354A Flame Sensor

INSTALLATION INSTRUCTIONS

APPLICATION

The Q354A Flame Sensor proves the presence of main burner flame in S87C,D,K and S89E,F Direct Ignition Modules and S89/S890C Hot Surface Ignition Modules.

INSTALLATION

When Installing This Product...

1. Read these instructions carefully. Failure to follow instructions can damage product or cause a hazardous condition.
2. Check ratings given in instructions and on product to make sure product is suitable for your application.
3. Make sure installer is a trained, experienced service technician.
4. After completing installation, use these instructions to check out product operation.

WARNING

Fire or Explosion Hazard.
Can cause property damage, severe injury, or death.

Follow these warnings exactly:

- (1) Disconnect power supply before wiring to prevent electrical shock or equipment damage.
- (1) Disconnect gas supply before starting installation. If installing gas control, perform Gas Leak Test using manufacturer's instructions.

Follow appliance manufacturer instructions if available; otherwise, use instructions provided below.

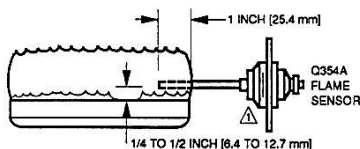
LOCATION

1. Disconnect power supply.
2. In replacement applications, remove old Q354A.
3. Position new Q354A for easy access, observation, and lighting. In replacement applications, position new Q354A in the same location and orientation as the original one.

4. Mount Q354A on main burner using a bracket or the Q347A Spark Igniter bracket. mounting surfaces other than the main burner may shift, bend, or warp as furnace expands and contracts while operating.

NOTE: On multiple burner systems, the Q347A can be mounted at one end of the row of main burners and the Q354A at the other end. The ignition module must provide enough time for all burners to ignite prior to lockout, while meeting all applicable safety standards.

5. Mount Q354A so the ignition flame remains properly positioned with respect to the main burner flame. Refer to Fig. 1.



⚠ POSITION SELECTED MUST PROVIDE AT LEAST 1.5µA FLAME CURRENT FOR S87C,D,K AND 0.8µA FLAME CURRENT FOR S89E,F AND S89/S890C. SEE SERVICE SECTION INSTRUCTIONS TO MEASURE FLAME CURRENT.

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Fig. 1. Mount Q354A with respect to main burner.

WIRING

1. All wiring must comply with applicable electrical codes and ordinances.
2. Follow circuit diagrams provided by the appliance manufacturer. If not available, refer to Fig. 2, 3, or 4.
3. In replacement applications, examine existing wiring. If damaged or deteriorated, replace.

IMPORTANT

Use thermoplastic insulated wire with a minimum rating of 105°C (221°F) for the ground wire. Asbestos insulated wire is not acceptable.

4. Attach female quick-connects to both ends of the wire.
5. Connect one end of wire to sensor terminal on ignition module.



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6.

Connect other end of wire to Q354A male quick connect.
7.

If necessary, shield thermoplastic wire to protect it from radiant burner heat.
8.

Ensure proper ground between main burner and Q347A. If necessary, run a lead from the main burner to common ground selected for Q347A.

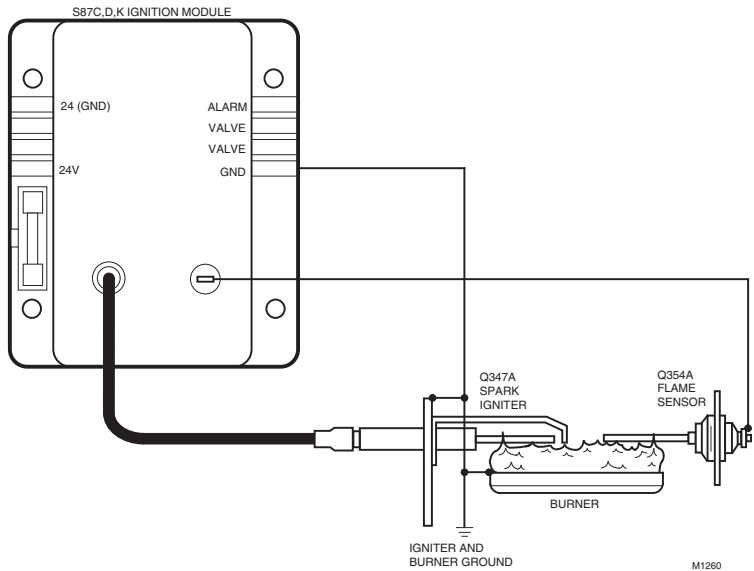


Fig. 2. Q354A, Q347A, and S87C,D,K DSI wiring connections.

