resideo

S8901 Hot Surface Ignition Control Module

INSTALLATION MANUAL

Application

The S8901 family of ignition controls provides fan relay, pressure switch input, ignition sequence, flame monitoring, and safety shutoff for direct ignition gas-fired appliances.

The table "Hot Surface Ignition Control Models" below describes the main features of each available model.

Hot Surface Ignition Control Models

S8	*9*	*0*	*1*	*A*	*1020*
Series	**Ignition Type**	**Enclosure**	**Connections**	**Trials, Fan**	**Unique SKU Identification**
S4 – Line Voltage Control	**7** – DSI - Internal Ignition	**0** –Enclosure	**1** – QC's	**A** – No fan or PS / Single Try	Identifies unique SKU
S8 – Low Voltage Control	**8** – DSI - External ignition	**2** – Bare Board 1	**2** – Plugs	**B** – No Fan or PS / Multitry	
	9 – HSI	**3** – Standoffs / Tray		**C** – Fan and PS / Single try	
				D – Fan and PS / Multitry	
				U – Universal	

1 Board only configuration, without protective casing or standoffs. For Installation within an OEM appliance cabinet.

Top row shows an example model number.

Ignition trials and ignition timings vary depending on the model ordered.

Models capable with pre-purge, post-purge, and inter-purge timings.

Models available with fan relay and pressure switch input.

Models designed for one- or two-rod applications (local or remote flame sensing).

Models available with or without alarm.

34-00059-01

All models provide:

- Natural or LP gas.
- Main burner ignition using a high voltage spark.
- Flame rectification circuit to monitor flame presence.
- Monitoring of 24 VAC and main burner flame.
- LED indicator for flame presence and system status/errors.
- Remote LED available on some models.
- Connections for flame reading via standard micro-ammeter or voltmeter.

Specifications

Control Voltage: 24V (18-30 Vac) 50/60 Hz.

Current Draw: 0.2 A plus valve load @ 24Vac.

Trial for Ignition, Prepurge, Postpurge, Interpurge and ignition timings: Dependent on model ordered.

Ignition Sequence: Refer to the "Normal Operating Sequence for Standard Models" on page 14 flowchart.

Flame Failure Response Time: 1 seconds maximum.

LED: The green status LED provides system status and error codes when in run mode, as well as when the system is attempting ignition.

Gas Control: Direct Ignition valves up to 2 A.

Operating Temperature:

- Minimum ambient temperature rating is -40°F (-40°C).
- Maximum ambient rating is 175°F (79°C).

Relative humidity: 0% to 95% (non-condensing).

Approvals: UL 60730-1, UL 60730-2-5.

Hot Surface Igniter or Igniter-sensor: Norton Model 201 or 271, or equivalent.

NOTE: If an igniter other than Norton Model 201 or 271 is used, the igniter must meet the following minimum specifications, required over the life of the igniter:

- Igniter must reach 1832 °F (1000 °C) within 34 seconds with 102 Vac applied.
- Igniter must maintain at least 500M ohms insulation resistance between the igniter lead wires and the igniter mounting bracket.
- Igniter must not develop an insulating layer on its surface (over time) which would prevent flame sensing.
- Igniter surface area immersed in flame must not exceed 1/4 of the grounded area immersed in flame. This would prevent flame sensing.
- Igniter current draw at 132 Vac must not exceed 5 A.

Planning the Installation

WARNING: FIRE OR EXPLOSION HAZARD
Can cause severe injury, death or property damage.

1. Plan the installation as outlined below.
2. Plan for frequent maintenance as described in the Maintenance section.

Hot Surface Ignition systems are used on a wide variety of heating appliances such as commercial cookers, 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 special Resideo review; contact your Resideo Sales Representative for assistance.

Review the following conditions that can apply to your specific installation and take the precautionary steps suggested.

Frequent Cycling
In applications with cycle rates greater than four times per hour, the control may wear out more quickly. Perform a monthly checkout.

Water or Steam Cleaning
Once a module or gas control has been exposed to moisture, 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 to prevent water or steam flow from reaching them. The controls should be installed 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. Use a NEMA 4 enclosure for the ignition control.

High Humidity or Dripping Water
Dripping water can cause the control to fail. Never install an appliance where water can drip on the controls.

In addition, high ambient humidity can damage the control.

If the appliance is in a humid atmosphere, make sure air circulation around the controls is adequate to prevent condensation. Also, regularly check out the system. A NEMA 4 enclosure is recommended for the ignition module.

Corrosive Chemicals
Corrosive chemicals can attack the module and gas control, eventually causing a failure. If chemicals are used for routine cleaning, make sure they do not reach the controls. Where chemicals are suspended in air, as in some industrial or agricultural applications, use a NEMA 4 enclosure for the ignition module.

Dust or Grease Accumulation
Heavy accumulations of dust or grease can cause controls to malfunction. Where dust or grease can be a problem, provide covers for the module and the gas control to limit contamination. A NEMA 4 enclosure is recommended for the ignition module.

