

PLANNING THE INSTALLATION

Hot surface ignition systems are used on a wide variety of central heating equipment and on heating appliances such as agricultural equipment, industrial heating equipment and pool heaters. Some of these applications may make heavy demands on the controls, either because of frequent cycling, or because of moisture, corrosive chemicals, dust or excessive heat in the environment. In these situations, special steps may be required to prevent nuisance shutdowns and premature control failure. These applications require Honeywell Residential Division Engineering review; contact your Honeywell Sales Representative for assistance.

FREQUENT CYCLING

These controls are designed for use on space heating appliances that typically cycle 3 to 4 times an hour during the heating season and not at all during the cooling season. In an application with significantly greater cycling rates and closer to year-round use, we recommend monthly checkout because the controls may wear out more quickly.

WATER OR STEAM CLEANING

Once a module or gas control has been wet, it may operate unreliably and must be replaced. If the appliance is likely to be cleaned with water or steam, the controls and associated wiring should be covered so water or steam flow cannot reach them. The controls should be high enough above the bottom of the cabinet so they will not be subject to flooding or splashing during normal cleaning procedures. If necessary, shield the controls to protect them from splashing water. A NEMA 4 enclosure is recommended for the ignition module; see the Electronic Ignition Service Manual, form 70-6604.

HIGH HUMIDITY OR DRIPPING WATER

Over time, dripping water or high ambient humidity can create unwanted electrical paths on the module circuit

board, causing the module to fail. *Never* install an appliance where water can drip on the controls.

In addition, high ambient humidity can cause the gas control to corrode, and finally to fail.

Where the appliance may be installed in a humid atmosphere, make sure air circulation around the module and gas control is adequate to prevent condensation. It's also important to regularly check out the system. A NEMA 4 enclosure may be needed for the ignition module; see the Electronic Ignition Service Manual, form 70-6604.

CORROSIVE CHEMICALS

Corrosive chemicals can also attack the module and gas control and eventually cause a failure. Where chemicals may be used routinely for cleaning, make sure the cleaning solution cannot reach the controls. Where chemicals are likely to be suspended in air, as in some industrial and agricultural applications, protect the ignition module from exposure with a NEMA 4 enclosure; see the Electronic Ignition Service Manual, form 70-6604.

DUST OR GREASE ACCUMULATION

Heavy accumulation of dust or grease may cause the controls to malfunction. Where dust or grease may be a problem, provide covers for the module and the gas control that will limit environmental contamination. A NEMA 4 enclosure is recommended for the ignition module; see the Electronic Ignition Service Manual, form 70-6604.

HEAT

The controls can be damaged by excessively high temperatures. Make sure the maximum ambient temperature at the control locations will not exceed the rating of the control. If the appliance normally operates at very high temperatures, insulation, shielding, and air circulation may be necessary to protect the controls. Proper insulation or shielding should be provided by the appliance manufacturer; make sure adequate air circulation is maintained when the appliance is installed.

INSTALLATION AND CHECKOUT

WHEN INSTALLING THIS IGNITION SYSTEM...

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

WARNING

FIRE OR EXPLOSION HAZARD. CAN CAUSE SERIOUS INJURY OR DEATH.

1. The Ignition module can malfunction if it gets wet, leading to accumulation of explosive gas:
 - Never install where water can flood, drip or condense on module.
 - Never try to use a module that has been wet—replace it.
2. Liquefied petroleum (LP) gas is heavier than air and will not vent upward naturally.
 - Do not operate electric switches, lights, or appliances until you are sure the appliance area is free of gas.

CAUTION

1. Disconnect power supply before beginning wiring to prevent electrical shock or equipment damage.
2. If a new gas control is to be installed, turn off gas supply before starting installation. Conduct Gas Leak Test according to gas control manufacturer's instructions after the gas control is installed.
3. If module must be mounted near moisture or water, provide suitable waterproof enclosure.

PERFORM PREINSTALLATION SAFETY INSPECTION

If this is a replacement installation, check the appliance and venting system carefully before installing new module.

If a condition which could result in unsafe operation is detected, the appliance should be shut off and the owner advised of the unsafe condition. Any potentially unsafe condition must be corrected before proceeding with the installation.

MAINTENANCE REQUIREMENTS IN SEVERE ENVIRONMENTS

Regular preventive maintenance is important in any application, but especially so in agricultural and industrial applications because

- In many such applications, the equipment operates 100,000-200,000 cycles per year. Such heavy cycling can wear out the gas control in one to two years. A normal forced air furnace, for which the controls were originally intended, typically operates less than 20,000 cycles per year.
- Exposure to water, dirt, chemicals, and heat can damage the module or the gas control and shut down the control system. A NEMA 4 enclosure can reduce exposure to environmental contaminants. See Electronic Ignition Service Manual, form 70-6604.

The maintenance program should include regular checkout of the system as outlined under Checkout, page 11.

WARNING

FIRE OR EXPLOSION HAZARD MAY CAUSE PROPERTY DAMAGE, SEVERE INJURY OR DEATH

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

Maintenance frequency must be determined individually for each application. Some considerations are:

- *Cycling frequency.* Appliances that may cycle more than 20,000 times annually should be checked monthly.
- *Intermittent use.* Appliances that are used seasonally should be checked before shutdown and again before the next use.
- *Consequence of unexpected shutdown.* Where the cost of an unexpected shutdown would be high, the system should be checked more often.
- *Dusty, wet, or corrosive environment.* Since these environments can cause the controls to deteriorate more rapidly, the system should be checked more often. Protective enclosures, as outlined under "Planning the Installation", are recommended regardless of checkout frequency.

