

Approvals:

Underwriters Laboratories Inc. Component Recognized: File
No. MP268, Guide No. MCCZ2.

CSA International Certified: 158158-1047805.

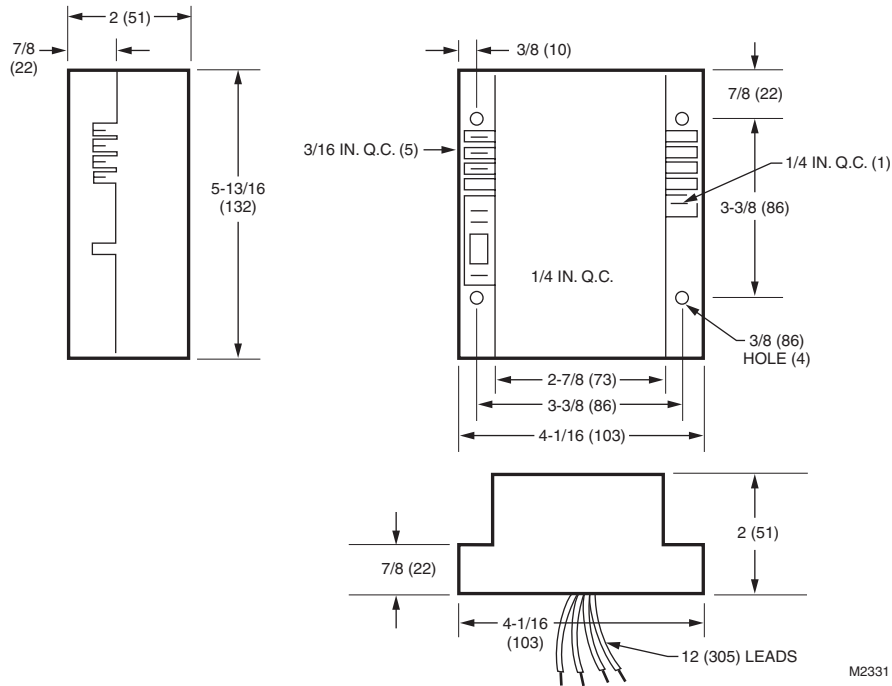


Fig. 1. S89 dimensions in in. (mm).

INSTALLATION

When Installing This Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

⚠ WARNING

Fire or Explosion Hazard.

Can cause severe injury, death or property damage.

1. Disconnect power supply before wiring to avoid electrical shock, explosion, or equipment damage.
2. If a new gas control is being installed, turn off gas supply before starting installation. Conduct Gas Leak Test after gas control is installed.
3. In an LP gas installation, remember that LP gas is heavier than air and will not vent upward naturally. Do not operate electric switches, lights, or appliances until you are sure that work area is free of gas.
4. Never install an S89 where water can flood, drip, or condense on the device. It can malfunction if it gets wet.
5. Never try to use a device that has been damp or wet—replace it.
6. If the control might be exposed to water or moisture, install it in a suitable waterproof enclosure.
7. Any replacement S89 must have the same or shorter lockout time *and* the same or longer delay timing as the original control.

Replacement Application Requirements

If this is a replacement application, follow the appliance manufacturer instructions, if available. The manufacturer usually provides wiring diagrams, start-up and checkout

instructions, and service procedures for their appliance. If the manufacturer instructions are not available, use the general guidelines that follow.

Mount the S89

Select a convenient location on the burner or furnace chassis or cabinet, protected from moisture due to splashing, dripping, or condensation. Allow room to easily reach the S89 terminals for wiring and servicing. Do not exceed the ratings given in the Specifications section.

The S89 may be mounted in any position. See Fig. 1 for mounting dimensions. Mount with 1 in. (25 mm) long, no. 6-32 machine screws or no. 8 sheet metal screws. Fasten securely.

Mount Auxiliary Controls

Mount the spark generator, igniter, flame sensor, thermostat, transformer, gas control, and any other auxiliary controls according to the control manufacturer instructions.

WIRING



CAUTION

Equipment Damage Hazard.

Can cause equipment malfunction or damage.