Heat
Excessively high temperatures can damage controls. Make sure the maximum ambient temperature at the control does not exceed the rating of the control. If the appliance operates at very high temperatures, use insulation, shielding, and air circulation, as necessary, to protect the controls. Proper insulation or shielding should be provided by the appliance manufacturer; verify proper air circulation is maintained when the appliance is installed.

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 these instructions to make sure the control is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out operation as provided in these instructions.
5. If the control module is continuously powered, resetting it or exiting lockout mode requires removing the 24VAC power source (turning it OFF), then restoring it (turning it ON). However, if the thermostat supplies the 24VAC power, you can reset the control module and exit lockout mode by adjusting the thermostat setting below room temperature. Wait one minute, then raise the setting to call for heat. This manual assumes that the thermostat is the source of 24VAC power to the control module.

Important:
If this is a replacement application, follow the appliance manufacturer's instructions if available.

WARNING: FIRE OR EXPLOSION HAZARD
Can cause severe injury, death or property damage.

1. The module can malfunction if it gets wet, leading to accumulation of explosive gas.
   - Never install where water can flood, drip or condense on the 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 naturally vent upward.
   - Do not operate electric switches, lights, or appliances until you are sure the appliance area is free of gas.

WARNING: ELECTRICAL SHOCK HAZARD
Can cause severe injury, death or property damage.
Disconnect power supply before beginning wiring or making wiring connections to prevent electrical shock or equipment damage.

CAUTION

1. If a new gas control is to be installed, turn off the gas supply before starting installation. Conduct a Gas Leak Test according to the gas control manufacturer instructions after the gas control is installed.
2. Wiring errors can cause improper appliance operation and dangerous conditions such as bypassing safety features.

CAUTION: EQUIPMENT DAMAGE HAZARD
Water can cause equipment damage or malfunction.
If the module must be mounted near water or moisture, provide suitable waterproof enclosure.

Maintenance Requirements in Severe Environments

Regular preventive maintenance is important in any application.

WARNING: FIRE OR EXPLOSION HAZARD
May cause severe injury, death or property damage.
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 modules to deteriorate more rapidly, the system should be checked more often.

Any module 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. Protective enclosures as outlined under “Planning the Installation” are recommended regardless of checkout frequency.

Location

The mounting location must provide:

- Good, clear access to the field wiring terminals.
- Operating ambient temperatures between -40°F and 175°F (-40°C and 79°C).
- Relative humidity below 95% noncondensing.
- Protection from water, steam or corrosive chemicals that are used to clean the appliance.
- Protection from dripping water, such as from an overfilled humidifier or from condensation.
- Protection from dust or grease accumulation.

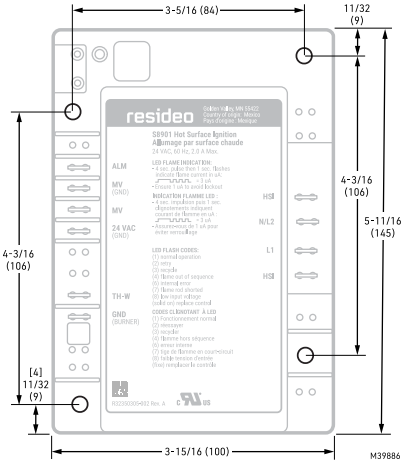
Mount the Ignition Module

Select a location close enough to the burner to allow a short (3 ft. [0.9 m] max.), direct cable route to the igniter or igniter/sensor. Ambient temperature at the module must be within the range listed under "Operating Temperature:" on page 2. The module must be protected from water, moisture, corrosive chemicals and excessive dust and grease.

The S8901 may be mounted in any position. See "Recommended Mounting Pattern" on the next page diagram for mounting hole locations.

Fasten securely with at least two No. 6-32 machine screws or No. 8 sheet metal screws using the mounting holes diagonally across from each other.

Recommended Mounting Pattern



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: EQUIPMENT DAMAGE HAZARD
Disconnect power supply before beginning wiring or making wiring connections to prevent electrical shock or equipment damage.

All wiring must comply with local codes and ordinances. See "Ignition Module wiring connection locations (Model S8901 shown)" on the next page for proper wiring connections.

Important:

1. As shown in the wiring diagrams, a common ground is required on:
    a. The burner mounting bracket, and
    b. The GND (BURNER) terminal on the ignition module. If ground is poor or erratic, shutdowns may occur occasionally, even though operation is normal at the time of checkout.
2. 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 main gas control and alarm, 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.

Connect Igniter

1. Prepare wiring harness to suit application. Use leadwires: No. 18 AWG, stranded copper with 105 °C rated 1/16 in. PVC insulation.
2. 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.

Connect Ignition Module

Note: Refer to "Ignition Module wiring connection locations (Model S8901 shown)" below and see "Wiring Connections" on the next page for the location of each connection.

Connect remaining system components to the ignition module terminals as shown in the appropriate wiring diagram.

- "S8901 Connection Wiring Diagram" on page 9
- "S8901 Wiring Diagram (without fan terminal)" on page 9
- "S8901 Wiring Diagram (with external fan connection)" on page 10

Connect Gas Control

Use 18-gauge solid or stranded wire. Use female quick connects for module connections. Connect to gas control terminals as shown in wiring diagrams, using terminals appropriate to the gas control.