Any control should be replaced if it does not perform properly on checkout or troubleshooting. In addition, replace any module if it is wet or looks like it has ever been wet.

MOUNT IGNITION MODULE

Select a location close enough to the burner to allow a short, direct cable route to the igniter. Ambient temperature at the module must be within the range of minus 40° F to plus 175° F [minus 40° C to plus 79° C]. The module must be protected from water, moisture, corrosive chemicals and excessive dust and grease.

The module can be mounted in any position. Fasten securely with four No. 6-32 machine or No. 8 sheetmetal screws 1 in. [25 mm] long.

MOUNT THE SYSTEM CONTROLS

Mount any required controls, such as the gas control, hot surface igniter, flame sensor, thermostat, limit and transformer according to manufacturer's instructions.

WIRE THE SYSTEM

CAUTION

1. Check the wiring diagram furnished by the appliance manufacturer, if available, for circuits differing from the wiring hookups shown. Carefully follow any special instructions affecting the general procedures outlined below.
2. Disconnect the power supply before making wiring connections to prevent electrical shock or equipment damage.

IMPORTANT

1. All wiring must comply with applicable electrical codes and ordinances.
2. When installing the hot surface igniter, the leadwires should be kept as short as possible and should not be allowed to rest against grounded metal surfaces.
3. A common ground is required for the S89/S890 and the main burner. The 24 V (GND) terminal internally grounds one side of the transformer. Any auxiliary controls or limits must not be in the grounded leg. In addition, the appliance should be earth-grounded.
4. Make sure the transformer has adequate VA. The ignition module requires at least 0.2 A at 24 Vac. Add the current draws of all other devices in the control circuit, including the gas control, and multiply by 24 to determine the total VA requirement of these components. Add this total to 4.8 VA (for the ignition module). The result is the minimum transformer VA rating. Use a Class II transformer if replacement is required.
5. Check that L1 (hot) and L2 (neutral) are wired to the proper terminals. If L1 and L2 are interchanged, the S89/S890 will not detect the flame, and will go into safety shutdown.

Connect Igniter

Prepare wiring harness. See Igniter wiring, page 3.

1. On models with quick connects, use insulated 1/4 in. female quick connects to connect the wiring harness leads to the HSI terminals on the ignition module.

2. On models with leadwires, use solderless connectors to connect the wiring harness leads to the blue leads from the module.

3. Connect the wiring harness to the igniter.

Connect Vent Damper

The D80B Vent Damper can be used with all ignition modules, although the Molex plug provided on some modules simplifies wiring connections when used with the D80D Plug-In Vent Damper. *Once a module with vent damper plug has powered a vent damper circuit, it cannot be used in a gas system without a vent damper.* A non-replaceable fuse in the module blows on initial power-up. Once this fuse has blown the module won't work unless the vent damper is connected.

To connect the plug-in model to D80D:

1. Remove the plug from the terminal strip on the ignition module case and discard.

2. Using the wiring harness supplied, insert the matching pin plug into receptacle on case and other end to vent damper.

To connect the D80B, follow the wiring diagrams supplied with the vent damper or see Fig. 5 for typical connections.

Connect Ignition Module

1. Connect remaining system components to the ignition module terminals as shown in the appropriate wiring diagram, Figs. 2 to 10.

- Figs. 2 and 3 are basic circuits for a heating only atmospheric burner system. Fig. 2 shows the C,G and J models with combination igniter-sensor; Fig. 3 shows the D,H models with separate igniter and sensor.

- Figs. 4 and 5 show the C,G and J models with a D80 Vent Damper. *Never* use a vent damper in an LP gas system or in a fan-assisted combustion system.

- Figs. 6-10 show S89C,G,J/S890C,G,J with combination igniter-sensor in a variety of systems, with alternate connections for vent damper plug models. Remember, however, that a vent damper

should not be used in a fan-assisted combustion system or an LP gas system and that the vent damper plug must not be removed except to connect a D80D with the plug-in cable. S89D,H/S890D,H with separate igniter and sensor can be substituted in these hookups by simply connecting the sensor as shown in Fig. 3.

2. Refer to heating appliance manufacturer's instructions for wiring auxiliary controls.

3. Adjust thermostat heat anticipator to match system current draw. The current draw equals the total current required for the ignition module (0.2 A) plus the gas control and any other auxiliary equipment in the control circuit.

Connect Gas Control

Use No. 18 gauge solid or stranded wire. Use 3/16 in. female quick connects for module connections. Connect to gas control terminals as shown in wiring diagrams, using terminals appropriate to the gas control.

Ground Control System

The igniter, flame sensor and ignition module must share a common ground with the main burner. Use thermo-plastic insulated wire with a minimum rating of 105° C [221° F] for the ground wire; asbestos insulation is not acceptable. If necessary, use a shield to protect the wire from radiant heat generated by the burner. Connect the ground wire as follows:

1. Fit one end of the ground wire with a female 3/16 in. quick-connect terminal and connect it to the male quick-connect GND(BURNER) terminal on the ignition module.

2. Strip the other end of the wire and fasten it under the igniter bracket mounting screw. If necessary, use a shield to protect the ground wire from radiant heat.

3. The burner serves as the common grounding area. If there is not good metal-to-metal contact between the burner and ground, run a lead from the burner to ground.