1. The sensor leadwire must be no more than 3 ft (0.9m) long. Do not allow the wire to touch grounded metal surfaces.
2. A common ground is required for the S89, the spark igniter and the main burner. The 24V (GND) terminal internally grounds one side of the transformer. Auxiliary controls or limits must be in the ungrounded leg.



WARNING

Electrical Shock Hazard.

Can cause severe injury, death or property damage.

Disconnect the power supply before beginning wiring. More than one disconnect may be required.

Use wiring diagrams and instructions provided by the appliance manufacturer, if available. Otherwise, follow the general procedures and diagrams outlined below.

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

1. Make sure the transformer has adequate power (VA) rating. See Table 1 in Specifications section.
2. If you are replacing an S89 that was used with an external valve on delay timer, you must disconnect the external timer and use an S89F to provide the delay function. External timers cannot be used with either S89E or S89F controllers because the safety circuit in

the controls may repeatedly set the timer to zero, preventing burner start. Always disconnect the external timer when using an S89E or F. To disconnect the timer:

- a. Turn off power.
 - b. Cut the two leadwires at the external timer.
 - c. Strip the ends of the wires 1/2 in. (13 mm) and connect with a solderless connector.
 - d. Restore power.
3. Wire system components and S89 as shown in Fig. 2 and 3. Refer to appliance manufacturer instructions for connections to other auxiliary controls.
 4. Make sure the L1 (Hot) and L2 (Ground) leads are connected to the right leads. If they are reversed, the S89 will not detect the flame and will go into safety lockout.
 5. Connect spark igniter, flame sensor, main burner, and S89 to a common ground. Use thermoplastic insulated wire with a minimum rating of 221°F (105°C) for the ground wire. Connect the ground wire as follows:
 - a. Connect one end of the ground wire to the quick-connect GND (burner) terminal on the S89, using a 1/4 in. (6 mm) quick-connect (AMP 41772 or equivalent).
 - b. Strip the other end of the wire and fasten it under the igniter bracket mounting screw.
 - c. If necessary, install a shield to protect the wire from radiant heat generated by the burner.
 - d. The burner serves as the common ground. If metal-to-metal contact between the burner and the appliance cabinet is poor, run a lead from the burner to the cabinet. The cabinet must be earth-grounded.

START-UP AND CHECKOUT

If this is a replacement application, refer to the specific instructions provided by the heating appliance manufacturer (if available). Also, since the auxiliary controls used on any system may differ, refer to the control manufacturer instructions for start-up and checkout procedures for other system components.

Perform Gas Leak Test



WARNING

Fire or Explosion Hazard.

Can cause severe injury, death or property damage.

1. Never use a flame to check for gas leaks, only a soap and water solution.
2. Test for gas leaks whenever work is done on a gas system.
3. Soap and water must not touch the S89.

With the main burner in operation, paint the pipe joints and gas control gasket edges with a rich soap and water solution. Bubbles indicate a gas leak. To stop the leak, tighten joints and screws, or replace the gas control. *Never* use a flame to check for gas leaks.