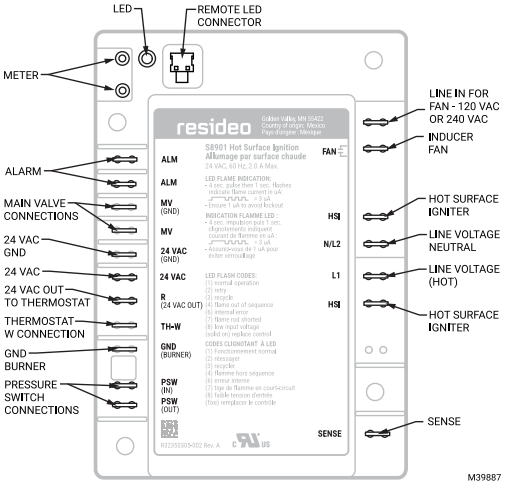
Grounding S8901, Hot Surface Igniter, and Main Burner.

For the system to operate properly, the hot surface igniter, flame sensor, and S8901 control module must share a common ground with the main burner. Use thermoplastic-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 wire as follows:

1. Fit one end of the ground wire with a female 1/4 in. quick-connect terminal and connect it to the male quick-connect GND (BURNER) terminal on the S8901 control 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. The burner serves as the common grounding area.

Note: While earth grounding of the burner is not required for the proper operation of this module, it is strongly recommended. Grounding may be required by the appliance manufacturer or by local electrical codes to ensure safety, reduce electrical noise, and prevent potential damage. Always consult the appliance documentation and applicable regulations before installation.

Ignition Module wiring connection locations (Model S8901 shown)



Wiring Connections

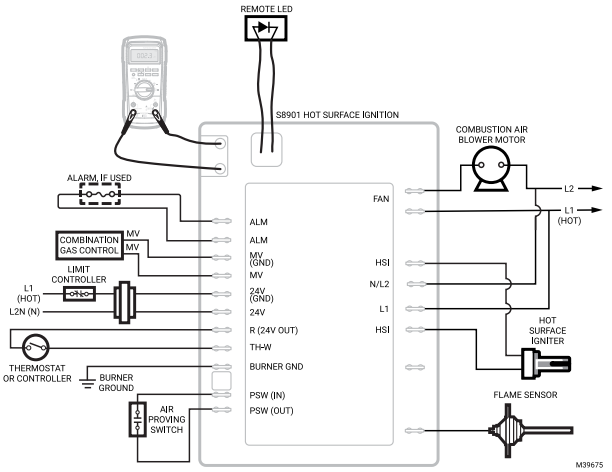
Connector Name	*Size*	*Description*
ALM	1/4 inch	Alarm Terminals [a]
ALM	1/4 inch	
MV	3/16 inch	Main Valve Connection
MV (GND)	1/4 inch	Common terminal for Main Valve Connection
24 VAC	1/4 inch	24 VAC Power in (for direct power for post purge)
24 VAC (GND)	1/4 inch	24 VAC Return path to transformer (Same connection as MV (GND))
TH-W	1/4 inch	Thermostat W wire connection
R (24 VAC OUT)	1/4 inch	24 VAC Power Out to thermostat (if 24V AC direct power)
GND (BURNER)	1/4 inch	Burner Ground
PSW (IN)	1/4 inch	24VAC Pressure Switch input
PSW (OUT)	1/4 inch	24 VAC Output to Pressure Switch
FAN	1/4 inch	Line in for fan - 120 Vac or 240 Vac
FAN	1/4 inch	Inducer Fan
HSI	1/4 inch	Hot Surface Igniter
L1	1/4 inch	Line Voltage (HOT)
N/L2	1/4 inch	Line Voltage (Neutral)
HSI	1/4 inch	Hot Surface Igniter
SENSE	3/16 inch	Flame Sensor for 2 rod remote sensing applications
Remote LED	Molex 26-60-4020	Pulses voltage in sync with LED flashes. Mating connector is Molex 26033021.
Meter Connections		Volt meter connections for reading flame current

Not all models have all terminals.

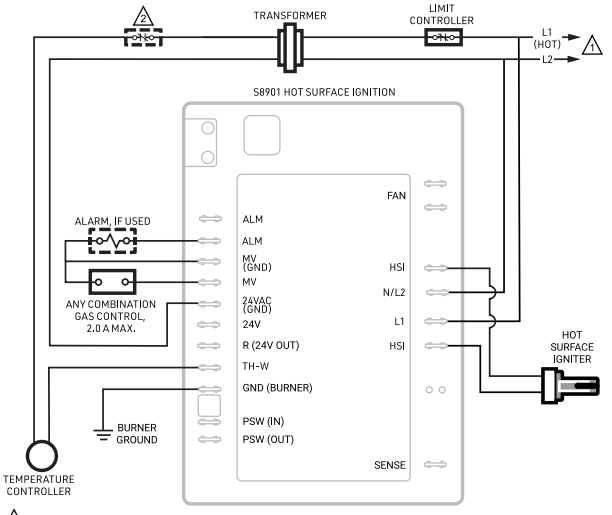
[a] There are two configurations for the alarm:

- If two terminals are present, it is a dry contact configuration. You need to provide power to either terminal. The other terminal will serve as the signal.
- If only one terminal is populated, the alarm signal will output 24 VAC when active. Power is supplied internally in this configuration.