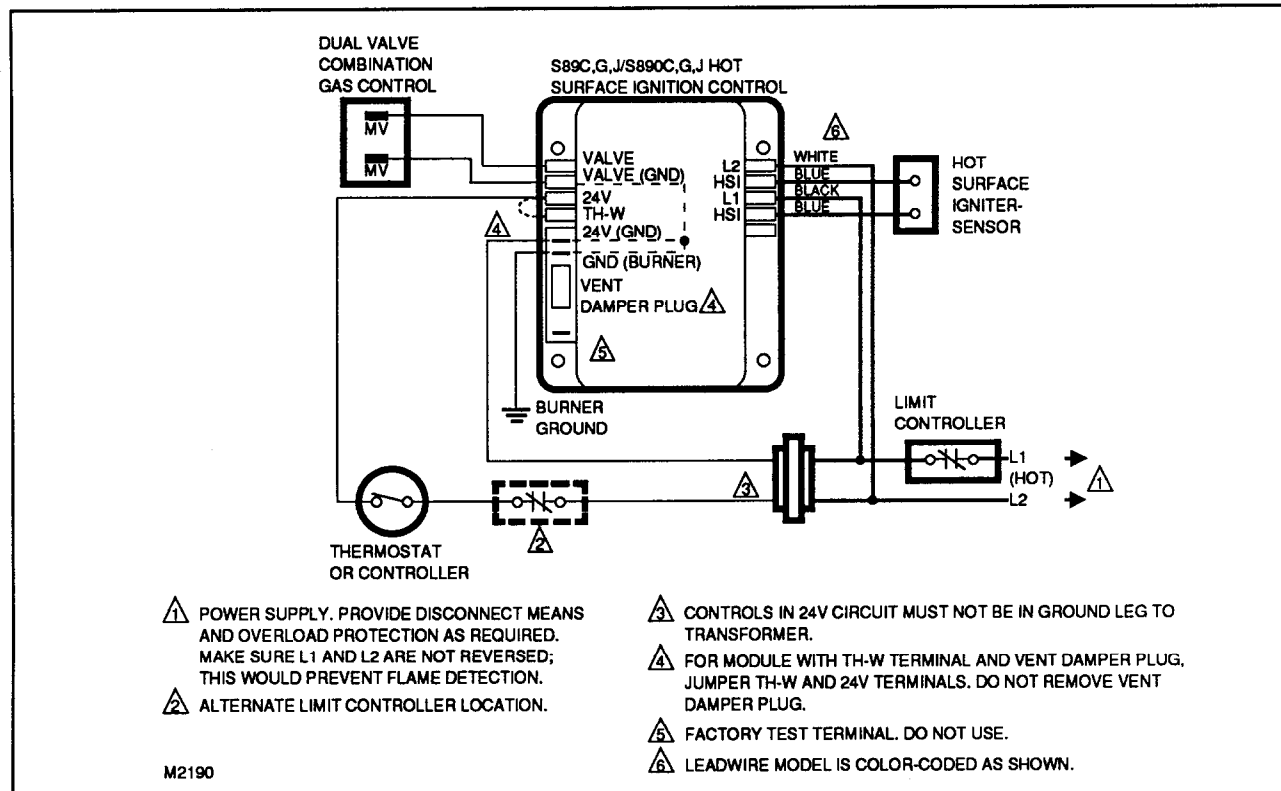


FIG. 2—S89C, G, J AND S890C, G, J IN AN ATMOSPHERIC BURNER HEATING SYSTEM.