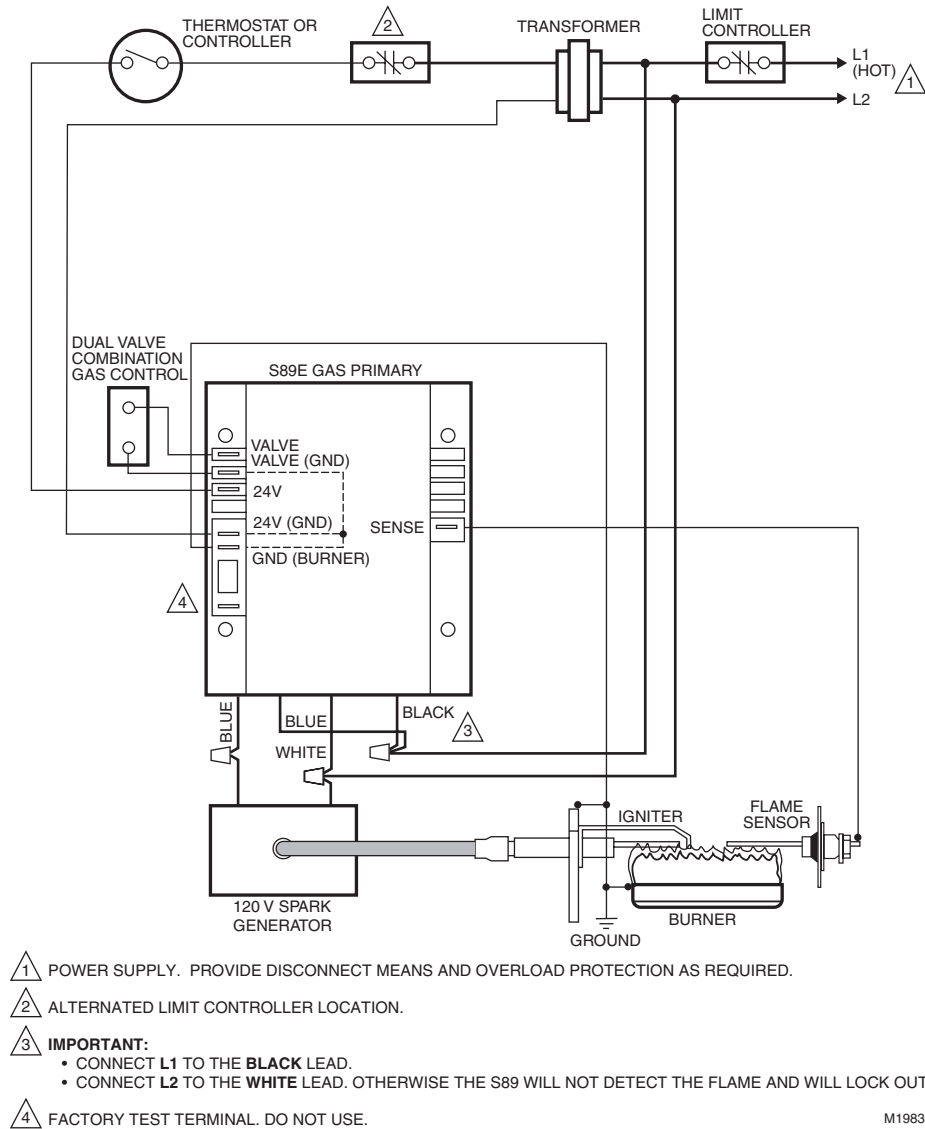


Fig. 2. S89E typical hookup in direct spark control system. See Fig. 8 for control system ladder diagram.

Check Out S89

NOTE: If operation is not as described below, refer to Troubleshooting section.

1. Set thermostat to call for heat.
2. Turn on power and gas supply.
3. Igniter starts to spark and gas control opens after safe start check (S89E: 10 seconds maximum) or safe start check plus valve on delay (S89F: 30 seconds minimum).
4. Main burner lights while igniter is on.

NOTE: If the gas control has been replaced or serviced, lightoff may be unsatisfactory until air has been purged from the gas line or the gas input and combustion air have been adjusted (see appliance manufacturer instructions).

5. Turn off gas supply.
6. Gas control closes.
7. The module begins the safe start check (S89E: 10 seconds maximum) or safe start check plus valve on delay (30 seconds minimum) after which the igniter starts and gas control opens.
8. Time system until gas control closes. S89 is now in safety lockout. The lockout time should be within the specifications in Table 2.
9. Open gas supply. System remains off and no gas flows to the main burner.