S8901 Connection Wiring Diagram

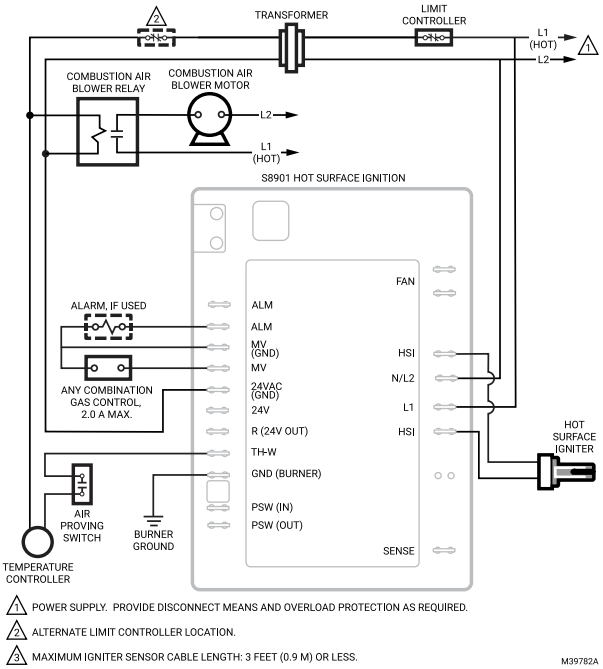


S8901 Wiring Diagram (without fan terminal)



1. POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.
2. ALTERNATE LIMIT CONTROLLER LOCATION.
3. MAXIMUM IGNITER SENSOR CABLE LENGTH: 3 FEET (0.9 M) OR LESS.

S8901 Wiring Diagram (with external fan connection)



Checkout

Check out the gas 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" on page 2 for more information.
- As the first step in troubleshooting.
- Any time work is done on the system.

If this is a replacement application, refer to the specific instructions provided by the heating appliance manufacturer (if available). Additionally, since the auxiliary controls used in any HSI system may vary, refer to the manufacturer's instructions for checkout and start-up procedures for other system components.

WARNING: FIRE OR EXPLOSION HAZARD
Failure to heed these warnings may cause fire or explosion with property damage, injury, or loss of life.

1. If you smell gas or suspect a gas leak, turn off gas at manual service valve and evacuate the building. 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 the steps below on initial installation and any time work is done involving the gas piping.

Step 1: Perform Visual Inspection.

1. With power off, make sure all wiring connections are clean and tight.
2. Turn on power to appliance and ignition module.
3. Open manual shutoff valves in the gas line to the appliance.
4. Perform Gas Leak Test ahead of gas control if piping has been disturbed.

   GAS LEAK TEST (Upstream of gas control)
   Paint the gas control gasket edges and all pipe connections upstream of the gas control with a rich soap and water solution. Bubbles indicate gas leaks. Tighten the joints and screws or replace component to stop gas leak. Recheck with soap and water solution.

Step 2: Verify control system ground.

For the system to operate properly, the spark igniter, flame sensor, and S8901 control module must share a common ground with the main burner. Use thermoplastic-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 wire as follows:

1. Fit one end of the ground wire with a female 1/4 in. quick-connect terminal and connect it to the male quick-connect GND (BURNER) terminal on the S8901 control 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. The burner serves as the common grounding area.

Step 3: Review Normal Operating Sequence and Module Specifications.

1. See "Operation" on the next page and "Specifications" on page 2.

Step 4: Reset the Module.

1. Turn the thermostat to its lowest setting.
2. Wait one minute.

As you do the remaining steps, watch for points where operation deviates from normal. Refer to the "Troubleshooting Guide" on page 20 to correct problems.

Step 5: Check Safety Shutoff Operation.

1. Turn gas supply off.
2. Set the thermostat or controller above room temperature to call for heat.
3. Watch for Igniter warmup either immediately or following pre-purge dependent on the model.
4. Time the length of time gas control stays open and ensure it matches the model specifications
5. For models with multiple ignition trials, verify that the ignition sequence restarts as expected.
6. Once system locks out, open manual gas cock and ensure no gas is flowing to the main burner.
7. Set thermostat below room temperature and wait one minute before proceeding.

Step 6: Check Normal Operation.

1. Turn on the gas supply.
2. Set thermostat or controller above room temperature to call for heat.
3. Make sure HSI igniter glows.
4. Make sure the main burner lights smoothly without flashback.

5. Ensure HSI igniter turns off.
6. Confirm that the burner operates smoothly without floating, lifting, or flame roll-lout into the furnace vestibule, or heat buildup in the vestibule.
7. Perform a gas leak test in the appliance.

   GAS LEAK TEST (Downstream of gas control) Apply a rich soap and water solution to the gas control gasket edges and all pipe connections downstream of the gas control. If bubbles appear, this indicates a gas leak. Tighten joints and screws or replace the faulty component to stop the leak. Recheck the area with the soap-and-water solution to ensure the leak is sealed.
8. Lower the thermostat or controller below room temperature. Ensure that the main burner flames extinguish properly.