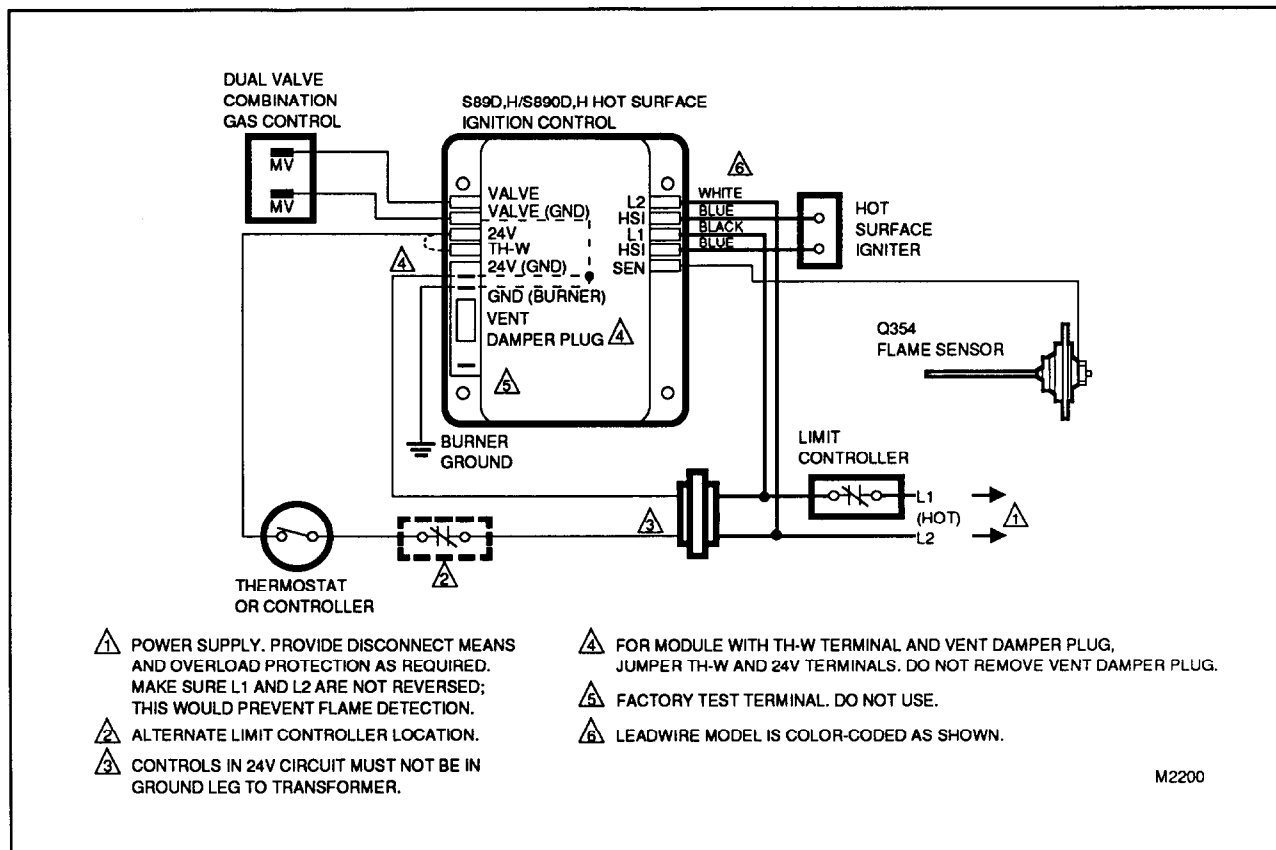


FIG. 3—S89D,H AND S890D,H IN AN ATMOSPHERIC BURNER HEATING SYSTEM.