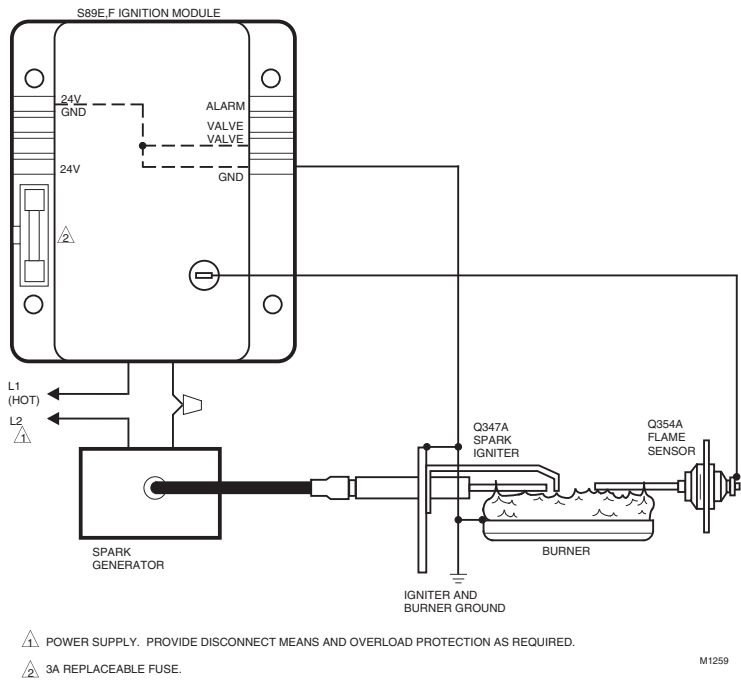


Fig. 3. Q354A, Q347A, and S89E,F DSI wiring connections.

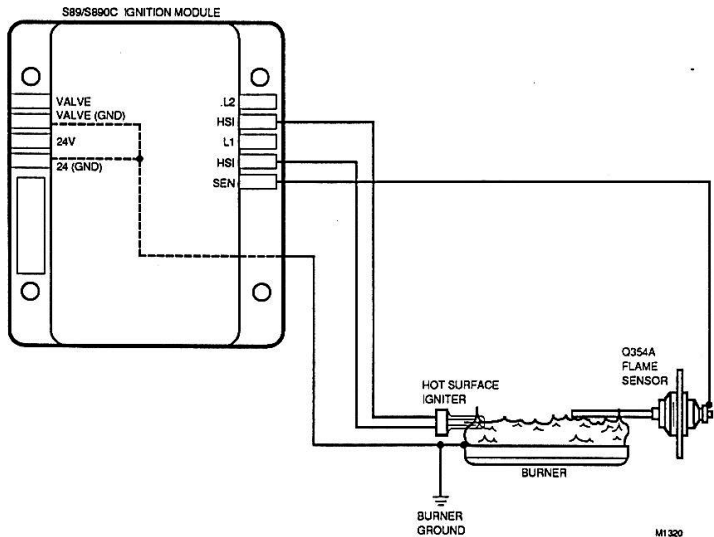


Fig. 4. Q354A and S89/S890C DSI wiring connections.

CHECKOUT

Since the application and controls used may differ, follow checkout procedures for the ignition module and the appliance manufacturer instructions. However, the following steps must be performed during all checkout procedures.

Start System

- 1. Ensure the power and gas supply are turned on.
- 2. Set thermostat to call for heat and watch for spark at the igniter. (S87J and K models provide a 30 second delay before spark startup for prepurge.)
- 3. Time the length of the spark operation. It must be within the lockout timing period. Refer to Table 1.