Step 7: Check burner flame condition.
The igniter-sensor or sensor must be constantly immersed in flame. Check conditions as shown in "Check Burning Flame Condition" on page 18.

If necessary, improve the flame condition or relocate the sensor to a place on the main burner where condition is better. Do not relocate igniter or igniter-sensor.

Reset After Safety Lockout
If the control goes into safety lockout, it will remain locked out for 1 hour unless the system is reset sooner. To reset the system, adjust the thermostat setting below room temperature, wait one minute, and move the thermostat setting up to call for heat. Normal ignition should occur as described in "Normal Operating Sequence for Standard Models" on page 14 flowchart.

Operation

Normal Operation

The S8901 is powered by a 24 Vac transformer and is activated when the thermostat calls for heat. Operation is as follows (refer to the "Normal Operating Sequence for Standard Models" on page 14).

All models check for a false flame condition (short to ground) on a call for heat. Module will lock out for 1 hour if false flame condition is present. Reset could be manually done from the thermostat. If no false flame condition is present, operation continues.

On models with a fan terminal, the combustion air blower will start. On proof of airflow, the air proving switch closes, and the prepurge timing will begin, timing dependent on the model.

On models without a fan terminal, prepurge timing will begin on a call for heat, timing dependent on the model.

Following prepurge, the module energizes the hot surface igniter while keeping the gas valve closed, depending on the warmup time period.

After the warmup period, the gas control opens for a timed trial for ignition, allowing gas flow to the main burner.

Near the end of the trial for ignition period, the igniter shuts off to allow the flame sensor to detect the presence of the main burner flame.

If the main burner lights, a flame sensing circuit is completed through the flame to the burner ground. A minimum of 0.8 uA needs to be sensed. This current flow sets the safety lockout timer to the reset (normal) condition. Should the current flow be interrupted; i.e., flame-out condition, the trial for ignition begins again.

The S8901 will keep the gas control main valve open as long as there is a call for heat and there is enough flame current sensed. If, however, the safety lockout timing period ends before the main burner lights or the flame sensor establishes enough current, the system will go into safety lockout for 1 hour (if exceeded number of trials).

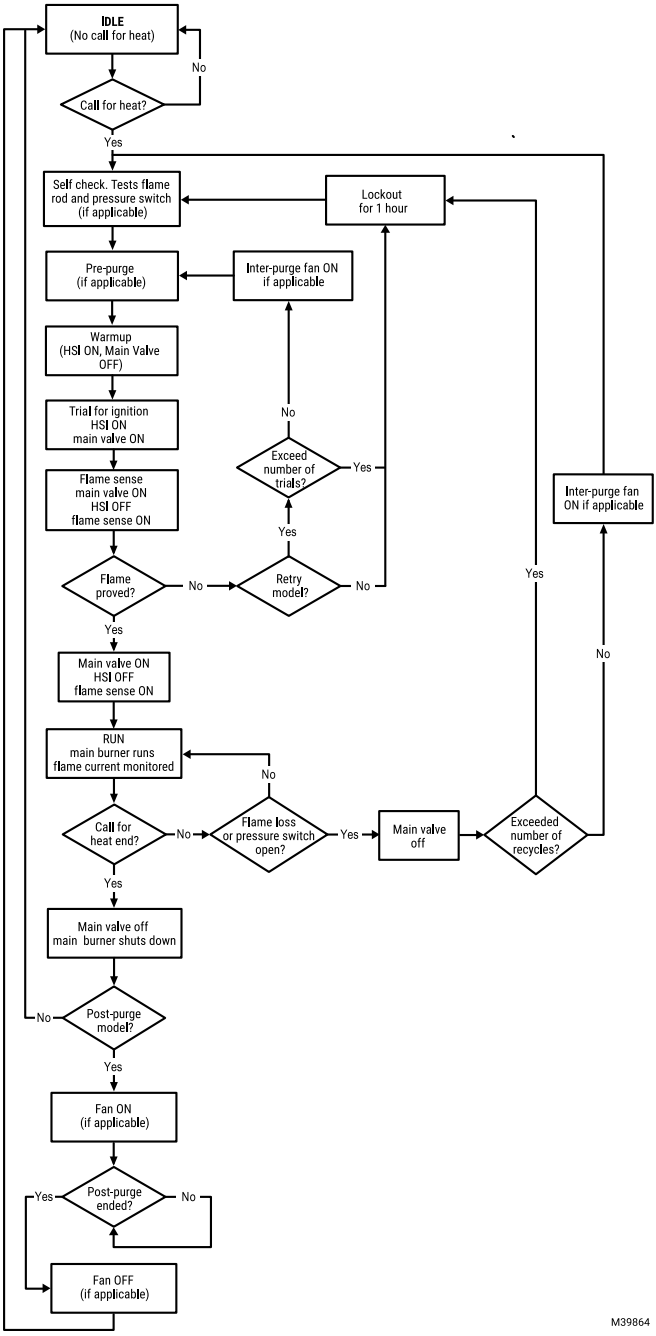
When the system goes into safety lockout, the gas control circuit is interrupted, and the alarm circuit is completed and LED will flash 2 times. The system will stay locked out for one hour or until it is reset by moving the thermostat set point below room temperature so there is no call for heat for at least 1 minute.