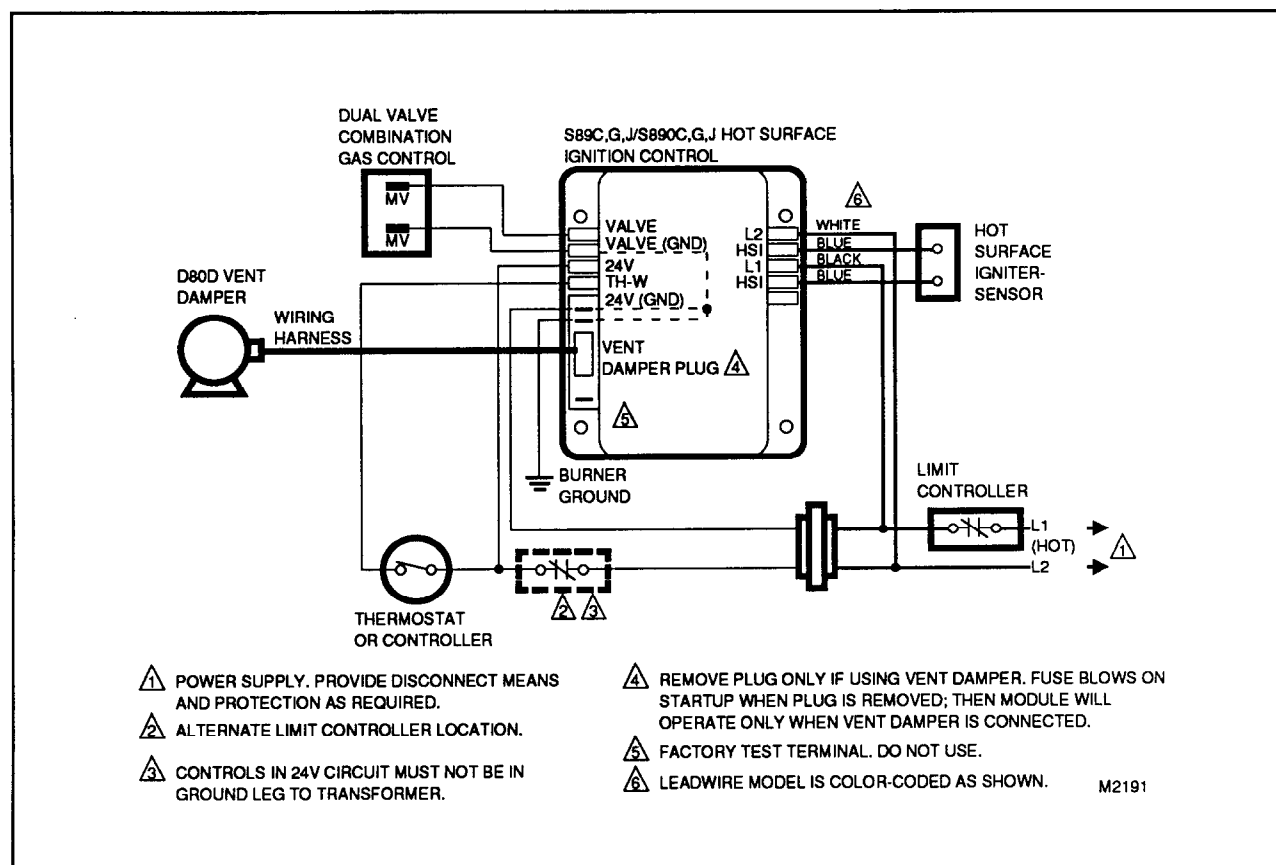
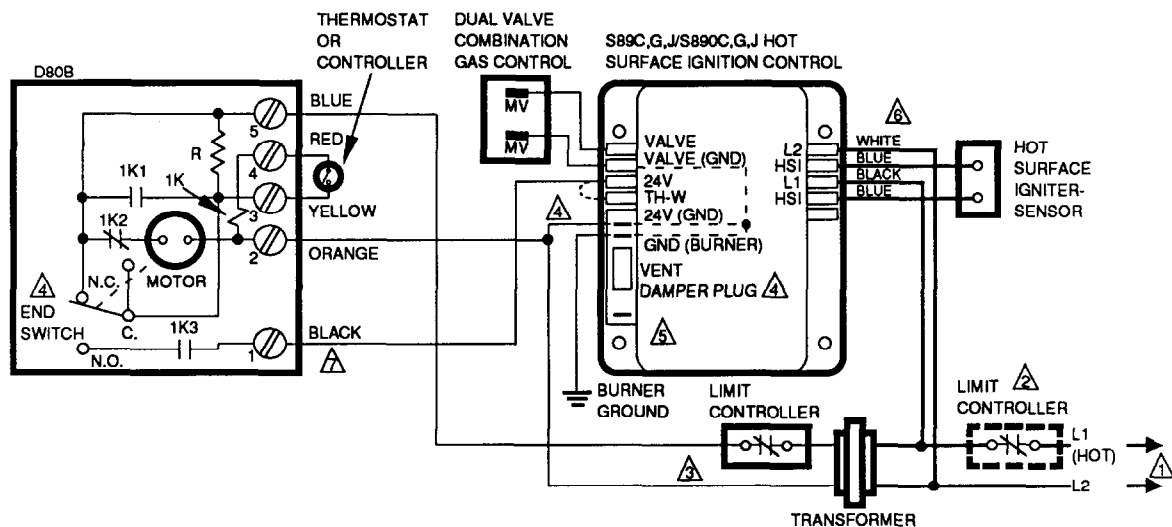
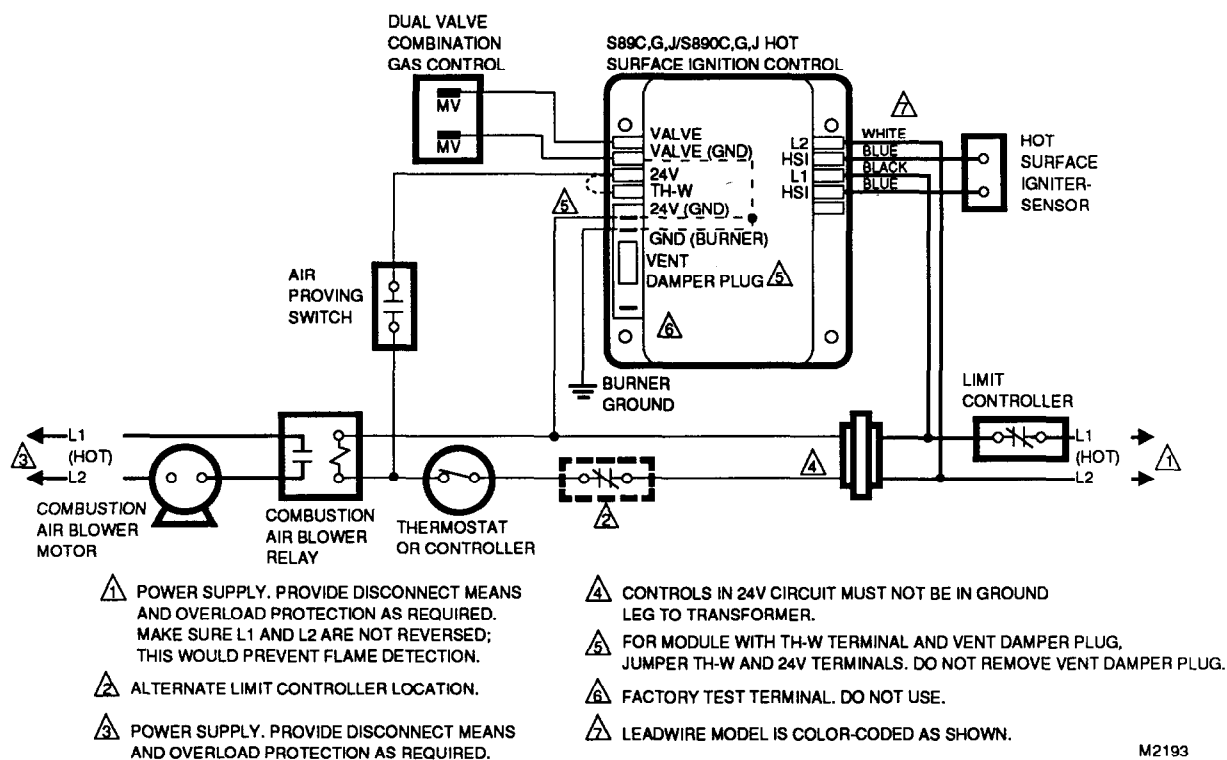