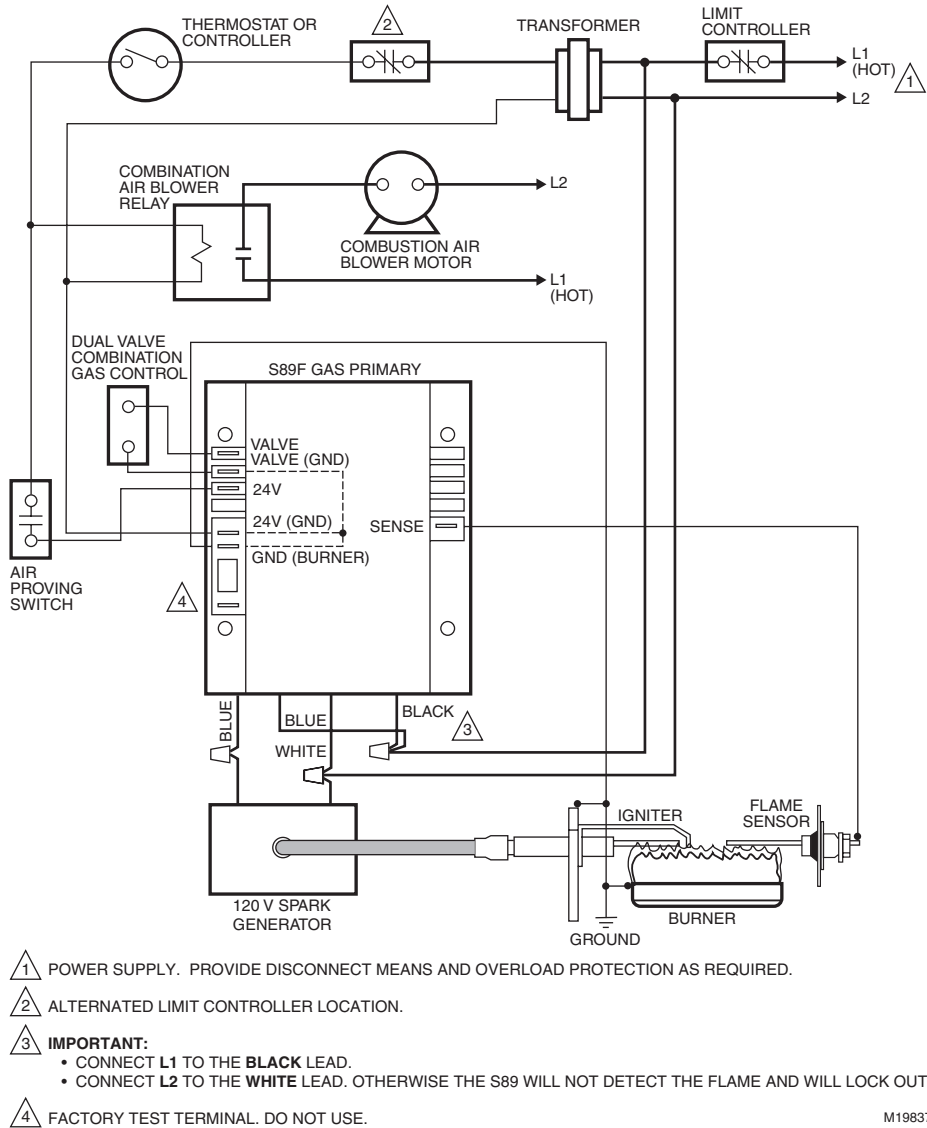


Fig. 3. S89F typical hookup in direct spark control system. See Fig. 9 for control system ladder diagram.

10. Turn off gas supply.
11. Gas control closes.
12. The module begins the safe start check (S89E: 10 seconds maximum) or safe start check plus valve on delay (38 seconds maximum) after which the igniter starts and gas control opens.
13. Time system until gas control closes. S89 is now in safety lockout. The lockout time should be within the specifications in Table 2.
14. Open gas supply. System remains off and no gas flows to the main burner.

Table 2. S89 Lockout Times.

Lockout Time Shown on S89 Module	Safety Lockout Time	
	Minimum	Maximum
4 seconds	3.0 seconds	5.5 seconds
11 seconds	8.0 seconds	15.0 seconds

Resetting S89 After Safety Lockout

Once the S89 locks out, it must be reset before the system will operate. To reset, set the thermostat below room temperature, wait at least 45 seconds, then turn the thermostat up to call for heat. The system should start normally. If adjusting the thermostat does not reset the S89, turn off power to the appliance for 45 seconds and then turn it on.

Final Checkout

With power and gas supply on, set thermostat to call for heat and observe operation through at least one complete cycle to make certain that all controls are operating safely.

OPERATION

The S89 is powered by a 24V transformer. It operates in response to a call for heat from the thermostat.