For a summary of the normal operating sequences across all standard models, refer to the "Normal Operating Sequence for Standard Models" on the next page.

Failed trial for ignition

If the main burner flame is not lit and sensed before the end of the ignition trial time, the control shuts off the gas valve (100% shutoff) and either retries or locks out for 1 hour before trying again (model dependent). If it goes into lockout, the control will remain in lockout for 1 hour or until power to the control is cycled by the system thermostat or by removing and restoring system power.

Normal Operating Sequence for Standard Models



Troubleshooting

WARNING: Fire, Explosion, or Electrical Shock Hazard.
Can cause severe injury, death or property damage.
Do not attempt to modify the physical or electrical characteristics of this device in any way. Replace it if troubleshooting indicates a malfunction.

Important:

1. The following service procedures are provided as a general guide. Follow appliance manufacturer's service instructions if available.
2. Meter readings between the gas control and ignition control must be taken within the trial for ignition period. Once the ignition control shuts off, lockout models must be reset by setting the thermostat down for at least 1 minute before continuing. On retry models, wait for retry or reset at the thermostat.
3. If any component does not function properly, make sure it is correctly installed and wired before replacing it.
4. The ignition module cannot be repaired. If it malfunctions, it must be replaced.
5. Only trained, experienced service technicians should service direct ignition systems.
6. After troubleshooting, check out the system again to be sure it is operating normally.

Preliminary Checks

Note: Before troubleshooting the system, perform the following checks:

1. Verify power to the heating appliance and the S8901. Voltage to the S8901 should be between 20.5 and 28.5 Vac.
2. Ensure that that the manual shutoff valve in the supply line and the gas cock knob on the combination gas control valve are open.
3. Check all wiring connections to ensure that they are clean and secure.
4. Make certain the S8901 is not in safety lockout.
   - De-energize the system by lowering the thermostat set point below room temperature.
   - Wait at least 1 minute, then re-energize the system by raising the thermostat set point 5°F above room temperature.
5. Inspect the ceramic insulator on the flame sensor, igniter or igniter/sensor. A cracked insulator will cause current to leak to ground. Replace the igniter or sensor if the insulator is cracked.
6. Check the flame sensor and its mounting bracket. Correct the position if bent out of shape.
7. Review the S8901 normal sequence of operation.

General troubleshooting process as it follows:

1. Refer to "LED Status and Troubleshooting" on page 18 for LED status codes.
2. Perform the "Checkout" on page 10 as the first step in troubleshooting.
3. Check the troubleshooting guide (See "Troubleshooting Guide" on page 20) to pinpoint the cause of the problem.
4. If troubleshooting indicates an ignition problem, see Ignition System Checks below to isolate and correct the problem.
5. Following troubleshooting, perform the "Checkout" on page 10 again to be sure system is operating normally.

Ignition System Checks

Step 1: Check Igniter Wiring Harness
Make sure:

- Ignition wire does not run in contact with any metal surfaces.
- Connections to the ignition module and to the igniter or igniter-sensor are clean and tight.
- Ignition wire provides good electrical continuity.

Step 2: Check ignition system grounding. Nuisance shutdowns are often caused by a poor or erratic ground.
A common ground is required for the module and the burner bracket.

- Check for good metal-to-metal contact between the igniter bracket and the main burner.
- Check the ground circuit from the GND (BURNER) terminal on the module to the main burner. Make sure connections are clean and tight. If the wire is damaged or deteriorated, replace it with 14- to 18-gauge, moisture-resistant, thermoplastic insulated wire with 221°F (105°C) minimum rating.
- If the flame sensor or bracket is bent out of position, restore it to the correct position.
- Check temperature at the igniter ceramic or flame sensor insulator. Excessive temperature will permit leakage to ground. Provide shield if temperature exceeds rating of igniter or sensor.
- Replace igniter and sensor or igniter-sensor with identical unit if insulator is cracked.

Step 3: Check flame sensing circuit.
Make sure burner flame is capable of providing a good rectification signal. Check conditions as shown in "Check Burning Flame Condition" on page 18.