FIG. 4—S89C, G, J AND S890C, G, J IN AN ATMOSPHERIC BURNER HEATING SYSTEM WITH THE D80D VENT DAMPER.



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FIG. 5—S89C, G, J AND S890C, G, J IN AN ATMOSPHERIC BURNER HEATING SYSTEM WITH D80B VENT DAMPER.



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FIG. 6—S89C, G, J AND S890C, G, J IN A FAN-ASSISTED COMBUSTION HEATING SYSTEM.

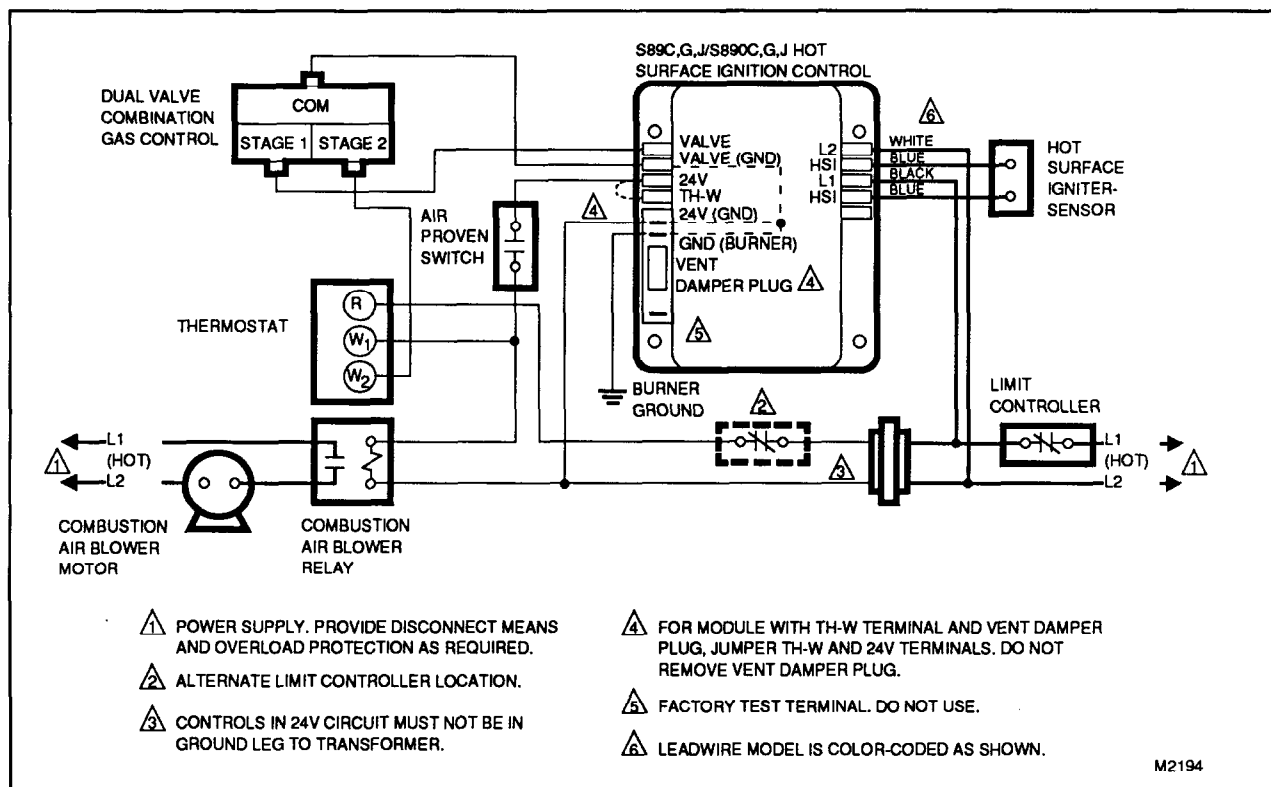


FIG. 7—S89C,G,J AND S890C,G,J IN A TWO STAGE FAN-ASSISTED COMBUSTION HEATING SYSTEM.