Table 1. Control Module Lockout Times

| Specified Lockout Time (stamped on ignition module) | Safety Lockout Time Not To Exceed |
|--|--------------------------------------|
| 4.0 seconds | 5.0 seconds |
| 6.0 seconds | 7.0 seconds |
| 11.0 seconds | 15.0 seconds |
| 15.0 seconds | 21.0 seconds |
| 21.0 seconds | 35.0 seconds |

- 4. Ensure that the system starts as follows:
 - Spark turns on.
 - Gas valve opens.
 - Burner ignites after gas reaches the main burner.
 - Spark igniter shuts off.

If the gas control has been replaced or serviced, lightoff may not be satisfactory until air has been purged from the gas line of the gas input and combustion air have been adjusted (see manufacturer instructions).

Reset Ignition Module After Lockout

If the ignition module goes into safety lockout, it will remain locked out until the system is reset. To reset the system, adjust the thermostat setting below room temperature, wait one minute, and move the thermostat setting above room temperature to call for heat. Normal ignition should occur as described above.

IMPORTANT

If adjusting the thermostat does not reset the ignition module, turn appliance power off for one minute, the turn power on.

SERVICE

Measuring Flame Current

The ignition module provides AC power to the flame sensor which the burner flame rectifies to direct current. The level of flame current is measured by the Q354A to assure flame presence. The S87C,D,K flame current must be at least 1.5 μ A and the S89E,F and S89/S890C flame current must be at least 0.8 μ A to assure proper appliance operation.

Measure flame current as follows:

- 1. Connect a DC microammeter in series with the ignition module sensor wire. Use the W136A Test Meter or equivalent.
 - Disconnect Q354A from sensor terminal on ignition module.
 - Connect red lead (positive lead) of microammeter to quick-connect sensor terminal on ignition module.
 - Connect black lead (negative lead) of microammeter to free end of Q354A leadwire.

2. Restart the system and read the meter. The flame sensor current must be at least 1.5 μA for S87C,D,K and at least 0.8 μA for S89E,F and S89/S890C and steady.
 - If the reading is less than 1.5 μA for S87C,D,K or 0.8 μA for S87E,F and S89/S890C or unsteady, see "Low or Unsteady Flame Current" on page 4.

Low or Unsteady Flame Current

If the ignition module flame current is less than 1.5 μA for S87C,D,K or 0.8 μA for S89E,F and S89/S890C or is unsteady check the burner flame, flame sensor location, and electrical connections as follows:

BURNER FLAME

The flame sensor must be constantly immersed in flame. Check burner flame conditions as shown in Fig. 5.

FLAME SENSOR LOCATION

The flame sensor is best when about 1 in. (25 mm) of flame rod is immersed in the burner flame. Refer to Fig. 1. A bent flame rod, bent mounting bracket, or cracked ceramic insulator can affect flame sensor current. Straighten mounting bracket or replace Q354A if necessary.

ELECTRICAL CONNECTIONS AND SHORTS

Connections at the flame sensor must be clean and tight. If wiring needs replacement, use moisture-resistant No. 18 wire rated for continuous duty up to 105°C (221°F).

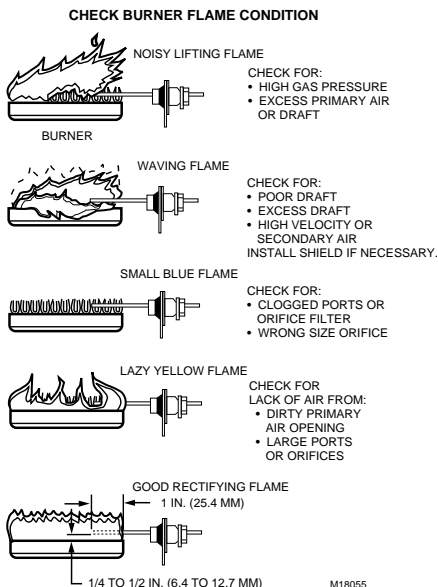


Fig. 5. Checking burner flame conditions.