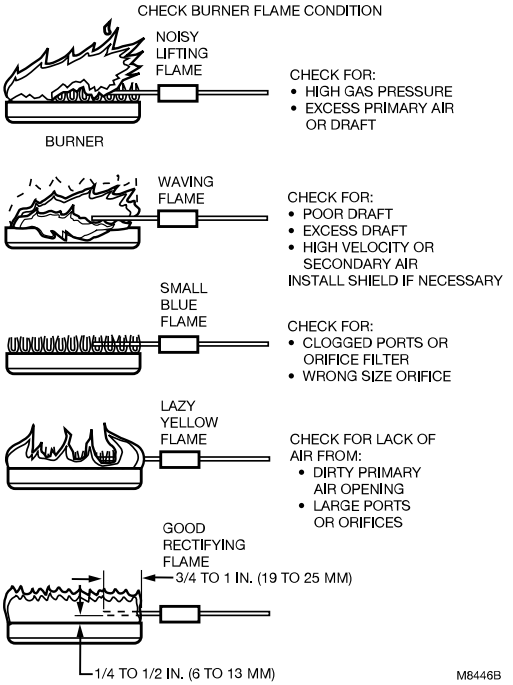
- Make sure about 3/4 to 1 in. of the flame sensor or igniter sensor is continuously immersed in the flame for best flame signal. See burner flame condition figure. Bend the bracket or flame sensor, or relocate the sensor as necessary. Do not relocate an igniter or combination igniter-sensor.
- Check for excessive (over 1000 °F [538 °C]) temperature at ceramic insulator on flame sensor. Excessive temperature can cause short to ground; move sensor to cooler location or shield insulator. Do not relocate an igniter or combination igniter-sensor.
- Check for cracked igniter-sensor or sensor ceramic insulator, which can cause short to ground, and replace unit if necessary.
    - Make sure electrical connections are clean and tight. Replace damaged wire with moisture-resistant No. 18 wire rated for continuous duty up to 105 °C [221 °F].
- If the igniter is other than a Norton 201 or 271, make sure it meets the following specifications.
    - Igniter must reach 1000 °C [1832 °F] within 36 seconds with 102 Vac applied.
    - Igniter must maintain at least 500 M ohms insulation resistance between the igniter leadwires and the igniter mounting bracket.
    - Igniter must not develop an insulating layer on its surface (over time) which would prevent flame sensing.

- Igniter surface area immersed in flame must not exceed 1/4 of the grounded area immersed in flame. This would prevent flame sensing.
- Igniter current draw at 132 Vac must not exceed 5 A.

Step 4: Check main burner lightoff.

- Set the thermostat to “Call for Heat" and observe the main burner during the ignition sequence.
- Make sure the igniter warms up and glows red. If not, check for 120Vac across L1 and L2 and that L1 and L2 are not reversed.
- Check that the main burner lights. If not check the following:
  - Check that Main Gas is flowing. Check all main gas supply valves are open, supply tubing is good, pressures are good, and main burner orifice
  - Check Electrical connections between the module and Gas Valve.
  - Check for 24Vac across MV Terminals on the Module. If Voltage is okay, replace the gas valve. If not, replace the module.
- **Note:** If Control goes into Lockout or retry delay, reset the "Call for Heat".
- Does the main burner remain powered and lit? if not, check the following:
  - Check continuity of ground wire.
  - Make sure L1 and L2 are not reversed, This would prevent flame detection.
  - Check that the main burner flame covers the igniter/sensor or sensor. Adjust the main burner Flame if necessary.
  - If Problem persists, replace the module

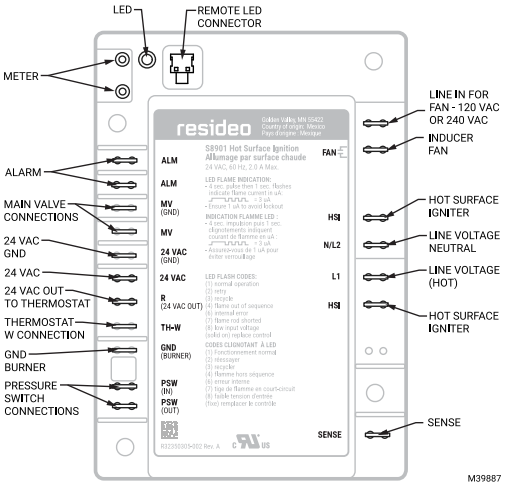
Check Burning Flame Condition



LED Status and Troubleshooting

This control has one LED used for flame sensing and system status:

Location of LED



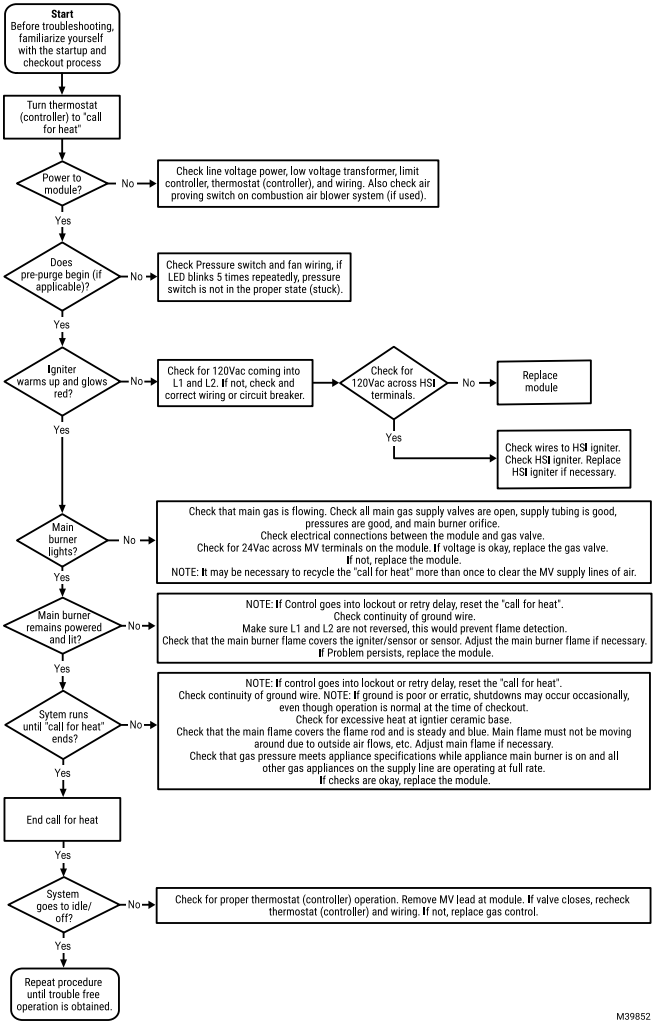
LED Status Codes.