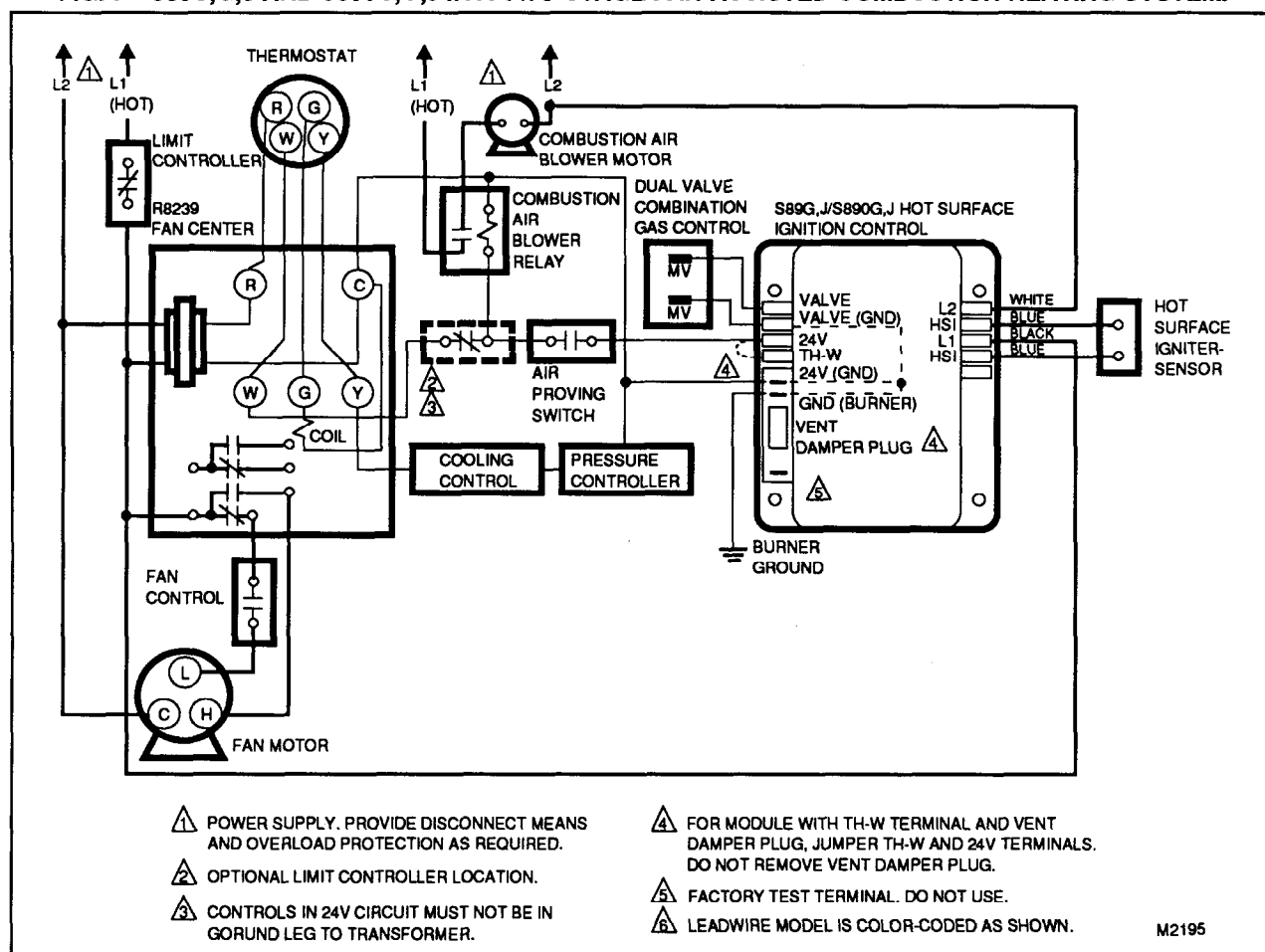
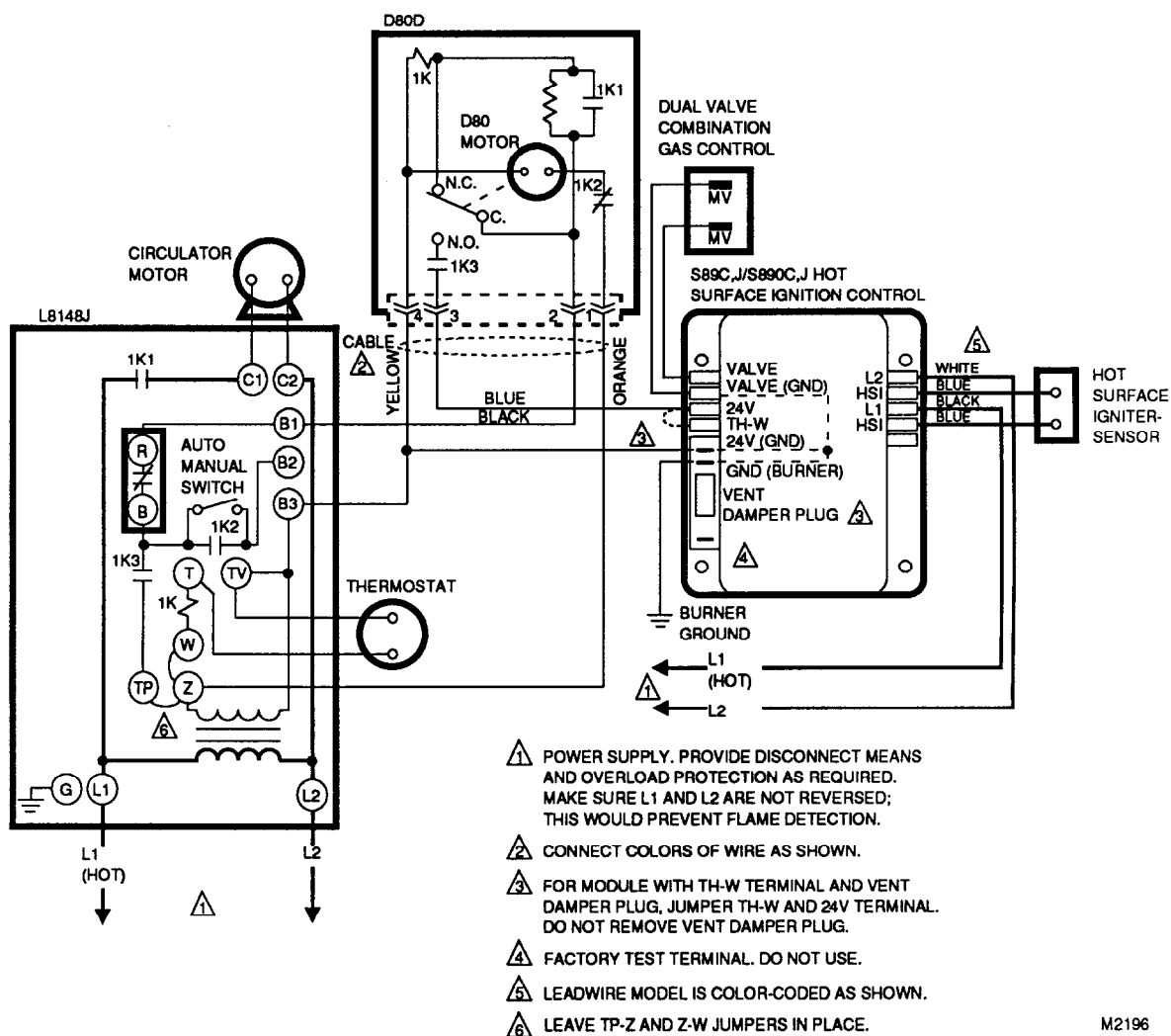


FIG. 8—S89C,G,H AND S890C,G,H IN A FAN-ASSISTED COMBUSTION HEATING-CENTRAL COOLING SYSTEM.



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FIG. 9—S89C,J AND S890C,J IN A HYDRONIC HEATING SYSTEM WITH ATMOSPHERIC BURNER.