LED Flash Code	Indicates	Description	Next System Action	Service Action
3 fast blinks	Test / Calibration	Calibration on power up.	No action needed.	No action needed. If it persists, replace the control.
Heartbeat (on/dim)	Normal Operation	Control is going through the normal sequence.	No action needed.	No action needed.
1	Idle	(For models that have continuous power) means control is on but no call for heat yet.	No action needed.	If it persist while call for heat is active, check TH-W terminal/wiring, make sure call for heat it reaching the control.
2	Retry	Main burner not detected during initial trial for ignition. If the number of trials has been exceeded, the control will go into a 1hr soft lockout before attempting ignition again.	Initiate new trial for ignition after retry delay completed.	If system fails to light on next trial for ignition check gas supply, main burner, HSI and flame sense wiring, flame rod contaminated or out of position, burner ground connection.
3	Recycle	Flame failed during normal run time. Control will do 5 recycles during 1 call for heat then lockout for 1hr.	Initiate new trial for ignition. Flash code will remain through the ignition trial until flame is proved.	If system fails to light on next trial for ignition, check gas supply, main burner, flame sense wiring, contamination of flame rod, burner ground connection.
4	Flame out of Sequence	Control sensed flame when there shouldn't be any flame.	If situation self corrects within 10 seconds, control returns to normal sequence. If flame out of sequence remains longer than 10 seconds, control will resume normal operation 1 hour after error is corrected.	Check for main burner flame. Replace gas valve if main burner flame is present. If no main burner flame, cycle "Call for Heat." If error repeats, replace control.
5	Pressure Switch Error	Pressure switch is stuck open or stuck closed.	If blinking continues while fan OFF, it means pressure switch failed to open (shorted). If blinking continues while fan ON, it means pressure switch failed to close.	Check pressure switch wiring, air hoses for connection and no water building up obstruction, and check to make sure venting is not blocked or obstructed.
6	Internal Error	Internal Error was detected.	Control remains in wait mode. When the fault corrects, control resumes normal operation.	Cycle "Call for Heat". If error repeats, replace control.
7	Flame rod shorted	Flame rod shorted.	Control remains in wait mode. When the fault corrects, control resumes normal operation.	Check flame sense lead wire for damage or shorting. Check that flame rod is in proper position. Check flame rod ceramic for cracks, damage or tracking.

LED Flash Code	Indicates	Description	Next System Action	Service Action
8	Low input voltage	Low input voltage.	Control remains in wait mode. When the fault corrects, control resumes normal operation.	Check transformer and AC line for proper input voltage to the control. Check with full system load on the transformer.
Solid on	Permanent Lock	Control is locked permanently.	Control detected welded relay contacts. All outputs are off	Replace Control.

Troubleshooting Guide

Refer to the following guide for troubleshooting.



Flame Current Measurement

Flame current of the device can be measured using a standard micro-ammeter or voltmeter by simply putting the meter probes into the holes as shown in "Measuring flame current with micro-ammeter." below and "Measuring flame current with voltmeter." below drawings.

- Flame current must be measured with main burner lit.
- Set meter to DC μ Amp scale on micro-ammeter or volts DC on voltmeter.
- If using a voltmeter, for every 1 μA of flame current, 1v will be displayed.

  Note: Trying to measure the main burner flame current in series with the wiring will not be accurate.

Recommended Minimum Flame Current:

- 1V DC is equivalent to 1 μ Amp DC minimum.
- Must read a steady 1 μ Amp DC or 1V DC minimum.

Measuring flame current with micro-ammeter.

Measuring flame current with voltmeter.

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Disposal: Please follow local guidelines regarding the disposal or recycling of batteries and/or electronics.

Online Installation Instructions

To access installation instructions in English and the latest documentation updates, scan the QR code or visit:

resideo.info/s8901-im

Instructions d'installation en ligne

Pour accéder aux instructions d'installation en Français ainsi qu'aux dernières mises à jour de la documentation, scannez le code QR ou visitez :

resideo.info/s8901-im-fr

Instrucciones de instalación en línea

Para acceder a las instrucciones de instalación en Español y a las actualizaciones mas recientes de la documentación, escanee el código QR o visite:

resideo.info/s8901-im-sp

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