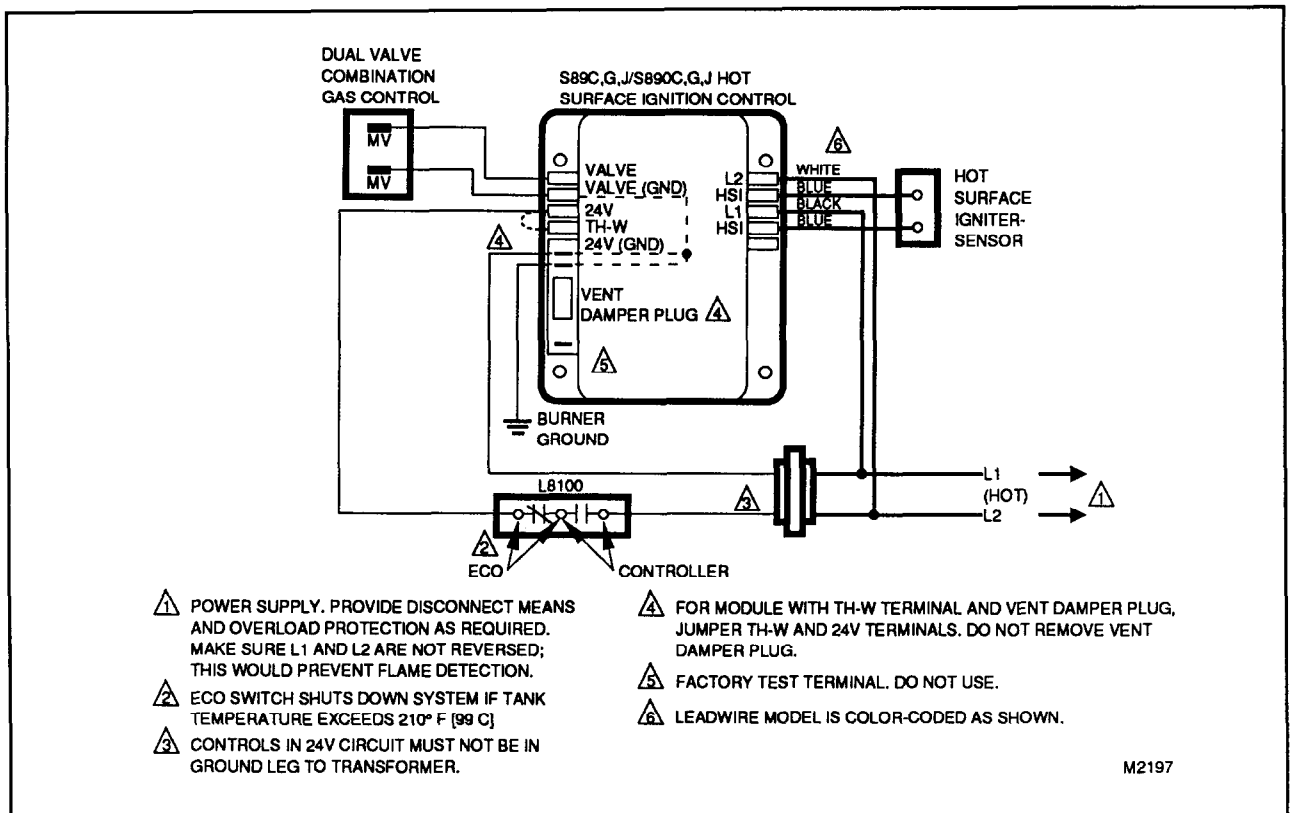


FIG. 10—S89C,G,J AND S890C,G,J IN A COMMERCIAL WATER HEATING SYSTEM.

CHECKOUT

Check out the control system:

- At initial installation of the appliance.
- As part of regular maintenance procedures. Maintenance intervals are determined by the application. See **PLANNING THE INSTALLATION**, page 4, for more information.
- As the first step in troubleshooting.
- Any time work is done on the system.

WARNING

FIRE OR EXPLOSION HAZARD.
CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY OR DEATH.

1. If you smell gas or suspect a gas leak, turn off gas at manual service valve and evacuate the house. Do not try to light any appliance, do not touch any electrical switch or telephone in the building until you are sure no spilled gas remains.
2. Gas leak test must be done as described in Steps 1 and 5 below on initial installation and any time work is done involving the gas piping.

STEP 1: Perform Visual Inspection.

- ☐ With power off, make sure all wiring connections are clean and tight.
- ☐ Turn on power to appliance and ignition module.
- ☐ Open manual shutoff valves in the gas line to the appliance.
- ☐ Do gas leak test upstream of gas control if piping has been disturbed.

GAS LEAK TEST: Paint pipe joints with rich soap and water solution. Bubbles indicate gas leak. Tighten joints to stop leak.

STEP 2: Review Normal Operating Sequence (Fig. 12) and Module Specifications.

- ☐ See **OPERATION**, page 12, and **SPECIFICATIONS**, page 2.

STEP 3: Reset the Module.

- ☐ Turn the thermostat to its lowest setting.
- ☐ Wait one minute.

As you do Steps 4 and 5, watch for points where operation deviates from normal. Refer to **Troubleshooting Chart (Fig. 13)** to correct problem.

STEP 4: Check Safety Lockout Operation.

- ☐ Turn gas supply off.
- ☐ Set thermostat or controller above room temperature to call for heat.
- ☐ Watch for igniter warmup either immediately or following prepurge. See **SPECIFICATIONS**, page 2.
- ☐ Time the length of time gas control stays open. The time should not exceed the following:
 - 4 sec. model—5.5 sec.
 - 6 sec. model—7.5 sec.
 - 11 sec. model—15.0 sec.
 - 15 sec. model—22.0 sec.
- ☐ Three try for ignition modules only (S89G,H; S890G,H): Watch for start of 30 sec. min. purge, followed by 34 sec. nom. igniter warmup and second try for ignition. After a third purge, warmup and trial for ignition sequence, these modules lock out.
- ☐ Open manual gas control knob and make sure no gas is flowing to burner.